Sun Ethernet Fabric Operating System

QoS Administration Guide

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Contents

Using This Documentation

Oracle's QoS management architectures in the SEFOS hardware are based on the IETF Differentiated Service Architecture. This document describes the basic tasks to configure QoS in either hardware environment.

Related Documentation

Documentation	Links
All Oracle products	http://oracle.com/documentation
Sun Blade 6000 Ethernet Switched NEM 24p 10GbE	http://www.oracle.com/pls/topic/lookup?ctx=SB6K-24p-10GbE
Sun Network 10GbE Switch 72p	http://www.oracle.com/pls/topic/lookup?ctx=SN-10GbE-72p
Sun Blade 6000 modular system	http://www.oracle.com/pls/topic/lookup?ctx=sb6000
Oracle Integrated Lights Out Manager (Oracle ILOM) 3.0	http://www.oracle.com/pls/topic/lookup?ctx=ilom30

For detailed information about the commands and options described in this document, refer to the *Sun Ethernet Fabric Operating System CLI Base Reference Manual*.

Acronyms and Abbreviations

Acronym or Abbreviation	Explanation
ACL	Access control list
IETF	Internet Engineering Task Force
IP	Internet Protocol
NEM	Network express module
QoS	Quality of service
SEFOS	Sun Ethernet Fabric Operating System
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VLAN	Virtual LAN

CLI Command Modes

The following table lists the configuration modes used in this document with their access and exit methods.

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Access SEFOS from Oracle ILOM with read-only rights (privilege level 1).	`SEFOS>`	Use the `logout` or `exit` command to return to the Oracle ILOM prompt.

Command Mode	Access Method	Prompt	Exit Method
Privileged EXEC	Access SEFOS from Oracle ILOM with full administrative rights (privilege level 15).	`SEFOS#`	Use the `logout` or `exit` command to return to the Oracle ILOM prompt.
Global Configuration	From User EXEC mode, use the `enable` command.	`SEFOS(config)#`	Use the `end` command to return to Privileged EXEC mode.
Interface Configuration	From Global Configuration mode, use the `interface interface-type interface-id` command.	`SEFOS(config-if)#`	Use the `exit` command to return to Global Configuration mode, or use the `end` command to return to Privileged EXEC mode.

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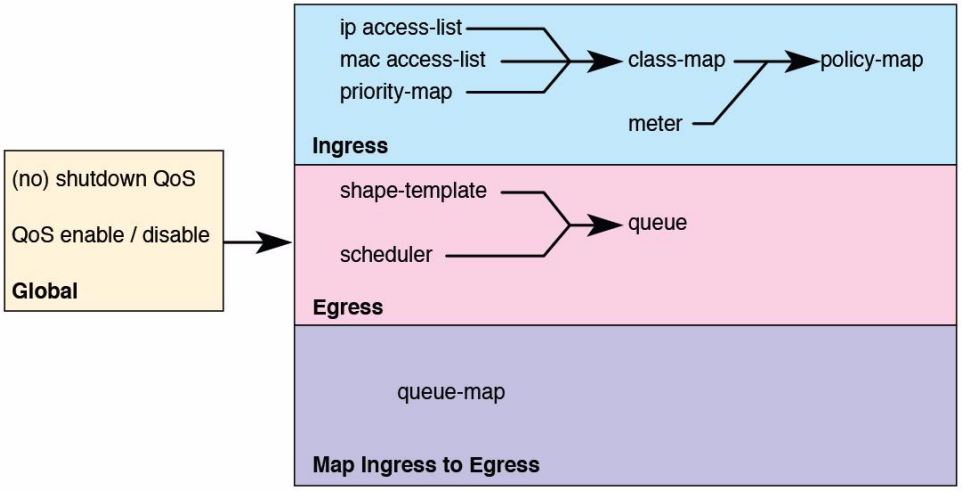
Configuration Overview

This section describes the QoS management architectures:

