



# OcNOS®

## Open Compute Network Operating System for Data Centers Version 7.0.0

Quality of Service Guide

February 2026

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# Preface

This guide describes how to configure OcNOS.

## Audience

This guide is intended for network administrators and other engineering professionals who configure OcNOS.

## Conventions

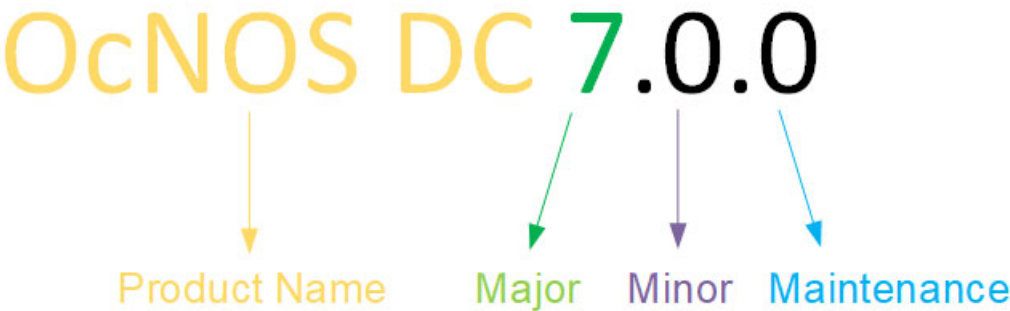
Table 1 on page 8 shows the conventions used in this guide.

Table 1: Conventions

Convention	Description
Italics	Emphasized terms or titles of books
Note:	Special instructions, suggestions, or warnings
<code>monospaced type</code>	Code elements such as commands, parameters, files, and directories

## IP Infusion Product Release Version

Each integer in release number indicates Major, Minor, and Maintenance release versions. Build numbers that follow the release numbers are for internal tracking and verification of the software build process and are visible to customers as part of the software version number.



**Product Name:** IP Infusion Product Family

**Major Version:** New customer-facing functionality that represents a significant change to the code base; including, a significant marketing change or direction in the product.



**Minor Version:** Enhancements or extensions to existing features, changes to address external needs, or internal improvements might be motivated by improvements to satisfy new sales regions or marketing initiatives.

**Maintenance Version:** A collection of product bugs or hotfixes usually scheduled every 30 or 60 days, based on the number of hotfixes.

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## Related Documentation

For information about installing OcNOS, see the *Installation Guide* for your platform.

---

## Feature Availability

Each OcNOS SKU contains a set of supported features. For a list of available features based on the SKU that you purchased. Refer to the *Feature Matrix*.

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## Migration Guide

Check the *Migration Guide* for necessary configuration changes before migrating from one version of OcNOS to another.

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## IP Maestro Support

Monitor devices running OcNOS Release 6.3.4-70 and above using IP Maestro software.

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## Technical Support

IP Infusion maintains an online technical support site that provides a variety of technical support programs for licensed OcNOS customers at the [Technical Assistance Center](#).

Customers and partners enjoy full access to the support website. The site allows customers and partners to open technical support calls, update open calls with new information, and review the status of open or closed calls. The password-protected site includes technical documentation, Release Notes, and descriptions of service offerings.

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## Technical Sales

Contact the IP Infusion sales representative for more information about the OcNOS solution.

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## Technical Documentation

For core commands and configuration procedures, visit: [Product Documentation](#).

For training videos, visit: [OcNOS Free Training Videos](#).

For a list of supported platforms and SKUs of OcNOS features, refer to the [OcNOS Feature Matrix](#).

**Disclaimer**

The global documentation site is evolving to provide an enhanced website user experience for select topics included in this release. Some guides are now available outside the existing documentation library and can be accessed directly from custom documentation landing pages. These guides offer robust in-built search functionality.

For the latest documentation, visit the product-specific documentation landing page and select the relevant guide.

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If you have comments, or need to report a problem with the content, contact [techpubs@ipinfusion.com](mailto:techpubs@ipinfusion.com).

# Command Line Interface

This chapter introduces the OcNOS Command Line Interface (CLI) and how to use its features.

## Overview

You use the CLI to configure, monitor, and maintain OcNOS devices. The CLI is text-based and each command is usually associated with a specific task.

You can give the commands described in this manual locally from the console of a device running OcNOS or remotely from a terminal emulator such as `putty` or `xterm`. You can also use the commands in scripts to automate configuration tasks.

## Chapter Organization

The chapters in command references are organized as described in [Command Description Format](#).

The chapters in configuration guides are organized into these major sections:

- An overview that explains a configuration in words
- Topology with a diagram that shows the devices and connections used in the configuration
- Configuration steps in a table for each device where the left-hand side shows the commands you enter and the right-hand side explains the actions that the commands perform
- Validation which shows commands and their output that verify the configuration

## Command Line Interface Help

You access the CLI help by entering a full or partial command string and a question mark “?”. The CLI displays the command keywords or parameters along with a short description. For example, at the CLI command prompt, type:

```
> show ?
```

The CLI displays this keyword list with short descriptions for each keyword:

show ?	
application-priority	Application Priority
arp	Internet Protocol (IP)
bfd	Bidirectional Forwarding Detection (BFD)
bgp	Border Gateway Protocol (BGP)
bi-lsp	Bi-directional lsp status and configuration
bridge	Bridge group commands
ce-vlan	COS Preservation for Customer Edge VLAN
class-map	Class map entry
cli	Show CLI tree of current mode
clns	Connectionless-Mode Network Service (CLNS)
control-adjacency	Control Adjacency status and configuration
control-channel	Control Channel status and configuration
cspf	CSPF Information
customer	Display Customer spanning-tree
cvlan	Display CVLAN information
debugging	Debugging functions

```

etherchannel      LACP etherchannel
ethernet          Layer-2
...

```

If you type the ? in the middle of a keyword, the CLI displays help for that keyword only.

```

> show de?
debugging  Debugging functions

```

If you type the ? in the middle of a keyword, but the incomplete keyword matches several other keywords, OcNOS displays help for all matching keywords.

```

> show i? (CLI does not display the question mark).
interface  Interface status and configuration
ip          IP information
isis       ISIS information

```

---

## Command Completion

The CLI can complete the spelling of a command or a parameter. Begin typing the command or parameter and then press the tab key. For example, at the CLI command prompt type `sh`:

```
> sh
```

Press the tab key. The CLI displays:

```
> show
```

If the spelling of a command or parameter is ambiguous, the CLI displays the choices that match the abbreviation. Type `show i` and press the tab key. The CLI displays:

```

> show i
interface  ip          ipv6      isis
> show i

```

The CLI displays the `interface` and `ip` keywords. Type `n` to select `interface` and press the tab key. The CLI displays:

```

> show in
> show interface

```

Type `?` and the CLI displays the list of parameters for the `show interface` command.

```

> show interface
IFNAME  Interface name
|       Output modifiers
>       Output redirection
<cr>

```

The CLI displays the only parameter associated with this command, the `IFNAME` parameter.

---

## Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands. For example:

```
> sh int xe0
```

is an abbreviation for:

```
> show interface xe0
```

## Command Line Errors

Any unknown spelling causes the CLI to display the error `Unrecognized command` in response to the `?`. The CLI displays the command again as last entered.

```
> show dd?
% Unrecognized command
> show dd
```

When you press the Enter key after typing an invalid command, the CLI displays:

```
(config)#router ospf here
                        ^
% Invalid input detected at '^' marker.
```

where the ^ points to the first character in error in the command.

If a command is incomplete, the CLI displays the following message:

```
> show
% Incomplete command.
```

Some commands are too long for the display line and can wrap mid-parameter or mid-keyword, as shown below. This does *not* cause an error and the command performs as expected:

```
area 10.10.0.18 virtual-link 10.10.0.19 authent
ication-key 57393
```

## Command Negation

Many commands have a `no` form that resets a feature to its default value or disables the feature. For example:

- The `ip address` command assigns an IPv4 address to an interface
- The `no ip address` command removes an IPv4 address from an interface

## Syntax Conventions

[Table 2](#) on page 13 describes the conventions used to represent command syntax in this reference.

**Table 2: Syntax conventions**

Convention	Description	Example
monospaced font	Command strings entered on a command line	<code>show ip ospf</code>
lowercase	Keywords that you enter exactly as shown in the command syntax.	<code>show ip ospf</code>
UPPERCASE	See <a href="#">Variable Placeholders</a>	<code>IFNAME</code>
( )	Optional parameters, from which you must select one. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	<code>(A.B.C.D &lt;0-4294967295&gt;)</code>

**Table 2: Syntax conventions (Continued)**

Convention	Description	Example
( )	Optional parameters, from which you select one or none. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	(A.B.C.D <0-4294967295> )
()	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	(IFNAME )
{ }	Optional parameters, from which you must select one or more. Vertical bars delimit the selections. Do not enter the braces or vertical bars as part of the command.	{intra-area <1-255> inter-area <1-255> external <1-255>}
[ ]	Optional parameters, from which you select zero or more. Vertical bars delimit the selections. Do not enter the brackets or vertical bars as part of the command.	[<1-65535> AA:NN internet local-AS no-advertise no-export]
?	Nonrepeatable parameter. The parameter that follows a question mark can only appear once in a command string. Do not enter the question mark as part of the command.	?route-map WORD
.	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	set as-path prepend .<1-65535>

## Variable Placeholders

Table 3 on page 14 shows the tokens used in command syntax use to represent variables for which you supply a value.

**Table 3: Variable placeholders**

Token	Description
WORD	A contiguous text string (excluding spaces)
LINE	A text string, including spaces; no other parameters can follow this parameter
IFNAME	Interface name whose format varies depending on the platform; examples are: eth0, Ethernet0, ethernet0, xe0
A.B.C.D	IPv4 address
A.B.C.D/M	IPv4 address and mask/prefix
X:X::X:X	IPv6 address
X:X::X:X/M	IPv6 address and mask/prefix
HH:MM:SS	Time format

**Table 3: Variable placeholders**

Token	Description
AA:NN	BGP community value
XX:XX:XX:XX:XX:XX	MAC address
<1-5> <1-65535> <0-2147483647> <0-4294967295>	Numeric range

---

## Command Description Format

[Table 4](#) on page 15 explains the sections used to describe each command in this reference.

**Table 4: Command descriptions**

Section	Description
<b>Command Name</b>	The name of the command, followed by what the command does and when should it be used
<b>Command Syntax</b>	The syntax of the command
<b>Parameters</b>	Parameters and options for the command
<b>Default</b>	The state before the command is executed
<b>Command Mode</b>	The mode in which the command runs; see <a href="#">Command Modes</a>
<b>Applicability</b>	The command introduced in a specific release version and modified or updated in subsequent versions.
<b>Example</b>	An example of the command being executed

---

## Keyboard Operations

[Table 5](#) on page 15 lists the operations you can perform from the keyboard.

**Table 5: Keyboard operations**

Key combination	Operation
Left arrow or Ctrl+b	Moves one character to the left. When a command extends beyond a single line, you can press left arrow or Ctrl+b repeatedly to scroll toward the beginning of the line, or you can press Ctrl+a to go directly to the beginning of the line.
Right arrow or Ctrl+f	Moves one character to the right. When a command extends beyond a single line, you can press right arrow or Ctrl+f repeatedly to scroll toward the end of the line, or you can press Ctrl+e to go directly to the end of the line.

**Table 5: Keyboard operations (Continued)**

Key combination	Operation
Esc, b	Moves back one word
Esc, f	Moves forward one word
Ctrl+e	Moves to end of the line
Ctrl+a	Moves to the beginning of the line
Ctrl+u	Deletes the line
Ctrl+w	Deletes from the cursor to the previous whitespace
Alt+d	Deletes the current word
Ctrl+k	Deletes from the cursor to the end of line
Ctrl+y	Pastes text previously deleted with Ctrl+k, Alt+d, Ctrl+w, or Ctrl+u at the cursor
Ctrl+t	Transposes the current character with the previous character
Ctrl+c	Ignores the current line and redisplay the command prompt
Ctrl+z	Ends configuration mode and returns to exec mode
Ctrl+l	Clears the screen
Up Arrow or Ctrl+p	Scroll backward through command history
Down Arrow or Ctrl+n	Scroll forward through command history

## Show Command Modifiers

**Note:** The show command output included in the guides is for illustration purposes only. Based on the combination of features enabled and ongoing enhancements made to the commands, the output for these commands may vary. For instance, the actual command output may differ depending on the software version, configuration, and platform. Field names, values, and formats are subject to change.

You can use two tokens to modify the output of a `show` command. Enter a question mark to display these tokens:

```
# show users ?
| Output modifiers
> Output redirection
```

You can type the | (vertical bar character) to use output modifiers. For example:

```
> show rsvp | ?
begin      Begin with the line that matches
exclude    Exclude lines that match
include    Include lines that match
last       Last few lines
redirect   Redirect output
```



---

## Begin Modifier

The `begin` modifier displays the output beginning with the first line that contains the input string (everything typed after the `begin` keyword). For example:

```
# show running-config | begin xe1
...skipping
interface xe1
  ipv6 address fe80::204:75ff:fee6:5393/64
!
interface xe2
  ipv6 address fe80::20d:56ff:fe96:725a/64
!
line con 0
  login
!
end
```

You can specify a regular expression after the `begin` keyword. This example begins the output at a line with either “xe2” or “xe4”:

```
# show running-config | begin xe[2-4]

...skipping
interface xe2
  shutdown
!
interface xe4
  shutdown
!
interface svlan0.1
  no shutdown
!
route-map myroute permit 2
!
route-map mymap1 permit 10
!
route-map rmap1 permit 2
!
line con 0
  login
line vty 0 4
  login
!
end
```

---

## Include Modifier

The `include` modifier includes only those lines of output that contain the input string. In the output below, all lines containing the word “input” are included:

```
# show interface xe1 | include input
  input packets 80434552, bytes 2147483647, dropped 0, multicast packets 0
  input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 1, missed 0
```

You can specify a regular expression after the `include` keyword. This examples includes all lines with “input” or “output”:

```
#show interface xe0 | include (in|out)put
input packets 597058, bytes 338081476, dropped 0, multicast packets 0
input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
output packets 613147, bytes 126055987, dropped 0
output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
```

---

## Exclude Modifier

The `exclude` modifier excludes all lines of output that contain the input string. In the following output example, all lines containing the word “input” are excluded:

```
# show interface xe1 | exclude input
Interface xe1
Scope: both
Hardware is Ethernet, address is 0004.75e6.5393
index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
VRF Binding: Not bound
Administrative Group(s): None
DSTE Bandwidth Constraint Mode is MAM
inet6 fe80::204:75ff:fee6:5393/64
output packets 4438, bytes 394940, dropped 0
output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
collisions 0
```

You can specify a regular expression after the `exclude` keyword. This example excludes lines with “output” or “input”:

```
# show interface xe0 | exclude (in|out)put
Interface xe0
Scope: both
Hardware is Ethernet Current HW addr: 001b.2139.6c4a
Physical:001b.2139.6c4a Logical:(not set)
index 2 metric 1 mtu 1500 duplex-full arp ageing timeout 3000
<UP,BROADCAST,RUNNING,MULTICAST>
VRF Binding: Not bound
Bandwidth 100m
DHCP client is disabled.
inet 10.1.2.173/24 broadcast 10.1.2.255
VRRP Master of : VRRP is not configured on this interface.
inet6 fe80::21b:21ff:fe39:6c4a/64
collisions 0
```

---

## Redirect Modifier

The `redirect` modifier writes the output into a file. The output is not displayed.

```
# show cli history | redirect /var/frame.txt
```

The output redirection token (`>`) does the same thing:

```
# show cli history >/var/frame.txt
```

---

## Last Modifier

The `last` modifier displays the output of last few number of lines (As per the user input). The last number ranges from 1 to 9999.

For example:

```
#show running-config | last 10
```

---

## String Parameters

The restrictions in [Table 6](#) on page 19 apply for all string parameters used in OcNOS commands, unless some other restrictions are noted for a particular command.

**Table 6: String parameter restrictions**

Restriction	Description
Input length	1965 characters or less
Restricted special characters	"?", ",", ">", " ", and "="  The " " character is allowed only for the <code>description</code> command in interface mode.

---

## Command Modes

Commands are grouped into modes arranged in a hierarchy. Each mode has its own set of commands. [Table P-7](#) lists the command modes common to all protocols.

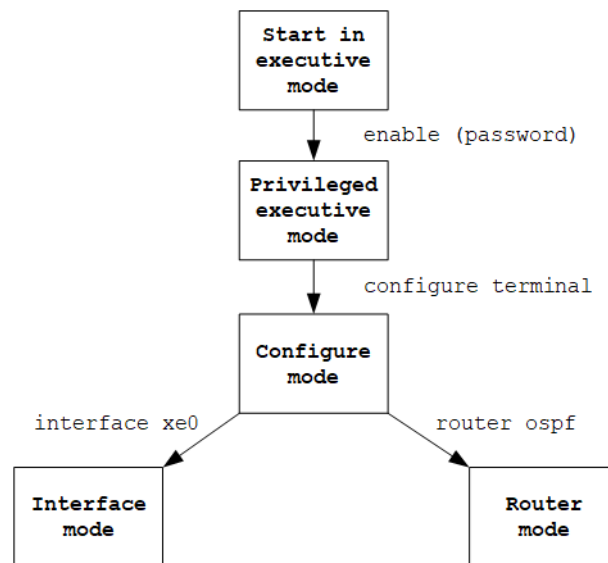
**Table 7: Common command modes**

Name	Description
Executive mode	Also called <i>view</i> mode, this is the first mode to appear after you start the CLI. It is a base mode from where you can perform basic commands such as <code>show</code> , <code>exit</code> , <code>quit</code> , <code>help</code> , and <code>enable</code> .
Privileged executive mode	Also called <i>enable</i> mode, in this mode you can run additional basic commands such as <code>debug</code> , <code>write</code> , and <code>show</code> .
Configure mode	Also called <i>configure terminal</i> mode, in this mode you can run configuration commands and go into other modes such as interface, router, route map, key chain, and address family.  Configure mode is single user. Only one user at a time can be in configure mode.
Interface mode	In this mode you can configure protocol-specific settings for a particular interface. Any setting you configure in this mode overrides a setting configured in router mode.
Router mode	This mode is used to configure router-specific settings for a protocol such as BGP or OSPF.

---

## Command Mode Tree

The diagram below shows the common command mode hierarchy.



**Figure 1: Common command modes**

To change modes:

1. Enter privileged executive mode by entering `enable` in Executive mode.
2. Enter configure mode by entering `configure terminal` in Privileged Executive mode.

The example below shows moving from executive mode to privileged executive mode to configure mode and finally to router mode:

```
> enable mypassword
# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
(config)# router ospf
(config-router)#
```

**Note:** Each protocol can have modes in addition to the common command modes. See the command reference for the respective protocol for details.

---

## Transaction-based Command-line Interface

The OcNOS command line interface is transaction based:

- Any changes done in configure mode are stored in a separate *candidate* configuration that you can view with the `show transaction current` command.
- When a configuration is complete, apply the candidate configuration to the running configuration with the `commit` command.
- If a `commit` fails, no configuration is applied as the entire transaction is considered failed. You can continue to change the candidate configuration and then retry the `commit`.
- Discard the candidate configuration with the `abort transaction` command.
- Check the last aborted transaction with the `show transaction last-aborted` command.
- Multiple configurations cannot be removed with a single `commit`. You must remove each configuration followed by a `commit`.

**Note:** All commands MUST be executed only in the default CML shell (`cmlsh`). If you log in as root and start `imish`, then the system configurations will go out of sync. The `imish` shell is not supported and should not be started manually.

# Quality of Service Configuration

---

## CHAPTER 1 QoS Introduction

---

This chapter contains a general overview of QoS functionality and terminology.

---

### QoS Functionality

Quality of Service (QoS) can be used to give certain traffic priority over other traffic. Without QoS, all traffic in a network has the same priority and chance of being delivered on time. If congestion occurs, all traffic has the same chance of being dropped. With QoS, specific network traffic can be prioritized to receive preferential treatment. In turn, a network performs more predictably, and utilizes bandwidth more effectively.

QoS is based on DiffServ architecture, which stipulates that individual packets be classified upon entry into a network. Classification information can be carried in the Layer-3 IP packet header or the Layer-2 frame. IP packet headers carry the information using 6-bits from the deprecated IP type of service (TOS) field. Layer-2 802.1Q frames carry the information using a 2-byte Tag Control Information field. All switches and routers accessing the Internet depend on class information to give the same forwarding treatment to packets with the same class information, and give different treatment to packets with different class information. A packet can be assigned class information, as follows:

- End hosts or switches along a path, based on a configured policy
- Detailed packet examination, expected to occur nearer to the network edge, to prevent overloading core switches and routers
- A combination of the above two techniques

Class information can be used by switches and routers along a path to limit the amount of allotted resources per traffic class. Per-hop behavior is an individual device's behavior when handling traffic in the DiffServ architecture. An end-to-end QoS solution can be created if all devices along a path have consistent per-hop behavior.

---

### Terminology

Following is a brief description of terms and concepts used to describe QoS.

---

#### ACL

Access control lists (ACLs) classify traffic with the same characteristics. IP traffic is classified using IP standard or IP extended ACLs. The ACL can have multiple access control entries (ACEs), which are commands that match fields against the contents of the packet. It is not possible to match IP fragments against configured IP extended ACLs to enforce QoS, but it is possible to match IP options against configured IP extended ACLs to enforce QoS.

---

#### CoS Value

Class of Service (CoS) is a 3-bit value used to classify the priority of Layer-2 frames upon entry into a network. QoS classifies frames by assigning priority-indexed CoS values to them, and gives preference to higher-priority traffic. Layer-2 802.1Q frame headers have a 2-byte Tag Control Information field that carries the CoS value in the three most-significant bits, called the User Priority bits. On interfaces configured as Layer-2 802.1Q trunks, all traffic is in 802.1Q frames, except for traffic in the native VLAN. Other frame types cannot carry Layer-2 CoS values. CoS values range from zero to seven, seven being the highest priority.

---

## DSCP Value

Differentiated Services Code Point (DSCP) is a 6-bit value used to classify the priority of Layer-3 packets upon entry into a network. DSCP values range from 0 to 63, 63 being the highest priority, 0 being best-effort traffic.

---

## Classification

Classification distinguishes one kind of traffic from another by examining the fields in the packet. The process generates an internal DSCP for a packet, which identifies all future QoS actions to be taken on the packet. Each packet is classified upon entry into the network. At the ingress, the packet is inspected, and the DSCP is determined based on ACLs or the configuration. The Layer-2 CoS value is then mapped to a DSCP value. The classification is carried in the IP packet header using 6 bits from the deprecated IP TOS field to carry the classification information. Classification can also occur in the Layer-2 frame. Classification is enabled only if QoS is globally enabled on the switch. By default, QoS is globally disabled, thus, no classification occurs. Classification occurs on an ingress physical port, but not at the switch virtual interface level. Classification can be based on QoS ACLs, or class maps and policy maps.

---

## Policing

Policing determines whether a packet is in or out of profile by comparing the internal DSCP to the configured policer. Policer limits the bandwidth consumed by a traffic flow with the results given to the marker. The two types of policers:

- Individual: QoS applies the bandwidth limits specified in the policer, separately, to each matched traffic class. An individual policer is configured within a policy map.
- Aggregate: QoS applies the bandwidth limits specified in an aggregate policer, cumulatively, to all matched traffic flows. An aggregate policer is configured by specifying the policer name within a policy map. The bandwidth limits of the policer are specified. In this way, multiple classes of traffic across policy map share the aggregate policer.

Policing and policers have the following attributes:

- Policers can occur only on a physical port basis.
- Policing can occur on ingress interfaces.
- Only one policer can be applied to a packet per direction.

---

## Marking

Marking determines how to handle a packet when it is out of profile. It assesses the policer and the configuration data to determine the action required for the packet, and then handles the packet using one of the following methods:

- Let the packet through without modification
- Drop the packet

Marking can occur on ingress and egress interfaces.

---

## Queuing

Queuing maps packets to a CoS queue. Each egress port can accommodate up to 8 CoS queues, prioritized as 0 lowest and 7 highest. The tagged packet incoming priority can be mapped to one of the 8 queues obtained from the filtering mechanism result. The untagged packet CoS priority is also obtained from the filtering mechanism result. After the packets are mapped to a CoS queue, they are scheduled.



---

## Bandwidth Reservation

Bandwidth reservation is the minimum guaranteed bandwidth allocated per queue. Total guaranteed bandwidth of all the queues belonging to a particular port should not exceed the interface Bandwidth. In case if no Bandwidth reservation is done for the queue, minimum guaranteed per each queue will be 1% of the parent node [scheduling node or interface]

---

## Scheduling

Scheduling forwards or conditions packets using one of the following methods:

- Strict Priority-Based (SP), in which any high-priority packets are first transmitted. Lower-priority packets are transmitted only when the higher-priority queues are empty. A problem may occur when too many lower-priority packets are not transmitted. Strict Priority will be operating on the remaining bandwidth available for the Port
- Weighted Round Robin (WRR), in which each queue is assigned a weight to control the number of packets relatively sent from each queue. The weights assigned for the queues will be in the ratio of bandwidth reservation of those queues
- Combination of WRR and SP, the Remaining Bandwidth will be scheduled in the strict order for the SP Queues. The Remaining Bandwidth will be scheduled in the WRR mode for WRR Queues.

---

## Class Map

A class map names and isolates specific traffic from other traffic. The class map defines the criteria used to match against a specific traffic flow to classify it further. The criteria can include:

- Matching the access group defined by the ACL
- Matching a specific list of DSCP values

If there is more than one type of traffic to be classified, another class map can be created under a different name. After a packet is matched against the class-map criteria, it is further classified using a policy map.

---

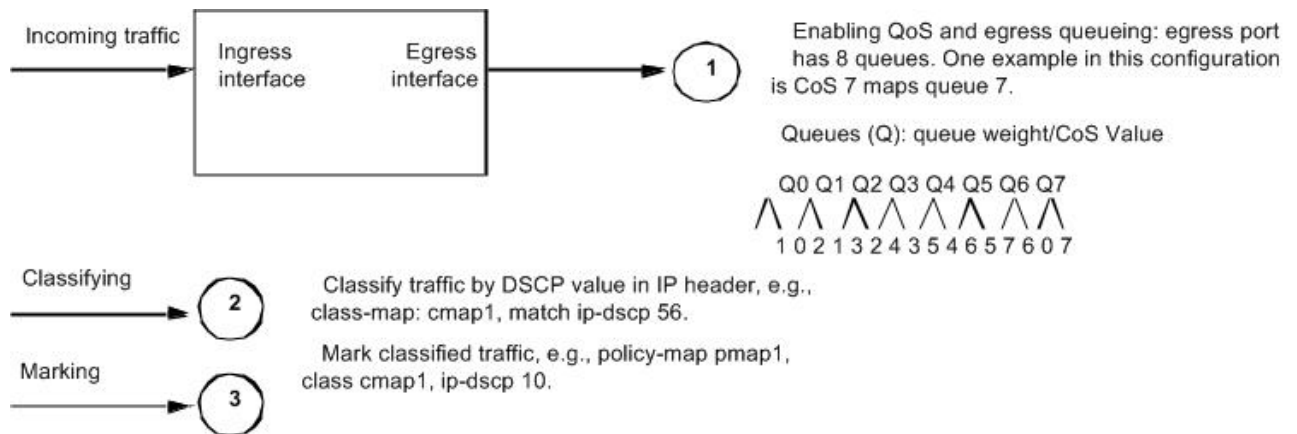
## Policy Map

A policy map specifies on which traffic class to act. This can be implemented as follows:

- Set a specific CoS or DSCP value in the traffic class.
- Specify the traffic bandwidth limitations for each matched traffic class (policer) and the action to take (marking) when the traffic is out of profile.

Policy maps have the following attributes:

- A policy map can contain multiple class statements, each with different match criteria and policers.
- A separate policy-map class can exist for each type of traffic received through an interface.
- There can be only one policy map per interface per direction. The same policy map can be applied to multiple interfaces and directions.
- Before a policy map can be effective, it must be attached to an interface.



## Enable/Disable Configuration

### Topology



Figure 1-1: Simple configuration of QoS

### Enabling QoS

The following steps describe how to enable QoS.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable (H)QoS on configuration mode.
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
qos enable
!
```

### Disabling QoS

The following steps disable QoS.

#configure terminal	Enter configure mode.
---------------------	-----------------------

(config)#qos disable	Disable (H)QoS on configuration mode.
(config)#exit	Exit configure mode.

## Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
% QoS is not enabled globally
```

## QoS Statistics Configuration

This section show how to enable QoS statistics.

### Topology



Figure 1-2: Simple configuration of QoS

### Enabling QoS Statistics

The following steps describe how to enable QoS Statistics.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics on configuration mode.
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
qos enable
qos statistics
!
```

## CHAPTER 2 Dscp-to-queue Map Profile Configuration

This chapter contains a complete sample of configuring Dscp-to-queue map profile.

### Topology

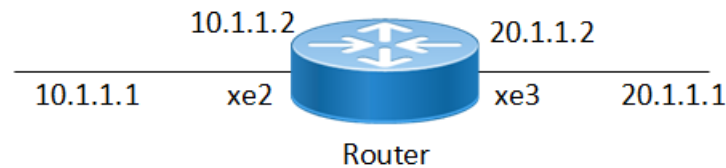


Figure 2-3: Simple configuration of Dscp-to-queue map

### Configuration of dscp-to-queue Map Profile on configuration mode

The following steps describe how to configure dscp-to-queue map on configuration mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#qos profile dscp-to-queue Profile1	Enter Dscp to queue map profile configuration mode
(config)#qos profile dscp-to-queue Dscp2queue	Enter dscp-to-queue profile configuration mode
(config-ingress-dscp-map)#dscp 10 queue 5	Map dscp 10 to queue 5
(config-ingress-dscp-map)#exit	Exit dscp-to-queue profile configure mode.
(config)#qos profile dscp-to-queue Profile3	Enter Dscp to queue map profile configuration mode
(config-ingress-dscp-map)#dscp 24 queue 6 color green	Map dscp 24 to queue 6 for green packets
(config-ingress-dscp-map)#exit	Exit dscp-to-queue profile configure mode
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```

#show running-config qos
qos enable
qos statistics
!
qos profile dscp-to-queue Profile1
  dscp 10 queue 5
!
qos profile dscp-to-queue Profile3
  dscp 24 queue 6 color green
  
```

## Configuration of dscp-to-queue Map Profile on Interface mode

The following steps describe how to configure dscp-to-queue map profile on interface mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#interface xe2	Enter interface mode.
(config-if)#qos map-profile dscp-to-queue Profile1	Map dscp-to-queue profile to the interface
(config-if)#exit	Exit interface mode.
(config)#exit	Exit configure mode.
(config)#interface xe3	Enter interface mode,
(config-if)#qos map-profile dscp-to-queue Profile3	Map dscp-to-queue profile to the interface
(config-if)#exit	Exit interface mode

## Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
qos enable
qos statistics
!
qos profile dscp-to-queue Profile1
  dscp 10 queue 5
!
!
!
interface xe2
  qos map-profile dscp-to-queue Profile1
!
interface xe3
  qos map-profile dscp-to-queue Profile3
!
```

```
#show qos-profile type dscp-to-queue Profile1
profile name: Profile1
profile type: dscp-to-queue
profile attached to 1 instances
configured mapping:
  dscp 10 queue 5
Detailed mapping:
```

Ingress map for dscp to queue-color

INPUT			OUTPUT			INPUT			OUTPUT			INPUT			OUTPUT		
DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color
0	0	green	16	2	green	32	4	green	48	6	green						
1	0	green	17	2	green	33	4	green	49	6	green						
2	0	green	18	2	green	34	4	green	50	6	green						
3	0	green	19	2	green	35	4	green	51	6	green						

4	0	green		20	2	yellow		36	4	yellow		52	6	green
5	0	green		21	2	green		37	4	green		53	6	green
6	0	green		22	2	red		38	4	red		54	6	green
7	0	green		23	2	green		39	4	green		55	6	green
8	1	green		24	3	green		40	5	green		56	7	green
9	1	green		25	3	green		41	5	green		57	7	green
10	5	green		26	3	green		42	5	green		58	7	green
11	1	green		27	3	green		43	5	green		59	7	green
12	1	yellow		28	3	yellow		44	5	green		60	7	green
13	1	green		29	3	green		45	5	green		61	7	green
14	1	red		30	3	red		46	5	green		62	7	green
15	1	green		31	3	green		47	5	green		63	7	green

## CHAPTER 3 Cos-to-queue Map Configuration

This chapter contains a complete sample of configuring Cos-to-queue map.

### Topology

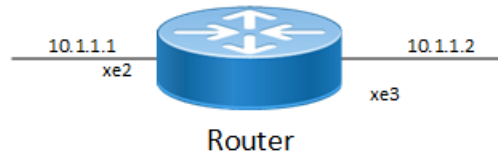


Figure 3-4: Simple configuration of CoS

### Configuration of Cos-to-queue Map on configuration mode

The following steps describe how to configure Cos-to-queue map on configuration mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#qos profile cos-to-queue Profile2	Enter cos-to-queue profile configuration mode
(config-ingress-cos-map)#cos 2 queue 4	Map cos 2 to queue 4 under cos-to-queue profile configuration mode
(config-ingress-cos-map)#exit	Exit configure mode.
(config)#qos profile cos-to-queue Profile4	Enter cos-to-queue profile configuration mode
(config-ingress-cos-map)#cos 3 queue 4 color yellow	Map cos 3 to queue 4 for yellow packets
(config-ingress-cos-map)#exit	Exit cos-to-queue map profile configuration
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos qos enable
qos statistics
!
qos profile cos-to-queue Profile2
  cos 2 dei all queue 4
  qos map cos 2 queue 4
!
qos profile cos-to-queue Profile4
  cos 3 dei all queue 4 color yellow
!
```

## Configuration of Cos-to-queue Map Profile on Interface mode

The following steps describe how to configure Cos-to-queue map profile on interface mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure the port as switchport
(config-if)#qos map-profile cos-to-queue Profile2	Map cos-to-queue profile on the interface
(config-if)#exit	Exit interface mode.
(config)#exit	Exit configure mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure the port as switchport
(config-if)#qos map-profile cos-to-queue Profile4	Map cos-to-queue profile on the interface
(config-if)#exit	Exit interface mode.
(config)#exit	Exit configure mode.

## Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
qos enable
qos statistics
!
qos profile cos-to-queue Profile2
  cos 2 dei all queue 4
!
!
!
interface ce3/1
  qos map-profile cos-to-queue Profile2
!
qos profile cos-to-queue Profile4
  cos 3 dei all queue 4 color yellow
!
!
#show qos-profile type cos-to-queue Profile4
profile name: Profile4
profile type: cos-to-queue
profile attached to 0 instances
configured mapping:
  cos 3 dei all queue 4 color yellow
Detailed mapping:
```

```
-----+-----+-----+-----+
      INPUT  |      OUTPUT  |      INPUT  |      OUTPUT  |
-----+-----+-----+-----+
```



COS	DEI	Queue	Color	COS	DEI	Queue	Color
0	0	0	green	0	1	0	yellow
1	0	1	green	1	1	1	yellow
2	0	2	green	2	1	2	yellow
3	0	4	yellow	3	1	4	yellow
4	0	4	green	4	1	4	yellow
5	0	5	green	5	1	5	yellow
6	0	6	green	6	1	6	yellow
7	0	7	green	7	1	7	yellow

# CHAPTER 4 Queue-color-to-cos Map Profile Configuration

This chapter contains a complete sample of configuring queue-color-to-cos map profile.

## Topology

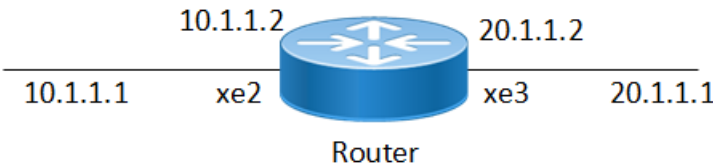


Figure 4-5: Queue color-to-cos map profile configuration

## Configuration queue-color-to-qos map profile

The following steps describe how to configure queue-color-to-cos map profile on configuration mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#qos profile queue-color-to-cos Profile5	Enter queue-color-to-cos profile configuration mode
(config-ingress-cos-map)#queue 2 color all cos 7	Map queue 2 to cos 7 for all colors under cos-to-queue profile configuration mode
(config-egress-cos-map)#exit	Exit queue-color-to-cos configuration mode
(config)#qos profile queue-color-to-cos default	Enter queue-color-to-cos default map profile configuration mode
(config-egress-cos-map)#queue 3 cos 5	Map queue 3 frames to cos 5
(config-egress-cos-map)#exit	Exit queue-color-to-cos
(config)#exit	Exit configure mode.

## Validation

Enter the commands below to confirm the configurations.

```

#show running-config qos
qos enable
qos statistics
!
qos profile queue-color-to-cos default
  queue 3 color all cos 5
!
qos profile queue-color-to-cos Profile5
  queue 2 color all cos 7
!
  
```

## Configuration of Queue-color-to-cos Map Profile on Interface mode

The following steps describe how to configure Queue-color-to-cos map profile on interface mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure the port as switchport
(config-if)#qos map-profile queue-color-to-cos Profile5	map queue-color-to-cos profile on the interface
(config-if)#exit	Exit interface mode.
(config)#exit	Exit configure mode.

## Validation

Enter the commands below to confirm the configurations.

```
# show running-config qos
qos enable
qos statistics
!
qos profile queue-color-to-cos default
  queue 3 color all cos 5
!
qos profile queue-color-to-cos Profile5
  queue 2 color all cos 7
!
!
!
interface xe2
  qos map-profile queue-color-to-cos Profile5
!
```

```
#show qos-profile type queue-color-to-cos Profile5
profile name: Profile5
profile type: queue-color-to-cos
profile attached to 1 instances
configured mapping:
  queue 2 color all cos 7
Detailed mapping:
```

INPUT			OUTPUT			INPUT			OUTPUT			INPUT			OUTPUT		
Queue	Color	COS	Queue	Color	COS	Queue	Color	COS	Queue	Color	COS	Queue	Color	COS	Queue	Color	COS
0	green	0	0	yellow	0	0	red	0	0	red	0	0	red	0	0	red	0
1	green	1	1	yellow	1	1	red	1	1	red	1	1	red	1	1	red	1
2	green	7	2	yellow	7	2	red	7	2	red	7	2	red	7	2	red	7
3	green	3	3	yellow	3	3	red	3	3	red	3	3	red	3	3	red	3
4	green	4	4	yellow	4	4	red	4	4	red	4	4	red	4	4	red	4
5	green	5	5	yellow	5	5	red	5	5	red	5	5	red	5	5	red	5
6	green	6	6	yellow	6	6	red	6	6	red	6	6	red	6	6	red	6
7	green	7	7	yellow	7	7	red	7	7	red	7	7	red	7	7	red	7

## CHAPTER 5 Queue-color-to-dscp Map Profile Configuration

This chapter contains a complete sample of configuring queue-color-to-dscp map profile.

### Topology

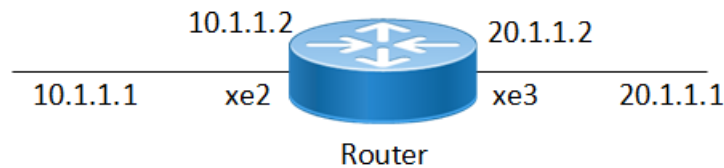


Figure 5-6: Queue color-to-dscp map profile configuration

### Configuration queue-color-to-dscp map profile

The following steps describe how to configure queue-color-to-dscp map profile on configuration mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#qos profile queue-color-to-dscp Profile6	Enter queue-color-to-dscp profile configuration mode
(config-egress-dscp-map)#queue 3 color green dscp 48	Map queue 3 to dscp 48 for green color traffic under queue-color-to-dscp profile configuration mode
(config-egress-dscp-map)#exit	Exit queue-color-to-dscp map configuration mode
(config)#qos profile queue-color-to-dscp default	Enter queue-color-to-dscp default map profile configuration mode
(config-egress-dscp-map)#queue 5 dscp 32	Map queue 5 frames to dscp 32
(config-egress-cos-map)#exit	Exit queue-color-to-dscp configuration mode
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
qos enable
qos statistics
!
qos profile queue-color-to-dscp default
  queue 5 color all dscp 32
!
qos profile queue-color-to-dscp Profile6
  queue 3 color green dscp 48
!
```

## Configuration of Queue-color-to-dscp Map Profile on Interface mode

The following steps describe how to configure Queue-color-to-dscp map profile on interface mode.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure the port as switchport
(config-if)#qos map-profile queue-color-to-dscp Profile6	map queue-color-to-dscp profile on the interface
(config-if)#exit	Exit interface mode.
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```
# show running-config qos
qos enable
qos statistics
!
qos profile queue-color-to-dscp default
  queue 5 color all dscp 32
!
qos profile queue-color-to-dscp Profile6
  queue 3 color green dscp 48
!
!
!
interface xe2
  qos map-profile queue-color-to-dscp Profile6
!
#show qos-profile type queue-color-to-dscp Profile6
profile name: Profile6
profile type: queue-color-to-dscp
profile attached to 1 instances
configured mapping:
  queue 3 color green dscp 48
Detailed mapping:
```

INPUT			OUTPUT			INPUT			OUTPUT			INPUT			OUTPUT		
Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP
0	green	0	0	yellow	0	0	red	0	0	red	0	0	red	0	0	red	0
1	green	10	1	yellow	12	1	red	14	1	red	14	1	red	14	1	red	14
2	green	18	2	yellow	20	2	red	22	2	red	22	2	red	22	2	red	22
3	green	48	3	yellow	28	3	red	30	3	red	30	3	red	30	3	red	30
4	green	34	4	yellow	36	4	red	38	4	red	38	4	red	38	4	red	38
5	green	40	5	yellow	40	5	red	40	5	red	40	5	red	40	5	red	40
6	green	48	6	yellow	48	6	red	48	6	red	48	6	red	48	6	red	48
7	green	56	7	yellow	56	7	red	56	7	red	56	7	red	56	7	red	56

## CHAPTER 6 Trust DSCP on Layer 2 Interface Configuration

This chapter contains a complete sample of configuring trust DSCP on Layer 2 interface.

**Note:** In case of vlan interface, for routed traffic, ingress qos mapping will be decided based upon the trust of member interface. With no trust set, applicable map will be cos map for routed traffic, and with trust set, applicable map will be dscp map.

### Topology

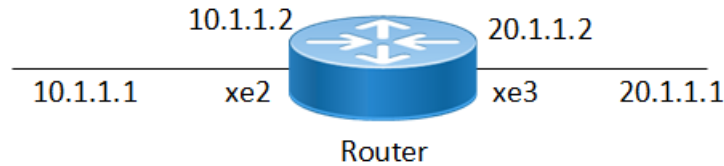


Figure 6-7: Simple configuration of trust DSCP

### Configuration Trust DSCP on Interface mode

The following steps describe how to configure trust DSCP on Layer 2 interface. By default, Layer 2 interface will be trust CoS and layer3 interface will be trust DSCP.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#interface xe2	Enter interface mode.
(config-if)#trust dscp	Configure trust DSCP on the interface xe2.
(config-if)#exit	Exit interface mode.
(config)#exit	Exit configure mode.

### Validation

Enter the commands below to confirm the configurations.

```

#show running-config qos
!
qos enable
qos statistics
!
interface xe2
  trust dscp

```

## CHAPTER 7 Service based Queue Distribution Configuration

This chapter describes configuring queue distribution based on type of service such as Precedence or DSCP on Layer 3 interface. Prior to this feature support, only one type of configuration was possible either precedence or DSCP.

Using the most significant three bits of the DSCP such as Class Selector bits which provides backward compatibility with ip precedence, user can set Precedence. For example when user configure Precedence as 101 in CLI, convert this value to DSCPs(101000 ~ 101111), then set the DSCP.

In the configuration section, new precedence profiles are introduced as qos map-profile based on the existing DSCP profiles.

The configuration procedures given below are similar to DSCP, however, both configurations are supported based on requirements.

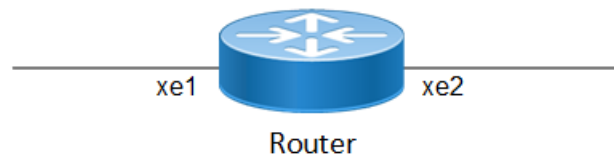
### Service based Queue configuration

There are 2 Qos-map Precedence profiles used in the configuration procedure.

#### Precedence-to-queue:

This is an ingress profile similar to dscp-to-queue. This profile will map precedence value 0-7 to queue 0-7

#### Topology



**Figure 7-8: Precedence-to-queue topology**

#configure terminal	Enter configure mode
(config)#enable qos	Enable Qos
(config)#exit	Exit configure mode
(config)# qos profile precedence-to-queue Prec1_que1	Configure qos-map profile precedence-to-queue with Profile name as Precel_que1
(config-ingress-prec-map)# precedence 1 queue 2	Configure mapping of prece 1 to queue 2, so that traffic with precedence 1 should take queue as q2
(config)#exit	Exit configure mode
(config)# interface xe1	Configure ingress interface xe1
(config-if)#qos map-profile precedence-to- queue Prec1_que1	Map the profile Prec1_que1 to interface xe1 so that ingress traffic hitting the xe1 interface with prece as 1 should take queue q2
(config)#commit	Commit the configuration
(config)#end	

## Validation

```
Router#show run int xe1
!
interface xe1
  qos map-profile precedence-to-queue Prec1_que1
!
```

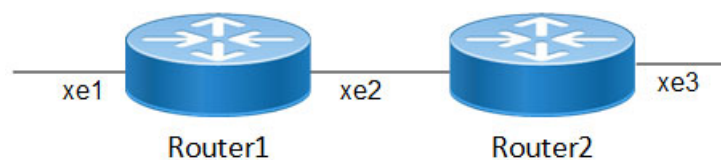
```
Router#show qos-profile type precedence-to-queue
profile name: Prec1_que1
profile type: precedence-to-queue
profile attached to 1 instances
configured mapping:
precedence 1 queue 2
Detailed mapping:
-----+-----
  INPUT |      OUTPUT
-----+-----
  PREC  | Queue | Out PREC
-----+-----
    0   |    0   |    0
    1   |    1   |    2
    2   |    2   |    0
    3   |    3   |    0
    4   |    4   |    0
    5   |    5   |    0
    6   |    6   |    0
    7   |    7   |    0
```

```
Router#show run qos
qos enable
!
qos profile precedence-to-queue Prec1_que1
  precedence 1 queue 2
!
interface xe1
  qos map-profile precedence-to-queue Prec1_que1
```

## Queue-to-precedence:

This is egress profile similar to queue-to-dscp. This qos-map profile maps default or corresponding queue to new precedence value that enables the user to see queue corresponding to new precedence mentioned in this profile on the next node egress interface.

## Topology





#configure terminal	Enter configure mode
(config)#enable qos	Enable Qos
(config)#exit	Exit configure mode
(config)# qos profile queue-to-precedence queue_prece1	Configure qos-map profile queue-to-precedence with Profile name as queue_prece1
(config-ingress-prec-map)# queue 2 precedence 5	Configure mapping of queue 2 to precedence 5, so that traffic with precedence 1 should take queue as q2
(config)#exit	Exit configure mode
(config)# interface xe2	Configure egress interface xe2 of 1st node
(config-if)#qos map-profile queue-to-precedence queue_prece1	Map the profile queue_prece1 to interface xe2 so that egress traffic from xe2 can be remarked with new precedence value 5 and on next node can verify this on egress interface xe3
(config)#commit	Commit the configuration
(config)#end	

## Validation

```

Router1#show run int ce50
!
interface ce50
  qos map-profile queue-to-precedence queue_prece1
!

Router1#show run qos
!
qos enable
qos statistics
qos remark dscp
!
qos profile queue-to-precedence queue_prece1
  queue 2 precedence 5
!
!
!
interface ce50
  qos map-profile queue-to-precedence queue_prece1
!

#show qos-profile queue_prece1
profile name: queue_prece1
profile type: queue-to-precedence
profile attached to 1 instances
configured mapping:
  queue 2 precedence 5
Detailed mapping:
-----+-----
  INPUT | OUTPUT
-----+-----

```

---

Queue	PREC
-----+-----	
0	0
1	1
2	5
3	3
4	4
5	5
6	6
7	7

## CHAPTER 8 Weights for Queues Configuration

This chapter contains a complete sample of configuring WRR weights for queues.

### Topology

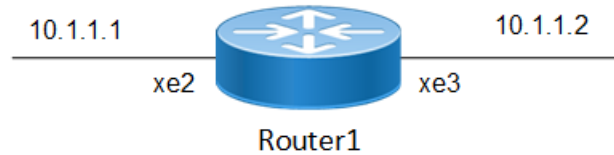


Figure 8-9: Simple configuration of QoS

### Configuring WRR Weights for Queues

Do the following to configure WRR weights for queues.

Note: This configuration is supported on supported on the Trident II and Trident II + hardware.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map cmap1	Enter class-map mode
(config-cmap-qos)#match cos 2	Configure match criteria as cos 2
(config-cmap-qos)#exit	Exit out of class-map mode
(config)#class-map cmap2	Enter class-map mode
(config-cmap-qos)#match cos 3	Configure match criteria as cos 3
(config-cmap-qos)#exit	Exit out of class-map mode
(config)#policy-map pmap1	Enter policy-map mode.
(config-pmap-qos)#class cmap1	Assign class cmap1.
(config-pmap-c-qos)#set qos-group 1	Remark matched traffic to qos-group 1
(config-pmap-c-qos)#exit	Exit out of pmap-c mode
(config-pmap-qos)#exit	Exit pmap mode.
(config)#policy-map pmap1	Enter policy-map mode.
(config-pmap-qos)#class cmap2	Assign class cmap2.
(config-pmap-c-qos)#set qos-group 2	Remark matched traffic to qos-group 2
(config-pmap-c-qos)#exit	Exit out of pmap-c mode
(config-pmap-qos)#exit	Exit pmap mode.
(config)#class-map type queuing cq1	Configure class-map of type queuing with name cq1, and enter into class-map mode
(config-cmap-que)#match qos-group 1	Configure match criteria as qos-group 1
(config-cmap-que)#exit	Exit out of class-map mode.

<code>(config)#class-map type queuing cq2</code>	Configure class-map of type queuing with name cq2, and enter into class-map mode.
<code>(config-cmap-que)#match qos-group 2</code>	Configure match criteria as qos-group 2.
<code>(config-cmap-que)#exit</code>	Exit out of class-map mode.
<code>(config)#policy-map type queuing pq1</code>	Configure policy-map of type queuing with name pq1, and enter into policy-map mode.
<code>(config-pmap-que)#class cq1</code>	Attach class cq1 to Policy-map pq1.
<code>(config-pmap-c-que)#wrr-queue weight 2</code>	Configure WRR Weight of 2.
<code>(config-pmap-c-que)#exit</code>	Exit from pmap-c mode.
<code>(config-pmap-que)#class cq2</code>	Assign class (queue) cq2 to pq1.
<code>(config-pmap-c-que)#wrr-queue weight 4</code>	Configure WRR weight of 4.
<code>(config-pmap-c-que)#exit</code>	Exit from pmap-c mode.
<code>(config-pmap-que)#exit</code>	Exit from pmap mode.
<code>(config)#interface xe2</code>	Enter into interface xe2.
<code>(config-if)#service-policy type queuing output pq1</code>	Assign service policy pq1 of type queueing on out direction.
<code>(config-if)#exit</code>	Exit interface mode
<code>(config)#exit</code>	Exit configure mode.
<code>(config)#bridge 1 protocol rstp vlan-bridge</code>	Specify VLAN for bridge 1.
<code>(config)#vlan database</code>	Enter the VLAN configuration mode.
<code>(config-vlan)#vlan 2-3 bridge 1 state enable</code>	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
<code>(config-vlan)#exit</code>	Exit the VLAN configuration mode.
<code>(config)#interface vlan1.2</code>	Enter interface mode.
<code>(config-if)# ip address 10.1.1.1/24</code>	Configure the IP address.
<code>(config-if)#exit</code>	Exit the interface mode.
<code>(config)#interface xe2</code>	Enter interface mode.
<code>(config-if)#switchport</code>	Configure xe2 as a Layer 2 port.
<code>(config-if)#bridge-group 1</code>	Associate the interface with bridge group 1.
<code>(config-if)#switchport mode trunk</code>	Configure port as a trunk.
<code>(config-if)#switchport trunk allowed vlan all</code>	Allow all the VLANs on the xe3 interface.
<code>(config-if)#exit</code>	Exit the interface mode.
<code>(config)#interface xe3</code>	Enter interface mode.
<code>(config-if)#switchport</code>	Configure xe3 as a Layer 2 port.
<code>(config-if)#bridge-group 1</code>	Associate the interface with bridge group 1.
<code>(config-if)#switchport mode trunk</code>	Configure port as a trunk.
<code>(config-if)#switchport trunk allowed vlan all</code>	Allow all the VLANs on the xe3 interface.
<code>(config-if)# service-policy type qos input pmap1</code>	Assign service-policy to interface on in-direction
<code>(config-if)#exit</code>	Exit the interface mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show running-config qos
qos enable
!
qos statistics
!
class-map cmap1
  match cos 2
!
class-map cmap2
  match cos 3
!
class-map type queuing match-any cq1
  match qos-group 1
!
class-map type queuing match-any cq2
  match qos-group 2
!
policy-map pmap1
  class cmap1
    set qos-group 1
    exit
  class cmap2
    set qos-group 2
    exit
!
!
policy-map type queuing pq1
  class type queuing cq1
    wrr-queue weight 2
    exit
  class type queuing cq2
    wrr-queue weight 4
    exit
!
!
interface xe2
  service-policy type queuing output pq1
!
interface xe3
  service-policy type qos input pmap1
!
```

```
#show policy-map
```

```
Type qos policy-maps
=====
```

```
policy-map pmap1
  class cmap1
```

```
set qos-group 1
exit
class cmap2
set qos-group 2
exit
```

Type queuing policy-maps

=====

```
policy-map type queuing default default-out-policy
class type queuing default q0
priority level 1
exit
class type queuing default q1
priority level 1
exit
class type queuing default q2
priority level 1
exit
class type queuing default q3
priority level 1
exit
class type queuing default q4
priority level 1
exit
class type queuing default q5
priority level 1
exit
class type queuing default q6
priority level 1
exit
class type queuing default q7
priority level 1
exit
```

```
policy-map type queuing pq1
class type queuing cq1
wrr-queue weight 2
exit
class type queuing cq2
wrr-queue weight 4
exit
```

#show class-map

Type qos class-maps

=====

```
class-map type qos match-any class-default
```

```
class-map cmap1
  match cos 2
```

```
class-map cmap2
  match cos 3
```

Type queuing class-maps

=====

```
class-map type queuing match-any cq1
  match qos-group 1
```

```
class-map type queuing match-any cq2
  match qos-group 2
```

```
class-map match-any q0
```

```
class-map match-any q1
```

```
class-map match-any q2
```

```
class-map match-any q3
```

```
class-map match-any q4
```

```
class-map match-any q5
```

```
class-map match-any q6
```

```
class-map match-any q7
```

Type Vlan-Queuing class-maps

=====

```
#show policy-map interface xe2
Interface xe2
Global statistics status : enabled
```

```
Service-policy (queuing) output: pq1
```

-----

```
Class-map (queuing): cq1
  match qos-group 1
  wrr-queue weight 2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): cq2
  match qos-group 2
```

---

```
wrr-queue weight 4
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q2
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

---



---

```
Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets

#show policy-map interface xe3

Interface xe3
Global statistics status : enabled

Service-policy (qos) input      : pmap1
-----
Class-map (qos): cmap1 (match all)
  match cos 2
  set qos-group 1
    matched      : 209681694 packets, 15097081968 bytes
    transmitted  : 209681694 packets, 15097081968 bytes

Class-map (qos): cmap2 (match all)
  match cos 3
  set qos-group 2
```

---

---

```
matched      : 0 packets, 0 bytes
transmitted  : 0 packets, 0 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
```

```
  priority level 1
```

```
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
```

```
  priority level 1
```

```
    output      : 11789 packets, 754820 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
```

```
  priority level 1
```

```
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
```

```
  priority level 1
```

```
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
```

```
  priority level 1
```

```
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
```

```
  priority level 1
```

```
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
```

```
  priority level 1
```

```
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
```

```
  priority level 1
```

```
    output      : 1460 packets, 93914 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
```

```
    output      : 39311112 packets, 2830400048 bytes
    dropped     : 0 packets, 0 bytes
```

```

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 78930334 packets, 5051541376 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q7
  output      : 21 packets, 1428 bytes
  dropped     : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets

```

## Configuring WRR Weights for Queues

Do the following to configure WRR weights for queues.

**Note:** This configuration is supported on the TD III and TD IV hardware.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default qmap	Configure QoS Policy-map
(config-pmap-que-def)#class type queuing default q0	Configure class type and specify the class-map type

(config-pmap-c-que-def)#wrr-queue weight 10	Configure WRR Weight of 10.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q1	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 15	Configure WRR Weight of 15.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q2	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 20	Configure WRR Weight of 20.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q3	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 25	Configure WRR Weight of 25.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q4	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 30	Configure WRR Weight of 30.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q5	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 35	Configure WRR Weight of 35.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q6	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 40	Configure WRR Weight of 40.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q7	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 45	Configure WRR Weight of 45.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que)#exit	Exit from pmap mode.
(config)#interface xe2	Enter into interface xe2.
(config-if)#service-policy type queuing output qmap	Assign service policy pq1 of type queueing on out direction.
(config-if)#shape rate 300 mbps burst 100	Configure QoS egress traffic shape
(config-if)#exit	Exit interface mode
(config)#exit	Exit configure mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
OcNOS#sh interface counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
```

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	best-effort	(E) 0	17	2746	0	0
cpu	ipmc-miss	(E) 0	7	1274	0	0
cpu	ospf	(E) 0	64	10508	0	0
cpu	nd	(E) 0	209	36326	0	0
cpu	arp	(E) 0	11	1540	0	0
cpu	igmp	(E) 0	4	560	0	0
cpu	bpdu	(E) 0	206	44163	0	0
cd1	q0	(E) 296926	193020	289530000	175171343	262757014500
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q1	(E) 295148	289520	434280000	175074412	262611618000
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q2	(E) 296926	386020	579030000	174977481	262466221500
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q3	(E) 295148	482521	723781500	174880552	262320828000
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q4	(E) 300482	579021	868531500	174783622	262175433000
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q5	(E) 295148	675521	1013281500	174686692	262030038000
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q6	(E) 296926	771972	1157958000	174589811	261884716500
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	q7	(E) 293370	868516	1302761198	174492848	261739272000
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd1	mc-q3	(E) 0	88	7704	0	0
cd3	q7	(E) 0	2	180	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd3	mc-q3	(E) 0	18	1676	0	0
cd22	mc-q0	(E) 0	4	560	0	0
cd22	mc-q1	(E) 0	206	44163	0	0
cd30/1	q0	(E) 0	1191525716	1787288574000	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/1	mc-q0	(E) 0	113674337	170511505500	0	0
cd30/2	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/2	mc-q3	(E) 0	25	2498	0	0

cd30/3	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/3	mc-q3	(E) 0	26	2580	0	0
cd30/4	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/4	mc-q3	(E) 0	26	2580	0	0
cd30/5	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/5	mc-q3	(E) 0	26	2580	0	0
cd30/6	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/6	mc-q3	(E) 0	26	2580	0	0
cd30/7	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/7	mc-q3	(E) 0	26	2580	0	0
cd30/8	q7	(E) 0	1	82	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd30/8	mc-q3	(E) 0	26	2580	0	0
cd31/1	q7	(E) 0	5	320	0	0
Green	drop	--		0		
Yellow	drop	--		0		
Red	drop	--		0		
Non-Red	drop	--		0		
cd31/1	mc-q3	(E) 0	90	7588	0	0
cd31/1	pg-q0	(I) 296418	NA	NA	NA	NA
cd31/1	pg-q1	(I) 295148	NA	NA	NA	NA
cd31/1	pg-q2	(I) 298450	NA	NA	NA	NA
cd31/1	pg-q3	(I) 302006	NA	NA	NA	NA
cd31/1	pg-q4	(I) 293370	NA	NA	NA	NA
cd31/1	pg-q5	(I) 300482	NA	NA	NA	NA
cd31/1	pg-q6	(I) 299466	NA	NA	NA	NA
cd31/1	pg-q7	(I) 295148	NA	NA	NA	NA

OcNOS#sh policy-map interface cd31/1

Interface cd31/1

Type Queuing policy-map : default-out-policy

Class-map (queuing): q0

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): q1

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

---

```
Class-map (queuing): q2
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
  priority
    output      : 5 packets, 320 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 92 packets, 7752 bytes
  dropped     : 0 packets, 0 bytes

Wred/Tail Drop Statistics :
-----
green   : 0 packets
```

---

```
yellow : 0 packets
red    : 0 packets
```

```
OcNOS#sh policy-map interface cd1
```

```
Interface cd1
```

```
Type Queuing policy-map : qmap
```

```
Class-map (queuing): q0
  wrr-queue weight 10
    output      : 221421 packets, 332131500 bytes
    dropped     : 200845495 packets, 301268242500 bytes
```

```
Class-map (queuing): q1
  wrr-queue weight 15
    output      : 332131 packets, 498196500 bytes
    dropped     : 200734354 packets, 301101531000 bytes
```

```
Class-map (queuing): q2
  wrr-queue weight 20
    output      : 442841 packets, 664261500 bytes
    dropped     : 200623215 packets, 300934822500 bytes
```

```
Class-map (queuing): q3
  wrr-queue weight 25
    output      : 553551 packets, 830326500 bytes
    dropped     : 200512078 packets, 300768117000 bytes
```

```
Class-map (queuing): q4
  wrr-queue weight 30
    output      : 664261 packets, 996391500 bytes
    dropped     : 200400951 packets, 300601426500 bytes
```

```
Class-map (queuing): q5
  wrr-queue weight 35
    output      : 774971 packets, 1162456500 bytes
    dropped     : 200289817 packets, 300434725500 bytes
```

```
Class-map (queuing): q6
  wrr-queue weight 40
    output      : 885630 packets, 1328445000 bytes
    dropped     : 200178738 packets, 300268107000 bytes
```

```
Class-map (queuing): q7
  wrr-queue weight 45
    output      : 996387 packets, 1494567698 bytes
    dropped     : 200067573 packets, 300101359500 bytes
```



```

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 91 packets, 7962 bytes
  dropped     : 0 packets, 0 bytes

```

#### Wred/Tail Drop Statistics :

```

-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets

```

```

OcNOS#sh policy-map
interface statistics type
OcNOS#sh policy-map statistics
Type qos class-map statistics:

```

Class-map	Match pkts	Match bytes	Dropped pkts	Dropped Bytes
-----------	------------	-------------	--------------	---------------

#### Type queuing class-map statistics:

Class-map	Total pkts	Total bytes	Dropped pkts	Dropped Bytes
cd1				
q0	248700	373050000	225492678	338239017000
q1	373050	559575000	225367899	338051848500
q2	497400	746100000	225243123	337864684500
q3	621750	932625000	225118353	337677529500
q4	746100	1119150000	224993584	337490376000
q5	870449	1305673500	224868812	337303218000
q6	994737	1492105500	224744099	337116148500
q7	1119122	1678670198	224619288	336928932000
cd3				
q7	2	180	0	0
cd30/1				
q0	1191525716	1787288574000	0	0
cd30/2				
q7	1	82	0	0
cd30/3				
q7	1	82	0	0
cd30/4				
q7	1	82	0	0
cd30/5				
q7	1	82	0	0
cd30/6				
q7	1	82	0	0
cd30/7				

q7	1	82	0	0
cd30/8				
q7	1	82	0	0
cd31/1				
q7	5	320	0	0
OcNOS#				

## Configuring WRR Weights for Queues

Do the following to configure WRR weights for queues.

