Configuring RSVP Support for Frame Relay

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This chapter describes the tasks for configuring the RSVP Support for Frame Relay feature.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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How to Configure RSVP Support for Frame Relay

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Enabling Frame Relay Encapsulation on an Interface

SUMMARY STEPS

1. Device(config)# **interface s3/0**
2. Device(config-if)# **encapsulation frame-relay**[**cisco**| **ietf**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	Device(config)# **interface s3/0**	Enables an interface (for example, serial interface 3/0) and enters configuration interface mode.
Step 2	Device(config-if)# **encapsulation frame-relay**[**cisco**| **ietf**]	Enables Frame Relay and specifies the encapsulation method.

Configuring a Virtual Circuit

Command	Purpose
`Device(config-if)#` **frame-relay interface-dlci** *dlci*	Assigns a data-link connection identifier (DLCI) to a specified Frame Relay subinterface on a router or access server.

Enabling Frame Relay Traffic Shaping on an Interface

Command	Purpose
`Device(config-if)#` **frame-relay traffic-shaping**	Enables traffic shaping and per-VC queueing for all permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) on a Frame Relay interface.

Enabling Enhanced Local Management Interface

Command	Purpose
`Router(config-if)#` **frame-relay lmi-type**	Selects the LMI type.

Enabling RSVP on an Interface

Command	Purpose
`Device(config-if)#` **ip rsvp bandwidth**	Enables RSVP on an interface.

Specifying a Traffic Shaping Map Class for an Interface

Command	Purpose
`Device(config-if)#` **frame-relay class** *name*	Associates a map class with an interface or subinterface.

Defining a Map Class with WFQ and Traffic Shaping Parameters

Command	Purpose
`Device(config)#` **map-class frame-relay** *map-class-name*	Defines parameters for a specified class.

Specifying the CIR

Command	Purpose
`Device(config-map-class)#` **frame-relay cir** {**in** | **out**} *bps*	Specifies the maximum incoming or outgoing CIR for a Frame Relay VC.

Specifying the Minimum CIR

Command	Purpose
`Device(config-map-class)#` **frame-relay mincir** {**in** | **out**} *bps*	Specifies the minimum acceptable incoming or outgoing CIR for a Frame Relay VC. **Note** If the minCIR is not configured, then the admission control value is the CIR/2.

Enabling WFQ

Command	Purpose
`Device(config-map-class)#` **frame-relay fair-queue**	Enables WFQ on a PVC.

Enabling FRF.12

Command	Purpose
`Device(config-map-class)#` **frame-relay fragment** *fragment-size*	Enables Frame Relay fragmentation on a PVC.

Configuring a Path

Command	Purpose
`Device(config)#` **ip rsvp sender**	Specifies the RSVP path parameters, including the destination and source addresses, the protocol, the destination and source ports, the previous hop address, the average bit rate, and the burst size.

Configuring a Reservation

Command	Purpose
`Device(config)#` **ip rsvp reservation**	Specifies the RSVP reservation parameters, including the destination and source addresses, the protocol, the destination and source ports, the next hop address, the next hop interface, the reservation style, the service type, the average bit rate, and the burst size.

Verifying RSVP Support for Frame Relay

Multipoint Configuration

To verify RSVP support for Frame Relay in a multipoint configuration, perform the following steps:

SUMMARY STEPS

1. Enter the **show ip rsvp installed**command to display information about interfaces and their admitted reservations. The output in the following example shows that serial subinterface 3/0.1 has two reservations:
2. Enter the **show ip rsvp installed detail**command to display additional information about interfaces, subinterfaces, DLCI PVCs, and their current reservations.

DETAILED STEPS

Step 1 Enter the **show ip rsvp installed**command to display information about interfaces and their admitted reservations. The output in the following example shows that serial subinterface 3/0.1 has two reservations:

Example:

```
Device# show ip rsvp installed
RSVP:Serial3/0
BPS    To              From            Protoc DPort  Sport  Weight Conversation
RSVP:Serial3/0.1
BPS    To              From            Protoc DPort  Sport  Weight Conversation
40K    145.20.22.212   145.10.10.211   UDP    10     10     0      24
50K    145.20.21.212   145.10.10.211   UDP    10     10     6      25
```

Note Weight 0 is assigned to voice-like flows, which proceed to the priority queue.

