



Policy-Based Queueing

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Note

- Queueing is optional. Use the commands described in this section to configure queueing on ports that serve congested links.
- For complete syntax and usage information for the commands used in this chapter, see these publications:
http://www.cisco.com/en/US/products/ps11846/prod_command_reference_list.html
- Cisco IOS Release 15.4SY supports only Ethernet interfaces. Cisco IOS Release 15.4SY does not support any WAN features or commands.



Tip

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html

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Prerequisites for Policy-Based Queueing

None.

Restrictions for Policy-Based Queueing

- Ports on the WS-X6904-40G-2T switching modules can be configured with two priority queues (2p6q4t). Priority queue 1 has higher priority than priority queue 2.
- The WS-X6904-40G-2T egress queues support QoS shaping.
 - Shaping buffers traffic that exceeds the total egress port bandwidth. You can configure shaping on the egress queues and for egress traffic on the port.
 - You configure shaping as a percentage of the total egress port bandwidth.
 - Shaping can be configured only on the egress queues of WS-X6904-40G-2T ports. You cannot configure shaping on a port-channel interface.
 - Ports with shaping configured can be members of an EtherChannel, but shaping can cause the egress traffic rate to vary significantly and cause significant differences between the member ports.
 - You configure shaping with the **shape average percent** command. The **show running-configuration** command displays the **shape average percent** command, but the **show policy-map type lan-queueing** command displays the shaping configuration with the **cir percentage** command under the heading “Average Rate Traffic Shaping” heading.

See the “[Configuring Policy-Based Queueing on WS-X6904-40G-2T Ports](#)” section on page 66-13.

- DSCP-based queueing is supported on 8q4t, 1p7q2t, 2p6q4t, and 1p7q4t ports. The Supervisor Engine 2T-10GE ports are 8q4t/1p7q4t with the **platform qos 10g-only** global configuration command configured, which disables the Gigabit Ethernet ports on the supervisor engine.
- The presence of a **match dscp** command or a **match precedence** command in a class map that is used in a queueing policy attached to a port enables DSCP-based queueing on the port in the direction that the queueing policy is attached.
- CoS-based queueing is always used for non-IP traffic, IP multicast traffic, and IP unknown unicast flood traffic.
- Class maps that are used in queueing policies can contain any combination and number of **match dscp**, **match precedence**, or **match cos** commands.
- You can attach one input and one output queueing policy to an interface, in addition to policies that configure marking or policing. To support per-queue shaping on WS-X6904-40G-2T egress nonprioritynonpriority queues, the output queueing policy on WS-X6904-40G-2T port egress queues supports child policies.
- To support migration from Cisco IOS Release 12.2SX configurations, Cisco IOS Release 15.4SY supports global configuration mode and interface configuration mode queueing commands.
 - When you attach an ingress or egress queueing policy to a port, all interface configuration mode queueing commands on the port are deleted.
 - An attached ingress or egress queueing policy supercedes the effect of any configured global configuration mode queueing commands.
 - If you attach a queueing policy in only one direction, the queueing configuration of the other direction is either the defaults or is defined by any configured global configuration mode queueing commands.
 - You cannot configure any interface configuration mode queueing commands on a port that has a queueing policy attached.

- Policy-based queueing is supported on all modules that Cisco IOS Release 15.4SY supports with the Supervisor Engine 2T-10GE.
- Queueing policies are specific to particular port types because a queueing policy cannot contain any commands that are not supported by the port to which it will be attached (see the “[Configuration Examples for Policy-Based Queueing](#)” section on page 66-19). Commands not supported on a port are not ignored. You cannot successfully apply a policy with unsupported commands to a port.
- For clarity, configure queueing policy names that correspond to the port type it supports; for example **1q2t_1q8t_ingress**.
- Queueing policies can contain multiple class maps; each class map configures a queue.
- A policy-map class defined by a **class** command that uses a class map and that contains the policy-map class **priority** command configures the priority queue. (The priority queue is the highest-numbered queue.) The class-map filters the QoS values (CoS or DSCP) it is configured with to the priority queue.
- Enabling SRR on a port disables the priority queue.
- A policy-map class defined by a **class** command that uses a class map and that does not contain the policy-map class **priority** command configures the highest-numbered nonpriority queue. (If the port has a priority queue, the highest-numbered nonpriority queue is numbered one less than the priority queue. If the port does not have a priority queue, the highest-numbered queue is a nonpriority queue.) Subsequent such commands define the configuration of the remaining nonpriority queues in reverse numerical order. You cannot skip a queue, but configuration of all queues is not required. The class-map filters the QoS values it is configured with to the nonpriority queue being configured.
- A **class** command that uses the **class-default** keywords configures queue 1. The **class-default** keywords filter all remaining QoS values to queue 1.
- For each nonpriority queue, policy-map class **queue-buffers** or **random-detect** commands assign QoS values (CoS or DSCP) to thresholds within a queue. Thresholds are configured in numerical order. You cannot skip a threshold, but configuration of all threshold is not required. QoS values that are to be applied to the thresholds must be from the group of values that the class-map filters to the queue.
 - The first **queue-buffers** or **random-detect** command assigns QoS values to the first threshold, and configures the percentage value applied to it.
 - Subsequent **queue-buffers** or **random-detect** commands that are configured with the same percentage value assign additional QoS values to the first threshold.
 - The next **queue-buffers** or **random-detect** command that is configured with a different percentage value assigns QoS values to the numerically next threshold, and configures the percentage value applied to it.
 - Subsequent **queue-buffers** or **random-detect** commands that are configured with the same percentage value assign additional QoS values to the numerically next threshold.
 - Each **queue-buffers** or **random-detect** command with a different percentage defines the next unconfigured threshold and any subsequent commands that repeat a percentage value assign additional QoS values to a configured threshold.
 - All unconfigured thresholds are at 100%.
 - All unassigned QoS labels are assigned to the highest-numbered threshold.

Information About Policy-Based Queueing

- [Port-Based Queue Types, page 66-4](#)
- [Queueing Policies, page 66-9](#)

Port-Based Queue Types

- [Ingress and Egress Buffers and Queues, page 66-4](#)
- [Ingress Queue Types, page 66-5](#)
- [Egress Queue Types, page 66-6](#)
- [Module to Queue Type Mappings, page 66-7](#)

Ingress and Egress Buffers and Queues



Note

The WS-X6904-40G-2T egress queues support QoS [shaping](#).

The Ethernet port ASICs have buffers that are divided into a fixed number of queues. When congestion avoidance is enabled, PFC QoS uses the traffic's Layer 2 CoS value or, on some port types, the Layer 3 DSCP values, to assign traffic to the queues. The buffers and queues store frames temporarily as they transit the switch. PFC QoS allocates the port ASIC memory as buffers for each queue on each port.

The Ethernet ports support the following types of queues:

- Nonpriority queues
- Priority queues

The Ethernet ports support the following types of scheduling algorithms between queues:

- Shaped round robin (SRR)—SRR allows a queue to use only the allocated bandwidth.
- Deficit weighted round robin (DWRR)—DWRR keeps track of any lower-priority queue under-transmission caused by traffic in a higher-priority queue and compensates in the next round.
- Weighted Round Robin (WRR)—WRR does not explicitly reserve bandwidth for the queues. Instead, the amount of bandwidth assigned to each queue is user configurable. The percentage or weight allocated to a queue defines the amount of bandwidth allocated to the queue.
- Priority queueing—Strict priority queueing allows delay-sensitive data such as voice to be dequeued and sent before packets in other queues are dequeued, giving delay-sensitive data preferential treatment over other traffic. The switch services traffic in the strict-priority transmit queue before servicing the nonpriority queues. After transmitting a packet from a nonpriority queue, the switch checks for traffic in the strict-priority queue. If the switch detects traffic in the strict-priority queue, it suspends its service of the nonpriority queue and completes service of all traffic in the strict-priority queue before returning to the nonpriority queue.

The Ethernet ports provide congestion avoidance with these types of thresholds within a queue:

- Weighted Random Early Detection (WRED)—On ports with WRED drop thresholds, frames with a given QoS label are admitted to the queue based on a random probability designed to avoid buffer congestion. The probability of a frame with a given QoS label being admitted to the queue or discarded depends on the weight and threshold assigned to that QoS label.

For example, if CoS 2 is assigned to queue 1, threshold 2, and the threshold 2 levels are 40 percent (low) and 80 percent (high), then frames with CoS 2 will not be dropped until queue 1 is at least 40 percent full. As the queue depth approaches 80 percent, frames with CoS 2 have an increasingly higher probability of being discarded rather than being admitted to the queue. Once the queue is over 80 percent full, all CoS 2 frames are dropped until the queue is less than 80 percent full. The frames the switch discards when the queue level is between the low and high thresholds are picked out at random, rather than on a per-flow basis or in a FIFO manner. This method works well with protocols such as TCP that can adjust to periodic packet drops by backing off and adjusting their transmission window size.

