

QoS Classification Commands

Note All commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router that is introduced from Cisco IOS XR Release 6.3.2. References to earlier releases in Command History tables apply to only the Cisco NCS 5500 Series Router.

Note

- Starting with Cisco IOS XR Release 6.6.25, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 560 Series Routers.
- Starting with Cisco IOS XR Release 6.3.2, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router.
- References to releases before Cisco IOS XR Release 6.3.2 apply to only the Cisco NCS 5500 Series Router.
- Cisco IOS XR Software Release 7.0.1 specific updates are not applicable for the following variants of Cisco NCS 540 Series Routers:
  - N540-28Z4C-SYS-A
  - N540-28Z4C-SYS-D
  - N540X-16Z4G8Q2C-A
  - N540X-16Z4G8Q2C-D
  - N540X-16Z8Q2C-D
  - N540-12Z20G-SYS-A
  - N540-12Z20G-SYS-D
  - N540X-12Z16G-SYS-A
  - N540X-12Z16G-SYS-D

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class (policy-map)

To specify the name of the class whose policy you want to create or change, use the **class** command in policy map configuration mode. To remove a class from the policy map, use the **no** form of this command.

class [**type qos**] {*class-name* | **class-default**}
no class [**type qos**] {*class-name* | **class-default**}

Syntax Description

type qos	(Optional) Specifies a quality-of-service (QoS) class.
class-name	Name of the class for which you want to configure or modify policy.
class-default	Configures the default class.

Command Default

No class is specified.

Type is QoS when not specified.

Command Modes

Policy map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Within a policy map, the **class (policy-map)** command can be used to specify the name of the class whose policy you want to create or change. The policy map must be identified first.

To identify the policy map (and enter the required policy map configuration mode), use the **policy-map** command before you use the **class (policy-map)** command. After you specify a policy map, you can configure the policy for new classes or modify the policy for any existing classes in that policy map.

The class name that you specify in the policy map ties the characteristics for that class—that is, its policy—to the class map and its match criteria, as configured using the **class-map** command.

The **class-default** keyword is used for configuring default classes. It is a reserved name and cannot be used with user-defined classes. It is always added to the policy map (type qos) even if the class is not configured. For example, the following configuration shows that the class has not been configured, but the running configuration shows ‘class class-default’.

```
RP/0/RP0/CPU0:router(config)# class-map p2
RP/0/RP0/CPU0:router(config-cmap)# match precedence 2
RP/0/RP0/CPU0:router(config-cmap)# end-class-map
RP/0/RP0/CPU0:router(config)# commit

RP/0/RP0/CPU0:router(config)# policy-map pm2
RP/0/RP0/CPU0:router(config-pmap)# class p2
RP/0/RP0/CPU0:router(config-pmap-c)# set precedence 3
RP/0/RP0/CPU0:router(config-pmap-c)# end-policy-map
RP/0/RP0/CPU0:router(config)# commit
RP/0/RP0/CPU0:router(config)# end
```

```
RP/0/RP0/CPU0:router# show run policy-map pm2
policy-map pm2
class p2
set precedence 3
!
class class-default
!
end-policy-map
!
```

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to create a policy map called policy1, which is defined to shape class1 traffic at 30 percent and default class traffic at 20 percent.

```
RP/0/RP0/CPU0:router(config)# class-map class1
RP/0/RP0/CPU0:router(config-cmap)# match precedence 3
RP/0/RP0/CPU0:router(config-cmap)#  exit

RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:routerconfig-pmap-c)# shape average percent 30
RP/0/RP0/CPU0:router(config-pmap-c)# exit


RP/0/RP0/CPU0:router(config-pmap)# class class-default
RP/0/RP0/CPU0:router(config-pmap-c)# shape average percent 20
```

The default class is used for packets that do not satisfy configured match criteria for class1. Class1 must be defined before it can be used in policy1, but the default class can be directly used in a policy map, as the system defines it implicitly.

class-map

To define a traffic class and the associated rules that match packets to the class, use the **class-map** command in XR Config mode. To remove an existing class map from the router, use the **no** form of this command.

class-map [**type** [**traffic** | **qos**]] [**match-all**] [**match-any**] *class-map-name*
no class-map [**type** [**traffic** | **qos**]] [**match-all**] [**match-any**] *class-map-name*

Syntax Description

type qos	(Optional) Specifies a quality-of-service (QoS) class-map.
traffic	(Optional) Specifies traffic type class-map.
match-all	(Optional) Specifies a match on all of the match criteria.
match-any	(Optional) Specifies a match on any of the match criteria. This is the default.
class-map-name	Name of the class for the class map. The class name is used for the class map and to configure policy for the class in the policy map. The class name can be a maximum of 63 characters, must start with an alphanumeric character, and in addition to alphanumeric characters, can contain any of the following characters: . _ @ $ % + | # : ; - =

Command Default

Type is QoS when not specified.

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **class-map** command specifies the name of the class for which you want to create or modify class map match criteria. Use of this command enables class map configuration mode in which you can enter any **match** command to configure the match criteria for this class. Packets arriving on the interface are checked against the match criteria configured for a class map to determine if the packet belongs to that class.

These commands can be used in a class map match criteria for the ingress direction:

- **match access-group**
- **match [not] dscp**
- **match [not] mpls experimental topmost**
- **match [not] precedence**
- **match [not] protocol**

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to specify class1 as the name of a class and defines a class map for this class. The packets that match the access list 1 are matched to class class1.

```
RP/0/RP0/CPU0:router(config)# class-map class1
RP/0/RP0/CPU0:router(config-cmap)# match access-group ipv4 1
```

end-class-map

To end the configuration of match criteria for the class and to exit class map configuration mode, use the **end-class-map** command in class map configuration mode.

end-class-map

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to end the class map configuration and exit class map configuration mode:

```
RP/0/RP0/CPU0:router(config)# class-map class1
RP/0/RP0/CPU0:router(config-cmap)# match access-group ipv4 1
RP/0/RP0/CPU0:router(config-cmap)# end-class-map
```

end-policy-map

To end the configuration of a policy map and to exit policy map configuration mode, use the **end-policy-map** command in policy map configuration mode.

end-policy-map

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

Policy map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to end the policy map configuration and exit policy map configuration mode.

```
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)# police rate 250
RP/0/RP0/CPU0:router(config-pmap)# end-policy-map
```

hw-module profile mpls-ext-dscp-preserve

To enable the QoS DSCP preservation at ingress for IPv4 or IPv6 SR-TE functionality, use the **hw profile mpls-ext-dscp-preserve** command in the XR Config mode.

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

hw profile mpls-ext-dscp-preserve { **v4uc-enable** | **v6uc-enable** }

Syntax Description

v4uc-enable	Allows you to preserve IP DSCP for IPv4 SR-TE traffic
v6uc-enable	Allows you to preserve IP DSCP for IPv6 SR-TE traffic

Syntax Description

This command has no keywords or arguments.

Command Default

This feature is disabled by default.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.7.1	This command was introduced.
Release 7.10.1	The **v6uc-enable** keyword was introduced.

Usage Guidelines

The router must be reloaded for the **hw-module** command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable QoS DSCP preservation for IPv4 SR-TE functionality at ingress.

```
Router#config
Router(config)#hw profile mpls-ext-dscp-preserve v4uc-enable
Router(config)#commit
Router(config)#exit
Router#reload location all
```

The following example shows how to enable QoS DSCP preservation for IPv6 SR-TE functionality at ingress.

```
Router#config
Router(config)#hw profile mpls-ext-dscp-preserve v6uc-enable
Router(config)#commit
Router(config)#exit
Router#reload location all
```

hw-module profile qos arp-isis-priority-enable

To enable the prioritization of IS-IS and ARP traffic in transit, use the **hw-module profile qos arp-isis-priority-enable** command in the XR Config mode.

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

hw-module profile qos arp-isis-priority-enable

no hw-module profile qos arp-isis-priority-enable

Syntax Description

This command has no keywords or arguments.

Command Default

This feature is disabled by default.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.5.1	This command was introduced.