**Note:** This configuration is supported on the TR III hardware.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default qmap	Configure QoS Policy-map
(config-pmap-que-def)#class type queuing default q0	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 10	Configure WRR Weight of 10.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q1	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 15	Configure WRR Weight of 15.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q2	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 20	Configure WRR Weight of 20.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q3	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 25	Configure WRR Weight of 25.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q4	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 30	Configure WRR Weight of 30.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q5	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 35	Configure WRR Weight of 35.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q6	Configure class type and specify the class-map type

(config-pmap-c-que-def)#wrr-queue weight 40	Configure WRR Weight of 40.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que-def)#class type queuing default q7	Configure class type and specify the class-map type
(config-pmap-c-que-def)#wrr-queue weight 45	Configure WRR Weight of 45.
(config-pmap-c-que)#exit	Exit from pmap-c mode.
(config-pmap-que)#exit	Exit from pmap mode.
(config)#interface xe2	Enter into interface xe2.
(config-if)#service-policy type queuing output qmap	Assign service policy pq1 of type queueing on out direction.
(config-if)#shape rate 300 mbps burst 100	Configure QoS egress traffic shape
(config-if)#exit	Exit interface mode
(config)#exit	Exit configure mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
OcNOS#sh interface counters queue-stats
```

E - Egress, I - Ingress, Q-Size is in bytes

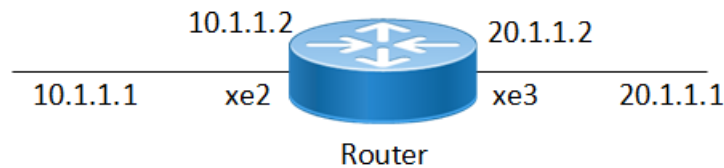
\* indicates monitor is active

```
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped bytes
```

## CHAPTER 9 Marking/Remarking Configuration

This chapter contains a complete sample of configuring Marking/Remarking.

### Topology



**Figure 9-10: Simple configuration of Marking/Remarking**

### L2 Interface

The following steps describe how to configure Marking/Remarking.

#configure terminal	Enter configure mode.
(config)#bridge 1 protocol rstp vlan-bridge	Configure bridge 1 as RSTP-VLAN aware.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate bridge to an interface.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe2 interface.
(config-if)#exit	Exit the xe2 interface mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map type qos cmap1	Enter Class-map mode
(config-cmap-qos)#match cos 2	Configure match criteria as CoS with Value 2
(config-cmap-qos)#exit	Exit Class-map mode
(config)#policy-map type qos pmap1	Enter policy-map mode
(config-pmap-qos)#class type qos cmap1	Assign Class cmap1 to Policy-map pmap1
(config-pmap-c-qos)#set cos 5	Remark cos from cos 2 to cos 5
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#exit	Exit out of Policy-map mode
(config)#interface xe2	Enter xe2 interface
(config-if)#service-policy type qos input pmap1	Assign service-policy to interface on in-direction

(config-if)#exit	Exit the xe2 interface mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.
(config-if)#bridge-group 1	Associate bridge to an interface.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the xe3 interface mode.
(config)#class-map type qos cmap2	Enter Class-map mode
(config-cmap-qos)#match protocol arp	Configure match criteria as protocol with arp
(config-cmap-qos)#exit	Exit Class-map mode
(config)#policy-map type qos pmap2	Enter policy-map mode
(config-pmap-qos)#class type qos cmap2	Assign Class cmap2 to Policy-map pmap2
(config-pmap-c-qos)#set cos 6	Remark all frame with ethertype as arp to cos 6
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#exit	Exit out of Policy-map mode
(config)#interface xe3	Enter xe3 interface
(config-if)#service-policy type qos input pmap2	Assign service-policy to interface on in-direction
(config-if)#exit	Exit out of interface mode
(config)#bridge 1 protocol rstp vlan-bridge	Specify VLAN for bridge 1.
(config)#vlan database	Enter the VLAN configuration mode.
(config-vlan)#vlan 2-3 bridge 1 state enable	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
(config-vlan)#exit	Exit the VLAN configuration mode.
(config)#interface vlan1.2	Enter interface mode.
(config-if)# ip address 10.1.1.2/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface vlan1.3	Enter interface mode.
(config-if)# ip address 20.1.1.1/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show running-config qos
qos enable
!
qos statistics
!
class-map type qos cmap1
  match cos 2
!
class-map type qos cmap2
```

```
match protocol arp
!
policy-map type qos pmap1
  class type qos cmap1
    set cos 5
  exit
!
policy-map type qos pmap2
  class type qos cmap2
    set cos 6
  exit
!
!
!
interface xe2
  service-policy type qos input pmap1
!
interface xe3
  service-policy type qos input pmap2
!

#show class-map cmap1

Type qos class-maps
=====

      class-map type qos cmap1
        match cos 2

#show policy-map

Type qos policy-maps
=====

policy-map type qos pmap1
  class type qos cmap1
    set cos 5
  exit

policy-map type qos pmap2
  class type qos cmap2
    set cos 6
  exit

Type queuing policy-maps
=====

policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
```

```
    priority
    exit
class type queuing default q3
    priority
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit

#show policy-map interface xe2

Interface xe2
Global statistics status : enabled

Class-map (qos): cmap1 (match all)
    match cos 2
    set cos 5
        matched      : 8 packets, 680 bytes
        transmitted  : 8 packets, 680 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
    priority
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
    priority
        output      : 12 packets, 1416 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q2
    priority
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
    priority
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
    priority
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
  priority
    output      : 589 packets, 37876 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q6
  output      : 7 packets, 448 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q7
  output      : 12 packets, 852 bytes
  dropped     : 0 packets, 0 bytes
```

Wred Drop Statistics :

```
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

OcNOS#show policy-map interface xe3

Interface xe3



---

```
Type QoS statistics status : enabled

Class-map (qos): cmap2 (match all)
  match protocol arp
  set cos 6

    matched      : 7 packets, 448 bytes
    transmitted  : 7 packets, 448 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q2
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
  priority
    output      : 699 packets, 59550 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
```

---

```

        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q4
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q5
    output      : 1 packets, 64 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q6
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q7
    output      : 2 packets, 136 bytes
    dropped     : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets

```

## L3 Interface

#configure terminal	Enter configure mode.
(config)#interface xe3	Enter interface mode.
(config-if)#ip address 10.1.1.1/24	Assign IP Address on interface to 10.1.1.2 with mask 255.255.255.0
(config-if)#exit	Exit out of interface mode
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map type qos cmap3	Configure class-map of type qos with name cmap3 and enter into Class-map mode
(config-cmap-qos)#match dscp 10	Configure match criteria as dscp with a value of 10.
(config-cmap-qos)#exit	Exit Class-map mode

<code>(config)#policy-map type qos pmap3</code>	Enter policy-map mode
<code>(config-pmap-qos)#class type qos cmap3</code>	Assign Class cmap3 to Policy-map pmap3
<code>(config-pmap-c-qos)#set dscp ef</code>	Remark frames with dscp value 10 to dscp 46
<code>(config-pmap-c-qos)#exit</code>	Exit out of policy-class-map mode
<code>(config-pmap-qos)#exit</code>	Exit out of Policy-map mode
<code>(config)#interface xe3</code>	Enter xe3 interface
<code>(config-if)#service-policy type qos input pmap3</code>	Assign service-policy pmap3 to interface xe3 on in-direction
<code>(config-if)#exit</code>	Exit out of interface mode
<code>(config)#ip access-list 101</code>	Configure access-list 101 with action as permit for tcp traffic with destination port as ftp port
<code>(config-ip-acl)#permit tcp any any eq ftp</code>	Permit for tcp traffic with destination port as ftp port.
<code>(config-ip-acl)#exit</code>	Exit access list mode
<code>(config)#class-map type qos match-any cmap4</code>	Enter Class-map mode
<code>(config-cmap-qos)#match access-group 101</code>	Configure access-group 101 as match criteria
<code>(config-cmap-qos)#exit</code>	Exit class-map mode
<code>(config)#policy-map type qos pmap4</code>	Enter policy map mode
<code>(config-pmap-qos)#class cmap4</code>	Assign Class cmap4 to Policy-map pmap4
<code>(config-pmap-c-qos)#set precedence 7</code>	Remark frames matching access-group 101 to precedence 7
<code>(config-pmap-c-qos)#exit</code>	Exit out of policy-class-map mode
<code>(config-pmap-qos)#exit</code>	Exit out of Policy-map mode
<code>(config)#interface xe2</code>	Enter interface mode.
<code>(config-if)#ip address 20.1.1.1/24</code>	Assign IP Address on interface to 20.1.1.1 with mask 255.255.255.0
<code>(config-if)#service-policy type qos input pmap4</code>	Assign service-policy to interface on in-direction

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show running-config qos
qos enable
!
qos statistics
!
class-map type qos cmap3
```

---

```
match dscp af11
!
class-map type qos match-any cmap4
  match access-group 101
!
policy-map type qos pmap3
  class type qos cmap3
    set dscp ef
  exit
policy-map type qos pmap4
  class type qos cmap4
    set precedence network
  exit
!
interface xe2
  service-policy type qos input pmap4
!
interface xe3
  service-policy type qos input pmap3

#show class-map type qos

Type qos class-maps
=====
    class-map type qos match-any class-default

    class-map type qos cmap3
      match dscp af11

    class-map type qos match-any cmap4
      match access-group 101

#show policy-map

Type qos policy-maps
=====

policy-map type qos pmap3
  class type qos cmap3
    set dscp ef

policy-map type qos pmap4
  class type qos cmap4
    set precedence network

Type queuing policy-maps
```

---

=====

```
policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
  class type queuing default q1
    priority
  class type queuing default q2
    priority
  class type queuing default q3
    priority
  class type queuing default q4
    priority
  class type queuing default q5
    priority
  class type queuing default q6
    priority
  class type queuing default q7
    priority
```

```
#show policy-map interface xe2
```

```
Interface xe2
```

```
Type Qos statistics status : enabled
```

```
-----
Class-map (qos): cmap4 (match any)
match access-group 101
set precedence 7
    matched      : 375594046 packets, 25540397168 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
priority
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
priority
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
priority
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
priority
    output      : 391282612 packets, 25042086656 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
priority
    output      : 4 packets, 256 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
```

```
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

```
#show policy-map interface xe3
```

```
Interface xe3
```

```
Global statistics status : enabled
```

```
-----
Class-map (qos): cmap3 (match all)
match dscp af11
set dscp 46
  matched      : 401497149 packets, 25695819008 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
priority level 1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
priority
  output      : 0 packets, 0 bytes
```

---

dropped : 0 packets, 0 bytes

Class-map (queuing): q2

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): q3

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): q4

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): q5

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): q6

priority

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): q7

priority

output : 382211720 packets, 25990396484 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): mc-q0

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): mc-q1

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): mc-q2



---

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
```

```
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

## CHAPTER 10 Policing Configuration

### Topology

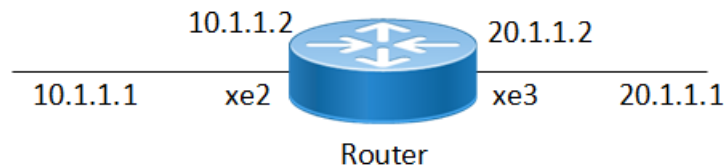


Figure 10-11: Simple configuration of Policing

### L2 Interface

Do the following to configure policing on an L2 interface.

#configure terminal	Enter configure mode.
(config)#bridge 1 protocol mstp	Configure bridge 1 as mstp aware.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate bridge to an interface.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe2 interface.
(config-if)#exit	Exit the xe2 interface mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map type qos 1234	Enter Class-map mode
(config-cmap-qos)#match cos 3	Configure match criteria as CoS with Value 3
(config-cmap-qos)#exit	Exit Class-map mode
(config)#policy-map type qos 1234	Enter policy-map mode
(config-pmap-qos)#class type qos 1234	Assign Class 1234 to Policy-map 1234
(config-pmap-c-qos)# police cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform transmit exceed set-cos-transmit 1 violate drop	Police access-list 102 frames @ Committed information rate 2 mbps, committed burst 2 mbyte, peak information rate 3 mbps, peak burst 2 mbytes when traffic is > CIR and <= PIR then Set the class of service (CoS) field to 1, if traffic violate the action then drop the frames.
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#exit	Exit out of Policy-map mode
(config)#interface xe2	Enter xe2 interface
(config-if)#service-policy type qos input 1234	Assign service-policy to interface on in-direction
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.

(config-if)#bridge-group 1	Associate bridge to an interface.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the xe3 interface mode.
(config)#mac access-list 102	Configure mac access-list with action
(config-mac-acl)#permit host 0000.0101.1010 host 0000.0202.2020	Permit when frames matches Source mac address 00:00:01:01:10:10 and destination mac address 00:00:02:02:20:20
(config-mac-acl)#exit	Exit mac access-list mode
(config)#class-map type qos match-any 2345	Enter Class-map mode
(cmap-qos-match-any-mode)#match access-group 102	Configure match criteria as access-group 102
(cmap-qos-match-any-mode)#exit	Exit Class-map mode
(config)#policy-map type qos 2345	Enter policy-map mode
(config-pmap-qos)#class type qos 2345	Assign Class 2345 to Policy-map 2345
(config-pmap-c-qos)# police cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform transmit exceed set-cos-transmit 1 violate drop	Police access-list 102 frames @ Committed information rate 2 mbps, committed burst 2 mbytes, peak information rate 3 mbps, peak burst 2 mbytes when traffic is > CIR and <= PIR, then set the class of service (CoS) field to 1, if traffic violate the action, then drop the frames.
(config-pmap-qos)#exit	Exit Policy-class mode
(config-pmap-qos)#exit	Exit Policy-map mode
(config)#interface xe3	Enter interface mode.
(config-if)#service-policy type qos input 2345	Assign service-policy 2345 to interface on in-direction
(config-if)#exit	Exit interface mode

## Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
qos enable
!
qos statistics
!
class-map type qos 1234
  match cos 2
!
class-map type qos match-any 2345
  match access-group 102
!
policy-map type qos 1234
  class type qos 1234
    police cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform transmit exceed set-cos-
transmit 1 violate drop
  exit
```

```

policy-map type qos 2345
  class type qos 2345
    police cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform transmit exceed set-cos-
transmit 1 violate drop
    exit
!
interface xe2
  service-policy type qos input 1234
!
interface xe3
  service-policy type qos input 2345
#show class-map type qos

Type qos class-maps
=====
    class-map type qos 1234
      match cos 2

    class-map type qos match-any 2345
      match access-group 102

    class-map type qos match-any class-default

#show policy-map type qos

Type qos policy-maps
=====

policy-map type qos 1234
  class type qos 1234
    police colour-aware cir 1 mbps bc 1 mbytes conform set-cos-transmit 5 violate
drop
    exit

policy-map type qos 2345
  class type qos 2345
    police colour-aware cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform tran
smit exceed set-cos-transmit 1 violate drop
    exit
#
#show policy-map interface xe2

Interface xe2
Global statistics status : enabled

Service-policy (qos) input      : 1234
-----
Class-map (qos): 1234 (match all)
match cos 3

```

```
police cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform transmit exceed set-cos-  
transmit 1 violate drop  
    matched      : 7419394 packets, 504519132 bytes  
    dropped      : 7409793 packets, 503866264 bytes
```

Service-policy (queuing) output: default-out-policy

-----  
Class-map (queuing): q0

priority

```
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

Class-map (queuing): q1

priority

```
    output      : 7222 packets, 491096 bytes  
    dropped     : 0 packets, 0 bytes
```

Class-map (queuing): q2

priority

```
    output      : 14444 packets, 982192 bytes  
    dropped     : 0 packets, 0 bytes
```

Class-map (queuing): q3

priority

```
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

Class-map (queuing): q4

priority

```
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

Class-map (queuing): q5

priority

```
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

Class-map (queuing): q6

priority

```
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

---

```
Class-map (queuing): q7
priority
    output      : 2 packets, 246 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
```

```
-----
green   : 0 packets
yellow  : 0 packets
```

---

```
red      : 0 packets
```

```
#show policy-map interface xe3
```

```
Interface xe3
```

```
Global statistics status : enabled
```

```
Service-policy (qos) input      : 2345
```

```
-----  
Class-map (qos): 2345 (match any)  
match access-group 102  
police colour-aware cir 2 mbps pir 3 mbps bc 2 mbytes be 2 mbytes conform trans  
mit exceed set-cos-transmit 1 violate drop  
    matched      : 16218780 packets, 1102879420 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----  
Class-map (queuing): q0  
priority  
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1  
priority  
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q2  
priority  
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q3  
priority  
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q4  
priority  
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
priority
    output      : 18527 packets, 1259836 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
priority
    output      : 5 packets, 615 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
```



---

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
```

```
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

## CHAPTER 11 Bandwidth Configuration

This chapter contains a complete sample of configuring Bandwidth.

### Topology

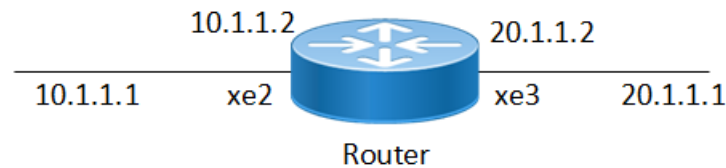


Figure 11-12: Simple configuration of Bandwidth

### L2/L3 Interface

The following steps describe how to configure bandwidth.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default P1	Configure policy-map of type queuing as default with name P1, and enter into policy-map mode
(config-pmap-que)#class type queuing default q2	Configure class-map of type queuing as default for q0 and enter into class-map mode
(config-pmap-c-que)#bandwidth percent 70	Configure minimum bandwidth as 70 percent of total bandwidth available on interface
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-que)#class type queuing default q3	Attach class q3 to Policy-map P1
(config-pmap-c-que)#bandwidth percent 30	Configure minimum bandwidth as 30 percent of remaining bandwidth available on interface after all allocations are done.
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-que)#exit	Exit out of Policy-map mode
(config)#class-map type qos c1	Enter Class-map mode
(config-cmap-qos)#match dscp 10	Configure match criteria as dscp 10
(config-cmap-qos)#match cos 3	Configure match criteria as cos 3
(config-cmap-qos)#exit	Exit out of class-map mode
(config)#class-map type qos c2	Enter Class-map mode
(config-cmap-qos)#match dscp 22	Configure match criteria as dscp 22
(config-cmap-qos)#match cos 4	Configure match criteria as cos 4
(config-cmap-qos)#exit	Exit out of class-map mode

(config)#policy-map type qos pmap1	Configure policy-map with name pmap1 and enter policy-map mode
(config-pmap-qos)#class type qos c1	Assign Class c1 to Policy-map pmap1
(config-pmap-c-qos)#set precedence 2	Set precedence to value 2
(config-pmap-c-qos)#exit	Exit out of pmap-c mode
(config-pmap-qos)#class type qos c2	Assign Class c2 to Policy-map pmap1
(config-pmap-c-qos)#set cos 2	Set cos to value 2
(config-pmap-c-qos)#exit	Exit out of pmap-c mode
(config)#interface xe3	Enter interface mode
(config-if)#service-policy type queuing output P1	Attach service-policy P1 of type queuing on out direction
(config-if)#exit	Exit out of interface mode
(config)#interface xe2	Enter interface mode
(config-if)#service-policy type qos input pmap1	Attach service-policy pmap1 of type qos on in direction
(config-if)#exit	Exit out of interface mode
(config)#bridge 1 protocol rstp vlan-bridge	Specify VLAN for bridge 1.
(config)#vlan database	Enter the VLAN configuration mode.
(config-vlan)#vlan 2-3 bridge 1 state enable	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
(config-vlan)#exit	Exit the VLAN configuration mode.
(config)#interface vlan1.2	Enter interface mode.
(config-if)# ip address 10.1.1.2/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface vlan1.3	Enter interface mode.
(config-if)# ip address 20.1.1.1/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show running-config qos
qos enable
!
qos statistics
!
class-map type qos c1
  match dscp af11
  match cos 2
!
class-map type qos c2
  match dscp af23
  match cos 4
!
policy-map type qos pmap1
  class type qos c1
    set precedence
    immediate
    exit
  class type qos
    c2
    set cos 2
    exit

!
policy-map type queuing default P1
class type queuing default q1
priority
  bandwidth percent 70
  exit
  class type queuing q2
priority
  bandwidth percent 30
  exit
!
!
!
interface xe2
  service-policy type qos input pmap1
!
interface xe3
  service-policy type queuing output P1
!

#show policy-map interface xe2

Interface xe2

Type QoS statistics status : enabled

Class-map (qos): c1 (match all)
```

---

```
match dscp af11
match cos 3
set precedence 2
```

```
Class-map (qos): c2 (match all)
  match dscp af23
  match cos 4
  set cos 2
```

```
Type Queuing policy-map : default-out-policy
```

```
Class-map (queuing): q0
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
  priority
    output          : 6 packets, 724 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
  priority
    output          : 0 packets, 0 bytes
```

---

```
        dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output          : 1 packets, 90 bytes
  dropped         : 0 packets, 0 bytes
```

```
Wred/Tail Drop Statistics :
```

```
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets
```

```
#show policy-map interface xe3
```

```
Interface xe3
Type Queuing policy-map : P1
```

```
Class-map (queuing): q0
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
  priority
  bandwidth percent 70
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
  priority
  bandwidth percent 30
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

---

```
Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred/Tail Drop Statistics :
```

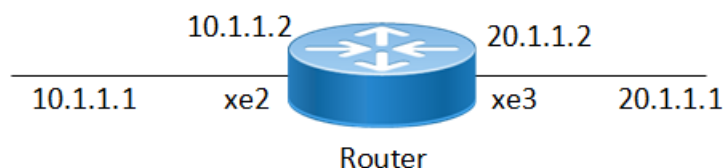
```
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets
```



## CHAPTER 12 Shaping Configuration

This chapter contains a complete sample of configuring Shaping.

### Topology



**Figure 12-13: Simple configuration of Shaping**

### L2/L3 Interface

The following steps describe how to configure Shaping.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default P1	Configure policy-map of type queuing with name P1, and enter into policy-map mode
(config-pmap-que)#class type queuing default q0	Configure class type queuing of type default and enter into class map configuration mode
(config-pmap-c-que)#shape 200 mbps	Configure shaping to 200 mbps
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-que)#exit	Exit out of Policy-map mode
(config)#class-map type qos c1	Enter Class-map mode
(config-cmap-qos)#match dscp 10	Configure match criteria as dscp 10
(config-cmap-qos)#match cos 3	Configure match criteria as cos 3
(config-cmap-qos)#exit	Exit out of class-map mode
(config)#class-map type qos c2	Enter Class-map mode
(config-cmap-qos)#match dscp 22	Configure match criteria as dscp 22
(config-cmap-qos)#match cos 4	Configure match criteria as cos 4
(config-cmap-qos)#exit	Exit out of class-map mode
(config)#policy-map type qos pmap1	Configure policy-map with name pmap1 and enter policy-map mode
(config-pmap-qos)#class type qos c1	Assign Class c1 to Policy-map pmap1
(config-pmap-c-qos)#set queue 2	Set queue 2 for frames with either cos 3 or dscp 10
(config-pmap-c-qos)#exit	Exit out of pmap-c mode
(config-pmap-qos)#class type qos c2	Assign Class c2 to Policy-map pmap1

(config-pmap-c-qos)#set queue 3	Set queue 3 for frames with either cos 4 or dscp 22
(config-pmap-c-qos)#exit	Exit out of pmap-c mode
(config-pmap-qos)#exit	Exit policy-map mode
(config)#interface xe3	Enter interface mode
(config-if)#service-policy type queuing output P1	Attach service-policy P1 of type queuing on out direction
(config-if)#exit	Exit out of interface mode
(config)#interface xe2	Enter interface mode
(config-if)#service-policy type qos input pmap1	Attach service-policy pmap1 of type qos on in direction
(config-if)#exit	Exit out of interface mode
(config)#bridge 1 protocol rstp vlan-bridge	Specify VLAN for bridge 1.
(config)#vlan database	Enter the VLAN configuration mode.
(config-vlan)#vlan 2-3 bridge 1 state enable	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
(config-vlan)#exit	Exit the VLAN configuration mode.
(config)#interface vlan1.2	Enter interface mode.
(config-if)# ip address 10.1.1.2/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface vlan1.3	Enter interface mode.
(config-if)# ip address 20.1.1.1/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show policy-map type queuing
```

```
Type queuing policy-maps
=====
```

```
policy-map type queuing default P1
  class type queuing default q0
    shape 200 mbps
    priority
  class type queuing default q1
    priority
  class type queuing default q2
    priority
  class type queuing default q3
    priority
  class type queuing default q4
    priority
  class type queuing default q5
    priority
  class type queuing default q6
    priority
  class type queuing default q7
    priority

policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
    exit

#show policy-map type qos
Type qos policy-maps
=====
```

```

policy-map type qos pmap1
  class type qos c1
    set queue 2
    exit
  class type qos c2
    set queue 3
    exit

```

```
#show class-map type queuing
```

```

Type queuing class-maps
=====
  class-map type queuing q0

  class-map type queuing q1

  class-map type queuing q2

  class-map type queuing q3

  class-map type queuing q4

  class-map type queuing q5

  class-map type queuing q6

  class-map type queuing q7

```

```
#show class-map type qos
```

```

Type qos class-maps
=====
  class-map type qos match-all c1
    match cos 3
    match dscp af11

  class-map type qos match-all c2
    match cos 4
    match dscp af23

```

```
#show queuing interface xe2
```

```
Egress Queuing for Ethernet xe2 [System]
```

-----						
-----						
L0	L1	L2	Group	PrioLevel	Shape	Bandwidth
-----						
q0			-	High	200 mbps	-
q1			-	High	-	-
q2			-	High	-	-
q3			-	High	-	-

q4	-	High	-	-
q5	-	High	-	-
q6	-	High	-	-
q7	-	High	-	-

```
#show queuing interface xe3
```

```
Egress Queuing for Ethernet xe3 [System]
```

L0	L1	L2	Group	PrioLevel	Shape	Bandwidth
q0			-	High	-	-
q1			-	High	-	-
q2			-	High	-	-
q3			-	High	-	-
q4			-	High	-	-
q5			-	High	-	-
q6			-	High	-	-
q7			-	High	-	-

```
#show policy-map interface xe3
```

```
Interface xe3
```

```
Type QoS statistics status : enabled
```

```
Class-map (qos): c1 (match all)
  match dscp af11
  match cos 3
  set queue 2
```

```
Class-map (qos): c2 (match all)
  match dscp af23
  match cos 4
  set queue 3
```

```
Type Queuing policy-map : default-out-policy
```

```
Class-map (queuing): q0
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
  priority
```

---

```
output          : 0 packets, 0 bytes
dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
priority
  output          : 6 packets, 724 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output          : 0 packets, 0 bytes
```

---

dropped : 0 packets, 0 bytes

Class-map (queuing): mc-q6

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): mc-q7

output : 1 packets, 90 bytes

dropped : 0 packets, 0 bytes

Wred/Tail Drop Statistics :

-----

green : 0 packets

yellow : 0 packets

red : 0 packets

## CHAPTER 13 Scheduling Configuration

This chapter contains a complete sample of configuring weight, strict priority on queues and weight between uc and mc queue.

### Topology

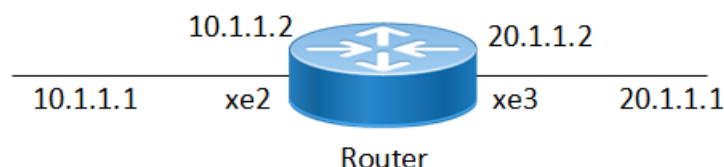


Figure 13-14: Simple configuration of Priority

### Configuring Weight on L2 /L3 Interface

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default default-out-policy	Enter policy-map type queueing default.
(config-pmap-que-def)#class type queuing default q0	Enter policy-class-map mode.
(config-pmap-c-que-def)#wrr-queue weight 2	Modify strict queue to wrr-queue with weight 2.
(config-pmap-c-que-def)#exit	Exit from policy-class-map mode.
(config-pmap-que-def)#exit	Exit from policy-map mode.
(config)#exit	Exit configure mode.

### Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show policy-map type queuing
```

```
Type queuing policy-maps
=====
```

```
policy-map type queuing default default-out-policy
  class type queuing default q0
    wrr-queue weight 2
  class type queuing default q1
    priority
  class type queuing default q2
    priority
```



```

class type queuing default q3
priority
class type queuing default q4
priority
class type queuing default q5
priority
class type queuing default q6
priority
class type queuing default q7
priority

```

## Configuring Strict priority on L2 /L3 Interface

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default p3	Enter policy-map type queueing default.
(config-pmap-que-def)#class type queuing default q0	Enter policy-class-map mode.
(config-pmap-c-que-def)#priority	Configure priority for q0.
(config-pmap-c-que-def)#exit	Exit from policy-class-map mode.
(config-pmap-que-def)#exit	Exit from policy-map mode.
(config)#interface xe2	Enter interface mode.
(config-if)#service-policy type queuing output p3	Attach policy-map of type queuing on egress interface
(config)#exit	Exit configure mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```

# show running-config qos
qos enable
qos statistics
!
!
policy-map type queuing default p3
  class type queuing default q0
    priority
  exit
!
interface xe2
  service-policy type queuing output p3
!

# show policy-map type queuing

```

```

Type queuing policy-maps
=====

```

```

policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
  class type queuing default q1
    priority
  class type queuing default q2
    priority
  class type queuing default q3
    priority
  class type queuing default q4
    priority
  class type queuing default q5
    priority
  class type queuing default q6
    priority
  class type queuing default q7
    priority

```

```

policy-map type queuing default p3
  class type queuing default q0
    priority
  class type queuing default q1
    priority
  class type queuing default q2
    priority
  class type queuing default q3
    priority
  class type queuing default q4
    priority
  class type queuing default q5
    priority
  class type queuing default q6
    priority
  class type queuing default q7
    priority

```

OcNOS#

## Configuring weight between unicast and multicast queues

Use the following configuration to set weights between unicast and multicast traffic of same traffic class.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)# set qos wrr uc 3 non-uc 1	Schedule unicast and multicast traffic in 3:1
(config)#exit	Exit configure mode.

**Note:** Unicast weight should be always higher than multicast weight (except on Trident+ platforms). Between unicast and multicast traffic of different traffic class, scheduling will be as per configuration given in the queuing policy-map attached on the interface.

This hardware limitation is for Trident3 platform which is scheduled between unicast and multicast that requires the unicast weight to be higher than the multicast queues weights.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#sh run qos
qos enable
qos statistics
set qos wrr uc 3 non-uc 1
!
```

```
#show int cou queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes
Dropped pkts	Dropped bytes			
ce1/1	q1	(E) 373152	1256	1256000
15241000				15245
ce1/1	mc-q1	(E) 92352	418	418000
16045000				16048
ce24/1	pg-q0	(I) 419536	NA	NA
NA				
ce24/1	pg-q1	(I) 468000	NA	NA
NA				

### Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show policy-map type queuing default default-out-policy Type queuing policy-maps
=====
```

```
policy-map type queuing default default-out-policy class type queuing default q0
wrr-queue weight 2
bandwidth percent 1 exit
class type queuing default q1 priority level 1
bandwidth percent 1 exit
class type queuing default q2 priority level 1
```

```
bandwidth percent 1 exit
class type queuing default q3 priority level 1
bandwidth percent 1 exit
class type queuing default q4 priority level 1
bandwidth percent 1 exit
```

```
class type queuing default q5 priority level 1
bandwidth percent 1 exit
class type queuing default q6 priority level 1
bandwidth percent 1 exit
class type queuing default q7 priority level 1
bandwidth percent 1 exit
```

```
#show queuing interface xe2
```

```
Egress Queuing for Ethernet xe2 [System]
```

```
L0 L1 L2 GroupPrioLevelShape Bandwidth

q0 - - -
-
q1 - High-
-
q2 - High-
-
q3 - High-
-
q4 - High-
-
q5 - High-
-
q6 - High-
-
q7 - High-
-
#
```

**Note:** Unicast weight should be always higher than multicast weight. Between unicast and multicast traffic of different traffic class, scheduling will be as per configuration given in the queueing policy-map attached on the interface.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)# set qos wrr uc 1 non-uc 1	Schedule unicast and multicast traffic in 1:1
(config)#exit	Exit configure mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show running-configuration qos
qos enable
qos statistics
set qos wrr uc 1 non-uc 1
```

!

#show policy-map

Type queuing policy-maps

=====

policy-map type queuing default default-out-policy

class type queuing default q0

priority

class type queuing default q1

priority

class type queuing default q2

priority

class type queuing default q3

priority

class type queuing default q4

priority

class type queuing default q5

priority

class type queuing default q6

priority

class type queuing default q7

priority

#show interface counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface		Queue/Class-map		Q-Size	Tx pkts	Tx bytes
Dropped pkts		Dropped bytes				
cpu	bpdu	(E) 0	1	68	0	
0						
ce1/1	q1	(E) 424320	0	0	16817	
16814000						
ce1/1	q7	(E) 0	1	64	0	
0						
ce1/1	mc-q2	(E) 102336	1710	1710000	15059	
15055000						
ce24/1	q7	(E) 0	1	64	0	
0						
ce24/1	pg-q1	(I) 509600	NA	NA	NA	
NA						
ce24/1	pg-q2	(I) 103584	NA	NA	NA	
NA						

By default, default-out-policy with priority on all queues is applied on ce1/1, hence receiving only q2 multicast traffic

#show interface counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes
Dropped pkts	Dropped bytes			
cpu	bpdu	(E) 0	1	68
0				0
ce1/1	q1	(E) 424320	816	816000
15276000				15279
ce1/1	q7	(E) 0	1	64
0				0
ce1/1	mc-q1	(E) 106080	816	816000
15226000				15229
ce24/1	q7	(E) 0	1	64
0				0
ce24/1	pg-q1	(I) 513344	NA	NA
NA				NA

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#policy-map type queuing default default-out-policy	Enter policy-map type queueing default.
(config-pmap-que-def)#class type queuing default q0	Enter policy-class-map mode.
(config-pmap-c-que-def)#wrr-queue weight 2	Modify strict queue to wrr-queue with weight 2.
(config-pmap-c-que-def)# class type queuing default q1	
(config-pmap-c-que-def)# wrr-queue weight 2	
(config-pmap-c-que-def)# class type queuing default q2	
(config-pmap-c-que-def)#wrr-queue weight 4	
(config-pmap-c-que-def)#exit	Exit from policy-class-map mode.
(config-pmap-que-def)#exit	Exit from policy-map mode.
(config)#exit	Exit configure mode.

## Validation

```
#show policy-map
```

```
Type queuing policy-maps
```

```
=====
```

```
policy-map type queuing default default-out-policy
  class type queuing default q0
wrr-queue weight 2
  class type queuing default q1
wrr-queue weight 2
```

```
class type queuing default q2
wrr-queue weight 4
class type queuing default q3
priority
class type queuing default q4
priority
class type queuing default q5
priority
class type queuing default q6
priority
class type queuing default q7
priority
```

```
#show interface counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
```

Interface		Queue/Class-map		Q-Size	Tx pkts	Tx bytes
Dropped pkts		Dropped bytes				
cpu	bpdu	(E) 0	1	68	0	
0						
ce1/1	q1	(E) 421824	312	312000	8957	
8954000						
ce1/1	q7	(E) 0	1	64	0	
0						
ce1/1	mc-q2	(E) 106080	624	624000	8607	
8592000						
ce24/1	q7	(E) 0	1	64	0	
0						
ce24/1	pg-q1	(I) 411008	NA	NA	NA	
NA						
ce24/1	pg-q2	(I) 106080	NA	NA	NA	
NA						

## CHAPTER 14 WRED Configuration

This chapter contains a complete sample of configuring WRED.

### Topology

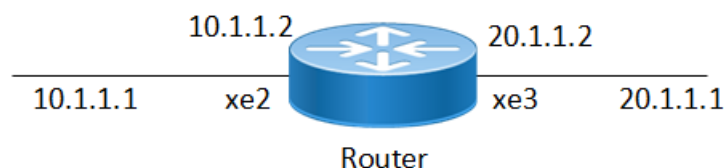


Figure 14-15: Simple configuration of WRED

### L2/L3 Interface

The following steps describe how to configure WRED.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map type qos match-all C1	Configure class-map of type qos with name C1, and enter into class-map mode
(config-cmap-que)#match cos 1	Configure match cos value 1
(config-cmap-que)#exit	Exit out of class-map mode
(config)#policy-map type qos p1	Configure policy-map of type qos with name p1, and enter into policy-map mode
(config-cmap-que)#class type qos C1	Enter class-map configuration mode
(config-cmap-que)# police cir 100 mbps pir 200 mbps	Configure police rate of cir 100 mbps and pir 200 mbps
(config-cmap-que)#exit	Exit out of class-map mode
(config-pmap-qos)#exit	Exit out of policy-class mode
(config)#policy-map type queuing default p3	Configure policy-map of type queuing with name p3, and enter into policy-map mode
(config-cmap-que)#class type queuing default q0	Enter class type of type queuing default configuration mode for q0
(config-pmap-c-que-def)#wrr-queue weight 10	Configure WRR weight of 10
(config-pmap-c-que-def)#random-detect min-threshold 50 max-threshold 80 kbytes	Configure WRED for minimum threshold of 50 kbytes and maximum threshold of 80 kbytes of queue size.
(config-pmap-c-que-def)#exit	Exit out of class configuration mode
(config)#interface xe3	Enter interface mode
(config-if)#service-policy type queuing output P3	Attach service-policy p3 of type queuing on out direction
(config-if)#exit	Exit out of interface mode
(config)#interface xe2	Enter interface mode



(config-if)#service-policy type qos input p1	Attach service-policy p1 of type qos on in direction
(config-if)#exit	Exit out of interface mode
(config)#bridge 1 protocol rstp vlan-bridge	Specify VLAN for bridge 1.
(config)#vlan database	Enter the VLAN configuration mode.
(config-vlan)#vlan 2-3 bridge 1 state enable	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
(config-vlan)#exit	Exit the VLAN configuration mode.
(config)#interface vlan1.2	Enter interface mode.
(config-if)# ip address 10.1.1.2/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface vlan1.3	Enter interface mode.
(config-if)# ip address 20.1.1.1/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.

## Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
os enable
qos statistics
!
class-map type qos match-all 1
!
class-map type qos match-all C1
  match cos 1
!
policy-map type qos p1
  class type qos C1
    police cir 100 mbps pir 200 mbps
  exit
!
!
```

```
policy-map type queuing default p3
  class type queuing default q0
    wrr-queue weight 10
    random-detect min-threshold 50 max-threshold 80 kbytes drop-probability 80
  exit
!
interface xe2
  service-policy type qos input p1
!
interface xe3
service-policy type queuing output p3

#show policy-map interface xe2

Interface xe2
Type QoS statistics status : enabled
Class-map (qos): C1 (match all)
  match cos 1
  police cir 100 mbps pir 200 mbps

Type Queuing policy-map : default-out-policy

Class-map (queuing): q0
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q1
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q2
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q3
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q4
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q5
  priority
```

---

```
output          : 0 packets, 0 bytes
dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
priority
  output          : 6 packets, 724 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output          : 1 packets, 90 bytes
  dropped         : 0 packets, 0 bytes
```

```
Wred/Tail Drop Statistics :
```

```
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets
```

---

```
#show policy-map interface xe3
```

```
Interface xe3
```

```
Type Queuing policy-map : p3
```

```
Class-map (queuing): q0
```

```
  wrr-queue weight 10
```

```
  random-detect min-threshold 50 kbytes max-threshold 80 kbytes drop-probability 80  
weight 8
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
```

```
  priority
```

```
    output                : 0 packets, 0 bytes
```

```
    dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
```

```
  output                : 0 packets, 0 bytes
```

```
  dropped                : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q2
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q3
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q4
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q5
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q6
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q7
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Wred/Tail Drop Statistics :
```

```
-----
```

```

green  : 0 packets
yellow : 0 packets
red    : 0 packets

```

```
#show queuing interface xe1/2
```

```
Egress Queuing for Ethernet ce2/1 [System]
```

L0	L1	L2	Group	PrioLevel	Shape	Bandwidth
q0			-	High	-	-
q1			-	High	-	-
q2			-	High	-	-
q3			-	High	-	-
q4			-	High	-	-
q5			-	High	-	-
q6			-	High	-	-
q7			-	High	-	-

## CHAPTER 15 Tail-Drop Configuration

### Topology

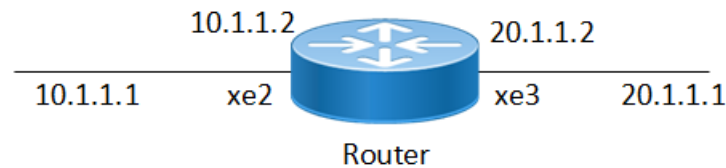


Figure 15-16: Simple configuration of Tail-Drop

### Configuring Tail-Drop

The following steps describe how to configure Tail-Drop.

#### Configuration on L2/L3 Interfaces

Do the following to configure Tail-Drop on a queue.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map type qos match-all C1	Configure class-map of type qos with name C1, and enter into class-map mode
(config-cmap-que)#match cos 1	match cos value 1
(config-cmap-qos)#exit	Exit out of class-map
(config)#policy-map type qos p1	Enter policy-map configuration mode of type qos
(config-cmap-que)#class type qos C1	Enter class-map configuration mode
(config-cmap-que)# police cir 100 mbps pir 200 mbps	Configure police rate of cir 100 mbps and pir 200 mbps
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-qos)#exit	Exit out of policy-class mode
(config)#policy-map type queuing default p3	Configure policy-map of type queuing with name p3 and enter into policy-map mode
(config-cmap-que)#class type queuing default q1	Enter class type of type queuing default configuration mode for q1
(config-pmap-c-que)#shape percent 20	Configure shaping to 20 percent of bandwidth available on interface
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-que)#class type queuing default q2	Enter class type of type queuing default configuration mode for q2
(config-pmap-c-que)#bandwidth 25000 kbps	Configure bandwidth to 25000 kbps

(config-pmap-c-que)#queue-limit 99 packets	Configure tail-drop to 99 packets
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-que)#class type queuing default q3	Enter class type of type queuing default configuration mode for q3
(config-pmap-c-que)#queue-limit 101 packets	Configure tail-drop to 101 packets
(config-pmap-c-que)#exit	Exit out of policy-class mode
(config-pmap-que)#exit	Exit out of policy-map mode
(config)#interface xe2	Enter interface mode
(config-if)#service-policy type queuing output p3	Attach service-policy p3 of type queuing on out direction
(config-if)#exit	Exit out of interface mode
(config)#interface xe3	Enter interface mode
(config-if)#service-policy type qos input p1	Attach service-policy p1 of type qos on in direction
(config-if)#exit	Exit out of interface mode
(config)#bridge 1 protocol rstp vlan-bridge	Specify VLAN for bridge 1.
(config)#vlan database	Enter the VLAN configuration mode.
(config-vlan)#vlan 2-3 bridge 1 state enable	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
(config-vlan)#exit	Exit the VLAN configuration mode.
(config)#interface vlan1.2	Enter interface mode.
(config-if)# ip address 10.1.1.2/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface vlan1.3	Enter interface mode.
(config-if)# ip address 20.1.1.1/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.

## Validation

Enter the commands below to confirm the configurations.

```
#show running-config qos
```

```
qos enable
!
qos statistics
!
class-map type qos match-all C1
  match cos 1
!
policy-map type qos p1
  class type qos C1
    police cir 100 mbps pir 200 mbps
  exit
!
!
policy-map type queuing default p3
  class type queuing default q1
    shape percent 20
    priority
  exit
  class type queuing default q2
    priority
    queue-limit 99 packets
    bandwidth 25000 kbps
  exit
  class type queuing default q3
    priority
    queue-limit 101 packets
  exit

#show class-map
Type qos class-maps
=====
    class-map type qos match-all C1
      match cos 1

    class-map type qos match-any class-default

Type queuing class-maps
=====
    class-map type queuing q0

    class-map type queuing q1

    class-map type queuing q2

    class-map type queuing q3

    class-map type queuing q4

    class-map type queuing q5
```



```
class-map type queuing q6
```

```
class-map type queuing q7
```

Type Vlan-Queuing class-maps

```
#show policy-map
```

Type qos policy-maps

=====

```
policy-map type qos p1
  class type qos C1
    police cir 100 mbps pir 200 mbps
```

Type queuing policy-maps

=====

```
policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
  class type queuing default q1
    priority
  class type queuing default q2
    priority
  class type queuing default q3
    priority
  class type queuing default q4
    priority
  class type queuing default q5
    priority
  class type queuing default q6
    priority
  class type queuing default q7
    priority
```

```
policy-map type queuing default p3
  class type queuing default q0
    priority
  class type queuing default q1
    shape percent 20
    priority
  class type queuing default q2
    priority
    queue-limit 99 packets
    bandwidth 25000 kbps
```

```
class type queuing default q3
  priority
  queue-limit 101 packets
class type queuing default q4
  priority
class type queuing default q5
  priority
class type queuing default q6
  priority
class type queuing default q7
  priority

#show policy-map interface xe2

QoS statistics status : enabled

Class-map (qos): C1 (match all)
  match cos 1
  police cir 100 mbps pir 200 mbps

Type Queuing policy-map : default-out-policy

Class-map (queuing): q0
  priority
    output          : 0 packets, 0 bytes
    dropped          : 0 packets, 0 bytes

Class-map (queuing): q1
  priority
    output          : 0 packets, 0 bytes
    dropped          : 0 packets, 0 bytes

Class-map (queuing): q2
  priority
    output          : 0 packets, 0 bytes
    dropped          : 0 packets, 0 bytes

Class-map (queuing): q3
  priority
    output          : 0 packets, 0 bytes
    dropped          : 0 packets, 0 bytes

Class-map (queuing): q4
  priority
    output          : 0 packets, 0 bytes
    dropped          : 0 packets, 0 bytes

Class-map (queuing): q5
  priority
```

---

```
output          : 0 packets, 0 bytes
dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
priority
  output          : 6 packets, 724 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output          : 1 packets, 90 bytes
  dropped         : 0 packets, 0 bytes
```

```
Wred/Tail Drop Statistics :
```

```
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets
```

```
#show policy-map interface xe3

Type Queuing policy-map : p3

Class-map (queuing): q0
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q1
  shape percent 20
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q2
  priority
  queue-limit 99 packets
  bandwidth 25000 kbps
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q3
  priority
  queue-limit 101 packets
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q4
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q5
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q6
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q7
  priority
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q0
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q1
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q2
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q3
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q4
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q5
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q6
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q7
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Wred/Tail Drop Statistics :
```