- Tail-drop thresholds—On ports with tail-drop thresholds, frames with a given QoS label are admitted to the queue until the drop threshold associated with that QoS label is exceeded; subsequent frames of that QoS label are discarded until the threshold is no longer exceeded. For example, if CoS 1 is assigned to queue 1, threshold 2, and the threshold 2 watermark is 60 percent, then frames with CoS 1 will not be dropped until queue 1 is 60 percent full. All subsequent CoS 1 frames will be dropped until the queue is less than 60 percent full. With some port types, you can configure the nonpriority receive queue to use both a tail-drop and a WRED-drop threshold by mapping a CoS value to the queue or to the queue and a threshold. The switch uses the tail-drop threshold for traffic carrying CoS values mapped only to the queue. The switch uses WRED-drop thresholds for traffic carrying CoS values mapped to the queue and a threshold. All LAN ports of the same type use the same drop-threshold configuration.



Note

- You can enable DSCP-based queues and thresholds on 8q4t, 1p7q2t, and 1p7q4t ports (see the [“Module to Queue Type Mappings”](#) section on page 66-7), either in a queuing policy or with legacy interface commands (see the [“Legacy Configuration Procedures for DSCP-Based Queue Mapping”](#) section on page 36-14).
- DSCP-based queuing is supported on 8q4t, 1p7q2t, and 1p7q4t ports. The Supervisor Engine 2T-10GE ports are 8q4t/1p7q4t with the **platform qos 10g-only** global configuration command configured. To configure DSCP-based queue mapping on Supervisor Engine 2T ports, you must enter **shutdown** interface configuration mode commands for the Supervisor Engine 2T Gigabit Ethernet ports, and then enter the **platform qos 10g-only** global configuration command, which disables the Gigabit Ethernet ports on the Supervisor Engine 2T.

The switch provides congestion avoidance with the combination of multiple queues and the scheduling algorithms associated with each queue.

Ingress Queue Types

To see the queue structure of a LAN port, enter the **show queueing interface** *type slot/port* | **include type** command. The command displays one of the following architectures:

- **1q2t** indicates one nonpriority queue with one configurable tail-drop threshold and one nonconfigurable tail-drop threshold.
- **2q4t** indicates two nonpriority queues, each with four configurable tail-drop thresholds.
- **2q8t** indicates two nonpriority queues, each with eight configurable tail-drop thresholds.
- **8q4t** indicates eight nonpriority queues, each with four thresholds, each configurable as either WRED-drop or tail-drop, with support for DSCP-based queuing.
- **8q8t** indicates eight nonpriority queues, each with eight thresholds, each configurable as either WRED-drop or tail-drop.

- **1p1q4t** indicates:
 - One strict-priority queue
 - One nonpriority queue with four configurable tail-drop thresholds.
- **1p7q2t** indicates the following:
 - One strict-priority queue
 - Seven nonpriority queues, each with two thresholds, each threshold configurable as either WRED-drop or tail-drop
 - Supports DSCP-based queueing
- **2p6q4t** indicates the following:
 - Two strict-priority queues
 - Six nonpriority queues, each with four thresholds, each threshold configurable as either WRED-drop or tail-drop
 - Supports DSCP-based queueing
- **1p7q4t** indicates the following:
 - One strict-priority queue
 - Seven nonpriority queues, each with four thresholds, each threshold configurable as either WRED-drop or tail-drop
 - Supports DSCP-based queueing

Egress Queue Types

To see the queue structure of an egress LAN port, enter the **show queueing interface** *type slot/port* | **include type** command. The command displays one of the following architectures:

- **1p3q8t** indicates the following:
 - One strict-priority queue
 - Three nonpriority queues, each with eight thresholds, each threshold configurable as either WRED-drop or tail-drop
- **2p6q4t** indicates the following:
 - Two strict-priority queues
 - Six nonpriority queues, each with four thresholds, each threshold configurable as either WRED-drop or tail-drop
 - Supports DSCP-based queueing
 - [Supports per-queue shaping and per-port shaping](#)
- **1p7q4t** indicates the following:
 - One strict-priority queue
 - Seven nonpriority queues, each with four thresholds, each threshold configurable as either WRED-drop or tail-drop
 - Supports DSCP-based queueing
 - [On WS-X6904-40G-2T, supports per-queue shaping and per-port shaping](#)

- **1p7q8t** indicates the following:
 - One strict-priority queue
 - Seven nonpriority queues, each with eight thresholds, each threshold configurable as either WRED-drop or tail-drop

Module to Queue Type Mappings

- [Table 66-1—Supervisor Engine Module QoS Queue Structures](#)
- [Table 66-2—40-Gigabit Ethernet Modules](#)
- [Table 66-3—10-Gigabit Ethernet Modules](#)
- [Table 66-4—Gigabit and 10/100/1000 Ethernet Modules](#)

Table 66-1 Supervisor Engine Module QoS Queue Structures

Supervisor Engines	Ingress Queue and Drop Thresholds	Ingress Queue Scheduler	Egress Queue and Drop Thresholds	Egress Queue Scheduler	Total Buffer Size	Ingress Buffer Size	Egress Buffer Size
VS-S2T-10G-XL, VS-S2T-10G							
With Gigabit Ethernet ports enabled	2q4t	WRR	1p3q4t	DWRR or SRR		128 MB	112 MB
	Does not support DSCP-based queuing.						
With Gigabit Ethernet ports disabled	8q4t	WRR	1p7q4t	DWRR or SRR			
	<ul style="list-style-type: none"> • Supports DSCP-based queuing. 						

Table 66-2 40-Gigabit Ethernet Modules

Modules	Ingress Queue and Drop Thresholds	Ingress Queue Scheduler	Egress Queue and Drop Thresholds	Egress Queue Scheduler	Total Buffer Size	Ingress Buffer Size	Egress Buffer Size
WS-X6904-40G-2TXL, WS-X6904-40G-2T (supports DSCP-based queuing; supports egress queue shaping)	1p7q4t or 2p6q4t	DWRR	1p7q4t or 2p6q4t	DWRR	See the Catalyst 6900 Series data sheet .		
	Note On WS-X6904-40G-2T ports, the bandwidth command must be configured if you configure any nondefault values for any other queuing commands on the port. (CSCtz05347)						

Table 66-3 10-Gigabit Ethernet Modules

Modules	Ingress Queue and Drop Thresholds	Ingress Queue Scheduler	Egress Queue and Drop Thresholds	Egress Queue Scheduler	Total Buffer Size	Ingress Buffer Size	Egress Buffer Size
WS-X6908-10GE (supports DSCP-based queueing)	8q4t	DWRR	1p7q4t	DWRR SRR	200 MB	108 MB	90 MB
WS-X6816-10T-2T, WS-X6716-10T, WS-X6816-10G-2T, WS-X6716-10GE (supports DSCP-based queueing)							
Performance mode	8q4t	DWRR	1p7q4t	DWRR SRR	198 MB	108 MB per port	90 MB per port
Oversubscription mode	1p7q2t	DWRR	1p7q4t	DWRR SRR	91 MB	90 MB per port	1 MB per port group
WS-X6704-10GE	8q8t	WRR	1p7q8t	DWRR	16 MB	2 MB	14 MB

Table 66-4 Gigabit and 10/100/1000 Ethernet Modules

Modules	Ingress Queue and Drop Thresholds	Ingress Queue Scheduler	Egress Queue and Drop Thresholds	Egress Queue Scheduler	Total Buffer Size	Ingress Buffer Size	Egress Buffer Size
WS-X6848-TX-2T , WS-X6748-GE-TX , WS-X6848-SFP-2T, WS-X6748-SFP, WS-X6824-SFP-2T, WS-X6724-SFP							
	2q8t	WRR	1p3q8t	DWRR	1.3 MB	166 KB	1.2 MB

Queueing Policies

Queueing policies use class-maps with **match** commands (see [Table 66-5](#)) and policy maps with scheduling and congestion management commands (see [Table 66-6](#)).

Table 66-5 Queueing Policy Class Map match Commands and Match Criteria

match Commands	Match Criteria
match cos <i>cos_list</i>	CoS values.
match dscp <i>dscp_list</i>	DSCP values.
match precedence <i>precedence_list</i>	Precedence values.

Note

- The presence of a **match dscp** command or a **match precedence** command in a class map that is used in a queueing policy attached to a port configures DSCP-based queueing in the direction of the policy (ingress or egress) on that port.
- CoS-based queueing is always used for non-IP traffic, IP multicast traffic, and IP unknown unicast flood traffic.
- Class maps that are used in queueing policies can contain both **match dscp** commands and **match cos** commands.

