Congestion Avoidance Commands

bandwidth remaining

To specify how to allocate leftover bandwidth to various classes, use the **bandwidth remaining** command in policy map class configuration mode. To return to the system defaults, use the **no** form of this command.

bandwidth remaining [{**ratio** *ratio-value*}]
no bandwidth remaining [{**ratio** *ratio-value*}]

Syntax Description

ratio *ratio-value*	Specifies the amount of guaranteed bandwidth, based on a bandwidth ratio value. Range is 1 to 63 for main interfaces, and 1 to 255 for subinterfaces.

Command Default

No bandwidth is specified.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 7.0.12	This command was introduced.

Usage Guidelines

Bandwidth, bandwidth remaining, and shaping commands can be configured together in the same class.

Note The **bandwidth remaining** command is supported only in the egress direction.

The available bandwidth is equally distributed among those queueing classes that do not have the remaining bandwidth explicitly configured.

The **bandwidth remaining** command is used to proportionally allocate bandwidth to the particular classes, but there is no reserved bandwidth capacity.

On egress, if the **bandwidth remaining** command is not present, then the bandwidth is shared equally among the configured queueing classes present in the policy-map.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how the remaining bandwidth is shared by classes class1 and class2 in a 20:80 ratio.

```
RP/0/RP0/CPU0:router(config)#policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)#class class1
RP/0/RP0/CPU0:router(config-pmap-c)#bandwidth remaining ratio 20
RP/0/RP0/CPU0:router(config-pmap-c)#exit
RP/0/RP0/CPU0:router(config-pmap)#class class2
RP/0/RP0/CPU0:router(config-pmap-c)#bandwidth remaining ratio 80
```

```
RP/0/RP0/CPU0:router(config-pmap-c)#exit
RP/0/RP0/CPU0:router(config-pmap)#exit
```

clear controller priority-flow-control statistics

To clear priority flow control statistics on an interface on a per-port or a per-traffic-class, per-port basis, use the **clear controller priority-flow-control statistics** command in XR EXEC mode.

clear controllers *interface-type interfacepath-id* **priority-flow-control statistics traffic-class** *tc*

Syntax Description

traffic class *tc*	—Traffic class to be cleared

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.0.11	This command was introduced.

Usage Guidelines

None

Example

This example shows a sample for the **clear controllers priority-flow-control statistics** command to clear statistics for traffic class 3:

```
Router#clear controller FourHundredGigE0/0/0/0 priority-flow-control statistics traffic-class
 3
```

clear controller priority-flow-control watchdog statistics

To clear priority flow control watchdog statistics on an interface on a per-port or a per-traffic-class, per-port basis, use **clear controller priority-flow-control watchdog-stats** command in XR EXEC mode.

clear controllers *interface-type interfacepath-id* **priority-flow-control watchdog-stats traffic-class** *tc*

Syntax Description

traffic class *tc*	—Traffic class to be cleared

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.0.11	This command was introduced.

Usage Guidelines

None

Example

This example shows how to clear priority flow control watchdog statistics for traffic class 3 on a FourHundredGigE 0/0/0/0 interface.

```
Router#clear controller FourHundredGigE 0/0/0/0 priority-flow-control watchdog-stats
traffic-class 3
```

hw-module profile npu memory buffer-extended bandwidth-congestion-detection enable

To enable the ability to detect High Bandwidth Memory (HBM) congestion when you configure PFC in the buffer-extended mode, use the **hw-module profile npu memory buffer-extended bandwidth-congestion-detection enable** command in the XR Config mode.

To disable this feature, use the **no** form of this command.

hw-module profile npu memory buffer-extended location *lc*
bandwidth-congestion-detection enable

Syntax Description

location *lc*	—Line card location

Command Default

This feature is disabled by default.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.5.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the detection of HBM congestion when packets are egressing from an interface.

```
Router#config
Router(config)#hw-module profile npu buffer-extended location 0/6/CPU0
bandwidth-congestion-detection enable
Router(config)#commit
Router(config)#exit
```

hw-module profile npu memory buffer-extended bandwidth-congestion-protect enable

To enable triggering of global pause frames (X-off) whenever there's HBM congestion in the buffer-extended mode, use the **hw-module profile npu memory buffer-extended bandwidth-congestion-protect enable** command in the XR Config mode.

To disable this feature, use the **no** form of this command.

hw-module profile npu memory buffer-extended location *lc* **bandwidth-congestion-protect enable**

Syntax Description

location *lc*	—Line card location

Command Default

This feature is disabled by default.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.5.4	This command was introduced.

Usage Guidelines

Configuring the **hw-module profile npu memory buffer-extended bandwidth-congestion-protect enable** command for line cards where you've configured headroom values exceeding 6144000 bytes could result in a commit error or the feature not being enabled.

You must reload the line card for the **hw-module profile npu memory buffer-extended bandwidth-congestion-protect enable** command to take effect.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the triggering of global pause frames (X-off) whenever there's HBM congestion.

```
Router#config
Router(config)#hw-module profile npu buffer-extended location 0/1/CPU0
bandwidth-congestion-protect enable
Router(config)#commit
```

hw-module profile priority-flow-control

To configure PFC threshold values, use the **hw-module profile priority-flow-control** command in XR Config mode. You can configure the values either in the **buffer-internal** mode or the **buffer-extended** mode. To return to the system defaults, use the **no** form of this command.

