



Configuring Custom Queueing

This chapter describes the tasks for configuring QoS custom queueing (CQ) on a router.

For complete conceptual information, see the “[Congestion Management Overview](#)” module.

For a complete description of the CQ commands in this chapter, see the *Cisco IOS Quality of Service Solutions Command Reference*. To locate documentation of other commands that appear in this chapter, use the command reference master index or search online.

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

CQ is not supported on any tunnels.

Custom Queueing Configuration Task List

You must follow certain required, basic steps to enable CQ for your network. In addition, you can choose to assign packets to custom queues based on protocol type, interface where the packets enter the router, or other criteria you specify.

To configure CQ, perform the tasks described in the following sections. The tasks in first and third sections are required; the tasks in the remaining sections are optional.

- [Defining the Custom Queue List](#) (Required)
- [Specifying the Maximum Size of the Custom Queues](#) (Optional)
- [Assigning Packets to Custom Queues](#) (Required)
- [Monitoring Custom Queue Lists](#) (Optional)

See the end of this chapter for the section “[Custom Queueing Configuration Examples](#).”

Defining the Custom Queue List

To assign a custom queue list to an interface, use the following commands beginning in global configuration mode:



Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

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	Command	Purpose
Step 1	Router(config)# interface <i>interface-type interface-number</i>	Specifies the interface, and then enters interface configuration mode.
Step 2	Router(config-if)# custom-queue-list <i>list</i>	Assigns a custom queue list to the interface. The list argument is any number from 1 to 16. There is no default assignment.

**Note**

Use the **custom-queue-list** command in place of the **priority-list** command. Only one queue list can be assigned per interface.

CQ allows a fairness not provided with priority queueing (PQ). With CQ, you can control the available bandwidth on an interface when it is unable to accommodate the aggregate traffic enqueued. Associated with each output queue is a configurable byte count, which specifies how many bytes of data should be delivered from the current queue by the system before the system moves on to the next queue. When a particular queue is being processed, packets are sent until the number of bytes sent exceeds the queue byte count defined by the **queue-list queue byte-count** command (see the following section “[Specifying the Maximum Size of the Custom Queues](#)”), or until the queue is empty.

Specifying the Maximum Size of the Custom Queues

You can specify the maximum number of packets allowed in each of the custom queues. The default is 20 entries.

You can also specify the approximate number of bytes to be forwarded from each queue during its turn in the cycle. The number is used as an average number, because whole packets must be forwarded.

To specify the approximate number of bytes to be forwarded from each queue during its turn in the cycle, use the following commands in global configuration mode, as needed:

Command	Purpose
Router(config)# queue-list <i>list-number queue-number</i> limit <i>limit-number</i>	Specifies the maximum number of packets allowed in each of the custom queues. The <i>limit-number</i> argument specifies the number of packets that can be queued at any one time. The range is from 0 to 32767.
Router(config)# queue-list <i>list-number queue-number</i> byte-count <i>byte-count-number</i>	Designates the average number of bytes forwarded per queue. The <i>byte-count-number</i> argument specifies the average number of bytes the system allows to be delivered from a given queue during a particular cycle.

Assigning Packets to Custom Queues

You can assign packets to custom queues based on the protocol type or interface where the packets enter the router. Additionally, you can set the default queue for packets that do not match other assignment rules. You can also specify multiple rules.

To define the CQ lists, use the following commands in global configuration mode, as needed:

Command	Purpose
Router(config)# queue-list <i>list-number</i> protocol <i>protocol-name</i> <i>queue-number</i> <i>queue-keyword</i> <i>keyword-value</i>	Establishes queueing priorities based on the protocol type.
Router(config)# queue-list <i>list-number</i> interface <i>interface-type</i> <i>interface-number</i> <i>queue-number</i>	Establishes CQ based on packets entering from a given interface.
Router(config)# queue-list <i>list-number</i> default <i>queue-number</i>	Assigns a queue number for those packets that do not match any other rule in the custom queue list.

All protocols supported by Cisco are allowed. The *queue-keyword* variable provides additional options, including byte count, TCP service and port number assignments, and AppleTalk, IP, IPX, VINES, or XNS access list assignments. Refer to the **queue-list protocol** command syntax description in the [Cisco IOS Quality of Service Solutions Command Reference](#).

When you use multiple rules, remember that the system reads the **queue-list** commands in order of appearance. When classifying a packet, the system searches the list of rules specified by **queue-list** commands for a matching protocol or interface type. When a match is found, the packet is assigned to the appropriate queue. The list is searched in the order it is specified, and the first matching rule terminates the search.

Monitoring Custom Queue Lists

To display information about the input and output queues when CQ is enabled on an interface, use the following commands in EXEC mode, as needed:

Command	Purpose
Router# show queue <i>interface-type</i> <i>interface-number</i>	Displays the contents of packets inside a queue for a particular interface or virtual circuit (VC).
Router# show queueing custom	Displays the status of the CQ lists.
Router# show interfaces <i>interface-type</i> <i>interface-number</i>	Displays the current status of the custom output queues when CQ is enabled.

Custom Queueing Configuration Examples

The following sections provide custom queueing examples:

- [Custom Queue List Defined Example](#)
- [Maximum Specified Size of the Custom Queues Examples](#)
- [Packets Assigned to Custom Queues Examples](#)

For information on how to configure CQ, see the section “[Custom Queueing Configuration Task List](#)” in this chapter.

Custom Queue List Defined Example

The following example illustrates how to assign custom queue list number 3 to serial interface 0:

```
interface serial 0
custom-queue-list 3
```

Maximum Specified Size of the Custom Queues Examples

The following example specifies the maximum number of packets allowed in each custom queue. The queue length of queue 10 is increased from the default 20 packets to 40 packets.

```
queue-list 3 queue 10 limit 40
```

The queue length limit is the maximum number of packets that can be enqueued at any time, with the range being from 0 to 32767 queue entries.

The following example decreases queue list 9 from the default byte count of 1500 to 1400 for queue number 10:

```
queue-list 9 queue 10 byte-count 1400
```

The byte count establishes the lowest number of bytes the system allows to be delivered from a given queue during a particular cycle.

Packets Assigned to Custom Queues Examples

The following examples assign packets to custom queues by either protocol type or interface type, and the default assignment for unmatched packets.

Protocol Type

The following example assigns traffic that matches IP access list 10 to queue number 1:

```
queue-list 1 protocol ip 1 list 10
```

The following example assigns Telnet packets to queue number 2:

```
queue-list 4 protocol ip 2 tcp 23
```

The following example assigns User Datagram Protocol (UDP) Domain Name Service (DNS) packets to queue number 3:

```
queue-list 4 protocol ip 3 udp 53
```

Interface Type

In this example, queue list 4 establishes queueing priorities for packets entering on serial interface 0. The queue number assigned is 10.

```
queue-list 4 interface serial 0 10
```

Default Queue

You can specify a default queue for packets that do not match other assignment rules. In this example, the default queue for list 10 is set to queue number 2:

```
queue-list 10 default 2
```

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