Table 66-6 Queuing Policy-Map Class Commands

Queuing Commands	Description
<code>bandwidth [remaining] percent <i>percentage</i></code>	Allocates bandwidth between nonpriority queues. The remaining keyword is required on ports that have a priority queue.
<code>shape average percent <i>percentage</i></code>	On WS-X6904-40G-2T ports, configures shaping on egress priority queues. Enables SRR on other ports, which allocates limited bandwidth between nonpriority egress queues (see “SRR” in the “Module to Queue Type Mappings” section on page 66-7).
<code>priority</code>	Applies a policy-map class to a priority queue.
<code>priority level {1 2} [<i>percent percentage</i>]</code>	(Required to configure multiple priority queues or shaping.) On WS-X6904-40G-2T ports, applies a policy-map class to one of the priority queues. Priority queue 1 has higher priority than priority queue 2. The optional percent <i>percentage</i> keyword and argument configure shaping on egress priority queues.
<code>queue-buffers ratio <i>weight</i></code>	Sets the queue size.
<code>queue-limit multiple-type-based</code>	Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
<code>queue-limit cos <i>cos_value</i> percent <i>percent_of_qsize</i></code>	Applies one CoS value to a tail-drop threshold and configures the threshold percentage.
<code>queue-limit dscp <i>dscp_value</i> percent <i>percent_of_qsize</i></code>	Applies one DSCP value to a tail-drop threshold and configures the threshold percentage.
<code>queue-limit precedence <i>precedence_value</i> percent <i>percent_of_qsize</i></code>	Applies one precedence value to a tail-drop threshold and configures the threshold percentage.
<code>queue-limit cos values <i>cos_list</i> percent <i>percent_of_qsize</i></code>	Applies multiple CoS values to a tail-drop threshold and configures the threshold percentage.
<code>queue-limit dscp values <i>dscp_list</i> percent <i>percent_of_qsize</i></code>	Applies multiple DSCP values to a tail-drop threshold and configures the threshold percentage.
<code>queue-limit precedence values <i>precedence_list</i> percent <i>percent_of_qsize</i></code>	Applies multiple precedence values to a tail-drop threshold and configures the threshold percentage.

Table 66-6 Queuing Policy-Map Class Commands (continued)

Queuing Commands	Description
<code>random-detect cos-based [aggregate]</code>	Enables application of CoS values to a WRED-drop threshold. The aggregate keyword enables use of the values keyword.
<code>random-detect dscp-based [aggregate]</code>	Enables application of DSCP values to a WRED-drop threshold. The aggregate keyword enables use of the values keyword.
<code>random-detect precedence-based [aggregate]</code>	Enables application of precedence values to a WRED-drop threshold. The aggregate keyword enables use of the values keyword.
<code>random-detect multiple-type-based [aggregate]</code>	Enables application of CoS, precedence, and DSCP values to a WRED-drop threshold. The aggregate keyword enables use of the values keyword.
<code>random-detect cos cos_value percent min_percent max_percent</code>	Applies one CoS value to a WRED-drop threshold and configures the threshold percentages.
<code>random-detect dscp dscp_value percent min_percent max_percent</code>	Applies one DSCP value to a WRED-drop threshold and configures the threshold percentages.
<code>random-detect precedence precedence_value percent min_percent max_percent</code>	Applies one DSCP value to a WRED-drop threshold and configures the threshold percentages.
<code>random-detect cos values cos_list percent min_percent max_percent</code>	Applies multiple CoS values to a WRED-drop threshold and configures the threshold percentages; requires the aggregate keyword.
<code>random-detect dscp values dscp_list percent min_percent max_percent</code>	Applies multiple DSCP values to a WRED-drop threshold and configures the threshold percentages; requires the aggregate keyword.
<code>random-detect precedence values precedence_list percent min_percent max_percent</code>	Applies multiple precedence values to a WRED-drop threshold and configures the threshold percentages.

How to Configure Policy-Based Queuing

- [Configuring a Queuing Policy Class Map, page 66-12](#)
- [Verifying a Queuing Policy Class Map, page 66-12](#)
- [Configuring Queuing Policy Maps, page 66-12](#)
- [Verifying a Queuing Policy Map, page 66-18](#)
- [Attaching a Queuing Policy Map to an Interface, page 66-18](#)



Note

See the “[Configuration Examples for Policy-Based Queuing](#)” section on page 66-19 for detailed information about which queuing commands are supported by each queue type.

Configuring a Queueing Policy Class Map

To configure a queueing policy class map, perform this task:

	Command	Purpose
Step 1	Router(config)# class-map type lan-queueing match-any class_name	Creates a class map. Create a class map for the thresholds on each type of queue that you are configuring. Give the class map a name that allows you to easily associate it with the queue type and threshold for which you configure it.
Step 2	Router (config-cmap)# match cos cos_value1 [cos_value2 ... [cos_valueN]]	(Optional) Configures the queueing policy class map to filter based on CoS values. You can enter multiple commands.
Step 3	Router (config-cmap)# match dscp dscp_value1 [dscp_value2 ... [dscp_valueN]]	(Optional) Configures the queueing policy class map to filter based on DSCP values and enables DSCP-based queueing on the port in the direction that the queueing policy is attached. You can enter multiple commands.
Step 4	Router (config-cmap)# match precedence precedence_value1 [precedence_value2 ... [precedence_valueN]]	(Optional) Configures the queueing policy class map to filter based on precedence values and enables DSCP-based queueing on the port in the direction that the queueing policy is attached. You can enter multiple commands.
Step 5	Router (config-cmap)# end	Exits configuration mode.