Step 2 Enter the **show ip rsvp installed detail**command to display additional information about interfaces, subinterfaces, DLCI PVCs, and their current reservations.

Note In the following output, the first flow gets a reserved queue with a weight > 0, and the second flow gets the priority queue with a weight = 0.

Example:

```
Device# show ip rsvp installed detail
RSVP:Serial3/0 has the following installed reservations
RSVP:Serial3/0.1 has the following installed reservations
RSVP Reservation. Destination is 145.20.21.212, Source is 145.10.10.211,
  Protocol is UDP, Destination port is 10, Source port is 10
  Reserved bandwidth:50K bits/sec, Maximum burst:1K bytes, Peak rate:50K bits/sec
QoS provider for this flow:
    WFQ on FR PVC dlci 101 on Se3/0: RESERVED queue 25.  Weight:6
  Data given reserved service:0 packets (0M bytes)
  Data given best-effort service:0 packets (0 bytes)
  Reserved traffic classified for 68 seconds
  Long-term average bitrate (bits/sec):0M reserved, 0M best-effort
```

```
RSVP Reservation. Destination is 145.20.22.212, Source is 145.10.10.211,
  Protocol is UDP, Destination port is 10, Source port is 10
  Reserved bandwidth:40K bits/sec, Maximum burst:1K bytes, Peak rate:40K bits/sec
QoS provider for this flow:
    WFQ on FR PVC dlci 101 on Se3/0: PRIORITY queue 24.  Weight:0
  Data given reserved service:0 packets (0M bytes)
  Data given best-effort service:0 packets (0 bytes)
  Reserved traffic classified for 707 seconds
  Long-term average bitrate (bits/sec):0M reserved, 0M best-effort
```

Point-to-Point Configuration

To verify RSVP support for Frame Relay in a point-to-point configuration, perform the following steps:

SUMMARY STEPS

1. Enter the **show ip rsvp installed**command to display information about interfaces and their admitted reservations. The output in the following example shows that serial subinterface 3/0.1 has one reservation, and serial subinterface 3/0.2 has one reservation.
2. Enter the **show ip rsvp installed detail**command to display additional information about interfaces, subinterfaces, DLCI PVCs, and their current reservations.

DETAILED STEPS

Step 1 Enter the **show ip rsvp installed**command to display information about interfaces and their admitted reservations. The output in the following example shows that serial subinterface 3/0.1 has one reservation, and serial subinterface 3/0.2 has one reservation.

Example:

```
Device# show ip rsvp installed
RSVP:Serial3/0
BPS    To              From            Protoc DPort  Sport
RSVP:Serial3/0.1
BPS    To              From            Protoc DPort  Sport
50K    145.20.20.212   145.10.10.211   UDP    10     10
RSVP:Serial3/0.2
BPS    To              From            Protoc DPort  Sport
10K    145.20.21.212   145.10.10.211   UDP    11     11
```

Note Weight 0 is assigned to voice-like flows, which proceed to the priority queue.

Step 2 Enter the **show ip rsvp installed detail**command to display additional information about interfaces, subinterfaces, DLCI PVCs, and their current reservations.

Note In the following output, the first flow with a weight > 0 gets a reserved queue and the second flow with a weight = 0 gets the priority queue.

Example:

```
Device# show ip rsvp installed detail
RSVP:Serial3/0 has the following installed reservations
RSVP:Serial3/0.1 has the following installed reservations
```

```
RSVP Reservation. Destination is 145.20.20.212, Source is 145.10.10.211,
  Protocol is UDP, Destination port is 10, Source port is 10
  Reserved bandwidth:50K bits/sec, Maximum burst:1K bytes, Peak rate:50K bits/sec
QoS provider for this flow:
    WFQ on FR PVC dlci 101 on Se3/0: RESERVED queue 25.  Weight:6
  Data given reserved service:415 packets (509620 bytes)
  Data given best-effort service:0 packets (0 bytes)
  Reserved traffic classified for 862 seconds
  Long-term average bitrate (bits/sec):4724 reserved, 0M best-effort
RSVP Reservation. Destination is 145.20.20.212, Source is 145.10.10.211,
  Protocol is UDP, Destination port is 11, Source port is 11
  Reserved bandwidth:10K bits/sec, Maximum burst:1K bytes, Peak rate:10K bits/sec
QoS provider for this flow:
    WFQ on FR PVC dlci 101 on Se3/0: PRIORITY queue 24.  Weight:0
  Data given reserved service:85 packets (104380 bytes)
  Data given best-effort service:0 packets (0 bytes)
  Reserved traffic classified for 875 seconds
  Long-term average bitrate (bits/sec):954 reserved, 0M best-effort
RSVP:Serial3/0.2 has the following installedreservations
RSVP Reservation. Destination is 145.20.21.212, Source is 145.10.10.211,
  Protocol is UDP, Destination port is 11, Source port is 11
  Reserved bandwidth:10K bits/sec, Maximum burst:1K bytes, Peak rate:10Kbits/sec
QoS provider for this flow:
    WFQ on FR PVC dlci 101 on Se3/0:PRIORITY queue 24.  Weight:0
  Data given reserved service:85 packets (104380 bytes)
  Data given best-effort service:0 packets (0 bytes)
  Reserved traffic classified for 875 seconds
  Long-term average bitrate (bits/sec):954 reserved, 0M best-effort
```