To disable this feature, use the no form of this command.

hw-module profile priority-flow-control location *lc* [**buffer-extended traffic-class** *value* **pause-threshold** *value unit* [**headroom** *value unit*] | **buffer-internal traffic-class** *value* **pause-threshold** *value unit* **headroom** *value unit* [**ecn** *value unit* | **max-threshold** *value unit* | **probability-percentage** *value unit*]]

For 88-LC0-36FH-M line cards:

hw-module profile priority-flow-control location <*lc*> [**buffer-extended traffic-class** *value* **pause-threshold** *value unit* [**headroom** *value unit*]]

Syntax Description

location	<*lc*> —Line card location
buffer-extended	**traffic-class** — value from 0 through 7 Sets PFC threshold values for long-reach PFC deployments. You can configure the following parameters using the **buffer-extended** option: *pause-threshold* — pause-threshold for traffic class in ms or us and in KB or MB for 88-LC0-36FH-M line cards. For 88-LC0-36FH-M line cards, also configure: *headroom* —headroom for traffic class in KB or MB
buffer-internal	**traffic-class** — value from 0 through 7 Sets PFC threshold values for short-reach PFC deployments. You can configure the following parameters using the **buffer-internal** option: **traffic-class** — value from 0 through 7 **pause-threshold** — pause-threshold for traffic class in bytes **headroom** — headroom for traffic class in bytes **ecn** — Explicit Congestion Notification (ECN) threshold in bytes From

Command Default

No default behavior or values.

Command Modes

XR Config

Command History

Release	Modification
Release 7.0.11	This command was introduced.

Release	Modification
Release 7.3.1	This command isn't supported.
Release 7.3.15	This command is supported.

Usage Guidelines

- If you add a new traffic class and configure PFC threshold values for the first time on that traffic class, you must reload the line card.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure the PFC threshold values using the buffer-internal mode.

```
RP/0/RP0/CPU0:router(config)#hw-module profile priority-flow-control location 0/1/CPU0
RP/0/RP0/CPU0:router(config-pfc-loc)#buffer-internal traffic-class 3 pause-threshold 403200
 bytes headroom 441600 bytes ecn 224640 bytes
RP/0/RP0/CPU0:router(config-pfc-loc)#buffer-internal traffic-class 4 pause-threshold 403200
 bytes headroom 441600 bytes ecn 224640 bytes

RP/0/RP0/CPU0:router(config-pfc-loc)#commit
```

This example shows how to configure the PFC threshold values using the buffer-extended mode.

```
RP/0/RP0/CPU0:router(config)#hw-module profile priority-flow-control location 0/6/0/1
RP/0/RP0/CPU0:router(config-pfc-loc)#buffer-extended traffic-class 3 pause-threshold 10 ms
RP/0/RP0/CPU0:router(config-pfc-loc)#buffer-extended traffic-class 4 pause-threshold 10 ms
RP/0/RP0/CPU0:router(config-pfc-loc)#commit
```

The following example shows how to configure PFC in buffer-internal mode with custom values for all parameters including **max-threshold** and **probability-percentage**.

```
Router(config)#hw-module profile priority-flow-control location 0/6/01
Router(config-pfc-loc)#buffer-internal traffic-class 3 pause-threshold 1574400 bytes headroom
 1651200 bytes ecn 629760 bytes max-threshold 1416960  bytes probability-percentage 50
Router(config-pfc-loc)#buffer-internal traffic-class 4 pause-threshold 1574400 bytes headroom
 1651200 bytes ecn 629760 bytes max-threshold 1416960  bytes probability-percentage 50
Router(config-pfc-loc)#commit
```

hw-module profile qos voq-mode

To configure the VOQ mode value or the fair VOQ mode value, use the hw-module profile qos voq-mode command in XR Config mode. To disable this mode, use the no form of the command. You can configure the normal VOQ mode value from 8 (default value) to 4 or conversely from 4 to 8.

hw-module profile qos voq-mode [**4** | **8** | **fair-4** | **fair-8**]

Syntax Description

4	Indicates the normal VOQ mode to configure to 4.
8	Indicates the normal VOQ mode to configure to 8.
fair-4	Indicates the fair VOQ mode to configure to fair-4.
fair-8	Indicates the fair VOQ mode to configure to fair-8.

Command Default

The default normal VOQ mode value is 8.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.0.12	This command was introduced.
Release 7.3.3	The option to configure fair VOQ mode was introduced.

Usage Guidelines

The default normal VOQ mode value is 8. To change the value to 4, you must:

1. Configure **hw-module profile qos voq-mode** *4* and commit.
2. Remove the queuing service-policy from all interfaces including main interface, subinterface, and bundle.
3. Run **reload location all** to reload all nodes on your router.

Note Because this mode supports a maximum of four VOQs, egress policy matches only on queues 7, 6, 5, and 0.

After you commit the *hw-module* configuration, you **must** reload the chassis immediately before proceeding with any other operation. Else, existing configurations on the chassis may be affected, leading to unexpected behavior.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable VOQ mode value 4 on the router.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile
RP/0/RP0/CPU0:router(config)#hw-module profile qos
RP/0/RP0/CPU0:router(config)#hw-module profile voq-mode 4
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router#reload location all
```

The following example shows how to configure fair-4 VOQ mode:

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile
RP/0/RP0/CPU0:router(config)#hw-module profile qos
RP/0/RP0/CPU0:router(config)#hw-module profile voq-mode fair-4
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router#reload location all
```

queue-limit

To specify or modify the maximum number of packets the queue can hold for a class policy configured in a policy map for each port, use the **queue-limit** command in policy map class configuration mode. To remove the queue packet limit from a class, use the **no** form of this command.

queue-limit *value* [*unit*] | *percent <1-100>* | *discard-class value <0-1> unit*
no queue-limit

Syntax Description

value	Maximum threshold for tail drop in bytes. Range is from 1 to 4294967295.
unit	(Optional) Units for the queue limit value. Values can be: • **bytes** —bytes • **kbytes** —kilobytes • **mbytes** —megabytes • **ms** —milliseconds • **packets** —packets (default) • **us** —microseconds **Note** When the specified *units* is packets, packets are assumed to be 256 bytes in size.
percent	(Optional) Allows you to specify queue limit thresholds as a percentage of the total buffer limit for each port. This makes your provisioning model simpler and makes it easier for you to adjust the queue burst limit, irrespective of the queue's service rate.
discard-class	(Optional) Allows you to configure dual queue limit thresholds for high priority and low priority. This option was introduced in Release 7.0.12. value • **0** —higher priority flow • **1** —lower priority flow (Optional) Units for the queue limit value. Values can be: • **bytes** —bytes • **kbytes** —kilobytes • **mbytes** —megabytes • **ms** —milliseconds • **packets** —packets (default) • **us** —microseconds

Command Default

The default value is 6 milliseconds for all queues including the high-priority queues.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 7.0.12	This command was introduced.