This example shows how to create a class map named **cos5** and how to configure filtering to match traffic with CoS 5:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# class-map cos5
Router(config-cmap)# match cos 5
Router(config-cmap)# end
```

Verifying a Queueing Policy Class Map

To verify the queueing policy class map, perform this task:

Command	Purpose
Router# show class-map class_name	Verifies the configuration.

Configuring Queueing Policy Maps

- [Configuring Policy-Based Queueing on WS-X6904-40G-2T Ports, page 66-13](#)
- [Creating a Queueing Policy, page 66-14](#)
- [Configuring a Priority Queue, page 66-15](#)

- [Configuring Nonpriority Queues](#), page 66-15
- [Configuring Thresholds](#), page 66-16

**Note**

- You can attach one input queuing policy map and one output queuing policy map to an interface.
- Queuing policy maps contain one policy-map class for each queue.
- Each policy-map class configures a queue.

Configuring Policy-Based Queuing on WS-X6904-40G-2T Ports

- [Configuring WS-X6904-40G-2T Nonpriority Egress Queue Shaping \(Except class-default\)](#), page 66-13
- [Configuring WS-X6904-40G-2T Multiple Priority Queues or Egress Priority-Queue Shaping](#), page 66-14
- [Configuring WS-X6904-40G-2T Class-Default Egress Shaping](#), page 66-14

**Note**

Use the procedures in these sections to configure the WS-X6904-40G-2T nonpriority ingress queues and single priority queues (ingress or egress) without shaping:

- [Creating a Queuing Policy](#), page 66-14
- [Configuring a Priority Queue](#), page 66-15
- [Configuring Nonpriority Queues](#), page 66-15

Configure thresholds as described in the “[Configuring Thresholds](#)” section on page 66-16.

Configuring WS-X6904-40G-2T Nonpriority Egress Queue Shaping (Except class-default)

The first **class** *class_map_name* command that you enter configures the highest numbered nonpriority queue. Subsequent **class** *class_map_name* commands configure the remaining nonpriority queues in reverse numerical order (highest-numbered to queue #2). To configure shaping on a nonpriority egress queue, perform this task:

	Command	Purpose
Step 1	Router(config)# policy-map type lan-queuing <i>child_policy_name</i>	Creates a child policy map for the nonpriority queues.
Step 2	Router(config-pmap)# class <i>class_map_name</i>	Creates a policy map class for a nonpriority egress queue numbered greater than one.
Step 3	Router(config-pmap-c)# bandwidth remaining percent <i>percentage</i>	Allocates DWRR bandwidth.
Step 4	Router(config-pmap-c)# shape average percent <i>percentage</i>	Configures shaping.
Step 5	Router(config-pmap-c)# queue-buffers ratio <i>weight</i>	(Optional) Sets queue buffer size.
Step 6	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring WS-X6904-40G-2T Multiple Priority Queues or Egress Priority-Queue Shaping

To enable the WS-X6904-40G-2T 2p6q4t port architecture (two priority queues) or to configure egress priority-queue shaping, perform this task:

	Command	Purpose
Step 1	Router(config-pmap)# class <i>class_map_name</i>	Creates a policy map class.
Step 2	Router(config-pmap-c)# priority level {1 2} [percent <i>percentage</i>]	Applies the class map to one of the priority queues. Priority queue 1 has higher priority than priority queue 2. Optionally, for egress queues, configures shaping .
Step 3	Router(config-pmap-c)# queue-buffers ratio <i>weight</i>	(Optional) Sets queue buffer size.
Step 4	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring WS-X6904-40G-2T Class-Default Egress Shaping

The **class class-default** command configures queue #1. To configure class-default egress shaping, perform this task:

	Command	Purpose
Step 1	Router(config)# policy-map type lan-queuing <i>parent_policy_name</i>	Creates the parent policy map for the port.
Step 2	Router(config-pmap)# class class-default	Configures the class-default policy map class.
Step 3	Router(config-pmap-c)# bandwidth remaining percent <i>percentage</i>	Allocates DWRR bandwidth.
Step 4	Router(config-pmap-c)# shape average percent <i>percentage</i>	Configures shaping.
Step 5	Router(config-pmap-c)# queue-buffers ratio <i>weight</i>	(Optional) Sets queue buffer size.
Step 6	Router(config-pmap-c)# service-policy <i>child_service_policy</i>	Required to support shaping on WS-X6904-40G-2T nonpriority egress queues numbered greater than one. (Not supported with class-default.)
Step 7	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Creating a Queuing Policy

To create a queuing policy, perform this task:

	Command	Purpose
Step 1	Router(config)# policy-map type lan-queuing <i>policy_name</i>	Creates a policy map.
Step 2	Router(config-pmap)# end	(Optional) Exits policy map class configuration mode.

Configuring a Priority Queue

1p1q4t, 1p1q8t, 1p7q2t, 1p3q8t, 1p7q8t, and 1p7q4t ports have priority queues. To configure the priority queue, perform this task:

	Command	Purpose
Step 1	Router(config-pmap)# class <i>class_map_name</i>	Creates a policy map class.
Step 2	Router(config-pmap-c)# priority	Applies the class map to the priority queue. Note The priority queue is not supported if SRR is enabled.
Step 3	Router(config-pmap-c)# queue-buffers <i>ratio weight</i>	(Optional) Sets queue buffer size.
Step 4	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring Nonpriority Queues

The first **class** *class_map_name* command that you enter that is not followed by the **priority** keyword configures the highest numbered nonpriority queue. Subsequent **class** *class_map_name* commands configure the remaining nonpriority queues in reverse numerical order (highest-numbered to queue #2). The **class class-default** command configures queue #1. To configure a nonpriority queue, perform this task:

	Command	Purpose
Step 1	Router(config-pmap)# class { <i>class_map_name</i> class-default }	Creates a policy map class. Note <ul style="list-style-type: none"> Enter a class map name to configure nonpriority queues numbered greater than one. Enter the class-default keyword to configure queue #1.
Step 2	Router(config-pmap-c)# bandwidth [remaining] <i>percent percentage</i>	Allocates WRR or DWRR bandwidth. Note <ul style="list-style-type: none"> On WS-X6904-40G-2T ports, the bandwidth command must be configured if you configure any nondefault values for any other queueing commands on the port. (CSCtz05347) Not required on ports that have one queue. The remaining keyword is required on ports that have a priority queue.
Step 3	Router(config-pmap-c)# shape <i>average percent percentage</i>	(Egress queues only) Enables SRR (not supported on WS-X6904-40G-2T ports), which allocates limited bandwidth between nonpriority egress queues. <ul style="list-style-type: none"> See “SRR” in the “Module to Queue Type Mappings” section on page 66-7). Configuring SRR disables the priority queue.

	Command	Purpose
Step 4	Router(config-pmap-c)# queue-buffers ratio <i>weight</i>	(Optional) Sets queue buffer size. Note Not required on ports that have one queue.
Step 5	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring Thresholds

- [Threshold Configuration Guidelines and Restrictions, page 66-16](#)
- [Configuring a Threshold as Tail-Drop with CoS-Based Queueing, page 66-16](#)
- [Configuring a Threshold as WRED-Drop with CoS-Based Queueing, page 66-17](#)
- [Configuring a Threshold as Tail-Drop with DSCP-Based Queueing, page 66-17](#)
- [Configuring a Threshold as WRED-Drop with DSCP-Based Queueing, page 66-18](#)

Threshold Configuration Guidelines and Restrictions

- To configure tail drop thresholds, enter **queue-limit** commands.
- For ports that support configuration as either tail-drop or WRED drop:
 - Enter **queue-limit** commands to configure a threshold as tail drop.
 - Enter **random-detect** commands to configure a threshold as WRED drop.
- The first **queue-limit cos**, **queue-limit dscp**, **random-detect cos**, or **random-detect dscp** command that you enter configures threshold #1.
- Subsequent commands with different threshold percentage values configure the remaining thresholds in numerical order (from threshold #2 to the highest-numbered threshold).
- Subsequent commands with an already configured threshold percentage value apply addition QoS values to the threshold indicated by the percentage value.
- Ports configured for DSCP-based queueing use CoS-based queueing for non-IP traffic, IP multicast traffic, and IP unknown unicast flood traffic. In queueing policies that configure DSCP-based queueing, configure CoS-based queueing to provide specific QoS for non-IP traffic, IP multicast traffic, and IP unknown unicast flood traffic.

Configuring a Threshold as Tail-Drop with CoS-Based Queueing

To configure a threshold as tail-drop with CoS-based queueing, perform this task:

	Command	Purpose
Step 1	Router(config-pmap-c)# queue-limit cos { <i>one_value</i> values <i>value_list</i> } percent <i>percentage</i>	Applies CoS to a tail-drop threshold and configures the threshold percentage.
Step 2	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring a Threshold as WRED-Drop with CoS-Based Queuing

To configure a threshold as WRED-drop with CoS-based queuing, perform this task:

	Command	Purpose
Step 1	Router(config-pmap-c)# random-detect cos-based [aggregate]	Enables application of CoS values to a WRED-drop threshold. Enter the aggregate keyword to configure multiple CoS values on the threshold with the values keyword.
Step 2	Router(config-pmap-c)# random-detect cos { <i>one_value</i> values value_list } percent <i>min_</i> % <i>max_</i> %	Applies CoS to a WRED-drop threshold and configures the threshold percentage.
Step 3	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring a Threshold as Tail-Drop with DSCP-Based Queuing

To configure a threshold as tail-drop with DSCP-based queuing, perform this task:

	Command	Purpose
Step 1	Router(config-pmap-c)# queue-limit multiple-type-based	(Optional) Enables application of CoS, DSCP, or precedence values to a tail-drop threshold.
Step 2	Router(config-pmap-c)# queue-limit { cos dscp precedence } { <i>one_value</i> values value_list } percent <i>percentage</i>	Applies QoS values to a tail-drop threshold and configures the threshold percentage.
Step 3	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Configuring a Threshold as WRED-Drop with DSCP-Based Queuing

To configure a threshold as WRED-drop with DSCP-based queuing, perform this task:

	Command	Purpose
Step 1	Router(config-pmap-c)# random-detect { dscp-based precedence-based multiple-type-based } [aggregate]	Enables application of QoS values to a WRED-drop threshold. Note <ul style="list-style-type: none"> Enter the dscp-based keyword to enable application of DSCP values to a WRED-drop threshold. Enter the precedence-based keyword to enable application of precedence values to a WRED-drop threshold. Enter the multiple-type-based keyword to enable application of both CoS, DSCP, or precedence values to a WRED-drop threshold. Enter the aggregate keyword to configure multiple QoS values on the threshold with the values keyword.
Step 2	Router(config-pmap-c)# random-detect { cos dscp precedence } { one_value values value_list } percent min_% max_%	Applies QoS values to a WRED-drop threshold and configures the threshold percentage.
Step 3	Router(config-pmap-c)# end	(Optional) Exits policy map class configuration mode.

Verifying a Queuing Policy Map

Use the **show policy-map *policy_name*** to verify the configuration.

Attaching a Queuing Policy Map to an Interface

To attach a queuing policy to an interface, perform this task:

	Command	Purpose
Step 1	Router(config)# interface <i>type slot/port</i>	Selects the interface to configure.
Step 2	Router(config-if)# service-policy type lan-queuing [input output] <i>policy_map_name</i>	Attaches a queuing policy to the interface.
Step 3	Router(config-if)# end	Exits configuration mode.

Use the **show policy-map interface** command to verify the configuration.

Configuration Examples for Policy-Based Queuing

- [Queuing Policy Sample Configuration, page 66-19](#)
- [Queuing Policy Commands Supported by Each Queue Type, page 66-20](#)
- [Queuing Policy Commands Sample Configurations for Each Queue Type, page 66-34](#)

Queuing Policy Sample Configuration

Without comments:

```
policy-map type lan-queuing p1
  class cos5
    priority
  class cos123
    bandwidth remaining percent 25
    queue-limit cos 2 percent 20
    queue-limit cos 3 percent 30
  class class-default
    queue-limit cos 6 percent 60
```

With comments:

```
policy-map type lan-queuing p1 ! For 1p3q8t
  class cos5 ! Configured to filter CoS 5
!The filtering configured in the class map selects the values that go to the queue
!
  priority ! Applies the class map to the priority queue (#4)
!
!
!First non-priority class applies to highest-numbered non-priority queue (#3)
  class cos123 ! Configured to filter CoS 1, 2, and 3
!The filtering configured in the class map selects the values that go to the queue
!
!
!'remaining' keyword required on ports that have a priority queue
  bandwidth remaining percent 25
!
!
!First queue-limit command assigns CoS 2 to threshold #1 and configures it at 20%
  queue-limit cos 2 percent 20
!Any other queue-limit command with the same percentage
!applies additional configuration to this threshold
!
!Next queue-limit command with different percentage value configures the next threshold
!Assigns CoS 3 to threshold #2 and configures it at 30%
  queue-limit cos 3 percent 30
!Any other queue-limit command with the same percentage
!applies additional configuration to this threshold
!
!Thresholds 3-8 are unconfigured
!All unconfigured thresholds are at 100%
!No explicit configuration provided for CoS 1: defaults to last threshold
!
!End of queue 3 configuration
!
!Queue 2 is unconfigured
!
  class class-default ! applies to queue #1
!'class-default' gets all remaining CoS values:
```