QoS Management Architectures

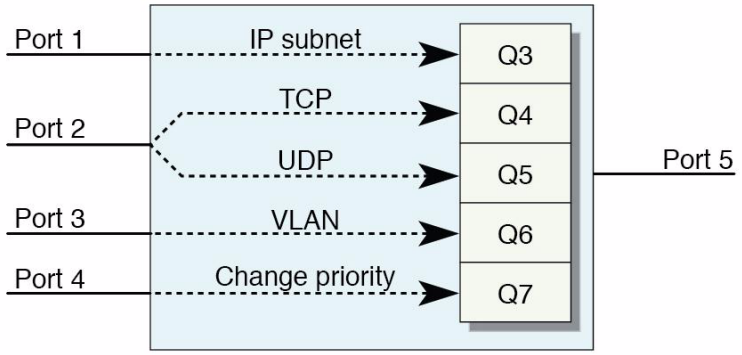
The QoS management architectures in the SEFOS hardware are based on the IETF Differentiated Service Architecture. However, in this architecture, routing and forwarding are decoupled from the QoS configuration.

In the following illustration, the arrows indicate the order of the scripts to be entered.



The following illustration shows a Layer 2 network. There are four down-stream ports and one up-link port. The traffic should be separated into different queues on the up-link. IP traffic from port 0/2 is separated into two classes: one for UDP

packets and one for TCP packets. At port 0/3, VLAN 1000 frames are grouped into one class. At port 0/4, the priority of VLAN frames is changed to 3. In this example, the egress queue is different than the default queue for priority 3.



The layer 2 network is configured by the following commands:

```
SEFOS# configure terminal
SEFOS(config)# vlan 1000
SEFOS(config-vlan)# ports extreme-ethernet 0/1-5
SEFOS(config-vlan)# exit
SEFOS(config)# no shutdown qos
SEFOS(config)# qos enable
SEFOS(config)# exit
SEFOS# show qos global info
QoS Global Information
----------------------
System Control       : Start
System Status        : Enable
Rate Unit            : kbps

Rate Granularity     : 64
Trace Flag           : 0
```

Configuring QoS

These topics explain how to configure QoS on a Sun Blade 6000 Ethernet Switched NEM 24p 10GbE.

Introduction

Configuring QoS involves the following three steps:

1. Classifying and conditioning the ingress traffic of interest.
2. Configuring the egress port queuing and scheduling.
3. Mapping the ingress traffic to egress queues.

Classifying and Conditioning Ingress Traffic

The first step in the configuration process involves defining the packet stream and determining how to condition it. This section includes examples of CLI commands that you can use to set up the classification and conditioning. Note that you must apply ACLs to an interface.

The following topics show how to classify and condition ingress traffic:

▼ Define an ACL and Access Group

1. Define an access list to capture source from a subnet.

```
SEFOS# configure terminal
SEFOS(config)# ip access-list extended 200
SEFOS(config-ext-nacl)# permit ip 10.123.1.0 255.255.255.0 any
SEFOS(config-ext-nacl)# exit
SEFOS(config)# ip access-list extended 210
SEFOS(config-ext-nacl)# permit ip any any
SEFOS(config-ext-nacl)# exit
```

2. Apply the ACL to interface `0/1`.

```
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# ip access-group 200 in
SEFOS(config-if)# ip access-group 210 in
SEFOS(config-if)# end
```

3. Review the access list information for `ip 200`.

```
SEFOS# show access-lists ip 200
Extended IP Access List 200
----------------------------
Filter Priority                 : 1
Filter Protocol Type            : ANY
IP address Type                 : IPV4
Source IP address               : 10.123.1.0
Source IP address mask          : 255.255.255.0
Source IP Prefix Length         : 24
Destination IP address          : 0.0.0.0
Destination IP address mask     : 0.0.0.0
Destination IP Prefix Length    : 0
Flow Identifier                 : 0
In Port List                    : Ex0/1
Out Port List                   : NIL
```

```
Filter TOS                          : NIL
Filter DSCP                         : NIL
Filter Action                       : Permit
Status                              : Active
```