Usage Guidelines

When configuring the **queue-limit** command, you must configure one of the following commands: **priority**, **shape average**, **bandwidth** or **bandwidth remaining**, except for the default class. The default value is 6 milliseconds for all queues including the high-priority queues.

The **queue-limit** command is supported only in the egress direction.

Packets satisfying the match criteria for a class accumulate in the queue reserved for the class until they are serviced by the scheduling mechanism. The **queue-limit** command defines the maximum threshold for a class. When that threshold is reached, enqueued packets to the class queue result in tail drop (packet drop). Tail drop is a congestion avoidance technique that drops packets when a virtual output queue is full, until congestion is eliminated.

Use the **show qos interface** command to display the queue limit and other QoS values.

Queue Limit Default Values

These default values are used when **queue-limit** is not configured in the class.

If QoS is configured and random-detect is configured when the **queue-limit** is configured in time units, the guaranteed service rate (for the non-priority class) or the interface rate (for the priority class) is used to compute the queue-limit.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure two queue limits, one for higher priority and the other for lower priority.:

```
RP/0/RP0/CPU0:router(config)#policy-map egress_pol_dql
RP/0/RP0/CPU0:router(config-pmap)# class tc7
RP/0/RP0/CPU0:router(config-pmap-c)#priority level 1
RP/0/RP0/CPU0:router(config-pmap-c)#queue-limit ?
<1-4294967295>  Max Threshold for tail drop
  discard-class   Discard Class based QLIMIT (upto 8 values)
  percent         Configure queue limit value in percentage

RP/0/RP0/CPU0:router(config-pmap-c)#queue-limit discard-class ?
<0-1>  Discard Class  value
RP/0/RP0/CPU0:router(config-pmap-c)#queue-limit discard-class 0 100 ?
bytes    Bytes
  kbytes   Kilobytes
  mbytes   Megabytes
  ms       Milliseconds
```

```
  packets  Packets (default)
  us       Microseconds
  <cr>
RP/0/RP0/CPU0:router(config-pmap-c)#queue-limit discard-class 0 100 mbytes
RP/0/RP0/CPU0:router(config-pmap-c)#queue-limit discard-class 1 50 mbytes
RP/0/RP0/CPU0:router(config-pmap-c)#commit
RP/0/RP0/CPU0:router(config-pmap-c)#end
```

random-detect

To enable random early detection (RED), use the **random-detect** command in policy map class configuration mode. To remove RED, use the **no** form of this command.

no random-detect

Syntax Description

min-threshold *value*	Minimum threshold in number of packets. The value range of this argument is from 0 through 1073741823 in packets. **Note** On your router, the threshold numbers are converted into units of bytes (minimum: 6144, maximum: 390070272) and enforced.
max-threshold *value*	Maximum threshold in number of packets. The value range of this argument is from the value of the *min-threshold* argument through 1073741823. When the queue length exceeds the maximum threshold, RED drops all packets with the specified discard class value. **Note** On your router, the threshold numbers are converted into units of bytes (minimum: 6144, maximum: 390070272) and enforced.
units	(Optional) Units for the threshold values. Values can be: • **bytes**—bytes • **gbytes**—gigabytes • **kbytes**—kilobytes • **mbytes** —megabytes • **ms** —milliseconds • **packets** —packets (default) • **us** —microseconds
discard-class *value*	Discard-class based RED (up to 2 values, which is 0 and 1).

Command Default

Default unit for *max-threshold* and *min-threshold* is **packets**.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 7.0.12	This command was introduced.

Usage Guidelines

The RED congestion avoidance technique takes advantage of the congestion control mechanism of TCP. By randomly dropping packets before periods of high congestion, RED tells the packet source to decrease its transmission rate. Assuming the packet source is using TCP, it decreases its transmission rate until all the packets reach their destination, indicating that the congestion is cleared. You can use RED as a way to cause

TCP to slow transmission of packets. TCP not only pauses, but it also restarts quickly and adapts its transmission rate to the rate that the network can support.

RED distributes losses in time and maintains normally low queue depth while absorbing traffic bursts. When enabled on an interface, RED begins dropping packets when congestion occurs at a rate you select during configuration.

When time units are used, the guaranteed service rate is used to compute thresholds.

When the value of the *units* argument is packets, packets are assumed to be 256 bytes in size.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to enable RED using a minimum threshold value of 1000000 and a maximum threshold value of 2000000:

```
RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:router(config-pmap-c)# random-detect 1000000 2000000
```

service-policy (interface)

To attach a policy map to an input interface or output interface to be used as the service policy for that interface, use the **service-policy** command in the appropriate configuration mode. To remove a service policy from an input or output interface, use the **no** form of the command.

service-policy {**input** | **output**} *policy-map*
no service-policy {**input** | **output**} *policy-map*

Syntax Description

input	Attaches the specified policy map to the input interface.
output	Attaches the specified policy map to the output interface.
policy-map	Name of a service policy map (created using the **policy-map** command) to be attached.

Command Default

No service policy is specified.

Command Modes

Interface configuration.

Command History

Release	Modification
Release 7.0.12	This command was introduced.

