



## Frame Relay IP RTP Priority

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This feature module describes the Frame Relay IP RTP Priority feature. It includes the following sections:

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### Feature Overview

The Frame Relay IP RTP Priority feature provides a strict priority queueing scheme on a Frame Relay permanent virtual circuit (PVC) for delay-sensitive data such as voice. Voice traffic can be identified by its Real-Time Transport Protocol (RTP) port numbers and classified into a priority queue configured by the **frame-relay ip rtp priority** command. The result of using this feature is that voice is serviced as strict priority in preference to other nonvoice traffic.

This feature extends the functionality offered by the **ip rtp priority** command by supporting Frame Relay PVCs. This feature allows you to specify a range of User Datagram Protocol (UDP) ports whose voice traffic is guaranteed strict priority service over any other queues or classes using the same output interface. Strict priority means that if packets exist in the priority queue, they are dequeued and sent first—that is, before packets in other queues are dequeued.

### Benefits

The strict priority queueing scheme allows delay-sensitive data such as voice to be dequeued and sent first—that is, before packets in other queues are dequeued. Delay-sensitive data is given preferential treatment over other traffic. This process is performed on a per-PVC basis, rather than at the interface level.

## Related Features and Technologies

The Frame Relay IP RTP Priority feature is related to the following features:

- IP RTP Priority
- Class-based weighted fair queueing (CBWFQ)
- Priority queueing
- Weighted fair queueing (WFQ)

## Related Documents

- *Quality of Service Solutions Configuration Guide*, Cisco IOS Release 12.0
- *Quality of Service Solutions Command Reference*, Cisco IOS Release 12.0
- *Class-Based Weighted Fair Queueing*
- *IP RTP Priority*

## Supported Platforms

- Cisco 1003
- Cisco 1004
- Cisco 1005
- Cisco 1600 series
- Cisco 2500 series
- Cisco 2600 series
- Cisco 3600 series
- Cisco 3800 series
- Cisco 4000 series (Cisco 4000, 4000-M, 4500, 4500-M, 4700, 4700-M)
- Cisco 5200 series
- Cisco 7000 series
- Cisco 7200 series
- Cisco 7500 series

This feature runs on the platforms listed. However, it is most useful on voice supported platforms, such as the Cisco 2600 series, Cisco 3600 series, Cisco 7200 series, and Cisco 7500 Route Switch Processor (RSP) series.

# Supported Standards, MIBs, and RFCs

## Standards

None

## MIBs

No new or modified MIBs are supported by this feature.

## RFCs

None

## Prerequisites

Frame Relay traffic shaping (FRTS) and Frame Relay Fragmentation (FRF.12) must be configured before the Frame Relay IP RTP Priority feature is used.

## Configuration Tasks

See the following sections for configuration tasks for the Frame Relay IP RTP Priority feature. Each task in the list is identified as either optional or required.

- Configuring Frame Relay IP RTP Priority (Required)
- Verifying Frame Relay IP RTP Priority (Optional)

## Configuring Frame Relay IP RTP Priority

To reserve a strict priority queue on a Frame Relay PVC for a set of RTP packet flows belonging to a range of UDP destination ports, use the following command in map-class configuration mode:

Command	Purpose
Router(config-map-class)# <b>frame-relay ip rtp priority</b> <i>starting-rtp-port-number port-number-range bandwidth</i>	Reserves a strict priority queue for a set of RTP packet flows belonging to a range of UDP destination ports.



### Note

Because the **frame-relay ip rtp priority** command gives absolute priority over other traffic, it should be used with care. In the event of congestion, if the traffic exceeds the configured bandwidth, then all the excess traffic is dropped.

## Verifying Frame Relay IP RTP Priority

To verify the Frame Relay IP RTP Priority feature, use one of the following commands in EXEC mode:

Command	Purpose
Router# <b>show frame relay pvc</b>	Displays statistics about PVCs for Frame Relay interfaces.
Router# <b>show queue</b> <i>interface-type interface-number</i>	Displays fair queuing configuration and statistics for a particular interface.
Router# <b>show traffic-shape queue</b>	Displays information about the elements queued at a particular time at the VC data link connection identifier (DLCI) level.

## Monitoring and Maintaining Frame Relay IP RTP Priority

To tune your RTP bandwidth or decrease RTP traffic if the priority queue is experiencing drops, use the following command in EXEC mode:

Command	Purpose
Router# <b>debug priority</b>	Displays priority queuing output if packets are dropped from the priority queue.

## Configuration Examples

This section provides the following configuration examples:

- Frame Relay IP RTP Priority Configuration Example

## Frame Relay IP RTP Priority Configuration Example

The following example first configures the Frame Relay map class called voip and then applies the map class to PVC 100 to provide strict priority service to matching RTP packets:

```
map-class frame-relay voip
  frame-relay cir 256000
  frame-relay bc 2560
  frame-relay be 600
  frame-relay mincir 256000
  no frame-relay adaptive-shaping
  frame-relay fair-queue
  frame-relay fragment 250
  frame-relay ip rtp priority 16384 16380 210

interface Serial15/0
  ip address 10.10.10.10 255.0.0.0
  no ip directed-broadcast
  encapsulation frame-relay
  no ip mroute-cache
  load-interval 30
  clockrate 1007616
  frame-relay traffic-shaping
  frame-relay interface-dlci 100
    class voip
  frame-relay ip rtp header-compression
  frame-relay intf-type dce
```

In this example, RTP packets on PVC 100 with UDP ports in the range 16384 to 32764 will be matched and given strict priority service.