```

-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets

```

```
Router#show queuing interface xe2
```

```
Egress Queuing for Ethernet xe2 [System]
```

L0	L1	L2	Group	PrioLevel	Shape	Bandwidth
q0			-	High	-	-
q1			-	High	-	-
q2			-	High	-	-
q3			-	High	-	-
q4			-	High	-	-
q5			-	High	-	-
q6			-	High	-	-
q7			-	High	-	-

Router#show queuing interface xe3

Egress Queuing for Ethernet xe3 [System]

L0	L1	L2	Group	PrioLevel	Shape	Bandwidth
q0			-	High	-	-
q1			-	High	20 percent	-
q2			-	High	-	25000 kbps
q3			-	High	-	-
q4			-	High	-	-
q5			-	High	-	-
q6			-	High	-	-
q7			-	High	-	-

## CHAPTER 16 Hierarchical Queuing Configuration

This chapter contains a complete sample of configuring hierarchical queuing.

### Topology

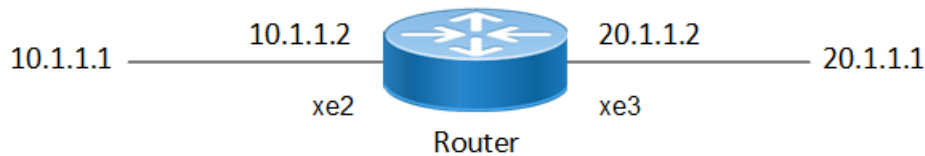


Figure 16-17: Simple configuration of Hierarchical Queuing

### Configuring Hierarchical Queuing

Do the following to configure 3-level hierarchical queuing on an interface.

#configure terminal	Enter configure mode.
(config)#qos enable	Enable QoS globally.
(config)#qos statistics	Enable QoS statistics.
(config)#class-map type qos match-any C_QOS1	Configure class-map C_QOS1 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 0	Configure match criteria as cos 0
(config-cmap-qos)#match dscp 0-7	Configure match criteria as dscp 0-7
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS2	Configure class-map C_QOS2 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 1	Configure match criteria as cos 1
(config-cmap-qos)#match dscp 8-15	Configure match criteria as dscp 8-15
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS3	Configure class-map C_QOS3 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 2	Configure match criteria as cos 2
(config-cmap-qos)#match dscp 16-23	Configure match criteria as dscp 16-23
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS4	Configure class-map C_QOS4 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 3	Configure match criteria as cos 3
(config-cmap-qos)#match dscp 24-31	Configure match criteria as dscp 24-31
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS5	Configure class-map C_QOS5 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 4	Configure match criteria as cos 4

(config-cmap-qos)#match dscp 32-39	Configure match criteria as dscp 32-39
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS6	Configure class-map C_QOS6 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 5	Configure match criteria as cos 5
(config-cmap-qos)#match dscp 40-47	Configure match criteria as dscp 40-47
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS7	Configure class-map C_QOS7 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 6	Configure match criteria as cos 6
(config-cmap-qos)#match dscp 48-55	Configure match criteria as dscp 48-55
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type qos match-any C_QOS8	Configure class-map C_QOS8 of type qos and enter into class-map mode
(config-cmap-qos)#match cos 7	Configure match criteria as cos 7
(config-cmap-qos)#match dscp 56-63	Configure match criteria as dscp 56-63
(config-cmap-qos)#exit	Exit out of cmap mode
(config)#class-map type queuing match-any cq1	Configure class-map cq1 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 1	Configure match criteria as qos-group 1
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq2	Configure class-map cq2 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 2	Configure match criteria as qos-group 2
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq3	Configure class-map cq3 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 3	Configure match criteria as qos-group 3
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq4	Configure class-map cq4 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 4	Configure match criteria as qos-group 4
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq5	Configure class-map cq5 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 5	Configure match criteria as qos-group 5
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq6	Configure class-map cq6 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 6	Configure match criteria as qos-group 6
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq7	Configure class-map cq7 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 7	Configure match criteria as qos-group 7



(config-cmap-que)#exit	Exit out of cmap mode.
(config)#class-map type queuing match-any cq8	Configure class-map cq8 of type queuing and enter into class-map mode.
(config-cmap-que)#match qos-group 8	Configure match criteria as qos-group 8
(config-cmap-que)#exit	Exit out of cmap mode.
(config)#policy-map type qos pmap1	Configure policy-map pmap1 og type qos and enter into policy-map mode.
(config-pmap-qos)#class type qos C_QOS1	Assign class C-QOS1 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 1	Remark matched traffic to qos-group 1
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS2	Assign class C-QOS2 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 2	Remark matched traffic to qos-group 2
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS3	Assign class C-QOS3 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 3	Remark matched traffic to qos-group 3
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS4	Assign class C-QOS4 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 4	Remark matched traffic to qos-group 4
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS5	Assign class C-QOS5 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 5	Remark matched traffic to qos-group 5
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS6	Assign class C-QOS6 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 6	Remark matched traffic to qos-group 6
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS7	Assign class C-QOS7 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 7	Remark matched traffic to qos-group 7
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#class type qos C_QOS8	Assign class C-QOS8 to pmap1 and enter into policy-class-map mode.
(config-pmap-c-qos)#set qos-group 8	Remark matched traffic to qos-group 8
(config-pmap-c-qos)#exit	Exit out of policy-class-map mode
(config-pmap-qos)#exit	Exit out of policy-map mode
(config)#policy-map type queuing P1P1	Configure policy-map of type queuing P1P1 and enter into policy-map mode.
(config-pmap-que)#class type queuing cq1	Assign class cq1 to policy-map P1 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 20	Shape the matched traffic to percent 20

(config-pmap-c-que)#queue-limit 70 packets	Configure tail-drop on q1 to 70 packets.
(config-pmap-c-que)#bandwidth percent 18	Configure minimum bandwidth to 18 percent on q1.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing cq2	Assign class cq2 to policy-map P1 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 80	Shape the matched traffic to percent 80
(config-pmap-c-que)#queue-limit 70 packets	Configure tail-drop on q2 to 70 packets.
(config-pmap-c-que)#bandwidth percent 75	Configure minimum bandwidth to 75 percent on q2.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#policy-map type queuing P2	Configure policy-map of type queuing P2 and enter into policy-map mode.
(config-pmap-que)#class type queuing cq3	Assign class cq3 to policy-map P2 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 25	Shape the matched traffic to percent 25
(config-pmap-c-que)#random-detect min-threshold 50 max-threshold 75 kbytes	Configure WRED on q3 to minimum threshold 50 and maximum threshold 75 packets.
(config-pmap-c-que)#bandwidth percent 20	Configure minimum bandwidth to 20 percent on q3.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing cq4	Assign class cq4 to policy-map P2 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 75	Shape the matched traffic to percent 75
(config-pmap-c-que)#random-detect min-threshold 50 max-threshold 75 kbytes	Configure WRED on q4 to minimum threshold 50 and maximum threshold 75 kbytes.
(config-pmap-c-que)#bandwidth percent 65	Configure minimum bandwidth to 65 percent on q4.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#policy-map type queuing P3	Configure policy-map of type queuing P3 and enter into policy-map mode.
(config-pmap-que)#class type queuing cq5	Assign class cq5 to policy-map P3 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 40	Shape the matched traffic to percent 40
(config-pmap-c-que)#queue-limit 100 packets	Configure Tail-Drop on q5 to 100 packets.
(config-pmap-c-que)#bandwidth percent 35	Configure minimum bandwidth to 35 percent on q5.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing cq6	Assign class cq6 to policy-map P3 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 60	Shape the matched traffic to percent 60
(config-pmap-c-que)#queue-limit 100 packets	Configure Tail-Drop on q6 to 100 packets.
(config-pmap-c-que)#bandwidth percent 55	Configure minimum bandwidth to 55 percent on q6.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#policy-map type queuing P4	Configure policy-map of type queuing P4 and enter into policy-map mode.

(config-pmap-que)#class type queuing cq7	Assign class cq7 to policy-map P4 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 40	Shape the matched traffic to percent 40
(config-pmap-c-que)#random-detect min-threshold 80 packets max-threshold 100 packets	Configure WRED on q7 to maximum threshold of 80 packets and maximum threshold of 100 packets..
(config-pmap-c-que)#bandwidth percent 35	Configure minimum bandwidth to 35 percent on q7.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing cq8	Assign class cq8 to policy-map P4 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 60	Shape the matched traffic to percent 60
(config-pmap-c-que)#random-detect min-threshold 80 packets max-threshold 100 packets	Configure WRED on q8 to minimum threshold of 80 packets and maximum threshold of 100 packets..
(config-pmap-c-que)#bandwidth percent 55	Configure minimum bandwidth to 55 percent on q8.
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#class-map type queuing match-any empty1	Configure class-map of type queuing empty1
(config-cmap-que)#exit	Exit out of cmap mode
(config)#class-map type queuing match-any empty2	Configure class-map of type queuing empty2
(config-cmap-que)#exit	Exit out of cmap mode
(config)#class-map type queuing match-any empty3	Configure class-map of type queuing empty3
(config-cmap-que)#exit	Exit out of cmap mode
(config)#class-map type queuing match-any empty4	Configure class-map of type queuing empty4
(config-cmap-que)#exit	Exit out of cmap mode
(config)#class-map type queuing match-any empty5	Configure class-map of type queuing empty5
(config-cmap-que)#exit	Exit out of cmap mode
(config)#class-map type queuing match-any empty6	Configure class-map of type queuing empty6
(config-cmap-que)#exit	Exit out of cmap mode
(config)#policy-map type queuing P1P2	Configure policy-map of type queuing P1P2 and enter into policy-map mode.
(config-pmap-que)#class type queuing empty1	Assign class-map of type queuing empty1 to P1P2 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 40	Shape the matched traffic to 40 percent
(config-pmap-c-que)#bandwidth percent 30	Configure minimum bandwidth to 30 percent on empty1.
(config-pmap-c-que)#service-policy P1P1	Assign service-policy P1P1
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing empty2	Assign class-map of type queuing empty2 to P1P2 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 60	Shape the matched traffic to 60 percent

(config-pmap-c-que)#bandwidth percent 55	Configure minimum bandwidth to 55 percent on empty2.
(config-pmap-c-que)#service-policy P2	Assign service-policy P2
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#policy-map type queuing P3P4	Configure policy-map of type queuing P3P4 and enter into policy-map mode.
(config-pmap-que)#class type queuing empty3	Assign class-map of type queuing empty3 to P3P4 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 40	Shape the matched traffic to 40 percent
(config-pmap-c-que)#bandwidth percent 35	Configure minimum bandwidth to 35 percent on empty3.
(config-pmap-c-que)#service-policy P3	Assign service-policy P3
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing empty4	Assign class-map of type queuing empty4 to P3P4 and enter into policy-class-map mode.
(config-pmap-c-que)#shape average percent 60	Shape the matched traffic to 60 percent
(config-pmap-c-que)#bandwidth percent 50	Configure minimum bandwidth to 50 percent on empty4.
(config-pmap-c-que)#service-policy P4	Assign service-policy P4
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#policy-map type queuing Pend	Configure policy-map of type queuing Pend and enter into policy-map mode.
(config-pmap-que)#class type queuing empty5	Assign class-map of type queuing empty5 to Pend and enter into policy-class-map mode.
(config-pmap-c-que)#shape average 400 mbps	Shape the matched traffic to 400 mbps
(config-pmap-c-que)#bandwidth 350 mbps	Configure minimum bandwidth to 350 mbps.
(config-pmap-c-que)#service-policy P1P1	Assign service-policy P1P1
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#class type queuing empty6	Assign class-map of type queuing empty6 to Pend and enter into policy-class-map mode.
(config-pmap-c-que)#shape average 500 mbps	Shape the matched traffic to 500 mbps
(config-pmap-c-que)#bandwidth 450 mbps	Configure minimum bandwidth to 450 mbps.
(config-pmap-c-que)#service-policy P3P4	Assign service-policy P3P4
(config-pmap-c-que)#exit	Exit out of policy-class-map mode.
(config-pmap-que)#exit	Exit out of policy-map mode.
(config)#interface xe2	Enter into interface mode
(config-if)#service-policy type qos input pmap1	Assign service-policy of type qos policy-map1.
(config-if)#exit	Exit out of intf mode
(config)#interface xe3	Enter into interface mode
(config-if)#service-policy type queuing output Pend	Assign service-policy of type queuing pend on out direction.
(config-if)#exit	Exit out of interface mode.

Configuring one of the scheduler modes implicitly un-configures other modes, only one scheduler mode can be configured at a time.

(config)#set qos wrr uc 1 non-uc 2	Schedule unicast and multicast traffic in 1:2
(config)#set qos sp	Set strict priority between unicast and multicast traffic, with higher priority to multicast traffic
(config)#interface xe49/2	Enter interface mode
(config-if)#exit	Exit interface mode
(config)#bridge 1 protocol rstp vlan-bridge	Specify VLAN for bridge 1.
(config)#vlan database	Enter the VLAN configuration mode.
(config-vlan)#vlan 2-3 bridge 1 state enable	Enable VLAN (2-3) on bridge 1. Specifying the enable state.
(config-vlan)#exit	Exit the VLAN configuration mode.
(config)#interface vlan1.2	Enter interface mode.
(config-if)# ip address 10.1.1.2/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface vlan1.3	Enter interface mode.
(config-if)# ip address 20.1.1.1/24	Configure the IP address.
(config-if)#exit	Exit the interface mode.
(config)#interface xe2	Enter interface mode.
(config-if)#switchport	Configure xe2 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.
(config)#interface xe3	Enter interface mode.
(config-if)#switchport	Configure xe3 as a Layer 2 port.
(config-if)#bridge-group 1	Associate the interface with bridge group 1.
(config-if)#switchport mode trunk	Configure port as a trunk.
(config-if)#switchport trunk allowed vlan all	Allow all the VLANs on the xe3 interface.
(config-if)#exit	Exit the interface mode.

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
#show running-config qos
qos enable
!
set qos wrr uc 1 non-uc 2
qos statistics
!
class-map type qos match-any C_QOS1
  match dscp 0-7
  match cos 0
!
class-map type qos match-any C_QOS2
  match dscp 8-15
```

```
match cos 1
!
class-map type qos match-any C_QOS3
  match dscp 16-23
  match cos 2
!
class-map type qos match-any C_QOS4
  match dscp 24-31
  match cos 3
!
class-map type qos match-any C_QOS5
  match dscp 32-39
  match cos 4
!
class-map type qos match-any C_QOS6
  match dscp 40-47
  match cos 5
!
class-map type qos match-any C_QOS7
  match dscp 48-55
  match cos 6
!
class-map type qos match-any C_QOS8
  match dscp 56-63
  match cos 7
!
class-map type queuing match-any cq1
  match qos-group 1
!
class-map type queuing match-any cq2
  match qos-group 2
!
class-map type queuing match-any cq3
  match qos-group 3
!
class-map type queuing match-any cq4
  match qos-group 4
!
class-map type queuing match-any cq5
!
class-map type queuing match-any cq6
  match qos-group 6
!
class-map type queuing match-any cq7
  match qos-group 7
!
class-map type queuing match-any cq8
  match qos-group 8
!
class-map type queuing match-any empty1
```

```
!  
class-map type queuing match-any empty2  
!  
class-map type queuing match-any empty3  
!  
class-map type queuing match-any empty4  
!  
class-map type queuing match-any empty5  
!  
class-map type queuing match-any empty6  
!  
policy-map type qos pmap1  
  class type qos C_QOS1  
    set qos-group 1  
    exit  
  class type qos C_QOS2  
    set qos-group 2  
    exit  
  class type qos C_QOS3  
    set qos-group 3  
    exit  
  class type qos C_QOS4  
    set qos-group 4  
    exit  
  class type qos C_QOS5  
    set qos-group 5  
    exit  
  class type qos C_QOS6  
    set qos-group 6  
    exit  
  class type qos C_QOS7  
    set qos-group 7  
    exit  
  class type qos C_QOS8  
    set qos-group 8  
    exit  
!  
policy-map type queuing P1P1  
  class type queuing cq1  
    shape average percent 20  
    wrr-queue weight 1  
    queue-limit 70 packets  
    bandwidth percent 18  
    exit  
  class type queuing cq2  
    shape average percent 80  
    wrr-queue weight 1  
    queue-limit 70 packets  
    bandwidth percent 75  
    exit
```

```
!  
policy-map type queuing P2  
  class type queuing cq3  
    shape average percent 25  
    wrr-queue weight 1  
    random-detect min-threshold 50 max-threshold 75 kbytes  
    bandwidth percent 20  
    exit  
  class type queuing cq4  
    shape average percent 75  
    wrr-queue weight 1  
    random-detect min-threshold 50 max-threshold 75 kbytes  
    bandwidth percent 65  
    exit  
!  
policy-map type queuing P3  
  class type queuing cq5  
    shape average percent 40  
    wrr-queue weight 1  
    queue-limit 100 packets  
    bandwidth percent 35  
    exit  
  class type queuing cq6  
    shape average percent 60  
    wrr-queue weight 1  
    queue-limit 100 packets  
    bandwidth percent 55  
    exit  
!  
policy-map type queuing P4  
  class type queuing cq7  
    shape average percent 40  
    wrr-queue weight 1  
    random-detect min-threshold 80 max-threshold 100 packets  
    bandwidth percent 35  
    exit  
  class type queuing cq8  
    shape average percent 60  
    wrr-queue weight 1  
    random-detect min-threshold 80 max-threshold 100 packets  
    bandwidth percent 55  
    exit  
!  
!  
policy-map type queuing P3P4  
  class type queuing empty3  
    shape average percent 40  
    wrr-queue weight 1  
    bandwidth percent 35  
    service-policy P3
```



```
    exit
class type queuing empty4
    shape average percent 60
    wrr-queue weight 1
    bandwidth percent 50
    service-policy P4
    exit
!
policy-map type queuing P1P2
    class type queuing empty1
        shape average percent 40
        wrr-queue weight 1
        bandwidth percent 30
        service-policy P1P1
        exit
    class type queuing empty2
        shape average percent 60
        wrr-queue weight 1
        bandwidth percent 55
        service-policy P2
        exit
!
policy-map type queuing Pend
    class type queuing empty5
        shape average 400 mbps
        wrr-queue weight 1
        bandwidth 350 mbps
        service-policy P1P1
        exit
    class type queuing empty6
        shape average 500 mbps
        wrr-queue weight 1
        bandwidth 450 mbps
        service-policy P3P4
        exit
!
!
interface xe2
    service-policy type qos input pmap1
!
interface xe3
    service-policy type queuing output Pend
!

#sh class-map

Type qos class-maps
=====
```

```
class-map type qos match-any C_QOS1
  match cos 0
  match dscp 0-7

class-map type qos match-any C_QOS2
  match cos 1
  match dscp 8-15

class-map type qos match-any C_QOS3
  match cos 2
  match dscp 16-23

class-map type qos match-any C_QOS4
  match cos 3
  match dscp 24-31

class-map type qos match-any C_QOS5
  match cos 4
  match dscp 32-39

class-map type qos match-any C_QOS6
  match cos 5
  match dscp 40-47

class-map type qos match-any C_QOS7
  match cos 6
  match dscp 48-55

class-map type qos match-any C_QOS8
  match cos 7
  match dscp 56-63

class-map type qos match-any class-default
```

#### Type queuing class-maps

=====

```
class-map type queuing match-any cq1
  match qos-group 1

class-map type queuing match-any cq2
  match qos-group 2

class-map type queuing match-any cq3
  match qos-group 3

class-map type queuing match-any cq4
  match qos-group 4

class-map type queuing match-any cq5
```

```
class-map type queuing match-any cq6
  match qos-group 6

class-map type queuing match-any cq7
  match qos-group 7

class-map type queuing match-any cq8
  match qos-group 8

class-map type queuing match-any empty1

class-map type queuing match-any empty2

class-map type queuing match-any empty3

class-map type queuing match-any empty4

class-map type queuing match-any empty5

class-map type queuing match-any empty6

class-map match-any q0

class-map match-any q1

class-map match-any q2

class-map match-any q3

class-map match-any q4

class-map match-any q5

class-map match-any q6

class-map match-any q7
```

```
Type Vlan-Queuing class-maps
=====
```

```
#show policy-map
```

```
Type qos policy-maps
=====
```

```
policy-map type qos pmap1
  class type qos C_QOS1
    set qos-group 1
```

```
exit
class type qos C_QOS2
  set qos-group 2
exit
class type qos C_QOS3
  set qos-group 3
exit
class type qos C_QOS4
  set qos-group 4
exit
class type qos C_QOS5
  set qos-group 5
exit
class type qos C_QOS6
  set qos-group 6
exit
class type qos C_QOS7
  set qos-group 7
exit
class type qos C_QOS8
  set qos-group 8
exit
```

Type queuing policy-maps  
=====

```
policy-map type queuing P1P1
  class type queuing cq1
    shape average percent 20
    wrr-queue weight 1
    queue-limit 70 packets
    bandwidth percent 18
  exit
  class type queuing cq2
    shape average percent 80
    wrr-queue weight 1
    queue-limit 70 packets
    bandwidth percent 75
  exit

policy-map type queuing P1P2
  class type queuing empty1
    shape average percent 40
    wrr-queue weight 1
    bandwidth percent 30
    service-policy P1P1
  exit
  class type queuing empty2
    shape average percent 60
```

```
wrr-queue weight 1
bandwidth percent 55
service-policy P2
exit
```

```
policy-map type queuing P2
class type queuing cq3
  shape average percent 25
  wrr-queue weight 1
  random-detect min-threshold 50 max-threshold 75 kbytes
  bandwidth percent 20
  exit
class type queuing cq4
  shape average percent 75
  wrr-queue weight 1
  random-detect min-threshold 50 max-threshold 75 kbytes
  bandwidth percent 65
  exit
```

```
policy-map type queuing P3
class type queuing cq5
  shape average percent 40
  wrr-queue weight 1
  queue-limit 100 packets
  bandwidth percent 35
  exit
class type queuing cq6
  shape average percent 60
  wrr-queue weight 1
  queue-limit 100 packets
  bandwidth percent 55
  exit
```

```
policy-map type queuing P3P4
class type queuing empty3
  shape average percent 40
  wrr-queue weight 1
  bandwidth percent 35
  service-policy P3
  exit
class type queuing empty4
  shape average percent 60
  wrr-queue weight 1
  bandwidth percent 50
  service-policy P4
  exit
```

```
policy-map type queuing P4
class type queuing cq7
  shape average percent 40
```

```
wrr-queue weight 1
random-detect min-threshold 80 max-threshold 100 packets
bandwidth percent 35
exit
class type queuing cq8
  shape average percent 60
  wrr-queue weight 1
  random-detect min-threshold 80 max-threshold 100 packets
  bandwidth percent 55
  exit

policy-map type queuing Pend
  class type queuing empty5
    shape average 400 mbps
    wrr-queue weight 1
    bandwidth 350 mbps
    service-policy P1P1
    exit
  class type queuing empty6
    shape average 500 mbps
    wrr-queue weight 1
    bandwidth 450 mbps
    service-policy P3P4
    exit

policy-map type queuing default default-out-policy
  class type queuing default q0
    priority level 1
    exit
  class type queuing default q1
    priority level 1
    exit
  class type queuing default q2
    priority level 1
    exit
  class type queuing default q3
    priority level 1
    exit
  class type queuing default q4
    priority level 1
    exit
  class type queuing default q5
    priority level 1
    exit
  class type queuing default q6
    priority level 1
    exit
  class type queuing default q7
    priority level 1
    exit
```

```
#show policy-map interface xe2

Interface xe2
Global statistics status : enabled

Service-policy (qos) input      : pmap1
-----
Class-map (qos): C_QOS1 (match any)
  match dscp 0-7
  match cos 0
  set qos-group 1
    matched      : 2 packets, 128 bytes
    transmitted  : 2 packets, 128 bytes

Class-map (qos): C_QOS2 (match any)
  match dscp 8-15
  match cos 1
  set qos-group 2
    matched      : 23751790 packets, 1520114560 bytes
    transmitted  : 23751790 packets, 1520114560 bytes

Class-map (qos): C_QOS3 (match any)
  match dscp 16-23
  match cos 2
  set qos-group 3
    matched      : 5412521 packets, 346401344 bytes
    transmitted  : 5412521 packets, 346401344 bytes

Class-map (qos): C_QOS4 (match any)
  match dscp 24-31
  match cos 3
  set qos-group 4
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes

Class-map (qos): C_QOS5 (match any)
  match dscp 32-39
  match cos 4
  set qos-group 5
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes

Class-map (qos): C_QOS6 (match any)
  match dscp 40-47
  match cos 5
  set qos-group 6
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS7 (match any)
  match dscp 48-55
  match cos 6
  set qos-group 7
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS8 (match any)
  match dscp 56-63
  match cos 7
  set qos-group 8
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
  priority level 1
    output      : 1 packets, 64 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
  priority level 1
```



---

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
  priority level 1
    output      : 2058 packets, 131912 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 4 packets, 272 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
```

```
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

```
#show policy-map interface xe3
```

```
Interface xe3
```

Global statistics status : enabled

Service-policy (queuing) output: Pend

-----  
Class-map (queuing): empty5

shape average 400 mbps

wrr-queue weight 1

bandwidth 350 mbps

Service-policy (queuing) output: P1P1

-----  
Class-map (queuing): cq1

match qos-group 1

shape percent 20

wrr-queue weight 1

queue-limit 70 packets

bandwidth percent 18

output : 1 packets, 64 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): cq2

match qos-group 2

shape percent 80

wrr-queue weight 1

queue-limit 70 packets

bandwidth percent 75

output : 10290336 packets, 658581504 bytes

dropped : 13382099 packets, 856454336 bytes

Class-map (queuing): empty6

shape average 500 mbps

wrr-queue weight 1

bandwidth 450 mbps

Service-policy (queuing) output: P3P4

-----  
Class-map (queuing): empty3

shape percent 40

wrr-queue weight 1

bandwidth percent 35

Service-policy (queuing) output: P3

-----  
Class-map (queuing): cq5

shape percent 40

wrr-queue weight 1

queue-limit 100 packets

bandwidth percent 35

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

```
Class-map (queuing): cq6
  match qos-group 6
  shape percent 60
wrr-queue weight 1
  queue-limit 100 packets
  bandwidth percent 55
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): empty4
  shape percent 60
wrr-queue weight 1
  bandwidth percent 50

Service-policy (queuing) output: P4
-----
Class-map (queuing): cq7
  match qos-group 7
  shape percent 40
wrr-queue weight 1
  random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
percent
  bandwidth percent 35
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): cq8
  match qos-group 8
  shape percent 60
wrr-queue weight 1
  random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
percent
  bandwidth percent 55
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
  priority level 1
```

---

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
```

```
priority level 1
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
```

```
priority level 1
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
```

```
priority level 1
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
```

```
priority level 1
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
```

```
priority level 1
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
```

```
priority level 1
```

```
output      : 2011 packets, 128964 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
```

```
output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q5
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q6
```

```

output      : 0 packets, 0 bytes
dropped     : 0 packets, 0 bytes

```

```
Class-map (queuing): mc-q7
```

```

output      : 11 packets, 748 bytes
dropped     : 0 packets, 0 bytes

```

```
Wred Drop Statistics :
```

```

-----
green  : 13382099 packets
yellow : 0 packets
red    : 0 packets

```

```
#show queuing interface xe2
```

```
Egress Queuing for Ethernet xe2 [System]
```

L0	L1	L2	Group	PrioLevel	Shape
Bandwidth					
q0			-	High	-
-					
q1			-	High	-
-					
q2			-	High	-
-					
q3			-	High	-
-					
q4			-	High	-
-					
q5			-	High	-
-					
q6			-	High	-
-					
q7			-	High	-

```
#show queuing interface xe3
```

```
Egress Queuing for Ethernet xe3 [System]
```

L0 Bandwidth	L1	L2	Group	PrioLevel	Shape
empty5 350 mbps			-	-	400 mbps
18 percent	cq1		1	-	20 percent
75 percent	cq2		2	-	80 percent
empty6 450 mbps			-	-	500 mbps
35 percent	empty3		-	-	40 percent
35 percent		cq5	-	-	40 percent
55 percent		cq6	6	-	60 percent
50 percent	empty4		-	-	60 percent
35 percent		cq7	7	-	40 percent
55 percent		cq8	8	-	60 percent

```
(config)#set qos wrr uc 1 non-uc 127
(config)#exit
```

```
#show policy-map interface xe2
```

```
Interface xe2
Global statistics status : enabled
```

```
Service-policy (qos) input      : pmap1
```

```
-----
Class-map (qos): C_QOS1 (match any)
  match dscp 0-7
  match cos 0
  set qos-group 1
    matched      : 2 packets, 128 bytes
    transmitted  : 2 packets, 128 bytes
```

```
Class-map (qos): C_QOS2 (match any)
  match dscp 8-15
  match cos 1
  set qos-group 2
    matched      : 24126931 packets, 1544123584 bytes
    transmitted  : 24126931 packets, 1544123584 bytes
```

```
Class-map (qos): C_QOS3 (match any)
```

```
match dscp 16-23
match cos 2
set qos-group 3
    matched      : 5412521 packets, 346401344 bytes
    transmitted  : 5412521 packets, 346401344 bytes
```

```
Class-map (qos): C_QOS4 (match any)
match dscp 24-31
match cos 3
set qos-group 4
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS5 (match any)
match dscp 32-39
match cos 4
set qos-group 5
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS6 (match any)
match dscp 40-47
match cos 5
set qos-group 6
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS7 (match any)
match dscp 48-55
match cos 6
set qos-group 7
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS8 (match any)
match dscp 56-63
match cos 7
set qos-group 8
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
```

---

```
priority level 1
    output      : 1 packets, 64 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q2
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
priority level 1
    output      : 2245 packets, 143880 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```



---

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q7
  output      : 4 packets, 272 bytes
  dropped     : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets

#show policy-map interface xe3

Interface xe3
Global statistics status : enabled

Service-policy (queuing) output: Pend
-----
Class-map (queuing): empty5
  shape average 400 mbps
  wrr-queue weight 1
  bandwidth 350 mbps

      Service-policy (queuing) output: P1P1
      -----
      Class-map (queuing): cq1
        match qos-group 1
        shape percent 20
wrr-queue weight 1
        queue-limit 70 packets
        bandwidth percent 18
          output      : 1 packets, 64 bytes
          dropped     : 0 packets, 0 bytes

      Class-map (queuing): cq2
        match qos-group 2
        shape percent 80
wrr-queue weight 1
```

---

```
queue-limit 70 packets
bandwidth percent 75
    output      : 10761532 packets, 688738048 bytes
    dropped     : 13382100 packets, 856454400 bytes
```

```
Class-map (queuing): empty6
  shape average 500 mbps
  wrr-queue weight 1
  bandwidth 450 mbps
```

```
Service-policy (queuing) output: P3P4
```

```
-----
Class-map (queuing): empty3
  shape percent 40
wrr-queue weight 1
  bandwidth percent 35
```

```
Service-policy (queuing) output: P3
```

```
-----
Class-map (queuing): cq5
  shape percent 40
wrr-queue weight 1
  queue-limit 100 packets
  bandwidth percent 35
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): cq6
  match qos-group 6
  shape percent 60
wrr-queue weight 1
  queue-limit 100 packets
  bandwidth percent 55
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): empty4
  shape percent 60
wrr-queue weight 1
  bandwidth percent 50
```

```
Service-policy (queuing) output: P4
```

```
-----
Class-map (queuing): cq7
  match qos-group 7
  shape percent 40
wrr-queue weight 1
  random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
```

```
percent
    bandwidth percent 35
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

    Class-map (queuing): cq8
        match qos-group 8
        shape percent 60
wrr-queue weight 1
    random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
percent
    bandwidth percent 55
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
    priority level 1
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
    priority level 1
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q2
    priority level 1
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
    priority level 1
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
    priority level 1
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
    priority level 1
        output      : 0 packets, 0 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
```

---

```
priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
    priority level 1
        output      : 2246 packets, 144004 bytes
        dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q4
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q5
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q6
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q7
    output      : 12 packets, 816 bytes
    dropped     : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green   : 13382099 packets
yellow  : 0 packets
red     : 0 packets

(config)#set qos wrr uc 1 non-uc 2
(config)#exit
```

---

```
#show policy-map interface xe2

Interface xe2
Global statistics status : enabled

Service-policy (qos) input      : pmap1
-----
Class-map (qos): C_QOS1 (match any)
  match dscp 0-7
  match cos 0
  set qos-group 1
    matched      : 2 packets, 128 bytes
    transmitted  : 2 packets, 128 bytes

Class-map (qos): C_QOS2 (match any)
  match dscp 8-15
  match cos 1
  set qos-group 2
    matched      : 24459636 packets, 1565416704 bytes
    transmitted  : 24459636 packets, 1565416704 bytes

Class-map (qos): C_QOS3 (match any)
  match dscp 16-23
  match cos 2
  set qos-group 3
    matched      : 5412521 packets, 346401344 bytes
    transmitted  : 5412521 packets, 346401344 bytes

Class-map (qos): C_QOS4 (match any)
  match dscp 24-31
  match cos 3
  set qos-group 4
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes

Class-map (qos): C_QOS5 (match any)
  match dscp 32-39
  match cos 4
  set qos-group 5
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes

Class-map (qos): C_QOS6 (match any)
  match dscp 40-47
  match cos 5
  set qos-group 6
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

---

```
Class-map (qos): C_QOS7 (match any)
  match dscp 48-55
  match cos 6
  set qos-group 7
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS8 (match any)
  match dscp 56-63
  match cos 7
  set qos-group 8
    matched      : 0 packets, 0 bytes
    transmitted  : 0 packets, 0 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
  priority level 1
    output      : 1 packets, 64 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q2
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q3
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q4
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q5
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
  priority level 1
    output      : 0 packets, 0 bytes
```

---

```
        dropped      : 0 packets, 0 bytes

Class-map (queuing): q7
  priority level 1
    output          : 2412 packets, 154568 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q4
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q5
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q6
  output           : 0 packets, 0 bytes
  dropped          : 0 packets, 0 bytes

Class-map (queuing): mc-q7
  output           : 4 packets, 272 bytes
  dropped          : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets

#show policy-map interface xe3

Interface xe3
Global statistics status : enabled
```

---

Service-policy (queuing) output: Pend

-----  
Class-map (queuing): empty5  
  shape average 400 mbps  
  wrr-queue weight 1  
  bandwidth 350 mbps

Service-policy (queuing) output: P1P1

-----  
Class-map (queuing): cq1  
  match qos-group 1  
  shape percent 20  
wrr-queue weight 1  
  queue-limit 70 packets  
  bandwidth percent 18  
    output      : 1 packets, 64 bytes  
    dropped     : 0 packets, 0 bytes

Class-map (queuing): cq2  
  match qos-group 2  
  shape percent 80  
wrr-queue weight 1  
  queue-limit 70 packets  
  bandwidth percent 75  
    output      : 10871860 packets, 695799040 bytes  
    dropped     : 13598654 packets, 870313856 bytes

Class-map (queuing): empty6  
  shape average 500 mbps  
  wrr-queue weight 1  
  bandwidth 450 mbps

Service-policy (queuing) output: P3P4

-----  
Class-map (queuing): empty3  
  shape percent 40  
wrr-queue weight 1  
  bandwidth percent 35

Service-policy (queuing) output: P3

-----  
Class-map (queuing): cq5  
  shape percent 40  
wrr-queue weight 1  
  queue-limit 100 packets  
  bandwidth percent 35  
    output      : 0 packets, 0 bytes  
    dropped     : 0 packets, 0 bytes



```
Class-map (queuing): cq6
  match qos-group 6
  shape percent 60
wrr-queue weight 1
  queue-limit 100 packets
  bandwidth percent 55
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): empty4
  shape percent 60
wrr-queue weight 1
  bandwidth percent 50

Service-policy (queuing) output: P4
-----
Class-map (queuing): cq7
  match qos-group 7
  shape percent 40
wrr-queue weight 1
  random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
percent
  bandwidth percent 35
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): cq8
  match qos-group 8
  shape percent 60
wrr-queue weight 1
  random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
percent
  bandwidth percent 55
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
  priority level 1
    output      : 0 packets, 0 bytes
```

---

```
        dropped      : 0 packets, 0 bytes

Class-map (queuing): q2
  priority level 1
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q3
  priority level 1
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q4
  priority level 1
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q5
  priority level 1
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q6
  priority level 1
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): q7
  priority level 1
    output          : 2410 packets, 154500 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q4
  output          : 0 packets, 0 bytes
```

---

---

```
        dropped      : 0 packets, 0 bytes

Class-map (queuing): mc-q5
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q6
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes

Class-map (queuing): mc-q7
    output          : 13 packets, 884 bytes
    dropped         : 0 packets, 0 bytes

Wred Drop Statistics :
-----
green  : 13598643 packets
yellow : 0 packets
red    : 0 packets

(config)#set qos sp
(config)#exit

#show policy-map interface xe2

Interface xe2
Global statistics status : enabled

Service-policy (qos) input      : pmap1
-----
Class-map (qos): C_QOS1 (match any)
  match dscp 0-7
  match cos 0
  set qos-group 1
    matched      : 2 packets, 128 bytes
    transmitted  : 2 packets, 128 bytes

Class-map (qos): C_QOS2 (match any)
  match dscp 8-15
  match cos 1
  set qos-group 2
    matched      : 24622849 packets, 1575862336 bytes
    transmitted  : 24622849 packets, 1575862336 bytes

Class-map (qos): C_QOS3 (match any)
  match dscp 16-23
  match cos 2
  set qos-group 3
```

---

```
matched      : 5412521 packets, 346401344 bytes
transmitted  : 5412521 packets, 346401344 bytes
```

```
Class-map (qos): C_QOS4 (match any)
match dscp 24-31
match cos 3
set qos-group 4
  matched      : 0 packets, 0 bytes
  transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS5 (match any)
match dscp 32-39
match cos 4
set qos-group 5
  matched      : 0 packets, 0 bytes
  transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS6 (match any)
match dscp 40-47
match cos 5
set qos-group 6
  matched      : 0 packets, 0 bytes
  transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS7 (match any)
match dscp 48-55
match cos 6
set qos-group 7
  matched      : 0 packets, 0 bytes
  transmitted  : 0 packets, 0 bytes
```

```
Class-map (qos): C_QOS8 (match any)
match dscp 56-63
match cos 7
set qos-group 8
  matched      : 0 packets, 0 bytes
  transmitted  : 0 packets, 0 bytes
```

```
Service-policy (queuing) output: default-out-policy
```

```
-----
Class-map (queuing): q0
priority level 1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q1
priority level 1
  output      : 1 packets, 64 bytes
  dropped     : 0 packets, 0 bytes
```

---

```
Class-map (queuing): q2
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q4
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q7
  priority level 1
    output      : 2493 packets, 159752 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

---

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 4 packets, 272 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
```

```
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

```
#show policy-map interface xe3
```

```
Interface xe3
Global statistics status : enabled
```

```
Service-policy (queuing) output: Pend
```

```
-----
Class-map (queuing): empty5
  shape average 400 mbps
  wrr-queue weight 1
  bandwidth 350 mbps
```

```
Service-policy (queuing) output: P1P1
```

```
-----
Class-map (queuing): cq1
  match qos-group 1
  shape percent 20
wrr-queue weight 1
  queue-limit 70 packets
  bandwidth percent 18
    output      : 1 packets, 64 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): cq2
  match qos-group 2
  shape percent 80
wrr-queue weight 1
  queue-limit 70 packets
  bandwidth percent 75
    output      : 10871860 packets, 695799040 bytes
```

---

dropped : 13743831 packets, 879605184 bytes

Class-map (queuing): empty6

shape average 500 mbps

wrr-queue weight 1

bandwidth 450 mbps

Service-policy (queuing) output: P3P4

-----

Class-map (queuing): empty3

shape percent 40

wrr-queue weight 1

bandwidth percent 35

Service-policy (queuing) output: P3

-----

Class-map (queuing): cq5

shape percent 40

wrr-queue weight 1

queue-limit 100 packets

bandwidth percent 35

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): cq6

match qos-group 6

shape percent 60

wrr-queue weight 1

queue-limit 100 packets

bandwidth percent 55

output : 0 packets, 0 bytes

dropped : 0 packets, 0 bytes

Class-map (queuing): empty4

shape percent 60

wrr-queue weight 1

bandwidth percent 50

Service-policy (queuing) output: P4

-----

Class-map (queuing): cq7

match qos-group 7

shape percent 40

wrr-queue weight 1

random-detect min-threshold 80 max-threshold 100 packets

bytes

kbytes

percent

bandwidth percent 35

output : 0 packets, 0 bytes

```

        dropped          : 0 packets, 0 bytes

    Class-map (queuing): cq8
        match qos-group 8
        shape percent 60
wrr-queue weight 1
        random-detect min-threshold 80 max-threshold 100 packets
bytes
kbytes
percent
        bandwidth percent 55
            output          : 0 packets, 0 bytes
            dropped          : 0 packets, 0 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes

Class-map (queuing): q1
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes

Class-map (queuing): q2
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes

Class-map (queuing): q3
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes

Class-map (queuing): q4
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes

Class-map (queuing): q5
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes

Class-map (queuing): q6
    priority level 1
        output          : 0 packets, 0 bytes
        dropped          : 0 packets, 0 bytes
```



---

```
Class-map (queuing): q7
  priority level 1
    output      : 2488 packets, 159492 bytes
    dropped     : 3 packets, 192 bytes
```

```
Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 13 packets, 884 bytes
  dropped     : 0 packets, 0 bytes
```

```
Wred Drop Statistics :
-----
green  : 13743818 packets
yellow : 0 packets
red    : 0 packets
```

## CHAPTER 17 VXLAN Quality of Service Configuration

This chapter contains the configurations for VXLAN Quality of Service (QoS) .

### Overview

VXLAN enables multiple tenants to operate in a data center. Each tenant is assigned a priority group to prioritize their traffic. Cloud carriers want to use quality of service to differentiate different applications.

Data center networks are being increasingly used by telecommunications operators as well as by enterprises. Currently these networks are organized as one large Layer 2 network in a single building. In some cases such a network is extended geographically using Virtual Local Area Network (VLAN) technologies as an even larger Layer 2 network connecting the virtual machines (VM), each with its own MAC address.

Multiple tenants might want their own isolated network domain. In a data center hosting multiple tenants, each tenant may independently assign MAC addresses and VLAN IDs and this might lead to duplication.

Cloud carriers wish to categorize the traffic based on the application such as voice, video, etc. Based on the type of the application different traffic classes may be identified and different priority levels can be assigned to each. To do so, quality of service marking is needed in VXLAN.

This chapter shows how to mark packet headers with the VXLAN tunnel end point (VTEP) when the frames are introduced by the virtual machines. The (re)marking /setting of QoS field DSCP/TOS in the VXLAN IP header is done with the two modes which are set globally.

### Topology

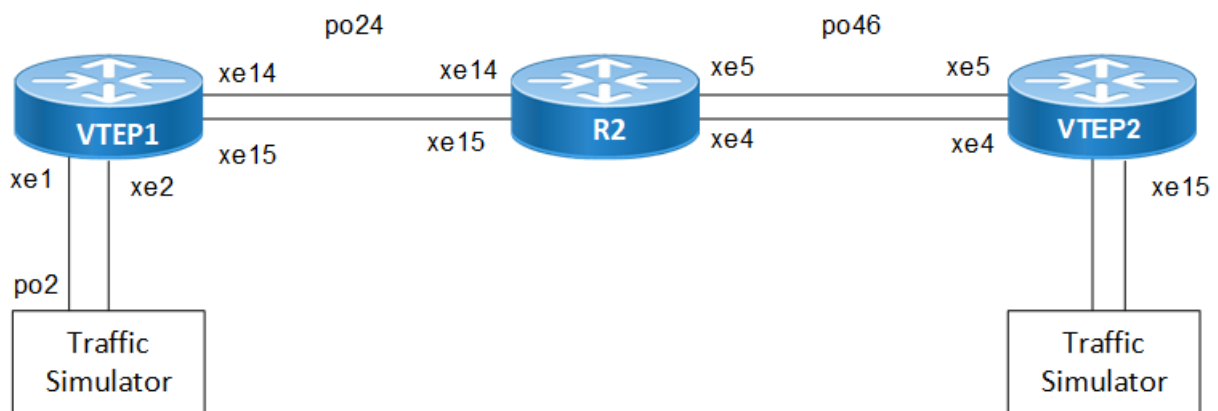


Figure 17-18: VXLAN QoS

### COS-DSCP

#### RTR1/VTEP1

#configure terminal	Enter Configure mode.
(config)#mac vrf vrf1	Create mac routing/forwarding instance with vrf1 name and enter into vrf mode

(config-vrf)#rd 1.1.1.1:11	Assign RD value
(config-vrf)#route-target both 10.10.10.10:100	Assign route-target value for import/export
(config-vrf)#exit	Exit from vrf mode
(config)#qos enable	Enable qos
(config)#qos profile cos-to-queue COS-QUE	Create qos profile for mapping traffic towards tunnel from access-if.
(config-ingress-cos-map)#cos 2 queue 3	Configure particular COS value to the queue value for configured profile.
(config-ingress-cos-map)#exit	Exit from qos profile config mode
(config)#qos profile queue-color-to-dscp QUE-DSCP	Create qos profile for attaching in vxlan tunnel egress.
(config-egress-dscp-map)#queue 3 dscp 16	Configure particular queue value to the dscp value for configured profile.
(config-egress-dscp-encap-map)#exit	Exit from qos profile config mode
(config)#interface po2	Create a port channel po2
(config-if)#switchport	Configure port as switchport
(config-if)#load-interval 30	Set load-interval
(config-if)#interface po24	Create a port channel po24
(config-if)#load-interval 30	Configure port as switchport
(config-if)#ip address 24.1.1.1/30	Set load-interval
(config-if)#interface lo	Enter in to loopback interface
(config-if)#ip address 1.1.1.1/32 secondary	Configure ip address
(config-if)#interface xe1	Enter in to interface mode
(config-if)#channel-group 2 mode active	Map to channel-group
(config-if)#interface xe2	Enter in to interface mode
(config-if)#channel-group 2 mode active	Map to channel-group
(config-if)#interface xe14	Enter in to interface mode
(config-if)#channel-group 24 mode ac-tive	Map to channel-group
(config-if)#interface xe15	Enter in to interface mode
(config-if)#channel-group 24 mode ac-tive	Map to channel-group
(config-if)#router ospf 1	Create ospf instance
(config-router)#ospf router-id 1.1.1.1	Configure ospf router-id
(config-router)#network 1.1.1.1/32 area 0.0.0.0	Configure loopback network address in to ospf
(config-router)#network 24.1.1.0/30 area 0.0.0.0	Configure network address in to ospf
(config-router)#router bgp 100	Enter into Router BGP mode
(config-router)#neighbor 6.6.6.6 re-mote-as 100	Specify a neighbor router with peer ip address and remote-as defined
(config-router)#neighbor 6.6.6.6 up-date-source lo	Specify the neighbor to use loopback address as source
(config-router)#address-family l2vpn evpn	Enter into l2vpn evpn address-family
(config-router-af)#neighbor 6.6.6.6 activate	Activate the neighbor to address-family

(config-router)#nvo vxlan vtep-ip-global 1.1.1.1	Configure Source vtep-ip-global configuration
(config)#nvo vxlan tunnel qos-map-mode cos-dscp egress QUE-DSCP	Configure the mapping qos profile in to vxlan tunnel egress
(config)#nvo vxlan id 1 in-gress-replication inner-vid-disabled	Create vnid 1 and disable inner-vid
(config-nvo)#vxlan host-reachability-protocol evpn-bgp vrf1	Assign vrf for evpn-bgp to carry EVPN route
(config-nvo)#nvo vxlan access-if port-vlan po2 1001	Create vxlan access-if with vlan 1001
(config-nvo-acc-if)#no shutdown	No shut the vxlan access-if
(config-nvo-acc-if)#map vnid 1	Map vnid to the vxlan access-if
(config-nvo-acc-if)#map qos-profile cos-to-queue COS-QUE	Map qos profile for vxlan access-if ingress traffic from CE
(config-nvo-acc-if)#exit	Exit from VxLAN access-interface mode and enter into configuration mode.
(config)#commit	Commit the candidate configuration to the running configuration

## R2

#configure terminal	Enter Configure mode.
(config)#interface po24	Create port channel
(config-if)#load-interval 30	Set load-interval
(config-if)#ip address 24.1.1.2/30	Assign ip address
(config-if)#interface po46	Create port channel
(config-if)#load-interval 30	Set load-interval
(config-if)#ip address 46.1.1.1/30	Assign ip address
(config-if)#interface lo	Enter in to loopback interface
(config-if)#ip address 4.4.4.4/32 secondary	Assign secondary ip address
(config-if)#interface xe4	Enter into interface mode
(config-if)#channel-group 46 mode active	Map port channel to the interface
(config-if)#interface xe5	Enter into interface mode
(config-if)#channel-group 46 mode active	Map port channel to the interface
(config-if)#interface xe14	Enter into interface mode
(config-if)#channel-group 24 mode active	Map port channel to the interface
(config-if)#interface xe15	Enter into interface mode
(config-if)#channel-group 24 mode active	Map port channel to the interface
(config-if)#router ospf 1	Create ospf instance
(config-router)#ospf router-id 4.4.4.4	Configure ospf router-id
(config-router)#network 4.4.4.4/32 area 0.0.0.0	Configure ospf network address with respective area
(config-router)#network 24.1.1.0/30 area 0.0.0.0	Configure ospf network address with respective area

(config-router)#network 46.1.1.0/30 area 0.0.0.0	Configure ospf network address with respective area
(config-router)#exit	Exit from router mode.
(config)#commit	Commit the candidate configuration to the running configuration

**RTR3/VTEP2**

#configure terminal	Enter Configuration mode
(config)#mac vrf vrf1	Create mac routing/forwarding instance with vrf1 name and enter into vrf mode
(config-vrf)#rd 6.6.6.6:11	Assign RD value
(config-vrf)#route-target both 10.10.10.10:100	Assign route-target value for import/export
(config-vrf)#exit	Exit from vrf mode
(config)#qos enable	Enable QOS
(config)#qos statistics	Enable QOS statistics
(config)#qos profile queue-color-to-cos QUE-COS	Create qos profile for mapping incoming traffic from tunnel to access-if.
(config-egress-cos-map)#queue 4 cos 5	Configure particular queue value to the cos value for configured profile.
(config-egress-cos-map)#qos profile dscp-to-queue DSCP-QUE	Create qos profile for attaching in vxlan tunnel ingress.
(config-ingress-dscp-map)#dscp 16 queue 4	Configure particular dscp value to the queue value for configured profile.
(config-egress-dscp-map)#interface po46	Create port channel
(config-if)#load-interval 30	Set load interval
(config-if)#ip address 46.1.1.2/30	Assign ip address
(config-if)#interface lo	Enter into loopback interface
(config-if)#ip address 6.6.6.6/32 secondary	Assign secondary ip address
(config-if)#interface xe4	Enter into interface mode
(config-if)#channel-group 46 mode active	Map channel group into the interface
(config-if)#interface xe5	Enter into interface mode
(config-if)#channel-group 46 mode active	Map channel group into the interface
(config-if)#interface xe15	Enter into interface mode
(config-if)#switchport	Make interface as L2 port
(config-if)#load-interval 30	Set load interval
(config-if)#router ospf 1	Create ospf instance
(config-router)#ospf router-id 6.6.6.6	Configure ospf router-id
(config-router)#network 6.6.6.6/32 area 0.0.0.0	Configure ospf network address with respective area
(config-router)#network 46.1.1.0/30 area 0.0.0.0	Configure ospf network address with respective area
(config-router)#router bgp 100	Enter into Router BGP mode

(config-router)#neighbor 1.1.1.1 re-mote-as 100	Specify a neighbor router with peer ip address and remote-as defined
(config-router)#neighbor 1.1.1.1 up-date-source lo	Specify the neighbor to use loopback address as source
(config-router)#address-family l2vpn evpn	Enter into l2vpn evpn address-family
(config-router-af)#neighbor 1.1.1.1 activate	Activate the neighbor to address-family
(config)#nvo vxlan vtep-ip-global 6.6.6.6	Configure Source vtep-ip-global configuration
(config)#nvo vxlan tunnel qos-map-mode cos-dscp ingress DSCP-QUE	Configure the mapping qos profile in to vxlan tunnel ingress
(config)#nvo vxlan id 1 in-gress-replication inner-vid-disabled	Create vnid 1 and disable inner-vid
(config-nvo)#vxlan host-reachability-protocol evpn-bgp vrf1	Assign vrf for evpn-bgp to carry EVPN route
(config-nvo)#nvo vxlan access-if port-vlan xe15 1000	Create vxlan access-if with vlan 1000
(config-nvo-acc-if)#no shutdown	No shut the vxlan access-if
(config-nvo-acc-if)#map vnid 1	Map vnid to the vxlan access-if
(config-nvo-acc-if)#map qos-profile queue-color-to-cos QUE-COS	Map qos profile for vxlan access-if egress traffic to CE
(config-nvo-acc-if)#exit	Exit from VxLAN access-interface mode and enter into configuration mode
(config)#commit	Commit the candidate configuration to the running configuration

## Validation

As per the QoS configuration, when L2 traffic with cos value 2 sent to VTEP1 access-if, the packets forwarded to queue 3 and packets in queue 3 are mapped with overlay dscp value 16 while egress out of tunnel. At VTEP2, when packets with overlay dscp value 16 ingresses at tunnel, it is forwarded to queue 4 and packets of queue 4 are remarked with cos value 5.

### RTR1/VTEP1

```
VTEP1#sh run nvo vxlan
!
nvo vxlan enable
!
nvo vxlan vtep-ip-global 1.1.1.1
!
nvo vxlan tunnel qos-map-mode cos-dscp egress QUE-DSCP
!
nvo vxlan id 1 ingress-replication inner-vid-disabled
  vxlan host-reachability-protocol evpn-bgp vrf1
!
nvo vxlan access-if port-vlan po2 1001
  map vnid 1
  map qos-profile cos-to-queue COS-QUE
!
VTEP1#show run qos
qos enable
```

```

!
qos profile cos-to-queue COS-QUE
  cos 2 dei all queue 3
!
qos profile queue-color-to-dscp QUE-DSCP
  queue 3 color all dscp 16
!

```

```

VTEP1#show interface xe14 count queue-stats
E - Egress, I - Ingress, Q-Size is in bytes

```

+-----+-----+-----+-----+-----+-----+					
+-----+-----+-----+-----+-----+-----+					
Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
+-----+-----+-----+-----+-----+-----+					
q0	(E) 12517376 0	0	0	0	0
q1	(E) 12517376 0	0	0	0	0
q2	(E) 12517376 0	0	0	0	0
q3	(E) 12517376 205284588	188040683524	0	0	0
q4	(E) 12517376 0	0	0	0	0
q5	(E) 12517376 0	0	0	0	0
q6	(E) 12517376 0	0	0	0	0
q7	(E) 12517376 7518	1007412	0	0	0

```

VTEP1#show interface xe15 count queue-stats
E - Egress, I - Ingress, Q-Size is in bytes

```

+-----+-----+-----+-----+-----+-----+					
+-----+-----+-----+-----+-----+-----+					
Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
+-----+-----+-----+-----+-----+-----+					
q0	(E) 12517376 0	0	0	0	0
q1	(E) 12517376 0	0	0	0	0
q2	(E) 12517376 0	0	0	0	0
q3	(E) 12517376 205624494	188352040168	0	0	0
q4	(E) 12517376 0	0	0	0	0
q5	(E) 12517376 0	0	0	0	0
q6	(E) 12517376 0	0	0	0	0
q7	(E) 12517376 9006	1136741	0	0	0

```

VTEP1#show nvo vxlan

```

```

VXLAN Information

```

```

=====

```

```

Codes: NW - Network Port
       AC - Access Port
       (u) - Untagged

```

```

VNID      VNI-Name      VNI-Type Type Interface ESI      VLAN DF-Status
Src-Addr      Dst-Addr

```

```

1      ----      L2      NW      ----      ----      ----      ----
1.1.1.1      6.6.6.6
1      ----      AC      po2      --- Single Homed port ---      1001 ----      ----
----
```

Total number of entries are 3

VTEP1#show nvo vxlan mac-table

```

=====
=====
                                     VXLAN MAC Entries
=====
=====
VNID      Interface  VlanId Inner-VlanId Mac-Addr      VTEP-Ip/ESI
Type                               AccessPortDesc
-----
1          po2        1001      ----          0000.2000.9991 1.1.1.1
Dynamic Local      -----          -----
```

Total number of entries are : 1

VTEP1#show nvo vxlan tunnel

VXLAN Network tunnel Entries

Source	Destination	Status	Up/Down	Update
1.1.1.1	6.6.6.6	Installed	00:11:29	00:11:29

Total number of entries are 2

VTEP1#show qos-profile COS-QUE

profile name: COS-QUE

profile type: cos-to-queue

profile attached to 1 instances

configured mapping:

cos 2 dei all queue 3

Detailed mapping:

INPUT				OUTPUT			
COS	DEI	Queue	Color	COS	DEI	Queue	Color
0	0	0	green	0	1	0	yellow
1	0	1	green	1	1	1	yellow
2	0	3	green	2	1	3	yellow
3	0	3	green	3	1	3	yellow
4	0	4	green	4	1	4	yellow
5	0	5	green	5	1	5	yellow
6	0	6	green	6	1	6	yellow



```

7          0          7          green  |  7          1          7          yellow

```

```

VTEP1#show qos-profile QUE-DSCP
profile name: QUE-DSCP
profile type: queue-color-to-dscp
profile attached to 1 instances
configured mapping:
  queue 3 color all dscp 16
Detailed mapping:

```

INPUT			OUTPUT			INPUT			OUTPUT		
Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP
0	green	0	0	yellow	0	0	red	0			
1	green	10	1	yellow	12	1	red	14			
2	green	18	2	yellow	20	2	red	22			
3	green	16	3	yellow	16	3	red	16			
4	green	34	4	yellow	36	4	red	38			
5	green	40	5	yellow	40	5	red	40			
6	green	48	6	yellow	48	6	red	48			
7	green	56	7	yellow	56	7	red	56			

## RTR2/VTEP2

```

VTEP2#show run nvo vxlan
!
nvo vxlan enable
!
nvo vxlan vtep-ip-global 6.6.6.6
!
nvo vxlan tunnel qos-map-mode cos-dscp ingress DSCP-QUE
!
nvo vxlan id 1 ingress-replication inner-vid-disabled
  vxlan host-reachability-protocol evpn-bgp vrf1
!
nvo vxlan access-if port-vlan xe15 1000
  map vnid 1
  map qos-profile queue-color-to-cos QUE-COS
!
!
VTEP2#show run qos
qos enable
qos statistics
!
qos profile queue-color-to-cos QUE-COS
  queue 4 color all cos 5
!
qos profile dscp-to-queue DSCP-QUE

```

```
dscp 16 queue 4
!
VTEP2#show nvo vxlan mac-table
```

VXLAN MAC Entries					
VNID	Interface	VlanId	Inner-VlanId	Mac-Addr	VTEP-Ip/ESI
Type		Status		AccessPortDesc	
1	----	----	----	0000.2000.9991	1.1.1.1
Dynamic Remote	-----	-----		-----	

Total number of entries are : 1

```
VTEP2#show nvo vxlan tunnel
VXLAN Network tunnel Entries
```

Source	Destination	Status	Up/Down	Update
6.6.6.6	1.1.1.1	Installed	00:09:39	00:09:39

Total number of entries are 2

```
VTEP2#show nvo vxlan
VXLAN Information
```

```
Codes: NW - Network Port
       AC - Access Port
       (u) - Untagged
```

VNID	VNI-Name	VNI-Type	Type	Interface	ESI	VLAN	DF-Status
Src-Addr	Dst-Addr						
1	----	L2	NW	----	----	----	----
6.6.6.6	1.1.1.1						
1	----	AC	xe15	--- Single Homed port ---	1000	----	----
----							

Total number of entries are 3

```
VTEP2#show interface xe15 count queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
```

Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts
Dropped bytes				
q0	(E) 12517376 0	0	0	0

q1	(E) 12517376 0	0	0	0
q2	(E) 12517376 0	0	0	0
q3	(E) 12517376 0	0	0	0
q4	(E) 12517376 37895872	36455829826	0	0
q5	(E) 12517376 0	0	0	0
q6	(E) 12517376 0	0	0	0
q7	(E) 12517376 0	0	0	0

VTEP2#show qos-profile QUE-COS

profile name: QUE-COS

profile type: queue-color-to-cos

profile attached to 1 instances

configured mapping:

queue 4 color all cos 5

Detailed mapping:

INPUT			OUTPUT			INPUT			OUTPUT			INPUT			OUTPUT		
Queue	Color	COS	Queue	Color	COS	Queue	Color	COS	Queue	Color	COS	Queue	Color	COS	Queue	Color	COS
0	green	0	0	yellow	0	0	red	0	0	red	0	0	red	0	0	red	0
1	green	1	1	yellow	1	1	red	1	1	red	1	1	red	1	1	red	1
2	green	2	2	yellow	2	2	red	2	2	red	2	2	red	2	2	red	2
3	green	3	3	yellow	3	3	red	3	3	red	3	3	red	3	3	red	3
4	green	5	4	yellow	5	4	red	5	4	red	5	4	red	5	4	red	5
5	green	5	5	yellow	5	5	red	5	5	red	5	5	red	5	5	red	5
6	green	6	6	yellow	6	6	red	6	6	red	6	6	red	6	6	red	6
7	green	7	7	yellow	7	7	red	7	7	red	7	7	red	7	7	red	7

VTEP2#show qos-profile DSCP-QUE

profile name: DSCP-QUE

profile type: dscp-to-queue

profile attached to 1 instances

configured mapping:

dscp 16 queue 4

Detailed mapping:

Ingress map for dscp to queue-color

INPUT			OUTPUT			INPUT			OUTPUT			INPUT			OUTPUT		
DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color	DSCP	Queue	Color
0	0	green	16	4	green	32	4	green	48	4	green	48	4	green	48	4	green
6	0	green	17	2	green	33	4	green	49	6	green	49	6	green	49	6	green

2	0	green		18	2	green		34	4	green		50
6	green											
3	0	green		19	2	green		35	4	green		51
6	green											
4	0	green		20	2	yellow		36	4	yellow		52
6	green											
5	0	green		21	2	green		37	4	green		53
6	green											
6	0	green		22	2	red		38	4	red		54
6	green											
7	0	green		23	2	green		39	4	green		55
6	green											
8	1	green		24	3	green		40	5	green		56
7	green											
9	1	green		25	3	green		41	5	green		57
7	green											
10	1	green		26	3	green		42	5	green		58
7	green											
11	1	green		27	3	green		43	5	green		59
7	green											
12	1	yellow		28	3	yellow		44	5	green		60
7	green											
13	1	green		29	3	green		45	5	green		61
7	green											
14	1	red		30	3	red		46	5	green		62
7	green											
15	1	green		31	3	green		47	5	green		63
7	green											

## CHAPTER 18 FP Rules Queuing Configuration

This chapter contains basic information about cpu-queue properties and complete sample configuration for cpu-queue properties.

DUT has many CPU queues for management/classification of control traffic and provides rate limiters for control plane protection. Different types of CPU port bound packets are queued in different cpu-queues each with different properties like rate, queue-limit, monitoring status and drop status.

### Topology



Figure 18-19: Simple configuration of CPU Queuing

### Default Values

R1#show cpu-queue details

\* - Can not configure the parameter

Cpu queue	Rate	In PPS	Lossy	Status	Monitor	Status
Name	Configured	Default	Configured	Default	Configured	Default
=====	=====	=====	=====	=====	=====	
sflow	-	32000	-	*lossy	-	monitor
bgp	-	1500	-	lossless	-	monitor
vrrp	-	500	-	lossless	-	monitor
rip	-	500	-	lossless	-	monitor
ospf	-	2000	-	lossless	-	monitor
dhcp	-	100	-	lossy	-	no-
monitor						
nd	-	6000	-	lossless	-	monitor
pim	-	4000	-	*lossy	-	*no-
monitor						
arp	-	6000	-	lossless	-	monitor
igmp	-	4000	-	*lossy	-	*no-
monitor						
bpdu	-	10000	-	lossless	-	monitor
ccm	-	500	-	lossy	-	no-
monitor						
bfd	-	2000	-	lossy	-	no-
monitor						
ptp	-	1000	-	lossy	-	no-
monitor						
isis	-	500	-	lossless	-	monitor
trill-isis	-	1000	-	lossless	-	monitor
acl	-	200	-	*lossy	-	*no-
monitor						
vxlan	-	500	-	lossy	-	monitor

Note: Enable feature before validating cpu-queue for that protocol.

Monitor option will generate operational log, if it reaches above 90%. Log generation will stop, when it goes below 90%.

1. 2001 Jan 07 22:29:03.345 : R1 : HSL : NOTIF : [CPU\_RATE\_HIGH\_4]: Average CPU queue rate for bpdu is 90% (540 pkts/sec).
2. 2001 Jan 07 22:29:08.346 : R1 : HSL : NOTIF : [CPU\_QUEUE\_RECOVERED\_4]: CPU queue rate for bpdu is back to normal. Current average rate is 89%.

Lossless option will drop the traffic at ingress interface. We can use "show interface counters indiscard-stats" to verify the drop. Packets will be incremented in IBP Discards column.

Lossy option will drop the traffic at cpu. We can use "show interface cpu counters queue-stats" to verify the drop.

"disable l3-protocols-cpu vxlan" command is used, when sending traffic to vxlan interface. In Vxlan, arp and nd traffic will go to vxlan queue. Remaining traffics are considered as data traffic.

## Configuring CPU Queuing Lossless

Do the following to configure CPU queuing on an interface.

#configure terminal	
(config)#bridge 1 protocol rstp	Configure Bridge 1
(config)#int xe52/2	
(config)#switchport	Configure interface as L2
(config-cmap-qos)#bridge-group 1	Configure bridge 1 in interface
(config-cmap-qos)#int xe52/3	
(config-cmap-qos)#switchport	Configure interface as L2
(config)#bridge-group 1	Configure bridge 1 in interface
(config-cmap-qos)#exit	
(config)#cpu-queue bpdu rate 600 lossless no-monitor	Configure bpdu cpu-queue with rate of 600 pps and lossless and no-monitor option

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
R1(config)#do show running-config | inc cpu
cpu-queue bpdu rate 600 lossless no-monitor
```

```
R1(config)#
```

```
R1(config)#do show cpu-queue details
```

```
* - Can not configure the parameter
```

Cpu queue	Rate	In PPS	Lossy	Status	Monitor	Status
Name	Configured	Default	Configured	Default	Configured	Default
sflow	-	32000	-	*lossy	-	monitor
bgp	-	1500	-	lossless	-	monitor

```

vrrp          -          500          -          lossless          -          monitor
rip           -          500          -          lossless          -          monitor
ospf          -          2000         -          lossless          -          monitor
dhcp         -          100          -          lossy            -          no-
monitor
nd            -          6000         -          lossless          -          monitor
pim           -          4000         -          *lossy            -          *no-
monitor
arp           -          6000         -          lossless          -          monitor
igmp          -          4000         -          *lossy            -          *no-
monitor
bpdu          600          10000         lossless          lossless          no-monitor          monitor
ccm           -          500          -          lossy            -          no-
monitor
bfd           -          2000         -          lossy            -          no-
monitor
ptp           -          1000         -          lossy            -          no-
monitor
isis          -          500          -          lossless          -          monitor
trill-isis    -          1000         -          lossless          -          monitor
acl           -          200          -          *lossy            -          *no-
monitor
vxlan         -          500          -          lossy            -          monitor

```

R1(config)#do clear interface cpu counters

R1(config)#do clear interface counters

R1(config)#do show interface counters rate

```

+-----+-----+-----+-----+
+
|      Interface      |      Rx bps      |      Rx pps      |      Tx bps      |      Tx pps      |
|
+-----+-----+-----+-----+
+
po1              436              0              2980              5
po2              768714          1372          769045          1373
xe52/1           0              0              44              0
xe52/2           0              0              263             0
xe52/3           669424827      99971          263             0
xe53/1           33              0              788             1
xe53/2           33              0              719             1
xe53/3           336             0              702             1
xe53/4           33              0              769             1
xe54/1           192176          343            192014          342
xe54/2           192166          343            192292          343
xe54/3           192150          343            192348          343
xe54/4           192204          343            192390          343

```

R1(config)#do show interface cpu counters rate

Load interval: 30 second

```

+-----+-----+-----+-----+
+
|      CPU Queue(%)   |      Rx bps      |      Rx pps      |      Tx bps      |      Tx pps      |
|
+-----+-----+-----+-----+
+
hw-bfd          ( N/A) -          -          101679          1374
bpdu            (100%) -          -          436856          600
ospf            ( 0%) -          -          84              0
bgp             ( 0%) -          -          44              0

```

R1(config)#do show interface cpu counters rate

Load interval: 30 second

	CPU Queue (%)	Rx bps	Rx pps	Tx bps	Tx pps
hw-bfd	( N/A) -	-		101574	1372
bpdu	( 99%) -	-		433465	599
ospf	( 0%) -	-		39	0
bgp	( 0%) -	-		44	0

R1(config)#do show interface cpu counters queue-sta

E - Egress, I - Ingress, Q-Size is in bytes

Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped
hw-bfd	(E) 0	130582	9663068	0
bpdu	(E) 2706080	57086	41576707	0
arp	(E) 0	2	136	0
ospf	(E) 0	35	4658	0
bgp	(E) 0	95	7030	0

R1(config)#do show interface counters indiscard-stats

Interface	Port Block Drops	Vlan Discards	ACL/QOS Drops	Policy Discards
xe52/3	0	13080579	0	0

Configuring cpu-queue with lossy

=====

## Configuring CPU Queuing Lossy

Do the following to configure CPU queuing on an interface.