Usage Guidelines

The line card must be reloaded for the **hw-module** command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the prioritization of IS-IS and ARP traffic in transit.

```
Router#config
Router(config)#hw-module profile qos arp-isis-priority-enable
Router(config)#commit
Router(config)#exit
Router#reload location 0/0/CPU0
```

hw-module profile qos gre-exp-classification-enable

To enable QoS classification on MPLS EXP labels in the inner MPLS header for MPLS over GRE single-pass scenarios, use the **hw-module profile qos gre-exp-classification-enable** command in the XR Config mode.

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

hw-module profile qos gre-exp-classification-enable

Syntax Description

This command has no keywords or arguments.

Command Default

This feature is disabled by default.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.5.2	This command was introduced.

Usage Guidelines

The line card must be reloaded for the **hw-module** command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable QoS classification on MPLS EXP labels in the inner MPLS header for MPLS over GRE single-pass scenarios.

```
Router#config
Router(config)#hw-module profile qos gre-exp-classification-enable
Router(config)#commit
Router(config)#exit
Router#reload location 0/0/CPU0
```

hw-module profile qos ingress-model peering

To enable the peering QoS profile feature, use the hw-module profile qos ingress-model peering command in the XR Config mode. To disable this feature, use the no form of this command.

hw-module profile qos ingress-model peering [location*node-id***]**

Syntax Description

location *node-id*	Indicates the designated node. The *node-id* argument is entered in the rack/slot/module notation.

Command Default

The peering QoS profile feature is disabled by default, unless enabled by this command.

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.2.1	This command was introduced.

Usage Guidelines

The router must be reloaded for the hw-module command to be functional.

After enabling the QoS peering feature using the **hw-module profile qos ingress-model peering** command, you can set the Layer 2 class of service (CoS) or drop eligible indicator (DEI) values at the egress using the **set cos** or **set dei** commands, respectively. However, at the egress, ensure you don't set the MPLS experimental imposition (EXP) values (using the **set mpls experimental imposition** command). Otherwise, when committing the policy map with these configurations at the egress, you will encounter an error. This error occurs because the internal fields required for egress EXP marking are not available with peering enabled.

When you enable the peering mode (using the **hw-module profile qos ingress-model peering** command), the QPPB feature doesn't work.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the peering QoS profile feature.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile qos ingress-model peering
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router# reload
```

hw-module profile qos ipv6 short

To configure the IPv6 source short address TCAM lookup and enable QoS Policy Propagation via BGP (QPPB), run the **hw-module profile qos ipv6 short** command in the XR Config mode.

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

hw-module profile qos ipv6 short

Syntax Description

ipv6 short	Reduces the destination IP Address to 96 bits, thus making space in the key for QPPB

Command Default

The QPPB feature is disabled by default, unless enabled by this command.

Command Modes

XR Config

Command History

Release	Modification
Release 6.5.1	This command was introduced.

Usage Guidelines

The router must be reloaded for the **hw-module** command to be functional.

You must configure the **hw-module profile qos ipv6 short** command for QPPB to work with IPv6 address families and packets.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the QPPB feature.

```
Router#config
Router(config)#hw-module profile qos ipv6 short
Router(config)#commit
Router#reload
```

hw-module profile qos ipv6 short-l2qos-enable

To enable classification of IPv6 packets based on (CoS, DEI) on L3 sub-interfaces, run the hw-module profile qos ipv6 short-l2qos-enable command in the XR Config mode.

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

hw-module profile qos ipv6 short-l2qos-enable

Syntax Description

ipv6 short-l2qos-enable	Reduces the destination IP Address to 96 bits, thus making space in the key for (CoS, DEI).

Command Default

The peering QoS profile feature is disabled by default, unless enabled by this command.

Command Modes

XR Config

Command History

Release	Modification
Release 7.1.1	This command was introduced.

Usage Guidelines

The router must be reloaded for the hw-module command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the peering QoS profile feature.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile qos ipv6 short-l2qos-enable
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router# reload
```

hw-module profile qos l2-match-dest-addr-v4v6

To enable matching class maps to IPv4 and IPv6 destination addresses on Layer 2 networks, run the hw-module profile qos l2-match-dest-addr-v4v6 command in the XR Config mode.

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

hw-module profile qos l2-match-dest-addr-v4v6

Syntax Description

This command has no keywords or arguments.

Command Default

This feature is disabled by default.

Command Modes

XR Config

Command History

Release	Modification
Release 7.5.1	This command was introduced.

Usage Guidelines

Reload the router for the **hw-module**command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable matching class maps to IPv4 and IPv6 destination addresses on Layer 2 networks.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile qos l2-match-dest-addr-v4v6
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router(config)#exit
RP/0/RP0/CPU0:router#reload
```

hw-module profile qos max-classmap-size

To define the maximum number of class-maps per ingress traffic policy, use the hw-module profile qos max-classmap-size command in the Global Configuration Mode.

hw-module profile qos max-classmap-size *size*

Syntax Description

size	Indicates the maximum number of class-maps permitted per ingress traffic policy. Allowed values are 1, 2, 4, 8, 16, and 32.

Command Default

Default size is 32.

Command Modes

Global Configuration Mode

Command History

Release	Modification
Release 7.10.1	Introduced support for a maximum of 1 class-map per ingress traffic policy for the NCS 5500 Series Routers and Line Cards and the NCS 5700 Series Routers and Line Cards.
Release 7.9.1	Introduced support for a maximum of 2 class-maps per ingress traffic policy for the NCS 5500 Series Routers and Line Cards and the NCS 5700 Series Routers and Line Cards.
Release 7.5.1	Introduced support for 2 class-maps permitted per ingress traffic policy, in addition to existing support of 4, 8, 16, 32 for NCS 540 variants.
Release 6.0.0	This command was introduced.

Usage Guidelines

The router **must be reloaded** for the hw-module command to be functional. This command only applies to ingress traffic policies.

In releases prior to Cisco IOS XR 7.5.1 release, only 4, 8, 16, or 32 class-maps per ingress traffic policy are supported. Egress traffic policies can support up to 8 class-maps per traffic policy.

Starting Cisco IOS XR 7.5.1 release, the **hw-module profile qos max-classmap-size** command allows you to set the maximum number of class-map permitted per policy to 2 in addition to existing support of 4, 8, 16, 32 class-maps on N540-ACC-SYS, N540X-ACC-SYS, N540-24Z8Q2C-SYS, N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to change the maximum number of class-maps to 16.

```
Router#config
Router(config)#hw-module profile qos max-classmap-size 16
Router(config)#commit
```

```
Router(config)#exit
Router# reload
```

hw-module profile qos policer-scale

To allocate up to a maximum of 64000 QoS policers, use the **hw-module profile qos policer-scale** command in the XR Config mode. To disable this feature, use the **no** form of this command.

hw-module profile qos policer-scale *size*

Syntax Description

size Number of policers allocated for QoS.

The default value is 32000. You can increase the value to 48000 or 64000, and reduce it back to 32000. CLI snapshot:

```
RP/0/RP0/CPU0:ios(config)#hw-module profile qos policer-scale ?
  32000  Max 32000 policers
  48000  Max 48000 policers
  64000  Max 64000 policers
```

Command Default

The command is disabled.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.8.1	This command was introduced.

Usage Guidelines

- The increase in QoS policer allocation is supported only on Cisco NCS 5700 series SE line cards.
- When more than 32000 policers are allocated for QoS, it reduces policers for BGP Flowspec. For example, if you allocate 48000 policers for QoS, the BGP Flowspec policer count reduces from 32000 to 16000.
- Since Enhanced QoS mode configuration does not support more than 32000 policers, you cannot enable the **hw-module profile qos policer-scale** and **hw-module profile stats qos-enhanced** commands at the same time.
- The QoS policer scale numbers are only applicable when the **hw-module profile mdb l3max-se** or **hw-module profile mdb l2max-se** command is enabled. For more information on hardware MDB profiles, see NCS5700 MDB Profile in the *NCS 5500 System Setup and Software Installation Guide*.
- After enabling this command, reload the router.

Some examples of increase in QoS policer allocation:

- If you allocate 48000 policers with 16 class-maps, then 2999 policers are allocated per core and 5998 policers per NPU.
- If you allocate 64000 policers with 16 class-maps, then 3999 policers are allocated per core and 7998 policers per NPU.

The following example shows how to allocate 48000 policers for QoS:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# hw-module profile qos policer-scale 48000
RP/0/RP0/CPU0:router(config)# commit
```



Note After you configure, reload the router to apply the profile. Use the **admin hw-module reload location all** command to reload the router.

hw-module profile qos policer-scale l2-mode

To enable the increase in number of ingress QoS policies supported on Layer 2, use the hw-module profile qos policer-scale l2-mode command in the global configuration mode. To disable this feature, use the **no** form of this command.

hw-module profile qos policer-scale l2-mode

Syntax Description

This command has no keywords or arguments.