```
!0, 4, 6, and 7
!  
!  
!Threshold 1 is explicitly configured:  
    queue-limit cos 6 percent 50  
!  
!Remaining thresholds (2-8) are not configured by the queueing policy  
!and cannot be configured by anything else  
!No explicit configuration provided for CoS 0, 4, and 7:  
!CoS values not explicitly configured default to the last threshold
```

Queueing Policy Commands Supported by Each Queue Type

- [1q2t, 1q8t Ingress Queue Supported Commands, page 66-21](#)
- [2q8t Ingress Queue Supported Commands, page 66-22](#)
- [8q4t Ingress Queue Supported Commands, page 66-23](#)
- [8q8t Ingress Queue Supported Commands, page 66-24](#)
- [1p1q4t Ingress Queue Supported Commands, page 66-25](#)
- [1p1q8t Ingress Queue Supported Commands, page 66-26](#)
- [1p7q2t Ingress Queue Supported Commands, page 66-27](#)
- [1p3q8t Egress Queue Supported Commands, page 66-28](#)
- [1p7q8t Egress Queue Supported Commands, page 66-29](#)
- [1p7q4t, 2p6q4t Ingress or Egress Queue Supported Commands, page 66-30](#)
- [WS-X6904-40G-2T 1p7q4t, 2p6q4t Egress Queue Supported Commands, page 66-32](#)

1q2t, 1q8t Ingress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1q2t, 1q8t
```

- Nonpriority queue 1 policy commands:

```
class class-default ! Receives all CoS values.
  ! bandwidth percent percentage ! WRR or DWRR bandwidth allocation.
  ! queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration (repeat to configure sequential thresholds):

```
! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values
! to a tail-drop threshold.

queue-limit cos {one_value | values value_list} percent percentage

! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage

! random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.

! random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.

! random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

2q8t Ingress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 2q8t, 8q8t
```

- Class commands for nonpriority queues numbered higher than 1—Configures queues in reverse numerical order; repeat to configure the next queue:


```
class class_map_name ! Receives CoS values filtered by class_map_name.
```
- Class command for queue #1:


```
class class-default ! Receives all remaining CoS values.
```
- Nonpriority queue configuration commands:


```
bandwidth percent percentage ! WRR or DWRR bandwidth allocation.

queue-buffers ratio weight ! Queue buffer size.
```
- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds in each queue:


```
! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.

queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage

! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage

! random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.

! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

! random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.

! random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.

! random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

8q4t Ingress Queue Supported Commands



Note

- Supports CoS-based, DSCP-based, and precedence-based queuing with tail-drop and WRED-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 8q4t
```

- Class commands for nonpriority queues numbered higher than 1—Configures queues in reverse numerical order; repeat to configure the next queue:

```
class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
```

- Class command for queue #1:

```
class class-default ! Receives all remaining QoS values (CoS, DSCP, precedence).
```

- Nonpriority queue configuration commands:

```
bandwidth percent percentage ! WRR or DWRR bandwidth allocation.
```

```
queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds in each queue:

```
queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
```

```
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
```

```
queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
```

```
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
```

```
random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
```

```
random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
```

```
random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
```

```
random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
```

```
random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

```
random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

8q8t Ingress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop or WRED-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1p1q8t
```

- Priority queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
  priority ! Applies the class map to the priority queue
```

- Nonpriority queue policy commands:

```
class class-default ! Receives all remaining CoS values.
  ! bandwidth remaining percent percentage ! WRR or DWRR bandwidth allocation.
  ! queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds:

```
! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```


1p1q4t Ingress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1p1q4t
```

- Priority queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
  priority ! Applies the class map to the priority queue
```

- Nonpriority queue policy commands:

```
class class-default ! Receives all remaining CoS values.
  ! bandwidth remaining percent percentage ! WRR or DWRR bandwidth allocation.
  ! queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds:

```
! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values
! to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
! random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

1p1q8t Ingress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop or WRED-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1p1q8t
```

- Priority queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
  priority ! Applies the class map to the priority queue
```

- Nonpriority queue policy commands:

```
class class-default ! Receives all remaining CoS values.
  ! bandwidth remaining percent percentage ! WRR or DWRR bandwidth allocation.
  ! queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds:

```
! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
!
random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

1p7q2t Ingress Queue Supported Commands



Note

- Supports CoS-based, DSCP-based, and precedence-based queuing with tail-drop and WRED-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1p7q2t
```

- Priority queue:

```
class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
  priority ! Applies the class map to the priority queue
```

- Class commands for nonpriority queues numbered higher than 1—Configures queues in reverse numerical order; repeat to configure the next queue:

```
class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
```

- Class command for queue #1:

```
class class-default ! Receives all remaining QoS values (CoS, DSCP, precedence).
```

- Nonpriority queue configuration commands:

```
bandwidth percent percentage ! WRR or DWRR bandwidth allocation.
!
queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds in each queue:

```
queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos {one_value | values value_list} percent min_% max_%
```

```

! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
random-detect {precedence one_value | values precedence value_list} percent min_%
max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.

```

1p3q8t Egress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop and WRED-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1p3q8t
```

- Priority queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
priority ! Applies the class map to the priority queue
```

- Class commands for nonpriority queues numbered higher than 1—Configures queues in reverse numerical order; repeat to configure the next queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
```

- Class command for queue #1:

```
class class-default ! Receives all remaining CoS values.
```

- Nonpriority queue configuration commands:

```
bandwidth percent percentage ! WRR or DWRR bandwidth allocation.
!
! shape average percent percentage ! SRR bandwidth allocation.
!
queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds:

```

! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.

```

```

! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos {one_value | values value_list} percent min_%% max_%%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect dscp {one_value | values value_list} percent min_%% max_%%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect {precedence one_value | values precedence value_list}
percent min_%% max_%%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.

```

1p7q8t Egress Queue Supported Commands



Note

- Supports CoS-based queuing with tail-drop and WRED-drop thresholds.
- Unsupported commands are included in this section as comments.

```
policy-map type lan-queuing policy_map_name ! For 1p7q8t
```

- Priority queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
priority ! Applies the class map to the priority queue
```

- Class commands for nonpriority queues numbered higher than 1—Configures queues in reverse numerical order; repeat to configure the next queue:

```
class class_map_name ! Receives CoS values filtered by class_map_name.
```

- Class command for queue #1:

```
class class-default ! Receives all remaining CoS values.
```

- Nonpriority queue configuration commands:

```
bandwidth percent percentage ! WRR or DWRR bandwidth allocation.
!
! shape average percent percentage ! SRR bandwidth allocation.
!
queue-buffers ratio weight ! Queue buffer size.
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds:

```
! queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
! queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword

```

```

!
! random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
! random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values
! to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
! random-detect {precedence one_value | values precedence value_list}
percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.

```

1p7q4t, 2p6q4t Ingress or Egress Queue Supported Commands



Note

- Supports CoS-based, DSCP-based, and precedence-based queueing with tail-drop and WRED-drop thresholds. Supports SRR (except WS-X6904-40G-2T) or DWRR dequeuing.
- WS-X6904-40G-2T supports [shaping](#). See the “[WS-X6904-40G-2T 1p7q4t, 2p6q4t Egress Queue Supported Commands](#)” section on page 66-32.
- Unsupported commands are included in this section as comments.

- Priority queue except WS-X6904-40G-2T with multiple priority queues:

```

class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
  priority ! Applies the class map to the priority queue
  ! Not supported if SRR mode is enabled.
  !
  queue-buffers ratio weight ! Queue buffer size.
  !

```

- WS-X6904-40G-2T priority queues:

```

class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
  priority [level { 1 | 2}]
  ! Applies the class map to one of the priority queues
  !
  queue-buffers ratio weight ! Queue buffer size.
  !

```

- Class commands for nonpriority queues numbered higher than 1—Configures queues in reverse numerical order; repeat to configure the next queue:

```

class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.

