

Monitoring Queue Thresholds

Purpose Display the color-based thresholds for queues on each egress slot.

Showing queue thresholds by queue profile shows buffer memory information for each queue profile and, within that profile, shows the thresholds for each region.

In addition, showing queue thresholds by region organizes the buffer memory information by queue region and, within each region, shows the buffer allocations for each queue profile.

Action To display the color-based queue thresholds for each of the 2000 video queues when 8000 total queues are configured:

```
host1#show qos queue-thresholds egress-slot 9 queue-profile video  
queue-profile video 2000 queues
```

| region | egress memory | exceeded length | conformed length | committed length | total committed memory |
|--------|------------------|--------------------|---------------------|---------------------|------------------------------|
| 0 | 0MB - 4MB | 34944 | 69888 | 139648 | 279296000 |
| 1 | 4MB - 8MB | 24448 | 48896 | 97792 | 195584000 |
| 2 | 8MB - 12MB | 14080 | 28032 | 55936 | 111872000 |
| 3 | 12MB - 16MB | 7040 | 14080 | 28032 | 56064000 |
| 4 | 16MB - 20MB | 5248 | 10496 | 20992 | 41984000 |
| 5 | 20MB - 24MB | 1280 | 2560 | 5120 | 10240000 |
| 6 | 24MB - 28MB | 1152 | 2176 | 4224 | 8448000 |
| 7 | 28MB - 32MB | 896 | 1792 | 3456 | 6912000 |

As shown, when all of the egress memory in use is between 0 MB and 4 MB, each video queue can queue 139,648 bytes of committed traffic. Because the default conformed fraction is 50 percent and the default exceeded fraction is 25 percent, half of the committed length, or 69,888 bytes, can be queued before conformed traffic is dropped, and one quarter of the committed length, or 34,944 bytes, can be queued before exceeded traffic is dropped. While memory fills, the video queues are given progressively smaller amounts of memory. For example, when 28 to 32 MB of buffer memory is in use, each video queue is limited to 3456 bytes. While memory fills beyond the last region, all frames are dropped except control traffic, until the queues are drained and memory usage falls back into one of the regions.

To display the router's memory management:

```
host1#show qos queue-thresholds egress-slot 9 region 0  
region 0 (0MB - 4MB) oversubscription 3330%
```

| queue-profile | exceeded length | conformed length | committed length | queue count | total committed memory |
|---------------|--------------------|---------------------|---------------------|----------------|------------------------------|
| default | 34944 | 69888 | 139648 | 2000 | 279296000 |
| video | 34944 | 69888 | 139648 | 2000 | 279296000 |
| multicast | 34944 | 69888 | 139648 | 2000 | 279296000 |
| internet | 34944 | 69888 | 139648 | 2000 | 279296000 |

Static and dynamic oversubscription determines that when 8000 queues are configured and 0–4 MB of egress buffer memory is in use, memory is oversubscribed by 3330 percent. If significantly fewer queues are configured, there is less oversubscription. This example illustrates static oversubscription.

Because all of the queues in Example 2 use default queue profiles, all queues have the same lengths. Each queue is allocated 139,648 bytes of committed buffer memory when operating within this region. This allocation allows active queues to burst traffic by using memory that is unused by quiescent queues. This example illustrates dynamic oversubscription, which is based on the assumption that when a large number of queues is configured, only a fraction of the queues is active at a given time. While more queues become active, memory fills and spills into another region. When this occurs, queues are given progressively smaller queue limits.

In memory regions 1 through 5, queue limits are progressively reduced. In region 6, memory is strictly partitioned among queues.

To display oversubscription in region 6:

```
host1#show qos queue-thresholds egress-slot 9 region 6
region 6 (24MB - 28MB) oversubscription 100%
```

| queue-profile | exceeded length | conformed length | committed length | queue count | total committed memory |
|---------------|--------------------|---------------------|---------------------|----------------|------------------------------|
| default | 1152 | 2176 | 4224 | 2000 | 8448000 |
| video | 1152 | 2176 | 4224 | 2000 | 8448000 |
| multicast | 1152 | 2176 | 4224 | 2000 | 8448000 |
| internet | 1152 | 2176 | 4224 | 2000 | 8448000 |

Oversubscription is 100 percent. When 24–28 MB of the memory is in use, there is no oversubscription of egress buffer memory; 32 MB of the 32-MB memory is allocated. In Example 3, each of the 8000 egress queues is given a queue of 4224 bytes, for a total of 16 MB.

