



Configuring Priority Queueing

This chapter describes the tasks for configuring priority queueing (PQ) on a router.

For complete conceptual information, see the section “Priority Queueing” in the chapter “Congestion Management Overview” in this book.

For a complete description of the PQ commands in this chapter, refer to 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.

Priority Queueing Configuration Task List

To configure PQ, perform the tasks in the following sections. The first two sections are required; the remaining section is optional.

- Defining the Priority List (Required)
- Assigning the Priority List to an Interface (Required)
- Monitoring Priority Queueing Lists (Optional)

See the end of this chapter for the section “Priority Queueing Configuration Examples.”

Defining the Priority List

A priority list contains the definitions for a set of priority queues. The priority list specifies which queue a packet will be placed in and, optionally, the maximum length of the different queues.

In order to perform queueing using a priority list, you must assign the list to an interface. The same priority list can be applied to multiple interfaces. Alternatively, you can create many different priority policies to apply to different interfaces.

To define a priority list, perform the tasks in the following sections. The first task is required; the second task is optional.

- Assigning Packets to Priority Queues (Required)
- Specifying the Maximum Size of the Priority Queues (Optional)

Assigning Packets to Priority Queues

Assign packets to priority queues based on the following:

- Protocol type
- Interface where the packets enter the router

You can specify multiple assignment rules. The **priority-list** commands are read in order of appearance until a matching protocol or interface type is found. When a match is found, the packet is assigned to the appropriate queue and the search ends. Packets that do not match other assignment rules are assigned to the default queue.

To specify which queue to place a packet in, use the following commands in global configuration mode:

	Command	Purpose
Step 1	priority-list <i>list-number</i> protocol <i>protocol-name</i> { high medium normal low } <i>queue-keyword</i> <i>keyword-value</i>	Establishes queueing priorities based on the protocol type.
Step 2	priority-list <i>list-number</i> interface <i>interface-type</i> <i>interface-number</i> { high medium normal low }	Establishes queueing priorities for packets entering from a given interface.
Step 3	priority-list <i>list-number</i> default { high medium normal low }	Assigns a priority queue for those packets that do not match any other rule in the priority list.

All protocols supported by Cisco are allowed. The *queue-keyword* argument provides additional options including byte count, TCP service and port number assignments, and AppleTalk, IP, IPX, VINES, or XNS access list assignments.

Specifying the Maximum Size of the Priority Queues

To specify the maximum number of packets allowed in each of the priority queues, use the following command in global configuration mode:

Command	Purpose
priority-list <i>list-number</i> queue-limit [<i>high-limit</i> [<i>medium-limit</i> [<i>normal-limit</i> [<i>low-limit</i>]]]]	Specifies the maximum number of packets allowed in each of the priority queues.

Use the **priority-list queue-limit** command for each priority list. The default queue limit arguments are listed in Table 7.

Table 7 Default Priority Queue Packet Limits

Priority Queue Argument	Packet Limits
<i>high-limit</i>	20
<i>medium-limit</i>	40
<i>normal-limit</i>	60
<i>low-limit</i>	80

Assigning the Priority List to an Interface

You can assign a priority list number to an interface. Only one list can be assigned per interface. To assign a priority group to an interface, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	<code>interface interface-type interface-number</code>	Specifies the interface, and then enters interface configuration mode.
Step 2	<code>priority-group list-number</code>	Assigns a priority list number to the interface.

Monitoring Priority Queueing Lists

To display information about the input and output queues, use one or more of the following commands in EXEC mode:

Command	Purpose
<code>show queue interface-type interface-number</code>	Displays the contents of packets inside a queue for a particular interface or VC.
<code>show queueing priority</code>	Displays the status of the priority queueing lists.

Priority Queueing Configuration Examples

The following sections provide PQ configuration examples:

- Priority Queueing Based on Protocol Type Example
- Priority Queueing Based on Interface Example
- Specify the Maximum Size of the Priority Queue Example
- Assign Priority List to an Interface Example
- Priority Queueing Using Multiple Rules Example

For information on how to configure PQ, see the section “Priority Queueing Configuration Task List” earlier in this chapter.

Priority Queueing Based on Protocol Type Example

The following example establishes queueing based on protocol type. The example assigns 1 as the arbitrary priority list number, specifies IP as the protocol type, and assigns a high priority level to traffic that matches IP access list 10.

```
access-list 10 permit 239.1.1.0 0.0.0.255
priority-list 1 protocol ip high list 10
```

Priority Queueing Based on Interface Example

The following example establishes queueing based on interface. The example sets any packet type entering on Ethernet interface 0 to a medium priority.

```
priority-list 3 interface ethernet 0 medium
```

Specify the Maximum Size of the Priority Queue Example

The following example changes the maximum number of packets in the high priority queue to 10. The medium-, normal, and low-limit queue sizes remain at their default 40-, 60-, and 80-packet limits.

```
priority-list 4 queue-limit 10 40 60 80
```

Assign Priority List to an Interface Example

The following example assigns priority group list 4 to serial interface 0:

```
interface serial 0
  priority-group 4
```

Priority Queueing Using Multiple Rules Example

When classifying a packet, the system searches the list of rules specified by **priority-list** commands for a matching protocol type. The following example specifies four rules:

- DECnet packets with a byte count less than 200 are assigned a medium priority queue level.
- IP packets originating or destined to TCP port 23 are assigned a medium priority queue level.
- IP packets originating or destined to User Datagram Protocol (UDP) port 53 are assigned a medium priority queue level.
- All IP packets are assigned a high priority queue level.

Remember that when using multiple rules for a single protocol, the system reads the priority settings in the order of appearance.

```
priority-list 4 protocol decnet medium lt 200
priority-list 4 protocol ip medium tcp 23
priority-list 4 protocol ip medium udp 53
priority-list 4 protocol ip high
```