



# CHAPTER 1

## Overview of QoS

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This chapter provides an overview of the Quality of Service (QoS) feature that is configurable on the Cisco 1000 Series Connected Grid Routers (*hereafter* referred to as the Cisco CG-OS router).

QoS allows you to classify the network traffic, prioritize the traffic flow, and help avoid traffic congestion in your network.

This chapter includes the following sections:

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- [System Recovery, page 1-3](#)
- [QoS Configuration with Modular QoS CLI, page 1-3](#)
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## Information About QoS

QoS employs classification, marking, and priority queues to manage the flow of traffic through the network.

The control of traffic is based on the fields in the packets that flow through the system. You use the Modular QoS CLI (MQC) to create the traffic classes (class-maps) and policies (policy-maps) employed by QoS.



### Note

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The system-defined components of the QoS feature such as traffic classes (class-maps) and policies (policy-maps), as discussed in [Chapter 2, “Using Modular QoS CLI,”](#) apply globally to the entire Cisco CG-OS router.

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This section includes the following topics:

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## Using QoS

QoS uses class maps, policy maps, and service policy assignments to direct how the Cisco CG-OS router manages and prioritizes traffic within the network.

To configure QoS on the Cisco CG-OS router, Cisco recommends the following configuration order:

1. Create class maps.

Class maps are a class of traffic that is based on packet-matching criteria. Class maps are referenced in policy maps.

2. Create policy maps.

Policy maps specify actions to take on class maps such as marking.

3. Apply service policies to a Layer 3 interface.

Service policies apply a specified policy map to output packets on an interface. The Cisco CG-OS router supports the following interfaces: cellular (3G), WiMax, and Ethernet (Fast Ethernet and Gigabit Ethernet).

For details on creating class maps, policy maps, and service policies on the Cisco CG-OS router, see [Chapter 2, “Using Modular QoS CLI.”](#)

**Note**

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The QoS marking and monitoring statistics functions only use IPv4.

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## Classification

Classification partitions traffic into classes. You can classify traffic by using Access Control Lists (ACLs), Layer 3 packet length, and the packet header fields that include IP precedence and Differentiated Services Code Point (DSCP).

When you define a traffic class, you can specify multiple match criteria and you can choose to not match on a particular criterion, or you can determine the traffic class by matching any or all criteria.

The Cisco CG-OS router assigns any traffic that fails to match any class to a default class of traffic called *class-default*.

For more information about configuring classification, see [Chapter 3, “Configuring Classification.”](#)

## Marking

Configuring marking on the Cisco CG-OS router allows you to modify the QoS fields of the outgoing packets on an interface. The QoS fields that you can mark are IP precedence and DSCP in Layer 3.

You define marking commands in class maps (traffic classes), which are then referenced in a policy map. Marking identifies the traffic type for priority queuing.

For more information about configuring marking, see [Chapter 4, “Configuring Marking.”](#)

## Priority Queuing

Priority queuing allows you to manage the flow of traffic within the network and to achieve throughput and latency targets. Priority queuing employs index values, which you assign to class-maps to determine the order in which the Cisco CG-OS router forwards the traffic associated with that class-map.

For information about configuring priority queuing, see [Chapter 5, “Configuring Priority Queuing.”](#)

## Sequencing of QoS Actions

The Cisco CG-OS router performs QoS actions on incoming and outgoing Layer 3 (cellular, WiMax, Ethernet) interfaces.

The sequencing of QoS actions on egress traffic is as follows:

1. Classification
2. Marking
3. Priority Queuing

## System Recovery

The Cisco CG-OS router recovers its previous state after a software restart without a loss of state.

## QoS Configuration with Modular QoS CLI

You use Modular QoS CLI (MQC) to configure QoS. [Table 1-1](#) lists the MQC configuration commands.

**Table 1-1** *MQC Configuration Commands*

MQC Command	Description
<b>class-map</b>	Defines a class map that represents a class of traffic.
<b>policy-map</b>	Defines a policy map that represents a set of policies that the Cisco CG-OS router applies to a set of class maps.

You can modify or delete MQC objects, except system-defined objects (such as type qos), when the objects have no association with any interface. For information on system-defined MQC objects, see [Chapter 2, “Using Modular QoS CLI.”](#)

After you define the QoS policy, you can attach the policy map to an interface by using the interface configuration command shown in [Table 1-2](#).

**Table 1-2** *Interface Command to Attach a Policy Map to an Interface*

Interface Command	Description
<b>service-policy</b>	Applies the specified service policy to input and output packets on the interface.

## QoS Statistics

The Cisco CG-OS router maintains statistics for each policy, class action, and match criteria per interface. By default, the collection of statistics is enabled on the Cisco CG-OS router; however, you can disable the collection of statistics by entering the **no qos statistics** command. You can view QoS statistics by using the **show policy-map** interface command, and you can clear statistics based on an interface or policy map with the **clear qos statistics** command.

For information about monitoring QoS statistics, see [Chapter 6, “Monitoring QoS Statistics.”](#)

## Default QoS Behavior

By default, priority queuing is enabled on the Cisco CG-OS router and all traffic is assigned a priority queue index of 3 (best effort). For information about configuring priority queuing and its indexes, see [Chapter 5, “Configuring Priority Queuing.”](#)