Usage Guidelines

You can attach a single policy map to one or more interfaces to specify the service policy for those interfaces. The class policies composing the policy map are then applied to packets that satisfy the class map match criteria for the class. To apply a new policy to an interface, you must remove the previous policy. A new policy cannot replace an existing policy.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows policy map policy2 applied to HundredGigE 0/0/0/0.

```
RP/0/RP0/CPU0:router(config)# class-map class2
RP/0/RP0/CPU0:router(config)# match precedence ipv4 2
RP/0/RP0/CPU0:router(config-cmap)# exit

RP/0/RP0/CPU0:router(config)# policy-map policy2
RP/0/RP0/CPU0:router(config-pmap)# class-map class2
RP/0/RP0/CPU0:router(config-pmap-c)# set precedence 3
RP/0/RP0/CPU0:router(config-pmap)# exit

RP/0/RP0/CPU0:router(config)# HundredGigE 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# service-policy input policy2
```

This example shows policy map policy 1 applied to Bundle-Ether interface.

```
RP/0/RP0/CPU0:router(config)# interface Bundle-Ether1
RP/0/RP0/CPU0:router(config-if)# service-policy input policy1
RP/0/RP0/CPU0:router(config-if)# exit
```

service-policy (policy map class)

To use a service policy as a QoS policy within a policy map (called a *hierarchical service policy*), use the **service-policy** command in policy map class configuration mode. To disable a particular service policy as a QoS policy within a policy map, use the **no** form of this command.

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

Syntax Description

type qos	(Optional) Specifies a QoS service policy.
policy-map-name	Name of the predefined policy map to be used as a QoS policy. The name can be a maximum of 40 alphanumeric characters.

Command Default

No service policy is specified.

Type is QoS when not specified.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 7.0.12	This command was introduced.

Usage Guidelines

The **service-policy (policy-map class)** command creates hierarchical service policies in policy-map class configuration mode.

This command is different from the **service-policy (interface)** command used in interface configuration mode.

The child policy is the previously defined service policy that is being associated with the class default of the parent policy-map. The new service policy using the preexisting service policy is the parent policy.

The **service-policy (policy-map class)** command has this restriction:

- The **priority** command can be used only in the child policy.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to create a hierarchical service policy in the service policy called parent:

```
RP/0/RP0/CPU0:router(config)# policy-map child
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:router(config-pmap-c)# priority level 1
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit
```

```
RP/0/RP0/CPU0:router(config)# policy-map parent
RP/0/RP0/CPU0:router(config-pmap)# class class-default
RP/0/RP0/CPU0:router(config-pmap-c)# shape average 10000000
RP/0/RP0/CPU0:router(config-pmap-c)# service-policy child
```

shape average

To shape traffic to the indicated bit rate according to the algorithm specified, use the **shape average** command in policy map class configuration mode. To remove traffic shaping, use the **no** form of this command.

shape average {**percent** *percentage* | *rate* [*units*] | **per-thousand** *value* | **per-million** *value* }
no shape average

Syntax Description

percent *percentage*	Specifies the interface bandwidth in percentage. Values can be from 1 to 100.
rate	Average shaping rate in the specified units. Values can be from 1 to 4294967295.
units	(Optional) Units for the bandwidth. Values can be: • **bps**—bits per second (default) • **gbps**—gigabits per second • **kbps**—kilobits per second • **mbps**—megabits per second
per-thousand *value*	Specifies shape rate as parts per thousand of the available bandwidth.
per-million *value*	Specifies shape rate as parts per million of the available bandwidth.

Command Default

units: **bps**

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 7.0.12	This command was introduced.

Usage Guidelines

The **shape average** command is supported only in the egress direction.

When you use the **shape average** command, egress shaping is done at the Layer 1 level and includes the Layer 1 header in the rate calculation. If you have both shape and bandwidth configured for a class, ensure that the shape percent value is always greater than the percent value for bandwidth. For bundled interfaces, **shape average** can be configured only as a percentage.

The **priority** and **shape average** commands can be configured together in the same class.

Task ID

Task ID	Operations
qos	read, write

Examples

This example sets traffic shaping to 50 percent of the parent shaper rate milliseconds:

```
RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:router(config-pmap-c)# shape average percent 50
```

This example shows how to set traffic shaping to 100000 kbps:

```
RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:router(config-pmap-c)# shape average 100000 kbps
```

show controllers all priority-flow-control statistics location all

To view Priority Flow Control statistics for all interfaces, run the **show controllers all priority-flow-control statistics location all** command in XR EXEC mode.

show controllers all priority-flow-control statistics location all

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.5	This command was introduced.

Usage Guidelines

- You can still view statistics per interface for PFC by running the **show controllers priority-flow-control statistics** command.
- Running the **clear controller priority-flow-control statistics** command also clears the counters for the corresponding interfaces that the **show controllers all priority-flow-control statistics location all** command displays.

Task ID

Task ID	Operation
qos	read, write

Examples

This example shows a sample output of the **show controllers all priority-flow-control statistics location all** command:

```
Router#show controllers all priority-flow-control statistics location all

                Interface   TC           Rx PFC           TxPFC        RxDropped
  FourHundredGigE0/0/0/0    0                0               0               NA
  FourHundredGigE0/0/0/0    7                0               0               NA
  FourHundredGigE0/0/0/0  all                0               0                0
  FourHundredGigE0/0/0/1    0                0               0               NA
  FourHundredGigE0/0/0/1    7                0               0               NA
  FourHundredGigE0/0/0/1  all                0               0                0
  FourHundredGigE0/0/0/2    0                0               0               NA
  FourHundredGigE0/0/0/2    7                0               0               NA
  FourHundredGigE0/0/0/2  all                0               0                0
  FourHundredGigE0/0/0/3    0                0               0               NA
```

show controllers all priority-flow-control watchdog statistics location all

To view Priority Flow Control Watchdog statistics for all interfaces, run the **show controllers all priority-flow-control watchdog-stats location all** command in XR EXEC mode.

show controllers all priority-flow-control watchdog-stats location all

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.5	This command was introduced.

Usage Guidelines

- You can still view statistics per interface for PFC Watchdog by running the **show controllers priority-flow-control watchdog statistics** command.
- Running the **clear controllers priority-flow-control watchdog statistics** command also clears the counters for the corresponding interfaces that the **show controllers all priority-flow-control watchdog-stats location all** command displays.