If memory continues to fill into region 7, egress buffer memory is undersubscribed, allowing control traffic to flow within the router. As shown in Example 4, when operating in region 7, only 80 percent of the 32-MB memory is allocated.

To display oversubscription in region 7:

```
host1#show qos queue-thresholds egress-slot 9 region 7
region 7 (28MB - 32MB) oversubscription 80%
```

| queue-profile | exceeded length | conformed length | committed length | queue count | total committed memory |
|---------------|--------------------|---------------------|---------------------|----------------|------------------------------|
| default | 896 | 1792 | 3456 | 2000 | 6912000 |
| video | 896 | 1792 | 3456 | 2000 | 6912000 |
| multicast | 896 | 1792 | 3456 | 2000 | 6912000 |
| internet | 896 | 1792 | 3456 | 2000 | 6912000 |

Region 7 has 2000 IP users, each with four queues. Each of the four queues use default queue profiles.

To display the queue thresholds in the multicast queue profile:

```
host1#show qos queue-thresholds egress-slot 9 queue-profile multicast
queue-profile multicast 2000 queues
```

| region | egress memory | exceeded length | conformed length | committed length | total committed memory |
|--------|------------------|--------------------|---------------------|---------------------|------------------------------|
| 0 | 0MB - 4MB | 5120 | 10112 | 20096 | 40192000 |
| 1 | 4MB - 8MB | 5120 | 10112 | 20096 | 40192000 |
| 2 | 8MB - 12MB | 5120 | 10112 | 20096 | 40192000 |
| 3 | 12MB - 16MB | 5120 | 10112 | 20096 | 40192000 |
| 4 | 16MB - 20MB | 5120 | 10112 | 20096 | 40192000 |
| 5 | 20MB - 24MB | 1280 | 2560 | 10112 | 20224000 |
| 6 | 24MB - 28MB | 1152 | 2176 | 4224 | 8448000 |
| 7 | 28MB - 32MB | 896 | 1792 | 3456 | 6912000 |

The multicast queue profile is configured with a committed length of 10,000 minimum and 20,000 maximum. When in regions 0–4, these queues would normally get more memory than the 20,000 byte maximum requested. In this case, the queue is limited to the maximum, and any excess memory is redistributed to other queues. Region 5 does not have enough memory to honor the 20,000-byte maximum requested.

Although a 20,000 byte maximum was requested, the router provisions memory in 128 byte blocks, rounded up or down per each request; 20,096 bytes is 157 blocks of 128 bytes.

In region 6, memory is strictly partitioned, and neither the minimum nor maximum request is honored. Instead, each multicast queue is given a fair share of the queue length so that aggressive bandwidth consumers cannot starve out moderate traffic consumers.

In region 7, memory is underprovisioned to allow queues to drain and to avoid starvation that occurs when egress buffer memory fills completely.

To display the queue thresholds for video queues:

```
host1#show qos queue-thresholds egress-slot 9 region 0
region 0 (0MB - 4MB) oversubscription 3330%
```

| queue-profile | exceeded length | conformed length | committed length | queue count | total committed memory |
|---------------|--------------------|---------------------|---------------------|----------------|------------------------------|
| default | 33664 | 67328 | 134656 | 2000 | 269312000 |
| video | 67328 | 134656 | 269184 | 2000 | 538368000 |
| multicast | 5120 | 10112 | 20096 | 2000 | 40192000 |
| internet | 33664 | 67328 | 134656 | 2000 | 269312000 |

You can configure video queues with a buffer weight of 16 and Internet and multicast queues with a buffer weight of 8 to ensure that video queues get to queue twice as much traffic as Internet and multicast queues.

Meaning Table 1 lists the **show qos queue-thresholds** command output fields.

Table 1: show qos queue-thresholds Output Fields

| Field Name | Field Description |
|------------------------|--|
| queue profile | Name of the queue profile |
| region | Egress buffer memory region |
| egress memory | Amount of memory in each region |
| exceeded length | Amount of exceeded traffic that can be queued at this egress memory usage |
| conformed length | Amount of conformed traffic that can be queued at this egress memory usage |
| committed length | Amount of committed traffic that can be queued at this egress memory usage |
| total committed memory | Amount of committed memory allocated to the queue |

- Related Topics**
- Configuring Queue Profiles to Manage Buffers and Thresholds
 - show qos queue-thresholds

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