Monitoring and Maintaining RSVP Support for Frame Relay

Command	Purpose
`Device#` **show ip rsvp installed**	Displays information about interfaces and their admitted reservations.
`Device#` **show ip rsvp installed detail**	Displays additional information about interfaces, DLCIs, and their admitted reservations.
`Device#` **show queueing**	Displays all or selected configured queueing strategies.

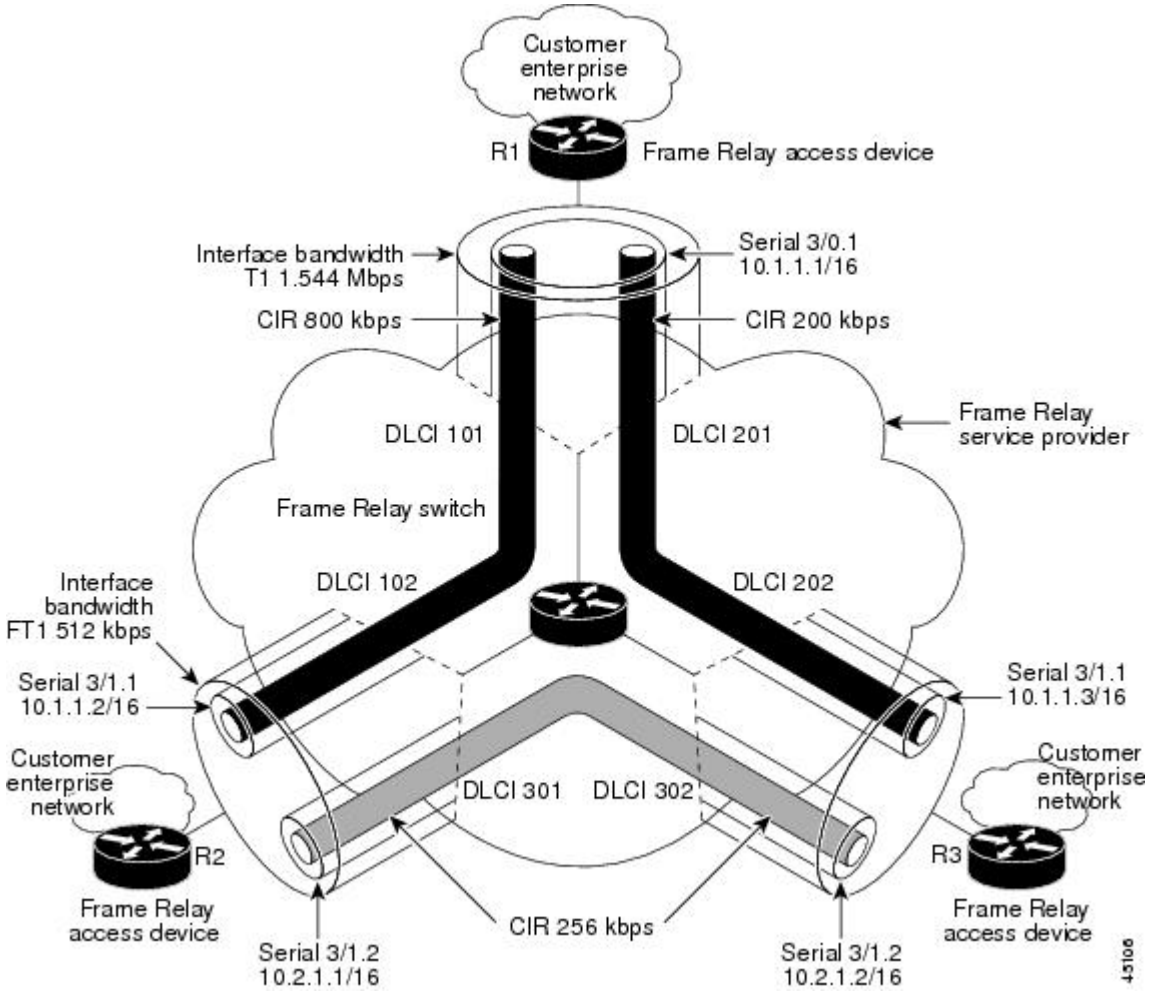
Configuration Examples for Configuring RSVP Support for Frame Relay