Command Default

The command is disabled.

Command Modes

Global Configuration Mode

Command History

Release	Modification
Release 24.2.1	This command was introduced. Applicable only to N540X-6Z18G-SYS-A/D routers.

Usage Guidelines

This command applies only to Layer 2 ingress QoS policies.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable increase in number of ingress QoS policies on all the class-map sizes in Layer 2.

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# hw-module profile qos policer-scale l2-mode
RP/0/RP0/CPU0:router(config)# commit
```

hw-module profile qos qosg-dscp-mark-enable

To set the qos-group and DSCP values within the same QoS policy that is applied in the ingress direction, use the hw-module profile qos qosg-dscp-mark-enable command in the XR Config mode.

hw-module profile qos qosg-dscp-mark-enable *value*

Syntax Description

value	The DSCP or precedence values that can be used in any policy that have both **set qos-group** and **set dscp** configured. The range is from 0 through 63. To use precedence values (instead of DSCP), multiply the precedence value by 8 to get DSCP. For example, to enable precedence=2 and precedence=6 with the above configuration, use the values 16 and 48 in the hw-module configuration command.

Command Default

This feature is disabled by default, unless enabled by this command.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.1.2	This command was introduced.

Usage Guidelines

The router must be reloaded for the hw-module command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable setting both qos-group and DSCP values within the same QoS policy that is applied in the ingress direction.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile qos qosg-dscp-mark-enable 13 16
RP/0/RP0/CPU0:router(config)#commit
```

hw-module profile stats egress-stats-scale

To extend the MPLS scale from 8k to 20k, use the **hw-module profile stats egress-stats-scale** command in XR Config mode.

hw-module profile stats egress-stats-scale

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.2.1	This command was introduced.

Usage Guidelines

- You must reload the router for the feature to be functional.
- The L2 counters/accounting will not work once this command is enabled.

Task ID

Task ID	Operation
configure-services	read, write
root-lr	read, write

The following example shows how to enable this command.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile stats egress-stats-scale
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router# reload
```

hw-module profile stats qos-enhanced

To enable the four counter mode in the system, use the hw-module profile stats qos-enhancedcommand in XR Config mode. To disable this mode, use the no form of the command. In the four counter mode, statistics for **conform**, **violate**, and **exceed** packets are collected in the hardware and displayed using the show policy-map command.

hw-module profile stats qos-enhanced

Syntax Description

This command has no keywords or arguments.

Command Default

The qos-enhanced mode is disabled by default, and therefore only the conform and violate statistics are available in the two counter mode.

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.2.1	This command was introduced.

Usage Guidelines

The router must be reloaded for the hw-module command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the four counter mode on the router.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile stats qos-enhanced
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router# reload
```

hw-module profile stats tx-scale-enhanced qos-enhanced

To enable the enhanced QOS statistics for increasing the Tx scale, use the **hw-module profile stats tx-scale-enhanced qos-enhanced** command in XR Config mode. To disable this mode, use the **no** form of the command.

hw-module profile stats tx-scale-enhanced qos-enhanced

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.2.1	This command was introduced.

Usage Guidelines

The router must be reloaded for the **hw-module** command to be functional.

Task ID

Task ID	Operation
qos	read, write

The following example shows how to enable the enhanced QOS statistics for increasing the Tx scale.

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#hw-module profile stats tx-scale-enhanced qos-enhanced
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router# reload
```

match access-group

To identify a specified access control list (ACL) number as the match criteria for a class map, use the **match access-group** command in class map configuration mode.

match access-group {**ipv4** | **ipv6**} *access-group-name*

Syntax Description

ipv4	Specifies the name of the IPv4 access group to be matched.
ipv6	Specifies the name of the IPv6 access group to be matched.
access-group-name	ACL whose contents are used as the match criteria against which packets are checked to determine if they belong to this class.

Command Default

By default, if neither IPv6 nor IPv4 is specified as the match criteria for a class map, IPv4 addressing is used.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.
Release 7.7.1	QoS support was added for classifying ingress IPv6 and IPv4 traffic, based on its packet length.

Usage Guidelines

For class-based features (such as marking and policing), you define traffic classes based on match criteria, including ACLs and input interfaces. Packets satisfying the match criteria for a class constitute the traffic for that class.

The **match access-group** command specifies an ACL whose contents are used as the match criteria against which packets are checked to determine if they belong to the class specified by the class map.

The **match access-group** command is supported only in the ingress direction. The maximum allowed entries: 8

To use the **match access-group** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish. You can specify up to eight IPv4 and IPv6 ACLs in a match statement.

QoS classification based on the packet length or TTL (time to live) field in the IPv4 and IPv6 headers is not supported. In Release 7.7.1, QoS support was added for classifying ingress IPv4 and IPv6 traffic, based on its packet length.

When an ACL list is used within a class-map, the deny action of the ACL is ignored and the traffic is classified based on the specified ACL match parameters.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to specify a class map called map1 and configures map1 to be used as the match criteria for this class:

```
RP/0/RP0/CPU0:router(config)# class-map map1
RP/0/RP0/CPU0:router(config-cmap)# match access-group ipv4 map1
RP/0/RP0/CPU0:router(config-cmap)# match access-group ipv6 map2
```

This example shows how to configure the QoS Classification Based on Packet Length feature.



Note This example enables traffic filtering for a specific packet length value by using **packet-length eq**. Instead of **eq**, you can also use one of these options:

- **gt** to filter packets with a greater value.
- **lt** to filter packets with a lesser value.
- **neq** to filter packets that do not contain the specified value.
- **range** to filter packets in the specified range of values.

```
/* Create an ACL that allows IPv4 traffic with the specified packet length */

Router# configure
Router(config)# ipv4 access-list aclv4_pktlen
Router(config-ipv4-acl)# 10 permit ipv4 any any packet-length eq 100
Router(config-ipv4-acl)# commit
```

Based on ACL **aclv4_pktlen**, create a QoS policy and apply it on the ingress IPv4 traffic.

```
/* QoS classification of ingress IPv4 traffic based on its packet length */

Router# configure
Router(config)# class-map match-any c_pktlen
Router(config-cmap)# match access-group ipv4 aclv4_pktlen
Router(config-cmap)# end-class-map
Router(config)# policy-map p_pktlen
Router(config-pmap)# class c_pktlen
Router(config-pmap-c)# set traffic-class 2
Router(config-pmap-c)# exit
Router(config-pmap)# class class-default
Router(config-pmap-c)# end-policy-map
Router(config-pmap-c)# commit
Router(config-pmap-c)# root
```

The policy-map **p_pktlen** is associated with interface HundredGigabitEthernet 0/0/0/0.

```
/* Apply the policy-map on the designated Ethernet interface */

Router(config)# interface hundredGigE 0/0/0/0
Router(config-if)# service-policy input p_pktlen
Router(config-if)# commit
```

match cos

To identify specified class of service (CoS) values as a match criteria in a class map, use the **match cos** command in class map configuration mode. To remove a specified CoS class value from the matching criteria for a class map, use the **no** form of this command.

match cos {*cos-value* [*cos-value1* **...** *cos-value7*]}
no match cos {*cos-value* [*cos-value1* **...** *cos-value7*]}

Syntax Description

cos-value	Identifier that specifies the exact value from 0 to 7. Up to eight CoS identifiers can be specified to match packets.

Command Default

No match criteria are specified.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

The **match cos** command is supported only in the ingress direction.

The **match cos** command specifies a class of service that is used as the match criteria against which packets are checked to determine if they belong to the class specified by the class map.

To use the **match cos** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish. If you specify more than one **match cos** command in a class map, the values of subsequent match statements are added to the first **match cos** command.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure the service policy called policy-in and attach service policy policy-in to an interface HundredGigE 0/0/0/3. In this example, class map cos146 evaluates all packets of service values of 1, 4, or 6. If the incoming packet has been marked with any of these CoS values, the traffic is policed at 300 mbps.