4. Review the access list information for `ip 210`**.**

```
SEFOS# show access-lists ip 210
Extended IP Access List 210
-----------------------------
Filter Priority                 : 1
Filter Protocol Type            : ANY
IP address Type                 : IPV4
Source IP address               : 0.0.0.0
Source IP address mask          : 0.0.0.0
Source IP Prefix Length         : 0
Destination IP address          : 0.0.0.0
Destination IP address mask     : 0.0.0.0
Destination IP Prefix Length    : 0
Flow Identifier                 : 0
In Port List                    : Ex0/1
Out Port List                   : NIL
Filter TOS                      : NIL
Filter DSCP                     : NIL
Filter Action                   : Permit
Status                          : Active
```

▼ Define TCP and UDP Traffic

You can define TCP and UDP traffic from a given subnet. Both rules are applied to interface `0/2`. This application enables traffic to be separated from one port into two classes, then enqueued to separate queues on egress.

1. Use the `ip access-list` **and** `ip access-group` **commands to define the TCP and UDP traffic.**

```
SEFOS# configure terminal
SEFOS(config)# ip access-list extended 101
SEFOS(config-ext-nacl)# permit tcp 10.123.1.0 255.255.255.0 any
SEFOS(config-ext-nacl)# exit
SEFOS(config)# ip access-list extended 102
SEFOS(config-ext-nacl)# permit udp 10.123.1.0 255.255.255.0 any
SEFOS(config-ext-nacl)# exit
SEFOS(config)# ip access-list extended 110
SEFOS(config-ext-nacl)# permit ip any any
SEFOS(config-ext-nacl)# exit
```

```
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# ip access-group 101 in
SEFOS(config-if)# ip access-group 102 in
SEFOS(config-if)# ip access-group 110 in
SEFOS(config-if)# end
```

2. Review the access list for `ip 101`**.**

```
SEFOS# show access-lists ip 101
Extended IP Access List 101
-----------------------------
Filter Priority                  : 1
Filter Protocol Type             : TCP
IP address Type                  : IPV4
Source IP address                : 10.123.1.0
Source IP address mask           : 255.255.255.0
Source IP Prefix Length          : 24
Destination IP address           : 0.0.0.0
Destination IP address mask      : 0.0.0.0
Destination IP Prefix Length     : 0
Flow Identifier                  : 0
In Port List                     : Ex0/2
Out Port List                    : NIL
Filter TOS                       : NIL
Filter DSCP                      : NIL
Filter Source Ports From         : 0
Filter Source Ports Till         : 65535
Filter Destination Ports From    : 0
Filter Destination Ports Till    : 65535
Filter Action                    : Permit
Status                           : Active
```

3. Review the access list for `ip 102`**.**

```
SEFOS# show access-lists ip 102
Extended IP Access List 102
-----------------------------
Filter Priority                  : 1
Filter Protocol Type             : UDP
IP address Type                  : IPV4
Source IP address                : 10.123.1.0
Source IP address mask           : 255.255.255.0
Source IP Prefix Length          : 24
Destination IP address           : 0.0.0.0
Destination IP address mask      : 0.0.0.0
Destination IP Prefix Length     : 0
Flow Identifier                  : 0
```

```
In Port List                        : Ex0/2
Out Port List                       : NIL
Filter TOS                          : NIL
Filter DSCP                         : NIL
Filter Source Ports From            : 0
Filter Source Ports Till            : 65535
Filter Destination Ports From       : 0
Filter Destination Ports Till       : 65535
Filter Action                       : Permit
Status                              : Active
```

4. Review the access list for `ip 110`**.**

```
SEFOS# show access-lists ip 110
Extended IP Access List 110
-----------------------------
Filter Priority               : 1
Filter Protocol Type          : ANY
IP address Type               : IPV4
Source IP address             : 0.0.0.0
Source IP address mask        : 0.0.0.0
Source IP Prefix Length       : 0
Destination IP address        : 0.0.0.0
Destination IP address mask   : 0.0.0.0
Destination IP Prefix Length  : 0
Flow Identifier               : 0
In Port List                  : Ex0/2
Out Port List                 : NIL
Filter TOS                    : NIL
Filter DSCP                   : NIL
Filter Action                 : Permit
Status                        : Active
```

▼ Define VLAN Tagged Packets

You can define a class of VLAN tagged packets and apply them to an interface.

