

Chapter 5

Gathering Statistics for Rates and Events in the Queue

This chapter provides information for configuring statistics profiles on the E-series router.

QoS topics are discussed in the following sections:

- QoS Statistics Overview on page 39
- Configuring Statistic Profiles for QoS on page 41
- Configuring Rate Statistics on page 41
- Configuring Event Statistics on page 42
- Clearing QoS Statistics on the Egress Queue on page 44
- Clearing QoS Statistics on the Fabric Queue on page 44
- Monitoring QoS Statistics for Rates and Events on page 44

QoS Statistics Overview

Statistics profiles enable you to gather statistics for the rate at which packets are forwarded out of a queue and for the rate at which committed, conformed, or exceeded packets are dropped. Statistics profiles also enable you to use events to monitor the rate statistics. You can then use **show** commands to view the results of the statistics gathering.

You can create up to 250 statistics profiles on the E-series router. The profiles are referenced by a queue rule within a QoS profile.

Statistics cannot be collected on failover queues.

When you create a statistics profile, you specify the time period over which statistics are gathered. To gather event statistics, you configure the thresholds for triggering rate-event reporting.

- Rate period—Time period, in seconds, over which statistics are gathered. For example, a 30-second rate period results in rate statistics being gathered over 30-second time segments.
- Forwarding rate threshold—Threshold for forwarding rate events. A forwarding-rate event is counted whenever the forwarding rate exceeds the specified threshold.
- Committed drop threshold—Threshold above which committed drop rate events are counted.
- Conformed drop threshold—Threshold above which conformed drop rate events are counted.
- Exceeded drop threshold—Threshold above which exceeded drop rate events are counted.

Rate Statistics

You can configure the E-series router to gather statistics for the rate at which queues forward and drop packets.

Queue rate statistics measure the forwarding and drop rates of each queue in bits per second. All bytes in the Layer 2 encapsulation are included in the rate calculation. For example, rates for a queue on Ethernet include the Ethernet and VLAN encapsulations.

For ATM modules, you can optionally configure queue statistics and queue rates to include the cell encapsulation and padding. Cell encapsulation and padding are referred to as the *cell tax*. The QoS shaping mode that you set on ATM line modules determines whether queue rate statistics include cell tax.

- If the interface is configured with frame-based QoS shaping mode, the egress queue measures frame rate statistics; an ATM cell tax is not included.
- If the interface is configured with cell-based QoS shaping mode, the egress queue measures cell rate statistics; cell rates include ATM Adaptation Layer 5 (AAL5) encapsulation and cell padding.
- If the interface is configured with byte adjustment, the egress queue measures rate statistics that are adjusted to the byte adjustment value.



NOTE: If you change the QoS shaping mode value in the middle of a rate period, the gathered rates are a mixture of cell- and frame-based rates for that one rate period. The next rate period uses a rate based on the new QoS shaping mode setting.

Event Statistics

You can configure the E-series router to count the number of times that forwarding or drop rates exceed a specific threshold. Events can be useful when you are monitoring service level agreements. For example, you might count the number of times that the drop rate of a queue is nonzero.

Configuring Statistic Profiles for QoS

To begin to configure a statistics profile, enter Statistics Profile Configuration mode.

- Issue the **statistics-profile** command from Global Configuration mode:

```
host1(config)#statistics-profile statpro-1
host1(config-statistics-profile)#
```

The router supports up to 250 statistics profiles.

Related Topics

- [Configuring Rate Statistics on page 41](#)
- [Configuring Event Statistics on page 42](#)
- [Monitoring QoS Statistics for Rates and Events on page 44](#)
- **statistics-profile** command

Configuring Rate Statistics

To gather rate statistics:

1. Create the statistics profile.

```
host1(config)#statistics-profile statpro-5
```

2. Set the length of time during which statistics are counted.

```
host1(config-statistics-profile)#rate-period 45
```

Rate period range is 1–43200 seconds.