#configure terminal	
R1(config)#cpu-queue bpdu rate 500 lossy no-monitor	Configure bpdu cpu-queue with rate of 500 pps and lossy and no-monitor option
R1(config-if)#exit	



## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
R1(config)#do clear interface cpu counters
R1(config)#do clear interface counters
R1(config)#do show running-config | inc cpu
cpu-queue bpdu rate 500 lossy no-monitor
disable l3-protocols-cpu vxlan
R1(config)#do show cpu-queue details
* - Can not configure the parameter
```

Cpu queue		Rate In PPS		Lossy Status		Monitor Status	
Name	Configured	Default	Configured	Default	Configured	Default	
=====	=====	=====	=====	=====	=====	=====	
sflow	-	32000	-	*lossy	-	monitor	
bgp	-	1500	-	lossless	-	monitor	
vrrp	-	500	-	lossless	-	monitor	
rip	-	500	-	lossless	-	monitor	
ospf	-	2000	-	lossless	-	monitor	
dhcp	-	100	-	lossy	-	no-	
monitor							
nd	-	6000	-	lossless	-	monitor	
pim	-	4000	-	*lossy	-	*no-	
monitor							
arp	-	6000	-	lossless	-	monitor	
igmp	-	4000	-	*lossy	-	*no-	
monitor							
bpdu	500	10000	lossy	lossless	no-monitor	monitor	
ccm	-	500	-	lossy	-	no-	
monitor							
bfd	-	2000	-	lossy	-	no-	
monitor							
ptp	-	1000	-	lossy	-	no-	
monitor							
isis	-	500	-	lossless	-	monitor	
trill-isis	-	1000	-	lossless	-	monitor	
acl	-	200	-	*lossy	-	*no-	
monitor							
vxlan	-	500	-	lossy	-	monitor	

```
R1(config)#do show interface counters rate
```

Interface		Rx bps		Rx pps		Tx bps		Tx pps	
-----		-----		-----		-----		-----	
+		+		+		+		+	
+		+		+		+		+	
+		+		+		+		+	
po1		780		0		2974		5	
po2		769353		1373		769260		1373	
xe52/1		0		0		11		0	
xe52/2		0		0		248		0	
xe52/3		669564071		100000		248		0	
xe53/1		98		0		871		1	
xe53/2		98		0		692		1	
xe53/3		485		0		699		1	
xe53/4		98		0		710		1	
xe54/1		192647		343		192322		343	

```

xe54/2          191965          342          192280          343
xe54/3          192466          343          192278          343
xe54/4          192295          343          192416          343

```

R1(config)#do show interface cpu counters rate

Load interval: 30 second

```

+-----+-----+-----+-----+-----+
| CPU Queue(%) | Rx bps | Rx pps | Tx bps | Tx pps |
+-----+-----+-----+-----+-----+
+
hw-bfd      ( N/A) -          -          101505          1371
bpdu        ( 99%) -          -          345547          499
ospf        (  0%) -          -           74           0
bgp         (  0%) -          -           44           0

```

R1(config)#do show interface cpu counters rate

Load interval: 30 second

```

+-----+-----+-----+-----+-----+
| CPU Queue(%) | Rx bps | Rx pps | Tx bps | Tx pps |
+-----+-----+-----+-----+-----+
+
hw-bfd      ( N/A) -          -          101505          1371
bpdu        ( 99%) -          -          345547          499
ospf        (  0%) -          -           74           0
bgp         (  0%) -          -           44           0

```

R1(config)#do show cpu-queue details

cpu-queue bpdu rate 500 lossy no-monitor

disable l3-protocols-cpu vxlan

R1(config)#

R1(config)#

R1(config)#do show interface cpu counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

```

+-----+-----+-----+-----+-----+
| Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped |
| pkts | Dropped bytes |
+-----+-----+-----+-----+-----+
+
hw-bfd      (E) 0          78216          5787984          0
0
bpdu        (E) 978848    39290          27124511          7818876
6550244016
arp         (E) 0          2           136           0
0
ospf        (E) 0          21          3070           0
0
bgp         (E) 0          55          4070           0
0

```

R1(config)#do show interface counters indiscard-stats

```

+-----+-----+-----+-----+-----+
| Interface | Port Block Drops | Vlan Discards | ACL/QOS Drops | Policy |
| Discards | EGR Port Unavail | IBP Discards | Total Discards |
+-----+-----+-----+-----+-----+
+
xe53/3      4          0          0          0          0
4          0          4

```

---

xe54/1	3		0		0	0
3		0		3		
xe54/2	2		0		0	0
2		0		2		
xe54/3	1		0		0	0
1		0		1		
xe54/4	3		0		0	0
3		0		3		

---

## CHAPTER 19 Rate Limiting BUM Traffic

---

To prevent the CPU from getting flooded with Broadcast, Unknown Unicast, and Multicast (BUM) traffic, rate limiting can be applied at the ingress interface. This configuration is called “storm control” and is independent of the QoS feature, and can be configured directly on the interface in the ingress direction.

---

### Configuring per port rate limiting for BUM traffic

BUM rate limiting can be configured on the interface via following command:

```
storm-control (errdisable|((broadcast|multicast|dlf) (level LEVEL | <0-4294967294>
(kbps|mbps|gbps|fps) burst-size <32-128000>)))
```

The `broadcast` option is for broadcast traffic, `multicast` option is for multicast traffic and `dlf` (Destination Lookup Failure) option is for unknown unicast traffic.

There are two ways to configure the rate limiting information. One is in percentage and the other is in absolute values. Use the `level` option to configure in percentage format where the link speed is used for rate calculation. Percentage value can be configured with up to four fractional digits in order to support kbps level rate limiting on 100 gbps ports, and the Absolute configuration option uses the input rate in kbps, mbps, fps, or gbps.

Burst-size is an optional parameter, if storm control is not configured with burst-size, default value is calculated as 5ms of configured rate to limit the traffic. Minimum of 32 Kbps burst will be allocated if the calculated value is below 32 Kbps.

An example of BUM rate limiting is shown below:

```
(config)#interface xe1
(config-if)#switchport
(config-if)#storm-control dlf 2 mbps
(config-if)#exit
```

In the configuration above, unknown unicast traffic received on `xe1` will be rate limited to 1.98 mbps. Burst-size is calculated as 32 Kbps.

Note:

- Minimum granularity for storm-control is 64kbps.
- Burst-range in XGS is 32-128000 Kbps.
- Storm Discard notification is sent in case of packet discards but not based on configuration.
- The maximum supported speed is 134 gbps (level 33) for storm-control on 400G interfaces.

---

### Storm Detection Time

Rate-limit setting should take place immediately after detecting storm. With existing burst size, rate limit is happening after few seconds, if burst size should be changed to a lower value so that rate-limiting happens immediately on the switch. Also, user have a provision to change burst size through CLI.

An example of BUM rate limiting with Burst-size configuration is shown below:

```
(config)#interface xe1
(config-if)#switchport
(config-if)#storm-control broadcast 600 kbps burst-size 15
(config-if)#exit
```

In the configuration above, broadcast traffic received on `xe1` will be rate limited to 576 kbps and Burst-size is configured as 40 Kbps. If traffic sent at 700 kbps. Time taken to detect the storm should be 0.32 Seconds.

Note: By default ARP/ND packet marked for drop by storm-control configuration will not get uplifted to CPU. Use `nvo vxlan disable-arp-storm-control-for-cpu` CLI to uplift the ARP/ND packet to CPU even if packet is marked for DROP by storm control.

---

## Storm Control Notifications

When storm control occurs in switch, there is no direct way for the user to identify the storm apart from discard counters with "show storm-control" CLI. So SNMP trap and syslog notifications are generated for the user to know about the storm control.

If storm-control occurs, based on the rate-limit discard counters, a Syslog notification and SNMP trap is generated. As the rate-limit packet discards stops, another syslog notification and SNMP trap is generated that storm packet discards are stopped.

---

## Displaying BUM rate limit information

Use the following command to verify BUM rate limit configuration:

```
show storm-control (INTERFACE-NAME|)
show storm-control
*The hardware applicable value is displayed
Port          BcastLevel (burst)      McastLevel (burst)      DlfLevel (burst)      Discards
xe1           576.000 kbps (40 Kbps)   100.0000% (0 Kbps)      1.984 mbps (32 Kbps)  125411

2021 Sep 23 19:51:09.639 : OcNOS : HSL : NOTIF : [IF_STORM_DISCARDS_4]: Storm control discards started on interface xe1 total
discards 364173

2021 Sep 23 19:52:45.740 : OcNOS : HSL : NOTIF : [IF_STORM_DISCARDS_4]: Storm control discards stopped on interface xe1 total
discards 1272806
```

## CHAPTER 20 Switch Packet Buffer Tuning

---

### Overview

The Switch packet buffer tuning, is a system aimed at enhancing network switch performance by avoiding congestion and packet drops. It refers to how a switch allocates packet buffer size based on traffic priority classes referred as Priority Groups (PG) instead of physical ports. Buffers temporarily store packets during congestion. Each PG competes for shared memory in the switch buffer pool.

In Data Center Bridging (DCB) or QoS (Quality of Service) implementations, traffic is grouped based on priority. Each group corresponds to a certain class of service, for example, storage traffic, control traffic, bulk data, best-effort, etc. Tuning the packet buffer size at the PG level ensures that each class of traffic gets the right amount of buffer space to avoid congestion and packet drops.

The section explains the configuration of packet buffers and CLIs introduced to implement the functionalities.

---

### Feature Characteristics

OcNOS can be customized to respond to Priority-based Flow Control (PFC) traffic to manage when to pause frames to prevent packet loss.

**Custom Device Responses and Ease of Configuration:** Switch Packet Buffer Tuning is indeed designed to allow for custom device responses to Priority-based Flow Control (PFC) pause storms. This feature grants users the ability to control precisely when the switch transmits pause frames to upstream devices. Furthermore, it simplifies configuration by enabling the global adjustment of buffer limits. Pausing the frames temporarily halt the traffic transmission with the link partner which effectively prevents the packet loss due to congestion.

**Priority Group (PG) Configuration:** Enables to configure each Priority Group (PG) port with a specific limit on the amount of shared memory it can receive. Priority groups are essential for classifying ingress packets based on their input priority.

**PFC XOFF Threshold and XON Offsets:** PGs can be configured using PFC XOFF threshold and XON offsets. XOFF threshold is an absolute value while XON limit is an offset from the XOFF limit. When the shared occupancy or receive buffer of an ingress PG reaches its configured PFC XOFF limit, the PG triggers the transmission of a PFC pause frame to its egress peer. This action signals the peer to stop sending packets, providing the device with the necessary time to alleviate traffic congestion. The primary purpose is to ensure that, during congestion at an egress port, the ingress port generates PFC frames based on these user-defined thresholds.

XOFF threshold default value is different for each platform, as follows:

- Tomahawk3 (TH3) platforms — 2 KB
- Tomahawk4 (TH4) platforms — 57409 KB
- Tomahawk 5 (TH5) platforms — 81659 KB
- Trident3 (TD3) platforms — 2 KB
- Trident 4 (TD4) platforms — 65489 KB

**Queue-Specific Buffer Limits with Dynamic Threshold (Alpha Value):** Beyond PG configuration, Switch Packet Buffer Tuning also enables users to adjust the limit of buffers that each individual queue can consume from the buffer shared pool. This fine-grained control is managed by a dynamic threshold setting, often referred to as the alpha value. Users can configure this dynamic threshold for different queues, thereby regulating their access to the shared buffer.

The implementation of Switch Packet Buffer Tuning is intended for LSW chipsets (Tomahawk4 (TH4) platforms, Tomahawk 5 (TH5) platforms, TD4) and DC chipsets (Tomahawk3 (TH3) platforms, TD3).

**Limitation:**

Configuring XOFF threshold imposes static limit of PG queue size which take precedence over dynamic threshold. Hence, users can configure either XOFF threshold or dynamic threshold at a time.

Performing add, delete, or update operations on PG profiles will cause a system-wide traffic interruption, resulting in configured session flaps.

QoS buffer configuration using flow-control buffer commands are only applicable to ports or priorities only when flow control is enabled. The flow control buffer configurations are optional. If the configurations are not done, defaults are used.

---

**Benefits**

Enables user to:

Customize device responses to PFC pause storms.

Avoid packet loss by pausing the traffic transmission using the PFC.

Globally adjust the limits of the buffers, leading to an ease of configuration.

---

**Prerequisites**

To adjust the PG queue size using dynamic threshold, standard traffic forwarding is sufficient. However, for modifying XON or XOFF thresholds, the interface must have PFC enabled.

---

**Configuration**

This section explain how to configure ingress QoS profile and egress policy mapping.

---

**Topology**

The following topology shows PFC threshold values on priority group interfaces xe1 of Rotuer 1.



**Figure 20-20: PFC**

---

**Configuration using Single Router**

The following procedure shows tje QoS profile mapping to ingress traffic to Priority Groups (PGs) and sets the XON/ XOFF thresholds for the desired lossless priority.

1. Assign QoS profiles mapping to priority group 3 and set dynamic threshold.

```
OcNOS(config)#qos profile ingress-pg-map PG_XOFF_TEST
OcNOS(config-ingress-pg-queue-map)#priority-group 3 dynamic-threshold 3
OcNOS(config-ingress-pg-queue-map)#commit
OcNOS(config)#int xe33
```

```
OcNOS(config-if)#qos map-profile ingress-pg-map PG_XOFF_TEST
OcNOS(config)#commit
```

Refer to [PG\\_XOFF\\_TEST](#) section for validation.

## 2. Configure XON and XOFF thresholds for the priority group 3.

```
OcNOS(config)#qos profile ingress-pg-map PG_XOFF_TEST
OcNOS(config-ingress-pg-queue-map)#priority-group 3 xon-threshold 4000 xoff-
threshold 2000
OcNOS(config-ingress-pg-queue-map)#commit
```

Refer to [PG\\_XOFF\\_TEST](#) section for validation.

## 3. Assign QoS profiles mapping to priority group 1 and set dynamic threshold.

```
OcNOS(config)#qos profile ingress-pg-map PG_LOSSLESS
OcNOS(config-ingress-pg-queue-map)#priority-group 1 dynamic-threshold 3
OcNOS(config-ingress-pg-queue-map)#commit
OcNOS(config-ingress-pg-queue-map)#
OcNOS(config)#
OcNOS(config)#int xe33
OcNOS(config-if)#qos map-profile ingress-pg-map PG_LOSSLESS
OcNOS(config-if)#comm
```

Refer to [PG\\_LOSSLESS](#) section for validation.

## 4. Configure XON and XOFF thresholds for the priority group 1.

```
OcNOS(config)#qos profile ingress-pg-map PG_LOSSLESS
OcNOS(config-ingress-pg-queue-map)#priority-group 1 xon-threshold 6000 xoff-
threshold 3000
OcNOS(config-ingress-pg-queue-map)#commit
OcNOS(config-ingress-pg-queue-map)#
OcNOS(config)#
```

# Validation

## PG\_XOFF\_TEST

Verify the ingress (I) and egress (E) queue statistics, including queue size for interface `xe33 pg-3`.

```
OcNOS#sh int cou que
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
-----+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped |
| bytes | | | | | | |
+-----+-----+-----+-----+-----+-----+-----+
xe33      q7      (E) 0      25      1600      0      0
xe33      pg-q3      (I) 1259840      NA      NA      NA      NA
xe34      q3      (E) 1272032      5087446      651193088      0      0
xe34      q7      (E) 0      26      1664      0      0
```

Look for the configured Priority Group `pg-3 (I)` on `xe33` and the corresponding egress queue `q3 (E)` on `xe34`. Ingress PG queue size (`pg-3` on `xe33`) is non-zero. This shows the ingress buffer is holding traffic before the PFC is triggered.

```
OcNOS#sh int cou que
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
-----+-----+-----+-----+-----+-----+-----+
-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped |
| bytes | | | | | | |
+-----+-----+-----+-----+-----+-----+-----+
xe33      q7      (E) 0      25      1600      0      0
xe33      pg-q3      (I) 1259840      NA      NA      NA      NA
xe34      q3      (E) 1272032      5087446      651193088      0      0
xe34      q7      (E) 0      26      1664      0      0
```



Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
xe33	q7	(E) 0	29	1856	0	0
<b>xe33</b>	<b>pg-q3</b>	<b>(I) 1268984</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
xe34	q3	(E) 1284224	5878738	752478464	0	0
xe34	q7	(E) 0	30	1920	0	0

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes  
\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
xe33	q7	(E) 0	31	1984	0	0
<b>xe33</b>	<b>pg-q3</b>	<b>(I) 1262888</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
xe34	q3	(E) 1256792	6104794	781413632	0	0
xe34	q7	(E) 0	31	1984	0	0

Verify the number of PFC pause frames sent and received on **xe33 - pg3** interface and priority.

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
xe33	0	0	0
xe33	1	0	0
xe33	2	0	0
<b>xe33</b>	<b>3</b>	<b>231708</b>	<b>0</b>
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0
xe34	2	0	0
xe34	3	0	0
xe34	4	0	0
xe34	5	0	0
xe34	6	0	0
xe34	7	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
xe33	0	0	0
xe33	1	0	0
xe33	2	0	0
<b>xe33</b>	<b>3</b>	<b>236432</b>	<b>0</b>
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0

```

xe34          2      0      0
xe34          3      0      0
xe34          4      0      0
xe34          5      0      0
xe34          6      0      0
xe34          7      0      0

```

OcNOS#sh priority-flow-control statistics all

```

interface      pri  pause sent      pause received
=====
xe33           0    0          0
xe33           1    0          0
xe33           2    0          0
xe33           3    238000      0
xe33           4    0          0
xe33           5    0          0
xe33           6    0          0
xe33           7    0          0
xe34           0    0          0
xe34           1    0          0
xe34           2    0          0
xe34           3    0          0
xe34           4    0          0
xe34           5    0          0
xe34           6    0          0
xe34           7    0          0

```

The PFC pause frame increases on the ingress interface xe33 on pg-3 when congestion is detected. This indicates that the switch is signaling the sender to stop sending traffic for this priority.

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped |
| bytes    | |               |        |          |          |            |         |
+-----+-----+-----+-----+-----+-----+-----+
xe33        q7              (E) 0    47          3008          0          0
xe33        pg-q3          (I) 1251712  NA          NA          NA          NA
xe34        q3              (E) 1265936  9271354  1186733312    0          0
xe34        q7              (E) 0      47          3008          0          0

```

OcNOS#sh qos-profile ingress-pg-map interface xe33

profile name: PG\_XOFF\_TEST

mapping:

```

priority-group 0  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 1  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 2  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 3  xon-threshold 48  xoff-threshold 32  dynamic-threshold 3
priority-group 4  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 5  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 6  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 7  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8

```

OcNOS#

Verify the XON and XOFF threshold value on interface xe33.

OcNOS#sh qos-profile ingress-pg-map interface xe33

profile name: PG\_XOFF\_TEST

mapping:

```

priority-group 0  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 1  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 2  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 3  xon-threshold 4000  xoff-threshold 2000  dynamic-threshold 3
priority-group 4  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 5  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 6  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8
priority-group 7  xon-threshold 48  xoff-threshold 32  dynamic-threshold 8

```

OcNOS#

## PG\_LOSSLESS

Verify the ingress (I) and egress (E) queue statistics, including queue size for interface xe33 pg-3.

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cd30	mc-q3	(E) 0	1	82	0	0
xe33	q7	(E) 0	77	4928	0	0
<b>xe33</b>	<b>pg-q3</b>	<b>(I) 1283970</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>xe34</b>	<b>q3</b>	<b>(E) 1283208</b>	<b>15150338</b>	<b>1939243264</b>	<b>0</b>	<b>0</b>
xe34	q7	(E) 0	77	4928	0	0

Look for the configured Priority Group pg-3 (I) on xe33 and the corresponding egress queue q3 (E) on xe34. Ingress PG queue size (pg-3 on xe33) is non-zero. This shows the ingress buffer is holding traffic before the PFC is triggered.

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cd30	mc-q3	(E) 0	1	82	0	0
xe33	q7	(E) 0	78	4992	0	0
<b>xe33</b>	<b>pg-q3</b>	<b>(I) 1283970</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>xe34</b>	<b>q3</b>	<b>(E) 1284224</b>	<b>15376274</b>	<b>1968163072</b>	<b>0</b>	<b>0</b>
xe34	q7	(E) 0	78	4992	0	0

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	nd	(E) 0	1	86	0	0

cd30	mc-q3	(E) 0	1	82	0	0
xe33	q7	(E) 0	84	5376	0	0
xe33	mc-q0	(E) 0	1	82	0	0
<b>xe33</b>	<b>pg-q3</b>	<b>(I) 1283970</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>xe34</b>	<b>q3</b>	<b>(E) 1281176</b>	<b>16618658</b>	<b>2127188224</b>	<b>0</b>	<b>0</b>
xe34	q7	(E) 0	85	5440	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
=====			
xe33	0	0	0
xe33	1	0	0
xe33	2	0	0
<b>xe33</b>	<b>3</b>	<b>773228</b>	<b>0</b>
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0
xe34	2	0	0
xe34	3	0	0
xe34	4	0	0
xe34	5	0	0
xe34	6	0	0
xe34	7	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
=====			
xe33	0	0	0
xe33	1	0	0
xe33	2	0	0
<b>xe33</b>	<b>3</b>	<b>792031</b>	<b>0</b>
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0
xe34	2	0	0
xe34	3	0	0
xe34	4	0	0
xe34	5	0	0
xe34	6	0	0
xe34	7	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
=====			
xe33	0	0	0
xe33	1	0	0
xe33	2	0	0
<b>xe33</b>	<b>3</b>	<b>829642</b>	<b>0</b>

```
xe33      4      0      0
xe33      5      0      0
xe33      6      0      0
xe33      7      0      0
xe34      0      0      0
xe34      1      0      0
xe34      2      0      0
xe34      3      0      0
xe34      4      0      0
xe34      5      0      0
xe34      6      0      0
xe34      7      0      0
```

```
OcNOS#sh priority-flow-control statistics all
interface      pri  pause sent      pause received
=====
xe33           0    0          0
xe33           1    0          0
xe33           2    0          0
xe33           3    848500        0
xe33           4    0          0
xe33           5    0          0
xe33           6    0          0
xe33           7    0          0
xe34           0    0          0
xe34           1    0          0
xe34           2    0          0
xe34           3    0          0
xe34           4    0          0
xe34           5    0          0
xe34           6    0          0
xe34           7    0          0
```

```
OcNOS#sh int cou rate mbps
+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+-----+
xe33       102.61  100208  8.55    16701
xe34       0.00    0       102.61  100208
```

```
OcNOS#sh int cou d
Interface xe33
  Rx EGR Port Unavail: 3615
```

```
OcNOS#sh int cou indiscard-stats
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Port Block Drops | Vlan Discards | ACL/QOS Drops | Policy Discards | EGR Port Unavail | IBP Discards | Total Discards |
+-----+-----+-----+-----+-----+-----+-----+
xe33       0          0          0          0          3615          0          3615
```

OcNOS#

Repeatedly execute the following show command during congestion. Focus on the Q-Size for the interface xe33

```
OcNOS#sh int cou rate mbps
```

```

+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+
xe33        847.74      827867      0.00      0
xe34        0.00        0      98.02     95724

```

OcNOS#sh int cou rate mbps

```

+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+
xe33        727.41     710363      0.14      281
xe34        0.00        0     102.44    100034

```

OcNOS#sh int cou rate mbps

```

+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+
xe33        372.03     363306      0.43      845
xe34        0.00        0      98.20     95903

```

OcNOS#sh int cou rate mbps

```

+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+
xe33        165.98     162089      0.64     1242
xe34        0.00        0     100.30    97945

```

OcNOS#sh int cou rate mbps

```

+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+
xe33        103.23     100808      0.71     1387
xe34        0.00        0     102.52    100118

```

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu        nd      (E) 0      8      688      0      0
cd30       mc-q3    (E) 0      3      246      0      0
cd32       mc-q3    (E) 0      3      246      0      0
xe33       q7      (E) 0      56     3652     0      0
xe33       mc-q0    (E) 0      2      164      0      0
xe33      pg-q1      (I) 1262634 NA      NA      NA      NA
xe34      q1        (E) 1281430 8638672 1105750016 35525383 4547249024
xe34       q7      (E) 0      56     3652     0      0

```

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu        nd      (E) 0      8      688      0      0

```

cd30	mc-q3	(E) 0	3	246	0	0
cd32	mc-q3	(E) 0	3	246	0	0
xe33	q7	(E) 0	58	3780	0	0
xe33	mc-q0	(E) 0	2	164	0	0
<b>xe33</b>	<b>pg-q1</b>	<b>(I) 1264412</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>xe34</b>	<b>q1</b>	<b>(E) 1263142</b>	<b>9093064</b>	<b>1163912192</b>	<b>35525383</b>	<b>4547249024</b>
xe34	q7	(E) 0	58	3780	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
=====			
xe33	0	0	0
<b>xe33</b>	<b>1</b>	<b>78713</b>	<b>0</b>
xe33	2	0	0
xe33	3	0	0
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0
xe34	2	0	0
xe34	3	0	0
xe34	4	0	0
xe34	5	0	0
xe34	6	0	0
xe34	7	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
=====			
xe33	0	0	0
<b>xe33</b>	<b>1</b>	<b>81841</b>	<b>0</b>
xe33	2	0	0
xe33	3	0	0
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0
xe34	2	0	0
xe34	3	0	0
xe34	4	0	0
xe34	5	0	0
xe34	6	0	0
xe34	7	0	0

OcNOS#sh priority-flow-control statistics all

interface	pri	pause sent	pause received
=====			
xe33	0	0	0
<b>xe33</b>	<b>1</b>	<b>86533</b>	<b>0</b>
xe33	2	0	0

```

xe33      3      0      0
xe33      4      0      0
xe33      5      0      0
xe33      6      0      0
xe33      7      0      0
xe34      0      0      0
xe34      1      0      0
xe34      2      0      0
xe34      3      0      0
xe34      4      0      0
xe34      5      0      0
xe34      6      0      0
xe34      7      0      0

```

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped |
| bytes    | | | | | | |
+-----+-----+-----+-----+-----+-----+-----+
cpu        nd      (E) 0      8      688      0      0
cd30       mc-q3   (E) 0      3      246      0      0
cd32       mc-q3   (E) 0      3      246      0      0
xe33       q7      (E) 0      70     4548     0      0
xe33       mc-q0   (E) 0      2      164      0      0
xe33       pg-q1   (I) 1265682 NA      NA      NA      NA
xe34       q1      (E) 1278382 11468368 1467951104 35525383 4547249024
xe34       q7      (E) 0      70     4548     0      0

```

OcNOS#sh qos-profile ingress-pg-map interface xe33

profile name: PG\_LOSSLESS

mapping:

```

priority-group 0 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 1 xon-threshold 48 xoff-threshold 32 dynamic-threshold 3
priority-group 2 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 3 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 4 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 5 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 6 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 7 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8

```

Verify the XON and XOFF threshold value on interface xe33.

OcNOS#sh qos-profile ingress-pg-map interface xe33

profile name: PG\_LOSSLESS

mapping:

```

priority-group 0 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 1 xon-threshold 6000 xoff-threshold 3000 dynamic-threshold 3
priority-group 2 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 3 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 4 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 5 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 6 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8
priority-group 7 xon-threshold 48 xoff-threshold 32 dynamic-threshold 8

```



OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	nd	(E) 0	8	688	0	0
cd30	mc-q3	(E) 0	3	246	0	0
cd32	mc-q3	(E) 0	3	246	0	0
xe33	q7	(E) 0	83	5380	0	0
xe33	mc-q0	(E) 0	2	164	0	0
xe33	pg-q1	(I) 1283970	NA	NA	NA	NA
xe34	q1	(E) 1287526	14074725	1801564800	35525383	4547249024
xe34	q7	(E) 0	84	5444	0	0

OcNOS#sh int cou que

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	nd	(E) 0	8	688	0	0
cd30	mc-q3	(E) 0	3	246	0	0
cd32	mc-q3	(E) 0	3	246	0	0
xe33	q7	(E) 0	86	5572	0	0
xe33	mc-q0	(E) 0	2	164	0	0
xe33	pg-q1	(I) 1283970	NA	NA	NA	NA
xe34	q1	(E) 1287526	14527797	1859558016	35525383	4547249024
xe34	q7	(E) 0	86	5572	0	0

OcNOS#sh priority-flow-control statistics all

interface pri pause sent pause received

xe33	0	0	0
<b>xe33</b>	<b>1</b>	<b>412811</b>	<b>0</b>
xe33	2	0	0
xe33	3	0	0
xe33	4	0	0
xe33	5	0	0
xe33	6	0	0
xe33	7	0	0
xe34	0	0	0
xe34	1	0	0
xe34	2	0	0
xe34	3	0	0
xe34	4	0	0
xe34	5	0	0
xe34	6	0	0
xe34	7	0	0

OcNOS#sh priority-flow-control statistics all

interface pri pause sent pause received

xe33	0	0	0
------	---	---	---

```

xe33           1      450417      0
xe33            2        0            0
xe33            3        0            0
xe33            4        0            0
xe33            5        0            0
xe33            6        0            0
xe33            7        0            0
xe34            0        0            0
xe34            1        0            0
xe34            2        0            0
xe34            3        0            0
xe34            4        0            0
xe34            5        0            0
xe34            6        0            0
xe34            7        0            0

```

OcNOS#sh int cou rate mbps

Interface	Rx mbps	Rx pps	Tx mbps	Tx pps
xe33	110.91	108309	8.13	15882
xe34	0.00	0	102.65	100247

OcNOS#sh int cou d

Interface xe33

```

Rx Port Block Drops: 12737520
Rx EGR Port Unavail: 12741164
Rx IBP Discards: 394956

```

Interface xe34

```

Rx Port Block Drops: 1
Rx EGR Port Unavail: 1
Tx Unicast Queue Drops: 35525383

```

OcNOS#sh int cou d

Interface xe33

```

Rx Port Block Drops: 12737520
Rx EGR Port Unavail: 12741164
Rx IBP Discards: 413773

```

Interface xe34

```

Rx Port Block Drops: 1
Rx EGR Port Unavail: 1
Tx Unicast Queue Drops: 35525383

```

OcNOS#sh int cou d

Interface xe33

```

Rx Port Block Drops: 12737520
Rx EGR Port Unavail: 12741164
Rx IBP Discards: 441995

```

Interface xe34

```

Rx Port Block Drops: 1
Rx EGR Port Unavail: 1
Tx Unicast Queue Drops: 35525383

```

```
OcNOS#sh int cou indiscard-stats
```

Interface Discards	Port Block Drops	Vlan Discards	ACL/QOS Drops	Policy Discards	EGR Port Unavail	IBP Discards	Total
xe33	12737520	0	0	0	12741164	620799	13361988
xe34	1	0	0	0	1	0	1

```
OcNOS#sh int cou indiscard-stats
```

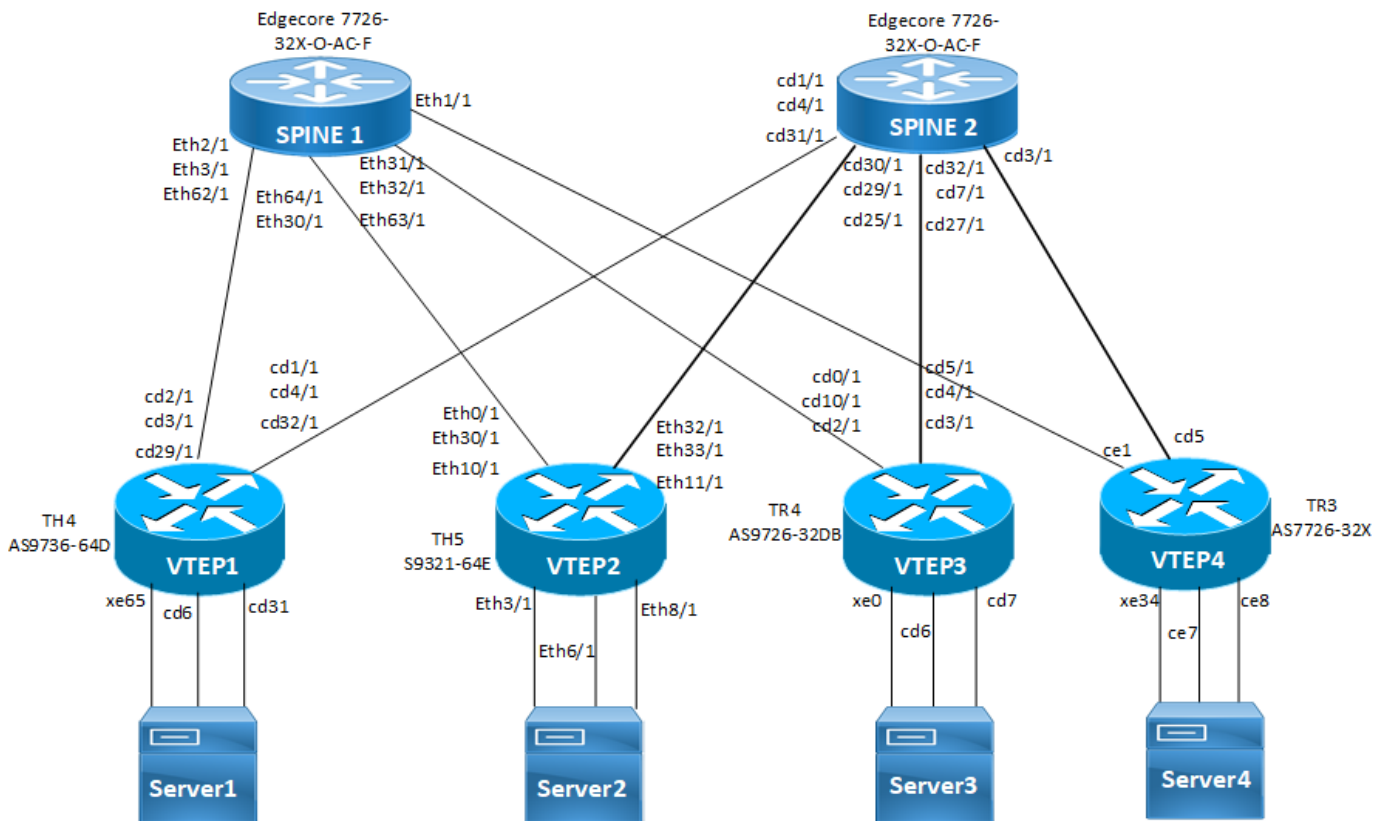
Interface Discards	Port Block Drops	Vlan Discards	ACL/QOS Drops	Policy Discards	EGR Port Unavail	IBP Discards	Total
xe33	12737520	0	0	0	12741164	649055	13390244
xe34	1	0	0	0	1	0	1

```
OcNOS#
```

## Topology

The topology involves four VTEP routers, hosts and two spines.

**Figure 20-21: PFC using Priority Group**



## Configuration using Spine and Leaf nodes

This procedure outlines the steps to configure the switch packet buffer tuning settings, primarily focusing on Quality of Service (QoS) and Priority Flow Control (PFC) configurations.

Execute the following steps to configure the QoS profiles and policy maps globally on Spine and Leaf nodes.

1. Define QoS profiles mapping of packet priorities to priority groups (PGs) and set congestion thresholds (XON/XOFF) for PFC enabled PGs.

```
#configure terminal
(config)#qos enable
(config)#qos statistics
(config)#qos profile ingress-pg-map default
2400 (config-ingress-pg-queue-map)#priority-group 0 dynamic-threshold 5
      (config-ingress-pg-queue-map)#priority-group 1 xon-offset 1200 xoff-threshold
      config-ingress-pg-queue-map)#exit
      (config)#qos profile ingress-pg-map pg2
      (config-ingress-pg-queue-map)#priority-group 0 xon-offset 200 dynamic-threshold 1
2000 (config-ingress-pg-queue-map)#priority-group 3 xon-offset 1000 xoff-threshold
      (config-ingress-pg-queue-map)#priority-group 5 xon-offset 2000 dynamic-threshold
9      (config-ingress-pg-queue-map)#exit
```

2. Configure QoS class maps (c1, c2, c3) and policy maps.

```
(config)#class-map type qos match-all c1
(config-cmap-qos)#match precedence routine
(config-cmap-qos)#exit
(config)#class-map type qos match-all c2
(config-cmap-qos)#match precedence flashoverride
(config-cmap-qos)#exit
(config)#class-map type qos match-all c3
(config-cmap-qos)#match dscp af11
(config-cmap-qos)#exit
(config)#policy-map type qos p1
(config-pmap-qos)#class type qos c1
(config-pmap-c-qos)#police cir 100 mbps pir 500 mbps
(config-pmap-c-qos)#exit
(config-pmap-qos)# class type qos c2
(config-pmap-c-qos)# police cir 500 mbps pir 1 gbps
(config-pmap-c-qos)# exit
(config-pmap-qos)#class type qos c3
(config-pmap-c-qos)#police cir 2 gbps pir 5 gbps
(config-pmap-c-qos)#exit
(config-pmap-qos)#exit
```

3. Apply the custom ingress PG map and configure PFC settings on relevant interfaces.

```
(config)#interface ethernet3/1
(config-if)#load-interval 30
(config-if)#ip address 101.1.2.2/24
(config-if)#ipv6 address 1102::2/64
(config-if)#lmtu 9216
```

```
(config-if)#qos map-profile ingress-pg-map pg2
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

**4. Set PFC mode and enable it for specific priorities (0-7) on interfaces like ethernet1/1, ethernet2/1, ethernet30/1, ethernet32/1, and ethernet64/1.**

```
(config)#interface ethernet1/1
(config-if)#priority-flow-control mode on
(config-if)#priority-flow-control advertise-local-config
(config-if)#priority-flow-control enable priority 0 1 2 3 4 5 6 7
(config-if)#load-interval 30
(config-if)#ip address 104.1.1.2/24
(config-if)#ipv6 address 1401::2/64
(config-if)#mtu 9216
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

```
(config)#interface ethernet2/1
(config-if)#priority-flow-control mode on
(config-if)#priority-flow-control advertise-local-config
(config-if)#priority-flow-control enable priority 0 1 2 3 4 5 6 7
(config-if)#load-interval 30
(config-if)#ip address 101.1.1.2/24
(config-if)#ipv6 address 1101::2/64
(config-if)#mtu 9216
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

```
(config)#interface ethernet3/1
(config-if)#load-interval 30
(config-if)#ip address 101.1.2.2/24
(config-if)#ipv6 address 1102::2/64
(config-if)#mtu 9216
(config-if)#qos map-profile ingress-pg-map pg2
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

```
(config)#interface ethernet30/1
(config-if)#priority-flow-control mode on
(config-if)#priority-flow-control advertise-local-config
(config-if)#priority-flow-control enable priority 0 1 2 3 4 5 6 7
(config-if)#load-interval 30
(config-if)#ip address 102.1.2.2/24
(config-if)#ipv6 address 1202::2/64
(config-if)#mtu 9216
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

```
(config)#interface ethernet31/1
(config-if)#load-interval 30
(config-if)#ip address 103.1.1.2/24
(config-if)#ipv6 address 1301::2/64
(config-if)#mtu 9216
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

```
(config)#interface ethernet32/1
```

```
(config-if)#priority-flow-control mode on
(config-if)#priority-flow-control advertise-local-config
(config-if)#priority-flow-control enable priority 0 1 2 3 4 5 6 7
(config-if)#load-interval 30
(config-if)#ip address 103.1.2.2/24
(config-if)#ipv6 address 1302::2/64
(config-if)#mtu 9216
(config-if)#ipv6 router ospf area 0.0.0.0 instance-id 0
```

**5. Configure queuing policy map (Q1) with rate shaping and Explicit Congestion Notification (ECN) threshold to queues q0, q1 and q4.**

```
(config)#policy-map type queuing default Q1
(config-pmap-que-def)#class type queuing default q0
(config-pmap-c-que-def)#shape 100 mbps
(config-pmap-c-que-def)#priority
(config-pmap-c-que-def)#random-detect green min-threshold 400 max-threshold 500
yellow min-threshold 200 max-threshold 300 red min-threshold 50 max-threshold 100
packets ecn
(config-pmap-queuing-class)#exit
(config-pmap-que-def)#class type queuing default q1
(config-pmap-c-que-def)#shape 2 gbps
(config-pmap-c-que-def)#priority
(config-pmap-c-que-def)#random-detect green min-threshold 500 max-threshold 600
yellow min-threshold 300 max-threshold 400 red min-threshold 100 max-threshold 200
packets ecn
(config-pmap-c-que-def)#exit
(config-pmap-que-def)#class type queuing default q4
(config-pmap-c-que-def)#shape 500 mbps
(config-pmap-c-que-def)#priority
(config-pmap-c-que-def)#random-detect green min-threshold 550 max-threshold 600
yellow min-threshold 400 max-threshold 500 red min-threshold 300 max-threshold 400
packets ecn
(config-pmap-c-que-def)#exit
```

**6. Configure Interior Gateway Protocol (IGP - OSPF) and External Gateway Protocol (EGP - BGP) to establish an eBGP-based spine-leaf fabric.**

```
(config)#router ospf 100
(config-router)#ospf router-id 100.1.1.1
(config-router)#network 100.1.1.1/32 area 0.0.0.0
(config-router)#network 101.1.1.0/24 area 0.0.0.0
(config-router)#network 101.1.2.0/24 area 0.0.0.0
(config-router)#network 102.1.1.0/24 area 0.0.0.0
(config-router)#network 102.1.2.0/24 area 0.0.0.0
(config-router)#network 103.1.1.0/24 area 0.0.0.0
(config-router)#network 103.1.2.0/24 area 0.0.0.0
(config-router)#network 104.1.1.0/24 area 0.0.0.0

(config)#router ipv6 ospf
(config-router)#router-id 100.1.1.1

(config)#router bgp 64001
(config-router)#bgp unnumbered-mode
(config-router)#neighbor ethernet31/1 remote-as external
```

```

(config-router)#neighbor ethernet31/1 as-origination-interval 1
(config-router)#neighbor ethernet31/1 advertisement-interval 0
(config-router)#neighbor ethernet31/1 fall-over bfd
(config-router)#neighbor ethernet1/1 remote-as external
(config-router)#neighbor ethernet1/1 as-origination-interval 1
(config-router)#neighbor ethernet1/1 advertisement-interval 0
(config-router)#neighbor ethernet1/1 fall-over bfd
(config-router)#neighbor ethernet32/1 remote-as external
(config-router)#neighbor ethernet32/1 as-origination-interval 1
(config-router)#neighbor ethernet32/1 advertisement-interval 0
(config-router)#neighbor ethernet32/1 fall-over bfd
(config-router)#neighbor ethernet64/1 remote-as external
(config-router)#neighbor ethernet64/1 as-origination-interval 1
(config-router)#neighbor ethernet64/1 advertisement-interval 0
(config-router)#neighbor ethernet64/1 fall-over bfd
(config-router)#neighbor ethernet3/1 remote-as external
(config-router)#neighbor ethernet3/1 as-origination-interval 1
(config-router)#neighbor ethernet3/1 advertisement-interval 0
(config-router)#neighbor ethernet3/1 fall-over bfd
(config-router)#neighbor ethernet2/1 remote-as external
(config-router)#neighbor ethernet2/1 as-origination-interval 1
(config-router)#neighbor ethernet2/1 advertisement-interval 0
(config-router)#neighbor ethernet2/1 fall-over bfd
(config-router)#neighbor ethernet30/1 remote-as external
(config-router)#neighbor ethernet30/1 as-origination-interval 1
(config-router)#neighbor ethernet30/1 advertisement-interval 0
(config-router)#neighbor ethernet30/1 fall-over bfd
(config-router)#exit-unnumbered-mode

(config-router)#address-family ipv4 unicast
(config-router-af)#network 100.1.1.1/32
(config-router-af)#max-paths ebgp 10
(config-router-af)#redistribute connected

(config-router)#bgp v4-unnumbered-mode
(config-router-v4-unnum)#neighbor ethernet31/1 activate
(config-router-v4-unnum)#neighbor ethernet1/1 activate
(config-router-v4-unnum)#neighbor ethernet32/1 activate
(config-router-v4-unnum)#neighbor ethernet64/1 activate
(config-router-v4-unnum)#neighbor ethernet3/1 activate
(config-router-v4-unnum)#neighbor ethernet2/1 activate
(config-router-v4-unnum)#neighbor ethernet30/1 activate
(config-router-v4-unnum)#exit-v4-unnumbered-mode

(config-router-af)#exit-address-family
(config-router)#exit

```

7. Apply queuing service policies with rate shaping on leaf interfaces, ensuring proper rate limiting and buffer allocation on the egress side.

```

(config)#interface cd1/1

```

```

(config-if)#description Connected-cd1/1-7040
(config-if)# priority-flow-control mode auto
(config-if)#load-interval 30
(config-if)#ip address 201.1.1.1/24
(config-if)#ipv6 address 2101::1/64
(config-if)#mtu 9216
(config-if)#service-policy type queuing output ETS1-SP2
(config-if)#shape rate 350 mbps burst 1000
(config-if)# ipv6 router ospf area 0.0.0.0 instance-id 0
(config-if)# lldp-agent
(config-if)# exit

```

## Sample Configuration

### Spine1

```

feature netconf-ssh vrf management
feature netconf-tls vrf management
service password-encryption
!
logging console 7
logging monitor 4
!
!
snmp-server enable traps link linkDown
snmp-server enable traps link linkUp
snmp-server enable traps ospf
snmp-server enable traps bgp
banner motd "NODE IS USING BY ARPITHA.PLEASE REFINE FROM USING IT"
!
bgp extended-asn-cap
!
load-balance rtag7
load-balance rtag7 macro-flow
load-balance rtag7 l2 dest-mac src-mac vlan
load-balance rtag7 ipv4 dest-ipv4 src-ipv4 destl4-port srcl4-port protocol-id rocev2-dest-qpairs
load-balance rtag7 ipv6 dest-ipv6 src-ipv6 destl4-port srcl4-port rocev2-dest-qpairs
next-hdr
!
bfd interval 100 minrx 100 multiplier 3
!
qos enable
qos statistics
qos profile ingress-pg-map default
  priority-group 0 dynamic-threshold 5
  priority-group 1 xon-offset 1200 xoff-threshold 2400
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 200 dynamic-threshold 1
  priority-group 3 xon-offset 1000 xoff-threshold 2000

```



```
priority-group 5 xon-offset 2000 dynamic-threshold 9
!
hostname Spine1-TH5-7001
port ethernet30 breakout 1X100g serdes 25g
port ethernet32 breakout 1X100g serdes 25g
port ethernet64 breakout 1X100g serdes 25g
port ethernet31 breakout 1X100g serdes 25g
port ethernet2 breakout 1X100g serdes 25g
port ethernet3 breakout 1X100g serdes 25g
port ethernet1 breakout 1X100g serdes 25g
ip domain-lookup vrf management
ip name-server vrf management 10.12.3.23
bridge 1 protocol rstp vlan-bridge
tfo Disable
errdisable cause stp-bpdu-guard
data-center-bridging enable bridge 1
priority-flow-control enable bridge 1
dynamic-load-balance enable
dynamic-load-balance mode fixed
feature ssh vrf management
feature dns relay
ip dns relay
ipv6 dns relay
feature ntp vrf management
lldp run
lldp tlv-select basic-mgmt port-description
lldp tlv-select basic-mgmt system-name
lldp tlv-select basic-mgmt system-capabilities
lldp tlv-select basic-mgmt system-description
lldp tlv-select basic-mgmt management-address
set lldp msg-tx-hold 1
set lldp timer msg-tx-interval 5
lldp notification-interval 1000
fault-management enable
maximum-paths 64
!
class-map type qos match-all c1
  match precedence routine
!
class-map type qos match-all c2
  match precedence flashoverride
!
class-map type qos match-all c3
  match dscp af11
!
policy-map type qos p1
  class type qos c1
    police cir 100 mbps pir 500 mbps
  exit
  class type qos c2
```

```
    police cir 500 mbps pir 1 gbps
    exit
class type qos c3
    police cir 2 gbps pir 5 gbps
    exit
!
policy-map type queuing default ETS
class type queuing default q0
    priority
    exit
class type queuing default q1
    priority
    exit
class type queuing default q2
    priority
    exit
class type queuing default q3
    priority
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default Q1
class type queuing default q0
    shape 100 mbps
    priority
    random-detect green min-threshold 400 max-threshold 500 yellow min-threshold 200 max-
threshold 300 red min-threshold 50 max-threshold 100 packets ecn
    exit
class type queuing default q1
    shape 2 gbps
    priority
    random-detect green min-threshold 500 max-threshold 600 yellow min-threshold 300 max-
threshold 400 red min-threshold 100 max-threshold 200 packets ecn
    exit
class type queuing default q4
    shape 500 mbps
    priority
    random-detect green min-threshold 550 max-threshold 600 yellow min-threshold 400 max-
threshold 500 red min-threshold 300 max-threshold 400 packets ecn
    exit
```

```
!  
policy-map type queuing default default-out-policy  
  class type queuing default q0  
    priority  
    exit  
  class type queuing default q1  
    priority  
    exit  
  class type queuing default q2  
    priority  
    exit  
  class type queuing default q3  
    priority  
    exit  
  class type queuing default q4  
    priority  
    exit  
  class type queuing default q5  
    priority  
    exit  
  class type queuing default q6  
    priority  
    exit  
  class type queuing default q7  
    priority  
    exit  
!  
vlan database  
  vlan-reservation 4001-4094  
  vlan 2-10 bridge 1 state enable  
!  
ip vrf management  
!  
interface eth0  
  ip vrf forwarding management  
  ip address dhcp  
!  
interface ethernet1/1  
  description Connected-ce1-7042  
  priority-flow-control mode on  
  priority-flow-control advertise-local-config  
  priority-flow-control enable priority 0 1 2 3 4 5 6 7  
  load-interval 30  
  ip address 104.1.1.2/24  
  ipv6 address 1401::2/64  
  mtu 9216  
  ipv6 router ospf area 0.0.0.0 instance-id 0  
!  
interface ethernet2/1  
  description Connected-cd2/1-7043
```

```
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 101.1.1.2/24
ipv6 address 1101::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface ethernet3/1
description Connected-cd3/1-7043
load-interval 30
ip address 101.1.2.2/24
ipv6 address 1102::2/64
mtu 9216
qos map-profile ingress-pg-map pg2
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface ethernet4
!
interface ethernet5

!
interface ethernet29
!
interface ethernet30/1
description Connected-Ethernet30/1-800G-7018
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 102.1.2.2/24
ipv6 address 1202::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface ethernet31/1
description Connected-cd0/1-7013
load-interval 30
ip address 103.1.1.2/24
ipv6 address 1301::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface ethernet32/1
description Connected-cd10/1-7013
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
```

```
load-interval 30
ip address 103.1.2.2/24
ipv6 address 1302::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
!
interface ethernet63
!
interface ethernet64/1
description Connected-Ethernet0/1-800G-7018
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 102.1.1.2/24
ipv6 address 1201::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface lo
ip address 127.0.0.1/8
ip address 100.1.1.1/32 secondary
ipv6 address ::1/128
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface lo.management
ip vrf forwarding management
ip address 127.0.0.1/8
ipv6 address ::1/128
!
interface mgmt1
!
interface mgmt2
!
exit
!
router ospf 100
ospf router-id 100.1.1.1
network 100.1.1.1/32 area 0.0.0.0
network 101.1.1.0/24 area 0.0.0.0
network 101.1.2.0/24 area 0.0.0.0
network 102.1.1.0/24 area 0.0.0.0
network 102.1.2.0/24 area 0.0.0.0
network 103.1.1.0/24 area 0.0.0.0
network 103.1.2.0/24 area 0.0.0.0
network 104.1.1.0/24 area 0.0.0.0
!
router ipv6 ospf
router-id 100.1.1.1
```

```
!  
router bgp 64001  
!  
  bgp unnumbered-mode  
  neighbor ethernet31/1 remote-as external  
  neighbor ethernet31/1 as-origination-interval 1  
  neighbor ethernet31/1 advertisement-interval 0  
  neighbor ethernet31/1 fall-over bfd  
  neighbor ethernet1/1 remote-as external  
  neighbor ethernet1/1 as-origination-interval 1  
  neighbor ethernet1/1 advertisement-interval 0  
  neighbor ethernet1/1 fall-over bfd  
  neighbor ethernet32/1 remote-as external  
  neighbor ethernet32/1 as-origination-interval 1  
  neighbor ethernet32/1 advertisement-interval 0  
  neighbor ethernet32/1 fall-over bfd  
  neighbor ethernet64/1 remote-as external  
  neighbor ethernet64/1 as-origination-interval 1  
  neighbor ethernet64/1 advertisement-interval 0  
  neighbor ethernet64/1 fall-over bfd  
  neighbor ethernet3/1 remote-as external  
  neighbor ethernet3/1 as-origination-interval 1  
  neighbor ethernet3/1 advertisement-interval 0  
  neighbor ethernet3/1 fall-over bfd  
  neighbor ethernet2/1 remote-as external  
  neighbor ethernet2/1 as-origination-interval 1  
  neighbor ethernet2/1 advertisement-interval 0  
  neighbor ethernet2/1 fall-over bfd  
  neighbor ethernet30/1 remote-as external  
  neighbor ethernet30/1 as-origination-interval 1  
  neighbor ethernet30/1 advertisement-interval 0  
  neighbor ethernet30/1 fall-over bfd  
  exit-unnumbered-mode  
!  
  address-family ipv4 unicast  
  network 100.1.1.1/32  
  max-paths ebgp 10  
  redistribute connected  
!  
  bgp v4-unnumbered-mode  
  neighbor ethernet31/1 activate  
  neighbor ethernet1/1 activate  
  neighbor ethernet32/1 activate  
  neighbor ethernet64/1 activate  
  neighbor ethernet3/1 activate  
  neighbor ethernet2/1 activate  
  neighbor ethernet30/1 activate  
  exit-v4-unnumbered-mode  
!  
exit-address-family
```

```
!  
exit  
!  
line console 0  
  exec-timeout 0 0  
line vty 0 16  
  exec-timeout 0 0  
!  
!  
end
```

## Leaf 1

```
feature netconf-ssh vrf management  
feature netconf-tls vrf management  
service password-encryption  
!  
logging console 7  
logging monitor 4  
logging logfile device_debug_log 2  
!  
!  
snmp-server enable traps link linkDown  
snmp-server enable traps link linkUp  
snmp-server enable traps ospf  
snmp-server enable traps bgp  
banner motd "NODE IS USING BY ARPITHA.PLEASE REFINER FROM USING IT"  
!  
bgp extended-asn-cap  
!  
load-balance rtag7  
load-balance rtag7 macro-flow  
load-balance rtag7 12 dest-mac src-mac vlan  
load-balance rtag7 ipv4 dest-ipv4 src-ipv4 destl4-port srcl4-port protocol-id roce2-  
dest-qpairs  
load-balance rtag7 ipv6 dest-ipv6 src-ipv6 destl4-port srcl4-port roce2-dest-qpairs  
next-hdr  
!  
bfd interval 100 minrx 100 multiplier 3  
!  
qos enable  
qos statistics  
qos profile ingress-pg-map default  
  priority-group 0 dynamic-threshold 5  
  priority-group 1 xon-offset 1200 xoff-threshold 2400  
qos profile ingress-pg-map pg2  
  priority-group 0 xon-offset 200 dynamic-threshold 1  
  priority-group 3 xon-offset 1000 xoff-threshold 2000  
  priority-group 5 xon-offset 2000 dynamic-threshold 9  
!
```

```
hostname Leaf1-TH4-7043
port cd3 breakout 1X100g serdes 25g
port cd4 breakout 1X100g serdes 25g
port cd2 breakout 1X100g serdes 25g
port cd1 breakout 1X100g serdes 25g
ip domain-lookup vrf management
ip name-server vrf management 10.12.3.23
bridge 1 protocol rstp vlan-bridge
tfo Disable
errdisable cause stp-bpdu-guard
data-center-bridging enable bridge 1
priority-flow-control enable bridge 1
dynamic-load-balance enable
dynamic-load-balance mode fixed
feature ssh vrf management
feature dns relay
ip dns relay
ipv6 dns relay
feature ntp vrf management
feature rsyslog
lldp run
lldp tlv-select basic-mgmt port-description
lldp tlv-select basic-mgmt system-name
lldp tlv-select basic-mgmt system-capabilities
lldp tlv-select basic-mgmt system-description
lldp tlv-select basic-mgmt management-address
lldp tlv-select ieee-8021-org-specific data-center-bridging
set lldp msg-tx-hold 1
set lldp timer msg-tx-interval 5
set lldp tx-fast-init 1
lldp notification-interval 5
fault-management enable
maximum-paths 64
!
policy-map type queuing default ETS
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
  exit
  class type queuing default q4
    priority
  exit
```



---

```
class type queuing default q5
  priority
  exit
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
policy-map type queuing default ETS1
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS1-SP1
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    bandwidth 300 mbps
    exit
```

---

```
class type queuing default q4
  priority
  exit
class type queuing default q5
  priority
  exit
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
policy-map type queuing default ETS1-SP2
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    bandwidth 200 mbps
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS2
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
```

