

Configuring Weighted Fair Queueing

This chapter describes the tasks for configuring QoS weighted fair queueing (WFQ) and Distributed WFQ (DWFQ) on a router. For a complete description of the commands mentioned in this chapter, refer to the *Quality of Service Solutions Command Reference*; the commands are listed alphabetically within that guide. To locate documentation of specific commands, use the command reference, master index, or search online.

Weighted Fair Queueing Configuration Task List

WFQ provides traffic priority management that automatically sorts among individual traffic streams without requiring that you first define access lists. WFQ can also manage duplex data streams such as those between pairs of applications, and simplex data streams such as voice or video. There are two categories of WFQ sessions: high bandwidth and low bandwidth. Low-bandwidth traffic has effective priority over high-bandwidth traffic, and high-bandwidth traffic shares the transmission service proportionally according to assigned weights.

When WFQ is enabled for an interface, new messages for high-bandwidth traffic streams are discarded after the configured or default congestive messages threshold has been met. However, low-bandwidth conversations, which include control message conversations, continue to enqueue data. As a result, the fair queue may occasionally contain more messages than its configured threshold number specifies.

With standard WFQ, packets are classified by flow. Packets with the same source IP address, destination IP address, source Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) port, or destination TCP or UDP port belong to the same flow. WFQ allocates an equal share of the bandwidth to each flow. Flow-based WFQ is also called fair queueing because all flows are equally weighted.

The Cisco IOS software provides two forms of WFQ:

- Standard WFQ, which is enabled by default on all serial interfaces that run at or below 2 Mbps, and can run on all Cisco serial interfaces.
- Distributed WFQ, which runs only on Cisco 7000 series routers with a Route Switch Processor-based RSP7000 interface processor or Cisco 7500 series routers with a Versatile Interface Processor-based VIP2-40 or greater interface processor. (A VIP2-50 interface processor is strongly recommended when the aggregate line rate of the port adapters on the VIP is greater than DS3. A VIP2-50 interface processor is required for OC-3 rates.)

To configure WFQ and DWFQ, perform the tasks in the following sections:

- Configure WFQ and DWFQ
- Monitor Fair Queueing

See the section “Fair Queueing Configuration Examples” later in this chapter for examples of how to configure fair queueing in your network.

Configure WFQ and DWFQ

To configure fair queueing on an interface, use one of the following commands in interface configuration mode after specifying the interface:

Command	Purpose
fair-queue [<i>congestive-discard-threshold</i> [<i>dynamic-queues</i> [<i>reservable-queues</i>]]]	Configure an interface to use fair queueing.
or	or
fair-queue	Configure an interface to use fair queueing on a Cisco router using a VIP-based interface.

WFQ uses a traffic data stream discrimination registry service to determine to which traffic stream a message belongs. See the table accompanying the description of the **fair-queue** command in the *Quality of Service Solutions Command Reference* for the attributes of a message that are used to classify traffic into data streams. Defaults are provided for the congestion threshold after which messages for high-bandwidth conversations are dropped, and for the number of dynamic and reservable queues; however, you can fine-tune your network operation by changing these defaults.

For DWFQ, packets are classified by flow. Packets with the same source IP address, destination IP address, source TCP or UDP port, destination TCP or UDP port, and protocol belong to the same flow.

Note WFQ is the default queueing mode on interfaces that run at or below E1 speeds (2.048 Mbps or less). It is enabled by default for physical interfaces that do not use Link Access Procedure, Balanced (LAPB), X.25, or Synchronous Data Link Control (SDLC) encapsulations. WFQ is not an option for these protocols. WFQ is also enabled by default on interfaces configured for Multilink Point-to-Point Protocol (MLP). However, if custom queueing or priority queueing is enabled for a qualifying link, it overrides fair queueing, effectively disabling it. Additionally, WFQ is automatically disabled if you enable autonomous or SSE switching.

DWFQ can be configured on interfaces but not subinterfaces. It is not supported on Fast EtherChannel, tunnel, or other logical or virtual interfaces such as MLP.

Monitor Fair Queueing

To monitor fair queueing services in your network, use the following commands in EXEC mode:

Command	Purpose
show interfaces [<i>interface</i>] fair-queue	Show information about an interface configured for WFQ and DWFQ.
show queueing fair	Show status of the fair queueing configuration.

Fair Queueing Configuration Examples

This section provides the following examples of QoS fair queueing configurations:

- WFQ Example
- DWFQ Example

WFQ Example

The following example requests a fair queue with a congestive discard threshold of 64 messages, 512 dynamic queues, and 18 RSVP queues:

```
interface Serial 3/0
 ip unnumbered Ethernet 0/0
 fair-queue 64 512 18
```

DWFQ Example

The following example enables DWFQ on the HSSI 0/0/0 interface:

```
interface Hssi0/0/0
 description 45Mbps to R2
 ip address 200.200.14.250 255.255.255.252
 fair-queue
```

The following is sample output from the **show interfaces fair-queue** command for this configuration:

```
Router# show interfaces hssi 0/0/0 fair-queue

Hssi0/0/0 queue size 0
      packets output 35, drops 0
WFQ: global queue limit 401, local queue limit 200
```