```
RP/0/RP0/CPU0:router(config)# class-map cos146
RP/0/RP0/CPU0:router(config-cmap)# match cos 1 4 6
RP/0/RP0/CPU0:router(config-cmap)# exit
RP/0/RP0/CPU0:router(config)# policy-map policy-in
RP/0/RP0/CPU0:router(config-pmap)# class cos146
RP/0/RP0/CPU0:router(config-pmap-c)# police rate 300 mbps
RP/0/RP0/CPU0:router(config-pmap-police)#exit
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit
```

```
RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/0/0/3
RP/0/RP0/CPU0:router(config-if)# service-policy input policy-in
```

match dei

To specify a drop eligible indicator (DEI) value as a match criteria in a class map, use the **match dei** command in class map configuration mode. To remove a specified DEI value from the matching criteria for a class map, use the **no** form of this command.

match dei *value*
no match dei

Syntax Description

value	Value of the DEI bit. Can be 0 or 1.

Command Default

There is no default DEI value; it must be specified.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

The **match dei** command specifies a DEI value that is used as the match criteria against which packets are checked to determine if they belong to the class specified by the class map.

Task ID

Task ID	Operation
qos	read, write

Examples

In this example, DEI value is specified as the matching criteria in a class map.

```
RP/0/RP0/CPU0:router(config)# class-map match-any match-dei
RP/0/RP0/CPU0:router(config-cmap)# match dei 0
RP/0/RP0/CPU0:router(config-cmap)# exit
RP/0/RP0/CPU0:router(config)# policy-map p1
RP/0/RP0/CPU0:router(config-pmap)# class match-dei
RP/0/RP0/CPU0:router(config-pmap)# set dei 1
RP/0/RP0/CPU0:router(config-pmap-c)#exit
RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/5/0/0.0 l2transport
RP/0/RP0/CPU0:router(config-subif)# encapsulation dot1q 1
RP/0/RP0/CPU0:router(config-subif)# rewrite ingress tag push dot1ad 5 symmetric
RP/0/RP0/CPU0:router(config-subif)# service-policy input p1
```

match destination-address

To identify a specified IP address as the match criteria for a class map, use the **match destination-address** command in class map configuration mode.

match destination-address { **ipv4** | **ipv6** } *ip-address*

Syntax Description

ipv4	Specifies the IPv4 address to be matched.
ipv6	Specifies the IPv6 address to be matched.
ip-address	IP address details.

Command Default

By default, if neither IPv6 nor IPv4 is specified as the match criteria for a class map, IPv4 addressing is used.

Command Modes

Class map configuration

Command History

Release	Modification
Release 7.5.1	This command was introduced.

Usage Guidelines

The **match destination-address** command is supported only in the ingress direction. The maximum allowed entries (any combination of IPv4 and IPv6 addresses, with a maximum of 4 addresses for each): 8

To use the **match destination-address** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish. You can specify up to a total of eight IPv4 and IPv6 addresses in a match statement.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to create a class-map and specify match-any criteria for IPv4 and IPv6 addresses:

```
RP/0/RP0/CPU0:router(config)# class-map match-any V4_V6_MATCH
RP/0/RP0/CPU0:router(config-cmap)# match destination-address ipv4 10.0.0.0 255.0.0.0
RP/0/RP0/CPU0:router(config-cmap)# match destination-address ipv6 201:1:1::1/32
```

match dscp

To identify specific IP differentiated services code point (DSCP) values as match criteria for a class map, use the **match dscp** command in class map configuration mode. To remove a DSCP value from a class map, use the **no** form of this command.

match [**not**] **dscp** {[**ipv4** | **ipv6**] *dscp-value* [*dscp-value1 . . . dscp-value7*] | [*min-value* – *max-value*]}
no match [**not**] **dscp** {[**ipv4** | **ipv6**] *dscp-value* [*dscp-value1 . . . dscp-value7*] | [*min-value* – *max-value*]}

Syntax Description

not	(Optional) Negates the specified match result.
ipv4	(Optional) Specifies the IPv4 DSCP value.
ipv6	(Optional) Specifies the IPv6 DSCP value.
dscp-value	IP DSCP value identifier that specifies the exact value or a range of values. Range is 0 - 63. Up to 64 IP DSCP values can be specified to match packets. Reserved keywords can be specified instead of numeric values. Table 1: IP DSCP Reserved Keywords, on page 32 describes the reserved keywords.
min-value	Lower limit of DSCP range to match. Value range is 0 - 63.
max-value	Upper limit of DSCP range to match. Value range is 0 - 63.

Command Default

Matching on IP Version 4 (IPv4) and IPv6 packets is the default.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **match dscp** command is supported only in the ingress direction. The minimum value is 0 and maximum value is 63. The maximum allowed entries: 64.

The **match dscp** command specifies a DSCP value that is used as the match criteria against which packets are checked to determine if they belong to the class specified by the class map.

To use the **match dscp** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish

The **match dscp** command examines the higher-order six bits in the type of service (ToS) byte of the IP header. If you specify more than one **match dscp** command in a class map, the new values are added to the existing statement.

The IP DSCP value is used as a matching criterion only. The value has no mathematical significance. For instance, the IP DSCP value 2 is not greater than 1. The value simply indicates that a packet marked with the IP DSCP value of 2 should be treated differently than a packet marked with an IP DSCP value of 1. The

treatment of these marked packets is defined by the user through the setting of policies in policy map class configuration mode.

Table 1: IP DSCP Reserved Keywords

DSCP Value	Reserved Keyword
0	default
10	AF11
12	AF12
14	AF13
18	AF21
20	AF22
22	AF23
26	AF31
28	AF32
30	AF33
34	AF41
36	AF42
38	AF43
46	EF
8	CS1
16	CS2
24	CS3
32	CS4
40	CS5
48	CS6
56	CS7
ipv4	ipv4 dscp
ipv6	ipv6 dscp

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure the service policy called policy1 and attach service policy policy1 to an interface HundredGigE 0/7/0/0 . In this example, class map dscp14 evaluates all packets entering for an IP DSCP value of 14. If the incoming packet has been marked with the IP DSCP value of 14, the packet is queued to the class queue with the bandwidth setting of 1000 mbps.

```
RP/0/RP0/CPU0:router(config)# class-map dscp14
RP/0/RP0/CPU0:router(config-cmap)# match dscp ipv4 14
RP/0/RP0/CPU0:router(config-cmap)# exit

RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class dscp14
RP/0/RP0/CPU0:router(config-pmap-c)#bandwidth 1000 mbps
RP/0/RP0/CPU0:router(config-pmap-c)#exit
RP/0/RP0/CPU0:router(config-pmap)# exit

RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/7/0/0
RP/0/RP0/CPU0:router(config-if)# service-policy input policy1
```

match mpls disposition class-map



Note This feature is not available on NC55-24DD and NC55-18DD-SE line cards for Cisco IOS XR Release 7.0.2.

To identify specific six-bit DSCP or three-bit precedence field values in the IPv4/IPv6 header in single MPLS labelled packet as match criteria for a class map, use the **match mpls disposition class-map <cmap-name>** command in class map configuration mode. The **<cmap-name>** is the child class-map name; the child class-map contains match statement for DSCP or precedence or both, and which must be configured before running this command. To remove **match mpls disposition class-map <cmap-name>**, use the **no** form of this command.

match mpls disposition {**class-map**} *c-map name*
no match mpls disposition {**class-map**} *c-map name*

Syntax Description

class-map *c-map name*	Name of the child class-map. The child class-map contains match statement for DSCP or precedence or both.

Command Default

No default behavior or values.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.6.25	This command was introduced.

Usage Guidelines

The **match mpls disposition class-map <cmap-name>** command is supported only in the ingress direction. It contains the child class-map name as argument which can have **match dscp <value>** or **match precedence <value>** statements. The minimum value for DSCP is 0 and the maximum value is 63. The maximum allowed entries are 8.

The class map uses this command to identify DSCP and/or precedence values matching on a packet.

To use this command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish. If you specify more than one **match mpls disposition class-map <cmap-name>** command in a class map, the new values are added to the existing match statement.

This command examines the DSCP/precedence bits contained in the IPv4/IPv6 header.

Task ID

Task ID	Operations
qos	read, write

Examples

In this example, **class map mplsmap1** evaluates all packets entering the **HundredGigabit Ethernet interface 0/1/0/9** that has one MPLS label and for DSCP value ranging from 11-20 and a precedence value of 3. All types of marking are supported for this match.