```

- Class command for queue #1:

```
class class-default ! Receives all remaining QoS values (CoS, DSCP, precedence).
```

- Nonpriority queue configuration commands:

```
shape average percent percentage
! Enables SRR on nonpriority egress queues.
```

```
bandwidth remaining percent percentage
! DWRR bandwidth allocation.
```



Note On WS-X6904-40G-2T ports, the **bandwidth** command must be configured if you configure any nondefault values for any other queuing commands on the port. ([CSCtz05347](#))

```
!
queue-buffers ratio weight ! Queue buffer size.
!
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds in each queue:

```
queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos {one_value | values value_list} percent min_% max_%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
random-detect dscp {one_value | values value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
random-detect {precedence one_value | values precedence value_list} percent min_% max_%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
```

WS-X6904-40G-2T 1p7q4t, 2p6q4t Egress Queue Supported Commands



Note

- Supports CoS-based, DSCP-based, and precedence-based queuing with tail-drop and WRED-drop thresholds. Supports DWRR dequeuing.
- Unsupported commands are included in this section as comments.
- You configure shaping with a child policy map for the nonpriority queues that you apply to a class-default parent policy map.
- Without shaping, you configure all policy-map class commands in one policy map.

- (For shaping) Child policy map command for nonpriority queues numbered higher than 1:

```
policy-map type lan-queuing child_policy_name
```

- Policy map class commands for nonpriority queues numbered higher than 1—Configures nonpriority queues in reverse numerical order; repeat to configure the next queue:

```
class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
```

- Configuration commands for nonpriority queues numbered higher than 1:

```
shape average percent percentage
! Configures shaping on egress nonpriority queues.
```

```
bandwidth remaining percent percentage
! DWRR bandwidth allocation.
```



- **Note** On WS-X6904-40G-2T ports, the **bandwidth** command must be configured if you configure any nondefault values for any other queuing commands on the port. ([CSCtz05347](#))

```
!
queue-buffers ratio weight ! Queue buffer size.
!
```

- Nonpriority queue threshold configuration—Repeat to configure sequential thresholds in each queue:

```
queue-limit multiple-type-based
! Enables application of CoS, precedence, and DSCP values to a tail-drop threshold.
!
queue-limit cos {one_value | values value_list} percent percentage
! Applies CoS to a tail-drop threshold and configures the threshold percentage
!
queue-limit dscp {one_value | values value_list} percent percentage
! Applies one DSCP value to a tail-drop threshold
! and configures the threshold percentage
!
random-detect cos-based [aggregate]
! Enables application of CoS values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect dscp-based [aggregate]
! Enables application of DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect precedence-based [aggregate]
! Enables application of precedence values to a WRED-drop threshold.
```



```

! The 'aggregate' keyword allows use of the 'values' keyword
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect multiple-type-based [aggregate]
! Enables application of CoS, precedence, and DSCP values to a WRED-drop threshold.
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos {one_value | values value_list} percent min_%% max_%%
! Applies CoS to a WRED-drop threshold and configures the threshold percentages.
!
random-detect dscp {one_value | values value_list} percent min_%% max_%%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.
!
random-detect {precedence one_value | values precedence value_list} percent min_%% max_%%
! Applies DSCP to a WRED-drop threshold and configures the threshold percentages.

```

- Single priority queue without shaping:

```

class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
  priority ! Applies the class map to the priority queue
  !
  queue-buffers ratio weight ! Queue buffer size.
  !

```

- Multiple priority queues without shaping:

```

class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
  priority level { 1 | 2}
  ! Applies the class map to one of the priority queues
  !
  queue-buffers ratio weight ! Queue buffer size.
  !

```

- Egress priority queues (single or multiple) with shaping:

```

class class_map_name
! Receives QoS values (CoS, DSCP, precedence) values filtered by class_map_name.
  priority level { 1 | 2} percent percentage
  ! Applies the class map to one of the priority queues
  ! Configures shaping on the queue
  !
  queue-buffers ratio weight ! Queue buffer size.
  !

```

- (For shaping) Parent policy map command for queue #1 (class-default):

```

policy-map type lan-queuing parent_policy_name

```

- Class command for queue #1 (class-default):

```

class class-default ! Receives all remaining QoS values (CoS, DSCP, precedence).

  shape average percent percentage
  ! Configures shaping on egress nonpriority queues.

  bandwidth remaining percent percentage
  ! DWRR bandwidth allocation.

```



Note On WS-X6904-40G-2T ports, the **bandwidth** command must be configured if you configure any nondefault values for any other queuing commands on the port. ([CSCtz05347](#))

```

!

```

```

queue-buffers ratio weight ! Queue buffer size.
!
service-policy child_service_policy
! If shaping is configured on the other nonpriority queues

```

To configure class-default thresholds, see the [“Nonpriority queue threshold configuration” information](#).

Queueing Policy Commands Sample Configurations for Each Queue Type

- [1q2t Ingress Queue Sample Configuration, page 66-34](#)
- [1q8t Ingress Queue Sample Configuration, page 66-34](#)
- [2q8t Ingress Queue Sample Configuration, page 66-35](#)
- [8q4t, 8q8t Ingress Queue Sample Configuration \(CoS-Based Queueing\), page 66-36](#)
- [8q4t Ingress Queue Sample Configuration \(DSCP-Based Queueing\), page 66-36](#)
- [1p1q4t Ingress Queue Sample Configuration, page 66-39](#)
- [1p1q8t Ingress Queue Sample Configuration, page 66-39](#)
- [1p3q8t Egress Queue Sample Configuration, page 66-40](#)
- [1p7q8t Egress Queue Sample Configuration, page 66-41](#)
- [1p7q4t Ingress or Egress Queue Sample Configuration \(CoS-Based Queueing\), page 66-42](#)
- [1p7q4t Ingress or Egress Queue Sample Configuration \(DSCP-Based Queueing\), page 66-43](#)



Note

These sample configurations approximate the default queueing enabled by the **auto qos default** and **platform qos queueing-only** global configuration commands.

1q2t Ingress Queue Sample Configuration



Note

Supports CoS-based queueing with tail-drop thresholds.

```

policy-map type lan-queuing p_map_1q2t
  class class-default ! Receives all CoS values.
  !
  ! Configures threshold #1:
  queue-limit cos values 0 1 3 4 percent 80
  ! Applies CoS values to threshold 1 and configures the threshold percentage
  !
  ! Other thresholds unconfigured; default to 100%
  ! Remaining CoS values are not explicitly configured:
  ! default to threshold 8 at 100%

```

1q8t Ingress Queue Sample Configuration



Note

Supports CoS-based queueing with tail-drop thresholds.

```

policy-map type lan-queuing p_map_1q8t
  class class-default ! Receives all CoS values.
  !
  ! Configures threshold #1:
  queue-limit cos 0 percent 50
  ! Applies CoS 0 to threshold 1 and configures the threshold percentage
  !
  ! Configures threshold #2:
  queue-limit cos values 1 2 3 4 percent 60
  ! Applies CoS 1, 2, 3, 4 to threshold 2 and configures the threshold percentage
  !
  ! Configures threshold #3:
  queue-limit cos values 6 7 percent 80
  ! Applies CoS 6 and 7 to threshold 3 and configures the threshold percentage
  !
  ! Other thresholds unconfigured; default to 100%
  ! CoS 5 is not explicitly configured: defaults to threshold 8 at 100%

```

2q8t Ingress Queue Sample Configuration



Note

Supports CoS-based queueing with tail-drop thresholds.

```

class-map type lan-queuing match-any c_map_cos_5
  match cos 5
!
policy-map type lan-queuing p_map_2q8t ! For 2q8t
!
! Configures queue #2:
class c_map_cos_5
! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_cos_5.
!
  bandwidth percent 10 ! WRR bandwidth allocation.
  queue-buffers ratio 20 ! Queue buffer size.
  !
  queue-limit cos 5 percent 100
  ! Applies CoS 5 to threshold 1 and configures the threshold percentage
!
! Configures queue #1:
class class-default ! Receives all remaining CoS values.
!
  bandwidth percent 90 ! WRR bandwidth allocation.
  !
  queue-buffers ratio 20 ! Queue buffer size.
  !
  ! Configures threshold #1:
  queue-limit cos values 0 1 percent 70
  ! Applies CoS 0 1 to threshold 1 and configures the threshold percentage
  !
  ! Configures threshold #2:
  queue-limit cos values 2 3 percent 80
  ! Applies CoS 2 3 to threshold 2 and configures the threshold percentage
  !
  ! Configures threshold #3:
  queue-limit cos 4 percent 90
  ! Applies CoS 4 to threshold 3 and configures the threshold percentage
  !
  ! CoS 6 and 7 default to threshold 4 at 100%

```

8q4t, 8q8t Ingress Queue Sample Configuration (CoS-Based Queuing)



Note

- Supports CoS-based, DSCP-based, and precedence-based queuing with tail-drop and WRED-drop thresholds. This sample configures CoS-based queuing.

```

class-map type lan-queuing match-any c_map_cos_5
  match cos 5
!
policy-map type lan-queuing p_map_8q4t_cos_8q8t ! For 8q4t CoS-based queuing and 8q8t

  ! Configures queue #8:
  class c_map_cos_5 ! Receives CoS values values filtered by c_map_cos_5.
  !
    bandwidth percent 90 ! WRR bandwidth allocation.
    queue-buffers ratio 20 ! Queue buffer size.
    !
    ! CoS 5 defaults to threshold 4 at 100%
  !
  ! Configures queue #1:
  class class-default
  ! Receives all remaining CoS values.
  !
    bandwidth percent 10 ! WRR bandwidth allocation.
    queue-buffers ratio 80 ! Queue buffer size.
    !
    ! Configures threshold #1:
    random-detect cos-based aggregate
    ! The 'aggregate' keyword allows use of the 'values' keyword
    !
    random-detect cos values 0 1 percent 40 70
    !
    ! Configures threshold #2:
    random-detect cos-based aggregate
    ! The 'aggregate' keyword allows use of the 'values' keyword
    !
    random-detect cos values 2 3 percent 40 80
    !
    ! Configures threshold #3:
    random-detect cos-based
    !
    random-detect cos value 4 percent 50 90
    !
    ! Configures threshold #4:
    random-detect cos-based aggregate
    ! The 'aggregate' keyword allows use of the 'values' keyword
    !
    random-detect cos values 6 7 percent 50 100

```

8q4t Ingress Queue Sample Configuration (DSCP-Based Queuing)



Note

- Supports CoS-based, DSCP-based, and precedence-based queuing with tail-drop and WRED-drop thresholds. This sample configures DSCP-based queuing.