1. Use the `mac access-list` **command to define the VLAN packages.**

```
SEFOS# configure terminal
SEFOS(config)# mac access-list extended 50
SEFOS(config-ext-macl)# permit any any Vlan 1000
SEFOS(config-ext-macl)# exit
SEFOS(config)# mac access-list extended 55
SEFOS(config-ext-macl)# permit any any
SEFOS(config-ext-macl)# exit
```

2. Apply the tagged packets to interface `0/3`**.**

```
SEFOS(config)# interface extreme-ethernet 0/3
SEFOS(config-if)# mac access-group 50 in
SEFOS(config-if)# mac access-group 55 in
SEFOS(config-if)# end
```

3. Review the access list for mac `50`**.**

```
SEFOS# show access-lists mac 50
Extended MAC Access List 50
-----------------------------
Filter Priority            : 1
Ether Type                 : 0
Protocol Type              : 0
Vlan Id                    : 1000
User-Priority              : 0
Destination MAC Address    : 00:00:00:00:00:00
Source MAC Address         : 00:00:00:00:00:00
In Port List               : Ex0/3
Filter Action              : Permit
Status                     : Active
```

4. Review the access list for mac `55`**.**

```
SEFOS# show access-lists mac 55
Extended MAC Access List 55
-----------------------------
Filter Priority            : 1
Ether Type                 : 0
Protocol Type              : 0
Vlan Id                    : 0
User-Priority              : 0
Destination MAC Address    : 00:00:00:00:00:00
Source MAC Address         : 00:00:00:00:00:00
In Port List               : Ex0/3
Filter Action              : Permit
Status                     : Active
```

▼ Define Incoming Packet Priorities

You can define the priority of incoming packets by using the `priority-map` command so that incoming packets are tagged with a defined priority. You can use the `map interface` command to define the interface.

1. **Define the priority for incoming packets on a given interface (`0/4` in this example).**

```
SEFOS# configure terminal
SEFOS(config)# priority-map 500
SEFOS(config-pri-map)# map interface extreme-ethernet 0/4
in-Priority-type vlanPri in-priority 5 regen-priority 3
SEFOS(config-pri-map)# exit
SEFOS(config)# exit
```

2. **Review the priority map information.**

```
SEFOS# show priority-map 500
QoS Priority Map Entries
------------------------
PriorityMapId          : 500
IfIndex                : Ex0/4
VlanId                 : 0
InPriorityType         : VlanPriority
InPriority             : 5
RegenPriority          : 3
InnerRegenPriority     : None
```

You can use any of the preceding commands to define a packet stream. You must define each traffic stream with an interface. After you define a packet stream, you must map it into a traffic class for QoS management. You do this with the `class-map` command.

▼ Define the Traffic Classes

Each instance of the `class-map` command shown in this example links each of the defined traffic classes shown in the prior examples with an identifier, by using the `set class` command. Use the identifiers with the `policy-map` command, as in the examples in the following sections.

1. **Define the traffic class.**

```
SEFOS# configure terminal
SEFOS(config)# class-map 1000
SEFOS(config-cls-map)# match access-group ip-access-list 200
SEFOS(config-cls-map)# set class 3000
SEFOS(config-cls-map)# exit
SEFOS(config)# class-map 1001
SEFOS(config-cls-map)# match access-group ip-access-list 101
SEFOS(config-cls-map)# set class 3001
```

```
SEFOS(config-cls-map)# exit
SEFOS(config)# class-map 1002
SEFOS(config-cls-map)# match access-group ip-access-list 102
SEFOS(config-cls-map)# set class 3002
SEFOS(config-cls-map)# exit
SEFOS(config)# class-map 1003
SEFOS(config-cls-map)# match access-group mac-access-list 50
SEFOS(config-cls-map)# set class 3003
SEFOS(config-cls-map)# exit
SEFOS(config)# class-map 1004
SEFOS(config-cls-map)# match access-group priority-map 500
SEFOS(config-cls-map)# set class 3004
SEFOS(config-cls-map)# exit
SEFOS(config)# exit
```