```
RP/0/RP0/CPU0:router(config)# class-map child-class
RP/0/RP0/CPU0:router(config-cmap)# match dscp 11-20
RP/0/RP0/CPU0:router(config-cmap)# match precedence 3
RP/0/RP0/CPU0:router(config-cmap)# exit

RP/0/RP0/CPU0:router(config)# class-map mplsmap1
RP/0/RP0/CPU0:router(config-cmap)# match mpls disposition class-map child-class
RP/0/RP0/CPU0:router(config-cmap# exit

RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class mplsmap1
RP/0/RP0/CPU0:router(config-pmap-c)# set traffic-class 3
RP/0/RP0/CPU0:router(config-pmap-c)# set dscp af31
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit

RP/0/RP0/CPU0:router(config)# interface HundredGigabitEthernet 0/1/0/9
RP/0/RP0/CPU0:router(config-if)# service-policy input policy1
```



Note The **set dscp** option is available from Release 7.1.1 onwards.

match mpls experimental topmost

To identify specific three-bit experimental (EXP) field values in the topmost Multiprotocol Label Switching (MPLS) label as match criteria for a class map, use the **match mpls experimental topmost** command in class map configuration mode. To remove experimental field values from the class map match criteria, use the **no** form of the command.

match [**not**] **mpls experimental topmost** *exp-value* [*exp-value1 . . .exp-value7*]
no match [**not**] **mpls experimental topmost** *exp-value* [*exp-value1 . . .exp-value7*]

Syntax Description

not	**not**
exp-value	Experimental value that specifies the exact value from 0 to 7. Up to eight experimental values can be specified to match MPLS headers.

Command Default

No default behavior or values

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **match mpls experimental topmost** command is supported only in the ingress direction. The minimum value is 0 and maximum value is 7. The maximum allowed entries: 8.

The **match mpls experimental topmost** command is used by the class map to identify MPLS experimental values matching on a packet.

To use the **match mpls experimental topmost** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish. If you specify more than one **match mpls experimental topmost** command in a class map, the new values are added to the existing match statement.

This command examines the three experimental bits contained in the topmost label of an MPLS packet. Up to eight experimental values can be matched in one match statement. For example, match mpls experimental topmost 2 4 5 7 returns matches for experimental values of 2, 4, 5, and 7. Only one of the four values is needed to yield a match (OR operation).

The experimental values are used as a matching criterion only. The value has no mathematical significance. For instance, the experimental value 2 is not greater than 1. The value indicates that a packet marked with the experimental value of 2 should be treated differently than a packet marked with the EXP value of 1. The treatment of these different packets is defined by the user through the setting of QoS policies in policy map class configuration mode.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure the service policy called policy1 and attach service policy policy1 to an interface. In this example, class map mplsmap1 evaluates all packets entering HundredGigabit Ethernet interface 0/1/0/9 for an MPLS experimental value of 1. If the incoming packet has been marked with the MPLS experimental value of 1, the packet is queued to the class queue with the bandwidth setting of 1000 mbps.

```
RP/0/RP0/CPU0:router(config)# class-map mplsmap1
RP/0/RP0/CPU0:router(config-cmap)# match mpls experimental topmost 1
RP/0/RP0/CPU0:router(config-cmap)# exit

RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class mplsmap1
RP/0/RP0/CPU0:router(config-pmap-c)# bandwidth 1000 mbps
RP/0/RP0/CPU0:router(config-pmap-c)#exit
RP/0/RP0/CPU0:router(config-pmap)#exit

RP/0/RP0/CPU0:router(config)# interface HundredGigabitEthernet  0/1/0/9
RP/0/RP0/CPU0:router(config-if)# service-policy input  policy1
```

match precedence

To identify IP precedence values as match criteria, use the **match precedence** command in class map configuration mode. To remove precedence values from a class map, use the **no** form of this command.

match [**not**] **precedence** [**ipv4** | **ipv6**] *precedence-value* [*precedence-value1* . . . *precedence-value7*]
no match [**not**] **precedence** [**ipv4** | **ipv6**] *precedence-value* [*precedence-value1* . . . *precedence-value7*]

Syntax Description

not	(Optional) Negates the specified match result.
ipv4	(Optional) Specifies the IPv4 precedence value.
ipv6	(Optional) Specifies the IPv6 precedence value.
precedence-value	An IP precedence value identifier that specifies the exact value. Reserved keywords can be specified instead of numeric values. Table 2: IP Precedence Values and Names, on page 39 describes the reserved keywords. Up to eight precedence values can be matched in one match statement.

Command Default

Matching on both IP Version 4 (IPv4) and IPv6 packets is the default.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **match precedence** command is supported only in the ingress direction. The minimum value is 0 and maximum value is 7. The maximum allowed entries: 8.

The **match precedence** command specifies a precedence value that is used as the match criteria against which packets are checked to determine if they belong to the class specified by the class map.

To use the **match precedence** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish. If you specify more than one **match precedence** command in a class map, the new values are added to the existing statement.

The **match precedence** command examines the higher-order three bits in the type of service (ToS) byte of the IP header. Up to eight precedence values can be matched in one match statement. For example, **match precedence ipv4 0 1 2 3 4 5 6 7** returns matches for IP precedence values of 0, 1, 2, 3, 4, 5, 6, and 7. Only one of the eight values is needed to yield a match (OR operation).

The precedence values are used as a matching criterion only. The value has no mathematical significance. For instance, the precedence value 2 is not greater than 1. The value simply indicates that a packet marked with the precedence value of 2 is different than a packet marked with the precedence value of 1. The treatment of these different packets is defined by the user through the setting of QoS policies in policy map class configuration mode.

This table lists the IP precedence value number and associated name in descending order of importance.

Table 2: IP Precedence Values and Names

Value	Name
0	routine
1	priority
2	immediate
3	flash
4	flash-override
5	critical
6	internet
7	network
ipv4	ipv4 precedence
ipv6	ipv6 precedence

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure the service policy called policy1 and attach service policy policy1 to an interface. In this example, class map ipprec5 evaluates all packets entering HundredGigabit Ethernet interface 0/1/0/9 for a precedence value of 5. If the incoming packet has been marked with the precedence value of 5, the packet is queued to the class queue with the bandwidth setting of 1000 mbps.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# class-map ipprec5
RP/0/RP0/CPU0:router(config-cmap)# match precedence ipv4 5
RP/0/RP0/CPU0:router(config-cmap)# exit

RP/0/RP0/CPU0:router(config)# policy-map policy1
RP/0/RP0/CPU0:router(config-pmap)# class ipprec5
RP/0/RP0/CPU0:router(config-pmap-c)# bandwidth 1000 mbps
RP/0/RP0/CPU0:router(config-pmap)# exit

RP/0/RP0/CPU0:router(config)# interface HundredGigabitEthernet  0/1/0/9
RP/0/RP0/CPU0:router(config-if)# service-policy input policy1
```

match protocol

To identify a specific protocol as the match criterion for a class map, use the **match protocol** command in class map configuration mode. To remove protocol-based match criteria from a class map, use the **no** form of this command.

match [**not**] **protocol** {*protocol-value* [*protocol-value1* **. . .** *protocol-value7*] | [*min-value* – *max-value*]}
no match [**not**] **protocol** {*protocol-value* [*protocol-value1* **. . .** *protocol-value7*] | [*min-value* – *max-value*]}

Syntax Description

not	(Optional) Negates the specified match result.
protocol-value	A protocol identifier. A single value for *protocol-value* (any combination of numbers and names) can be matched in one match statement.
min-value	Lower limit of protocol range to match. Minimum value is 0.
max-value	Upper limit of protocol range to match. Maximum value is 255.

Command Default

No default behavior or values

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **match protocol** command is supported only in ingress direction. The maximum allowed entry is 1.

Definitions of traffic classes are based on match criteria, including protocols, access control lists (ACLs), input interfaces, QoS labels, and experimental (EXP) field values. Packets satisfying the match criteria for a class constitute the traffic for that class.

The **match protocol** command specifies the name of a protocol to be used as the match criteria against which packets are checked to determine if they belong to the class specified by the class map. Available protocol names are listed in the table that follows.