- Example Multipoint Configuration, page 8
- Example Point-to-Point Configuration, page 10

Example Multipoint Configuration

The figure below shows a multipoint interface configuration commonly used in Frame Relay environments in which multiple PVCs are configured on the same subinterface at device R1.

Figure 1 Multipoint Interface Configuration



RSVP performs admission control based on the minCIR of DLCI 101 and DLCI 201. The congestion point is not the 10.1.1.1/16 subinterface, but the CIR of DLCI 101 and DLCI 201.

The following example is a sample output for serial interface 3/0:

```
interface Serial3/0
 no ip address
 encapsulation frame-relay
 no fair-queue
 frame-relay traffic-shaping
 frame-relay lmi-type cisco
 ip rsvp bandwidth 350 350
!
interface Serial3/0.1 multipoint
 ip address 10.1.1.1 255.255.0.0
 frame-relay interface-dlci 101
```

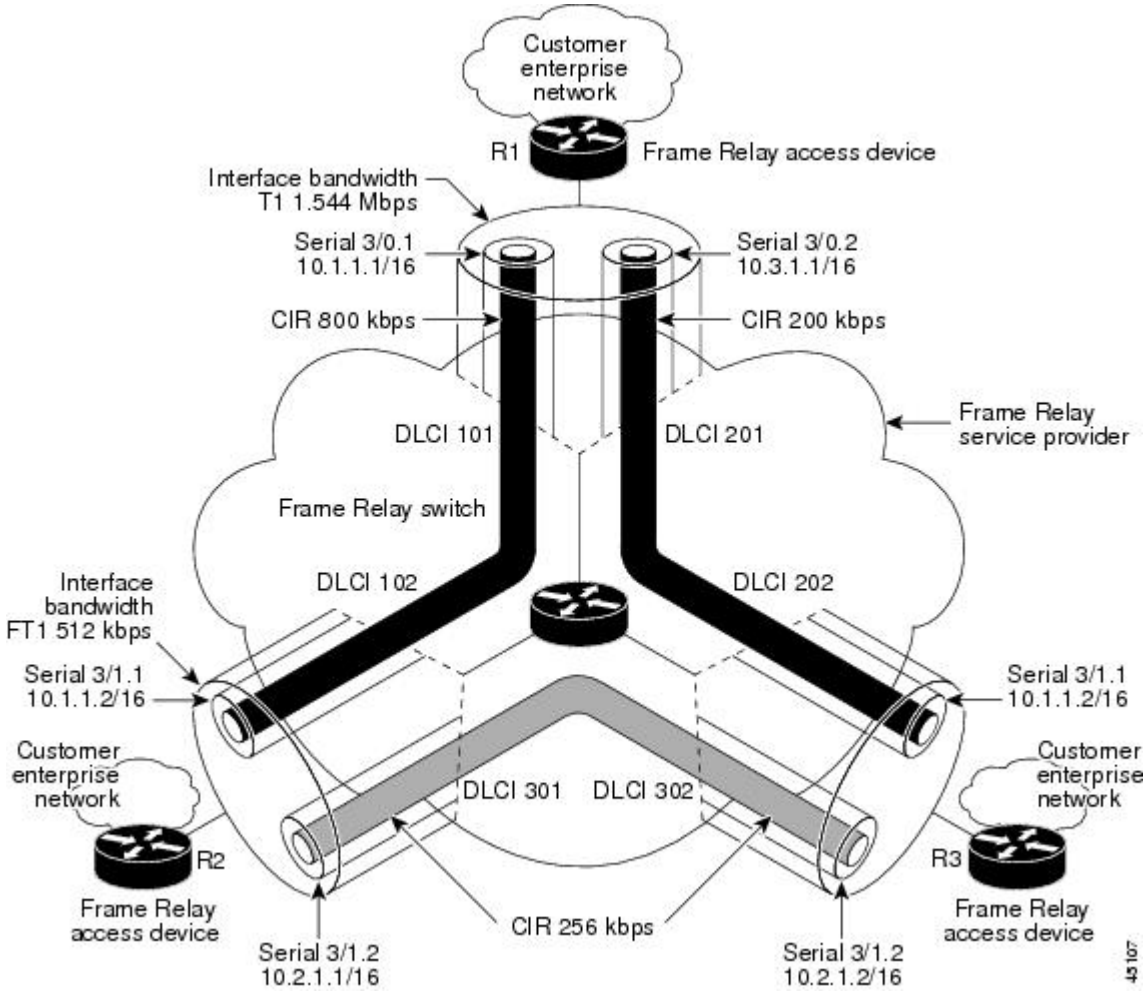
```
  class fr-voip
 frame-relay interface-dlci 201
  class fast-vcs
 ip rsvp bandwidth 350 350
ip rsvp pq-profile 6000 2000 ignore-peak-value
!
!
map-class frame-relay fr-voip
 frame-relay cir 800000
 frame-relay bc 8000
 frame-relay mincir 128000
 frame-relay fragment 280
 no frame-relay adaptive-shaping
 frame-relay fair-queue
!
map-class frame-relay fast-vcs
 frame-relay cir 200000
 frame-relay bc 2000
 frame-relay mincir 60000
 frame-relay fragment 280
 no frame-relay adaptive-shaping
 frame-relay fair-queue
!
```