## Command Reference

This section documents the modified **frame-relay ip rtp priority** command. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command reference publications.

## frame-relay ip rtp priority

To reserve a strict priority queue on a Frame Relay permanent virtual circuit (PVC) for a set of Real-Time Transport Protocol (RTP) packet flows belonging to a range of User Datagram Protocol (UDP) destination ports, use the **frame-relay ip rtp priority** map-class configuration command. To disable the strict priority queue, use the **no** form of this command.

**frame-relay ip rtp priority** *starting-rtp-port-number port-number-range bandwidth*

**no frame-relay ip rtp priority**

### Syntax Description

<i>starting-rtp-port-number</i>	The starting UDP port number. The lowest port number to which the packets are sent.
<i>port-number-range</i>	The range of UDP destination ports. Number, which added to the <i>starting-rtp-port-number</i> , yields the highest UDP port number.
<i>bandwidth</i>	Maximum allowed bandwidth (in kbps).

### Defaults

This command has no default behavior or values.

### Command Modes

Map-class configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

This command is most useful for voice applications, or other applications that are delay-sensitive. To use this command, you must first enter the **map-class frame-relay** command. After the Frame Relay map class has been configured, it must then be applied to a PVC.

This command extends the functionality offered by the **ip rtp priority** command by supporting Frame Relay PVCs. The command allows you to specify a range of UDP ports whose voice traffic is guaranteed strict priority service over any other queues or classes using the same output interface. Strict priority means that if packets exist in the priority queue, they are dequeued and sent first—that is, before packets in other queues are dequeued.

Frame Relay traffic shaping (FRTS) and Frame Relay Fragmentation (FRF.12) must be configured before the **frame-relay ip rtp priority** command is used.

Compressed RTP (CRTP) can be used to reduce the bandwidth required per voice call. When using CRTP with Frame Relay, you must use the **encapsulation frame-relay cisco** command instead of the **encapsulation frame-relay ietf** command.

Remember the following guidelines when configuring the *bandwidth* parameter:

- It is always safest to allocate to the priority queue slightly more than the known required amount of bandwidth, to allow room for network bursts.
- The IP RTP Priority admission control policy takes RTP header compression into account. Therefore, while configuring the *bandwidth* parameter of the **ip rtp priority** command you only need to configure for the bandwidth of the compressed call. Because the *bandwidth* parameter is the maximum total bandwidth, you need to allocate enough bandwidth for all calls if there will be more than one call.
- Configure a bandwidth that allows room for Layer 2 headers. The bandwidth allocation takes into account the payload plus the IP, UDP, and RTP headers but does not account for Layer 2 headers. Allowing 25 percent bandwidth for other overhead is conservative and safe.
- The sum of all bandwidth allocation for voice and data flows on an interface cannot exceed 75 percent of the total available bandwidth, unless you change the default maximum reservable bandwidth. To change the maximum reservable bandwidth, use the **max-reserved-bandwidth** command on the interface.



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**Note** The **max-reserved-bandwidth** command is intended for use on main interfaces only; it has no effect on virtual circuits (VCs) or ATM permanent virtual circuits (PVCs).

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## Examples

The following example first configures the Frame Relay map class called voip and then applies the map class to PVC 100 to provide strict priority service to matching RTP packets:

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map-class frame-relay voip
  frame-relay cir 256000
  frame-relay bc 2560
  frame-relay be 600
  frame-relay mincir 256000
  no frame-relay adaptive-shaping
  frame-relay fair-queue
  frame-relay fragment 250
  frame-relay ip rtp priority 16384 16380 210

interface Serial5/0
  ip address 10.10.10.10 255.0.0.0
  no ip directed-broadcast
  encapsulation frame-relay
  no ip mroute-cache
  load-interval 30
  clockrate 1007616
  frame-relay traffic-shaping
  frame-relay interface-dlci 100
    class voip
  frame-relay ip rtp header-compression
  frame-relay intf-type dce
```

In this example, RTP packets on PVC 100 with UDP ports in the range 16384 to 32764 will be matched and given strict priority service.

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>ip rtp priority</b>	Reserves a strict priority queue on a Frame Relay PVC for a set of RTP packet flows belonging to a range of UDP destination ports.
	<b>map-class frame-relay priority</b>	Specifies a map class to define QoS values for an SVC.
	<b>priority</b>	Gives priority to a class within a policy map.
	<b>show frame-relay pvc</b>	Displays statistics about PVCs for Frame Relay interfaces.
	<b>show queue</b>	Displays the contents of packets inside a queue for a particular interface or VC.
	<b>show traffic-shape queue</b>	Displays information about the elements queued at a particular time at the VC (DLCI) level.