The *protocol-value* argument supports a range of protocol numbers. After you identify the class, you may use the **match protocol** command to configure its match criteria.

Table 3: Protocol Names and Descriptions

Name	Description
ahp	Authentication Header Protocol
esp	Encapsulation Security Payload
gre	Cisco Generic Routing Encapsulation Tunneling

Name	Description
icmp	Internet Control Message Protocol
igmp	Internet Gateway Message Protocol
igrp	Cisco IGRP Routing protocol
ipinip	IP in IP tunneling
ipv4	Any IPv4 protocol
ipv6	Any IPv6 protocol
mpls	Any MPLS packet
nos	KA9Q NOS Compatible IP over IP Tunneling
ospf	Open Shortest Path First, Routing Protocol
pcp	Payload Compression Protocol
pim	Protocol Independent Multicast
sctp	Stream Control Transmission Protocol
tcp	Transport Control Protocol
udp	User Datagram Protocol

Task ID

Task ID	Operations
qos	read, write

Examples

In this example, all TCP packets belong to class class 1:

```
RP/0/RP0/CPU0:router(config)# class-map class 1
RP/0/RP0/CPU0:router(config-cmap)# match protocol tcp
```

match qos-group

To identify specific quality-of-service (QoS) group values as match criteria in a class map, use the **match qos-group** command in class map configuration mode. To remove a specific QoS group value from the matching criteria for a class map, use the **no** form of this command.

match qos-group [*qos-group-value*]
no match qos-group

Syntax Description

qos-group-value	QoS group value identifier that specifies the exact value from 1through 511 in peering profile, and 1 through 7 in all other cases. Range is not supported.

Command Default

No match criteria are specified.

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The egress default class will implicitly match qos-group 0. The minimum value is 1 and maximum value is 7, and 1 and 511 for peering profiles.

The **match qos-group** command sets the match criteria for examining QoS groups marked on the packet. One class map can match only one qos-group value from 1 through 7, and from 1 through 511 for peering profiles.

The QoS group value is used as a matching criterion only. The value has no mathematical significance. For instance, the QoS group value 2 is not greater than 1. The value simply indicates that a packet marked with the QoS group value of 2 should be treated differently than a packet marked with a QoS group value of 1. The treatment of these different packets is defined using the **service-policy** command in policy map class configuration mode.

The QoS group setting is limited in scope to the local router. Typically, the QoS group is set on the ingress on the local router to be used locally and the router to give differing levels of service based on the group identifier.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows that packets in qos-group 5 are matched.

```
RP/0/RP0/CPU0:router(config)# class-map qosgroup5
RP/0/RP0/CPU0:router(config-cmap)# match qos-group 5
RP/0/RP0/CPU0:router(config-cmap)# exit
```

match traffic-class

To identify specified traffic-class values as a match criteria in a class map, use the **match traffic-class** command in class map configuration mode. To remove a specified traffic-class value from the matching criteria for a class map, use the **no** form of this command.

match traffic-class *traffic-class-value*
no match traffic-class *traffic-class-value*

Syntax Description

traffic-class-value	Identifier that specifies the exact value from 1 through 7. The class-default in the egress policy maps to 0.

Command Default

None

Command Modes

Class map configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

The **match traffic-class** command is supported only in the egress direction.

The **match traffic-class** command specifies a traffic-class ID that is used as the match criteria against which packets are checked to determine if they belong to the queue set by an ingress policy-map.

To use the **match traffic-class** command, you must first enter the **class-map** command to specify the name of the class whose match criteria you want to establish.

Task ID

Task ID	Operations
qos	read, write

Examples

The following example shows that packets in traffic-class 2 are matched.

```
RP/0/RP0/CPU0:router(config)# class-map match-any rdb
RP/0/RP0/CPU0:router(config-cmap)# match traffic-class 2
RP/0/RP0/CPU0:router(config-cmap)# exit
```

random-detect discard-class

To configure the Weighted Random Early Detection (WRED) thresholds for packets with a specific discard class value, use the **random-detect discard-class** command in policy map class configuration mode. To return the thresholds to the default for the discard class, use the **no** form of this command.

random-detect discard-class *discard-value min-threshold* [*units*] *max-threshold* [*units*]
no random-detect discard-class *discard-value min-threshold* [*units*] *max-threshold* [*units*]

Syntax Description

discard-value	Discard class ID. Prior to IOS XR Release 7.1.1, an integer from 0 through 2, to be marked on the packet. From IOS XR Release 7.1.1, an integer from 0 through 3, to be marked on the packet. (See **Usage Guidelines** below.)
min-threshold	Minimum threshold in number of packets. The value range of this argument is from 0 to 1073741823 in bytes.
max-threshold	Maximum threshold in number of packets. The value range of this argument is from the value of the *min-threshold* argument to 1073741823. When the average queue length exceeds the maximum threshold, WRED drops all packets with the specified discard class value.
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

Command Default

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

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

WRED is a congestion avoidance mechanism that slows traffic by randomly dropping packets when congestion exists. WRED is most useful with protocols like TCP that respond to dropped packets by decreasing the transmission rate.

If you set a discard-class of 3, the packet is dropped at ingress itself.

When you configure the **random-detect discard-class** command on an interface, packets are given preferential treatment based on the discard class of the packet.

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 set the discard class values for discard class 1 to a minimum byte threshold of 1000000 and a maximum byte threshold 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 discard-class 1 1000000 bytes 2000000
bytes
```

set cos

To set the Layer 2 class of service (CoS) value of an outgoing packet, use the **set cos** command in policy map class configuration mode. To remove a specific CoS value setting, use the **no** form of this command.

set cos *cos-value*
no set cos *cos-value*

Syntax Description

cos-value	Specific IEEE 802.1Q CoS value from 0 to 7.

Command Default

No Layer 2 CoS value of an outgoing packet is set.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

Use the **set cos** command to mark a packet that is being sent to a switch. Switches can leverage Layer 2 header information, including a CoS value marking.

The **set cos** command is supported only in the ingress direction. Only unconditional COS marking in the ingress direction is supported.

Task ID

Task ID	Operations
qos	read, write

Examples

In this example, the policy map called cos-set is created to assign different CoS values for different service classes, and then is attached to the output interface HundredGigE 0/0/0/3.

```
RP/0/RP0/CPU0:router(config)# policy-map cos-set
RP/0/RP0/CPU0:router(config-pmap)# class class1...
RP/0/RP0/CPU0:router(config-pmap-c)# set cos 1
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)#set cos 2
RP/0/RP0/CPU0:router(config-pmap-c)#exit
RP/0/RP0/CPU0:router(config-pmap)# interface HundredGigE 0/0/0/3
RP/0/RP0/CPU0:router(config-if)# service-policy input cos-set
```

set dei

To set the drop eligible indicator (DEI) value in a policy map class, use the **set dei** command in policy map class configuration mode. To remove a specified DEI value from a policy map class, use the **no** form of this command.

set dei *value*
no set dei

Syntax Description

value	Value of the DEI bit. Can be 0 or 1.

Command Default

There is no default DEI value; it must be specified.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

The **set dei** command specifies a DEI value in a policy map class. For example, traffic can be policed and the excess traffic can be marked with DEI value of 1, so that it can be preferentially dropped in the egress interface or further downstream, when there is congestion.

Note On NCS 5700 Series Routers, for L3 forwarded packets, the LSB ECN bit is copied to DEI when no egress marking policy with CoS is applied and CoS/DEI is not set from ingress. This is a limitation on ASIC.

Task ID

Task ID	Operation
qos	read, write

Examples

In this example, 802.1ad CoS plus DEI is derived from the incoming 802.1q CoS. Packets with a CoS value of 0 are remarked with a DEI value of 1.