2. Review the information for class-map `1000`**.**

```
SEFOS# show class-map 1000
QoS Class Map Entries
---------------------
ClassMapId           : 1000
L2FilterId           : None
L3FilterId           : 200
PriorityMapId        : None
CLASS                : 3000
PolicyMapId          : None
PreColor             : None
Status               : Active
```

3. Review the information for class-map `1001`**.**

```
SEFOS# show class-map 1001
QoS Class Map Entries
---------------------
ClassMapId          : 1001
L2FilterId          : None
L3FilterId          : 101
PriorityMapId       : None
CLASS               : 3001
PolicyMapId         : None
PreColor            : None
Status              : Active
```

4. Review the information for class-map 1002**.**

```
SEFOS# show class-map 1002
ClassMapId          : 1002
L2FilterId          : None
L3FilterId          : 102
PriorityMapId       : None
CLASS               : 3002
PolicyMapId         : None
PreColor            : None
Status              : Active
```

5. Review the information for class-map 1003**.**

```
SEFOS# show class-map 1003
QoS Class Map Entries
---------------------
ClassMapId          : 1003
L2FilterId          : 50
L3FilterId          : None
PriorityMapId       : None
CLASS               : 3003
PolicyMapId         : None
PreColor            : None
Status              : Active
```

6. Review the information for class-map 1004**.**

```
SEFOS# show class-map 1004
QoS Class Map Entries
---------------------
ClassMapId         : 1004
L2FilterId         : None
L3FilterId         : None
PriorityMapId      : 500
CLASS              : 3004
PolicyMapId        : None
PreColor           : None
Status             : Active
```

▼ Set the Rate and Burst Tolerance of a Traffic Stream

You can use the `meter` command to set the rate (in Mbps) and burst tolerance (in KB) of a traffic stream.

1. Set the rate and burst tolerance.

```
SEFOS# configure terminal
SEFOS(config)# meter 4000
SEFOS(config-meter)# meter-type srTCM color-mode blind cir 5000
cbs 50 ebs 50
SEFOS(config-meter)# exit
SEFOS(config)# meter 4001
SEFOS(config-meter)# meter-type trTCM color-mode blind cir 5000
cbs 50 eir 7000 ebs 100
SEFOS(config-meter)# exit
SEFOS(config)# meter 4002
SEFOS(config-meter)# meter-type trTCM color-mode blind cir 7000
cbs 50 eir 9000 ebs 100
SEFOS(config-meter)# exit
SEFOS(config)# exit
```

2. Review the meter information.

```
SEFOS# show meter
QoS Meter Entries
-----------------
MeterId          : 4000
Type             : SRTCM
Color Mode       : Color Blind
Interval         : None
CIR              : 5000
CBS              : 50
EIR              : None
EBS              : 50
NextMeter        : None
Status           : Active

MeterId          : 4001
Type             : TRTCM
Color Mode       : Color Blind
Interval         : None
CIR              : 5000
CBS              : 50
EIR              : 7000
EBS              : 100
NextMeter        : None
Status           : Active

MeterId          : 4002
Type             : TRTCM
Color Mode       : Color Blind
Interval         : None
CIR              : 7000
CBS              : 50
EIR              : 9000
EBS              : 100
NextMeter        : None
Status           : Active
```

The `MeterID 4000` value defines a meter with the same CBS and EBS. This meter is effectively a simple token bucket meter.

▼ Set up the Ingress Policy

You can use the `policy-map` command to set up the ingress policy.