Task ID

Task ID	Operation
qos	read, write

Examples

This example shows the sample output of the **show controllers all priority-flow-control watchdog-stats location all** command:

```
Router#show controllers all priority-flow-control watchdog-stats location all

                Interface   TC  Watchdog  Shutdown Auto Restore  SAR     SAR Instantaneous
    Total Dropped          Dropped
                                  Events    Events       Events  Events              Events

   FourHundredGigE0/0/0/0    0         0         0            0       0                   0
                0                0
   FourHundredGigE0/0/0/0    7         0         0            0       0                   0
                0                0
   FourHundredGigE0/0/0/1    0         0         0            0       0                   0
                0                0
   FourHundredGigE0/0/0/1    7         0         0            0       0                   0
                0                0
   FourHundredGigE0/0/0/2    0         0         0            0       0                   0
                0                0
```

```
FourHundredGigE0/0/0/2     7          0          0          0          0          0
                0                0
FourHundredGigE0/0/0/3     0          0          0          0          0          0
                0                0
FourHundredGigE0/0/0/3     7          0          0          0          0          0
                0                0
FourHundredGigE0/0/0/4     0          0          0          0          0          0
                0                0
```

show controllers npu packet-memory

To display the High Bandwidth Memory (HBM) congestion state and the current current memory usage of Shared Memory System (SMS) and HBM, use the **show controllers npu packet-memory** command in the XR EXEC mode.

show controllers npu packet-memory [all | congestion | interface *type* **| usage {instance {** *number* **|** *all* **}| verbose}]**

Syntax Description

all	Displays all details, including memory usage and congestion .
congestion	Displays Open Forwarding Abstraction (OFA) hardware congestion.
interface *type*	Displays the name of the IEEE 802.3 interfaces. For *type*, you can specify a specific interface or use **all** to specify all interfaces.
usage instance*number*	Displays information for the specific device instance number selected.
usage instance*all*	Displays information for all device instances
verbose	Displays information details, including timestamp in milliseconds.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.5	Counters to view buffer availability for Shared Memory System (SMS) and High Bandwidth Memory (HBM) were added.
Release 7.5.3	This command was introduced.

Usage Guidelines

The **show controllers npu packet-memory** command is supported only when you:

- configure Priority Flow Control in the buffer-extended mode. (See **hw-module profile priority-flow-control**.)
- configure the **hw-module profile npu memory buffer-extended bandwidth-congestion-detection enable** command to detect HBM congestion.

For details on detecting HBM congestion, and detailed examples of **show controllers npu packet-memory**, see the *Modular QoS Configuration Guide for Cisco 8000 Series Routers*.

Task ID

Task ID	Operations
interface	read
cisco-support	read

From Release 7.5.5, you can also view details of the buffer available for SMS (**Buff-int-free Min WM**) and HBM (**Buff-ext-free Min WM**) when you run the **show controllers npu packet-memory usage instance all location all** command.

```
Router#show controller npu packet-memory usage instance all location all
HW memory Information For Location: 0/6/CPU0

-------------------------------------------------------------------------------------------------------------------
Timestamp(msec)                    | Device | Buff-int | Buff-int | Buff-ext | Buff-ext |
Buff-int-free | Buff-ext-free
                                                  Usage      Max WM   | Usage    | Max WM   | Min
 WM         | Min WM
-------------------------------------------------------------------------------------------------------------------
Wed 2023-08-30 23:47:40.918 UTC       0       1518       6668      17154      17656
293394          982846
Wed 2023-08-30 23:47:41.918 UTC       0       1227       5631      16010      16427
293685          983990
Wed 2023-08-30 23:47:42.919 UTC       0       1398       8295      15041      15734
293514          984959
Wed 2023-08-30 23:47:43.919 UTC       0       1765       8892      14744      15678
293147          985256
Wed 2023-08-30 23:47:41.011 UTC       1      10380      12419      37532      38165
284532          962468
Wed 2023-08-30 23:47:42.011 UTC       1      10463      11977      37315      38326
284449          962685
Wed 2023-08-30 23:47:43.013 UTC       1       9145      12604      37714      38242
285767          962286
Wed 2023-08-30 23:47:44.013 UTC       1      10996      13272      37429      38051
283916          962571
```

Run the **show controllers npu packet-memory usage verbose instance all location all** to view memory usage details in SMS and HBM.

```
RP/0/RP0/CPU0:Router#show controllers npu packet-memory usage verbose instance all location
 all

HW memory Information For Location: 0/RP0/CPU0

* Option 'verbose' formatted data is for internal consumption.
-----------------------------------------------------------------------
Timestamp(msec) | Device | Buff-int | Buff-int | Buff-ext | Buff-ext
                           Usage      Max WM   | Usage    | Max WM
-----------------------------------------------------------------------
   1663958881006       0       2455       2676        637        640
   1663958882007       0       2461       2703        635        640
   1663958883007       0       2364       2690        635        640
   1663958884007       0      71603      75325       3183      18336
   1663958885008       0       2458       2852       1275       1279
   1663958886008       0       2484       2827       1275       1279
```

Run the **show controllers npu packet-memory congestion verbose instance all location all** command to view congestion details in SMS and HBM.

```
Router#show controllers npu packet-memory congestion verbose instance all location all
HW memory Information For Location: 0/RP0/CPU0
```

```
* Option 'verbose' formatted data is for internal consumption.
```

Timestamp(msec)	Buff-int Usage	Buff-int Max WM	Event Type	Device Buff-ext Usage	Slice Buff-ext Max WM	VOQ	VOQ-buff int-WM	Evicted-buff int-WM	Buff-int UC-WM
1663958550349	70410	70410	0	34405	0	5	534	16011	63969	65451
1663958551101	2440	2440	1	0	0	5	534	0	0	900
1663958557354	70573	70573	0	34408	0	5	534	16011	63984	65493
1663958558354	2455	2455	1	0	0	5	534	0	0	915
1663958564606	70081	70081	0	34532	0	5	534	16011	64002	65520
1663958565356	2417	2417	1	0	0	5	534	0	0	915

show controllers npu packet-memory interface sq-buffer-usage

To display the source queue buffer usage information in the packet memory space, use the show controllers npu packet-memory **sq-buffer-usage** command in the XR EXEC mode.

show controllers npu packet-memory interface *type* **sq-buffer-usage [latest] location** *ID*

Syntax Description

latest	Shows the latest information about priority flow control (PFC) source queue buffer usage at the specified NPU node/all nodes.
location *ID*	Specifies the node location. For *ID*, you can specify a specific node in the *rack/slot/module* notation or use **all** to specify all nodes.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

Displaying the source queue buffer usage in all ports at all locations is not supported.

