

## How Shared Shaping Works

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You can configure the shared-shaping rate on either the best-effort scheduler node or the best-effort queue for the logical interface. The router also locates the queues in named traffic-class groups that are associated with the logical interface and shapes that set of queues to the shared rate. The shared-shaping rate is the total bandwidth for the logical interface.

A typical configuration places the low-latency voice traffic in the auto-strict-priority traffic-class group and video traffic in a separate extended traffic-class group. The data traffic is usually queued in the best-effort traffic class in the default traffic-class group.

The constraints of both the legacy hierarchical scheduler and the shared shaper affect the bandwidth of scheduler objects. The shared shaper limits the bandwidth even when the port or VP is not congested. When the port or VP is congested, the legacy scheduler is dominant. For example, when a heavily oversubscribed VP becomes congested, the legacy hierarchical scheduler may limit the VP bandwidth to a lower rate, so that shared shaping of excess bandwidth does not apply.

When determining the shared-shaping rate, the system includes all bytes in Layer 2 encapsulations. The packets that are included in the rate depend on the Layer 2 node that is specified in the QoS profile. For example, the shaping rate for an Ethernet node includes bytes from the Ethernet and VLAN encapsulations.

Two types of shared shaping are available, depending on your hardware. *Simple* shared shaping can shape the best-effort node or queue associated with a logical interface to a shared rate. *Compound* shared shaping is a hardware-assisted mode that controls bandwidth for all scheduler objects associated with the subscriber logical interface.

Table 1 compares the two types of shared shaping that are available.

**Table 1: Comparison of Simple and Compound Shared Shaping**

Shared Shaper	Advantages
<b>Simple</b>	<ul style="list-style-type: none"><li>■ Simple shared shaping is useful for triple-play configurations, because it manages voice and video queues in addition to data queues so that the shared rate cannot be exceeded.</li><li>■ You can use line modules that have any ASIC hardware.</li></ul>
<b>Compound</b>	<ul style="list-style-type: none"><li>■ Compound shared shaping is useful for triple-play configurations, because it manages voice and video queues in addition to data queues so that the shared rate cannot be exceeded.</li><li>■ Compound shared shaping responds to changes in traffic rates more rapidly than simple shared shaping, in the order of milliseconds.</li><li>■ You can use line modules with the EFA2 ASIC or the TFA ASIC.</li></ul>

## **Active Constituents for Shared Shaping**

When you specify a shared-shaping rate on a best-effort node or queue, QoS shapes the aggregate of traffic for the logical interface that owns the best-effort queue or node. QoS locates the queues and nodes owned by that logical interface and applies the shared shaper to them. The nodes and queues owned by the interface are called the *constituents* of the shared-shaper instance. For example, if the logical interface type is VC, the constituents are all VC objects: VC nodes and VC queues. A shared-shaping rule in a profile can apply to up to eight constituents.

*Active* constituents are actively controlled by the shared-shaper mechanism. *Inactive* constituents are indirectly controlled. For example, when ATM VC queues are stacked above an ATM VC node, the ATM VC node might be an active constituent. In this case, the queues stacked above the node are shaped to the shared rate indirectly by the hierarchical scheduler. If the ATM VC queues are the active constituents, then the ATM VC node is inactive.

- Related Topics**
- Simple Shared Shaping Overview
  - Compound Shared Shaping Overview
  - Constituent Selection for Shared Shaping Overview

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