1. **Link the traffic class to a defined meter.**

```
SEFOS(config)# policy-map 5000
SEFOS(config-ply-map)# set policy class 3000 default-priority-type
none
SEFOS(config-ply-map)# set meter 4001 conform-action
set-ip-dscp-transmit 10 exceed-action  set-ip-dscp-transmit 12
violate-action set-ip-dscp-transmit 14
SEFOS(config-ply-map)# exit
SEFOS(config)# policy-map 5001
SEFOS(config-ply-map)# set policy class 3001 default-priority-type
none
SEFOS(config-ply-map)# set meter 4002 conform-action
set-ip-dscp-transmit 10 exceed-action  set-ip-dscp-transmit 12
violate-action set-ip-dscp-transmit 14
SEFOS(config-ply-map)# exit
SEFOS(config)# policy-map 5002
SEFOS(config-ply-map)# set policy class 3002 default-priority-type
none
SEFOS(config-ply-map)# set meter 4002 conform-action
set-ip-dscp-transmit 10 exceed-action  set-ip-dscp-transmit 12
violate-action set-ip-dscp-transmit 14
SEFOS(config-ply-map)# exit
SEFOS(config)# policy-map 5003
SEFOS(config-ply-map)# set policy class 3003 default-priority-type
none
SEFOS(config-ply-map)# set meter 4000 conform-action
set-ip-dscp-transmit 10 exceed-action  set-ip-dscp-transmit 12
violate-action set-ip-dscp-transmit 14
SEFOS(config-ply-map)# exit
SEFOS(config)# policy-map 5004
SEFOS(config-ply-map)# set policy class 3004 default-priority-type
none
SEFOS(config-ply-map)# set meter 4000 conform-action
set-ip-dscp-transmit 10 exceed-action  set-ip-dscp-transmit 12
violate-action set-ip-dscp-transmit 14
SEFOS(config-ply-map)# exit
SEFOS(config)# exit
```

2. **Review the policy map information.**

```
SEFOS# show policy-map
QoS Policy Map Entries
----------------------
PolicyMapId      : 1
IfIndex          : 0
Class            : 1
DefaultPHB       : None.
```

```
MeterId          : 0
ConNClass        : 0
ExcNClass        : 0
VioNClass        : 0
ConfAct          : None.
ExcAct           : None.
VioAct           : None.

PolicyMapId      : 5000
IfIndex          : 0
Class            : 3000
DefaultPHB       : None.
MeterId          : 4001
ConNClass        : 0
ExcNClass        : 0
VioNClass        : 0
ConfAct          : IP Dscp 10
ExcAct           : IP Dscp 12
VioAct           : IP Dscp 14
```

```
PolicyMapId      : 5001
IfIndex          : 0
PolicyMapId      : 5003
Class            : 3001
IfIndex          : 0
Class            : 3003
DefaultPHB       : None.
MeterId          : 4000
MeterId          : 4002
ExcNClass        : 0
DefaultPHB       : None.
ConNClass        : 0
ConNClass        : 0
ExcNClass        : 0
VioNClass        : 0
ConfAct          : IP Dscp 10
VioNClass        : 0
ExcAct           : IP Dscp 12
ConfAct          : IP Dscp 10
VioAct           : IP Dscp 14
ExcAct           : IP Dscp 12
VioAct           : IP Dscp 14
PolicyMapId      : 5002
IfIndex          : 0
PolicyMapId      : 5004
Class            : 3002
IfIndex          : 0
Class            : 3004
```

```
DefaultPHB        : None.
MeterId           : 4000
MeterId           : 4002
ExcNClass         : 0
DefaultPHB        : None.
ConNClass         : 0
ConNClass         : 0
ExcNClass         : 0
VioNClass         : 0
ConfAct           : IP Dscp 10
VioNClass         : 0
ExcAct            : IP Dscp 12
ConfAct           : IP Dscp 10
VioAct            : IP Dscp 14
ExcAct            : IP Dscp 12
VioAct            : IP Dscp 14
```

Classifying and Scheduling Egress Class Traffic

After you define the traffic streams of interest, you must use the `scheduler` command to define the egress scheduler behavior.

