



CHAPTER 1

Overview

This chapter describes the Quality of Service (QoS) features that are used to prevent traffic congestion.

Improving the Quality of Service

QoS lets you classify network traffic so that it can be policed and prioritized in a way that prevents congestion. Traffic is processed based on how you classify it and the QoS policies that you put in place.

You can implement a QoS policy using the following steps:

-
- Step 1** Define a traffic class by using the **class-map** command.
 - Step 2** Create a traffic policy by using the **policy-map** command.
A traffic policy defines how specific traffic is to be acted upon to improve the quality of service.
 - Step 3** Attach the traffic policy to an interface or port profile by using the **service-policy** command.
 - Step 4** Police the traffic.
-

Traffic Classification and Marking

Traffic classification and traffic marking are used together to sort and modify traffic for the best quality of service. [Table 1-1](#) describes these processes.

Table 1-1 Traffic Classification and Traffic Marking

| QoS Method | Description | Command | Mechanism |
|--|---|--------------|-------------|
| Traffic Classification | Groups network traffic based on defined criteria. | match | class maps |
| Traffic Marking | Modifies traffic attributes by class. | set | policy maps |

Traffic Classification

Classifying network traffic allows you to organize traffic (that is, packets) into traffic classes or categories on the basis of whether the traffic matches specific criteria. Classifying network traffic (used in conjunction with marking network traffic) is the foundation for applying QoS actions. For more information, see [Chapter 2, “Configuring QoS Classification.”](#)

Traffic Marking

Marking is the process of assigning a priority and involves changing the fields, such as class of service or DSCP, in a packet. The traffic is then marked accordingly as it comes into the device on an ingress interface. The markings are used to treat the traffic as it leaves the device on the egress interface. For more information about configuring marking, see [Chapter 3, “Configuring QoS Marking Policies.”](#)

Policing

Policing is the monitoring of data rates and burst sizes for a particular class of traffic. QoS policing on a network determines whether network traffic is within a specified profile (contract). This may cause out-of-profile traffic to drop or to be marked down to another differentiated services code point (DSCP) value to enforce a contracted service level. DSCP is a measure of the QoS level of the frame. For more information about configuring policing, see [Chapter 4, “Configuring QoS Policing.”](#)

QoS Commands

QoS configuration commands are shown in [Table 1-2](#).

Table 1-2 QoS Configuration Commands

| Global Configuration Commands | Class Map QoS Configuration Command | Policy Map QoS Configuration Command | Interface or Port Profile Configuration Command | Policy Map Class QoS Configuration Command | Description |
|-------------------------------|-------------------------------------|--------------------------------------|---|--|---|
| <code>class-map</code> | | | | | Defines a class map that represents a class of traffic. |
| <code>table-map</code> | | | | | Defines a table map that represents a mapping from one set of field values to another set of field values. You can reference a table map from a policy map. |
| <code>policy-map</code> | | | | | Defines a policy map that represents a set of policies to be applied to a set of class maps. Policy maps can reference table maps. |

Table 1-2 QoS Configuration Commands

| Global Configuration Commands | Class Map QoS Configuration Command | Policy Map QoS Configuration Command | Interface or Port Profile Configuration Command | Policy Map Class QoS Configuration Command | Description |
|-------------------------------|-------------------------------------|--------------------------------------|---|--|---|
| | | | service-policy | | Applies a specified policy map to input or output packets on interfaces configured as follows: <ul style="list-style-type: none"> inherited from a port-profile¹ port-channel Ethernet VEthernet |
| | | | | police | Defines the action to take regarding packet data rates. |
| | match | | | | Defines the criteria for a class map. |
| | | set | | | Defines the packet header values for a policy map. |

1. For information about port profiles see the *Cisco Nexus 1000V Port Profile Configuration Guide, Release 4.0(4)SV1(1)*.

QoS Statistics

Statistics are maintained for each policy, class action, and match criteria per interface. For information about monitoring QoS statistics, see [Chapter 5, “Monitoring QoS Statistics.”](#)

Default QoS Behavior

There is no default QoS behavior. Policing and prioritization of traffic are only implemented when you apply a policy map to an interface.

However, when designing your QoS and ACL policies, keep in mind that ACLs referenced within a QoS policy are processed as follows as part of the QoS policy:

- QoS ingress processing follows ACL processing.
- QoS egress processing precedes ACL egress processing.

Supported RFCs

The following RFCs are supported by QoS.

Table 1-3 **Supported RFCs**

| Number | Title |
|--------------------------|--|
| RFC 2475 | Architecture for Differentiated Services |
| RFC 2697 | A Single Rate Three Color Marker |
| RFC 2698 | A Dual Rate Three Color Marker |
| RFC 3289 | Management Information Base for the Differentiated Services Architecture |
| RFC 3550 | RTP: A Transport Protocol for Real-Time Applications |

High Availability Requirements for QoS Features

QoS recovers its previous state after a software restart, and it is able to switch over from the active supervisor to the standby supervisor without a loss of state.