



# Distributed Traffic Shaping for Line Cards in the Cisco 12000 Gigabit Switch Router

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This document describes the Distributed Traffic Shaping (DTS) feature for the 12000 series Gigabit Route Processor line cards. This document includes the following sections:

- [Feature Overview, page 1](#)
- [Supported Platforms, page 2](#)
- [Supported Standards, MIBs, and RFCs, page 2](#)
- [Prerequisites, page 3](#)
- [Configuration Tasks, page 3](#)
- [Monitoring DTS Configuration, page 4](#)
- [Configuration Example, page 5](#)
- [Command Reference, page 5](#)

## Feature Overview

Traffic Shaping is a mechanism used to control or modify the flow of traffic on an interface.

Distributed Traffic Shaping (DTS) is an implementation of traffic shaping on the line cards. DTS on GSR shapes the output traffic to a specified bit rate and buffers the excessive packets in the shape queue to transmit out later.

Distributed Traffic Shaping supports traffic shaping regardless of the encapsulation. The traffic shaping implementation is per interface on a line card. Currently, the traffic shaping scheme assumes one queue per interface.

## Benefits

The DTS feature is used to manage the bandwidth of an interface to meet remote site requirements and to conform to the service rate provided on an interface.

## Restrictions

DTS on GSR line cards is subject to the following restrictions:

- Subinterfaces are not supported.
- DTS is implemented on the transmit side only.
- The Weighted Random Early Detection (WRED) feature must be configured for DTS to operate correctly (see “Prerequisites” on page 3).
- DTS statistics are not supported on Engine 2 line cards (see “Monitoring DTS Configuration” on page 4).
- Due to hardware limitations, *Burst size* and *excess burst size* parameters are not supported when configuring Engine 2 line cards (see “Configuring Distributed Traffic Shaping for Engine 2 Line Cards” on page 4).

## Related Features and Technologies

- DTS for line cards in the Cisco 12000 series GSR is similar to the Generic Traffic Shaping feature implemented in Cisco IOS Release 11.2.
- DTS for line cards in the Cisco 12000 series GSR provides different features from DTS support in Cisco IOS Release 12.0(5)XE.

## Supported Platforms

This feature is supported on the following Cisco 12000 series routers:

- Cisco 12016 series
- Cisco 12012 series
- Cisco 12008 series

DTS is supported on the following Cisco 12000 line cards:

Line Card Engine	Line Cards Supporting DTS
Engine 0	QOC-3 POS OC-12 POS
Engine 2	QOC-12 POS OC-48 POS

## Supported Standards, MIBs, and RFCs

### Standards

- No new standards are supported by this feature.

### MIBs

- No new or modified MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB web site on Cisco Connection Online (CCO) at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

#### RFCs

- No new or modified RFCs are supported by this feature.

## Prerequisites

- For Engine 0 line cards, Cisco IOS Release 12.0(10)S or later is required.
- For Engine 2 line cards, Cisco IOS Release 12.0(16)S or later is required.
- The Weighted Random Early Detection (WRED) feature must be configured for DTS to operate correctly. Without WRED, the buffer manager will start to drop packets once the output buffer is used up. This will also cause interfaces configured without DTS to drop some (but not all) packets. The result is a limited output rate for the non-DTS-enabled interfaces.

## Configuration Tasks

Perform the following tasks to configure DTS on GSR:

- [Configuring Distributed Traffic Shaping for Engine 0 Line Cards](#) (below)
- [Configuring Distributed Traffic Shaping for Engine 2 Line Cards](#), page 4

## Configuring Distributed Traffic Shaping for Engine 0 Line Cards

To configure DTS on GSR for outbound traffic on an Engine 0 interface, use the following command in interface configuration mode:

Command	Purpose
<code>traffic-shape rate <i>bit-rate</i> [<i>burst-size</i> [<i>excess-burst-size</i>]]</code>	Configure traffic shaping for outbound traffic on an interface.  To obtain the best use of <i>burst-size</i> and <i>excess-burst-size</i> , specify only the required <i>bit-rate</i> value. The software will automatically tune the other values for optimum performance.