3. Reference the statistics profile by a QoS profile.

```
host1(config)#qos-profile qospro-3
host1(config-qos-profile)#ip queue traffic-class tc1 scheduler-profile sp1
statistics-profile statpro-5
```

4. Attach the QoS profile to the appropriate interface.

```
host1(config)#interface gigabitEthernet 1/0
host1(config-subif)#qos-profile qospro-3
host1(config-subif)#exit
```

5. (Optional) Display the rate statistics.

```
host1#show egress-queue rates interface gigabitEthernet 1/0
```

Related Topics

- Configuring Statistic Profiles for QoS on page 41
- Configuring a QoS Profile on page 138
- Monitoring QoS Statistics for Rates and Events on page 44
- **interface** command
- **qos-profile** command
- **queue** command
- **rate-period** command
- **statistics-profile** command

Configuring Event Statistics

To configure the router to count events on a queue, you configure the threshold above which forwarding or drop events are counted.

A forwarding rate event occurs each time the forwarding rate exceeds the threshold during the specified rate period.

A drop event occurs each time the number of packets dropped exceeds the threshold during the specified rate period.

To gather event statistics:

1. Create the statistics profile.

```
host1(config)#statistics-profile statpro-1
```

2. Set the length of time during which statistics are counted.

```
host1(config-statistics-profile)#rate-period 30
```

Rate period range is 1–43200 seconds.

3. (Optional) Set the threshold above which forwarding rate events are counted.

```
host1(config-statistics-profile)#forwarding-rate-threshold 10000000
```

Forwarding rate threshold range is 0–1073741824 bps; default is no threshold.

4. (Optional) Set a threshold for committed (green) packets.

```
host1(config-statistics-profile)#committed-drop-threshold 2000000
```

Drop rate threshold range is 0–1073741824 bps; default is no threshold.

5. (Optional) Set a threshold for conformed (yellow) packets.

```
host1(config-statistics-profile)#conformed-drop-threshold 4000000
```

Drop rate threshold range is 0–1073741824 bps; default is no threshold.

6. (Optional) Set a threshold for exceeded (red) packets.

```
host1(config-statistics-profile)#exceeded-drop-threshold 6000000
```

Drop rate threshold range is 0–1073741824 bps; default is no threshold.

7. Reference the statistics profile in a QoS profile.

```
host1(config)#qos-profile qospro-1
host1(config-qos-profile)#ip queue traffic-class tc1 scheduler-profile sp1
statistics-profile statpro-1
```

8. Attach the QoS profile to the appropriate interface.

```
host1(config)#interface gigabitEthernet 1/0
host1(config-subif)#qos-profile qospro-1
host1(config-subif)#exit
```

9. (Optional) Display the event statistics.

```
host1#show egress-queue events interface gigabitEthernet 1/0
```

Related Topics

- Configuring Statistic Profiles for QoS on page 41
- Configuring a QoS Profile on page 138
- Monitoring QoS Statistics for Rates and Events on page 44
- **committed-drop-threshold** command
- **conformed-drop-threshold** command
- **exceeded-drop-threshold** command
- **forwarding-rate-threshold** command

- **qos-profile** command
- **queue** command
- **rate-period** command
- **statistics-profile** command

Clearing QoS Statistics on the Egress Queue

To clear statistics from the egress queue for the specified interface and traffic class:

- Issue the **clear egress-queue** command.

```
host1#clear egress-queue atm 3/0 explicit traffic-class class15
```

Use the **explicit** keyword to clear queues only on the specified interface and not queues stacked above the interface.

Related Topics

- Monitoring QoS Statistics for Rates and Events on page 44
- **clear egress-queue** command

Clearing QoS Statistics on the Fabric Queue

To clear statistics from the fabric queue for the specified traffic class and egress slot:

- Issue the **clear fabric-queue** command.

```
host1#clear fabric-queue traffic-class class15 egress-slot 3
```

By default, statistics for all traffic classes and all slots are cleared.

Related Topics

- Monitoring QoS Statistics for Rates and Events on page 44
- **clear fabric-queue** command

Monitoring QoS Statistics for Rates and Events

To monitor statistics for rates and events in the queue:

- Monitoring Forwarding and Drop Events on the Egress Queue on page 329
- Monitoring Forwarding and Drop Rates on the Egress Queue on page 330
- Monitoring Queue Statistics for the Fabric on page 334

- Monitoring the Configuration of Statistics Profiles on page 335