Task ID

Task ID	Operations
interface	read
cisco-support	read

This example displays periodic information about the source queue buffer usage per port in the packet memory space

```
Router#show controllers npu packet-memory interface FourHundredGigE 0/0/0/23 sq-buffer-usage
 location 0/RP0/CPU0
Thu Feb  1 16:52:48.101 UTC

------------------------------------------------------------------------------
Node ID: 0/RP0/CPU0
Source Queue Buffer Usage Info for interface(s) FourHundredGigE0_0_0_23

Intf          Intf        TC      buffer-usage      congestion-state
name          handle
              (hex)
------------------------------------------------------------------------------
FH0/0/0/23    0x0f0001c8     3              0                 NO
FH0/0/0/23    0x0f0001c8     6              0                 NO
```

This example displays latest information about the source queue buffer usage per port in the packet memory space.

```
RP/0/RP0/CPU0:ios#show controllers npu packet-memory interface FourHundredGigE 0/0/0/23
sq-buffer-usage latest location 0/RP0/CPU0
Thu Feb  1 16:57:20.657 UTC

------------------------------------------------------------------------
This option will affect system performance and should be used with caution.
Integration of this CLI with automation scripts is not recommended

------------------------------------------------------------------------
Node ID: 0/RP0/CPU0
Source Queue Buffer Usage Info for interface(s) FourHundredGigE0_0_0_23

Intf          Intf        TC      buffer-usage      congestion-state
name          handle
              (hex)
------------------------------------------------------------------------
FH0/0/0/23   0x0f0001c8     3              0                 NO
FH0/0/0/23   0x0f0001c8     6              0                 NO
```

This example displays periodic information about source queue buffer usage in all ports in the packet memory space.

```
RP/0/RP0/CPU0:ios#show controllers npu packet-memory interface all sq-buffer-usage location
 0/RP0/CPU0
Thu Feb  1 17:04:40.472 UTC

------------------------------------------------------------------------
Node ID: 0/RP0/CPU0
Source Queue Buffer Usage Info for interface(s) all

Intf          Intf        TC      buffer-usage      congestion-state
name          handle
              (hex)
------------------------------------------------------------------------
Hu0/0/0/0    0x0f000130     3              0                 NO
Hu0/0/0/0    0x0f000130     6              0                 NO
Hu0/0/0/35   0x0f000138     3              0                 NO
Hu0/0/0/35   0x0f000138     6              0                 NO
Hu0/0/0/34   0x0f000140     3              0                 NO
Hu0/0/0/34   0x0f000140     6              0                 NO
Hu0/0/0/33   0x0f000148     3              0                 NO
Hu0/0/0/33   0x0f000148     6              0                 NO
Hu0/0/0/32   0x0f000150     3              0                 NO
Hu0/0/0/32   0x0f000150     6              0                 NO
Hu0/0/0/31   0x0f000158     3              0                 NO
Hu0/0/0/31   0x0f000158     6              0                 NO
Hu0/0/0/30   0x0f000160     3              0                 NO
Hu0/0/0/30   0x0f000160     6              0                 NO
Hu0/0/0/29   0x0f000168     3              0                 NO
Hu0/0/0/29   0x0f000168     6              0                 NO
Hu0/0/0/28   0x0f000170     3              0                 NO
Hu0/0/0/28   0x0f000170     6              0                 NO
Hu0/0/0/27   0x0f000178     3              0                 NO
Hu0/0/0/27   0x0f000178     6              0                 NO
Hu0/0/0/26   0x0f000180     3              0                 NO
Hu0/0/0/26   0x0f000180     6              0                 NO
Hu0/0/0/25   0x0f000188     3              0                 NO
Hu0/0/0/25   0x0f000188     6              0                 NO
Hu0/0/0/24   0x0f000190     3              0                 NO
Hu0/0/0/24   0x0f000190     6              0                 NO
Hu0/0/0/20   0x0f000198     3              0                 NO
Hu0/0/0/20   0x0f000198     6              0                 NO
Hu0/0/0/19   0x0f0001a0     3              0                 NO
Hu0/0/0/19   0x0f0001a0     6              0                 NO
```

```
Hu0/0/0/15    0x0f0001a8     3              0                NO
Hu0/0/0/15    0x0f0001a8     6              0                NO
Hu0/0/0/8     0x0f0001b0     3              0                NO
Hu0/0/0/8     0x0f0001b0     6              0                NO
Hu0/0/0/1     0x0f0001b8     3              0                NO
Hu0/0/0/1     0x0f0001b8     6              0                NO
FH0/0/0/2     0x0f0001c0     3              0                NO
```