```
class type queuing default q3
  priority
exit
class type queuing default q4
  priority
exit
class type queuing default q5
  priority
exit
class type queuing default q6
  priority
exit
class type queuing default q7
  priority
exit
!
policy-map type queuing default ETS2-SP1
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
    bandwidth 250 mbps
  exit
  class type queuing default q4
    priority
  exit
  class type queuing default q5
    priority
  exit
  class type queuing default q6
    priority
  exit
  class type queuing default q7
    priority
  exit
!
policy-map type queuing default ETS2-SP2
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
```

```
class type queuing default q2
  priority
  exit
class type queuing default q3
  priority
  bandwidth 150 mbps
  exit
class type queuing default q4
  priority
  exit
class type queuing default q5
  priority
  exit
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
policy-map type queuing default ETS3
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS4
  class type queuing default q0
    priority
    exit
```

```
class type queuing default q1
  priority
  exit
class type queuing default q2
  priority
  exit
class type queuing default q3
  priority
  exit
class type queuing default q4
  priority
  exit
class type queuing default q5
  priority
  exit
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
    dynamic-threshold 5
    bandwidth 500 mbps
    exit
  class type queuing default q1
    priority
    bandwidth 170 mbps
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    bandwidth 200 mbps
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
```

```
    exit
!
vlan database
  vlan-reservation 4001-4094
  vlan 2-10 bridge 1 state enable
!
ip vrf management
!
interface sa10
  switchport
  bridge-group 1
  switchport mode trunk
  switchport trunk allowed vlan all
!
interface cd1/1
  description Connected-cd1/1-7040
  priority-flow-control mode auto
  load-interval 30
  ip address 201.1.1.1/24
  ipv6 address 2101::1/64
  mtu 9216
  service-policy type queuing output ETS1-SP2
  shape rate 350 mbps burst 1000
  ipv6 router ospf area 0.0.0.0 instance-id 0
  lldp-agent
  exit
!
interface cd2/1
  description Connected-Ethernet2/1-800G-7001
  priority-flow-control mode auto
  load-interval 30
  ip address 101.1.1.1/24
  ipv6 address 1101::1/64
  mtu 9216
  service-policy type queuing output ETS1-SP1
  shape rate 500 mbps burst 1000
  ipv6 router ospf area 0.0.0.0 instance-id 0
  lldp-agent
  exit
!
interface cd3/1
  description Connected-Ethernet3/1-800G-7001
  load-interval 30
  ip address 101.1.2.1/24
  ipv6 address 1102::1/64
  mtu 9216
  service-policy type queuing output ETS2-SP1
  shape rate 410 mbps burst 1000
  qos map-profile ingress-pg-map pg2
  ipv6 router ospf area 0.0.0.0 instance-id 0
```

```
!  
interface cd4/1  
  description Connected-cd1/4-7040  
  priority-flow-control mode auto  
  load-interval 30  
  ip address 201.1.2.1/24  
  ipv6 address 2102::1/64  
  mtu 9216  
  service-policy type queuing output ETS2-SP2  
  shape rate 250 mbps burst 1000  
  ipv6 router ospf area 0.0.0.0 instance-id 0  
  lldp-agent  
  exit  
!  
interface cd5  
!  
interface cd6  
  description Connected-Spirent-99.15-1/97  
  priority-flow-control mode on  
  priority-flow-control advertise-local-config  
  priority-flow-control enable priority 0 1 2 3 4 5 6 7  
  load-interval 30  
  ip address 10.1.2.1/24  
  ipv6 address 1002::1/64  
  mtu 9216  
  ipv6 router ospf area 0.0.0.0 instance-id 0  
  lldp-agent  
  exit  
!  
interface cd7  
!  
interface cd30  
!  
interface cd31  
  priority-flow-control mode on  
  priority-flow-control advertise-local-config  
  priority-flow-control enable priority 0 1 2 3 4 5 6 7  
  lldp-agent  
  exit  
!  
interface cd32  
!  
interface cd64  
!  
interface eth0  
  ip vrf forwarding management  
  ip address dhcp  
!  
interface lo  
  ip address 127.0.0.1/8
```

```
ip address 1.1.1.1/32 secondary
ipv6 address ::1/128
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface lo.management
ip vrf forwarding management
ip address 127.0.0.1/8
ipv6 address ::1/128
!
interface xe65
description Connected-Spirent-99.10-6/1
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 10.1.1.1/24
ipv6 address 1001::1/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface xe66
!
exit
!
router ospf 100
ospf router-id 1.1.1.1
network 1.1.1.1/32 area 0.0.0.0
network 101.1.1.0/24 area 0.0.0.0
network 101.1.2.0/24 area 0.0.0.0
network 201.1.1.0/24 area 0.0.0.0
network 201.1.2.0/24 area 0.0.0.0
!
router ipv6 ospf
router-id 1.1.1.1
!
router bgp 65001
bgp router-id 1.1.1.1
!
bgp unnumbered-mode
neighbor cd1/1 remote-as external
neighbor cd1/1 as-origination-interval 1
neighbor cd1/1 advertisement-interval 0
neighbor cd1/1 fall-over bfd
neighbor cd4/1 remote-as external
neighbor cd4/1 as-origination-interval 1
neighbor cd4/1 advertisement-interval 0
neighbor cd4/1 fall-over bfd
neighbor cd2/1 remote-as external
```



```
neighbor cd2/1 as-origination-interval 1
neighbor cd2/1 advertisement-interval 0
neighbor cd2/1 fall-over bfd
neighbor cd3/1 remote-as external
neighbor cd3/1 as-origination-interval 1
neighbor cd3/1 advertisement-interval 0
neighbor cd3/1 fall-over bfd
exit-unnumbered-mode
!
address-family ipv4 unicast
network 1.1.1.1/32
max-paths ebgp 10
redistribute connected
!
bgp v4-unnumbered-mode
neighbor cd1/1 activate
neighbor cd4/1 activate
neighbor cd2/1 activate
neighbor cd3/1 activate
exit-v4-unnumbered-mode
!
exit-address-family
!
exit
!
line console 0
  exec-timeout 0 0
line vty 0 16
  exec-timeout 0 0
!
!
end

!
```

## Leaf 2

```
feature netconf-ssh vrf management
feature netconf-tls vrf management
service password-encryption
!
logging console 7
logging monitor 4
logging logfile device_debug_log 2
!
!
snmp-server enable traps link linkDown
snmp-server enable traps link linkUp
snmp-server enable traps ospf
```

```
snmp-server enable traps bgp
banner motd "NODE IS USING BY ARPITHA. PLEASE DND UNTILL I INFORM IN GROUP"
!
bgp extended-asn-cap
!
load-balance rtag7
load-balance rtag7 macro-flow
load-balance rtag7 l2 dest-mac src-mac vlan
load-balance rtag7 ipv4 dest-ipv4 src-ipv4 destl4-port srcl4-port protocol-id rocev2-
dest-qpairs
load-balance rtag7 ipv6 dest-ipv6 src-ipv6 destl4-port srcl4-port rocev2-dest-qpairs
next-hdr
!
bfd interval 100 minrx 100 multiplier 3
!
qos enable
qos statistics
qos profile ingress-pg-map default
  priority-group 0 dynamic-threshold 5
  priority-group 1 xon-offset 1200 xoff-threshold 2400
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 200 dynamic-threshold 1
  priority-group 3 xon-offset 1000 xoff-threshold 2000
  priority-group 5 xon-offset 2000 dynamic-threshold 9
!
hostname Leaf2-TH5-7018
port ethernet32 breakout 1X100g serdes 25g
port ethernet6 breakout 1X400g serdes 50g
port ethernet8 breakout 1X100g serdes 25g
port ethernet33 breakout 1X100g serdes 25g
port ethernet3 breakout 1X100g serdes 25g
port ethernet30 breakout 1X100g serdes 25g
port ethernet29 breakout 1X100g serdes 25g
port ethernet0 breakout 1X100g serdes 25g
ip domain-lookup vrf management
ip name-server vrf management 10.12.3.23
bridge 1 protocol rstp vlan-bridge
tfo Disable
errdisable cause stp-bpdu-guard
data-center-bridging enable bridge 1
priority-flow-control enable bridge 1
dynamic-load-balance enable
dynamic-load-balance mode fixed
feature ssh vrf management
feature dns relay
ip dns relay
ipv6 dns relay
feature ntp vrf management
feature rsyslog
logging remote server 10.16.100.20 5 port 1514 vrf management
lldp run
```

---

```
lldp tlv-select basic-mgmt port-description
lldp tlv-select basic-mgmt system-name
lldp tlv-select basic-mgmt system-capabilities
lldp tlv-select basic-mgmt system-description
lldp tlv-select basic-mgmt management-address
lldp tlv-select ieee-8021-org-specific data-center-bridging
set lldp msg-tx-hold 1
set lldp timer msg-tx-interval 5
lldp notification-interval 1000
fault-management enable
maximum-paths 64
!
class-map type qos match-all c1
  match precedence routine
!
class-map type qos match-all c2
  match precedence flashoverride
!
class-map type qos match-all c3
  match dscp af11
!
policy-map type qos p1
  class type qos c1
    police cir 100 mbps pir 500 mbps
    exit
  class type qos c2
    police cir 500 mbps pir 1 gbps
    exit
  class type qos c3
    police cir 2 gbps pir 5 gbps
    exit
!
policy-map type queuing default ETS
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
```

```
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS1
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default ETS1-SP1
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        bandwidth 300 mbps
        exit
    class type queuing default q4
        priority
```

```
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS1-SP2
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        bandwidth 200 mbps
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default ETS2
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
```

```
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS2-SP1
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        bandwidth 250 mbps
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default ETS2-SP2
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
```

```
    exit
class type queuing default q3
    priority
    bandwidth 150 mbps
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS3
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default ETS4
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
```

```
    exit
class type queuing default q2
    priority
    exit
class type queuing default q3
    priority
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default Q1
    class type queuing default q0
        shape 100 mbps
        priority
        random-detect green min-threshold 400 max-threshold 500 yellow min-threshold 200 max-
threshold 300 red min-threshold 50 max-threshold 100 packets ecn
        exit
    class type queuing default q1
        shape 2 gbps
        priority
        random-detect green min-threshold 500 max-threshold 600 yellow min-threshold 300 max-
threshold 400 red min-threshold 100 max-threshold 200 packets ecn
        exit
    class type queuing default q4
        shape 500 mbps
        priority
        random-detect green min-threshold 550 max-threshold 600 yellow min-threshold 400 max-
threshold 500 red min-threshold 300 max-threshold 400 packets ecn
        exit
!
policy-map type queuing default default-out-policy
    class type queuing default q0
        priority
        bandwidth 1 gbps
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        bandwidth 50 mbps
```



```
    exit
class type queuing default q3
    priority
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
vlan database
    vlan-reservation 4001-4094
    vlan 2-10 bridge 1 state enable
!
ip vrf management
!
interface eth0
    ip vrf forwarding management
    ip address dhcp
!
interface ethernet0/1
    description Connected-Ethernet64/1-800G-7001
    priority-flow-control mode auto
    load-interval 30
    ip address 102.1.1.1/24
    ipv6 address 1201::1/64
    mtu 9216
    service-policy type queuing output ETS1-SP1
    shape rate 1500 mbps burst 1000
    ipv6 router ospf area 0.0.0.0 instance-id 0
    lldp-agent
    exit
!
interface ethernet1
!
interface ethernet2
!
interface ethernet3/1
    description Connected-Spirent-99.20-10/1
    priority-flow-control mode on
    priority-flow-control advertise-local-config
    priority-flow-control enable priority 0 1 2 3 4 5 6 7
    load-interval 30
```

```
ip address 20.1.1.1/24
ipv6 address 2001::1/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface ethernet4
!
interface ethernet5
!
interface ethernet6/1
description Connected-Spirent-99.15-1/105
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 20.1.2.1/24
ipv6 address 2002::1/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface ethernet7
!
interface ethernet8/1
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
lldp-agent
exit
!
interface ethernet9
!
interface ethernet29/1
!
interface ethernet30/1
description Connected-Ethernet30/1-800G-7001
load-interval 30
ip address 102.1.2.1/24
ipv6 address 1202::1/64
mtu 9216
service-policy type queuing output ETS2-SP1
shape rate 1340 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface ethernet31
!
interface ethernet32/1
```

```
description Connected-cd30/1-7040
priority-flow-control mode auto
load-interval 30
ip address 202.1.1.1/24
ipv6 address 2201::1/64
mtu 9216
service-policy type queuing output ETS1-SP2
shape rate 1110 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface ethernet33/1
description Connected-cd29/1-7040
priority-flow-control mode auto
load-interval 30
ip address 202.1.2.1/24
ipv6 address 2202::1/64
mtu 9216
service-policy type queuing output ETS2-SP2
shape rate 1210 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface ethernet34
!
interface lo
ip address 127.0.0.1/8
ip address 2.2.2.2/32 secondary
ipv6 address ::1/128
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface lo.management
ip vrf forwarding management
ip address 127.0.0.1/8
ipv6 address ::1/128
!
interface mgmt64
!
interface mgmt65
!
exit
!
router ospf 100
ospf router-id 2.2.2.2
network 2.2.2.2/32 area 0.0.0.0
network 20.1.1.0/24 area 0.0.0.0
network 102.1.1.0/24 area 0.0.0.0
network 102.1.2.0/24 area 0.0.0.0
```

```
network 202.1.1.0/24 area 0.0.0.0
network 202.1.2.0/24 area 0.0.0.0
!
router ipv6 ospf
  router-id 2.2.2.2
!
router bgp 65002
  bgp router-id 2.2.2.2
  !
  bgp unnumbered-mode
  neighbor ethernet33/1 remote-as external
  neighbor ethernet33/1 as-origination-interval 1
  neighbor ethernet33/1 advertisement-interval 0
  neighbor ethernet33/1 fall-over bfd
  neighbor ethernet32/1 remote-as external
  neighbor ethernet32/1 as-origination-interval 1
  neighbor ethernet32/1 advertisement-interval 0
  neighbor ethernet32/1 fall-over bfd
  neighbor ethernet0/1 remote-as external
  neighbor ethernet0/1 as-origination-interval 1
  neighbor ethernet0/1 advertisement-interval 0
  neighbor ethernet0/1 fall-over bfd
  neighbor ethernet30/1 remote-as external
  neighbor ethernet30/1 as-origination-interval 1
  neighbor ethernet30/1 advertisement-interval 0
  neighbor ethernet30/1 fall-over bfd
  exit-unnumbered-mode
  !
  address-family ipv4 unicast
  network 2.2.2.2/32
  max-paths ebgp 10
  redistribute connected
  !
  bgp v4-unnumbered-mode
  neighbor ethernet33/1 activate
  neighbor ethernet32/1 activate
  neighbor ethernet0/1 activate
  neighbor ethernet30/1 activate
  exit-v4-unnumbered-mode
  !
  exit-address-family
  !
  exit
!
line console 0
  exec-timeout 0 0
line vty 0 16
  exec-timeout 0 0
!
!
```

---

end

## Spine 2

```
feature netconf-ssh vrf management
feature netconf-tls vrf management
service password-encryption
!
logging console 7
logging monitor 4
logging level all 2
!
!
snmp-server enable traps link linkDown
snmp-server enable traps link linkUp
snmp-server enable traps ospf
snmp-server enable traps bgp
banner motd "NODE IS USING BY ARPITHA.PLEASE REFINE FROM USING IT"
!
bgp extended-asn-cap
!
load-balance rtag7
load-balance rtag7 macro-flow
load-balance rtag7 l2 dest-mac src-mac vlan
load-balance rtag7 ipv4 dest-ipv4 src-ipv4 destl4-port srcl4-port protocol-id rocev2-
dest-qpairs
load-balance rtag7 ipv6 dest-ipv6 src-ipv6 destl4-port srcl4-port rocev2-dest-qpairs
next-hdr
!
bfd interval 100 minrx 100 multiplier 3
!
qos enable
qos statistics
qos profile ingress-pg-map default
  priority-group 0 dynamic-threshold 5
  priority-group 1 xon-offset 1200 xoff-threshold 2400
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 200 dynamic-threshold 1
  priority-group 3 xon-offset 1000 xoff-threshold 2000
  priority-group 5 xon-offset 2000 dynamic-threshold 9
!
hostname Spine2-TR4-7040
port cd30 breakout 1X100g serdes 25g
port cd4 breakout 1X100g serdes 25g
port cd7 breakout 1X100g serdes 25g
port cd32 breakout 1X100g serdes 25g
port cd29 breakout 1X100g serdes 25g
port cd3 breakout 1X100g serdes 25g
port cd1 breakout 1X100g serdes 25g
```

```
port cd27 breakout 1X100g serdes 25g
ip domain-lookup vrf management
ip name-server vrf management 10.12.3.23
bridge 1 protocol rstp vlan-bridge
tfo Disable
errdisable cause stp-bpdu-guard
data-center-bridging enable bridge 1
priority-flow-control enable bridge 1
dynamic-load-balance enable
dynamic-load-balance mode fixed
feature ssh vrf management
feature dns relay
ip dns relay
ipv6 dns relay
feature ntp vrf management
feature rsyslog
logging remote server 10.16.100.20 5 port 1514 vrf management
lldp run
lldp tlv-select basic-mgmt port-description
lldp tlv-select basic-mgmt system-name
lldp tlv-select basic-mgmt system-capabilities
lldp tlv-select basic-mgmt system-description
lldp tlv-select basic-mgmt management-address
lldp tlv-select ieee-8021-org-specific data-center-bridging
set lldp msg-tx-hold 1
set lldp timer msg-tx-interval 5
set lldp tx-fast-init 1
lldp notification-interval 5
fault-management enable
maximum-paths 64
!
class-map type qos match-all c1
  match precedence routine
!
class-map type qos match-all c2
  match precedence flashoverride
!
class-map type qos match-all c3
  match dscp af11
!
policy-map type qos p1
  class type qos c1
    police cir 100 mbps pir 500 mbps
    exit
  class type qos c2
    police cir 500 mbps pir 1 gbps
    exit
  class type qos c3
    police cir 2 gbps pir 5 gbps
    exit
```

```
!  
policy-map type queuing default ETS  
  class type queuing default q0  
    priority  
    exit  
  class type queuing default q1  
    priority  
    exit  
  class type queuing default q2  
    priority  
    exit  
  class type queuing default q3  
    priority  
    exit  
  class type queuing default q4  
    priority  
    exit  
  class type queuing default q5  
    priority  
    exit  
  class type queuing default q6  
    priority  
    exit  
  class type queuing default q7  
    priority  
    exit  
!  
policy-map type queuing default Q1  
  class type queuing default q0  
    shape 100 mbps  
    priority  
    random-detect green min-threshold 400 max-threshold 500 yellow min-threshold 200 max-  
threshold 300 red min-threshold 50 max-threshold 100 packets ecn  
    exit  
  class type queuing default q1  
    shape 2 gbps  
    priority  
    random-detect green min-threshold 500 max-threshold 600 yellow min-threshold 300 max-  
threshold 400 red min-threshold 100 max-threshold 200 packets ecn  
    exit  
  class type queuing default q4  
    shape 500 mbps  
    priority  
    random-detect green min-threshold 550 max-threshold 600 yellow min-threshold 400 max-  
threshold 500 red min-threshold 300 max-threshold 400 packets ecn  
    exit  
!  
policy-map type queuing default default-out-policy  
  class type queuing default q0  
    priority  
    exit
```

```
class type queuing default q1
  priority
  exit
class type queuing default q2
  priority
  exit
class type queuing default q3
  priority
  exit
class type queuing default q4
  priority
  exit
class type queuing default q5
  priority
  exit
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
vlan database
  vlan-reservation 4001-4094
  vlan 2-10 bridge 1 state enable
!
ip vrf management
!
interface cd1/1
  description Connected-cd1/1-7043
  priority-flow-control mode on
  priority-flow-control advertise-local-config
  priority-flow-control enable priority 0 1 2 3 4 5 6 7
  load-interval 30
  ip address 201.1.1.2/24
  ipv6 address 2101::2/64
  mtu 9216
  ipv6 router ospf area 0.0.0.0 instance-id 0
  lldp-agent
  exit
!
interface cd2
!
interface cd3/1
  description Connected-ce5-7042
  priority-flow-control mode on
  priority-flow-control advertise-local-config
  priority-flow-control enable priority 0 1 2 3 4 5 6 7
  load-interval 30
  ip address 204.1.1.2/24
```



```
ipv6 address 2401::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd4/1
description Connected-cd4/1-7043
load-interval 30
ip address 201.1.2.2/24
ipv6 address 2102::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface cd5
!
interface cd6
!
interface cd7/1
description Connected-cd5/1-7013
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 203.1.2.2/24
ipv6 address 2302::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd8
!
interface cd27/1
switchport
bridge-group 1
switchport mode trunk
switchport trunk allowed vlan all
load-interval 30
mtu 9216
!
interface cd28
!
interface cd29/1
description Connected-Ethernet33/1-800G-7018
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 202.1.2.2/24
```

```
ipv6 address 2202::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd30/1
description Connected-Ethernet32/1-800G-7018
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 202.1.1.2/24
ipv6 address 2201::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd31
!
interface cd32/1
description Connected-cd2/1-7013
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 203.1.1.2/24
ipv6 address 2301::2/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface eth0
ip vrf forwarding management
ip address dhcp
!
interface lo
ip address 127.0.0.1/8
ip address 200.1.1.1/32 secondary
ipv6 address ::1/128
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface lo.management
ip vrf forwarding management
ip address 127.0.0.1/8
ipv6 address ::1/128
!
interface xe33
```

```
switchport
bridge-group 1
switchport mode trunk
switchport trunk allowed vlan all
load-interval 30
mtu 9216
!
interface xe34
 ip address 95.1.1.1/24
 ip address 94.1.1.1/24 secondary
!
exit
!
router ospf 100
 ospf router-id 200.1.1.1
 network 200.1.1.1/32 area 0.0.0.0
 network 201.1.1.0/24 area 0.0.0.0
 network 201.1.2.0/24 area 0.0.0.0
 network 202.1.1.0/24 area 0.0.0.0
 network 202.1.2.0/24 area 0.0.0.0
 network 203.1.1.0/24 area 0.0.0.0
 network 203.1.2.0/24 area 0.0.0.0
 network 204.1.1.0/24 area 0.0.0.0
!
router ipv6 ospf
 router-id 200.1.1.1
!
router bgp 64001
 bgp router-id 200.1.1.1
!
 bgp unnumbered-mode
 neighbor cd32/1 remote-as external
 neighbor cd32/1 as-origination-interval 1
 neighbor cd32/1 advertisement-interval 0
 neighbor cd32/1 fall-over bfd
 neighbor cd29/1 remote-as external
 neighbor cd29/1 as-origination-interval 1
 neighbor cd29/1 advertisement-interval 0
 neighbor cd29/1 fall-over bfd
 neighbor cd30/1 remote-as external
 neighbor cd30/1 as-origination-interval 1
 neighbor cd30/1 advertisement-interval 0
 neighbor cd30/1 fall-over bfd
 neighbor cd3/1 remote-as external
 neighbor cd3/1 as-origination-interval 1
 neighbor cd3/1 advertisement-interval 0
 neighbor cd3/1 fall-over bfd
 neighbor cd7/1 remote-as external
 neighbor cd7/1 as-origination-interval 1
 neighbor cd7/1 advertisement-interval 0
```

```
neighbor cd7/1 fall-over bfd
neighbor cd1/1 remote-as external
neighbor cd1/1 as-origination-interval 1
neighbor cd1/1 advertisement-interval 0
neighbor cd1/1 fall-over bfd
neighbor cd4/1 remote-as external
neighbor cd4/1 as-origination-interval 1
neighbor cd4/1 advertisement-interval 0
neighbor cd4/1 fall-over bfd
exit-unnumbered-mode
!
address-family ipv4 unicast
network 200.1.1.1/32
max-paths ebgp 10
redistribute connected
!
bgp v4-unnumbered-mode
neighbor cd32/1 activate
neighbor cd29/1 activate
neighbor cd30/1 activate
neighbor cd3/1 activate
neighbor cd7/1 activate
neighbor cd1/1 activate
neighbor cd4/1 activate
exit-v4-unnumbered-mode
!
exit-address-family
!
exit
!
line console 0
  exec-timeout 0 0
line vty 0 16
  exec-timeout 0 0
!
!
end

!
```

### Leaf 3

```
feature netconf-ssh vrf management
feature netconf-tls vrf management
service password-encryption
!
logging console 7
logging monitor 4
!
snmp-server enable traps link linkDown
```

---

```
snmp-server enable traps link linkUp
snmp-server enable traps ospf
snmp-server enable traps bgp
banner motd "NODE IS USING BY ARPITHA.PLEASE REFINE FROM USING IT"
!
bgp extended-asn-cap
!
load-balance rtag7
load-balance rtag7 macro-flow
load-balance rtag7 l2 dest-mac src-mac vlan
load-balance rtag7 ipv4 dest-ipv4 src-ipv4 destl4-port srcl4-port protocol-id rocev2-
dest-qpairs
load-balance rtag7 ipv6 dest-ipv6 src-ipv6 destl4-port srcl4-port rocev2-dest-qpairs
next-hdr
!
bfd interval 100 minrx 100 multiplier 3
!
qos enable
qos statistics
qos profile ingress-pg-map default
  priority-group 0 dynamic-threshold 5
  priority-group 1 xon-offset 1200 xoff-threshold 2400
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 200 dynamic-threshold 1
  priority-group 3 xon-offset 1000 xoff-threshold 2000
  priority-group 5 xon-offset 2000 dynamic-threshold 9
!
hostname Leaf3-TR4-7013
port cd5 breakout 1X100g serdes 25g
port cd8 breakout 1X100g serdes 25g
port cd9 breakout 1X100g serdes 25g
port cd10 breakout 1X100g serdes 25g
port cd3 breakout 1X100g serdes 25g
port cd4 breakout 1X100g serdes 25g
port cd2 breakout 1X100g serdes 25g
port cd1 breakout 1X100g serdes 25g
port cd0 breakout 1X100g serdes 25g
ip domain-lookup vrf management
ip name-server vrf management 10.12.3.23
bridge 1 protocol rstp vlan-bridge
tfo Disable
errdisable cause stp-bpdu-guard
data-center-bridging enable bridge 1
priority-flow-control enable bridge 1
feature ssh vrf management
feature dns relay
ip dns relay
ipv6 dns relay
feature ntp vrf management
lldp run
lldp tlv-select basic-mgmt port-description
```

---

---

```
lldp tlv-select basic-mgmt system-name
lldp tlv-select basic-mgmt system-capabilities
lldp tlv-select basic-mgmt system-description
lldp tlv-select basic-mgmt management-address
lldp tlv-select ieee-8021-org-specific data-center-bridging
set lldp msg-tx-hold 1
set lldp timer msg-tx-interval 5
set lldp tx-fast-init 1
lldp notification-interval 5
fault-management enable
maximum-paths 64
!
policy-map type queuing default ETS
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
  exit
  class type queuing default q4
    priority
  exit
  class type queuing default q5
    priority
  exit
  class type queuing default q6
    priority
  exit
  class type queuing default q7
    priority
  exit
!
policy-map type queuing default ETS1-SP1
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
```

---

```
    bandwidth 300 mbps
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS1-SP2
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        bandwidth 200 mbps
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default ETS2-SP1
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
```

```
    priority
    exit
class type queuing default q3
    priority
    bandwidth 350 mbps
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS2-SP2
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        bandwidth 250 mbps
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default default-out-policy
    class type queuing default q0
        priority
        bandwidth 375 mbps
```



```
exit
class type queuing default q1
priority
exit
class type queuing default q2
priority
bandwidth 200 mbps
exit
class type queuing default q3
priority
bandwidth 150 mbps
exit
class type queuing default q4
priority
exit
class type queuing default q5
priority
exit
class type queuing default q6
priority
exit
class type queuing default q7
priority
exit
!
vlan database
vlan-reservation 4001-4094
vlan 2-10 bridge 1 state enable
!
ip vrf management
!
interface cd0/1
description Connected-Ethernet31/1-7001
priority-flow-control mode auto
load-interval 30
ip address 103.1.1.1/24
ipv6 address 1301::1/64
mtu 9216
service-policy type queuing output ETS1-SP1
shape rate 800 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd1/1
!
interface cd2/1
description Connected-cd32/1-7040
priority-flow-control mode auto
load-interval 30
```

```
ip address 203.1.1.1/24
ipv6 address 2301::1/64
mtu 9216
service-policy type queuing output ETS1-SP2
shape rate 500 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd3/1
!
interface cd4/1
description Connected-Spine2-cd27/1
switchport
bridge-group 1
switchport mode trunk
switchport trunk allowed vlan add 3
load-interval 30
mtu 9216
!
interface cd5/1
description Connected-cd7/1-7040
priority-flow-control mode auto
load-interval 30
ip address 203.1.2.1/24
ipv6 address 2302::1/64
mtu 9216
service-policy type queuing output ETS2-SP2
shape rate 650 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd6
description Connected-Spirent-99.15-1/113
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 30.1.2.1/24
ipv6 address 3002::1/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd7
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
```

```
lldp-agent
exit
!
interface cd8/1
!
interface cd9/1
!
interface cd10/1
description Connected-7001-Ethernet32/1-800G
priority-flow-control mode auto
load-interval 30
ip address 103.1.2.1/24
ipv6 address 1302::1/64
mtu 9216
service-policy type queuing output ETS2-SP1
shape rate 650 mbps burst 1000
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
interface cd11
!
interface eth0
ip vrf forwarding management
ip address dhcp
!
interface lo
ip address 127.0.0.1/8
ipv6 address ::1/128
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface lo.management
ip vrf forwarding management
ip address 127.0.0.1/8
ipv6 address ::1/128
!
interface vlan1.3
ip address 30.1.1.1/24
ipv6 address 3001::1/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface xe0
!
interface xe1
!
exit
!
router ospf 100
ospf router-id 3.3.3.3
```

```
network 3.3.3.3/32 area 0.0.0.0
network 30.1.1.0/24 area 0.0.0.0
network 103.1.1.0/24 area 0.0.0.0
network 103.1.2.0/24 area 0.0.0.0
network 203.1.1.0/24 area 0.0.0.0
network 203.1.2.0/24 area 0.0.0.0
!
router ipv6 ospf
  router-id 3.3.3.3
!
router bgp 65003
  bgp router-id 3.3.3.3
  !
  bgp unnumbered-mode
  neighbor cd0/1 remote-as external
  neighbor cd0/1 as-origination-interval 1
  neighbor cd0/1 advertisement-interval 0
  neighbor cd0/1 fall-over bfd
  neighbor cd10/1 remote-as external
  neighbor cd10/1 as-origination-interval 1
  neighbor cd10/1 advertisement-interval 0
  neighbor cd10/1 fall-over bfd
  neighbor cd2/1 remote-as external
  neighbor cd2/1 as-origination-interval 1
  neighbor cd2/1 advertisement-interval 0
  neighbor cd2/1 fall-over bfd
  neighbor cd5/1 remote-as external
  neighbor cd5/1 as-origination-interval 1
  neighbor cd5/1 advertisement-interval 0
  neighbor cd5/1 fall-over bfd
  exit-unnumbered-mode
  !
  address-family ipv4 unicast
  network 3.3.3.3/32
  max-paths ebgp 10
  redistribute connected
  !
  bgp v4-unnumbered-mode
  neighbor cd0/1 activate
  neighbor cd10/1 activate
  neighbor cd2/1 activate
  neighbor cd5/1 activate
  exit-v4-unnumbered-mode
  !
  exit-address-family
  !
  exit
!
line console 0
  exec-timeout 0 0
```

```
line vty 0 16
  exec-timeout 0 0
!
!
end
```

```
!
```

#### Leaf 4

```
feature netconf-ssh vrf management
feature netconf-tls vrf management
service password-encryption
!
logging console 7
logging monitor 4
logging logfile device_debug_log 2
logging level nsm 4
logging level rip 5
logging level ripng 5
logging level ospf 5
!
snmp-server enable traps link linkDown
snmp-server enable traps link linkUp
snmp-server enable traps ospf
snmp-server enable traps bgp
banner motd "NODE IS USING BY ARPITHA.PLEASE REFINE FROM USING IT"
!
bgp extended-asn-cap
!
load-balance rtag7
load-balance rtag7 macro-flow
load-balance rtag7 l2 dest-mac src-mac vlan
load-balance rtag7 ipv4 dest-ipv4 src-ipv4 destl4-port srcl4-port protocol-id
load-balance rtag7 ipv6 dest-ipv6 src-ipv6 destl4-port srcl4-port next-hdr
hardware-profile filter ingress-ipv6 disable
hardware-profile filter bfd-group enable
!
bfd interval 100 minrx 100 multiplier 3
!
qos enable
qos statistics
qos profile ingress-pg-map default
  priority-group 0 dynamic-threshold 5
  priority-group 1 xon-offset 1200 xoff-threshold 2400
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 200 dynamic-threshold 1
  priority-group 3 xon-offset 1000 xoff-threshold 2000
  priority-group 5 xon-offset 2000 dynamic-threshold 9
!
```

```
hostname Leaf4-TR3-7042
ip domain-lookup vrf management
ip name-server vrf management 10.12.3.23
bridge 1 protocol rstp vlan-bridge
tfo Disable
errdisable cause stp-bpdu-guard
data-center-bridging enable bridge 1
priority-flow-control enable bridge 1
dynamic-load-balance enable
dynamic-load-balance mode fixed
feature ssh vrf management
feature dns relay
ip dns relay
ipv6 dns relay
feature ntp vrf management
feature rsyslog
logging remote server 10.16.100.20 5 port 1514 vrf management
lldp run
lldp tlv-select basic-mgmt port-description
lldp tlv-select basic-mgmt system-name
lldp tlv-select basic-mgmt system-capabilities
lldp tlv-select basic-mgmt system-description
lldp tlv-select basic-mgmt management-address
lldp tlv-select ieee-8021-org-specific data-center-bridging
set lldp msg-tx-hold 1
set lldp timer msg-tx-interval 5
set lldp tx-fast-init 1
lldp notification-interval 1000
fault-management enable
maximum-paths 64
!
policy-map type queuing default ETS
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
  exit
  class type queuing default q4
    priority
  exit
  class type queuing default q5
    priority
  exit
```

```
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
policy-map type queuing default ETS1
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS1-SP1
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    bandwidth 450 mbps
    exit
  class type queuing default q4
    priority
    exit
```

```
class type queuing default q5
  priority
exit
class type queuing default q6
  priority
exit
class type queuing default q7
  priority
exit
!
policy-map type queuing default ETS1-SP2
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
    bandwidth 300 mbps
  exit
  class type queuing default q4
    priority
  exit
  class type queuing default q5
    priority
  exit
  class type queuing default q6
    priority
  exit
  class type queuing default q7
    priority
  exit
!
policy-map type queuing default ETS2
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
  class type queuing default q2
    priority
  exit
  class type queuing default q3
    priority
  exit
```



---

```
class type queuing default q4
  priority
  exit
class type queuing default q5
  priority
  exit
class type queuing default q6
  priority
  exit
class type queuing default q7
  priority
  exit
!
policy-map type queuing default ETS2-SP1
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
    priority
    exit
  class type queuing default q4
    priority
    exit
  class type queuing default q5
    priority
    exit
  class type queuing default q6
    priority
    exit
  class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS2-SP2
  class type queuing default q0
    priority
    exit
  class type queuing default q1
    priority
    exit
  class type queuing default q2
    priority
    exit
  class type queuing default q3
```

---

```
    priority
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default ETS3
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        exit
    class type queuing default q3
        priority
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
policy-map type queuing default ETS4
    class type queuing default q0
        priority
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
```

```
    exit
class type queuing default q3
    priority
    exit
class type queuing default q4
    priority
    exit
class type queuing default q5
    priority
    exit
class type queuing default q6
    priority
    exit
class type queuing default q7
    priority
    exit
!
policy-map type queuing default default-out-policy
    class type queuing default q0
        priority
        bandwidth 1200 mbps
        exit
    class type queuing default q1
        priority
        exit
    class type queuing default q2
        priority
        bandwidth 200 mbps
        exit
    class type queuing default q3
        priority
        exit
    class type queuing default q4
        priority
        exit
    class type queuing default q5
        priority
        exit
    class type queuing default q6
        priority
        exit
    class type queuing default q7
        priority
        exit
!
vlan database
    vlan-reservation 4001-4094
    vlan 2-10 bridge 1 state enable
!
ip vrf management
```

```
!  
interface ce1  
  description Connected-Ethernet1/1-800G-7001  
  load-interval 30  
  ip address 104.1.1.1/24  
  ipv6 address 1401::1/64  
  mtu 9216  
  service-policy type queuing output ETS1-SP1  
  shape rate 1200 mbps burst 1000  
  ipv6 router ospf area 0.0.0.0 instance-id 0  
!  
interface ce2  
!  
interface ce3  
!  
interface ce4  
!  
interface ce5  
  description Connected-cd3/1-7040  
  priority-flow-control mode auto  
  load-interval 30  
  ip address 204.1.1.1/24  
  ipv6 address 2401::1/64  
  mtu 9216  
  service-policy type queuing output ETS1-SP2  
  shape rate 900 mbps burst 1000  
  ipv6 router ospf area 0.0.0.0 instance-id 0  
  lldp-agent  
  exit  
!  
interface ce6  
!  
interface ce7  
  description Connected-Spirent-99.40-2/9  
  priority-flow-control mode on  
  priority-flow-control advertise-local-config  
  priority-flow-control enable priority 0 1 2 3 4 5 6 7  
  load-interval 30  
  ip address 40.1.2.1/24  
  ipv6 address 4002::1/64  
  mtu 9216  
  ipv6 router ospf area 0.0.0.0 instance-id 0  
  lldp-agent  
  exit  
!  
interface ce8  
  priority-flow-control mode on  
  priority-flow-control advertise-local-config  
  priority-flow-control enable priority 0 1 2 3 4 5 6 7  
  ip address 88.1.1.1/24
```

```
lldp-agent
exit
!
interface ce26
!
interface eth0
ip vrf forwarding management
ip address dhcp
!
interface lo
ip address 127.0.0.1/8
ip address 4.4.4.4/32 secondary
ipv6 address ::1/128
!
interface lo.management
ip vrf forwarding management
ip address 127.0.0.1/8
ipv6 address ::1/128
ipv6 router ospf area 0.0.0.0 instance-id 0
!
interface xe33
!
interface xe34
description Connected-Spirent-99.10-6/6
priority-flow-control mode on
priority-flow-control advertise-local-config
priority-flow-control enable priority 0 1 2 3 4 5 6 7
load-interval 30
ip address 40.1.1.1/24
ipv6 address 4001::1/64
mtu 9216
ipv6 router ospf area 0.0.0.0 instance-id 0
lldp-agent
exit
!
exit
!
router ospf 100
ospf router-id 4.4.4.4
network 4.4.4.4/32 area 0.0.0.0
network 40.1.1.0/24 area 0.0.0.0
network 104.1.1.0/24 area 0.0.0.0
network 204.1.1.0/24 area 0.0.0.0
!
router ipv6 ospf
router-id 4.4.4.4
!
router bgp 65004
bgp router-id 4.4.4.4
!
```

```

bgp unnumbered-mode
neighbor ce5 remote-as external
neighbor ce5 as-origination-interval 1
neighbor ce5 advertisement-interval 0
neighbor ce5 fall-over bfd
neighbor ce1 remote-as external
neighbor ce1 as-origination-interval 1
neighbor ce1 advertisement-interval 0
neighbor ce1 fall-over bfd
exit-unnumbered-mode
!
address-family ipv4 unicast
network 4.4.4.4/32
max-paths ebgp 10
redistribute connected
!
bgp v4-unnumbered-mode
neighbor ce5 activate
neighbor ce1 activate
exit-v4-unnumbered-mode
!
exit-address-family
!
exit
!
line console 0
  exec-timeout 0 0
line vty 0 16
  exec-timeout 0 0
!
!
end

```

---

## Validation

Verify the QoS Priority Group (PG) settings, including the XON/XOFF and dynamic thresholds, for the defined profiles.

```

#sh qos-profile ingress-pg-map all
qos profile ingress-pg-map default
  priority-group 0 xon-offset 32 dynamic-threshold 5
  priority-group 1 xon-offset 1200 xoff-threshold 2400
  priority-group 2 xon-offset 32 dynamic-threshold 8
  priority-group 3 xon-offset 32 dynamic-threshold 8
  priority-group 4 xon-offset 32 dynamic-threshold 8
  priority-group 5 xon-offset 32 dynamic-threshold 8
  priority-group 6 xon-offset 32 dynamic-threshold 8
  priority-group 7 xon-offset 32 dynamic-threshold 8
!
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 200 dynamic-threshold 1

```

```

priority-group 1 xon-offset 32 dynamic-threshold 8
priority-group 2 xon-offset 32 dynamic-threshold 8
priority-group 3 xon-offset 1000 xoff-threshold 2000
priority-group 4 xon-offset 32 dynamic-threshold 8
priority-group 5 xon-offset 2000 dynamic-threshold 9
priority-group 6 xon-offset 32 dynamic-threshold 8
priority-group 7 xon-offset 32 dynamic-threshold 8
!

```

```

#sh qos-profile ingress-pg-map interface ethernet3/1
profile name: pg2

```

mapping:

```

priority-group 0 xon-offset 200 dynamic-threshold 1
priority-group 1 xon-offset 32 dynamic-threshold 8
priority-group 2 xon-offset 32 dynamic-threshold 8
priority-group 3 xon-offset 1000 xoff-threshold 2000
priority-group 4 xon-offset 32 dynamic-threshold 8
priority-group 5 xon-offset 2000 dynamic-threshold 9
priority-group 6 xon-offset 32 dynamic-threshold 8
priority-group 7 xon-offset 32 dynamic-threshold 8

```

Verify that traffic is being correctly classified and processed by the queuing policies on the interfaces.

```

#sh policy-map statistics type qos
+-----+-----+-----+-----+
|      Class-map      | Match pkts | Match bytes | Dropped pkts | Dropped Bytes |
+-----+-----+-----+-----+
#sh policy-map statistics type queuing
+-----+-----+-----+-----+
|      Class-map      | Total pkts | Total bytes | Dropped pkts | Dropped Bytes |
+-----+-----+-----+-----+
ethernet1/1
q7          291          28105          0          0
ethernet2/1
q7          287          27506          0          0
ethernet3/1
q7          292          27011          0          0
ethernet30/1
q7          294          28028          0          0
ethernet31/1
q7          281          26458          0          0
ethernet32/1
q7          293          28045          0          0
ethernet64/1
q7          281          26305          0          0
#

```

The non-zero counts for Total pkts and Total bytes for class-map q7 (Queue 7) on multiple interfaces indicate that the queuing policy is operational.

The Dropped pkts and Dropped Bytes columns show 0 for all monitored interfaces and q7. This indicates that the buffers were not congested enough to trigger packet drops.

## Implementation Examples

Following are some the real time examples to create, attach, update PG profile.

## Latency-Sensitive Applications (Low Alpha)

For voice network traffic, consistent and predictable latency is critical. By configuring a low alpha value (e.g. 1/16 MMU alpha) on the relevant traffic classes, queues rely primarily on their reserved buffers rather than the shared pool. This ensures packets are forwarded with minimal jitter. Following is an ingress PG map profile example for low alpha value.

```
OcNOS(config)#qos profile ingress-pg-map pg2
OcNOS(config-ingress-pg-queue-map)#priority-group 3 xon-offset 2000 dynamic-
threshold 2
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
```

## Latency-Tolerant Applications (High Alpha)

For workloads like backup traffic or bulk file transfers, the priority is maximizing throughput rather than minimizing latency. By setting a higher alpha value (e.g. 1/4 or 1/2 MMU alpha), queues can aggressively borrow from the shared buffer, allowing them to handle large bursts of data efficiently. Following is an ingress PG map profile example for high alpha value.

```
OcNOS(config)#qos profile ingress-pg-map pg2
OcNOS(config-ingress-pg-queue-map)#priority-group 5 xon-offset 2000 dynamic-
threshold 9
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
```

### To create a PG profile.

```
OcNOS(config)#qos profile ingress-pg-map pg1
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
```

### To add a map in the default global PG profile with dynamic threshold

```
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 0 dynamic-threshold 5
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
```

### To add a map in the default global PG profile with XON offsets and XOFF threshold

```
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 1 xon-offset 1200 xoff-
threshold 2400
OcNOS(config-ingress-pg-queue-map)#comm
```

### To attach a PG profile to an interface

```
OcNOS(config)#qos profile ingress-pg-map pg2
OcNOS(config-ingress-pg-queue-map)#priority-group 0 xon-offset 200 dynamic-
threshold 1
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
OcNOS(config)#interface cel
OcNOS(config-if)#qos map-profile ingress-pg-map pg2
OcNOS(config-if)#comm
```

### To add a member interface to a LAG that has a PG profile attached

```
OcNOS(config)#bridge 1 protocol ieee vlan-bridge
OcNOS(config)#vlan 100 br 1
```



```
OcNOS(config)#interface sa10
OcNOS(config-if)#switchport
OcNOS(config-if)#bridge-group 1
OcNOS(config-if)#switchport mode trunk
OcNOS(config-if)#switchport trunk allowed vlan all
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#interface ce5
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#int ce4
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#interface sa10
OcNOS(config-if)#qos map-profile ingress-pg-map pg2
OcNOS(config-if)#comm
OcNOS(config)#interface ce6
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#interface ce7
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#end
```

#### To attach a PG profile to a MLAG interface

```
OcNOS(config)#bridge 1 protocol rstp vlan-bridge
OcNOS(config)#comm
OcNOS(config)#interface sa20
OcNOS(config-if)#switchport
OcNOS(config-if)#bridge-group 1
OcNOS(config-if)#switchport mode trunk
OcNOS(config-if)#switchport trunk allowed vlan all
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#interface ce9
OcNOS(config-if)#static-channel-group 20
OcNOS(config-if)#exit
OcNOS(config)#interface ce10
OcNOS(config-if)#static-channel-group 20
OcNOS(config-if)#exit
OcNOS(config)#comm
OcNOS(config)#interface mlag1
OcNOS(config-if)#switchport
OcNOS(config-if)#bridge-group 1
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#interface sa20
OcNOS(config-if)#mlag 1
OcNOS(config-if)#comm
```

```
OcNOS(config-if)#exit
OcNOS(config)#interface mlag1
OcNOS(config-if)#qos map-profile ingress-pg-map pg2
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#end
OcNOS(config)#interface cel3
OcNOS(config-if)#static-channel-group 20
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#end
```

### To change the queue size for PFC triggers by modifying XON offset values

```
OcNOS(config)#qos profile ingress-pg-map PG_XON_TEST
OcNOS(config-ingress-pg-queue-map)#priority-group 1 xon-offset 20000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#
```

### To reconfigure XON offset in an ingress-pg-map with dynamic threshold mapped to a priority

```
OcNOS(config)#qos profile ingress-pg-map pg3
OcNOS(config-ingress-pg-queue-map)#priority-group 0 xon-offset 2000 dynamic-
threshold 10
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#priority-group 0 xon-offset 2900
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
```

### To configure egress dynamic-threshold value

```
OcNOS(config)#policy-map type queuing default default-out-policy
OcNOS(config-pmap-que-def)#class type queuing default q0
OcNOS(config-pmap-c-que-def)#dynamic-threshold 5
OcNOS(config-pmap-c-que-def)#comm
OcNOS(config-pmap-c-que-def)#exit
OcNOS(config-pmap-que-def)#exit
OcNOS(config)#end
```

---

## CLI Commands

The Switch Buffer Tuning introduces the following configuration commands.

- [qos profile ingress-pg-map](#)
- [dynamic-threshold](#)

## qos profile ingress-pg-map

Use this command to create a ingress priority group (PG) profile or update the default ingress PG profile.

Use `no` parameter of this command to remove a ingress PG profile.

Use `no` parameter of `priority-group` command to unset a PG mapping in the ingress PG profile.

Use `show qos-profile` to show the profile detail.

Use `qos map-profile` to map the profile on interface.

### Command Syntax

```
qos profile ingress-pg-map (NAME|default) priority-group <0-7> (xon-offset <1-83000> (xoff-threshold <1-83000> | dynamic-threshold <0-10> |) | xoff-threshold <1-83000> | dynamic-threshold <0-10>)
no qos profile ingress-pg-map (NAME|default)
no priority-group <0-7>
```

### Parameters

Use this command to update the priority mapping in the PG profile.

<code>ingress-pg-map &lt;NAME&gt;</code>	Specifies the name of the ingress priority group map profile.
<code>default</code>	Specifies the default PG map profile.
<code>priority-group &lt;0-7&gt;</code>	Specifies the priority mapping in the PG profile. The values are defined in Kbytes by default.
<code>xon-offset &lt;1-83000&gt;</code>	Specifies XON buffer offset of the shared memory that a PG can receive. The value is specified in Kbytes by default. When the buffer usage on the ingress priority group drops below this PFC XON offset from the shared limit, the priority group sends a PFC message to the peer to resume packet transmission.
	When the ingress PG buffer reaches the configured limit, it triggers the transmission of PFC pause frames to its egress peer.

`xoff-threshold <1-83000>` Specifies the absolute threshold at which the PG XOFF will start. The value is specified in Kbytes by default. Typically The difference between these thresholds provides hysteresis in toggling between X-OFF and X-ON, thereby limiting the PFC transmission rate.

`dynamic-threshold <0-10>` Defines the configurable limit on how many buffers each queue can draw from the shared buffer pool. This pool operates according to a dynamic threshold parameter known as the alpha value.

The dynamic threshold modifies the PG queue size only in the absence of a configured `xoff-threshold`.

The dynamic threshold can be set individually for different queues, allowing fine-grained control over how each queue accesses the shared buffer. Following are the dynamic threshold values that can be configured:

- 0 1/128 MMU alpha.
- 1 1/64 MMU alpha.
- 2 1/32 MMU alpha.
- 3 1/16 MMU alpha.
- 4 1/8 MMU alpha.
- 5 1/4 MMU alpha.
- 6 1/2 MMU alpha.
- 7 1 MMU alpha.
- 8 2 MMU alpha.
- 9 4 MMU alpha.
- 10 8 MMU alpha

**Note:** Memory Management Unit (MMU) refers to block inside a switch that controls packet buffering and queue management.

**Note:** Only a single threshold attribute—`xoff-threshold` or `dynamic-threshold`—is valid and permitted in the CLI configuration.

## Default

- `xon-offset` — 32
- `xoff-threshold` — None.
- `dynamic-threshold` — 8

## Command Mode

Configure Mode

## Applicability

Introduced in OcNOS Version 7.0.0. This command is supported only on the Trident3 (TD3) platforms, Trident 4 (TD4) platforms, Tomahawk3 (TH3) platforms, Tomahawk4 (TH4) platforms, and Tomahawk 5 (TH5) platforms.

## Example

Command to create and attach user-defined PG profile.

```
OcNOS#configure terminal
(config)#qos profile ingress-pg-map PG1
```

```
(config-ingress-pg-queue-map)#priority-group 0 xon-offset 30000
(config-ingress-pg-queue-map)#priority-group 1 xoff-threshold 20000
(config-ingress-pg-queue-map)#priority-group 2 dynamic-threshold 2
(config-ingress-pg-queue-map)#priority-group 3 xon-offset 2000 xoff-threshold
10000
(config-ingress-pg-queue-map)#priority-group 4 xon-offset 50000 dynamic-
threshold 9

(config)#interface xe65
(config-if)#qos map-profile ingress-pg-map PG1
```

#### Updating default global PG profile with XON-offset:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 1 xon-offset 5000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
OcNOS(config)#end
OcNOS#
```

#### Updating default global PG profile with XOFF-threshold:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 2 xoff-threshold 10000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#end
OcNOS#
```

#### Updating default global PG profile with dynamic-threshold:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 3 dynamic-threshold 2
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
OcNOS(config)#end
OcNOS#
```

#### Updating default global PG profile with XON-offset and XOFF-threshold:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 4 xon-offset 5000 xoff-
threshold 15000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#end
OcNOS#
```

#### Updating default global PG profile with XON-offset and dynamic threshold:

```
OcNOS#conf t
```

---

```
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 5 xon-offset 1000 dynamic-
threshold 8
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#end
OcNOS#
```

**Accessing default global PG profile:**

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z. OcNOS(config)#qos
profile ingress-pg-map default OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit OcNOS(config)#end
```

**Detaching a PG profile:**

```
OcNOS(config)#int ce1
OcNOS(config-if)#no qos map-profile ingress-pg-map pg2 OcNOS(config-if)#comm
2025 Aug 20 01:17:47.594 : OcNOS : HSL : DEBUG : QOS: zNSM_SYNC: Successfully
set/unset xon: 5000 xoff: 15000 dynamic_threshold: 0 on port :5
OcNOS(config-if)#exit OcNOS(config)#end
```

---

## dynamic-threshold

Use this command to configure egress dynamic-threshold values.

Use `no` parameter of this command to unconfigure .

### Command Syntax

```
dynamic-threshold <0-10>
no dynamic-threshold
```

### Parameters

<0-10>

Specifies the egress dynamic-threshold value in kbytes. It defines the dynamic limit of the PG queue. Define a configurable limit on how many buffers each queue can draw from the shared buffer pool. This pool operates according to a dynamic threshold parameter known as the alpha value.

The dynamic threshold can be set individually for different queues, allowing fine-grained control over how each queue accesses the shared buffer. Following are the dynamic threshold values that can be configured:

- 0 1/128 MMU alpha.
- 1 1/64 MMU alpha.
- 2 1/32 MMU alpha.
- 3 1/16 MMU alpha.
- 4 1/8 MMU alpha.
- 5 1/4 MMU alpha.
- 6 1/2 MMU alpha.
- 7 1 MMU alpha.
- 8 2 MMU alpha.
- 9 4 MMU alpha.
- 10 8 MMU alpha

### Default

None

### Command Mode

config-pmap-c-queue-def mode

policy-class-map-queue mode

### Applicability

Introduced in OcNOS Version 7.0.0. This command is supported only on the Trident3 (TD3) platforms, Trident 4 (TD4) platforms, Tomahawk3 (TH3) platforms, Tomahawk4 (TH4) platforms, and Tomahawk 5 (TH5) platforms.

### Example

Command to configure egress dynamic-threshold value:

```
OcNOS#configure terminal
(config)#policy-map type queuing default default-out-policy
(config-pmap-que-def)#class type queuing default q0
(config-pmap-c-que-def)#dynamic-threshold 7
```

The following existing CLI commands are updated to include `ingress-pg-map` attribute.

- [show qos-profile](#)
- [qos map-profile](#)

---

## show qos-profile

```
show qos-profile (type (cos-to-queue | dscp-encap | dscp-to-dscp | dscp-to-queue |
exp-to-queue | queue-to-exp | precedence-to-precedence | precedence-to-queue |
queue-color-to-cos | ingress-pg-map | egress-dynamic-ecn) (interface NAME| all)
```

The CLI is modified to include `ingress-pg-map` attribute.

`ingress-pg-map` - This attribute displays the details of the PG profile attached to an interface or all.

---

## qos map-profile

```
qos map-profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-color-
to-dscp | precedence-to-queue | queue-to-precedence | ingress-pg-map| egress-
dynamic-ecn) NAME
```

This CLI is modified to include `ingress-pg-map` attribute.

`ingress-pg-map` - This attribute attach or detach an ingress priority group profile to and from an interface.

---

## Troubleshooting

Following are some of the commands that can be used for troubleshooting:

```
show policy-map statistics type qos
show policy-map
show qos-profile ingress-pg-map(interface NAME| all)
```

---

## Glossary

The following provides definitions for key terms or abbreviations and their meanings used throughout this document:

Key Terms/ Acronym	Description
PG	Priority group is mechanism to allocates packet buffer size based on traffic priority classes referred as Priority Groups (PG) instead of physical ports.



QoS	Quality of service refers to an ability to deliver, control the bandwidth, set priorities for specific network traffic, and provide an appropriate level of security.
PFC	Priority Flow Control is a packet control mechanism to manage when to pause frames to prevent packet loss.

# Explicit Congestion Notification (ECN) Configuration

---

## Overview

Traditionally, packet congestion in TCP/IP networks is indicated by packet loss. However, Explicit Congestion Notification (ECN) is a mechanism that allows two endpoints in a TCP/IP network to signal congestion without dropping packets. The two endpoints are an ECN-enabled sender and an ECN-enabled receiver. ECN must be enabled on both endpoints and on all of the intermediate devices between the endpoints for ECN to work properly. Any device in the transmission path that does not support ECN breaks the end-to-end ECN functionality.

With ECN enabled, routers and switches that detect congestion can mark packets in the IP header instead of discarding them. An ECN field is used in the IP header with two bits ('10' and '01') to indicate that the endpoints are ECN capable transport. The receiving endpoint then echoes this congestion notification back to the sender, prompting it to reduce the transmission rate just as if a packet loss had occurred.

ECN operation requires support on both endpoints as well as on the network devices in the forwarding path. If any device in the transmission path does not support ECN, the end-to-end ECN capability is disrupted. When successfully negotiated, ECN improves efficiency by reducing packet loss, lowering retransmissions, and enabling faster recovery during congestion events.

OcNOS supports following ECN Markings:

- [Static ECN Marking](#)
- [Dynamic ECN Marking](#)

## CHAPTER 22 Static ECN Marking

### Overview

OcNOS with Explicit Congestion Notification (ECN) capability uses Weighted Random Early Detection (WRED) technique that prevents buffer overflows by static ECN (S-ECN) marking. It marks the ECN based on packet attributes and probabilistic mathematical functions.

WRED drops packets, based on the average queue length exceeding a specific threshold value, to indicate congestion. ECN is an extension to WRED in that ECN marks packets instead of dropping them when the average queue length exceeds a specific threshold value. When configured with the WRED -- Explicit Congestion Notification feature, routers and end hosts would use this marking as a signal that the network is congested and slow down sending packets.

ECN requires an ECN-specific field that has two bits--the ECN-capable Transport (ECT) bit and the CE (Congestion Experienced) bit--in the IP header. The ECT bit and the CE bit can be used to make four ECN field combinations of 00 to 11. The first number is the ECT bit and the second number is the CE bit. The table below lists each of the ECT and CE bit combination settings in the ECN field and what the combinations indicate.

Table 22-1 explains the output fields.

**Table 22-1: show BFD fields**

ECT Bit	CE Bit	Combination Indicates
0	0	Not- ECN capable
0	1	Endpoints of the transport protocol are ECN capable
1	0	Endpoints of the transport protocol
1	1	Congestion experienced

The ECN field combination 00 indicates that a packet is not using ECN. The ECN field combinations of 01 and 10 called as ECT(1) and ECT(0) respectively. This sets by the data sender to indicate that the endpoints of the transport protocol are ECN-capable. Routers treat those two field combinations identically. Data senders can use either one or both of these two combinations.

### Feature Characteristics

If the number of packets in the queue is below the minimum threshold, packets are transmitted. This happens whether or not ECN is enabled, and this treatment is identical to the treatment a packet receives when WRED only is being used on the network.

If the number of packets in the queue is between the minimum threshold and the maximum threshold, one of the following three scenarios can occur:

If the ECN field on the packet indicates that the endpoints are ECN-capable (that is, the ECT bit is set to 1 and the CE bit is set to 0, or the ECT bit is set to 0 and the CE bit is set to 1)--and the WRED algorithm determines that the packet should have been dropped based on the drop probability--the ECT and CE bits for the packet are changed to 1, and the packet is transmitted. This happens because ECN is enabled and the packet gets marked instead of dropped.