Note When FRTS is enabled, the Frame Relay Committed Burst (Bc) value (in bits) should be configured to a maximum of 1/100th of the CIR value (in bits per second). This configuration ensures that the FRTS token bucket interval (Bc/CIR) does not exceed 10 Ms, and that voice packets are serviced promptly.

Example Point-to-Point Configuration

The figure below shows a point-to-point interface configuration commonly used in Frame Relay environments in which one PVC per subinterface is configured at device R1.

Figure 2 Sample Point-to-Point Interface Configuration



Notice that the device interface bandwidth for R1 is T1 (1.544 Mbps), whereas the CIR value of DLCI 201 toward R3 is 256 kbps. For traffic flows from R1 to R3 over DLCI 201, the congestion point is the CIR for DLCI 201. As a result, RSVP performs admission control based on the minCIR and reserves resources, including queues and bandwidth, on the WFQ system that runs on each DLCI.

The following example is sample output for serial interface 3/0:

```
interface Serial3/0
 no ip address
 encapsulation frame-relay
no fair-queue
 frame-relay traffic-shaping
 frame-relay lmi-type cisco
 ip rsvp bandwidth 500 500
!
```

```
interface Serial3/0.1 point-to-point
 ip address 10.1.1.1 255.255.0.0
 frame-relay interface-dlci 101
  class fr-voip
 ip rsvp bandwidth 350 350
!
interface Serial3/0.2 point-to-point
 ip address 10.3.1.1 255.255.0.0
 frame-relay interface-dlci 201
  class fast-vcs
 ip rsvp bandwidth 150 150
ip rsvp pq-profile 6000 2000 ignore-peak-value
!
!
map-class frame-relay fr-voip
 frame-relay cir 800000
 frame-relay bc 8000
 frame-relay mincir 128000
 frame-relay fragment 280
 no frame-relay adaptive-shaping
 frame-relay fair-queue
```

Note When FRTS is enabled, the Frame Relay Committed Burst (Bc) value (in bits) should be configured to a maximum of 1/100th of the CIR value (in bits per second). This configuration ensures that the FRTS token bucket interval (Bc/CIR) does not exceed 10 Ms, and that voice packets are serviced promptly.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
RSVP commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	*Cisco IOS Quality of Service Solutions Command Reference*
Overview on RSVP	*Signalling Overview*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	--

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html