```
RP/0/RP0/CPU0:router(config)# class-map match-any remark-cos
RP/0/RP0/CPU0:router(config-cmap)# match cos 0
RP/0/RP0/CPU0:router(config-cmap)# exit
RP/0/RP0/CPU0:router(config)# policy-map p1
RP/0/RP0/CPU0:router(config-pmap)# class remark-cos
RP/0/RP0/CPU0:router(config-pmap-c)# set dei 1
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config)# interface HundredGigE0/5/0/0.0 l2transport
RP/0/RP0/CPU0:router(config-subif)# encapsulation dot1q 1
```

```
RP/0/RP0/CPU0:router(config-subif)# rewrite ingress tag push dot1ad 5 symmetric
RP/0/RP0/CPU0:router(config-subif)# service-policy input p1
```

set discard-class

To set the discard class and Quality of Service (QoS) group identifiers on IP Version 4 (IPv4) or Multiprotocol Label Switching (MPLS) packets, use the **set discard-class** command in policy map class configuration mode. To leave the discard-class values unchanged, use the **no** form of this command.

set discard-class *discard-class-value*
no set discard-class *discard-class-value*

Syntax Description

discard-class-value	Discard class ID. Prior to IOS XR Release 7.1.1, an integer from 0 through 2, to be marked on the packet. From IOS XR Release 7.1.1, an integer from 0 through 3, to be marked on the packet. (See **Usage Guidelines** below.)

Command Default

No default behavior or values

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **set discard-class** command associates a discard class ID with a packet. After the discard class is set, other QoS services such as Weighted Random Early Detection (WRED) can operate on the bit settings.

If however, you set a discard-class of 3, the packet is dropped at ingress itself.

Discard-class indicates the discard portion of the per hop behavior (PHB). The **set discard-class** command is typically used in Pipe mode. Discard-class is required when the input PHB marking is used to classify packets on the output interface.

The **set discard-class** command is supported only in the ingress direction.Unconditional discard-class marking is supported.

The discard-class values can be used to specify the type of traffic that is dropped when there is congestion.



Note

1. Marking of the discard class has only local significance on a node.
2. Discard class cannot be associated with a QoS profile in peering mode.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to set the discard class value to 1 for packets that match the MPLS experimental bits 1:

```
RP/0/RP0/CPU0:router(config)# class-map cust1
RP/0/RP0/CPU0:router(config-cmap)# match mpls experimental topmost 1
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 cust1
RP/0/RP0/CPU0:router(config-pmap-c)# set discard-class 1
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit
RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# service-policy input policy2
```

set dscp

To mark a packet by setting the IP differentiated services code point (DSCP) in the type of service (ToS) byte, use the **set dscp** command in policy-map class configuration mode. To remove a previously set DSCP value, use the **no** form of this command.

set dscp [**tunnel**] *dscp-value*
no set dscp [**tunnel**] *dscp-value*

Syntax Description

tunnel	(Optional) Sets the DSCP on the outer IP header. This command is available on Layer 3 interfaces in the ingress direction.
dscp-value	Number from 0 to 63 that sets the DSCP value. Reserved keywords can be specified instead of numeric values. Table 1: IP DSCP Reserved Keywords, on page 32 describes the reserved keywords.

Command Default

No default behavior or values

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

While marking a packet, ensure you don't set the IP DSCP (using the **set dscp** command) and the MPLS experimental imposition values (using the **set mpls experimental imposition** command) for the same class map. Else, neither the DSCP remarking nor the MPLS EXP values may take effect at the ingress. This will cause, per default QoS behavior, the IP precedence values to be copied to the EXP bits on the imposed packets. Such an action could lead to unintended packets marked as high-priority by your customer being forwarded as high-priority MPLS packets in the network.

After the DSCP bit is set, other quality-of-service (QoS) services can then operate on the bit settings. The **set dscp** is supported only in the ingress direction.

The network gives priority (or some type of expedited handling) to marked traffic. Typically, you set the DSCP value at the edge of the network (or administrative domain); data then is queued based on the DSCP value.

Task ID

Task ID	Operations
qos	read, write

Examples

In this example, the DSCP ToS byte is set to 6 in the policy map called policy-in. All packets that satisfy the match criteria of class1 are marked with the DSCP value of 6. The network configuration determines how packets are marked.

```
RP/0/RP0/CPU0:router (config)# policy-map policy-in
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:router(config-pmap-c)# set dscp 6
```

set ip encapsulation

To set traffic class imposition for SRv6 encapsulation, use the **set ip encapsulation** command in policy map class configuration mode.

set ip encapsulation class-of-service *cos-value*

Syntax Description

class-of-service	Specifies the class of service.
cos-value	Specifies the number that sets the SRv6 encapsulation in the IP header. The value ranges from 0 to 63.

Command Default

None

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 24.2.1	This command was introduced.

Usage Guidelines

- The **set ip encapsulation class-of-service** command is not allowed in egress QoS policies.
- The IP encapsulation marking (**set ip encapsulation class-of-service**) and the MPLS experimental imposition marking (**set mpls experimental**) features are mutually exclusive. Both the configurations are not allowed at the same time.
- On the NCS 5500 series routers, the **set ip encapsulation class-of-service** command is allowed only when the **policy-map-extend** oprion is enabled. On the NCS 5700series routers, the command is supported in native mode without enabling the **policy-map-extend**.
- The **policy-map-extend** option enables 6-bit DSCP marking for both L2 and L3 modes at the same time. It is not feasible to enable the **policy-map-extend** option exclusively for L2 and L3 modes due to the shared hardware resources for L2 and L3 SRv6 traffic-class.
- To support DSCP marking on the NCS 5700 series routers, the **propagate** option must be enabled in the SRv6 configurations.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to set the traffic class imposition for SRv6 encapsulations.

```
RP/0/RP0/CPU0:router(config)# class-map match-any class1
RP/0/RP0/CPU0:router(config-pmap)# match protocol ipv4
RP/0/RP0/CPU0:router(config-pmap-c)# match access-group ipv4 10
RP/0/RP0/CPU0:router(config-cmap-c)# class class-default
```

```
RP/0/RP0/CPU0:router(config-cmap-c)# end-class-map
RP/0/RP0/CPU0:router(config)# policy-map SRv6
RP/0/RP0/CPU0:router(config-pmap)# class class1
RP/0/RP0/CPU0:router(config-pmap-c)# set ip encapsulation class-of-service 55
RP/0/RP0/CPU0:router(config-cmap-c)# class class-default
RP/0/RP0/CPU0:router(config-cmap-c)# end-policy-map
RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/0/0/24
RP/0/RP0/CPU0:router(config-if)# service-policy input SRv6
```

set mpls experimental imposition

To set the experimental (EXP) value of the Multiprotocol Label Switching (MPLS) packet topmost or imposition labels, use the **set mpls experimental** command in policy map configuration mode. To leave the EXP value unchanged, use the **no** form of this command.

set mpls experimental {**topmost**} *exp-value*
no set mpls experimental {**topmost**} *exp-value*

Syntax Description

topmost	Specifies to set the EXP value of the topmost label.
exp-value	Value of the MPLS packet label. Range is 0 to 7.

Command Default

No MPLS experimental value is set

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

After enabling the QoS peering feature using the **hw-module profile qos ingress-model peering** command, you can set the Layer 2 class of service (CoS) or drop eligible indicator (DEI) values at the egress using the **set cos** or **set dei** commands, respectively. However, at the egress, ensure you don't set the MPLS experimental imposition (EXP) values (using the **set mpls experimental imposition** command). Otherwise, when committing the policy map with these configurations at the egress, you will encounter an error. This error occurs because the internal fields required for egress EXP marking are not available with peering enabled.

While marking a packet, ensure you don't set the IP DSCP (using the **set dscp** command) and the MPLS experimental imposition values (using the **set mpls experimental imposition** command) for the same class map. Else, neither the DSCP remarking nor the MPLS EXP values may take effect at the ingress. This will cause, per default QoS behavior, the IP precedence values to be copied to the EXP bits on the imposed packets. Such an action could lead to unintended packets marked as high-priority by your customer being forwarded as high-priority MPLS packets in the network.

After the MPLS experimental bits are set, other QoS services can then operate on the bit settings.

This command is supported only in ingress direction. Unconditional MPLS experimental marking is supported.

The network gives priority (or some type of expedited handling) to the marked traffic. Typically, the MPLS experimental value is set at the edge of the network (or administrative domain) and queuing is acted on it thereafter.

While upgrading to Release 6.5.3 and above, if `set mpls experimental { topmost } exp-value` command is used in the egress PM of label imposition node, replace it with `set mpls experimental { imposition } exp-value` before the upgrade. Else, configuration fails after upgrade. This is because `set mpls experimental { topmost } exp-value` command does not work in egress.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to set the MPLS experimental to 5 for packets that match access list 101:

```
RP/0/RP0/CPU0:router(config)# class-map class1
RP/0/RP0/CPU0:router(config-cmap)# match access-group ipv4 acl101
RP/0/RP0/CPU0:router(config-cmap)# exit

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)# set mpls experimental topmost 5
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit

RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# service-policy input policy1
```

set precedence

To set the precedence value in the IP header, use the **set precedence** command in policy map class configuration mode. To leave the precedence value unchanged, use the **no** form of this command.

set precedence [**tunnel**] *value*
no set precedence [**tunnel**] *value*

Syntax Description

tunnel	(Optional) Sets the IP precedence on the outer IP header.
value	Number or name that sets the precedence bits in the IP header. Range is from 0 to 7. Reserved keywords can be specified instead of numeric values. Table 2: IP Precedence Values and Names, on page 39 describes the reserved keywords.

Command Default

No default behavior or values

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Precedence can be set using a number or corresponding name. After IP Precedence bits are set, other QoS services can then operate on the bit settings.

The **set precedence** command is supported only in the ingress direction. Unconditional precedence marking is supported.

The network gives priority (or some type of expedited handling) to the marked traffic. IP precedence can be set at the edge of the network (or administrative domain) and have queueing act on it thereafter.

The mapping from keywords such as 0 (routine) and 1 (priority) to a precedence value is useful only in some instances. That is, the use of the precedence bit is evolving. You can define the meaning of a precedence value by enabling other features that use the value. In the case of high-end Internet QoS, IP precedences can be used to establish classes of service that do not necessarily correspond numerically to better or worse handling in the network.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to set the IP precedence to 5 (critical) for packets that match the access control list named customer1:

```
RP/0/RP0/CPU0:router(config)# class-map class1
RP/0/RP0/CPU0:router(config-cmap)# match access-group ipv4 customer1
RP/0/RP0/CPU0:router(config-cmap)# exit
```

```
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)# set precedence 5
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit

RP/0/RP0/CPU0:router(config)# interface HundredGigE 0/1/0/9
RP/0/RP0/CPU0:router(config-if)# service-policy input policy1
```

set qos-group

To set the quality of service (QoS) group identifiers on packets, use the **set qos-group** command in policy map class configuration mode. To leave the QoS group values unchanged, use the **no** form of this command.

set qos-group *qos-group-value*
no set qos-group *qos-group-value*

Syntax Description

qos-group-value	QoS group ID. An integer from 1 to 7, to be marked on the packet. The *qos-group-value* is used to classify traffic and remark it on the egress interface policy.

Command Default

No group ID is specified.

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **set qos-group** command is supported only in the ingress direction.

The **set qos-group** is used to group incoming traffic and then to classify and remark packets on the egress interface

Task ID

Task ID	Operations
qos	read, write

Examples

This example sets the **qos-group** value to 5:

```
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)# set qos-group 5
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit
```

set traffic-class

To set the traffic-class of an ingress packet to allow for its subsequent classification into the correct egress queue in the egress QoS-policy, use the **set traffic-class** command in policy map class configuration mode. To remove a specific traffic-class value setting, use the **no** form of this command.

set traffic-class *traffic-class-value*
no set traffic-class *traffic-class-value*

Syntax Description

traffic-class-value	Value from 0 through 7.

Command Default

None

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

If you set a traffic class at the ingress policy and don’t have a matching class at egress for the corresponding traffic class value, then the traffic at ingress with this class isn't accounted for in the default class at the egress policy map.

The **set traffic-class** command is supported only on ingress policies.

If the ingress policy doesn't explicitly set the traffic-class value, it’s implicitly set to 0.

Task ID

Task ID	Operations
qos	read, write

Examples

In this example, traffic is set to the traffic-class value of 3.

```
RP/0/RP0/CPU0:router(config)# policy-map pm2
RP/0/RP0/CPU0:router(config-pmap)# class class-default
RP/0/RP0/CPU0:router(config-pmap-c)# set traffic-class 3
RP/0/RP0/CPU0:router(config-pmap-c)# exit
RP/0/RP0/CPU0:router(config-pmap)# exit
```

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* } { **peak burst size** *units* }
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.
peak burst size	Specifies maximum burst size for the egress shaper. Values can be from 1 to 4294967295.
value	(Optional) Units for the bandwidth. Values can be: • **Bytes**—Bytes (default) • **Kbytes**—Kilobytes • **Ms**—Milliseconds • **packets**—Packets • **us**—Microseconds

Command Default

units: **bps**

Command Modes

Policy map class configuration

Command History

Release	Modification
Release 6.0	This command was introduced.
Release 6.6.25	Added absolute rate units for shaper on bundle and link aggregation (LAG) interfaces.

Release	Modification
Release 7.2.1	Added peak burst size for egress shaper.

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.

The default burst size is bytes (when no unit is specified).

The per-class statistics for a shaper action do not reflect the Layer 1 header and the overhead bytes (if any configured) even though the shaper includes them in the rate calculation.

From Release 7.11.1, for Hierarchical QoS (H-QoS) and egress traffic management (ETM) models:

- Port shaper and burst on a particular physical interface are programmed when an egress policy map with only a **class-default** configuration and a configured shaper value is applied on that interface.
- The shaper rate on the default class is calculated as the port shaper and the burst as the port burst.

From Release 7.11.1, for non-H-QoS and non-ETM models:

- Port level burst on a particular interface is programmed when you configure it along with port shaper.
- You must attach an egress QoS parent policy map to the main interface.
- The shaper rate on the parent policy configured for the default class is considered as port shaper and the burst as port burst.

Task ID

Task ID	Operations
qos	read, write

Examples

This example sets traffic shaping to 50 percent of the parent shaper rate milliseconds and peak burst for egress shaping to 1000:

```
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 1000
```

This example shows how to set traffic shaping to 100000 kbps and peak burst for egress shaping to 1000:

```
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 1000
```

show qos hw-module-status

To display all the QoS hardware module profile names on the router and to know if the profile is configured on the router, and whether it requires a reboot, use the **show qos hw-module-status** command in the XR EXEC mode.

show qos hw-module-status [**location** *node-id*]

Syntax Description

location *node-id*	(Optional) Displays detailed QoS hardware module profile information for the designated node. The *node-id* argument is entered in the *rack/slot/module/port* notation.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 25.3.1	Added **ingress-fadt-set** entry in the CLI output to display configuration and applied status of the fair adaptive drop threshold profile.
Release 7.8.1	This command was introduced. Applicable to NCS 540 variants only.

Usage Guidelines

The **show qos hw-module-status** command displays all QoS hardware module profile names on the router. The router must be reloaded for the **hw-module** profiles to be functional.

Task ID

Task ID	Operations
qos	read

Examples

This is the sample output of **show qos hw-module-status** command, displaying QoS hardware module profile names configured on the router. Following are the fields that are displayed:

- **hw-module profile**: Displays all the QoS hardware module profile names.
- **Configured**: Displays whether the profile is configured by the user, and if it's present in the router or not.
- **Applied**: Displays whether the configuration is applied on the router or not.
- **Action**: Displays whether the router needs a reboot or not.

```
RP/0/RP0/CPU0:router# show qos hw-module-status location 0/0/CPU0
-------------------------------------------------------------------------------------------
hw-module profile                    Configured          Applied            Action
-------------------------------------------------------------------------------------------
hqos-enable                           Yes                 Yes                None
```

```
physical-hqos-enable                Yes                 Yes                 None
wred-stats-enable                   No                  No                  None
qos-stats-collection                No                  No                  None
arp-isis-priority-enable            No                  No                  None
conform-aware-policer               No                  No                  None
ecn_marking_stats                   Yes                 Yes                 None
gre_exp_classification_enable       No                  No                  None
shared-policer-per-class-stats      No                  No                  None
ipv6_short                          No                  No                  None
qos_ipv6_short_etm_profile          Yes                 Yes                 None
short_l2qos_enable                  No                  No                  None
l2_match_dest_addr_v4v6             No                  No                  None
stats qos_enhanced                  No                  No                  None
free-buffer-int-threshold           No                  No                  None
qosg-dscp-mark-enable               Yes                 Yes                 None
ingress_qos_model                   No                  Yes-DEFAULT         None
ingress_fadt_set                    No                  Yes-DEFAULT         None
max-classmap-size                   No                  Yes                 None
etm_low_rate_connector              No                  No                  None
```