If the ECN field on the packet indicates that neither endpoint is ECN-capable (that is, the ECT bit is set to 0 and the CE bit is set to 0), the packet might be dropped based on the WRED drop probability. This is the identical treatment that a packet receives when WRED is enabled without ECN configured on the router.

If the ECN field on the packet indicates that the network is experiencing congestion (that is, both the ECT bit and the CE bit are set to 1), the packet is transmitted. No further marking is required.

If the number of packets in the queue is above the maximum threshold, packets are dropped based on the drop probability. This is the identical treatment a packet receives when WRED is enabled without ECN configured on the router.

## Topology



Figure 22-22: Simple configuration of ECN

## Configuring ECN on L3 Interface

Do the following to configure ECN on an L3 interface.

#configure terminal	Enter inside configure mode
(config)#qos enable	Enable QoS on configuration mode.
(config)#qos statisticsEnable	QoS statistics on configuration mode.
(config)#class-map match-any cmap	Enter Class-map mode
(cmap-qos-match-any-mode)#match precedence 3	Configure match criteria as precedence with Value 3
(config-pmap-qos)#policy-map pmap	Enter policy-map mode
(config-pmap-qos)#class cmap	Assign Class cmap to Policy-map pmap
(cmap-qos-match-any-mode)#match precedence 3	Configure match criteria as precedence with Value 3
(config-pmap-qos)#policy-map pmap	Enter policy-map mode
(config-pmap-qos)#class cmap	Assign Class cmap to Policy-map pmap
(config-pmap-c-qos)# police cir 328 mbps pir 556 mbps conform transmit exceed transmit violate transmit	Police Precedence 3 frames @ Committed information rate of 328 mbps and pir 556 mbps conform transmit exceed transmit violate transmit.
(config-pmap-c-qos)#end	Exit out of policy-class-map mode
#configure terminal	Enter inside configure mode
(config)#interface xe29	Enter interface mode
(config-if)#service-policy type qos input pmap	Assign service-policy to interface on in-direction
(config-if)#exit	Exit interface mode
(config)#policy-map type queuing default xyz	Enter policy-map queuing mode
(config-pmap-que-def)#class type queuing default q3	Enter class-map type queuing
(config-pmap-c-que-def)#shape percent 80	Configure shape percent 80 in q3
(config-pmap-c-que-def)# random-detect min-threshold 100 max-threshold 200 packets ecn	Configure ECN with Random Early Detection which includes minimum and maximum threshold in packets

#configure terminal	Enter configure mode
(config)#interface xe30	Enter interface mode
(config-if)#service-policy type queuing output xyz	Attach policy on egress interface
(config-if)#exit	Exit configure mode

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
Router#show policy-map interface xe30
Interface xe30
Global statistics status : enabled
Service-policy (queuing) output: xyz
-----
Class-map (queuing): q0
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q1
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q2
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q3
  shape percent 80
  priority level 1
  random-detect min-threshold 100 max-threshold 200 packets ecn
    output      : 44808 packets, 67210500 bytes
    dropped     : 10516 packets, 15774000 bytes
Class-map (queuing): q4
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q5
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q6
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q7
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
```

```

        dropped      : 0 packets, 0 bytes
Class-map (queuing): mc-q2
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
Class-map (queuing): mc-q3
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
Class-map (queuing): mc-q4
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
Class-map (queuing): mc-q5
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
Class-map (queuing): mc-q6
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
Class-map (queuing): mc-q7
    output          : 0 packets, 0 bytes
    dropped         : 0 packets, 0 bytes
Wred Drop Statistics:
green  : 0 packets
yellow : 0 packets
red    : 0 packets

```

## Topology



Figure 22-23: Simple configuration of ECN

## Configuring ECN on L2 Interface

Do the following to configure ECN on an L2 interface.

#configure terminal	Enter inside configure mode
(config)#bridge 1 protocol mstp	Configure bridge 1 as MSTP aware
(config)#interface xe29	Enter interface mode
(config-if)#switchport	Configure xe29 as a layer 2 port
(config-if)#bridge-group 1	Associate bridge to an interface
(config-if)#switchport mode trunk	Configure port as trunk
(config-if)#switchport trunk allowed vlan all	Allow all the vlan on the interface xe29
(config-if)#exit	Exit the xe29 interface mode
(config)#interface xe30	Enter interface mode

(config-if)#switchport	Configure xe30 as a layer 2 port
(config-if)#bridge-group 1	Associate bridge to an interface
(config-if)#switchport mode trunk	Configure port as trunk
(config-if)#switchport trunk allowed vlan all	Allow all the vlan on the interface xe30
(config-if)#exit	Exit the xe30 interface mode
(config)#qos enable	Enable QoS on configuration mode
(config)#qos statistics	Enable QoS statistics on configuration mode
(config)#class-map match-any cmap	Enter Class-map mode
(cmap-qos-match-any-mode)#match precedence 3	Configure match criteria as precedence with Value 3
(config-pmap-qos)#policy-map pmap	Enter policy-map mode
(config-pmap-qos)#class cmap	Assign Class cmap to Policy-map pmap
(config-pmap-c-qos)# police cir 328 mbps pir 556 mbps conform transmit exceed transmit violate transmit	Police Precedence 3 frames @ Committed information rate of 328 mbps and pir 556 mbps conform transmit exceed transmit violate transmit.
(config-pmap-c-qos)#end	Exit out of policy-class-map mode
#configure terminal	Enter inside configure mode
(config)#interface xe29	Enter interface mode
(config-if)#trust dscp	Configure trust DSCP on the interface xe29
(config-if)#service-policy type qos input pmap	Assign service-policy to interface on in-direction
(config-if)#exit	Exit interface mode
(config)#policy-map type queuing default xyz	Enter policy-map queuing mode
(config-pmap-que-def)#class type queuing default q3	Enter class-map type queuing
(config-pmap-c-que-def)#shape average 900 mbps	Configure shape average 900 in q3
(config-pmap-c-que-def)#random-detect green 1000 2000 yellow 3000 4000 red 5000 6000 bytes ecn	Configure ECN with Random Early Detection which includes minimum and maximum threshold for green, yellow and red packets
(config-pmap-c-que-def)#end	Exit pmap mode
#configure terminal	Enter configure mode
(config)#interface xe30	Enter interface mode
(config-if)#service-policy type queuing output xyz	Attach policy on egress interface
(config-if)#exit	Exit configure mode

## Validation

Enter the commands listed in the sections below to confirm the configurations.

```
Router#show policy-map interface xe30
Interface xe30
Global statistics status : enabled
Service-policy (queuing) output: xyz
-----
Class-map (queuing) : q0
```

```
priority level 1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): q1
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q2
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q3
  shape average 900 mbps
  priority level 1
    random-detect green min-threshold 1000 max-threshold 2000 yellow minimum-threshold 3000 max-threshold 4000 red min-threshold 5000 maximum-threshold 6000 bytes ecn
    output      : 308318 packets, 462477000 bytes
    dropped     : 29774 packets, 44661000 bytes
Class-map (queuing): q4
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q5
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q6
  priority level 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): q7
  priority level 1
    output      : 3 packets, 369 bytes
    dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```



---

```
Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
Wred Drop Statistics :
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
```

---

## CHAPTER 23 Dynamic ECN Marking

---

---

### Overview

The existing ECN functionality is enhanced to support dynamic ECN (D-ECN) that allows more precise ECN marking based on shared buffer usage.

---

### Feature Characteristics

In Dynamic ECN, a dynamic threshold is used to allow more precise ECN marking by taking into account actual shared buffer usage. Typically, a D-ECN threshold value is based on D-ECN-Offset and D-ECN-Floor values.

D-ECN Threshold = (Queue's shared limit - D-ECN-Floor) - D-ECN-Offset, where

- D-ECN-Offset (D-ECN on-offset - Once queue size reached this offset, ECN is marked.)
- D-ECN-Floor (D-ECN off-offset - Once the queue size reaches this offset, ECN marking is stopped.)

While off-offset likely provides hysteresis (a threshold to stop marking). The off-offset, used in conjunction with the on-offset (a threshold for ECN marking), provides hysteresis for D-ECN marking. It determines the point (likely calculated as Queue's shared limit – off-offset) below which the queue's shared buffer usage must fall for the device to stop marking packets with ECN for that queue, after having started marking due to crossing the on-offset threshold.

This mechanism prevents rapid oscillation between marking and not marking when the queue usage hovers near the activation threshold, contributing to more stable congestion signaling.

Both Static ECN (S-ECN) and Dynamic ECN (D-ECN) can be enabled simultaneously, with the final ECN marking determined by a logical OR operation between the two.

Limitation:

This functionality is supported on Broadcom Tomahawk5 platforms only.

More than 3 D-ECN user defined profiles cannot be created.

---

### Benefits

This enhancement provides the following capabilities for AI/ML networking environment where lossless traffic is crucial:

- Controls congestion through tunable threshold values
- Provides more accurate ECN marking aligned with buffer usage
- Improves stability and performance for high-throughput

---

### Prerequisites

Ensure baseline QoS is enabled and potentially Static ECN via WRED is configured in an applied policy map.

## Configuring Dynamic ECN

### Topology

The following topology shows ECN Marked packets on the egress interfaces xe1 of Switch 1.

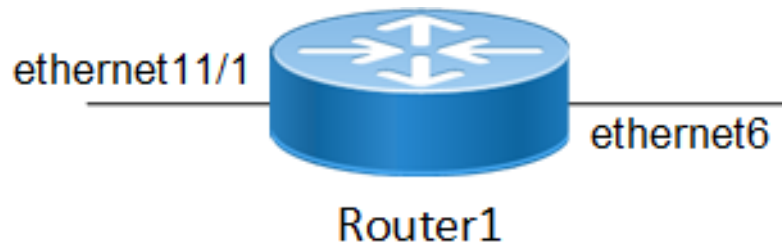


Figure 23-24: ECN Enabled Bridge

### Configuration

The following procedure defines a QoS profile with specific queue offsets, applying it to an interface, and validating its behavior under different traffic conditions.

1. Create a global D-ECN profile and define queue mapping .

```
OcNOS(config)#qos profile egress-dynamic-ecn DECN
OcNOS(config-eg-dynamic-ecn-map)#queue 0 on-offset 4000 off-offset 1000 kbytes
OcNOS(config-eg-dynamic-ecn-map)#queue 1 on-offset 5000000 off-offset 2000000
bytes
OcNOS(config-eg-dynamic-ecn-map)#queue 2 on-offset 4000 off-offset 5000 kbytes
OcNOS(config-eg-dynamic-ecn-map)#queue 3 on-offset 5000000 off-offset 6000000
bytes
OcNOS(config-eg-dynamic-ecn-map)#queue 4 on-offset 5000 off-offset 10000 kbytes
OcNOS(config-eg-dynamic-ecn-map)# queue 5 on-offset 3000000 off-offset 12000000
bytes
OcNOS(config-eg-dynamic-ecn-map)#commit
OcNOS(config-eg-dynamic-ecn-map)#exit
```

2. Assign the D-ECN profile to an interface.

```
OcNOS(config)#interface ethernet11/1
OcNOS(config-if)#load-interval 30
OcNOS(config-if)#ip address 20.1.1.1/24
OcNOS(config-if)#mtu 9216
OcNOS(config-if)#shape rate 9803 mbps burst 1000
OcNOS(config-if)#qos map-profile egress-dynamic-ecn DECN
OcNOS(config-if)#commit
OcNOS(config-if)#exit
```

### Sample Show Running Configuration

!

```
service password-encryption
!
logging console 5
logging level all 5
!
!
snmp-server enable traps link linkDown
snmp-server enable traps link linkUp
!
qos enable
qos statistics
qos profile egress-dynamic-ecn DECN
  queue 0 on-offset 4000 off-offset 1000 kbytes
  queue 1 on-offset 5000000 off-offset 2000000 bytes
  queue 2 on-offset 4000 off-offset 5000 kbytes
  queue 3 on-offset 5000000 off-offset 6000000 bytes
  queue 4 on-offset 5000 off-offset 10000 kbytes
  queue 5 on-offset 3000000 off-offset 12000000 bytes
!
hostname DUT1
port ethernet3 breakout 1X100g serdes 25g
port ethernet11 breakout 1X100g serdes 25g
tfo Disable
errdisable cause stp-bpdu-guard
feature dns relay
ip dns relay
ipv6 dns relay
!
vlan database
  vlan-reservation 4029-4094
!
ip vrf management
!
interface eth0
  ip vrf forwarding management
  ip address dhcp
!
interface ethernet0
!
interface ethernet1
!
interface ethernet2
!
interface ethernet3/1
  description Connected-Spirent
  load-interval 30
  ip address 10.1.1.1/24
  mtu 9216
!
interface ethernet10
```

```

!
interface ethernet11/1
  description Connected-DUT2
  load-interval 30
  ip address 20.1.1.1/24
  mtu 9216
  shape rate 9803 mbps burst 1000
  qos map-profile egress-dynamic-ecn DECN
!
interface ethernet12
!
interface ethernet63
!
interface lo
  ip address 127.0.0.1/8
  ip address 1.1.1.1/32 secondary
  ipv6 address ::1/128
!
interface lo.management
  ip vrf forwarding management
  ip address 127.0.0.1/8
  ipv6 address ::1/128
!
interface mgmt64
!
interface mgmt65
!
  exit
!
router ospf 100
  ospf router-id 1.1.1.1
  network 1.1.1.1/32 area 0.0.0.0
  network 10.1.1.0/24 area 0.0.0.0
  network 20.1.1.0/24 area 0.0.0.0
!
line console 0
  exec-timeout 0 0
!
!
end
!

```

---

## Validation

Confirm that the D-ECN profile `DECN` has been created with the intended on-offset and off-offset values for specific queues.

```

#show qos-profile egress-dynamic-ecn interface ethernet11/1
profile name: DECN
  mapping:

```

```

queue 0 on-offset 4000 off-offset 1000 kbytes
queue 1 on-offset 5000000 off-offset 2000000 bytes
queue 2 on-offset 4000 off-offset 5000 kbytes
queue 3 on-offset 5000000 off-offset 6000000 bytes
queue 4 on-offset 5000 off-offset 10000 kbytes
queue 5 on-offset 3000000 off-offset 12000000 bytes

```

### Scenario 1: Traffic Sent with Priority 0

In this scenario, traffic is sent with Priority 0, which maps to Queue 0 of the DECN profile. The queue parameters for Queue 0 are: on-offset 4000 kbytes and off-offset 1000 kbytes. The on-offset (4 MB) is greater than the off-offset (1 MB).

Repeatedly execute the following show command during congestion. Focus on the Q-Size (current queue depth in bytes) for the relevant egress queues (q0(E)).

```

DUT1#sh int counters rate mbps
+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+-----+
| ethernet3/1 | 361.48 | 45185 | 0.00 | 0 |
| ethernet11/1 | 0.00 | 0 | 361.44 | 45179 |
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
| cpu | ipmc-reserved | (E) 0 | 16 | 1408 | 0 | 0 |
| cpu | ospf | (E) 0 | 8 | 720 | 0 | 0 |
| cpu | arp | (E) 0 | 1 | 86 | 0 | 0 |
| ethernet3/1 | mc-q3 | (E) 0 | 8 | 656 | 0 | 0 |
| ethernet3/1 | pg-q0 | (I) 467868 | NA | NA | NA | NA |
| ethernet11/1 | q0 | (E) 473710 | 5202206 | 5202206000 | 0 | 0 |
| ethernet11/1 | mc-q3 | (E) 0 | 9 | 770 | 0 | 0 |
DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
| cpu | ipmc-reserved | (E) 0 | 16 | 1408 | 0 | 0 |
| cpu | ospf | (E) 0 | 8 | 720 | 0 | 0 |
| cpu | arp | (E) 0 | 1 | 86 | 0 | 0 |
| ethernet3/1 | mc-q3 | (E) 0 | 8 | 656 | 0 | 0 |
| ethernet3/1 | pg-q0 | (I) 608584 | NA | NA | NA | NA |
| ethernet11/1 | q0 | (E) 610870 | 6318910 | 6318910000 | 0 | 0 |
| ethernet11/1 | mc-q3 | (E) 0 | 9 | 770 | 0 | 0 |
DUT1#
DUT1#
DUT1#show int counters ecn

```

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      16      1408      0      0
cpu      ospf          (E) 0      8       720      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3        (E) 0      8       656      0      0
ethernet3/1 pg-q0        (I) 692404  NA      NA      NA      NA
ethernet11/1 q0          (E) 698500  7033136  7033136000 0      0
ethernet11/1 mc-q3        (E) 0      9       770      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      16      1408      0      0
cpu      ospf          (E) 0      8       720      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3        (E) 0      8       656      0      0
ethernet3/1 pg-q0        (I) 763778  NA      NA      NA      NA
ethernet11/1 q0          (E) 779780  7681954  7681954000 0      0
ethernet11/1 mc-q3        (E) 0      9       770      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      16      1408      0      0
cpu      ospf          (E) 0      8       720      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3        (E) 0      8       656      0      0
ethernet3/1 pg-q0        (I) 832358  NA      NA      NA      NA
ethernet11/1 q0          (E) 840740  8170203  8170203000 0      0
ethernet11/1 mc-q3        (E) 0      9       770      0      0

DUT1#
DUT1#
DUT1#show int counters ecn

```

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      16      1408      0      0
cpu      ospf          (E) 0      8       720      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3        (E) 0      8       656      0      0
ethernet3/1 pg-q0        (I) 900176   NA      NA      NA      NA
ethernet11/1 q0          (E) 908050   8718274  8718274000 0      0
ethernet11/1 mc-q3      (E) 0      9       770      0      0

DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      20      1760      0      0
cpu      ospf          (E) 0      10      900      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3        (E) 0      10      820      0      0
ethernet3/1 pg-q0        (I) 3228848  NA      NA      NA      NA
ethernet11/1 q0          (E) 3235960 27728891 27728891000 0      0
ethernet11/1 mc-q3      (E) 0      11      942      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      20      1760      0      0
cpu      ospf          (E) 0      10      900      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3        (E) 0      10      820      0      0
ethernet3/1 pg-q0        (I) 3282188  NA      NA      NA      NA
ethernet11/1 q0          (E) 3288030 28162978 28162978000 0      0
ethernet11/1 mc-q3      (E) 0      11      942      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes

```



```

* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      20      1760      0      0
cpu      ospf          (E) 0      10      900       0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3          (E) 0      10      820       0      0
ethernet3/1 pg-q0          (I) 3336798 NA      NA      NA      NA
ethernet11/1 q0           (E) 3347720 28633276 28633276000 0      0
ethernet11/1 mc-q3          (E) 0      11      942       0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      20      1760      0      0
cpu      ospf          (E) 0      10      900       0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3          (E) 0      10      820       0      0
ethernet3/1 pg-q0          (I) 3393948 NA      NA      NA      NA
ethernet11/1 q0           (E) 3401060 29064737 29064737000 0      0
ethernet11/1 mc-q3          (E) 0      11      942       0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0      20      1760      0      0
cpu      ospf          (E) 0      10      900       0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3          (E) 0      10      820       0      0
ethernet3/1 pg-q0          (I) 3459988 NA      NA      NA      NA
ethernet11/1 q0           (E) 3470910 29632387 29632387000 0      0
ethernet11/1 mc-q3          (E) 0      11      942       0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes

```

```

* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    20      1760     0         0
cpu      ospf         (E) 0    10      900      0         0
cpu      arp          (E) 0     1      86       0         0
ethernet3/1 mc-q3        (E) 0    10      820      0         0
ethernet3/1 pg-q0        (I) 3517138 NA      NA      NA
ethernet11/1 q0          (E) 3524250 30073593 30073593000 0         0
ethernet11/1 mc-q3        (E) 0    11      942      0         0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+

```

DUT1#

DDUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    20      1760     0         0
cpu      ospf         (E) 0    10      900      0         0
cpu      arp          (E) 0     1      86       0         0
ethernet3/1 mc-q3        (E) 0    10      820      0         0
ethernet3/1 pg-q0        (I) 3790188 NA      NA      NA
ethernet11/1 q0          (E) 3793490 32290068 32290068000 0         0
ethernet11/1 mc-q3        (E) 0    11      942      0         0

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    22      1936     0         0
cpu      ospf         (E) 0    11      990      0         0
cpu      arp          (E) 0     1      86       0         0
ethernet3/1 mc-q3        (E) 0    11      902      0         0
ethernet3/1 pg-q0        (I) 4348734 NA      NA      NA
ethernet11/1 q0          (E) 4359910 36885616 36885616000 0         0
ethernet11/1 mc-q3        (E) 0    12      1028     0         0

```

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+

```

```

+-----+-----+-----+-----+-----+-----+
+-----+
cpu          ipmc-reserved      (E) 0          22          1936          0          0
cpu          ospf                (E) 0          11          990          0          0
cpu          arp                 (E) 0          1           86          0          0
ethernet3/1  mc-q3              (E) 0          11          902          0          0
ethernet3/1  pg-q0              (I) 5300218     NA          NA          NA          NA
ethernet11/1 q0                (E) 5304790    44630757    44630757000  0          0
ethernet11/1 mc-q3              (E) 0          12          1028         0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1    603080

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved      (E) 0          22          1936          0          0
cpu          ospf                (E) 0          11          990          0          0
cpu          arp                 (E) 0          1           86          0          0
ethernet3/1  mc-q3              (E) 0          11          902          0          0
ethernet3/1  pg-q0              (I) 5351018     NA          NA          NA          NA
ethernet11/1 q0                (E) 5354320     45028376    45028376000  0          0
ethernet11/1 mc-q3              (E) 0          12          1028         0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1    603080

```

DUT1#

The ECN bit starts marking from the 5.3MB.

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved      (E) 0          22          1936          0          0
cpu          ospf                (E) 0          11          990          0          0
cpu          arp                 (E) 0          1           86          0          0
ethernet3/1  mc-q3              (E) 0          11          902          0          0
ethernet3/1  pg-q0              (I) 5391658     NA          NA          NA          NA
ethernet11/1 q0                (E) 5401310     45408708    45408708000  0          0
ethernet11/1 mc-q3              (E) 0          12          1028         0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1    603080

```

DUT1#

```

DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    22      1936    0        0
cpu      ospf        (E) 0    11      990     0        0
cpu      arp         (E) 0    1       86      0        0
ethernet3/1 mc-q3        (E) 0    11      902     0        0
ethernet3/1 pg-q0        (I) 5442458 NA      NA      NA      NA
ethernet11/1 q0          (E) 5449570 45787987 45787987000 0        0
ethernet11/1 mc-q3        (E) 0    12      1028    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 603080

DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    23      2026    0        0
cpu      ospf        (E) 0    11      990     0        0
cpu      arp         (E) 0    1       86      0        0
ethernet3/1 mc-q3        (E) 0    11      902     0        0
ethernet3/1 pg-q0        (I) 5505958 NA      NA      NA      NA
ethernet11/1 q0          (E) 5510530 46295155 46295155000 0        0
ethernet11/1 mc-q3        (E) 0    13      1114    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 1827063

DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    24      2112    0        0
cpu      ospf        (E) 0    12      1080    0        0
cpu      arp         (E) 0    1       86      0        0
ethernet3/1 mc-q3        (E) 0    12      984     0        0
ethernet3/1 pg-q0        (I) 6615938 NA      NA      NA      NA
ethernet11/1 q0          (E) 6621780 55374545 55374545000 0        0
ethernet11/1 mc-q3        (E) 0    13      1114    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+

```

```

+-----+
 ethernet11/1      10407354
 DUT1#
 DUT1#
 DUT1#show int counters queue-stats
 E - Egress, I - Ingress, Q-Size is in bytes
 * indicates monitor is active
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+
cpu      ipmc-reserved (E) 0      24      2112      0      0
cpu      ospf          (E) 0      12      1080      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3      (E) 0      12      984       0      0
ethernet3/1 pg-q0      (I) 6693154 NA      NA      NA      NA
ethernet11/1 q0        (E) 6708140 56038518 56038518000 0      0
ethernet11/1 mc-q3      (E) 0      13      1114      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface | ECN marked packets |
+-----+
 ethernet11/1      11632937
 DUT1#
 DUT1#
 DUT1#show int counters queue-stats
 E - Egress, I - Ingress, Q-Size is in bytes
 * indicates monitor is active
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+
cpu      ipmc-reserved (E) 0      24      2112      0      0
cpu      ospf          (E) 0      12      1080      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3      (E) 0      12      984       0      0
ethernet3/1 pg-q0      (I) 6774688 NA      NA      NA      NA
ethernet11/1 q0        (E) 6784340 56662700 56662700000 0      0
ethernet11/1 mc-q3      (E) 0      13      1114      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface | ECN marked packets |
+-----+
 ethernet11/1      11632937
 DUT1#
 DUT1#
 DUT1#show int counters queue-stats
 E - Egress, I - Ingress, Q-Size is in bytes
 * indicates monitor is active
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+
cpu      ipmc-reserved (E) 0      25      2202      0      0
cpu      ospf          (E) 0      12      1080      0      0
cpu      arp           (E) 0      1       86       0      0
ethernet3/1 mc-q3      (E) 0      12      984       0      0
ethernet3/1 pg-q0      (I) 6839458 NA      NA      NA      NA
ethernet11/1 q0        (E) 6846570 57222674 57222674000 0      0
ethernet11/1 mc-q3      (E) 0      14      1200      0      0

DUT1#
DUT1#

```

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
 ethernet11/1    12858460

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0   25      2202     0          0
cpu          ospf          (E) 0   12      1080     0          0
cpu          arp           (E) 0   1        86       0          0
ethernet3/1  mc-q3          (E) 0   12      984      0          0
ethernet3/1  pg-q0          (I) 6901688 NA      NA        NA        NA
ethernet11/1 q0             (E) 6915150 57730055 57730055000 0          0
ethernet11/1 mc-q3          (E) 0   14      1200     0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
 ethernet11/1    12858460

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0   25      2202     0          0
cpu          ospf          (E) 0   12      1080     0          0
cpu          arp           (E) 0   1        86       0          0
ethernet3/1  mc-q3          (E) 0   12      984      0          0
ethernet3/1  pg-q0          (I) 6974078 NA      NA        NA        NA
ethernet11/1 q0             (E) 6982460 58293625 58293625000 0          0
ethernet11/1 mc-q3          (E) 0   14      1200     0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
 ethernet11/1    14082242

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0   25      2202     0          0
cpu          ospf          (E) 0   12      1080     0          0
cpu          arp           (E) 0   1        86       0          0
ethernet3/1  mc-q3          (E) 0   12      984      0          0
ethernet3/1  pg-q0          (I) 7031228 NA      NA        NA        NA
ethernet11/1 q0             (E) 7038340 58777958 58777958000 0          0
ethernet11/1 mc-q3          (E) 0   14      1200     0          0

```

```

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface | ECN marked packets |
+-----+
 ethernet11/1      14082242
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved (E) 0      26      2332      0      0
cpu      ospf        (E) 0      13      1170      0      0
cpu      arp         (E) 0      1       86       0      0
ethernet3/1 mc-q3      (E) 0      12      984       0      0
ethernet3/1 pg-q0      (I) 7168134 NA      NA      NA
ethernet11/1 q0        (E) 7172960 59864594 59864594000 0      0
ethernet11/1 mc-q3      (E) 0      15      1326      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface | ECN marked packets |
+-----+
 ethernet11/1      15309267
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved (E) 0      26      2332      0      0
cpu      ospf        (E) 0      14      1256      0      0
cpu      arp         (E) 0      1       86       0      0
ethernet3/1 mc-q3      (E) 0      12      984       0      0
ethernet3/1 pg-q0      (I) 7301738 NA      NA      NA
ethernet11/1 q0        (E) 7315200 60991052 60991052000 0      0
ethernet11/1 mc-q3      (E) 0      15      1326      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface | ECN marked packets |
+-----+
 ethernet11/1      16534053
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved (E) 0      27      2418      0      0
cpu      ospf        (E) 0      14      1256      0      0
cpu      arp         (E) 0      1       86       0      0
ethernet3/1 mc-q3      (E) 0      13      1066      0      0

```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
ethernet3/1	pg-q0	(I) 7516368	NA	NA	NA	NA
ethernet11/1	q0	(E) 7523480	62728932	62728932000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      17760196

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped bytes |
+-----+-----+-----+-----+-----+-----+
cpu        ipmc-reserved (E) 0    27      2418    0        0
cpu        ospf         (E) 0    14      1256    0        0
cpu        arp          (E) 0    1       86     0        0
ethernet3/1 mc-q3       (E) 0    13      1066    0        0
ethernet3/1 pg-q0       (I) 7584948 NA      NA      NA      NA
ethernet11/1 q0        (E) 7589520 63277600 63277600000 0        0
ethernet11/1 mc-q3      (E) 0    15      1326    0        0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      18984683

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped bytes |
+-----+-----+-----+-----+-----+-----+
cpu        ipmc-reserved (E) 0    27      2418    0        0
cpu        ospf         (E) 0    14      1256    0        0
cpu        arp          (E) 0    1       86     0        0
ethernet3/1 mc-q3       (E) 0    13      1066    0        0
ethernet3/1 pg-q0       (I) 7638288 NA      NA      NA      NA
ethernet11/1 q0        (E) 7646670 63732680 63732680000 0        0
ethernet11/1 mc-q3      (E) 0    15      1326    0        0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      18984683

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped bytes |
+-----+-----+-----+-----+-----+-----+
cpu        ipmc-reserved (E) 0    27      2418    0        0

```



```

cpu                ospf                (E) 0                14                1256                0                0
cpu                arp                  (E) 0                1                 86                 0                0
ethernet3/1        mc-q3                (E) 0                13                1066                0                0
ethernet3/1        pg-q0                (I) 7704328          NA                 NA                 NA                 NA
ethernet11/1       q0                  (E) 7717790          64291138          64291138000        0                0
ethernet11/1       mc-q3                (E) 0                15                1326                0                0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      20210552
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu            ipmc-reserved    (E) 0      27        2418      0          0
cpu            ospf          (E) 0      14        1256      0          0
cpu            arp           (E) 0      1         86        0          0
ethernet3/1    mc-q3          (E) 0      13        1066      0          0
ethernet3/1    pg-q0          (I) 7763764 NA         NA         NA         NA
ethernet11/1   q0             (E) 7777480 64755857  64755857000 0          0
ethernet11/1   mc-q3          (E) 0      15        1326      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      20210552
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu            ipmc-reserved    (E) 0      27        2418      0          0
cpu            ospf          (E) 0      14        1256      0          0
cpu            arp           (E) 0      1         86        0          0
ethernet3/1    mc-q3          (E) 0      13        1066      0          0
ethernet3/1    pg-q0          (I) 7820914 NA         NA         NA         NA
ethernet11/1   q0             (E) 7825740 65194300  65194300000 0          0
ethernet11/1   mc-q3          (E) 0      15        1326      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      20210552
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+

```

```

+-----+-----+-----+-----+-----+-----+
+-----+
cpu          ipmc-reserved      (E) 0          27          2418          0          0
cpu          ospf                (E) 0          14          1256          0          0
cpu          arp                 (E) 0          1           86           0          0
ethernet3/1  mc-q3              (E) 0          13          1066          0          0
ethernet3/1  pg-q0              (I) 7898384     NA           NA           NA          NA
ethernet11/1 q0                (E) 7901940     65814692     65814692000  0          0
ethernet11/1 mc-q3              (E) 0          15          1326          0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 21436610

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved      (E) 0          27          2418          0          0
cpu          ospf                (E) 0          14          1256          0          0
cpu          arp                 (E) 0          1           86           0          0
ethernet3/1  mc-q3              (E) 0          13          1066          0          0
ethernet3/1  pg-q0              (I) 7945374     NA           NA           NA          NA
ethernet11/1 q0                (E) 7954010     66207808     66207808000  0          0
ethernet11/1 mc-q3              (E) 0          15          1326          0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 21436610

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved      (E) 0          27          2418          0          0
cpu          ospf                (E) 0          14          1256          0          0
cpu          arp                 (E) 0          1           86           0          0
ethernet3/1  mc-q3              (E) 0          13          1066          0          0
ethernet3/1  pg-q0              (I) 7992364     NA           NA           NA          NA
ethernet11/1 q0                (E) 7994650     66590690     66590690000  0          0
ethernet11/1 mc-q3              (E) 0          15          1326          0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 21436610

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	ipmc-reserved	(E) 0	27	2418	0	0
cpu	ospf	(E) 0	14	1256	0	0
cpu	arp	(E) 0	1	86	0	0
ethernet3/1	mc-q3	(E) 0	13	1066	0	0
ethernet3/1	pg-q0	(I) 8048244	NA	NA	NA	NA
ethernet11/1	q0	(E) 8055610	67053443	67053443000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	22662866

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	ipmc-reserved	(E) 0	27	2418	0	0
cpu	ospf	(E) 0	14	1256	0	0
cpu	arp	(E) 0	1	86	0	0
ethernet3/1	mc-q3	(E) 0	13	1066	0	0
ethernet3/1	pg-q0	(I) 8105394	NA	NA	NA	NA
ethernet11/1	q0	(E) 8112760	67505535	67505535000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	22662866

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	ipmc-reserved	(E) 0	27	2418	0	0
cpu	ospf	(E) 0	14	1256	0	0
cpu	arp	(E) 0	1	86	0	0
ethernet3/1	mc-q3	(E) 0	13	1066	0	0
ethernet3/1	pg-q0	(I) 8163814	NA	NA	NA	NA
ethernet11/1	q0	(E) 8171180	68021380	68021380000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	23887051

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	27	2418	0	0
cpu	ospf	(E) 0	14	1256	0	0
cpu	arp	(E) 0	1	86	0	0
ethernet3/1	mc-q3	(E) 0	13	1066	0	0
ethernet3/1	pg-q0	(I) 8238744	NA	NA	NA	NA
ethernet11/1	q0	(E) 8244840	68610470	68610470000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	23887051

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	27	2418	0	0
cpu	ospf	(E) 0	14	1256	0	0
cpu	arp	(E) 0	1	86	0	0
ethernet3/1	mc-q3	(E) 0	13	1066	0	0
ethernet3/1	pg-q0	(I) 8358124	NA	NA	NA	NA
ethernet11/1	q0	(E) 8370570	69596225	69596225000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	25112001

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	27	2418	0	0
cpu	ospf	(E) 0	15	1346	0	0
cpu	arp	(E) 0	1	86	0	0
ethernet3/1	mc-q3	(E) 0	13	1066	0	0
ethernet3/1	pg-q0	(I) 8407654	NA	NA	NA	NA
ethernet11/1	q0	(E) 8411210	69969844	69969844000	0	0
ethernet11/1	mc-q3	(E) 0	15	1326	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
-----------	--------------------

```

ethernet11/1      25112001
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0   27      2418    0        0
cpu      ospf         (E) 0   15      1346    0        0
cpu      arp          (E) 0   1        86      0        0
ethernet3/1 mc-q3       (E) 0   13      1066    0        0
ethernet3/1 pg-q0      (I) 8454644 NA      NA      NA      NA
ethernet11/1 q0        (E) 8463280 70368735 70368735000 0        0
ethernet11/1 mc-q3     (E) 0   15      1326    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      26338023
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0   28      2508    0        0
cpu      ospf         (E) 0   15      1346    0        0
cpu      arp          (E) 0   1        86      0        0
ethernet3/1 mc-q3       (E) 0   13      1066    0        0
ethernet3/1 pg-q0      (I) 8504174 NA      NA      NA      NA
ethernet11/1 q0        (E) 8507730 70765972 70765972000 0        0
ethernet11/1 mc-q3     (E) 0   16      1412    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      26338023
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0   28      2508    0        0
cpu      ospf         (E) 0   15      1346    0        0
cpu      arp          (E) 0   1        86      0        0
ethernet3/1 mc-q3       (E) 0   13      1066    0        0
ethernet3/1 pg-q0      (I) 8551164 NA      NA      NA      NA
ethernet11/1 q0        (E) 8555990 71144368 71144368000 0        0
ethernet11/1 mc-q3     (E) 0   16      1412    0        0

DUT1#
DUT1#
DUT1#show int counters ecn

```

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      26338023
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved      (E) 0      28      2508      0      0
cpu      ospf                (E) 0      15      1346      0      0
cpu      arp                  (E) 0      1      86      0      0
ethernet3/1  mc-q3            (E) 0      13      1066      0      0
ethernet3/1  pg-q0            (I) 8597646      NA      NA      NA      NA
ethernet11/1  q0              (E) 8602980      71547781      71547781000      0      0
ethernet11/1  mc-q3            (E) 0      16      1412      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      27563934
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved      (E) 0      28      2508      0      0
cpu      ospf                (E) 0      15      1346      0      0
cpu      arp                  (E) 0      1      86      0      0
ethernet3/1  mc-q3            (E) 0      13      1066      0      0
ethernet3/1  pg-q0            (I) 8652764      NA      NA      NA      NA
ethernet11/1  q0              (E) 8665210      71997342      71997342000      0      0
ethernet11/1  mc-q3            (E) 0      16      1412      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      27563934
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved      (E) 0      28      2508      0      0
cpu      ospf                (E) 0      15      1346      0      0
cpu      arp                  (E) 0      1      86      0      0
ethernet3/1  mc-q3            (E) 0      13      1066      0      0
ethernet3/1  pg-q0            (I) 8709914      NA      NA      NA      NA
ethernet11/1  q0              (E) 8718550      72468888      72468888000      0      0
ethernet11/1  mc-q3            (E) 0      16      1412      0      0

```

```

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
| ethernet11/1    | 27563934            |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
| cpu            | ipmc-reserved      | (E) 0  | 28       | 2508     | 0             | 0
| cpu            | ospf               | (E) 0  | 15       | 1346     | 0             | 0
| cpu            | arp                | (E) 0  | 1        | 86       | 0             | 0
| ethernet3/1    | mc-q3              | (E) 0  | 14       | 1148     | 0             | 0
| ethernet3/1    | pg-q0              | (I) 8772398 | NA      | NA       | NA            | NA
| ethernet11/1   | q0                 | (E) 8778240 | 72952445 | 72952445000 | 0             | 0
| ethernet11/1   | mc-q3              | (E) 0  | 16       | 1412     | 0             | 0
+-----+-----+-----+-----+-----+-----+

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
| ethernet11/1    | 28788659            |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
| cpu            | ipmc-reserved      | (E) 0  | 29       | 2594     | 0             | 0
| cpu            | ospf               | (E) 0  | 15       | 1346     | 0             | 0
| cpu            | arp                | (E) 0  | 1        | 86       | 0             | 0
| ethernet3/1    | mc-q3              | (E) 0  | 14       | 1148     | 0             | 0
| ethernet3/1    | pg-q0              | (I) 8821674 | NA      | NA       | NA            | NA
| ethernet11/1   | q0                 | (E) 8829040 | 73375762 | 73375762000 | 0             | 0
| ethernet11/1   | mc-q3              | (E) 0  | 16       | 1412     | 0             | 0
+-----+-----+-----+-----+-----+-----+

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
| ethernet11/1    | 28788659            |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
| cpu            | ipmc-reserved      | (E) 0  | 29       | 2594     | 0             | 0
| cpu            | ospf               | (E) 0  | 15       | 1346     | 0             | 0
| cpu            | arp                | (E) 0  | 1        | 86       | 0             | 0
| ethernet3/1    | mc-q3              | (E) 0  | 14       | 1148     | 0             | 0
| ethernet3/1    | pg-q0              | (I) 8896604 | NA      | NA       | NA            | NA
+-----+-----+-----+-----+-----+-----+

```

```

ethernet11/1      q0      (E) 8900160      73998715      73998715000      0      0
ethernet11/1      mc-q3    (E) 0      16      1412      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface      | ECN marked packets |
+-----+
ethernet11/1      28788659
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts    | Tx bytes    | Dropped pkts | Dropped
bytes |
+-----+
cpu              ipmc-reserved    (E) 0      29          2594        0           0
cpu              ospf              (E) 0      15          1346        0           0
cpu              arp                (E) 0      2           172         0           0
ethernet3/1      mc-q3              (E) 0      15          1230        0           0
ethernet3/1      pg-q0              (I) 8902954 NA          NA           NA           NA
ethernet11/1     q0                 (E) 8905240 74383033    74383033000 32           32000
ethernet11/1     mc-q3              (E) 0      16          1412        0           0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface      | ECN marked packets |
+-----+
ethernet11/1      30014796
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts    | Tx bytes    | Dropped pkts | Dropped
bytes |
+-----+
cpu              ipmc-reserved    (E) 0      29          2594        0           0
cpu              ospf              (E) 0      15          1346        0           0
cpu              arp                (E) 0      2           172         0           0
ethernet3/1      mc-q3              (E) 0      15          1230        0           0
ethernet3/1      pg-q0              (I) 8901684 NA          NA           NA           NA
ethernet11/1     q0                 (E) 8906510 74780865    74780865000 32           32000
ethernet11/1     mc-q3              (E) 0      16          1412        0           0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface      | ECN marked packets |
+-----+
ethernet11/1      30014796
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts    | Tx bytes    | Dropped pkts | Dropped
bytes |
+-----+
cpu              ipmc-reserved    (E) 0      29          2594        0           0
cpu              ospf              (E) 0      15          1346        0           0

```



cpu	arp	(E) 0	2	172	0	0
ethernet3/1	mc-q3	(E) 0	15	1230	0	0
ethernet3/1	pg-q0	(I) 8901684	NA	NA	NA	NA
ethernet11/1	q0	(E) 8906510	75327220	75327220000	32	32000
ethernet11/1	mc-q3	(E) 0	16	1412	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      31238517

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0   29      2594     0          0
cpu          ospf              (E) 0   15      1346     0          0
cpu          arp                (E) 0    2       172      0          0
ethernet3/1   mc-q3              (E) 0   15      1230     0          0
ethernet3/1   pg-q0              (I) 8897874 NA      NA       NA         NA
ethernet11/1  q0                  (E) 8906510 75757960 75757960000 150        150000
ethernet11/1  mc-q3              (E) 0    16      1412     0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      31238517

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0   29      2594     0          0
cpu          ospf              (E) 0   15      1346     0          0
cpu          arp                (E) 0    2       172      0          0
ethernet3/1   mc-q3              (E) 0   15      1230     0          0
ethernet3/1   pg-q0              (I) 8904224 NA      NA       NA         NA
ethernet11/1  q0                  (E) 8901430 76800871 76800871000 269        269000
ethernet11/1  mc-q3              (E) 0    16      1412     0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      32464885

```

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	29	2594	0	0
cpu	ospf	(E) 0	15	1346	0	0
cpu	arp	(E) 0	2	172	0	0
ethernet3/1	mc-q3	(E) 0	15	1230	0	0
ethernet3/1	pg-q0	(I) 8904224	NA	NA	NA	NA
ethernet11/1	q0	(E) 8900160	80133567	80133567000	505	505000
ethernet11/1	mc-q3	(E) 0	16	1412	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	36142406

DUT1#

The ECN marking started at 4.9 MB, this suggests the system's dynamic calculation or effective buffer space led to ECN marking somewhere between the on-offset (4 MB) and the full buffer capacity (which must be greater than 5.3 MB). The drops confirm the queue eventually exceeded its maximum ECN marking threshold and hit the drop threshold (likely the maximum queue depth).

## Scenario 2: Traffic Sent with Priority 3

In this scenario, traffic is sent with Priority 3, which maps to Queue 3 of the DECN profile. The queue parameters for Queue 3 are: on-offset 5,000,000 bytes (5 MB) and off-offset 6,000,000 bytes (6 MB). The off-offset is greater than the on-offset.

Verify that the D-ECN profile `DECN` has been created with the intended on-offset and off-offset values for specific queues.

```
DUT1#sh qos-profile egress-dynamic-ecn all
qos profile egress-dynamic-ecn DECEN
queue 0 on-offset 4000 off-offset 1000 kbytes
queue 1 on-offset 5000000 off-offset 2000000 bytes
queue 2 on-offset 4000 off-offset 5000 kbytes
queue 3 on-offset 5000000 off-offset 6000000 bytes
queue 4 on-offset 5000 off-offset 10000 kbytes
queue 5 on-offset 3000000 off-offset 12000000 bytes
!
```

Repeatedly execute the following show command during congestion. Focus on the Q-Size (current queue depth in bytes) for the relevant egress queues (q3(E)).

```
DUT1#sh int counters rate mbps
+-----+-----+-----+-----+-----+
| Interface | Rx mbps | Rx pps | Tx mbps | Tx pps |
+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#
DUT1#sh int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped bytes |
+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped bytes |
```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes	
cpu	ipmc-reserved	(E) 0	3	262	0	0	
cpu	ospf	(E) 0	1	90	0	0	
ethernet3/1	mc-q3	(E) 0	2	164	0	0	
<b>ethernet11/1</b>	<b>mc-q3</b>	<b>(E) 0</b>	1	86	0	0	

DUT1#

DUT1#sh int counters ecn

Interface	ECN marked packets

DUT1#

DUT1#sh int counters drop-stats

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	7	614	0	0
cpu	ospf	(E) 0	3	270	0	0
cpu	arp	(E) 0	1	68	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	4	328	0	0
ethernet3/1	pg-q3	(I) 162814	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 171450</b>	2734867	2734867000	0	0
ethernet11/1	mc-q3	(E) 0	3	258	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	9	790	0	0
cpu	ospf	(E) 0	4	360	0	0
cpu	arp	(E) 0	1	68	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	5	410	0	0
ethernet3/1	pg-q3	(I) 1717294	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 1720850</b>	15403857	15403857000	0	0
ethernet11/1	mc-q3	(E) 0	4	344	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes

```

+-----+-----+-----+-----+-----+-----+
+-----+
cpu          ipmc-reserved      (E) 0          9          790          0          0
cpu          ospf                (E) 0          4          360          0          0
cpu          arp                 (E) 0          1          68           0          0
ethernet3/1  q7                 (E) 0          1          64           0          0
ethernet3/1  mc-q3              (E) 0          5          410          0          0
ethernet3/1  pg-q3              (I) 1768094     NA          NA           NA         NA
ethernet11/1 q3                (E) 1776730     15815800    15815800000  0          0
ethernet11/1 mc-q3              (E) 0          4          344          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved      (E) 0          9          790          0          0
cpu          ospf                (E) 0          4          360          0          0
cpu          arp                 (E) 0          1          68           0          0
ethernet3/1  q7                 (E) 0          1          64           0          0
ethernet3/1  mc-q3              (E) 0          5          410          0          0
ethernet3/1  pg-q3              (I) 1815084     NA          NA           NA         NA
ethernet11/1 q3                (E) 1827530     16223716    16223716000  0          0
ethernet11/1 mc-q3              (E) 0          4          344          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved      (E) 0          9          790          0          0
cpu          ospf                (E) 0          4          360          0          0
cpu          arp                 (E) 0          1          68           0          0
ethernet3/1  q7                 (E) 0          1          64           0          0
ethernet3/1  mc-q3              (E) 0          5          410          0          0
ethernet3/1  pg-q3              (I) 1865884     NA          NA           NA         NA
ethernet11/1 q3                (E) 1874520     16652934    16652934000  0          0
ethernet11/1 mc-q3              (E) 0          4          344          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active

```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	9	790	0	0
cpu	ospf	(E) 0	4	360	0	0
cpu	arp	(E) 0	1	68	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	5	410	0	0
ethernet3/1	pg-q3	(I) 1919224	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 1927860</b>	17056967	17056967000	0	0
ethernet11/1	mc-q3	(E) 0	4	344	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
cpu	0
cpu	0
cpu	0
ethernet3/1	0
ethernet3/1	0
ethernet3/1	0
<b>ethernet11/1</b>	0
ethernet11/1	0

DUT1#

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	9	790	0	0
cpu	ospf	(E) 0	4	360	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	5	410	0	0
ethernet3/1	pg-q3	(I) 2371344	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 2379980</b>	20747961	20747961000	0	0
ethernet11/1	mc-q3	(E) 0	5	426	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
cpu	0
cpu	0
cpu	0
ethernet3/1	0
ethernet3/1	0
ethernet3/1	0
<b>ethernet11/1</b>	0
ethernet11/1	0

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	9	790	0	0
cpu	ospf	(E) 0	4	360	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	5	410	0	0
ethernet3/1	pg-q3	(I) 2418334	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 2425700</b>	21150485	21150485000	0	0
ethernet11/1	mc-q3	(E) 0	6	512	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
cpu	0
cpu	0
cpu	0
ethernet3/1	0
ethernet3/1	0
ethernet3/1	0
<b>ethernet11/1</b>	0
ethernet11/1	0

DUT1#

```
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	10	880	0	0
cpu	ospf	(E) 0	4	360	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	5	410	0	0
ethernet3/1	pg-q3	(I) 2470404	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 2481580</b>	21586976	21586976000	0	0
ethernet11/1	mc-q3	(E) 0	6	512	0	0

```
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	12	1056	0	0
cpu	ospf	(E) 0	6	540	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	6	492	0	0
ethernet3/1	pg-q3	(I) 4038854	NA	NA	NA	NA
ethernet11/1	q3	(E) 4047490	34346942	34346942000	0	0
ethernet11/1	mc-q3	(E) 0	7	598	0	0

```
DUT1#
DUT1#
DUT1#show int counters ecn
```

Interface	ECN marked packets
cpu	0
cpu	0
cpu	0
ethernet3/1	0
ethernet3/1	0
ethernet3/1	0
ethernet11/1	0
ethernet11/1	0

```
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	12	1056	0	0
cpu	ospf	(E) 0	6	540	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	6	492	0	0
ethernet3/1	pg-q3	(I) 4084574	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 4090670</b>	34751620	34751620000	0	0
ethernet11/1	mc-q3	(E) 0	7	598	0	0

```
DUT1#
DUT1#
DUT1#show int counters ecn
```

Interface	ECN marked packets
cpu	0
cpu	0
cpu	0
ethernet3/1	0
ethernet3/1	0
ethernet3/1	0
ethernet11/1	0
ethernet11/1	0

```
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
```

```

* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    12      1056     0         0
cpu      ospf          (E) 0     6       540     0         0
cpu      arp           (E) 0     2       154     0         0
ethernet3/1 q7          (E) 0     1        64     0         0
ethernet3/1 mc-q3       (E) 0     6       492     0         0
ethernet3/1 pg-q3       (I) 4135374 NA      NA      NA      NA
ethernet11/1 q3          (E) 4144010 35144895 35144895000 0         0
ethernet11/1 mc-q3       (E) 0     7        598    0         0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    12      1056     0         0
cpu      ospf          (E) 0     6       540     0         0
cpu      arp           (E) 0     2       154     0         0
ethernet3/1 q7          (E) 0     1        64     0         0
ethernet3/1 mc-q3       (E) 0     6       492     0         0
ethernet3/1 pg-q3       (I) 4178554 NA      NA      NA      NA
ethernet11/1 q3          (E) 4192270 35540317 35540317000 0         0
ethernet11/1 mc-q3       (E) 0     7        598    0         0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved   (E) 0    12      1056     0         0
cpu      ospf          (E) 0     6       540     0         0
cpu      arp           (E) 0     2       154     0         0
ethernet3/1 q7          (E) 0     1        64     0         0
ethernet3/1 mc-q3       (E) 0     6       492     0         0
ethernet3/1 pg-q3       (I) 4225544 NA      NA      NA      NA
ethernet11/1 q3          (E) 4240530 35925450 35925450000 0         0
ethernet11/1 mc-q3       (E) 0     7        598    0         0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+-----+-----+-----+-----+
| Interface | ECN marked packets |
+-----+-----+-----+-----+-----+
DUT1#

```

```

DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0    12      1056      0          0
cpu      ospf        (E) 0     6       540       0          0
cpu      arp         (E) 0     2       154       0          0
ethernet3/1 q7          (E) 0     1        64        0          0
ethernet3/1 mc-q3      (E) 0     6       492       0          0
ethernet3/1 pg-q3      (I) 4278884 NA       NA       NA       NA
ethernet11/1 q3         (E) 4288790 36324390 36324390000 0          0
ethernet11/1 mc-q3      (E) 0     7        598       0          0

```

```

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0    12      1056      0          0
cpu      ospf        (E) 0     6       540       0          0
cpu      arp         (E) 0     2       154       0          0
ethernet3/1 q7          (E) 0     1        64        0          0
ethernet3/1 mc-q3      (E) 0     6       492       0          0
ethernet3/1 pg-q3      (I) 4324604 NA       NA       NA       NA
ethernet11/1 q3         (E) 4335780 36725380 36725380000 0          0
ethernet11/1 mc-q3      (E) 0     7        598       0          0

```

```

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0    13      1142      0          0
cpu      ospf        (E) 0     6       540       0          0
cpu      arp         (E) 0     2       154       0          0
ethernet3/1 q7          (E) 0     1        64        0          0
ethernet3/1 mc-q3      (E) 0     7       574       0          0
ethernet3/1 pg-q3      (I) 4374134 NA       NA       NA       NA
ethernet11/1 q3         (E) 4386580 37131835 37131835000 0          0
ethernet11/1 mc-q3      (E) 0     7        598       0          0

```

```

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+

```



```

| Interface          | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface          | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0      13        1142      0          0
cpu          ospf          (E) 0      6         540      0          0
cpu          arp           (E) 0      2         154      0          0
ethernet3/1  q7           (E) 0      1         64       0          0
ethernet3/1  mc-q3        (E) 0      7         574      0          0
ethernet3/1  pg-q3        (I) 4426204 NA        NA        NA         NA
ethernet11/1 q3          (E) 4436110 37544472  37544472000 0          0
ethernet11/1 mc-q3        (E) 0      7         598      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface          | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface          | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0      13        1142      0          0
cpu          ospf          (E) 0      6         540      0          0
cpu          arp           (E) 0      2         154      0          0
ethernet3/1  q7           (E) 0      1         64       0          0
ethernet3/1  mc-q3        (E) 0      7         574      0          0
ethernet3/1  pg-q3        (I) 4471924 NA        NA        NA         NA
ethernet11/1 q3          (E) 4484370 37944866  37944866000 0          0
ethernet11/1 mc-q3        (E) 0      7         598      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface          | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface          | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0      13        1142      0          0
cpu          ospf          (E) 0      6         540      0          0
cpu          arp           (E) 0      2         154      0          0
ethernet3/1  q7           (E) 0      1         64       0          0
ethernet3/1  mc-q3        (E) 0      7         574      0          0
ethernet3/1  pg-q3        (I) 5176266 NA        NA        NA         NA
ethernet11/1 q3          (E) 5189220 43662200  43662200000 0          0
ethernet11/1 mc-q3        (E) 0      7         598      0          0

DUT1#

```

```

DUT1#
DUT1#show int counters ecn
+-----+
| Interface          | ECN marked packets |
+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+
| Interface          | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+
cpu          ipmc-reserved    (E) 0      14        1232      0          0
cpu          ospf              (E) 0      7          630      0          0
cpu          arp                (E) 0      2          154      0          0
ethernet3/1  q7                  (E) 0      1          64       0          0
ethernet3/1  mc-q3             (E) 0      7          574      0          0
ethernet3/1  pg-q3             (I) 5532374 NA         NA        NA         NA
ethernet11/1 q3                  (E) 5539740 46589865  46589865000 0          0
ethernet11/1 mc-q3             (E) 0      8          684      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface          | ECN marked packets |
+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+
| Interface          | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+
cpu          ipmc-reserved    (E) 0      14        1232      0          0
cpu          ospf              (E) 0      7          630      0          0
cpu          arp                (E) 0      2          154      0          0
ethernet3/1  q7                  (E) 0      1          64       0          0
ethernet3/1  mc-q3             (E) 0      7          574      0          0
ethernet3/1  pg-q3             (I) 5579364 NA         NA        NA         NA
ethernet11/1 q3                  (E) 5593080 46978497  46978497000 0          0
ethernet11/1 mc-q3             (E) 0      8          684      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface          | ECN marked packets |
+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+
| Interface          | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+
cpu          ipmc-reserved    (E) 0      14        1232      0          0
cpu          ospf              (E) 0      7          630      0          0
cpu          arp                (E) 0      2          154      0          0
ethernet3/1  q7                  (E) 0      1          64       0          0
ethernet3/1  mc-q3             (E) 0      7          574      0          0
ethernet3/1  pg-q3             (I) 5632704 NA         NA        NA         NA
ethernet11/1 q3                  (E) 5641340 47413278  47413278000 0          0

```

```

ethernet11/1      mc-q3      (E) 0      8      684      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
-----+
cpu             ipmc-reserved      (E) 0      14      1232      0      0
cpu             ospf              (E) 0      7      630      0      0
cpu             arp                (E) 0      2      154      0      0
ethernet3/1     q7                  (E) 0      1      64       0      0
ethernet3/1     mc-q3              (E) 0      7      574      0      0
ethernet3/1     pg-q3              (I) 5691124  NA      NA      NA      NA
ethernet11/1    q3                (E) 5693410  47839095  47839095000  0      0
ethernet11/1    mc-q3              (E) 0      8      684      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
-----+
cpu             ipmc-reserved      (E) 0      15      1318      0      0
cpu             ospf              (E) 0      7      630      0      0
cpu             arp                (E) 0      2      154      0      0
ethernet3/1     q7                  (E) 0      1      64       0      0
ethernet3/1     mc-q3              (E) 0      8      656      0      0
ethernet3/1     pg-q3              (I) 5739384  NA      NA      NA      NA
ethernet11/1    q3                (E) 5749290  48244010  48244010000  0      0
ethernet11/1    mc-q3              (E) 0      8      684      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
-----+
cpu             ipmc-reserved      (E) 0      15      1318      0      0
cpu             ospf              (E) 0      7      630      0      0
cpu             arp                (E) 0      2      154      0      0
ethernet3/1     q7                  (E) 0      1      64       0      0

```

ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 5797804	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 5803900</b>	48705431	48705431000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+
| Interface | ECN marked packets |
+-----+

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+
cpu      ipmc-reserved  (E) 0    15      1318     0          0
cpu      ospf      (E) 0    7       630     0          0
cpu      arp       (E) 0    2       154     0          0
ethernet3/1 q7      (E) 0    1       64      0          0
ethernet3/1 mc-q3   (E) 0    8       656     0          0
ethernet3/1 pg-q3   (I) 5847334 NA      NA      NA      NA
ethernet11/1 q3      (E) 5849620 49114106 49114106000 0          0
ethernet11/1 mc-q3  (E) 0    8       684     0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+
| Interface | ECN marked packets |
+-----+

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+
cpu      ipmc-reserved  (E) 0    15      1318     0          0
cpu      ospf      (E) 0    7       630     0          0
cpu      arp       (E) 0    2       154     0          0
ethernet3/1 q7      (E) 0    1       64      0          0
ethernet3/1 mc-q3   (E) 0    8       656     0          0
ethernet3/1 pg-q3   (I) 5896864 NA      NA      NA      NA
ethernet11/1 q3      (E) 5905500 49568426 49568426000 0          0
ethernet11/1 mc-q3  (E) 0    8       684     0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+
| Interface | ECN marked packets |
+-----+

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+
cpu      ipmc-reserved  (E) 0    15      1318     0          0