## Configuring Distributed Traffic Shaping for Engine 2 Line Cards

To configure DTS on GSR for outbound traffic on an Engine 2 interface, use the following command in interface configuration mode:

Command	Purpose
<code>traffic-shape rate bit-rate</code>	Configure traffic shaping for outbound traffic on an interface.  <b>Note</b> Due to hardware limitations, <i>burst-size</i> and <i>excess-burst-size</i> parameters are not supported on Engine 2 line cards. Specifying only the bit rate.

## Monitoring DTS Configuration

This section describes the commands to monitor the DTS configuration:

- [Monitor the DTS Configuration on Engine 0 Line Cards](#)
- [Monitor the DTS Configuration on Engine 2 Line Cards](#)

### Monitor the DTS Configuration on Engine 0 Line Cards

To monitor the current traffic shaping configuration and statistics for Engine 0 line cards, use the following commands in EXEC mode:

Command	Purpose
<code>show traffic-shape [interface-name]</code>	Show the current traffic-shaping configuration.
<code>show traffic-shape statistics [interface-name]</code>	Show the current traffic-shaping statistics.

### Monitor the DTS Configuration on Engine 2 Line Cards

To monitor the current traffic shaping configuration for Engine 2 line cards, use the following command in EXEC mode:

Command	Purpose
<code>show traffic-shape [interface-name]</code>	Show the current traffic-shaping configuration.  <b>Note</b> DTS statistics are not supported on Engine 2 line cards.

# Configuration Example

This section provides the following configuration example:

- [DTS on GSR \(OC-12 POS Engine 0 Line Card\)](#)

## DTS on GSR (OC-12 POS Engine 0 Line Card)

The following configuration example shows how to enable DTS for an OC-12 POS line card in a GSR. The output on the interface is configured to limit all output to 5 Mbps.

```
router(config)# interface pos 4/0
router(config-if)# traffic-shape rate 5000000 625000 625000
```

## Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command references.

### traffic-shape rate

To configure line cards for DTS in a Cisco 12000 GSR, use the **traffic-shape rate** interface configuration command. Use the **no** form of this command to disable DTS.

```
[no] traffic-shape rate bit-rate [burst-size [excess-burst-size]]
```



#### Note

Due to hardware limitations, *burst-size* and *excess-burst-size* parameters are not supported on Engine 2 line cards. Specify only the *bit rate* for Engine 2 line cards.

#### Syntax Description

<i>argument</i>	Definition of argument
<i>bit-rate</i>	Engine 0 line cards bit rate: <ul style="list-style-type: none"> <li>• a value between 1 and 155520000 for QOC-3 POS line card</li> <li>• a value between 1 and 622080000 for the OC-12 POS line card.</li> </ul> Engine 2 line cards bite rate: <ul style="list-style-type: none"> <li>• a value between 50000000(8Mbps) and 622080000 for QOC-12 POS cards</li> <li>• a value between 700000000 and 2488320000 for OC-48 line cards</li> </ul>
<i>burst-size</i>	The number of bits in a measurement interval (Engine 0 line cards only). The value can be between 1 and 155520000 for QOC-3 POS line card and between 1 and 622080000 for the OC-12 POS line card.
<i>excess-burst-size</i>	The number of bits permitted to exceed the burst size (Engine 0 line cards only). The value can be between 0 and 155520000 for QOC-3 POS line card and between 0 and 622080000 for the OC-12 POS line card.

## traffic-shape rate

### Defaults

No default behavior or values.

### Command Modes

Interface

### Command History

Release	Modification
12.0(10)S	This command was modified to accommodate Engine 0 line rates.
12.0(16)S	This command was modified to accommodate Engine 2 line rates.

### Usage Guidelines

This command enables DTS on GSR line cards. The supported line card are listed below. This command has no effect on non-supported GSR line cards.

Line Card Engine	Line Cards Supporting DTS
Engine 0	QOC-3 POS OC-12 POS
Engine 2	QOC-12 POS OC-48 POS

- To obtain the best use of burst-size and excess-burst-size in Engine 0 line cards, specify only the required bit-rate value. The software will automatically tune the other values for optimum performance.
- Specify only the bit rate for Engine 2 line cards. Due to hardware limitations, *burst-size* and *excess-burst-size* parameters are not supported on Engine 2 line cards.

### Examples

The following example The following example limits interface transmission to 5 Mbps on the selected Engine 0 line card interface:

```
traffic-shape rate 5000000 625000 625000
```