```

class-map type lan-queuing match-any c_map_cos_5_dscp_40_46
  match cos 5
  !
  match dscp 40 46
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_48-63
  match dscp 48 49 50 51 52 53 54 55
  match dscp 56 57 58 59 60 61 62 63

  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_32_34-38
  match dscp 32 34 35 36 37 38
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_24_26_28_30
  match dscp 24 26 28 30
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_18_20_22
  match dscp 18 20 22
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_10_12_14
  match dscp 10 12 14
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
policy-map type lan-queuing p_map_8q4t_dscp ! For 8q4t DSCP-based queuing

  ! Configures queue #8:
  class c_map_cos_5_dscp_40_46
  ! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_cos_5.
  !
    bandwidth percent 90 ! WRR bandwidth allocation.
    queue-buffers ratio 20 ! Queue buffer size.
    !
    ! CoS 5 and DSCP 40, 46 default to threshold 4 at 100%
  !
  ! Configures queue #7:
  class c_map_dscp_48-63
  ! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_48-63.
  !
    bandwidth remaining percent 10 ! WRR bandwidth allocation.
    queue-buffers ratio 10 ! Queue buffer size.
    !
    ! DSCP 48-63 default to threshold 4 at 100%
  !
  ! Configures queue #6:
  class c_map_dscp_32_34-38
  ! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_32_34-38.
  !
    bandwidth remaining percent 10 ! WRR bandwidth allocation.
    queue-buffers ratio 10 ! Queue buffer size.
    !
    ! DSCP 32, 34-38 default to threshold 4 at 100%
  !
  ! Configures queue #5:
  class c_map_dscp_24_26_28_30
  ! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_24_26_28_30.
  !
    bandwidth remaining percent 10 ! WRR bandwidth allocation.
    queue-buffers ratio 10 ! Queue buffer size.

```

```

!
! DSCP 24, 26, 28, 30 default to threshold 4 at 100%
!
! Configures queue #4:
class c_map_dscp_18_20_22
! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_18_20_22.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1:
random-detect dscp-based
random-detect dscp 20 percent 70 100
random-detect dscp 22 percent 70 100
random-detect dscp 18 percent 70 100
!
! Configures queue #3:
class c_map_dscp_10_12_14
! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_10_12_14.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1:
random-detect dscp-based
random-detect dscp 14 percent 70 100
random-detect dscp 12 percent 70 100
random-detect dscp 10 percent 70 100
!
! Configures queue #1:
class class-default
! Receives all remaining QoS values (CoS, DSCP, precedence).
!
bandwidth percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 80 ! Queue buffer size.
!
! Configures threshold #1:
random-detect cos-based aggregate
random-detect cos values 0 1 percent 40 70
!
! Configures threshold #2:
random-detect cos-based aggregate
random-detect cos values 2 3 percent 40 80
!
! Configures threshold #3:
random-detect cos-based
random-detect cos value 4 percent 50 90
!
! Configures threshold #4:
random-detect cos-based aggregate
random-detect cos values 6 7 percent 50 100
! DSCP values default to this threshold
! 0-9, 11, 13, 15-17, 19, 21, 23, 25, 27, 29, 31, 33, 39, 41-45, 47

```

1p1q4t Ingress Queue Sample Configuration



Note

Supports CoS-based queueing with tail-drop thresholds.

```
class-map type lan-queuing match-any c_map_cos_5
  match cos 5
!
policy-map type lan-queuing p_map_1p1q4t ! For 1p1q4t
!
  ! Configures the priority queue:
  class c_map_cos_5 ! Receives CoS values filtered by c_map_cos_5.
    priority ! Applies the class map to the priority queue
  !
  ! Configures queue #1:
  class class-default ! Receives all remaining CoS values.
  !
    ! Configures threshold #1
    queue-limit cos values 0 1 percent 70
    ! Applies CoS 0 1 to threshold 1 and configures the threshold percentage
    !
    ! Configures threshold #2
    queue-limit cos values 2 3 percent 80
    ! Applies CoS 2 3 to threshold 2 and configures the threshold percentage
    !
    ! Configures threshold #3
    queue-limit cos 4 percent 90
    ! Applies CoS 4 to threshold 3 and configures the threshold percentage
    !
    ! CoS 6 and 7 default to threshold 4 at 100%
```

1p1q8t Ingress Queue Sample Configuration



Note

Supports CoS-based queueing with tail-drop or WRED-drop thresholds.

```
class-map type lan-queuing match-any c_map_cos_5
  match cos 5
!
policy-map type lan-queuing p_map_1p1q8t ! For 1p1q8t
!
  ! Configures the priority queue:
  class c_map_cos_5 ! Receives CoS values filtered by c_map_cos_5.
    priority ! Applies the class map to the priority queue
  !
  class class-default ! Receives all remaining CoS values.
  !
    random-detect cos-based
    ! Enables application of CoS values to a WRED-drop threshold.
    !
    ! Configures threshold #1
    random-detect cos 0 percent 40 70
    ! Applies CoS to WRED-drop threshold 1 and configures the threshold percentages.
    !
    ! Configures threshold #2
    random-detect cos 1 percent 40 70
    ! Applies CoS to WRED-drop threshold 2 and configures the threshold percentages.
    !
```

```

! Configures threshold #3
random-detect cos 2 percent 50 80
! Applies CoS to WRED-drop threshold 3 and configures the threshold percentages.
!
! Configures threshold #4
random-detect cos 3 percent 50 80
! Applies CoS to WRED-drop threshold 4 and configures the threshold percentages.
!
! Configures threshold #5
random-detect cos 4 percent 60 90
! Applies CoS to WRED-drop threshold 5 and configures the threshold percentages.
!
! Configures threshold #6
random-detect cos 6 percent 60 90
! Applies CoS to WRED-drop threshold 6 and configures the threshold percentages.
!
! Configures threshold #7
random-detect cos 7 percent 70 100
! Applies CoS to WRED-drop threshold 7 and configures the threshold percentages.

```

1p3q8t Egress Queue Sample Configuration



Note Supports CoS-based queuing with tail-drop and WRED-drop thresholds.

```

class-map type lan-queuing match-any c_map_cos_2_3_4
  match cos 2 3 4
!
class-map type lan-queuing match-any c_map_cos_5
  match cos 5
!
class-map type lan-queuing match-any c_map_cos_6_7
  match cos 6 7
!
policy-map type lan-queuing p_map_1p3q8t
!
  ! Configures the priority queue:
  class c_map_cos_5 ! Receives CoS values filtered by c_map_cos_5.
    priority ! Applies the class map to the priority queue
  !
  ! Configures queue #3 for 1p3q8t:
  class c_map_cos_6_7
  ! Receives CoS values values filtered by c_map_cos_6_7.
  !
    bandwidth remaining percent 40 ! WRR bandwidth allocation.
    queue-buffers ratio 15 ! Queue buffer size.
    !
    ! Configures threshold #1:
    random-detect cos-based aggregate
    ! The 'aggregate' keyword allows use of the 'values' keyword
    !
    random-detect cos values 6 7 percent 70 100
  !
  ! Configures queue #2 for 1p3q8t:
  class c_map_cos_2_3_4
  ! Receives CoS values values filtered by c_map_cos_2_3_4.
  !
    bandwidth remaining percent 30 ! WRR bandwidth allocation.
    queue-buffers ratio 20 ! Queue buffer size.
    !
    ! Configures threshold #1:

```



```

random-detect cos-based
!
random-detect cos 2 percent 40 70
! Applies CoS to WRED-drop threshold 1 and configures the threshold percentages.
!
! Configures threshold #2:
random-detect cos-based aggregate
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos values 3 4 percent 70 100
! Applies CoS to WRED-drop threshold 2 and configures the threshold percentages.
!
! Configures queue #1:
class class-default
! Receives all remaining CoS values.
!
    bandwidth remaining percent 25 ! WRR bandwidth allocation.
    queue-buffers ratio 20 ! Queue buffer size.
    !
    ! Configures threshold #1:
    random-detect cos-based
    !
    random-detect cos 0 percent 40 70
    ! Applies CoS to WRED-drop threshold 1 and configures the threshold percentages.
    !
    ! Configures threshold #2:
    random-detect cos-based
    !
    random-detect cos 1 percent 70 100
    ! Applies CoS to WRED-drop threshold 2 and configures the threshold percentages.

```

1p7q8t Egress Queue Sample Configuration



Note

Supports CoS-based queuing with tail-drop and WRED-drop thresholds.