```

```

cpu          ospf          (E) 0          7          630          0          0
cpu          arp           (E) 0          2          154          0          0
ethernet3/1  q7            (E) 0          1          64           0          0
ethernet3/1  mc-q3         (E) 0          8          656          0          0
ethernet3/1  pg-q3         (I) 5950204     NA          NA           NA          NA
ethernet11/1 q3          (E) 5960110     49975592    49975592000  0          0
ethernet11/1 mc-q3         (E) 0          8          684          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved (E) 0      15        1318      0          0
cpu          ospf          (E) 0      7          630       0          0
cpu          arp           (E) 0      2          154       0          0
ethernet3/1  q7            (E) 0      1          64        0          0
ethernet3/1  mc-q3         (E) 0      8          656       0          0
ethernet3/1  pg-q3         (I) 6001004  NA        NA         NA         NA
ethernet11/1 q3          (E) 6008370  50381591  50381591000 0          0
ethernet11/1 mc-q3         (E) 0      8          684       0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved (E) 0      15        1318      0          0
cpu          ospf          (E) 0      7          630       0          0
cpu          arp           (E) 0      2          154       0          0
ethernet3/1  q7            (E) 0      1          64        0          0
ethernet3/1  mc-q3         (E) 0      8          656       0          0
ethernet3/1  pg-q3         (I) 6049264  NA        NA         NA         NA
ethernet11/1 q3          (E) 6054090  50775924  50775924000 0          0
ethernet11/1 mc-q3         (E) 0      8          684       0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      358374
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+

```

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6097524	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 6101080</b>	51176001	51176001000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	358374

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6147054	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 6154420</b>	51600218	51600218000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	358374

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface bytes	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6195314	NA	NA	NA	NA
<b>ethernet11/1</b>	<b>q3</b>	<b>(E) 6207760</b>	52009715	52009715000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	1583949

DUT1#

```

DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved  (E) 0    15      1318    0        0
cpu      ospf      (E) 0    7        630    0        0
cpu      arp       (E) 0    2        154    0        0
ethernet3/1 q7      (E) 0    1        64     0        0
ethernet3/1 mc-q3    (E) 0    8        656    0        0
ethernet3/1 pg-q3    (I) 6248654 NA      NA      NA
ethernet11/1 q3      (E) 6252210 52409416 52409416000 0 0
ethernet11/1 mc-q3    (E) 0    8        684    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 1583949

DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved  (E) 0    15      1318    0        0
cpu      ospf      (E) 0    7        630    0        0
cpu      arp       (E) 0    2        154    0        0
ethernet3/1 q7      (E) 0    1        64     0        0
ethernet3/1 mc-q3    (E) 0    8        656    0        0
ethernet3/1 pg-q3    (I) 6296914 NA      NA      NA
ethernet11/1 q3      (E) 6310630 52849253 52849253000 0 0
ethernet11/1 mc-q3    (E) 0    8        684    0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 2808676

DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved  (E) 0    15      1318    0        0
cpu      ospf      (E) 0    7        630    0        0
cpu      arp       (E) 0    2        154    0        0
ethernet3/1 q7      (E) 0    1        64     0        0
ethernet3/1 mc-q3    (E) 0    8        656    0        0
ethernet3/1 pg-q3    (I) 6352794 NA      NA      NA
ethernet11/1 q3      (E) 6358890 53272904 53272904000 0 0
ethernet11/1 mc-q3    (E) 0    8        684    0        0

DUT1#
DUT1#

```

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
 ethernet11/1    2808676

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0        15        1318      0          0
cpu          ospf          (E) 0        7         630      0          0
cpu          arp           (E) 0        2         154      0          0
ethernet3/1  q7             (E) 0        1          64       0          0
ethernet3/1  mc-q3          (E) 0        8         656      0          0
ethernet3/1  pg-q3          (I) 6399784   NA        NA        NA        NA
ethernet11/1 q3             (E) 6413500  53693500 53693500000 0          0
ethernet11/1 mc-q3          (E) 0        8          684      0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
 ethernet11/1    2808676

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0        15        1318      0          0
cpu          ospf          (E) 0        7         630      0          0
cpu          arp           (E) 0        2         154      0          0
ethernet3/1  q7             (E) 0        1          64       0          0
ethernet3/1  mc-q3          (E) 0        8         656      0          0
ethernet3/1  pg-q3          (I) 6458204   NA        NA        NA        NA
ethernet11/1 q3             (E) 6464300  54107543 54107543000 0          0
ethernet11/1 mc-q3          (E) 0        8          684      0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
 ethernet11/1    4035567

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0        15        1318      0          0
cpu          ospf          (E) 0        7         630      0          0
cpu          arp           (E) 0        2         154      0          0
ethernet3/1  q7             (E) 0        1          64       0          0
ethernet3/1  mc-q3          (E) 0        8         656      0          0

```



Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
ethernet3/1	pg-q3	(I) 6503924	NA	NA	NA	NA
ethernet11/1	q3	(E) 6517640	54527506	54527506000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	4035567

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6559804	NA	NA	NA	NA
ethernet11/1	q3	(E) 6569710	54945687	54945687000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	4035567

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6608064	NA	NA	NA	NA
ethernet11/1	q3	(E) 6619240	55357831	55357831000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	5260967

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6608064	NA	NA	NA	NA
ethernet11/1	q3	(E) 6619240	55357831	55357831000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

```

+-----+-----+-----+-----+-----+-----+-----+
+-----+
cpu          ipmc-reserved      (E) 0          15          1318          0          0
cpu          ospf                (E) 0          7           630          0          0
cpu          arp                 (E) 0          2           154          0          0
ethernet3/1  q7                 (E) 0          1            64          0          0
ethernet3/1  mc-q3              (E) 0          8           656          0          0
ethernet3/1  pg-q3              (I) 6657594     NA           NA           NA         NA
ethernet11/1 q3                 (E) 6667500     55771959     55771959000  0          0
ethernet11/1 mc-q3              (E) 0          8            684          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      5260967
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
+-----+
cpu          ipmc-reserved      (E) 0          15          1318          0          0
cpu          ospf                (E) 0          7           630          0          0
cpu          arp                 (E) 0          2           154          0          0
ethernet3/1  q7                 (E) 0          1            64          0          0
ethernet3/1  mc-q3              (E) 0          8           656          0          0
ethernet3/1  pg-q3              (I) 6712204     NA           NA           NA         NA
ethernet11/1 q3                 (E) 6728460     56234706     56234706000  0          0
ethernet11/1 mc-q3              (E) 0          8            684          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      5260967
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes      | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
+-----+
cpu          ipmc-reserved      (E) 0          15          1318          0          0
cpu          ospf                (E) 0          7           630          0          0
cpu          arp                 (E) 0          2           154          0          0
ethernet3/1  q7                 (E) 0          1            64          0          0
ethernet3/1  mc-q3              (E) 0          8           656          0          0
ethernet3/1  pg-q3              (I) 6770624     NA           NA           NA         NA
ethernet11/1 q3                 (E) 6774180     56665032     56665032000  0          0
ethernet11/1 mc-q3              (E) 0          8            684          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      6485321
DUT1#
DUT1#

```

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6818884	NA	NA	NA	NA
ethernet11/1	q3	(E) 6828790	57082415	57082415000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	6485321

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6872224	NA	NA	NA	NA
ethernet11/1	q3	(E) 6877050	57495016	57495016000	0	0
ethernet11/1	mc-q3	(E) 0	8	684	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	6485321

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	15	1318	0	0
cpu	ospf	(E) 0	7	630	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 6917944	NA	NA	NA	NA
ethernet11/1	q3	(E) 6925310	57905128	57905128000	0	0
ethernet11/1	mc-q3	(E) 0	9	770	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      7711568
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved      (E) 0      16      1408      0      0
cpu      ospf              (E) 0      7      630      0      0
cpu      arp              (E) 0      2      154      0      0
ethernet3/1 q7          (E) 0      1      64      0      0
ethernet3/1 mc-q3        (E) 0      8      656      0      0
ethernet3/1 pg-q3        (I) 6971284 NA      NA      NA      NA
ethernet11/1 q3          (E) 6976110 58318739 58318739000 0      0
ethernet11/1 mc-q3        (E) 0      9      770      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      7711568
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved      (E) 0      16      1408      0      0
cpu      ospf              (E) 0      8      720      0      0
cpu      arp              (E) 0      2      154      0      0
ethernet3/1 q7          (E) 0      1      64      0      0
ethernet3/1 mc-q3        (E) 0      8      656      0      0
ethernet3/1 pg-q3        (I) 7017004 NA      NA      NA      NA
ethernet11/1 q3          (E) 7027418 58704985 58704985000 0      0
ethernet11/1 mc-q3        (E) 0      9      770      0      0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      7711568
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved      (E) 0      16      1408      0      0
cpu      ospf              (E) 0      8      720      0      0
cpu      arp              (E) 0      2      154      0      0
ethernet3/1 q7          (E) 0      1      64      0      0
ethernet3/1 mc-q3        (E) 0      8      656      0      0
ethernet3/1 pg-q3        (I) 7067804 NA      NA      NA      NA

```

```

ethernet11/1      q3              (E) 7075170      59119204      59119204000    0              0
ethernet11/1      mc-q3             (E) 0            9              770            0              0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      8935836
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes     | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu             ipmc-reserved      (E) 0         16            1408          0              0
cpu             ospf              (E) 0         8              720           0              0
cpu             arp              (E) 0         2              154           0              0
ethernet3/1     q7                (E) 0         1              64            0              0
ethernet3/1     mc-q3             (E) 0         8              656           0              0
ethernet3/1     pg-q3             (I) 7118604    NA             NA             NA             NA
ethernet11/1    q3                (E) 7124700    59534683      59534683000   0              0
ethernet11/1    mc-q3             (E) 0         9              770           0              0

DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      8935836
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes     | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu             ipmc-reserved      (E) 0         16            1408          0              0
cpu             ospf              (E) 0         8              720           0              0
cpu             arp              (E) 0         2              154           0              0
ethernet3/1     q7                (E) 0         1              64            0              0
ethernet3/1     mc-q3             (E) 0         8              656           0              0
ethernet3/1     pg-q3             (I) 7168134    NA             NA             NA             NA
ethernet11/1    q3                (E) 7174230    59929345      59929345000   0              0
ethernet11/1    mc-q3             (E) 0         9              770           0              0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      8935836
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts      | Tx bytes     | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu             ipmc-reserved      (E) 0         16            1408          0              0

```

```

cpu          ospf          (E) 0          8          720          0          0
cpu          arp           (E) 0          2          154          0          0
ethernet3/1  q7            (E) 0          1          64           0          0
ethernet3/1  mc-q3         (E) 0          8          656          0          0
ethernet3/1  pg-q3         (I) 7216394    NA          NA           NA          NA
ethernet11/1 q3            (E) 7221220    60312092    60312092000  0          0
ethernet11/1 mc-q3         (E) 0          9          770          0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      10162022
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes          |
+-----+-----+-----+-----+-----+-----+-----+
cpu            ipmc-reserved (E) 0      16        1408      0          0
cpu            ospf          (E) 0      8          720      0          0
cpu            arp           (E) 0      2          154      0          0
ethernet3/1    q7            (E) 0      1          64        0          0
ethernet3/1    mc-q3         (E) 0      8          656      0          0
ethernet3/1    pg-q3         (I) 7265924 NA         NA         NA          NA
ethernet11/1   q3            (E) 7280910 60751844  60751844000 0          0
ethernet11/1   mc-q3         (E) 0      9          770      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      10162022
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size    | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes          |
+-----+-----+-----+-----+-----+-----+-----+
cpu            ipmc-reserved (E) 0      16        1408      0          0
cpu            ospf          (E) 0      8          720      0          0
cpu            arp           (E) 0      2          154      0          0
ethernet3/1    q7            (E) 0      1          64        0          0
ethernet3/1    mc-q3         (E) 0      8          656      0          0
ethernet3/1    pg-q3         (I) 7321804 NA         NA         NA          NA
ethernet11/1   q3            (E) 7327900 61172398  61172398000 0          0
ethernet11/1   mc-q3         (E) 0      9          770      0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface      | ECN marked packets |
+-----+-----+
ethernet11/1      10162022
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active

```

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	16	1408	0	0
cpu	ospf	(E) 0	8	720	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	8	656	0	0
ethernet3/1	pg-q3	(I) 7368794	NA	NA	NA	NA
ethernet11/1	q3	(E) 7378700	61551811	61551811000	0	0
ethernet11/1	mc-q3	(E) 0	9	770	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	11387653

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	17	1494	0	0
cpu	ospf	(E) 0	8	720	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	9	738	0	0
ethernet3/1	pg-q3	(I) 7420864	NA	NA	NA	NA
ethernet11/1	q3	(E) 7426960	61967600	61967600000	0	0
ethernet11/1	mc-q3	(E) 0	9	770	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	11387653

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	17	1494	0	0
cpu	ospf	(E) 0	8	720	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	9	738	0	0
ethernet3/1	pg-q3	(I) 7469124	NA	NA	NA	NA
ethernet11/1	q3	(E) 7486650	62428120	62428120000	0	0
ethernet11/1	mc-q3	(E) 0	9	770	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	11387653

```

ethernet11/1      11387653
DUT1#
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0    19      1670    0        0
cpu      ospf          (E) 0    9       810     0        0
cpu      arp           (E) 0    2       154     0        0
ethernet3/1 q7          (E) 0    1       64      0        0
ethernet3/1 mc-q3       (E) 0    10      820     0        0
ethernet3/1 pg-q3       (I) 8897874 NA      NA      NA      NA
ethernet11/1 q3          (E) 8902700 76261118 76261118000 116    116000
ethernet11/1 mc-q3      (E) 0    10      856     0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      26093802
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0    19      1670    0        0
cpu      ospf          (E) 0    9       810     0        0
cpu      arp           (E) 0    2       154     0        0
ethernet3/1 q7          (E) 0    1       64      0        0
ethernet3/1 mc-q3       (E) 0    10      820     0        0
ethernet3/1 pg-q3       (I) 8897874 NA      NA      NA      NA
ethernet11/1 q3          (E) 8907780 76897331 76897331000 234    234000
ethernet11/1 mc-q3      (E) 0    10      856     0        0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1      26093802
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu      ipmc-reserved    (E) 0    19      1670    0        0
cpu      ospf          (E) 0    9       810     0        0
cpu      arp           (E) 0    2       154     0        0
ethernet3/1 q7          (E) 0    1       64      0        0
ethernet3/1 mc-q3       (E) 0    10      820     0        0
ethernet3/1 pg-q3       (I) 8899144 NA      NA      NA      NA
ethernet11/1 q3          (E) 8905240 77967301 77967301000 352    352000
ethernet11/1 mc-q3      (E) 0    10      856     0        0

```



```

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface      | ECN marked packets |
+-----+
 ethernet11/1    27319501
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0        19        1670      0          0
cpu          ospf             (E) 0        9         810       0          0
cpu          arp              (E) 0        2         154       0          0
ethernet3/1  q7                (E) 0        1          64        0          0
ethernet3/1  mc-q3             (E) 0        10        820       0          0
ethernet3/1  pg-q3             (I) 8902954   NA         NA         NA         NA
ethernet11/1 q3                (E) 8903970   78799470   78799470000 352        352000
ethernet11/1 mc-q3             (E) 0        10        856       0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface      | ECN marked packets |
+-----+
 ethernet11/1    28544865
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0        19        1670      0          0
cpu          ospf             (E) 0        9         810       0          0
cpu          arp              (E) 0        2         154       0          0
ethernet3/1  q7                (E) 0        1          64        0          0
ethernet3/1  mc-q3             (E) 0        10        820       0          0
ethernet3/1  pg-q3             (I) 8900414   NA         NA         NA         NA
ethernet11/1 q3                (E) 8901430   79381642   79381642000 470        470000
ethernet11/1 mc-q3             (E) 0        10        856       0          0

DUT1#
DUT1#
DUT1#show int counters ecn
+-----+
| Interface      | ECN marked packets |
+-----+
 ethernet11/1    28544865
DUT1#
DUT1#
DUT1#show int counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
* indicates monitor is active
+-----+-----+-----+-----+-----+-----+
| Interface      | Queue/Class-map    | Q-Size      | Tx pkts  | Tx bytes  | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+
cpu          ipmc-reserved    (E) 0        19        1670      0          0
cpu          ospf             (E) 0        9         810       0          0

```

```

cpu          arp          (E) 0          2          154          0          0
ethernet3/1  q7          (E) 0          1          64          0          0
ethernet3/1  mc-q3       (E) 0          10         820         0          0
ethernet3/1  pg-q3       (I) 8902954    NA         NA          NA         NA
ethernet11/1 q3          (E) 8902700    80251342   80251342000 588        588000
ethernet11/1 mc-q3       (E) 0          10         856         0          0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 29770381

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu        ipmc-reserved (E) 0    19      1670    0        0
cpu        ospf         (E) 0    9       810     0        0
cpu        arp          (E) 0    2       154     0        0
ethernet3/1 q7          (E) 0    1       64      0        0
ethernet3/1 mc-q3       (E) 0    10      820     0        0
ethernet3/1 pg-q3       (I) 8900414 NA      NA      NA      NA
ethernet11/1 q3          (E) 8902700 81034557 81034557000 588      588000
ethernet11/1 mc-q3       (E) 0    10      856     0        0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 29770381

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

```

+-----+-----+-----+-----+-----+-----+-----+
| Interface | Queue/Class-map | Q-Size | Tx pkts | Tx bytes | Dropped pkts | Dropped
bytes |
+-----+-----+-----+-----+-----+-----+-----+
cpu        ipmc-reserved (E) 0    19      1670    0        0
cpu        ospf         (E) 0    9       810     0        0
cpu        arp          (E) 0    2       154     0        0
ethernet3/1 q7          (E) 0    1       64      0        0
ethernet3/1 mc-q3       (E) 0    10      820     0        0
ethernet3/1 pg-q3       (I) 8900414 NA      NA      NA      NA
ethernet11/1 q3          (E) 8900160 81746163 81746163000 707      707000
ethernet11/1 mc-q3       (E) 0    10      856     0        0

```

DUT1#

DUT1#

DUT1#show int counters ecn

```

+-----+-----+
| Interface | ECN marked packets |
+-----+-----+
ethernet11/1 30995866

```

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	19	1670	0	0
cpu	ospf	(E) 0	10	900	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	10	820	0	0
ethernet3/1	pg-q3	(I) 8896604	NA	NA	NA	NA
ethernet11/1	q3	(E) 8901430	82396091	82396091000	707	707000
ethernet11/1	mc-q3	(E) 0	10	856	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	32220671

DUT1#

DUT1#

DUT1#show int counters queue-stats

E - Egress, I - Ingress, Q-Size is in bytes

\* indicates monitor is active

Interface	Queue/Class-map	Q-Size	Tx pkts	Tx bytes	Dropped pkts	Dropped bytes
cpu	ipmc-reserved	(E) 0	20	1760	0	0
cpu	ospf	(E) 0	10	900	0	0
cpu	arp	(E) 0	2	154	0	0
ethernet3/1	q7	(E) 0	1	64	0	0
ethernet3/1	mc-q3	(E) 0	10	820	0	0
ethernet3/1	pg-q3	(I) 8900414	NA	NA	NA	NA
ethernet11/1	q3	(E) 8902700	83211870	83211870000	825	825000
ethernet11/1	mc-q3	(E) 0	11	942	0	0

DUT1#

DUT1#

DUT1#show int counters ecn

Interface	ECN marked packets
ethernet11/1	32220671

DUT1#

DUT1#

DUT1#sh int counters rate mbps

Interface	Rx mbps	Rx pps	Tx mbps	Tx pps
ethernet3/1	9804.80	1225599	0.00	0
ethernet11/1	0.00	0	9803.85	1225481

DUT1#

DUT1#sh int counters rate mbps

Interface	Rx mbps	Rx pps	Tx mbps	Tx pps
ethernet3/1	9804.80	1225599	0.00	0
ethernet11/1	0.00	0	9803.85	1225481

DUT1#

DUT1#

DUT1#sh int counters rate mbps

Interface	Rx mbps	Rx pps	Tx mbps	Tx pps
ethernet3/1	9804.80	1225599	0.00	0
ethernet11/1	0.00	0	9803.85	1225481

DUT1#

DUT1#

```
DUT1#sh int counters drop-stats
Interface ethernet11/1
  Tx Unicast Queue Drops: 1652

DUT1#
DUT1#sh int counters drop-stats
Interface ethernet11/1
  Tx Unicast Queue Drops: 1770

DUT1#
DUT1#
DUT1#sh int counters drop-stats
Interface ethernet11/1
  Tx Unicast Queue Drops: 1888

DUT1#
DUT1#
DUT1#sh int counters drop-stats
Interface ethernet11/1
  Tx Unicast Queue Drops: 2007

DUT1#
DUT1#
DUT1#sh int counters drop-stats
Interface ethernet11/1
  Tx Unicast Queue Drops: 2125

DUT1#
DUT1#
DUT1#sh policy-map interface ethernet11/1

Interface ethernet11/1

Type Queuing policy-map : default-out-policy

Service-policy (queuing) output: default-out-policy
Interface Bandwidth 100000000 kbps
Port Shaper 9803 mbps
-----
Class-map (queuing): q0
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): q1
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): q2
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): q3
priority
  output          : 103031224 packets, 103031224000 bytes
  dropped         : 2716 packets, 2716000 bytes

Class-map (queuing): q4
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): q5
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes

Class-map (queuing): q6
priority
  output          : 0 packets, 0 bytes
  dropped         : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output      : 12 packets, 1028 bytes
  dropped     : 0 packets, 0 bytes

Wred/Tail Drop Statistics :
-----
green  : 0 packets
yellow : 0 packets
red    : 0 packets
ecn    : 51828361 packets

DUT1#sh policy-map interface ethernet11/1

Interface ethernet11/1

Type Queuing policy-map : default-out-policy

Service-policy (queuing) output: default-out-policy
Interface Bandwidth 100000000 kbps
Port Shaper 9803 mbps
-----
Class-map (queuing): q0
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q1
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q2
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q3
  priority
    output      : 106358809 packets, 106358809000 bytes
    dropped     : 3070 packets, 3070000 bytes

Class-map (queuing): q4
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q5
  priority
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes

Class-map (queuing): q6
  priority
    output      : 0 packets, 0 bytes
```

```

        dropped          : 0 packets, 0 bytes

Class-map (queuing): q7
  priority
    output              : 0 packets, 0 bytes
    dropped             : 0 packets, 0 bytes

Class-map (queuing): mc-q0
  output              : 0 packets, 0 bytes
  dropped             : 0 packets, 0 bytes

Class-map (queuing): mc-q1
  output              : 0 packets, 0 bytes
  dropped             : 0 packets, 0 bytes

Class-map (queuing): mc-q2
  output              : 0 packets, 0 bytes
  dropped             : 0 packets, 0 bytes

Class-map (queuing): mc-q3
  output              : 13 packets, 1114 bytes
  dropped             : 0 packets, 0 bytes

Wred/Tail Drop Statistics :
-----
green   : 0 packets
yellow  : 0 packets
red     : 0 packets
ecn     : 55504842 packets

DUT1#

```

---

## Implementation Examples

Here's a real-time example illustrating how Dynamic ECN (D-ECN) functions:

### Example:

Traffic enters Switch1 on interface `xe0` and is destined out of interface `xe11`. The D-ECN profile EG1 is applied to the egress interface `xe1`. Profile EG1 configures queue 3 with an on-offset of 7000 bytes and an off-offset of 8000 bytes.

```

qos enable
!
OcNOS(config-pmap-que-def)#int xe1
OcNOS(config-if)#qos map-profile egress-dynamic-ecn EG1
OcNOS(config-eg-dynamic-ecn-map)#queue 3 on-offset 7000 off-offset 8000 bytes

```

### Scenario:

A burst of traffic arrives at `xe0`, destined for `xe1`, and this traffic maps to egress queue 3. The egress interface `xe1` starts experiencing congestion, causing packets to build up in queue 3.

The shared **buffer** usage for queue 3 on interface `xe1` begins to **increase** due to the congestion.

```

OcNOS(config)#policy-map type queuing default p3
OcNOS(config-pmap-que-def)#class type queuing default q3
OcNOS(config-pmap-c-que-def)#random-detect min-threshold 50 max-threshold 80
kbytes

```

The switch continuously **compares** the current shared buffer usage for queue 3 against the **D-ECN threshold**. This threshold is calculated as Queue's shared limit – D-ECN-Offset (where D-ECN-Offset is the on-offset value). In this case, it's Queue's shared limit – 7000 bytes.

When the shared buffer usage for queue 3 reaches or exceeds (Queue's shared limit – 7000 bytes), the D-ECN mechanism signals the switch to **start marking the ECN field** (setting the CE codepoint) in the IP header of subsequent packets exiting queue 3 on interface `xe1`. Packets are marked, not dropped.

ECN-capable receiving endpoints detect the CE marking and **signal congestion back to the sender**. The sender then reduces its transmission rate, helping to alleviate the congestion on Switch1's egress queue 3.

As the sender reduces its rate, the buffer usage for queue 3 decreases. Once the usage drops below the deactivation threshold (calculated as Queue's shared limit – off-offset, or Queue's shared limit – 8000 bytes), the switch **stops marking packets** for queue 3. The slightly larger off-offset provides hysteresis, preventing rapid on/off marking if the queue usage fluctuates near the on-offset threshold.

Congestion is signaled dynamically based on shared buffer pressure before potential packet drops occur, allowing endpoints to react proactively. The **on-offset and off-offset provide precise control over when marking starts and stops**, tailored to buffer conditions.

---

## New CLI Commands

The feature introduces the following configuration commands.

- `qos profile egress-dynamic-ecn` - Creates a new egress dynamic ECN profile and map it to a queue size.

---

### `qos profile egress-dynamic-ecn`

Use this command to set the queue mapping for egress dynamic ECN profile.

Use the `no` form of this command delete the profile.

Use `show qos-profile` to show the profile detail.

Use `qos map-profile` to map the profile on interface.

### Command Syntax

```
qos profile egress-dynamic-ecn <NAME> queue <0-7> on-offset <1-266338050> off-
offset <1-266338050> (packets | bytes | kbytes)
no qos profile egress-dynamic-ecn <NAME> no queue <0-7>
```

### Parameters

Name	The profile name to be created.
queue <0-7>	The queue value.
on-offset <1-266338050>	ON-offset value
off-offset <1-266338050>	OFF-offset value
(packets   bytes   kbytes)	Offset units

### Default

By default, "default" profile is created for all the profile types. These profiles can only be updated by the user neither be created nor be destroyed.

## Command Mode

config-eg-dynamic-ecn-map

## Applicability

This command was introduced in OcNOS version 7.0.0.

This command applies only to the Tomahawk 5 (TH5) platforms.

## Example

To create a new profile:

```
#configure terminal
(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
(config-egress-prec-map)#queue 1 on-offset 7000 off-offset 9000 bytes
(config)#interface xe2
(config-if)#qos map-profile egress-dynamic-ecn egr-dyn-ecn-map
```

To create Dynamic-ECN profile

```
OcNOS (config)#qos profile egress-dynamic-ecn egl
```

To delete D-ECN thresholds mapping for each queue in the profile.

```
OcNOS (config)#no qos profile egress-dynamic-ecn egl
```

To attach a D-ECN profile on an interface

```
(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
(config-eg-dynamic-ecn-map)#queue 1 on-offset 20 off-offset 50 packets
(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
(config-egress-prec-map)#queue 1 on-offset 7000 off-offset 9000 bytes
(config)#interface xe2
(config-if)#qos map-profile egress-dynamic-ecn egr-dyn-ecn-map
OcNOS (config)#end
```

Simultaneously supporting Static and D-ECN profile on an interface. Static-ECN is via WRED ECN marking. The final marking is the logical OR of the two ECN features.

```
OcNOS (config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
OcNOS (config-eg-dynamic-ecn-map)#queue 2 on-offset 70000 off-offset 90000 bytes
```

---

## Existing CLI Commands

The following two CLIs are modified to include **egress-dynamic-ecn** attribute.

- **qos map-profile** - Updated to attach or detach an egress dynamic ECN profile to and from an interface. .
- **show qos-profile** - Updated to displays the details of egress dynamic ECN.

---

## qos map-profile

Use this command to attach (map) a profile to an interface.

Use the **no** form of this command to remove a profile.



## Command Syntax

```
qos map-profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-color-
to-dscp | precedence-to-queue | queue-to-precedence | ingress-pg-map | egress-
dynamic-ecn) NAME

no qos map-profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-
color-to-dscp | precedence-to-queue | queue-to-precedence | ingress-pg-map |
egress-dynamic-ecn) NAME
```

## Parameters

**egress-dynamic-ecn**

Profile for egress dynamic ECN map

## Default

No default D-ECN profile.

## Command Mode

Interface modes

## Applicability

The `egress-dynamic-ecn` option is added in OcNOS version 7.0.0. It applies only for Tomahawk 5 (TH5) platforms.

## Example

To create a D-ECN profile EG1 is to the egress interface `xe1`.

```
OcNOS(config-pmap-que-def)#int xe1
OcNOS(config-if)#qos map-profile egress-dynamic-ecn EG1
OcNOS(config-eg-dynamic-ecn-map)#queue 3 on-offset 70000 off-offset 8000 bytes
```

---

## show qos-profile

Use this command to show the all configured QoS profiles configurations like type, name, maps configured except for the default maps, attached info (to how many interfaces it is attached) etc,

## Command Syntax

```
show qos-profile (type (cos-to-queue | dscp-encap | dscp-to-dscp | dscp-to-queue |
exp-to-queue | queue-to-exp | precedence-to-precedence | precedence-to-queue |
queue-color-to-cos | ingress-pg-map | egress-dynamic-ecn) (interface NAME| all)
```

## Parameters

**egress-dynamic-ecn**

Specify the profile for egress dynamic ECN map

## Command Mode

Privileged exec

Configuration Mode

Interface Mode

---

## Applicability

The `egress-dynamic-ecn` option is added in OcNOS version 7.0.0. It applies only for Tomahawk 5 (TH5) platforms.

## Examples

To display the Dynamic-ECN profile mapping details:

```
OcNOS#sh qos-profile egress-dynamic-ecn all
qos profile egress-dynamic-ecn eg1
  queue 2 on-offset 70000 off-offset 90000 bytes
  queue 3 on-offset 100 off-offset 200 kbytes
  queue 6 on-offset 40 off-offset 50 kbytes
!

OcNOS#show qos-profile egress-dynamic-ecn interface ethernet1
profile name: eg1
mapping:
  queue 2  on-offset 70000  off-offset 90000  bytes
  queue 3  on-offset 100   off-offset 200    kbytes
  queue 6  on-offset 40    off-offset 50     kbytes
```

---

## Troubleshooting

Following are some of the commands used for troubleshooting:

```
show interface (IFNAME|) counters (active|)
show interface (IFNAME|) counters rate (kbps|mbps|gbps|)
show interface (IFNAME|) counters error-stats
show interface (IFNAME|) counters protocol
show interface (IFNAME|) counters queue-stats
show interface cpu counters queue-stats
show interface cpu counters
show class-map (type (qos|queuing)|) (NAME|)
show policy-map statistics type qos
show priority-flow-control deadlock-status [ IFNAME ]
show qos-profile egress-dynamic-ecn all
```

---

## Glossary

The following table provides definitions for key terms or abbreviations and their meanings used throughout this document:

Key Terms/Acronym	Description
S-ECN	Static Explicit Congestion Notification
D-ECN	Dynamic Explicit Congestion Notification

# Quality of Service Command Reference

---

## CHAPTER 1 Quality of Service Commands

---

This chapter is a reference for the ingress Quality of Service (QoS) and hierarchical QoS.

- [bandwidth](#)
- [class-map type qos](#)
- [class-map type queuing](#)
- [class type qos](#)
- [class type queuing](#)
- [clear qos statistics](#)
- [cpu-queue](#)
- [dynamic-threshold](#)
- [egress cos map](#)
- [egress dscp map](#)
- [ingress cos map](#)
- [ingress dscp map](#)
- [lossless](#)
- [match access-group](#)
- [match cos](#)
- [match cos inner](#)
- [match dscp](#)
- [match ip rtp](#)
- [match mac](#)
- [match precedence](#)
- [match protocol](#)
- [match qos-group](#)
- [match traffic-type](#)
- [match vlan](#)
- [match vlan inner](#)
- [police](#)
- [policy-map](#)
- [priority](#)
- [priority \(queuing\)](#)
- [qos \(enable | disable\)](#)
- [qos map-profile](#)
- [qos profile](#)
- [qos profile egress-dynamic-ecn](#)
- [qos profile ingress-pg-map](#)
- [qos profile precedence-to-queue](#)

- qos profile queue-to-precedence
- qos remark
- qos statistics
- queue-limit
- random-detect
- service-policy
- service-policy type qos
- service-policy type queuing
- set bridge cos
- set bridge dscp
- set cos
- set dscp
- set precedence
- set qos-group
- set qos queue scheduler
- set queue
- shape
- shape rate
- show class-map
- show cpu-queue details
- show interface counters
- show policy-map
- show policy-map interface
- show storm-control
- show qos-profile
- show qos-profile interface
- show queuing interface
- show running-config qos
- show running-config cpu-queue
- storm-control
- trust dscp
- wrr-queue weight

---

## bandwidth

Use this command to allocate a minimum percentage of the interface bandwidth to a queue.

Use the `no` command to remove a bandwidth configuration.

### Command Syntax

```
bandwidth (<1-10000000000> (kbps|mbps|gbps) | percent <1-100>)  
no bandwidth
```

### Parameters

<1-10000000000>	Bandwidth value
kbps	Units in kilobits/sec.
mbps	Units in megabits/sec.
gbps	Units in gigabits/sec.
percent <1-100>	Specify the percentage from 1 to 100.

### Default

No default value is specified

### Command Mode

Policy-class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
(config)# policy-map type queuing PQOS  
(config-pmap-que)# class type queuing 1p7q4t-out-pq1  
(config-pmap-c-que)# bandwidth 10 mbps
```

---

## class-map type qos

Use this command to create a class-map of type qos.

Use the `no` command to remove a class-map.

Note:

- Class-map without any match qualification behaves similar to default class by matching all the packets on the interface it is attached via service policy.
- In a class-map, adding or deleting match criteria with misconfiguration will have silent exit and will not proceed with operation.

### Command Syntax

```
class-map (type qos|) (match-any|match-all|) NAME
no class-map (type qos|) (match-any|match-all|) NAME
```

### Parameters

<code>type qos</code>	Ingress/egress class map.
<code>NAME</code>	Specify the class map name (Max Size 32)
<code>match-any</code>	Match any parameter (boolean OR)
<code>match-all</code>	Match all parameters (boolean AND)

### Default

By default, match type is match-all for any class-map

### Command Mode

Configuration Mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
#configure terminal
(config)# class-map type qos C_QOS1
```

---

## class-map type queuing

Use this command to create a class-map of type queuing.

Use the `no` command to remove a class-map.

**Note:** Class-maps with no action are treated as incomplete configuration and don't take any effect until the action is added. Class-map deletion is not allowed if it is referenced by any policy-map.

### Command Syntax

```
class-map type queuing (match-any|) NAME
no class-map type queuing (match-any|) NAME
```

### Parameters

<code>type queuing</code>	Egress class map
<code>NAME</code>	Specify the class map name (Max Size 32)
<code>match-any</code>	Match any parameter (boolean OR)

### Default

By default, class-map type is match-any

### Command Mode

Configuration Mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II and Trident II+ platforms.

### Examples

```
#configure terminal
(config)# class-map type queuing C_QOS1
```



---

## class type qos

Use this command to add a QoS class-map to a qos policy map.

Use the `no` command to remove a QoS class-map from the policy map.

**Note:** Implicit priority of the classes in a policy-map will be calculated based on the number of matches with VLAN match given lower weight-age over other matches. In case of classes with conflicting matches, it is not guaranteed which class the traffic would hit. Users are recommended to use priority in such cases.

### Command Syntax

```
class (type qos|) (NAME|class-default)
no class (type qos|) (NAME|class-default)
```

### Parameters

<code>type qos</code>	Ingress/egress class map.
<code>NAME</code>	Specify the class map name
<code>class-default</code>	Specify the default class map

### Default

By default, class is type qos

### Command Mode

Policy-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#
(config)#policy-map type qos PP
(config-pmap-que)#class type qos C_PP_1
```

---

## class type queuing

Use this command to add a queuing class-map to a queuing policy map.

Use the `no` command to remove a queuing class-map from the policy map.

### Command Syntax

```
class (type queuing ((default (q0|q1|q2|q3|q4|q5|q6|q7))|NAME) | NAME | queuing
class-default)
no class (type queuing|) NAME
```

### Parameters

<code>type queuing</code>	Egress class map
<code>NAME</code>	Specify the class map name
<code>&lt;q0-q7&gt;</code>	Default queue name
<code>class-default</code>	Specify the default class map

### Default

No default value is specified

### Command Mode

Policy Map type queuing Mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#
(config)#policy-map type queuing PP
(config-pmap-que)#class type queuing C_PP_1
```

---

## clear qos statistics

Use this command to clear the quality of service (QoS) statistics.

### Command Syntax

```
clear qos statistics (interface IFNAME|) ((type qos|type qos input|type qos
output|type queuing|type all)|)
```

### Parameters

interface IFNAME	(Optional) Specifies the interface name for which to clear QoS statistics (maximum length 32 characters).
type qos	(Optional) Clears QoS statistics
type qos input	(Optional) Clears QoS input statistics
type qos output	(Optional) Clears QoS output statistics
type queuing	(Optional) Clears queuing class statistics
type all	(Optional) Clears all QoS and queuing statistics

### Default

if no parameters are configured, the command will clear type QoS and type queuing class statistics on all interfaces.

### Command Mode

Privileged Exec mode

### Applicability

Introduced before OcNOS version 1.3.

### Examples

To clear QoS statistics on all interfaces, use the following command:

```
OcNOS#clear qos statistics
```

---

## cpu-queue

Use this command to configure create a cpu queue for vxlan.

Use the `no` form of this command to remove a cpu queue.

### Command Syntax

```
cpu-queue <queue-name> ( (rate <value>|) (lossy|lossless|) (monitor|no-monitor|) )
no cpu-queue <queue-name> ( (rate|) (lossy|lossless|) (monitor|no-monitor) |)
```

### Parameters

queue-name	Name of the cpu queue
rate	When the packets are uplifted
lossy	If enabled, packets are dropped at cpu-queue when the cpu-queues congested
loseless	If enabled, packets are dropped at ingress port
monitor	Enable logging when cpu-queue discards packets
no-monitor	Disable logging

### Default

Default value for vxlan cpu-queue command is 500.

### Command Mode

Configure mode

### Applicability

This command was introduced before OcNOS version 1.3.8

### Example

```
#configure terminal
(config)#cpu-queue cpu rate 500
(config-dscp-queue)#exit
```

---

## dynamic-threshold

Use this command to configure egress dynamic-threshold values.

Use `no` parameter of this command to unconfigure .

### Command Syntax

```
dynamic-threshold <0-10>
no dynamic-threshold
```

### Parameters

<0-10>

Specifies the egress dynamic-threshold value in kbytes.

Define a configurable limit on how many buffers each queue can draw from the shared buffer pool. This pool operates according to a dynamic threshold parameter known as the alpha value.

The dynamic threshold can be set individually for different queues, allowing fine-grained control over how each queue accesses the shared buffer. Following are the dynamic threshold values that can be configured:

- 0 1/128 MMU alpha.
- 1 1/64 MMU alpha.
- 2 1/32 MMU alpha.
- 3 1/16 MMU alpha.
- 4 1/8 MMU alpha.
- 5 1/4 MMU alpha.
- 6 1/2 MMU alpha.
- 7 1 MMU alpha.
- 8 2 MMU alpha.
- 9 4 MMU alpha.
- 10 8 MMU alpha

### Default

### Command Mode

config-pmap-c-queue-def mode

policy-class-map-queue mode

### Applicability

Introduced in OcNOS version 7.0.0. This command is supported only on the Trident IV, Tomahawk IV, and Tomahawk V platforms.

### Example

Command to configure egress dynamic-threshold value:

```
OcNOS#configure terminal
(config)#policy-map type queuing default default-out-policy
(config-pmap-que-def)#class type queuing default q0
(config-pmap-c-que-def)#dynamic-threshold 7
```

## egress cos map

Use this command to map a queue value to the CoS value.

Use the `no` form of this command to remove the map.

Note:

- Egress CoS map will be taking effect only when remark CoS is enabled.
- Color is an optional parameter. If not provided, the same map will be set for all colors.
- If ingress qos policy-map is configured with set cos action on ingress interface, set action will take priority over egress cos map and packet will egress out with set cos value.

### Command Syntax

```
queue <0-7> (color (green|yellow|red|all)|) cos <0-7>
no queue <0-7> (color (green|yellow|red|all)|)
```

### Parameters

<0-7>	Identifying queue number
color	Maps different colors such as green or yellow or red or all
<0-7>	CoS value

### Default

By default, CoS to queue mapping is one to one.

### Command Mode

Egress cos map mode

### Applicability

This command was introduced in OcNOS DC version 4.2.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Example

```
(config)#qos profile queue-color-to-cos default
(config-egress-cos-map)#queue 1 color green cos 5
(config-egress-cos-map)#queue 1 cos 6
```

Color is an optional parameter. So if users do not provide color, for all colors same CoS remarking will be set. If user provides color, then only for that specific color egress map will be changed. If user provides map for all colors as well as without color, map with color will take priority.

```
(config-egress-cos-map)#no queue 1 color green
(config-egress-cos-map)#no queue 1
```

If user want to remove all the mapping of queue (for all colors) no need to provide color, else can provide specific color to remove specific map .

## egress dscp map

Use this command to map a queue to a DSCP value.

Use the `no` form of this command to remove the map.

Note:

- Egress DSCP map will be taking effect only when remark DSCP is enabled.
- Color is an optional parameter. If not provided, the same map will be set for all colors.
- If ingress qos policy-map is configured with set dscp/precedence action on ingress interface, set action will take priority over egress dscp map and packet will egress out with set scp/precedence value.

### Command Syntax

```
queue <0-7> (color (green|yellow|red|all)|) dscp <0-63>
no queue <0-7> (color (green|yellow|red|all)|)
```

### Parameters

<code>&lt;0-7&gt;</code>	Identifying queue number
<code>color</code>	Maps different colors such as green or yellow or red or all
<code>dscp &lt;0-63&gt;</code>	DSCP value

### Default

By default, 8 DSCP values are mapped to one queue.

For example: DSCP 0-7 queue 0, DSCP 8-15 queue 1.

### Command Mode

Egress dscp map mode

### Applicability

This command was introduced in OcNOS DC version 4.2

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Example

```
(config)#qos profile queue-color-to-dscp default
(config-egress-dscp-map)#queue 2 color yellow dscp 40
(config-egress-dscp-map)#queue 2 dscp 36
```

If user specifies color in map then map will be set for that specific color else for all colors same map will be set.

```
(config-egress-dscp-map)#no queue 2 color yellow
(config-egress-dscp-map)#no queue 2
```

If user want to remove all the mapping of dscp (for all colors) no need to provide color, else can provide specific color to remove specific map.



---

## ingress cos map

Use this command to map a CoS value to the queue.

Use the `no` form of this command to remove the map.

### Command Syntax

```
cos <0-7> (dei (0|1|all)|) queue <0-7> (color (green|yellow|red)|)
no cos <0-7> (dei (0|1|all)|)
```

### Parameters

<0-7>	CoS value
dei	Drop Eligible Indicator (0 1 all)
queue <0-7>	Identifying queue number
color	Maps different colors such as green or yellow or red or all.

### Default

By default, CoS to queue mapping is one to one, and DEI 0 will be mapped to color "green" and DEI 1 will be mapped to color "yellow".

### Command Mode

Ingress cos map mode

### Applicability

This command was introduced in OcNOS DC version 4.2.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Example

```
(config)#qos profile cos-to-queue default
(config-ingress-cos-map)#cos 1 queue 2
```

---

## ingress dscp map

Use this command to map a DSCP value to the queue.

Use the `no` form of this command to remove the map.

**Note:** Color is an optional parameter. If not provided, it will be set as the default value. Please refer the Configuration Guide for the default value table.

### Command Syntax

```
dscp <0-63> queue <0-7> (color (green|yellow|red) |)
no dscp <0-63>
```

### Parameters

<code>&lt;0-63&gt;</code>	DSCP value
<code>queue &lt;0-7&gt;</code>	Identifying queue number
<code>color</code>	Maps different colors such as green or yellow or red or all.

### Default

By default, 8 DSCP values are mapped to one queue.

For example: DSCP 0-7 queue 0, DSCP 8-15 queue 1.

### Command Mode

Ingress dscp map mode

### Applicability

This command was introduced in OcNOS DC version 4.2.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Example

```
(config)#qos profile dscp-to-queue default
(config-ingress-dscp-map)#dscp 1 queue 2
```

---

## lossless

Use this command to enable lossless setting on egress queue.

### Command Syntax

```
(no|) lossless
```

### Parameters

None

### Default

Disabled

### Command Mode

Policy-class-map-queue mode

### Applicability

This command was introduced in OcNOS version 6.2.

### Example

```
OcNOS#con t
OcNOS(config)#policy-map type queuing default p1
OcNOS(config-pmap-que)#class type queuing default q0
OcNOS(config-pmap-c-que)#lossless
```

---

## match access-group

Use this command to classify the group based on the access group.

Use the `no` command to remove access group match criteria from a class map

### Command Syntax

```
match access-group NAME
no match access-group NAME
```

### Parameters

`access-group NAME` Specify the access group name

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)# class-map class_acl
(config-cmap-qos)# match access-group my_acl
```

---

## match cos

Use this command to classify the traffic based on cos

Use the `no` command to remove the match configuration.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on cos using the command `match cos 2,4,6` and remove the match configuration using the command `no match cos 2-6`.

### Command Syntax

```
match cos WORD
no match cos
```

### Parameters

WORD	CoS value or list of specified CoS values. Valid values are from 0 to 7.
------	--

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#class-map type qos C_QOS1
(config-cmap-qos)#match cos 1
```

---

## match cos inner

Use this command to classify the traffic based on inner cos.

Use the `no` command to remove the match configuration.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on inner cos using the command `match cos inner 2,4,6` and remove the match configuration using the command `no match cos inner 2-6`.

### Command Syntax

```
match cos inner WORD
no match cos inner
```

### Parameters

WORD	Inner CoS value or list of specified CoS values. Valid values are from 0 to 7.
------	--

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#class-map type qos C_QOS1
(config-cmap-qos)#match cos inner 1
```

## match dscp

Use this command to classify the traffic based on dscp.

Use the `no` command to remove the configured dscp value.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on dscp using the command `match dscp 2,4,6` and remove the match configuration using the command `no match dscp 2-6`.

### Command Syntax

```
match dscp [WORD | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 |
af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | default | ef]
no match dscp
```

### Parameters

WORD	<0-63> List of DSCP values.
af11	AF11 dscp (001010).
af12	AF12 dscp (001100)
af13	AF13 dscp (001110)
af21	AF21 dscp (010010)
af22	AF22 dscp (010100)
af23	AF23 dscp (010110)
af31	AF31 dscp (011010)
af32	AF32 dscp (011100)
af33	AF33 dscp (011110)
af41	AF41 dscp (100010)
af42	AF42 dscp (100100)
af43	AF43 dscp (100110)
cs1	CS1(precedence 1) dscp (001000)
cs2	CS2(precedence 2) dscp (010000)
cs3	CS3(precedence 3) dscp (011000)
cs4	CS4(precedence 4) dscp (100000)
cs5	CS5(precedence 5) dscp (101000)
cs6	CS6(precedence 6) dscp (110000)
cs7	CS7(precedence 7) dscp (111000)
default	Default dscp (000000)
ef	EF dscp (101110)
all	Delete all matched DSCP values.

### Default

No default value is specified

**Command Mode**

Class-map mode

**Applicability**

This command was introduced before OcNOS version 1.3.

**Examples**

```
(config)#class-map type qos C_QOS7  
(config-cmap-qos)#match dscp 48-55
```



---

## match ip rtp

Use this command to configure a class map to use the Real-Time Protocol (RTP) port as a match criteria.

Use the `no` command to remove the RTP port as a match criteria.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on RTP port using the command `match ip rtp 5000,7000,9000` and remove the match configuration using the command `no match ip rtp 5000-9000`.

### Command Syntax

```
match ip rtp WORD
no match ip rtp
```

### Parameters

WORD	Specify User Datagram Protocol (UDP) or list of UDP ports that are using RTP. Valid values are from 2000 to 65535.
------	--

### Default

No default value is specified

### Command Mode

Class-map type qos

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)# class-map my_test
(config-cmap-qos)# match ip rtp 2300
```

---

## match mac

Use this command to classify based on the mac address (can be source or destination or both)

Use the `no` command to remove the match configuration.

### Command Syntax

```
match mac (src |dest) (XX:XX:XX:XX:XX:XX| XX-XX-XX-XX-XX-XX |XXXX.XXXX.XXXX)
no match mac (src |dest)
```

### Parameters

<code>mac src</code>	Specifies the source Ethernet MAC
<code>mac dest</code>	Specifies the destination Ethernet MAC
<code>XX:XX:XX:XX:XX:XX</code>	MAC address option 1
<code>XX-XX-XX-XX-XX-XX</code>	MAC address option 2
<code>XXXX.XXXX.XXXX</code>	MAC address option 3

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#class-map type qos C_QOS1
(config-cmap-qos)#match mac src 11:22:33:44:55:66
(config-cmap-qos)#match mac dest 3344.5566.7788
```

---

## match precedence

Use this command to traffic classification based on precedence.

Use the `no` command to remove the match configuration.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on precedence using the command `match precedence 2,4,6` and remove the match configuration using the command `no match precedence 2-6`.

### Command Syntax

```
match precedence [WORD | critical | flash | flash-override | immediate | internet |  
network | priority | routine | 0-7]  
no match precedence
```

### Parameters

<code>word</code>	IP precedence value
<code>critical</code>	Critical precedence
<code>flash</code>	Flash precedence
<code>flash-override</code>	Flash override precedence
<code>immediate</code>	Immediate precedence
<code>internet</code>	Internetwork control precedence
<code>network</code>	Network control precedence
<code>priority</code>	Priority precedence
<code>routine</code>	Routine precedence
<code>all</code>	Delete all matched IP precedence values.
<code>0-7</code>	Valid values are in range 0-7

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)# class-map my_test  
(config-cmap-qos)# match precedence 7
```

---

## match protocol

Use this command to classify traffic based on protocol.

Use the `no` command to remove the specified protocol as a match criteria.

### Command Syntax

```
match protocol (arp | bridging | cdp | clns | clns-is | clns-es | dhcp | isis |  
netbios )  
no match protocol
```

### Parameters

arp	Address Resolution Protocol (ARP)
bridging	Bridging
cdp	Cisco Discovery Protocol (CDP)
clns	Connection-less Network Service (CLNS)
clns-is	CLNS Intermediate System
clns-es	CLNS end System
dhcp	Dynamic Host Configuration (DHCP)
isis	Intermediate system to intermediate system (IS-IS)
netbios	NetBIOS Extended User Interface (NetBEUI)
all	Delete all matched protocols.

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)# class-map my_test  
(config-cmap-qos)# match protocol
```

---

## match qos-group

Use this command to match a QoS group in a type queuing class map.

Use the `no` to remove a QoS match on a queue number from a type queuing class map.

### Command Syntax

```
match qos-group <1-2000>
no match qos-group <1-2000>
```

### Parameters

`qos-group <1-2000>` Specify qos group value or list of qos group values specified in bytes.

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to Trident II and Trident II+ platforms.

### Examples

```
(config)#
(config)#class-map type queuing match-any C_PP_1
(config-cmap-que)#match qos-group 1
```

---

## match traffic-type

Use this command to classify based on traffic-type

Use the `no` command to remove the match configuration.

Note: Class with match traffic type default will have lower priority over class with other traffic type match.

### Command Syntax

```
match traffic-type (l2-uc|l2-uc-unknown|default)
no match traffic-type (l2-uc|l2-uc-unknown|default)
```

### Parameters

<code>traffic-type l2-uc</code>	Match L2 Unicast traffic
<code>traffic-type l2-uc-unknown</code>	Match Unknown L2 Unicast traffic
<code>traffic-type default</code>	Match all other traffic-types

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
(config)#class-map type qos C_QOS1
(config-cmap-qos)#match traffic-type l2-uc
```

---

## match vlan

Use this command to classify the traffic based on a VLAN.

Use the `no` command to remove the match configuration.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on VLAN using the command `match vlan 2,4,6` and remove the match configuration using the command `no match vlan 2-6`.

### Command Syntax

```
match vlan WORD
no match vlan (WORD|all)
```

### Parameters

WORD	Enter VLAN ID <1-4094> or range of VLAN ID's separated by commas. For example, 2 or 2,4-5 or 50,51,52 or 100-120,122-130 etc.
all	Delete all VLAN ID entries.

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#class-map type qos C_QOS1
(config-cmap-qos)#match vlan 1
```

---

## match vlan inner

Use this command to classify the traffic based on the inner VLAN.

Use the `no` command to remove the match configuration.

**Note:** The match commands which accept range have silent exit which makes removal of these match configurations easier. For example, classify the traffic based on the inner VLAN using the command `match vlan inner 2,4,6` and remove the match configuration using the command `no match vlan inner 2-6`.

### Command Syntax

```
match vlan inner WORD
no match vlan inner (WORD|all)
```

### Parameters

WORD	Enter VLAN ID <1-4094> or list of VLAN ID's separated by commas. For example, 2,4 etc.
all	Delete all VLAN ID entries.

### Default

No default value is specified

### Command Mode

Class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#class-map type qos C_QOS1
(config-cmap-qos)#match vlan inner 1
```



## police

Use this command to configure policing of the data rates for a particular class of traffic.

Use the `no` command to remove a policing configuration.

Note: Committed Information Rate (CIR) and Peak Information Rate (PIR) can only be whole numbers.

Note: Granularity for policer is 8kbps.

### Command Syntax

```
police (colour-blind | colour-aware |) (cir) (<1-2000000000> (kbps|mbps|gbps) |
percent <1-100>) ((pir (<1-2000000000> (kbps|mbps|gbps) | percent <1-100>)) (bc)
<1-256000> (kbytes|mbytes|ms|us)) ((be)<1-256000>
(kbytes|mbytes|ms|us)) ((conform (transmit | set-prec-transmit <0-7> | set-dscp-
transmit <0-63> | set-cos-transmit <0-7> )) | ((exceed (drop | set-dscp-transmit
<0-63> | set-cos-transmit <0-7> | transmit )) | ((violate (drop | set-dscp-
transmit <0-63> | transmit))))))
no police
```

### Parameters

<code>colour-blind</code>	Do not police on color.
<code>colour-aware</code>	Do police on color.
<code>cir &lt;1-2000000000&gt;</code>	Specify Committed information rate.
<code>pir &lt;1-2000000000&gt;</code>	Peak information rate.
<code>kbps</code>	Specify the units of kbps per second.
<code>mbps</code>	Specify the units of mbps per second.
<code>gbps</code>	Specify the units of gbps per second.
<code>Percent</code>	Specify the rate in percent.
<code>bc &lt;1-256000&gt;</code>	Burst rate committed.
<code>be &lt;1-256000&gt;</code>	Burst rate extended.
<code>transmit</code>	Specify the action of transmitting packets.
<code>set-prec-transmit</code>	Sets the IP precedence field to the specified value and transmits the packet.
<code>set-dscp-transmit</code>	Sets the Differentiated Service Code Point (DSCP) field to the specified value and transmits the packet.
<code>set-cos-transmit</code>	Sets the class of service (CoS) field to the specified value and transmits the packet.
<code>drop</code>	Specify the action of dropping packets.
<code>conform</code>	Sets the action to take when the data rate is within bounds

exceed	Sets the action to take when the data rate is exceeded. Default is drop.
violate	Sets the action to take when the data rate violates the configured rate values. The default is drop.

## Default

**Table 23: Default values**

Parameter	Default
policer-type	Color-Blind
cir	N/A
pir	0
bc	0
be	0
conform	Transmit
exceed	Drop
violate	Drop

## Command Mode

Policy-map mode

## Applicability

This command was introduced before OcNOS version 1.3. On Tomahawk 3 and Tomahawk 4 hardware, the policer is not supported in the egress direction.

## Examples

```
(config)# policy-map type qos 2345
(config-pmap-qos)#class type qos 2345
(config-pmap-c-qos)# police cir 2 mbps pir 4 mbps bc 2 mbytes be 4 mbytes conform
transmit exceed set-cos-transmit 1 violate drop
```

## Usage

Traffic policing is based on the concept of *marking* IP packets, and then *metering* the packets in relation to how they are marked. This is called the “Two Rate Three Color Marker (trTCM)” process.

The Two Rate Three Color Marker (trTCM) meters an IP packet stream, and marks its packets as either green, yellow, or red. A packet is marked RED if it exceeds the *Peak Information Rate* (PIR). Otherwise it is marked either YELLOW or GREEN depending on whether it exceeds or does not exceed the Committed Information Rate (CIR). The trTCM is useful, for example, for ingress policing of a service, where a peak rate needs to be enforced separately from a committed rate.

The Meter meters each packet and passes the packet and the metering result to the Marker. The Meter operates in one of two modes – Color-Blind or Color-Aware. In the Color-Blind mode, the Meter assumes that the packet stream is uncolored. In the Color-Aware mode, the Meter assumes that some preceding entity has pre-colored the incoming packet stream so that each packet is either GREEN, YELLOW, or RED.

The following describes the equations used to determine the BC and BE values:

**Note:** CIR, PIR, BC, and BE values are all in kbits/sec.

=====

```
BC = CIR * 5 / 1000;
Range check [64kbytes-256mbytes]
if (BC / 8) < 64)
then BC = 64 * 8;
else if (BC / 8) > 256000)
then BC = 256000 * 8;
```

=====

Same calculation for BE, as well.

**Note:** If the PIR value is not mentioned in the configuration, then the CIR value itself is considered for BE calculation.

=====

```
BE = PIR * 5 / 1000;
Range check [64kbytes-256mbytes]
if (BE / 8) < 64)
then BE = 64 * 8;
else if (BE / 8) > 256000)
then BE = 256000 * 8;
```

=====

**For example:**

Configure: police CIR 1 mbps

Hardware: CIR = 1000kbits/sec , BC = 512kbits, BE = 512kbits

Configure: police CIR 1 mbps PIR 200 mbps

Hardware: CIR = 1000kbits/sec, BC = 512kbits, PIR = 200000kbits/sec, BE = 1000kbits

For additional information regarding policing, see RFC 2697 and RFC 2698.

---

## policy-map

Use this command to create a policy map and enter policy-map mode.

Use the `no` command to remove a policy map.

Note: You cannot delete a policy map if it is attached to an interface.

### Command Syntax

```
policy-map {NAME | (type (qos|queuing (|default)) NAME)}  
no policy-map {NAME | (type (qos|queuing (|default)) NAME)}
```

### Parameters

NAME	Policy map name (maximum 32 characters)
type qos	QoS policy map
type queuing	Queuing policy map
type default	Default class map
type NAME	Specify the class map name (Max Size 32)

### Default

No default value is specified

### Command Mode

Configuration mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#  
(config)#policy-map type qos PQOS
```

---

## priority

Use this command to set the user priority for the class attached to this policy-map.

Use the `no` parameter with this command to unset the priority value.

**Note:** The higher the priority number in a policy map, the greater the priority assigned to the class. User-configured priorities override default priorities. This rule does not apply to classes with match access-group criteria, as priorities in such cases are determined by the sequence number in the access list. This behavior is consistent across all platforms.