The following procedures show how to classify and schedule egress class traffic:

- "Define the Egress Scheduler Behavior" on page 20
- "Define a General Shaper" on page 21
- "Insatiate Egress Queues" on page 21

▼ Define the Egress Scheduler Behavior

1. Use the `scheduler` command to define the behavior at an interface.

```
SEFOS# configure terminal
SEFOS(config)# scheduler 8000 interface extreme-ethernet 0/5
sched-algo deficit-rr
SEFOS(config)# exit
```

2. Review the scheduler entries.

```
SEFOS# show scheduler interface extreme-ethernet 0/5
QoS Scheduler Entries
---------------------
IfIndex    Scheduler Index   Scheduler Algo      Shape Index
Scheduler HL    GlobalId
------  ------  ----------          ---------  --------    -------
Ex0/5     1     weightedRoundRobin      0          0           5
Ex0/5    8000   deficitRoundRobin        0         0           25
```

A default scheduler, `1`, is defined at the interface `0/5`. The `scheduler` command defines and sets the scheduler to be the current scheduler.

▼ Define a General Shaper

1. Define the general shaper.

```
SEFOS# configure terminal
SEFOS(config)# shape-template 7000 cir 5000 cbs 50
SEFOS(config)# exit
```

2. Review the shape template entries.

```
SEFOS# show shape-template
QoS Shape Template Entries
--------------------------
ShapeTemplate Id    CIR    CBS    EIR    EBS
----------------    -----  -----  -----  ----
7000                5000   50     10000  10000
```

▼ Insatiate Egress Queues

The `queue` command instantiates one of eight egress queues with a defined queue type, along with an optional shaper.

1. **Instantiate egress queues at a defined interface (`0/5` in this example).**

```
SEFOS# configure terminal
SEFOS(config)# queue 1 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# queue 2 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# queue 3 interface extreme-ethernet 0/5 scheduler
8000 weight 100 shaper 7000
SEFOS(config)# queue 4 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# queue 5 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# queue 6 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# queue 7 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# queue 8 interface extreme-ethernet 0/5 scheduler
8000 weight 100
SEFOS(config)# exit
```

2. **Review the queue entries.**

```
SEFOS# show queue interface extreme-ethernet 0/5
Ex0/5  8       1        8000       100    1      none    40
```

Mapping Ingress Traffic to Egress Class

The `queue-map` command links the traffic class defined in the `set-class` command or traffic with a regenerated priority to one of eight egress queues on an interface.

The following procedure shows how to map ingress traffic to egress class:

- "Map Ingress Traffic to Egress Class" on page 23

▼ Map Ingress Traffic to Egress Class

1. Map ingress traffic on a defined interface (`0/5` in this example).

```
SEFOS# configure terminal
SEFOS(config)# queue-map CLASS 3000 interface extreme-ethernet 0/5
queue-id 3
SEFOS(config)# queue-map CLASS 3001 interface extreme-ethernet 0/5
queue-id 4
SEFOS(config)# queue-map CLASS 3002 interface extreme-ethernet 0/5
queue-id 5
SEFOS(config)# queue-map CLASS 3003 interface extreme-ethernet 0/5
queue-id 6
SEFOS(config)# queue-map CLASS 3004 interface extreme-ethernet 0/5
queue-id 7
SEFOS(config)# exit
```

2. Review the queue map entries.

```
SEFOS# show queue-map interface extreme-ethernet 0/5
QoS Queue Map Entries
---------------------
IfIndex  CLASS  PriorityType  Priority Value  Mapped Queue
-------------------------------------------------------------
Ex0/5    3000   none          0               3
Ex0/5    3001   none          0               4
Ex0/5    3002   none          0               5

Ex0/5    3003   none          0               6
Ex0/5    3004   none          0               7
```

Forwarding packets from the same traffic class to the different egress ports is possible, such as when the system is configured as a router with more than one interface connecting to other routers. Thus, to guarantee the packet behavior on a different port, you can repeat the steps in the forwarding example (using the `queue`, `scheduler`, and `queue-map` commands) for a different interface.