```

class-map type lan-queuing match-any c_map_cos_2_3_4
    match cos 2 3 4
!
class-map type lan-queuing match-any c_map_cos_5
    match cos 5
!
class-map type lan-queuing match-any c_map_cos_6_7
    match cos 6 7
!
policy-map type lan-queuing p_map_1p7q8t
!
    ! Configures the priority queue:
    class c_map_cos_5 ! Receives CoS values filtered by c_map_cos_5.
        priority ! Applies the class map to the priority queue
    !
    ! Configures queue #7:
    class c_map_cos_6_7
    ! Receives CoS values values filtered by c_map_cos_6_7.
    !
        bandwidth remaining percent 40 ! WRR bandwidth allocation.
        queue-buffers ratio 15 ! Queue buffer size.
        !
        ! Configures threshold #1:
        random-detect cos-based aggregate
        ! The 'aggregate' keyword allows use of the 'values' keyword

```

```

!
    random-detect cos values 6 7 percent 70 100
!
! Configures queue #6 for 1p7q8t:
class c_map_cos_2_3_4
! Receives CoS values values filtered by c_map_cos_2_3_4.
!
    bandwidth remaining percent 30 ! WRR bandwidth allocation.
    queue-buffers ratio 20 ! Queue buffer size.
    !
    ! Configures threshold #1:
    random-detect cos-based
    !
    random-detect cos 2 percent 40 70
    ! Applies CoS to WRED-drop threshold 1 and configures the threshold percentages.
    !
    ! Configures threshold #2:
    random-detect cos-based aggregate
    ! The 'aggregate' keyword allows use of the 'values' keyword
    !
    random-detect cos values 3 4 percent 70 100
    ! Applies CoS to WRED-drop threshold 2 and configures the threshold percentages.
!
! Configures queue #1:
class class-default
! Receives all remaining CoS values.
!
    bandwidth remaining percent 25 ! WRR bandwidth allocation.
    queue-buffers ratio 50 ! Queue buffer size.
    !
    ! Configures threshold #1:
    random-detect cos-based
    !
    random-detect cos 0 percent 40 70
    ! Applies CoS to WRED-drop threshold 1 and configures the threshold percentages.
    !
    ! Configures threshold #2:
    random-detect cos-based
    !
    random-detect cos 1 percent 70 100
    ! Applies CoS to WRED-drop threshold 2 and configures the threshold percentages.

```

1p7q4t Ingress or Egress Queue Sample Configuration (CoS-Based Queueing)



Note

Supports CoS-based, DSCP-based, and precedence-based queueing with tail-drop and WRED-drop thresholds. Supports SRR (except WS-X6904-40G-2T) or DWRR dequeuing. This sample configures CoS-based queueing.

```

class-map type lan-queuing match-any c_map_cos_5
    match cos 5
!
policy-map type lan-queuing p_map_1p7q4t_cos

    ! Configures the priority queue:
    class c_map_cos_5 ! Receives CoS values filtered by c_map_cos_5.
        priority ! Applies the class map to the priority queue
    !
    ! Configures queue #1:
    class class-default
    ! Receives all remaining CoS values.

```

```
!
bandwidth remaining percent 85 ! WRR bandwidth allocation.
```



Note On WS-X6904-40G-2T ports, the **bandwidth** command must be configured if you configure any nondefault values for any other queuing commands on the port. ([CSCtz05347](#))

```
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1:
random-detect cos-based aggregate
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos values 0 1 percent 40 70
!
! Configures threshold #2:
random-detect cos-based aggregate
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos values 2 3 percent 40 80
!
! Configures threshold #3:
random-detect cos-based
!
random-detect cos value 4 percent 50 90
!
! Configures threshold #4:
random-detect cos-based aggregate
! The 'aggregate' keyword allows use of the 'values' keyword
!
random-detect cos values 6 7 percent 50 100
```

1p7q4t Ingress or Egress Queue Sample Configuration (DSCP-Based Queuing)



Note

Supports CoS-based, DSCP-based, and precedence-based queuing with tail-drop and WRED-drop thresholds. Supports SRR (except WS-X6904-40G-2T) or DWRR dequeuing. This sample configures DSCP-based queuing.

```
class-map type lan-queuing match-any c_map_cos_5_dscp_40_46
  match cos 5
  !
  match dscp 40 46
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_48-63
  match dscp 48 49 50 51 52 53 54 55
  match dscp 56 57 58 59 60 61 62 63
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_32_34-38
  match dscp 32 34 35 36 37 38
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_24_26_28_30
  match dscp 24 26 28 30
  ! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_18_20_22
```

```

match dscp 18 20 22
! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
class-map type lan-queuing match-any c_map_dscp_10_12_14
match dscp 10 12 14
! NOTE: Enables DSCP-based queuing on the port in the direction of the queuing policy.
!
policy-map type lan-queuing p_map_1p7q4t_dscp

! Configures the priority queue:
class c_map_cos_5_dscp_40_46 ! Receives CoS values filtered by c_map_cos_5_dscp_40_46.
priority ! Applies the class map to the priority queue
!
! Configures queue #7:
class c_map_dscp_48-63
! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_48-63.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.

```



Note On WS-X6904-40G-2T ports, the **bandwidth** command must be configured if you configure any nondefault values for any other queuing commands on the port. (CSCtz05347)

```

queue-buffers ratio 10 ! Queue buffer size.
!
! DSCP 48-63 default to threshold 4 at 100%
!
! Configures queue #6:
class c_map_dscp_32_34-38
! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_32_34-38.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! DSCP 32, 34-38 default to threshold 4 at 100%
!
! Configures queue #5:
class c_map_dscp_24_26_28_30
! Receives QoS values (CoS, DSCP, precedence) values
! filtered by c_map_dscp_24_26_28_30.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1
queue-limit dscp values 24 30 percent 100
!
! Configures threshold #2
queue-limit dscp 28 percent 100
!
! Configures threshold #3
queue-limit dscp 26 percent 100
!
! Configures queue #4:
class c_map_dscp_18_20_22
! Receives QoS values (CoS, DSCP, precedence) values filtered by c_map_dscp_18_20_22.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1:
random-detect dscp-based

```

```

random-detect dscp 20 percent 70 100
!
! Configures threshold #2:
random-detect dscp-based
random-detect dscp 22 percent 70 100
!
! Configures threshold #3:
random-detect dscp-based
random-detect dscp 18 percent 70 100
!
! Configures queue #3:
class c_map_dscp_10_12_14
! Receives QoS values (CoS, DSCP, precedence) values filtered by ! c_map_dscp_10_12_14.
!
bandwidth remaining percent 10 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1:
random-detect dscp-based
random-detect dscp 14 percent 70 100
random-detect dscp 12 percent 70 100
random-detect dscp 10 percent 70 100
!
! Configures queue #1:
class class-default
! Receives all remaining QoS values (CoS, DSCP, precedence).
!
bandwidth remaining percent 25 ! WRR bandwidth allocation.
queue-buffers ratio 10 ! Queue buffer size.
!
! Configures threshold #1:
random-detect cos-based aggregate
random-detect cos values 0 1 percent 40 70
!
! Configures threshold #2:
random-detect cos-based aggregate
random-detect cos values 2 3 percent 40 80
!
! Configures threshold #3:
random-detect cos-based
random-detect cos value 4 percent 50 90
!
! Configures threshold #4:
! Remaining DSCP values default to this threshold
! 0-9, 11, 13, 15-17, 19, 21, 23, 25, 27, 29, 31, 33, 39, 41-45, 47
!
random-detect cos-based aggregate
random-detect cos values 6 7 percent 50 100

```

**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html

[Participate in the Technical Documentation Ideas forum](#)

Queuing on FEX

QoS on FEX host ports is enabled by default with default queuing configuration. Queuing on FEX provides the facility to configure your own queuing model on FEX ports. Queuing is supported in the egress direction only. The queuing features are configurable through the lan-queuing policies and do not support any legacy queuing commands. Priority queue configuration is optional. Queuing on FEX is supported in DSCP mode is only. When applied to an interface the configuration will be propagated to all the interfaces of a member FEX, in case of a stack.

DoD certification mandates the queuing configuration for supported features. These features are as follows:

- Priority queuing
- Queue bandwidth
- DSCP to queue map
- Queue buffer

Priority Queuing

This example shows how to configure priority queuing:

```
Router# show policy-map type lan-queuing ltest
Policy Map type lan-queuing ltest
  Class ltest
    bandwidth remaining 10 (%)
  Class ltest1
    priority
  Class class-default
```

Queue Bandwidth

This example shows how to configure queue bandwidth percentage:

```
Router# show policy-map type lan-queuing ltest
Policy Map type lan-queuing ltest
  Class ltest
    bandwidth remaining 10 (%)
    Average Rate Traffic Shaping
    cir 30%
  Class ltest1
    priority
  Class class-default
*Dec 15 08:39:42.535: 020: 00 00 00 64 00 04 01 64 00 00 00 64 00 05 01 64
...d...d...d...d
*Dec 15 08:39:42.535: 030: 00 00 00 64
```

DSCP to Queue Map

The ability to map a DSCP to a particular queue is provided.

Queue Buffer

This example shows how to configure buffer per queue:

```
Router# show policy-map type lan-queuing ltest
Policy Map type lan-queuing ltest
Class ltest
  bandwidth remaining 10 (%)
  queue-buffers ratio 30
Class ltest1
  priority
  queue-buffers ratio 40
Class class-default
```