### Command Syntax

```
priority <1-1000>
no priority
```

### Parameters

<1-1000>	Priority value
----------	----------------

### Default

No default value is specified

### Command Mode

Policy-class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
#configure terminal
(config)#policy-map pmap1
(config-pmap)#class cmap1
(config-pmap-c)#priority 20
```

---

## priority (queuing)

Use this command to configure a single output queuing class as the priority queue.

Note: Priority can be set only on default queues (such as queues in the default queuing policy-map).

### Command Syntax

```
priority
```

### Parameters

None

### Default

No default value is specified. Higher priority queue will have higher priority always when set.

### Command Mode

Policy map-class type queuing mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
#configure terminal
(config)#policy-map type queuing default default-out-policy
(config-pmap-que)#class type queuing default q0
(config-pmap-c-que)#priority
```

---

## qos (enable | disable)

Use this command to globally enable or disable Quality-of-Service (QoS).

Note: Enabling or disabling QoS is a disruptive operation, stopping all traffic on ports which causes traffic loss.

### Command Syntax

```
qos (enable | disable)
```

### Parameters

enable	Globally enable QoS
disable	Globally disable QoS

### Default

By default, QoS is enabled.

### Command Mode

Configure

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
#configure terminal
(config)# qos enable

(config)#qos disable
```

## qos map-profile

Use this command to attach (map) a profile to an interface.

Use the no form of this command to remove a profile.

Note:

- By-default, "default" profiles are attached on their supported interfaces (cos-to-queue and queue-to-cos on L2 interfaces and DSCP-to-queue and queue-color-to-DSCP on L3 interfaces).
- You can create and attach your own profile to supported interfaces. After removing a user-defined profiles from an interface, the "default" profile is applied.

### Command Syntax

```
qos map-profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-color-
to-dscp | precedence-to-queue | queue-to-precedence | ingress-pg-map | egress-
dynamic-ecn) NAME
```

```
no qos map-profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-
color-to-dscp | precedence-to-queue | queue-to-precedence | ingress-pg-map |
egress-dynamic-ecn) NAME
```

### Parameters

cos-to-queue	Profile for CoS to queue map
dscp-to-queue	Profile for DSCP to queue map
queue-color-to-cos	Profile for queue color to CoS map
queue-color-to-dscp	Profile for queue color to DSCP map
precedence-to-queue	Profile for precedence to queue map
queue-to-precedence	Profile for queue to precedence map
ingress-pg-map	Profile for ingress priority group map
egress-dynamic-ecn	Profile for egress dynamic ECN map
NAME	Profile map name (maximum 32 characters)

### Default

By default, the default cos-to-queue-profile is applied to an L2 interface, and the default DSCP-to-queue profile is attached to an L3 interface.

### Command Mode

Interface modes



## Applicability

This command was introduced in OcNOS DC version 4.2

The `egress-dynamic-ecn` option is added in OcNOS version 7.0.0. It applies only for Tomahawk 5 (TH5) platforms.

## Example

```
(config-if)#qos map-profile cos-to-queue cos-map
(config-if)#qos map-profile dscp-to-queue dscp-map
(config-if)#qos map-profile queue-color-to-cos egress-cos-map
(config-if)#qos map-profile queue-color-to-dscp q-to-dscp-map
```

### Attaching a PG profile.

```
OcNOS(config)#int ce1
OcNOS(config-if)#qos map-profile ingress-pg-map pg2
OcNOS(config-if)#commit
OcNOS(config-if)#exit
OcNOS(config)#end
```

### Updating the PG profile attached to an interface.

```
OcNOS(config)#qos profile ingress-pg-map pg2
OcNOS(config-ingress-pg-queue-map)#priority-group 0 xon-offset 1000 xoff-
threshold 600 dynamic-threshold 6
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
OcNOS(config)#end
```

### Attaching a PG profile to a LAG interface.

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#bridge 1 protocol ieee vlan-bridge
OcNOS(config)#vlan 100 br 1
OcNOS(config)#int sa10
OcNOS(config-if)#switchport
OcNOS(config-if)#bridge-group 1
OcNOS(config-if)#switchport mode trunk
OcNOS(config-if)#switchport trunk allowed vlan all
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#int ce5
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#int ce4
% Warning: Executing the CLI from higher config mode level
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#comm
OcNOS(config-if)#
OcNOS(config-if)#exit
OcNOS(config)#int sa10
OcNOS(config-if)#qos map-profile ingress-pg-map pg2
```

```
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#end
```

#### Adding a member interface to a LAG that has a PG profile attached:

```
OcNOS#sh run qos
qos enable
!
qos profile ingress-pg-map default
  priority-group 0 xon-offset 3500 xoff-threshold 2000 dynamic-threshold 9
  priority-group 1 xon-offset 2400 xoff-threshold 1200
!
qos profile ingress-pg-map pg2
  priority-group 0 xon-offset 1000 xoff-threshold 600 dynamic-threshold 6
!
!
!
!
interface sa10
  qos map-profile ingress-pg-map pg2
!
```

```
OcNOS(config)#int ce6
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#int ce7
OcNOS(config-if)#static-channel-group 10
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#end
```

#### Attaching a PG profile to a MLAG interface.

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#bridge 1 protocol rstp vlan-bridge
OcNOS(config)#comm
OcNOS(config)#int sa20
OcNOS(config-if)#switchport
OcNOS(config-if)#bridge-group 1
OcNOS(config-if)#switchport mode trunk
OcNOS(config-if)#switchport trunk allowed vlan all
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#int ce9
OcNOS(config-if)#static-channel-group 20
```

```
OcNOS(config-if)#exit
OcNOS(config)#int ce10
OcNOS(config-if)#static-channel-group 20
OcNOS(config-if)#exit
OcNOS(config)#comm
OcNOS(config)#int mlag1
OcNOS(config-if)#switchport
OcNOS(config-if)#bridge-group 1
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#int sa20
OcNOS(config-if)#mlag 1
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#int mlag1
OcNOS(config-if)#qos map-profile ingress-pg-map pg2
OcNOS(config-if)#comm
OcNOS(config-if)#exit
OcNOS(config)#end
```

To create a D-ECN profile EG1 is to the egress interface xe1.

```
    OcNOS(config-pmap-que-def)#int xe1
    OcNOS(config-if)#qos map-profile egress-dynamic-ecn EG1
OcNOS(config-eg-dynamic-ecn-map)#queue 3 on-offset 70000 off-offset 8000 bytes
```

## qos profile

Use this command to create new profiles or to update "default" profiles.

Use the no form of this command to remove the "user-defined" profiles, or to undo custom updates in "default" profiles.

### Command Syntax

```
qos profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-color-to-
dscp) (NAME|default)

no qos profile (cos-to-queue | dscp-to-queue | queue-color-to-cos | queue-color-to-
dscp) (NAME|default)
```

### Parameters

cos-to-queue	Profile for CoS to queue map
dscp-to-queue	Profile for DSCP to queue map
queue-color-to-cos	
	Profile for queue color to CoS map
queue-color-to-dscp	
	Profile for queue color to DSCP map
NAME	Profile map name (maximum 32 characters)

### Default

By default, "default" profile is created for all the profile types. These profiles can only be updated by the user neither be created nor be destroyed.

### Command Mode

Configure modes

### Applicability

This command was introduced in OcNOS DC version 4.2.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Example

To create a new profile:

```
(config)#qos profile cos-to-queue cos-map
(config)#qos profile dscp-to-queue dscp-map
(config)#qos profile queue-color-to-cos egress-cos-map
(config)#qos profile queue-color-to-dscp q-to-dscp-map
```

To update the "default" profile:

```
(config)#qos profile cos-to-queue default
(config)#qos profile dscp-to-queue default
(config)#qos profile queue-color-to-cos default
(config)#qos profile queue-color-to-dscp default
```

## qos profile egress-dynamic-ecn

Use this command to set the queue mapping for egress dynamic ECN profile.

Use the `no` form of this command delete the profile.

Use `show qos-profile` to show the profile detail.

Use `qos map-profile` to map the profile on interface.

### Command Syntax

```
qos profile egress-dynamic-ecn <NAME> queue <0-7> on-offset <1-266338050> off-
offset <1-266338050> (packets | bytes | kbytes)
no qos profile egress-dynamic-ecn <NAME> no queue <0-7>
```

### Parameters

Name	The profile name to be created.
queue <0-7>	The queue value.
on offset <1-266338050>	ON-offset value
off-offset <1-266338050>	OFF-offset value
(packets   bytes   kbytes)	Offset units

### Default

By default, "default" profile is created for all the profile types. These profiles can only be updated by the user neither be created nor be destroyed.

### Command Mode

config-eg-dynamic-ecn-map

### Applicability

This command was introduced in OcNOS version 7.0.0.

This command applies only to the Tomahawk 5 (TH5) platforms.

### Example

To create a new profile:

```
#configure terminal
(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
(config-egress-prec-map)#queue 1 on-offset 7000 off-offset 9000 bytes
(config)#interface xe2
(config-if)#qos map-profile egress-dynamic-ecn egr-dyn-ecn-map
```

To create Dynamic-ECN profile

```
OcNOS(config)#qos profile egress-dynamic-ecn eg1
```

To delete D-ECN thresholds mapping for each queue in the profile.

```
OcNOS(config)#no qos profile egress-dynamic-ecn eg1
```

**To attach a D-ECN profile on an interface**

```
(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
(config-eg-dynamic-ecn-map)#queue 1 on-offset 20 off-offset 50 packets
(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
(config-egress-prec-map)#queue 1 on-offset 7000 off-offset 9000 bytes
(config)#interface xe2
(config-if)#qos map-profile egress-dynamic-ecn egr-dyn-ecn-map
OcNOS(config)#end
```

Simultaneously supporting Static and D-ECN profile on an interface. Static-ECN is via WRED ECN marking. The final marking is the logical OR of the two ECN features.

```
OcNOS(config)#qos profile egress-dynamic-ecn egr-dyn-ecn-map
OcNOS(config-eg-dynamic-ecn-map)#queue 2 on-offset 70000 off-offset 90000 bytes
```

## qos profile ingress-pg-map

Use this command to create a ingress priority group (PG) profile or update the default ingress PG profile.

Use `no` parameter of this command to remove a ingress PG profile.

Use `no` parameter of `priority-group` command to unset a PG mapping in the ingress PG profile.

Use [show qos-profile](#) to show the profile detail.

Use [qos map-profile](#) to map the profile on interface.

### Command Syntax

```
qos profile ingress-pg-map (NAME|default) priority-group <0-7> (xon-offset <0-83000> (xoff-threshold <> | dynamic-threshold <0-10> |) | xoff-threshold <> | dynamic-threshold <0-10>)no qos profile ingress-pg-map (NAME|default)
no qos profile ingress-pg-map (NAME|default)
no priority-group <0-7>
```

### Parameters

Use this command to update the priority mapping in the PG profile.

<code>ingress-pg-map &lt;NAME&gt;</code>	Specifies the name of the ingress priority group map profile.
<code>default</code>	Specifies the default PG map profile.
<code>priority-group &lt;0-7&gt;</code>	Specifies the priority mapping in the PG profile. The values are defined in Kbytes by default.
<code>xon-offset &lt;1-83000&gt;</code>	Specifies XON buffer offset of the shared memory that a PG can receive. The value is specified in Kbytes by default. When the buffer usage on the ingress priority group drops below this PFC XON offset from the shared limit, the priority group sends a PFC message to the peer to resume packet transmission.
	When the ingress PG buffer reaches the configured limit, it triggers the transmission of PFC pause frames to its egress peer.

`xoff-threshold <1-83000>` Specifies the absolute threshold at which the PG XOFF will start. The value is specified in Kbytes by default. Typically The difference between these thresholds provides hysteresis in toggling between X-OFF and X-ON, thereby limiting the PFC transmission rate.

`dynamic-threshold <0-10>` Defines the configurable limit on how many buffers each queue can draw from the shared buffer pool. This pool operates according to a dynamic threshold parameter known as the alpha value.

The dynamic threshold modifies the PG queue size only in the absence of a configured `xoff-threshold`.

The dynamic threshold can be set individually for different queues, allowing fine-grained control over how each queue accesses the shared buffer. Following are the dynamic threshold values that can be configured:

- 0 1/128 MMU alpha.
- 1 1/64 MMU alpha.
- 2 1/32 MMU alpha.
- 3 1/16 MMU alpha.
- 4 1/8 MMU alpha.
- 5 1/4 MMU alpha.
- 6 1/2 MMU alpha.
- 7 1 MMU alpha.
- 8 2 MMU alpha.
- 9 4 MMU alpha.
- 10 8 MMU alpha

**Note:** Memory Management Unit (MMU) refers to block inside a switch that controls packet buffering and queue management.

**Note:** Only a single threshold attribute—`xoff-threshold` or `dynamic-threshold`—is valid and permitted in the CLI configuration.

## Default

- `xon-offset` — 32
- `xoff-threshold` — None.
- `dynamic-threshold` — 8

## Command Mode

Configure Mode

## Applicability

Introduced in OcNOS version 7.0.0. This command is supported only on the Trident3 (TR3) platforms, Trident 4 (TR4) platforms, Tomahawk3 (TH3) platforms, Tomahawk4 (TH4) platforms, and Tomahawk 5 (TH5) platforms.

## Example

Command to create and attach user-defined PG profile.

```
OcNOS#configure terminal
(config)#qos profile ingress-pg-map PG1
```



```
(config-ingress-pg-queue-map)#priority-group 0 xon-offset 30000
(config-ingress-pg-queue-map)#priority-group 1 xoff-threshold 20000
(config-ingress-pg-queue-map)#priority-group 2 dynamic-threshold 2
(config-ingress-pg-queue-map)#priority-group 3 xon-offset 2000 xoff-threshold
10000
(config-ingress-pg-queue-map)#priority-group 4 xon-offset 50000 dynamic-
threshold 9

(config)#interface xe65
(config-if)#qos map-profile ingress-pg-map PG1
```

#### Updating default global PG profile with XON-offset:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 1 xon-offset 5000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
OcNOS(config)#end
OcNOS#
```

#### Updating default global PG profile with XOFF-threshold:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 2 xoff-threshold 10000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#end
OcNOS#
```

#### Updating default global PG profile with dynamic-threshold:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 3 dynamic-threshold 2
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit
OcNOS(config)#end
OcNOS#
```

#### Updating default global PG profile with XON-offset and XOFF-threshold:

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 4 xon-offset 5000 xoff-
threshold 15000
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#end
OcNOS#
```

#### Updating default global PG profile with XON-offset and dynamic threshold:

```
OcNOS#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
OcNOS(config)#qos profile ingress-pg-map default
OcNOS(config-ingress-pg-queue-map)#priority-group 5 xon-offset 1000 dynamic-
threshold 8
OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#end
OcNOS#
```

**Accessing default global PG profile:**

```
OcNOS#conf t
Enter configuration commands, one per line. End with CNTL/Z. OcNOS(config)#qos
profile ingress-pg-map default OcNOS(config-ingress-pg-queue-map)#comm
OcNOS(config-ingress-pg-queue-map)#exit OcNOS(config)#end
```

**Detaching a PG profile:**

```
OcNOS(config)#int ce1
OcNOS(config-if)#no qos map-profile ingress-pg-map pg2 OcNOS(config-if)#comm
2025 Aug 20 01:17:47.594 : OcNOS : HSL : DEBUG : QOS: zNSM_SYNC: Successfully
set/unset xon: 5000 xoff: 15000 dynamic_threshold: 0 on port :5
OcNOS(config-if)#exit OcNOS(config)#end
```

---

## qos profile precedence-to-queue

Use this command to set the precedence to queue profile.

Use the no form of this command delete the profile.

Use [show qos-profile](#) to show the profile detail.

Use [qos map-profile](#) to map the profile on interface.

### Command Syntax

```
qos profile precedence-to-queue (NAME|)
precedence <0-7> queue <0-7>
no qos profile precedence-to-queue (NAME|)
no precedence <0-7> queue <0-7>
```

### Parameters

NAME	The profile name to be created
precedence <0-7>	Precedence value
queue <0-7>	The queue value

### Command Mode

Configure modes

### Applicability

This command was introduced in OcNOS version 5.0.

### Example

```
#configure terminal
(config)#qos profile precedence-to-queue prec-map
(config-ingress-prec-map)#precedence 1 queue 1
(config)#interface xel
(config-if)#qos map-profile precedence-to-queue prec-map
```

---

## qos profile queue-to-precedence

Use this command to set the queue to precedence profile.

Use the `no` form of this command delete the profile.

Use `show qos-profile` to show the profile detail.

Use `qos map-profile` to map the profile on interface.

### Command Syntax

```
qos profile queue-to-precedence (NAME|)
queue <0-7> precedence <0-7>
no qos profile queue-to-precedence (NAME|)
no queue <0-7> precedence <0-7>
```

### Parameters

NAME	The profile name to be created
queue <0-7>	The queue value
precedence <0-7>	Precedence value

### Command Mode

Configure modes

### Applicability

This command was introduced in OcNOS version 5.0.

### Example

```
#configure terminal
(config)#qos profile queue-to-precedence egress-prec-map
(config-egress-prec-map)#queue 1 precedence 0
(config)#interface xe2
(config-if)#qos map-profile queue-to-precedence egress-prec-map
```

---

## qos remark

Use this command to enable remarking of the Class of service (CoS) and Differentiated Services Control Protocol (DSCP) set by the egress map.

Use the `no` command to disable remarking of the CoS and DSCP.

### Command Syntax

In Config mode

```
qos remark (cos|dei|dscp)
no qos remark (cos|dei|dscp)
```

In Interface mode

```
qos remark (cos|dei|dscp) (enable|disable)
no qos remark (cos|dei|dscp)
```

### Parameters

type	Remarking type. For example, CoS or DEI (Drop Eligible Indicator bit) or DSCP
(enable disable)	Remarking action

### Default

By default, remarking is disabled.

### Command Mode

Configure mode, Interface mode

### Applicability

This command was introduced in OcNOS DC version 4.2.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

Interface remarking will take priority over global remarking configurations.

```
((config)#qos remark cos
(config)#qos remark dscp
(config-if)# qos remark cos disable
(config-if)# qos remark cos enable
(config-if)# qos remark dscp disable
```

---

## qos statistics

Use this command to enable Quality of Service (QoS) statistics.

Use the `no` command to disable QoS statistics

Note: Class-map statistics is cleared whenever the match or action property of the class is modified dynamically.

### Command Syntax

```
qos statistics
no qos statistics
```

### Parameters

None

### Default

By default, QoS statistics is disabled

### Command Mode

Configure Mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#qos statistics
```

---

## queue-limit

Use this command to configure tail drop by setting queue limits on egress queues.

Use the `no` command to remove a queue limit.

### Command Syntax

```
queue-limit (<1-629145600>) (packets|bytes|kbytes|mbytes|ms)
no queue-limit
```

### Parameters

<1-629145600>	Specify queue-limit threshold range values in packets, bytes, mbytes,ms us or Kilobytes.
packets	Specify the units of queue-limit in packets (min 9 - max 614400)
bytes	Specify the units of queue-limit in bytes (min 9416 - max 629145600)
kbytes	Specify the units of queue-limit in kilobytes (min 9 - max 614400)
mbytes	Specify the units of queue-limit in mega-bytes (min 1 - max 600)
ms	Specify the units of queue-limit in milliseconds (min 1 - max 50)
us	Specify the units of queue-limit in micro-seconds (min 1 - max 50000)

### Default

Default queue size is 62914560 bytes

### Command Mode

Policy-class-map-queue mode

### Applicability

This command was introduced in OcNOS version 3.0.

### Examples

```
(config)# policy-map type queuing default P1
(config-pmap-que-def)#class type queuing default q1
(config-pmap-c-que-def)# queue-limit 1 mbytes
```

## random-detect

Use this command to configure weighted random early detection (WRED).

Use the `no` command to remove a WRED configuration.

**Note:** Explicit Congestion Notification (ECN) ECN-WRED is independent of WRED and max queue size parameters. With ECN, queue size can be reached until default max queue size is exceeded.

### Command Syntax

```
random-detect green (min-threshold|)<1-524288> (max-threshold|)<1-524288> (drop-
probability <1-100>|) yellow (min-threshold|)<1-524288> (max-threshold|)<1-
524288> (drop-probability <1-100>|) red (min-threshold|)<1-524288> (max-
threshold|)<1-524288>) (packets | bytes |
kbytes) (ecn|)
```

```
random-detect (min-threshold|)<1-524288> (max-threshold|)<1-524288> (packets |
bytes | kbytes) (drop-probability <1-100>|) (ecn|)
```

```
random-detect weight <0-15>
```

```
no random-detect green (min-threshold|)<1-524288> (max-threshold|)<1-524288> (drop-
probability <1-100>|) yellow (min-threshold|)<1-524288> (max-threshold|)<1-
524288> (drop-probability <1-100>|) red (min-threshold|)<1-524288> (max-
threshold|)<1-524288>) (packets | bytes |
kbytes) (ecn|)
```

```
no random-detect (min-threshold|)<1-524288> (max-threshold|)<1-524288> (packets |
bytes | kbytes) (drop-probability <1-100>|) (ecn|)
```

```
no random-detect weight
```

### Parameters

min-threshold

Specify the minimum threshold. In the range of <1-524288>

max-threshold

Specify the maximum threshold. In the range of <1-524288>

drop-probability

Specify the probability of dropping. In the range <1-100>

Packets, bytes, kbytes

Specify the thresholds in Packets, Bytes, or Kilobytes.

ecn

Explicit Congestion Notification

weight

Specify the weight level . In the range <0-15>

### Default

No default value is specified

### Command Mode

Policy-class map mode



**Applicability**

This command was introduced before OcNOS version 1.3.

Drop-probability and weight were introduced on OcNOS DC version 4.2.

This command applies only to the Trident II, Trident II+, Trident III, Tomahawk, and Helix platforms.

**Examples**

```
(config)# policy-map type queuing default xyz
(config-pmap-que)#class type queuing default q1
(config-pmap-c-que)#random-detect min-threshold 200 max-threshold 512 kbytes
drop-probability 50 ecn
(config-pmap-c-que)#random-detect weight 10
(config-pmap-c-que)#no random-detect
```

---

## service-policy

Use this command to attach a child policy onto a parent policy.

Use the `no` command detach child policy from the parent policy.

### Command Syntax

```
service-policy NAME
no service-policy NAME
```

### Parameters

NAME Specify the policy map to attach to the parent policy.

### Default

No default value is specified

### Command Mode

Policy-class-map queuing mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II and Trident II+ platforms.

### Examples

```
(config)#policy-map type queuing P1
(config-pmap-que)#class type queuing empty5b
(config-pmap-c-que)#service-policy PQOS
```

---

## service-policy type qos

Use this command to attach a service-policy of type qos to the interface.

Use the `no` command to remove a service-policy from an interface.

### Command Syntax

```
service-policy type qos (input|output) NAME
no service-policy type qos (input|output) NAME
```

### Parameters

<code>type qos (input output)</code>	Specify whether the policy map is of input or output type QoS.
<code>NAME</code>	Specify the policy map to attach to this interface.

### Default

No default value is specified

### Command Mode

Interface mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#int xe3
(config-if)#service-policy type qos input PQOS
```

---

## service-policy type queuing

Use this command to attach a service-policy of type queuing to the interface.

Use the `no` command to remove a service-policy from an interface.

### Command Syntax

```
service-policy type queuing output NAME
no service-policy type queuing output NAME
```

### Parameters

<code>type queuing</code>	Specify whether the policy map is of type queuing.
<code>NAME</code>	Specify the policy map to attach to this interface.

### Default

By default, default-out-policy is attached on all interface

### Command Mode

Interface mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#int xe3
(config-if)#service-policy type queuing output PQOS
```

---

## set bridge cos

Use this command to set the Class-of-Service (CoS) value for L2 packets only.

Use the `no` parameter with this command to unset a CoS value.

### Command Syntax

```
set bridge cos (<0-7>)
no set bridge cos
```

### Parameters

<0-7>                      CoS value.

### Default

No default value is specified

### Command Mode

Policy-class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
#configure terminal
(config)#policy-map pmap1
(config-pmap)#class cmap1
(config-pmap-c)#set bridge cos 2
```

## set bridge dscp

Use this command to set the DSCP value for L3 packets only.

Use the `no` parameter with this command to unset a DSCP value.

### Command Syntax

```
set bridge dscp (<0-63>|af11| af12| af13| af21| af22| af23| af31|
                 af32| af33| af41| af42| af43| cs1| cs2| cs3| cs4| cs5|
                 cs6| cs7| default| ef)
no set bridge dscp
```

### Parameters

<0-63>	DSCP value
af11	DSCP (001011) decimal value 11
af12	DSCP (001100) decimal value 12
af13	DSCP (001101) decimal value 13
af21	DSCP (010101) decimal value 21
af22	DSCP (010110) decimal value 22
af23	DSCP (010111) decimal value 23
af31	DSCP (011111) decimal value 31
af32	DSCP (010000) decimal value 32
af33	DSCP (010001) decimal value 33
af41	DSCP (101001) decimal value 41
af42	DSCP (101010) decimal value 42
af43	DSCP (101011) decimal value 38
cs1	(Precedence 1) DSCP (001000) decimal value 8
cs2	(Precedence 2) DSCP (010000) decimal value 16
cs3	(Precedence 3) DSCP (011000) decimal value 24
cs4	(Precedence 4) DSCP (100000) decimal value 32
cs5	(Precedence 5) DSCP (101000) decimal value 40
cs6	(Precedence 6) DSCP (110000) decimal value 48
cs7	(Precedence 7) DSCP (111000) decimal value 56
default	DSCP (000000) decimal value 0
ef	DSCP (101110) decimal value 46

### Default

No default value is specified

### Command Mode

Policy-class-map mode

**Applicability**

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

**Examples**

```
#configure terminal
(config)#policy-map pmap1
(config-pmap)#class cmap1
(config-pmap-c)#set bridge dscp 25
```

---

## set cos

Use this command for matching traffic classes set action as change cos in the egress packet to the prescribed value.

Use the `no cos` command to remove the assigned value from the class.

### Command Syntax

```
set cos <0-7>
no set cos
```

### Parameters

<0-7> Specify CoS value to assign for this class of traffic

### Default

No default value is specified

### Command Mode

Policy-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
(config)# policy-map my_policy1
(config-pmap-qos)# class traffic_class2
(config-pmap-c-qos)# no set cos
```



## set dscp

Use this command for matching traffic classes set action as change DSCP in the egress packet to the prescribed value.

Use the `no` command to remove the assigned value from the class.

### Command Syntax

```
set dscp (<0-63>|af11| af12| af13| af21| af22| af23| af31|
          af32| af33| af41| af42| af43| cs1| cs2| cs3| cs4| cs5|
          cs6| cs7| default| ef )

no set dscp
```

### Parameters

<0-63>	DSCP value
af11	DSCP (001011) decimal value 11
af12	DSCP (001100) decimal value 12
af13	DSCP (001101) decimal value 13
af21	DSCP (010101) decimal value 21
af22	DSCP (010110) decimal value 22
af23	DSCP (010111) decimal value 23
af31	DSCP (011111) decimal value 31
af32	DSCP (010000) decimal value 32
af33	DSCP (010001) decimal value 33
af41	DSCP (101001) decimal value 41
af42	DSCP (101010) decimal value 42
af43	DSCP (101011) decimal value 38
cs1	(Precedence 1) DSCP (001000) decimal value 8
cs2	(Precedence 2) DSCP (010000) decimal value 16
cs3	(Precedence 3) DSCP (011000) decimal value 24
cs4	(Precedence 4) DSCP (100000) decimal value 32
cs5	(Precedence 5) DSCP (101000) decimal value 40
cs6	(Precedence 6) DSCP (110000) decimal value 48
cs7	(Precedence 7) DSCP (111000) decimal value 56
default	DSCP (000000) decimal value 0
ef	DSCP (101110) decimal value 46

### Default

No default value is specified

**Command Mode**

Policy map class mode

**Applicability**

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

**Examples**

```
#configure terminal
(config)#policy-map pmap1
(config-pmap)#class cmap1
(config-pmap-c)#set dscp af12
```

---

## set precedence

Use this command for matching traffic classes set action as change precedence in the egress packet to the prescribed value.

Use the `no` command to leave the precedence value unchanged for the class.

### Command Syntax

```
set (precedence (<0-7>| critical| flash | flash-override|immediate|internet|
network| priority| routine))
no set precedence
```

### Parameters

<0-7>	Specify IP precedence value to assign for this class of traffic
critical	Critical precedence
flash	Flash precedence
flash-override	Flash override precedence
immediate	Immediate precedence
internet	Internetwork control precedence
network	Network control precedence
priority	Priority precedence
routine	Routine precedence

### Default

No default value is specified

### Command Mode

Policy-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
(config)# policy-map policy1
(config-pmap-qos)# class class2
(config-pmap-c-qos)# set precedence 3
```

---

## set qos-group

Use this command to match a QoS group in a type queuing class map.

Use the `no` command to remove a QoS group match on a queue number from a type queuing class map.

### Command Syntax

```
set qos-group <1-2000>
no set qos-group <1-2000>
```

### Parameters

`<1-2000>` Specify the QoS group value to assign for this class of traffic.

### Default

No default value is specified

### Command Mode

Policy-class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II and Trident II+ platforms.

### Examples

```
(config)#
(config)#policy-map type qos PQOS
(config-pmap-qos)#class type qos C_QOS1
(config-pmap-c-qos)#set qos-group 1
```

---

## set qos queue scheduler

Use this command to change the scheduler mode of Unicast Queue and Non-Unicast queue groups to WRR or SP.

Use the `no` command to disable the set mode, and to change to the default mode

### Command Syntax

```
set qos ((wrr uc <1-127> non-uc <1-127>) | sp)
no set qos (wrr|sp)
```

### Parameters

wrr	Weighted Round Robin Mode
uc <1-127>	Unicast Queues from 1 to 127
non-uc <1-127>	Non-Unicast Queues from 1 to 127
sp	Strict Priority Mode

### Default

The default is WRR with 32:2.

### Command Mode

Configure Mode

### Applicability

This command was introduced before OcNOS version 1.3 for platforms Trident II and Trident II+

Tomahawk support is provided with OcNOS DC version 4.2.

Tomahawk supports only wrr setting between uc and mc queues.

### Examples

```
(config)#set qos wrr uc 30 non-uc 40
(config)#no set qos wrr
```

---

## set queue

Use this command for matching traffic classes set action as change cos in the egress packet to the prescribed value.

Use the `no` command to remove the assigned value from the class.

### Command Syntax

```
set queue <0-7>
no set queue
```

### Parameters

<0-7> Specify queue value to assign for this class of traffic

### Default

No default value is specified

### Command Mode

Policy-map-class qos mode

### Applicability

This command was introduced before OcNOS version 1.3.

This command applies only to the Trident II, Trident II+, and Tomahawk platforms.

### Examples

```
(config)# policy-map my_policy1
(config-pmap-qos)# class traffic_class2
(config-pmap-c-qos)# set queue 4
```

---

## shape

Use this command to configure shaping on an egress queue to impose a maximum rate on it.

Use the `no` command to remove a shaping configuration.

### Command Syntax

```
shape (<1-1000000000> (kbps|mbps|gbps) | percent <1-100>)  
no shape
```

### Parameters

<1-1000000000>	Specify an optional keyword. Shaping is based on an average rate. Average rate for shaping in the range of <1-1000000000>
kbps	Specify the units of kbps per second.
mbps	Specify the units of mbps per second.
gbps	Specify the units of gbps per second.
percent <1-100>	Specify the percentage from 1 to 100.

### Default

No default value is specified

### Command Mode

Policy-class-map mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)# policy-map type queuing my_queue  
(config-pmap-que)# class type queuing PQOS  
(config-pmap-c-que)# shape percent 25
```

---

## shape rate

Use this command to configure shaping on an egress port to impose a maximum rate on it.

Use the `no` form of the command to remove a shaping configuration.

### Command Syntax

```
shape rate <1-1000000000> (kbps|mbps|gbps) burst SHAPE_BURST_RATE
no shape rate
```

### Parameters

`<1-1000000000>` Average rate for shaping in the following range:

8 kbps to 1000 gbps for Trident3

1 kbps to 1000 gbps for other XGS platforms

`kbps` Units of kbps per second.

`mbps` Units of mbps per second.

`gbps` Units of gbps per second.

`SHAPE_BURST_RATE`

The burst size allowed by the traffic shaper. It determines the maximum amount of data to send or receive before shaping the traffic per the specified rate..

The burst value in kbits in the following range::

`<2-1000000>` for Trident3 and tomahwak

`<1-1000000>` for other XGS platforms

The limitation of 1000000 kbits is often a default or practical limit set by the network device or software. This limit ensures that bursts of traffic beyond this size are controlled to prevent network congestion or degradation of service quality. It is the maximum value supported by the hardware.

### Default

NA

### Command Mode

Interface mode

### Applicability

This command was introduced in OcNOS version 1.3.8.

### Examples

```
(config)#interface xel1
(config-if)#shape rate 100 mbps burst 20
```



---

## show class-map

Use this command to display qos/queuing class maps.

### Command Syntax

```
show class-map (type (qos|queuing)|) (NAME|)
```

### Parameters

type qos	Specify the QoS type class map
type queuing	Specify the queuing type class map
NAME	Specify the named class map

### Command Mode

Privileged executive mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
#show class-map type qos
Type qos class-maps
=====
class-map type qos 1234
match cos 3
class-map type qos 2345
QOS-ACCESS-LIST-NAME: 101
```

```
#show class-map 1234
Type qos class-maps
=====
class-map type qos 1234
match cos 3
```

## show cpu-queue details

Use this command to display details about CPU queue for QoS.

### Command Syntax

```
show cpu-queue details
```

### Parameters

None

### Command Mode

Exec mode

### Applicability

This command was introduced before OcNOS version 1.3.8

### Example

```
#show cpu-queue details
```

```
* - Can not configure the parameter
```

Cpu queue		Rate In PPS		Lossy Status		Monitor Status	
Name	Configured	Default	Configured	Default	Configured	Default	
=====	=====	=====	=====	=====	=====	=====	=====
sflow	10000	32000	-	*lossy	no-monitor	monitor	
bgp	-	1500	-	lossless	-	monitor	
vrrp	-	500	-	lossless	-	monitor	
rip	-	500	-	lossless	-	monitor	
ospf	0	2000	lossy	lossless	monitor	monitor	
dhcp	-	100	-	lossy	-	no-monitor	
nd	200	6000	lossless	lossless	monitor	monitor	
pim	-	4000	-	*lossy	-	*no-monitor	
arp	100	6000	lossy	lossless	no-monitor	monitor	
igmp	-	4000	-	*lossy	-	*no-monitor	
bpdu	1000	10000	-	lossless	monitor	monitor	
ccm	-	500	-	lossy	-	no-monitor	
bfd	-	2000	-	lossy	-	no-monitor	
ptp	-	1000	-	lossy	-	no-monitor	
isis	-	500	-	lossless	-	monitor	
trill-isis	-	1000	-	lossless	-	monitor	
acl	-	200	-	*lossy	-	*no-monitor	
vxlan	-	500	-	lossy	-	monitor	

Table 24 explains the output fields.

**Table 24: show CPU Queue fields**

Entry	Description
CPU queue name	Name of the CPU queue
Rate In PPS	At which packets are successfully delivered
Lossy Status	Status of the network lossy or lossless
Monitor Status	Status of the network monitor

## show interface counters

Use this command to see the interface counters.

Note: VPLS BUM traffic will not be read in the interface queue statistics.

### Command Syntax

```
show interface IFNAME counters queue-stats | (statistics (type queuing rate))
```

### Parameters

IFNAME      Interface name

statistics (type queuing rate). Displays statistics of the particular queuing rate type.

### Command Mode

Exec

### Applicability

This command was introduced in OcNOS version 3.0.

### Examples

```
#show interface xel counters queue-stats
E - Egress, I - Ingress, Q-Size is in bytes
+---+---+---+---+---+---+
| Q | Q-Sz | Tx pkt | Tx byte | Drp pkt | Drop byte |
+---+---+---+---+---+---+
q0  629160 100      12000      0         0
q1  629160 0         0         0         0
q2  629160 0         0         0         0
q3  629160 0         0         0         0
q4  629160 0         0         0         0
q5  629160 0         0         0         0
q6  629160 0         0         0         0
q7  629160 0         0         0         0
```

## show policy-map

Use this command to display:

1. Type qos/queuing policy-map
2. Non zero statistics for type qos or queuing classes on interfaces

### Command Syntax

```
show policy-map statistics type qos
show policy-map statistics type queuing default (rate (gbps|kbps|mbps) |)
```

### Parameters

type qos	Type qos policy-map
statistics	Displays QoS statistics.
type queuing	Type queuing policy-maps
default	Default queue of the port
rate	Show instantaneous rate (gbps/kbps/mbps)

### Command Mode

Privileged executive and Configure mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
P1#show policy-map statistics
Type qos class-map statistics:
```

Class-map	Match pkts	Match bytes	Dropped pkts	Dropped Bytes
ce29/1				
C1	100	6796	0	0

```
Type queuing class-map statistics:
```

Class-map	Total pkts	Total bytes	Dropped pkts	Dropped Bytes
ce1/1				
q7	1689	108888	0	0
ce2/1				
q6	8	912	0	0
ce5/1				
q6	8	912	0	0
ce29/1				
q7	104	7052	0	0

```
P1#show policy-map statistics type qos
```

Class-map	Match pkts	Match bytes	Dropped pkts	Dropped Bytes
ce29/1				
C1	100	6796	0	0

## show policy-map interface

Use this command to display the statistics and the configurations of the input and output policies that are attached to an interface.

### Command Syntax

```
show policy-map interface (NAME (type (qos (input | output |) | queuing) |
  (statistics (class NAME (type (qos | queuing (rate|)) | type (qos | queuing (rate
    (gbps|kbps|mbps)|)))) | class NAME)|brief)
```

### Parameters

interface IFNAME	Specifies the interface name for which to display policy maps (maximum length 32 characters).
type qos	(Optional) Displays QoS policy maps for the specified interface.
type qos input	(Optional) Displays QoS input policy maps for the specified interface.
type qos output	(Optional) Displays QoS output policy maps for the specified interface.
statistics class	(Optional) Displays statistics of the particular class.
statistics class NAME	(Optional) Name of the particular class.
statistics type	(Optional) Displays statistics of the particular type.
statistics type qos	(Optional) Displays statistics of the particular QoS type.
statistics type queuing rate (gbps kbps mbps)	(Optional) Displays statistics of the particular queuing rate type in gbps or bps or mbps.
interface class NAME	(Optional) Displays statistics of the particular class.
type queuing	(Optional) Displays queuing policy-maps for the specified interface.
brief	Displays all QoS and queuing policy maps for the specified interface.

### Command Mode

Privileged executive and Configure mode

### Applicability

Introduced before OcNOS version 1.3.

### Examples

```
OcNOS#show policy-map interface xe19/1
```

---

```
Interface xe19/1
Global statistics status : enabled

Service-policy (qos) input : p1
-----
Class-map (qos): c1 (match all)
match vlan 2
police cir 2 mbps
    matched      : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes

Class-map (qos): c3 (match all)
police cir 2 mbps
    matched      : 2172408 packets, 2172408000 bytes
    dropped      : 2128959 packets, 2128959000 bytes

Service-policy (queuing) output: default-out-policy
-----
Class-map (queuing): q0
priority level 1
bandwidth percent 1
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes

Class-map (queuing): q1
priority level 1
bandwidth percent 1
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes

Class-map (queuing): q2
priority level 1
bandwidth percent 1
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes

Class-map (queuing): q3
priority level 1
bandwidth percent 1
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes

Class-map (queuing): q4
priority level 1
bandwidth percent 1
    output       : 0 packets, 0 bytes
    dropped      : 0 packets, 0 bytes

Class-map (queuing): q5
priority level 1
```

---

```
bandwidth percent 1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q6
  priority level 1
  bandwidth percent 1
    output      : 0 packets, 0 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): q7
  priority level 1
  bandwidth percent 1
    output      : 1445 packets, 92536 bytes
    dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q0
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q1
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q2
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q3
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q4
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q5
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q6
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```

```
Class-map (queuing): mc-q7
  output      : 0 packets, 0 bytes
  dropped     : 0 packets, 0 bytes
```



---

## show storm-control

Use the command to verify the BUM rate limit configured.

### Command Syntax

```
show storm-control (INTERFACE-NAME|)
```

### Parameters

INTERFACE-NAME	Specifies the interface name for which to display the storm control details
----------------	---

### Command Mode

Privileged executive mode

### Applicability

Introduced before OcNOS version 1.3.

### Example

```
OcNOS#show storm-control xe2
*The hardware applicable value is displayed
Port          BcastLevel    McastLevel    DlfLevel      Discards
xe2           100.0000%      100.0000%      100.0000%      0

OcNOS#show storm-control
*The hardware applicable value is displayed
Port  BcastLevel (burst)    McastLevel (burst)    DlfLevel (burst)    Discards
xe64/2 1000.000 fps      2000.000 fps          5000.000 fps        7144132
```

## show qos-profile

Use this command to show the all configured QoS profiles configurations like type, name, maps configured except for the default maps, attached info (to how many interfaces it is attached) etc,

### Command Syntax

```
show qos-profile (type (cos-to-queue | dscp-encap | dscp-to-dscp | dscp-to-queue |
exp-to-queue | queue-to-exp | precedence-to-precedence | precedence-to-queue |
queue-color-to-cos | ingress-pg-map | egress-dynamic-ecn) (interface NAME| all)
```

### Parameters

all	Displays all configured profiles
cos-to-queue	Displays profile for cos to Traffic-Class map
dscp-encap	Displays profile for dscp encapsulation map
dscp-to-dscp	Displays profile for in Dscp to Dscp map
dscp-to-queue	Displays profile for dscp to Traffic-Class map
exp-to-queue	Displays profile for exp to Traffic-Class map
precedence-to-precedence	Displays profile for precedence to precedence map
precedence-to-queue	Displays profile for precedence to Traffic-Class map
queue-color-to-cos	Displays profile for Traffic-Class color to cos map
ingress-pg-map	Specify the profile for ingress priority group map. In the show output, the <code>xoff-threshold</code> is displayed only when configured. If not configured, the <code>dynamic-threshold</code> is displayed, as it is the default setting for PG queues, which includes pre-set PG and <code>xon-offset</code> values.
egress-dynamic-ecn	Specify the profile for egress dynamic ECN map
interface NAME	Profile map name (maximum 32 characters)

### Command Mode

Privileged exec

Configuration Mode

Interface Mode

### Applicability

This command was introduced in OcNOS DC version 4.2. The `egress-dynamic-ecn` option is added in OcNOS version 7.0.0. It applies only for Tomahawk 5 (TH5) platforms.

### Examples

```
OcNOS#show qos-profile in xe1
profile name: default
profile type: cos-to-queue (Ingress)
mapping:
```

-----+-----		-----+-----
INPUT   OUTPUT		INPUT   OUTPUT
-----+-----		-----+-----

COS	DEI	Queue	Color	COS	DEI	Queue	Color
0	0	0	green	0	1	0	yellow
1	0	1	green	1	1	1	yellow
2	0	2	green	2	1	2	yellow
3	0	3	green	3	1	3	yellow
4	0	4	green	4	1	4	yellow
5	0	5	green	5	1	5	yellow
6	0	6	green	6	1	6	yellow
7	0	7	green	7	1	7	yellow

profile name: default

profile type: queue-color-to-cos (Egress)

Status: Inactive

mapping:

INPUT			OUTPUT			INPUT		
OUTPUT								
Queue	Color	COS	Queue	Color	COS	Queue	Color	COS
0	green	0	0	yellow	0	0	red	0
1	green	1	1	yellow	1	1	red	1
2	green	2	2	yellow	2	2	red	2
3	green	3	3	yellow	3	3	red	3
4	green	4	4	yellow	4	4	red	4
5	green	5	5	yellow	5	5	red	5
6	green	6	6	yellow	6	6	red	6
7	green	7	7	yellow	7	7	red	7

OcNOS#show qos-profile ingress-pg-map interface ethernet0

profile name: pg1

mapping:

```

priority-group 0 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 1 xon-offset 200 xoff-threshold 400 dynamic-threshold 2
priority-group 2 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 3 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 4 xon-offset 1000 xoff-threshold 2400 dynamic-threshold 0
priority-group 5 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 6 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 7 xon-offset 48 xoff-threshold 32 dynamic-threshold 7

```

OcNOS#show qos-profile ingress-pg-map all

qos profile ingress-pg-map default

```

priority-group 0 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 1 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 2 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 3 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 4 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 5 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 6 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 7 xon-offset 48 xoff-threshold 32 dynamic-threshold 7

```

!

qos profile ingress-pg-map pg1

```

priority-group 0 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 1 xon-offset 200 xoff-threshold 400 dynamic-threshold 2
priority-group 2 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 3 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 4 xon-offset 1000 xoff-threshold 2400 dynamic-threshold 0
priority-group 5 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 6 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
priority-group 7 xon-offset 48 xoff-threshold 32 dynamic-threshold 7
!
OcNOS#show qos-profile ingress-pg-map interface ethernet0
profile name: pg1
mapping:
  priority-group 0  xon-offset 48  xoff-threshold 32  dynamic-threshold 7
  priority-group 1  xon-offset 200  xoff-threshold 400  dynamic-threshold 2
  priority-group 2  xon-offset 48  xoff-threshold 32  dynamic-threshold 7
  priority-group 3  xon-offset 48  xoff-threshold 32  dynamic-threshold 7
  priority-group 4  xon-offset 1000  xoff-threshold 2400  dynamic-threshold 0
  priority-group 5  xon-offset 48  xoff-threshold 32  dynamic-threshold 7
  priority-group 6  xon-offset 48  xoff-threshold 32  dynamic-threshold 7
  priority-group 7  xon-offset 48  xoff-threshold 32  dynamic-threshold 7

```

To display the Dynamic-ECN profile mapping details:

```

OcNOS#sh qos-profile egress-dynamic-ecn all
qos profile egress-dynamic-ecn egl
  queue 2 on-offset 70000 off-offset 90000 bytes
  queue 3 on-offset 100 off-offset 200 kbytes
  queue 6 on-offset 40 off-offset 50 kbytes
!

OcNOS#show qos-profile egress-dynamic-ecn interface ethernet1
profile name: egl
mapping:
  queue 2  on-offset 70000  off-offset 90000  bytes
  queue 3  on-offset 100   off-offset 200    kbytes
  queue 6  on-offset 40    off-offset 50     kbytes

```

To display the Dynamic-ECN profile mapping details:

```

OcNOS#sh qos-profile egress-dynamic-ecn all
qos profile egress-dynamic-ecn egl
  queue 2 on-offset 70000 off-offset 90000 bytes
  queue 3 on-offset 100 off-offset 200 kbytes
  queue 6 on-offset 40 off-offset 50 kbytes
!

OcNOS#show qos-profile egress-dynamic-ecn interface ethernet1
profile name: egl
mapping:
  queue 2  on-offset 70000  off-offset 90000  bytes
  queue 3  on-offset 100   off-offset 200    kbytes
queue 6  on-offset 40    off-offset 50     kbytes

```

---

## show qos-profile interface

Use this command to show the all configured QoS profiles configurations attached on an interface.

### Command Syntax

```
show qos-profile interface NAME
```

### Parameters

NAME	Profile map name (maximum 32 characters)
------	--

### Command Mode

Privileged exec, config, interface, class-map, policy-map and policy-map-class

### Applicability

This command was introduced in OcNOS-SP version 1.0.

### Examples

```
(config)#show qos-profile interface xell
profile name: cos-map
profile type: cos-to-queue
mapping:
qos profile cos-to-queue cos-map
cos 0 dei 0 queue 0 color green
cos 0 dei 1 queue 0 color yellow
cos 0 queue 0
cos 1 dei 0 queue 1 color green
cos 1 dei 1 queue 1 color yellow
cos 1 queue 1
cos 2 dei 0 queue 2 color green
cos 2 dei 1 queue 2 color yellow
cos 2 queue 2
cos 3 dei 0 queue 3 color green
cos 3 dei 1 queue 3 color yellow
cos 3 queue 3
cos 4 dei 0 queue 4 color green
cos 4 dei 1 queue 4 color yellow
cos 4 queue 4
cos 5 dei 0 queue 5 color green
cos 5 dei 1 queue 5 color yellow
cos 5 queue 5
cos 6 dei 0 queue 6 color green
```

---

# show queuing interface

Use this command to display the configurations of queues attached to an interface.

## Command Syntax

```
show queuing interface NAME
```

## Parameters

NAME                      Interface name.

## Command Mode

Privileged exec & config mode

## Applicability

This command was introduced before OcNOS version 1.3.

## Examples

```
# show queuing interface xe1/1
Egress Queuing for Ethernet xe1/1 [System]
```

L0	L1	L2	Group	PrioLevel	Shape	Bandwidth
q0				-	High	- -
q1				-	High	- -
q2				-	High	- -
q3				-	High	- -
q4				-	High	- -
q5				-	High	- -
q6				-	High	- -
q7				-	High	- -

---

## show running-config qos

Use this command to show the user configured QoS configurations.

### Command Syntax

```
show running-config qos (all|)
```

### Parameters

**all** Show all QoS related configuration information including all defaults.

### Command Mode

Exec, config, interface, class-map, policy-map and policy-map-class

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
#show running-config qos
qos enable
!

#show running-config qos all
!
qos enable
!
qos profile cos-to-queue default
cos 0 dei 0 queue 0 color green
cos 0 dei 1 queue 0 color yellow
cos 0 queue 0
cos 1 dei 0 queue 1 color green
cos 1 dei 1 queue 1 color yellow
cos 1 queue 1
cos 2 dei 0 queue 2 color green
cos 2 dei 1 queue 2 color yellow
cos 2 queue 2
cos 3 dei 0 queue 3 color green
cos 3 dei 1 queue 3 color yellow
cos 3 queue 3
cos 4 dei 0 queue 4 color green
cos 4 dei 1 queue 4 color yellow
cos 4 queue 4
cos 5 dei 0 queue 5 color green
cos 5 dei 1 queue 5 color yellow
cos 5 queue 5
cos 6 dei 0 queue 6 color green
cos 6 dei 1 queue 6 color yellow
cos 6 queue 6
cos 7 dei 0 queue 7 color green
cos 7 dei 1 queue 7 color yellow
cos 7 queue 7
!
qos profile queue-color-to-cos default
```

```
queue 0 color green cos 0
queue 0 color yellow cos 0
queue 0 color red cos 0
queue 0 color all cos 0
queue 1 color green cos 1
queue 1 color yellow cos 1
queue 1 color red cos 1
queue 1 color all cos 1
queue 2 color green cos 2
queue 2 color yellow cos 2
queue 2 color red cos 2
queue 2 color all cos 2
queue 3 color green cos 3
queue 3 color yellow cos 3
queue 3 color red cos 3
queue 3 color all cos 3
queue 4 color green cos 4
queue 4 color yellow cos 4
queue 4 color red cos 4
queue 4 color all cos 4
queue 5 color green cos 5
queue 5 color yellow cos 5
queue 5 color red cos 5
queue 5 color all cos 5
queue 6 color green cos 6
queue 6 color yellow cos 6
queue 6 color red cos 6
queue 6 color all cos 6
queue 7 color green cos 7
queue 7 color yellow cos 7
queue 7 color red cos 7
queue 7 color all cos 7
!
qos profile dscp-to-queue default
dscp 0 queue 0 color green
dscp 1 queue 0 color green
dscp 2 queue 0 color green
dscp 3 queue 0 color green
dscp 4 queue 0 color green
dscp 5 queue 0 color green
dscp 6 queue 0 color green
dscp 7 queue 0 color green
dscp 8 queue 1 color green
dscp 9 queue 1 color green
dscp 10 queue 1 color green
dscp 11 queue 1 color green
dscp 12 queue 1 color yellow
dscp 13 queue 1 color green
dscp 14 queue 1 color red
dscp 15 queue 1 color green
dscp 16 queue 2 color green
dscp 17 queue 2 color green
dscp 18 queue 2 color green
dscp 19 queue 2 color green
dscp 20 queue 2 color yellow
dscp 21 queue 2 color green
dscp 22 queue 2 color red
```



```
dscp 23 queue 2 color green
dscp 24 queue 3 color green
dscp 25 queue 3 color green
dscp 26 queue 3 color green
dscp 27 queue 3 color green
dscp 28 queue 3 color yellow
dscp 29 queue 3 color green
dscp 30 queue 3 color red
dscp 31 queue 3 color green
dscp 32 queue 4 color green
dscp 33 queue 4 color green
dscp 34 queue 4 color green
dscp 35 queue 4 color green
dscp 36 queue 4 color yellow
dscp 37 queue 4 color green
dscp 38 queue 4 color red
dscp 39 queue 4 color green
dscp 40 queue 5 color green
dscp 41 queue 5 color green
dscp 42 queue 5 color green
dscp 43 queue 5 color green
dscp 44 queue 5 color green
dscp 45 queue 5 color green
dscp 46 queue 5 color green
dscp 47 queue 5 color green
dscp 48 queue 6 color green
dscp 49 queue 6 color green
dscp 50 queue 6 color green
dscp 51 queue 6 color green
dscp 52 queue 6 color green
dscp 53 queue 6 color green
dscp 54 queue 6 color green
dscp 55 queue 6 color green
dscp 56 queue 7 color green
dscp 57 queue 7 color green
dscp 58 queue 7 color green
dscp 59 queue 7 color green
dscp 60 queue 7 color green
dscp 61 queue 7 color green
dscp 62 queue 7 color green
dscp 63 queue 7 color green
!
qos profile queue-color-to-dscp default
queue 0 color green dscp 0
queue 0 color yellow dscp 0
queue 0 color red dscp 0
queue 0 color all dscp 0
queue 1 color green dscp 10
queue 1 color yellow dscp 12
queue 1 color red dscp 14
queue 1 color all dscp 8
queue 2 color green dscp 18
queue 2 color yellow dscp 20
queue 2 color red dscp 22
queue 2 color all dscp 16
queue 3 color green dscp 26
queue 3 color yellow dscp 28
```

```
queue 3 color red dscp 30
queue 3 color all dscp 24
queue 4 color green dscp 34
queue 4 color yellow dscp 36
queue 4 color red dscp 38
queue 4 color all dscp 32
queue 5 color green dscp 40
queue 5 color yellow dscp 40
queue 5 color red dscp 40
queue 5 color all dscp 40
queue 6 color green dscp 48
queue 6 color yellow dscp 48
queue 6 color red dscp 48
queue 6 color all dscp 48
queue 7 color green dscp 56
queue 7 color yellow dscp 56
queue 7 color red dscp 56
queue 7 color all dscp 56
!
policy-map type queuing default default-out-policy
  class type queuing default q0
    priority
  exit
  class type queuing default q1
    priority
  exit
class type queuing default q2
  priority
exit
class type queuing default q3
  priority
exit
class type queuing default q4
  priority
exit
class type queuing default q5
  priority
exit
class type queuing default q6
  priority
exit
class type queuing default q7
  priority
exit
!
interface xe1/1
  service-policy type queuing default default-out-policy
!
interface xe1/2
  service-policy type queuing default default-out-policy
!
interface xe1/3
  service-policy type queuing default default-out-policy
!
interface xe1/4
  service-policy type queuing default default-out-policy
!
```

```
interface xe2/1
  service-policy type queuing default default-out-policy
```

---

## show running-config cpu-queue

Use this command to display details about CPU queue information based on processes running.

### Command Syntax

```
show running-config cpu-queue
```

### Parameters

None

### Command Mode

Exec mode

### Applicability

This command was introduced before OcNOS version 1.3.8

### Example

```
#show running-config | in cpu-queue
cpu-queue sflow rate 10000 no-monitor
cpu-queue ospf rate 0 lossy monitor
cpu-queue nd rate 200 lossless monitor
cpu-queue arp rate 100 lossy no-monitor
cpu-queue bpdu rate 1000 monitor
```

## storm-control

Use this command to set the rising threshold level for broadcast, multicast, or destination lookup failure traffic. The storm control action occurs when traffic utilization reaches this level.

Storm control is used to block the forwarding of unnecessary flooded traffic. A packet storm occurs when a large number of broadcast packets are received on a port. Forwarding these packets can cause the network to slow down or time out.

Use the `no` form of this command to disable storm control.

Note:

- Granularity of storm-control is around 18 kbps for lower values and it increases when configured with increase in rate. Deviation is expected  $\pm 7/8$  % of rate configured for lower value rate changes.
- If the burst-size limit is set too low, too many packets will be subjected to rate limiting, and the desired rate limit will not be achieved. The burst size needs to be large enough to accommodate the maximum transmission unit (MTU) size of the packets.
- The `storm-control dlf` command applies rate limiting to all Broadcast, Unknown Unicast, and Multicast (BUM) traffic, not just the unknown unicast packets that typically trigger DLF.

### Command Syntax

```
storm-control (errdisable|((broadcast|multicast|dlf) (level LEVEL | <0-4294967294>
(kbps|mbps|gbps|fps) burst-size <32-128000>)))
no storm-control (errdisable|broadcast|multicast|dlf)
```

### Parameters

<code>errdisable</code>	Error disable interface on storm control
<code>broadcast</code>	Broadcast rate limiting.
<code>multicast</code>	Multicast rate limiting.
<code>dlf</code>	Destination lookup failure (DLF) limiting.
<code>level</code>	Sets the percentage of the threshold.
<code>LEVEL</code>	The percentage of the threshold; percentage of the maximum speed (pps) of the interface <0.0000-1000.0000>.
<code>&lt;0-4294967294&gt;</code>	Sets absolute threshold value <0-1000000000>
<code>kbps</code>	Specifies the units of Kilobits per second.
<code>mbps</code>	Specifies the units of Megabits per second.
<code>gbps</code>	Specifies the units of Gigabits per second.
<code>fps</code>	Specifies the units of Frames per second.
<code>burst-size</code>	Set burst size
<code>&lt;32-128000&gt;</code>	Value of burst in kbps

### Default

Disabled

**Command Mode**

Interface mode

**Applicability**

This command was introduced in OcNOS version 3.0.

**Examples**

```
#configure terminal
(config)#interface xe1
(config-if)#storm-control broadcast level 30

(config)#interface xe2
(config-if)#storm-control multicast level 30

(config)#interface xe3
(config-if)#storm-control multicast 300 mbps

(config)#interface xe4
(config-if)#no storm-control multicast
```

---

## trust dscp

Use this command to use dscp value to decide queue mapping for packets in Layer 2 interfaces.

The no parameter with this command un-sets trust dscp.

### Command Syntax

```
trust dscp
no trust dscp
```

### Parameters

None

### Default

By default, trust dscp is disabled on L2 interface

### Command Mode

Interface mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
#configure terminal
(config)#int xe1/1
(config-if)#trust dscp
```

---

## wrr-queue weight

Use this command to set wrr-queue weight for a queue.

Use the priority command to un-set configured wrr configuration.

### Command Syntax

```
wrr-queue weight <1-127>
```

### Parameters

<1-127>                      wrr queue weight to be configured.

### Default

No default value is specified

### Command Mode

Policy-class-map queuing Mode

### Applicability

This command was introduced before OcNOS version 1.3.

### Examples

```
(config)#policy-map type queuing default default-out-policy
(config-pmap-que-def)# class type queuing default q0
(config-pmap-c-que-def)#wrr-queue weight 2
(config-pmap-c-que-def)#priority
```



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