This example displays latest information about the source queue buffer usage in all ports in the packet memory space.

```
RP/0/RP0/CPU0:ios#show controllers npu packet-memory interface all sq-buffer-usage latest
location 0/RP0/CPU0
Thu Feb  1 17:04:02.892 UTC

------------------------------------------------------------------------
This option will affect system performance and should be used with caution.
Integration of this CLI with automation scripts is not recommended

------------------------------------------------------------------------
Node ID: 0/RP0/CPU0
Source Queue Buffer Usage Info for interface(s) all

Intf          Intf        TC      buffer-usage      congestion-state
name          handle
              (hex)
------------------------------------------------------------------------
Hu0/0/0/0     0x0f000130     3              0                NO
Hu0/0/0/0     0x0f000130     6              0                NO
Hu0/0/0/35    0x0f000138     3              0                NO
Hu0/0/0/35    0x0f000138     6              0                NO
Hu0/0/0/34    0x0f000140     3              0                NO
Hu0/0/0/34    0x0f000140     6              0                NO
Hu0/0/0/33    0x0f000148     3              0                NO
Hu0/0/0/33    0x0f000148     6              0                NO
Hu0/0/0/32    0x0f000150     3              0                NO
Hu0/0/0/32    0x0f000150     6              0                NO
Hu0/0/0/31    0x0f000158     3              0                NO
Hu0/0/0/31    0x0f000158     6              0                NO
Hu0/0/0/30    0x0f000160     3              0                NO
Hu0/0/0/30    0x0f000160     6              0                NO
Hu0/0/0/29    0x0f000168     3              0                NO
Hu0/0/0/29    0x0f000168     6              0                NO
Hu0/0/0/28    0x0f000170     3              0                NO
Hu0/0/0/28    0x0f000170     6              0                NO
Hu0/0/0/27    0x0f000178     3              0                NO
Hu0/0/0/27    0x0f000178     6              0                NO
Hu0/0/0/26    0x0f000180     3              0                NO
Hu0/0/0/26    0x0f000180     6              0                NO
Hu0/0/0/25    0x0f000188     3              0                NO
Hu0/0/0/25    0x0f000188     6              0                NO
Hu0/0/0/24    0x0f000190     3              0                NO
Hu0/0/0/24    0x0f000190     6              0                NO
Hu0/0/0/20    0x0f000198     3              0                NO
Hu0/0/0/20    0x0f000198     6              0                NO
Hu0/0/0/19    0x0f0001a0     3              0                NO
Hu0/0/0/19    0x0f0001a0     6              0                NO
Hu0/0/0/15    0x0f0001a8     3              0                NO
Hu0/0/0/15    0x0f0001a8     6              0                NO
Hu0/0/0/8     0x0f0001b0     3              0                NO
 --More--
```

Note If there is no traffic and congestion in the system when the snapshot is taken , the value of *buffer-usage* is 0 and *congestion-state* is NO. If there is traffic and congestion at the egress interface, the values of *buffer-usage* and *congestion-state* are as highlighted below:

```
RP/0/RP0/CPU0:ios#show controllers npu packet-memory interface fourHundredGigE 0/0/0/4
sq-buffer-usage latest location 0/RP0/CPU0
Fri Aug 25 04:09:25.447 UTC

------------------------------------------------------------------------
Node ID: 0/RP0/CPU0
Source Queue Buffer Usage Info for interface(s) FourHundredGigE0_0_0_4

Intf          Intf        TC      buffer-usage      congestion-state
name          handle
              (hex)
------------------------------------------------------------------------
FH0/0/0/4     0x0f000130     2             0                 NO
FH0/0/0/4     0x0f000130     3          8319                 YES
FH0/0/0/4     0x0f000130     4             0                 NO
FH0/0/0/4     0x0f000130     6             0                 NO
```

Displaying the source queue buffer usage in all ports at all locations is not supported.

These examples throw the 'Operation not supported' error in an attempt to display periodic/latest information about the source queue buffer usage in all ports at all locations.

```
RP/0/RP0/CPU0:ios#show controllers npu packet-memory interface all sq-buffer-usage location
 all
Thu Feb  1 17:13:35.010 UTC
Operation not supported on this location: all

RP/0/RP0/CPU0:ios#show controllers npu packet-memory interface all sq-buffer-usage latest
location all
Thu Feb  1 17:14:50.261 UTC
Operation not supported on this location: all
```

show controllers npu priority-flow-control

To display the current status and configured thresholds in a hardware module configuration, use **show controllers npu priority-flow-control** command in XR EXEC mode.

show controllers npu priority-flow-control <*loc*>

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.4	The output added values for ECN maximum threshold value and mark probability.
Release 7.0.11	This command was introduced.

Usage Guidelines

None

Example

This example shows sample output of `show controllers npu priority-flow-control loc 0/0/CPU0` command:

```
RP/0/RP1/CPU0:router#show controllers npu priority-flow-control loc 0/0/CPU0
Mon Oct 12 14:35:17.531 UTC

Location:    0/0/CPU0
PFC:          Enabled
TC    Pause-threshold    Resume-Threshold     Headroom
-------------------------------------------------------
3       403200 bytes        40320 bytes        441600 bytes
4       403200 bytes        40320 bytes        441600 bytes
RP/0/RP1/CPU0:router#
```

This example shows the sample output with custom values for all parameters including **max-threshold** and **probability-percentage**.

```
Router#show controllers npu priority-flow-control location all

Location:              0/6/CPU0
PFC:                    Enabled
PFC Mode:               buffer-internal
TC    Pause-threshold    Headroom       ECN            ECN-MAX         Prob-per
-------------------------------------------------------------------------------
3    1574400 bytes      1651200 bytes   629760 bytes   1416960 bytes   50
4    1574400 bytes      1651200 bytes   629760 bytes   1416960 bytes   50
```

show controllers priority-flow-control statistics

To display statistics about the priority flow control on an interface, use the **show controllers priority-flow-control statistics** command in XR EXEC mode.

show controllers *interface-type interface-path-id* **priority-flow-control statistics**

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.4	An additional counter for PFC Tx pause frames per traffic class was added.
Release 7.0.11	This command was introduced.

Usage Guidelines

From Release 7.5.5, you can also view the PFC statistics for all interfaces using the **show controllers all priority-flow-control statistics location all** command.

