

Chapter 2

Defining Service Levels with Traffic Classes and Traffic-Class Groups

This chapter provides information for configuring traffic classes and traffic-class groups on the E-series router.

QoS topics are discussed in the following sections:

- Traffic Class and Traffic-Class Groups Overview on page 13
- Configuring Traffic Classes That Define Service Levels on page 15
- Configuring Traffic-Class Groups That Define Service Levels on page 15
- Monitoring Traffic Classes and Traffic-Class Groups for Defined Levels of Service on page 16

Traffic Class and Traffic-Class Groups Overview

A traffic class is a systemwide collection of buffers, queues, and bandwidth that you can allocate to provide a defined level of service to packets in the traffic class.

A traffic class corresponds to what the IETF DiffServ working group calls a traffic class in RFC 2597—Assured Forwarding PHB Group (June 1999).

Traffic classes are global to the router. Packets are:

- Classified into a traffic class on ingress or egress by input policies
- Queued on fabric queues that are specific to the traffic class
- Queued on the egress line module on queues that are specific to the traffic class
- Scheduled for transmission by the scheduler

Best-Effort Forwarding

The router has a default traffic class called best-effort. You cannot delete this class. You can add the best-effort class to a traffic-class group. The router assigns packets to the best-effort class in each of the following cases:

- You do not create any other traffic classes.
- Packets are not classified into a traffic class.
- Packets arrive at an egress line module that has no queues allocated for their traffic class.

Traffic-Class Groups Overview

You can put traffic classes into a group to create a hierarchy of scheduler nodes and queues. Organizing traffic into multiple traffic-class groups enables you to manage and shape traffic—by service class, for example—when the traffic classes are distributed across different VCs. A traffic-class group contains one or more traffic classes, but a particular traffic class can belong only to a single group—either the default group or one named group.

You can configure an auto-strict group and up to three extended traffic-class groups. You must put traffic classes that require strict-priority scheduling in the auto-strict group. You can optionally put traffic classes that need a separate round robin (for example, video) in an extended group.

A traffic class that is not contained in any named group is considered to belong to the default group. Traffic classes are placed in the default traffic-class group when the classes are configured—you can then move a class to another traffic-class group. When you delete a traffic-class from a named group, the class is automatically moved to the default traffic-class group. ATM VC nodes that are configured in the default group (which is the factory default configuration) receive backpressure from the segmentation and reassembly (SAR) feature in the default qos-mode-port node.

Traffic-class groups are global in scope by default. However, you might want to manage certain traffic classes through particular line modules. If you have already created a traffic-class group, you can subsequently specify a slot number to create a local instance of the group that is restricted to the module occupying that slot. Characteristics configured for the local group on the line module override those of the global group, for only that line module. Traffic classes in a globally scoped traffic-class group cannot belong to any other group. Traffic classes in a local traffic-class group cannot belong to any other group.

Configuring Traffic Classes That Define Service Levels

The router supports up to eight global traffic classes. Each traffic class can appear in only one traffic-class group. If not explicitly added to a traffic-class group, the traffic class is considered to be ungrouped.

To configure a traffic class:

1. Create a traffic class by assigning a name that represents the type of service and enter Traffic Class Configuration mode.

```
host1(config)#traffic-class low-loss1
host1(config-traffic-class)#
```

The traffic class name can be up to 31 characters. It cannot include spaces.

2. (Optional) Specify strict-priority scheduling across the fabric for queues in the traffic class.

```
host1(config-traffic-class)#fabric-strict-priority
```

3. (Optional) For ERX-1440, E120, and E320 routers, specify the relative weight for queues in the traffic class in the fabric.

```
host1(config-traffic-class)#fabric-weight 12
```

Fabric weight controls the bandwidth of fabric queues associated with the traffic class. It does not control the weight of egress queues associated with the traffic class. If multiple traffic classes are strict priority, the fabric weight determines which class gets more bandwidth.

The weight value is in the range 1–63. The default is 8. Zero is not a valid weight.

Related Topics

- [Monitoring Traffic Classes and Traffic-Class Groups for Defined Levels of Service on page 16](#)
- **fabric-strict-priority** command
- **fabric-weight** command
- **traffic-class** command

Configuring Traffic-Class Groups That Define Service Levels

You can configure a traffic-class group and enter Traffic Class Group Configuration mode, from which you can add classes to or delete classes from the group.

Each traffic class can appear in only one traffic-class group. If not explicitly added to a traffic-class group, the traffic class is considered to be ungrouped.

To configure a traffic-class group:

1. Create a traffic-class group by assigning a name that represents the type of service and enter Traffic Class Group Configuration mode.

```
host1(config)#traffic-class-group assured slot 9 extended
host1(config-traffic-class-group)#
```

The traffic class name can be up to 31 characters. It cannot include spaces.

If you do not specify a keyword, the group is strict-priority by default.

You can use the **auto-strict-priority** keyword to explicitly configure a single traffic-class group with strict-priority scheduling, regardless of the scheduler profile associated with the group node.

You can use the **extended** keyword to configure up to three extended traffic-class groups. Scheduling for these groups is determined by the scheduler profile associated with the group node. If an explicitly configured strict-priority group exists, the scheduler for the extended groups may not specify strict-priority scheduling.

Use the **slot slotNumber** option to associate a pre-existing global traffic-class group with the module occupying that slot. Characteristics configured for the local group on the line module override those of the global group.

2. Add traffic classes to the traffic-class group.

```
host1(config-traffic-class-group)#traffic-class low-latency-traffic-class
```

Related Topics

- [Configuring Traffic Classes That Define Service Levels on page 15](#)
- [Monitoring Traffic Classes and Traffic-Class Groups for Defined Levels of Service on page 16](#)
- **traffic-class** command
- **traffic-class-group** command

Monitoring Traffic Classes and Traffic-Class Groups for Defined Levels of Service

To monitor traffic classes and traffic-class groups:

- [Monitoring Service Levels with Traffic Classes on page 314](#)
- [Monitoring Service Levels with Traffic-Class Groups on page 315](#)