Example

This example shows a sample output of the **show controllers priority-flow-control statistics** command:

```
RP/0/RP1/CPU0:router#show controllers hundredGigE 0/0/0/0 priority-flow-control statistics

Mon Oct 12 12:22:39.362 UTC

Priority flow control information for interface HundredGigE0/0/0/0:

Priority Flow Control:
    Total Rx PFC Frames: 0
    Total Tx PFC Frames: 1764273
    Rx Data Frames Dropped: 0
    CoS  Status  Rx Frames
    ---  ------  ----------
      0    Off       0
      1    Off       0
      2    Off       0
      3    Off       0
      4    Off       0
      5    Off       0
      6    Off       0
      7    Off       0
```

This example shows the sample output with counters for PFC Tx frames per traffic class.

```
Router#show controllers hundredGigE 0/0/0/4  priority-flow-control statistics

Priority flow control information for interface HundredGigE0/0/0/4:
Priority Flow Control:
    Total Rx PFC Frames: 0
    Total Tx PFC Frames: 4832680
    Rx Data Frames Dropped: 1442056 (possible overflow)
```

```
CoS  Status  Rx Frames   Tx Frames
---  ------  ----------  ----------
  0  on             0           0
  1  on             0           0
  2  on             0           0
  3  on             0     2416374
  4  on             0     2416306
  5  on             0           0
  6  on             0           0
  7  on             0           0
```

show controllers priority-flow-control watchdog statistics

To display statistics about watchdog for priority flow control on an interface, use **show controllers priority-flow-control watchdog statistics** command in XR EXEC mode.

show controllers *interface-type interface-path-id* **priority-flow-control watchdog statistics**

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.4	The command output included separate counters for total dropped packets and dropped packets.
Release 7.0.11	This command was introduced.

Usage Guidelines

From Release 7.5.5, you can view the PFC Watchdog statistics for all interfaces using the **show controllers all priority-flow-control watchdog-stats location all** command.

Example

This example shows the sample output of `show controllers hundredGigE 0/0/0/0 priority-flow-control watchdog-stats` command:

```
Router# show controllers hundredGigE 0/0/0/0 priority-flow-control watchdog-stats


Priority flow control information for interface HundredGigE0/0/0/0:

Priority flow control watchdog statistics:
SAR: Auto restore and shutdown
-------------------------------------------------------------------------------------------------
Traffic Class            :       0        1        2        3        4        5        6
      7
-------------------------------------------------------------------------------------------------
Watchdog Events          :       0        0        0        0        0        0        0
      0
Shutdown Events          :       0        0        0        0        0        0        0
      0
Auto Restore Events      :       0        0        0        0        0        0        0
      0
SAR Events               :       0        0        0        0        0        0        0
      0
SAR Instantaneous Events :       0        0        0        0        0        0        0
      0
Total Dropped Packets    :       0        0        0        0        0        0        0
      0
```

From Release 7.5.4 onwards, the output includes separate counters for total dropped packets and dropped packets:

```
Router#show  controllers hundredGigE 0/1/0/43 priority-flow-control watchdog-stats

Priority flow control information for interface HundredGigE0/1/0/43:


Priority flow control watchdog statistics:
SAR: Auto restore and shutdown
-------------------------------------------------------------------------------------------------------
Traffic Class            :       0        1        2         3         4        5        6
        7
-------------------------------------------------------------------------------------------------------
Watchdog Events          :       0        0        0         3         3        0        0
        0
Shutdown Events          :       0        0        0         3         3        0        0
        0
Auto Restore Events      :       0        0        0         3         3        0        0
        0
SAR Events               :       0        0        0      3510      3510        0        0
        0
SAR Instantaneous Events :       0        0        0      1172      1172        0        0
        0
Total Dropped Packets    :       0        0        0 941505767 941488166        0        0
        0
Dropped Packets          :       0        0        0 314855466 314887161        0        0
        0
```

Note Disregard the **SAR Events** and **SAR Instantaneous Events** entries because those numbers have no bearing on your operations.

show hw-module bandwidth-congestion-protect

To view the current status of global pause frames (X-off) in case of High Bandwidth Memory (HBM) congestion, use the **show hw-module bandwidth-congestion-protect** command in XR EXEC mode.

show hw-module bandwidth-congestion-protect location *lc*

Syntax Description

location	*lc* —Line card location

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.5.4	This command was introduced.

Usage Guidelines

- Use this command to view the status of the global pause frame (X-off) configuration after you configure the **hw-module profile npu memory buffer-extended bandwidth-congestion-protect enable** command.
- The table lists the various possibilities for the command output based on your activity.

If you...	Configured field displays…	Applied field displays…	Action field displays…
Configure the **hw-module profile npu memory buffer-extended** command	**Yes**	**No**	**Reload**
Use the **no** form of the **hw-module profile npu memory buffer-extended** command after configuring it, but before reloading the line card	**No**	**No**	**N/A**

If you...	Configured field displays…	Applied field displays…	Action field displays…
Configure the **hw-module profile npu memory buffer-extended** command for a supported variant and reload the line card	**Yes**	**Yes, Active** **Note** **Yes** indicates that the configuration is programmed to the hardware, **Active** indicates that the global X-off functionality is active on the hardware.	**N/A**
Use the **no** form of the **hw-module profile npu memory buffer-extended** command when it is active, and commit the **no** form but don't reload the line card	**No** **Note** At this stage, the output displays the user action and not the hardware status.	**No** **Note** At this stage, the output displays the user action and not the hardware status.	**Reload**
Reload the line card after committing the **no** form of the **hw-module profile npu memory buffer-extended** command	**No** **Note** At this stage, the output displays the hardware status.	**No** **Note** At this stage, the output displays the hardware status.	**N/A**

Task ID

Task ID	Operation
qos	read, write

Example

This example shows how to view the current status of global pause frames (X-off) in case of High Bandwidth Memory (HBM) congestion using the **show hw-module bandwidth-congestion-protect location 0/1/CPU0** command:

```
RP/0/RP1/CPU0:router#show hw-module bandwidth-congestion-protect location 0/1/CPU0

Location   Configured     Applied          Action
--------------------------------------------------------------------------------

0/1/CPU0     Yes             No               Reload
```