RSVP Interface-Based Receiver Proxy

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The RSVP Interface-Based Receiver Proxy feature lets you configure a proxy router by outbound interface instead of configuring a destination address for each flow going through the same interface.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

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Prerequisites for RSVP Interface-Based Receiver Proxy

You must configure an IP address and enable Resource Reservation Protocol (RSVP) on one or more interfaces on at least two neighboring routers that share a link within the network.

Restrictions for RSVP Interface-Based Receiver Proxy

- Filtering using access control lists (ACLs), application IDs, or other mechanisms is not supported.
- A provider edge (PE) router cannot switch from being a proxy node to a transit node for a given flow during the lifetime of the flow.

Information About RSVP Interface-Based Receiver Proxy

To use the RSVP Interface-Based Receiver Proxy feature, you should understand the following concepts:

- Feature Overview of RSVP Interface-Based Receiver Proxy, page 2
- Benefits of RSVP Interface-Based Receiver Proxy, page 3

Feature Overview of RSVP Interface-Based Receiver Proxy

The RSVP Interface-Based Receiver Proxy feature allows you to use RSVP to signal reservations and guarantee bandwidth on behalf of a receiver that does not support RSVP, by terminating the PATH message and generating a RESV message in the upstream direction on an RSVP-capable router on the path to the endpoint. An example is a video-on-demand flow from a video server to a set-top box, which is a computer that acts as a receiver and decodes the incoming video signal from the video server.

Because set-top boxes may not support RSVP natively, you cannot configure end-to-end RSVP reservations between a video server and a set-top box. Instead, you can enable the RSVP interface-based receiver proxy on the router that is closest to that set-top box.

The router terminates the end-to-end sessions for many set-top boxes and performs admission control on the outbound (or egress) interface of the PATH message, where the receiver proxy is configured, as a proxy for Call Admission Control (CAC) on the router-to-set-top link. The RSVP interface-based receiver proxy determines which PATH messages to terminate by looking at the outbound interface to be used by the traffic flow.

You can configure an RSVP interface-based receiver proxy to terminate PATH messages going out a specified interface with a specific action (reply with RESV, or reject). The most common application is to configure the receiver proxy on the edge of an administrative domain on interdomain interfaces. The router then terminates PATH messages going out the administrative domain while still permitting PATH messages transitioning through the router within the same administrative domain to continue downstream.

In the video-on-demand example described above, the last-hop Layer 3 router supporting RSVP implements the receiver proxy, which is then configured on the interfaces facing the Layer 2 distribution network (for example, Digital Subscriber Line access [DSLAM] or cable distribution). Also, since RSVP is running and performing CAC on the router with the receiver proxy, you can configure RSVP enhancements such as local policy and Common Open Policy Service (COPS) for more fine-grained control on video flow CAC.

The router terminates the end-to-end sessions for many set-top boxes, with the assumption that the links further downstream (for example, from the DSLAM to the set-top box) never become congested or, more likely, in the case of congestion, that the voice and video traffic from the router gets the highest priority and access to the bandwidth.

Benefits of RSVP Interface-Based Receiver Proxy

Ease of Use and Scalability Improvement

Previously, you had to configure a receiver proxy for every separate RSVP stream or set-top box. Now you can configure the proxy by outbound interface. For example, if there were 100 set-top boxes downstream from the proxy router, you had to configure 100 proxies. With this enhancement, you configure only the outbound interface(s). In addition, the receiver proxy is guaranteed to terminate the reservation only on the last hop within the core network. Nodes that may function as transit nodes for some PATH messages but should proxy others depending on their placement in the network can perform the correct functions on a flow-by-flow basis.

In the video-on-demand example described above, a PATH message that transits through an edge router to another edge router (around the edge) is not terminated, whereas an otherwise identical PATH message that actually exits the aggregation network and transitions to the access network is terminated. This allows for more accurate CAC in the network and also simplifies and reduces configuration requirements.

How to Configure RSVP Interface-Based Receiver Proxy

This section contains the following procedures:

- Enabling RSVP on an Interface, page 3 (required)
- Configuring a Receiver Proxy on an Outbound Interface, page 4 (required)
- Verifying the RSVP Interface-Based Receiver Proxy Configuration, page 5 (optional)

Enabling RSVP on an Interface

Perform this task to enable RSVP on an interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *interface number*
4. **ip rsvp bandwidth** [*interface-kbps*] [*single-flow-kbps*]
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *interface number* **Example:** `Router(config)# interface Ethernet0/0`	Configures the interface type and enters interface configuration mode.
Step 4	**ip rsvp bandwidth** [*interface-kbps*] [*single-flow-kbps*] **Example:** `Router(config-if)# ip rsvp bandwidth 7500 7500`	Enables RSVP on an interface. • The optional *interface-kbps* and *single-flow-kbps* arguments specify the amount of bandwidth that can be allocated by RSVP flows or to a single flow, respectively. Values are from 1 to 10000000. **Note** Repeat this command for each interface on which you want to enable RSVP.
Step 5	**end** **Example:** `Router(config-if)# end`	(Optional) Returns to privileged EXEC mode.

Configuring a Receiver Proxy on an Outbound Interface

Perform this task to configure a receiver proxy on an outbound interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *interface number*
4. **ip rsvp listener outbound** {**reply** | **reject**}
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *interface number* **Example:** `Router(config)# interface Ethernet0/0`	Configures the interface type and enters interface configuration mode.
Step 4	**ip rsvp listener outbound** {**reply** | **reject**} **Example:** `Router(config-if)# ip rsvp listener outbound reject`	Configures an RSVP router to listen for PATH messages sent through a specified interface. • Enter the **reply** keyword or the **reject** keyword to specify the response that you want to PATH messages.
Step 5	**end** **Example:** `Router(config-if)# end`	(Optional) Returns to privileged EXEC mode.

Verifying the RSVP Interface-Based Receiver Proxy Configuration

Perform the following task to verify the configuration.

Note You can use the following **show** commands in user EXEC or privileged EXEC mode.

SUMMARY STEPS

1. **enable**
2. **show ip rsvp listeners** [*dst* | **any**] [**udp** | **tcp** | **any** | *protocol*] [*dst-port* | **any**]
3. **show ip rsvp sender** [**detail**] [**filter** [**destination** *ip-addr* | *hostname*] [**source** *ip-addr* | *hostname*] [**dst-port** *port*] [**src-port** *port*]]
4. **show ip rsvp reservation** [**detail**] [**filter** [**destination** *ip-addr* | *hostname*] [**source** *ip-addr* | *hostname*] [**dst-port** *port*] [**src-port** *port*]]
5. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	(Optional) Enables privileged EXEC mode. • Enter your password if prompted. **Note** Skip this step if you are using the **show** commands in user EXEC mode.
Step 2	**show ip rsvp listeners** [*dst* | **any**] [**udp** | **tcp** | **any** | *protocol*] [*dst-port* | **any**] **Example:** `Router# show ip rsvp listeners`	Displays RSVP listeners for a specified port or protocol.
Step 3	**show ip rsvp sender** [**detail**] [**filter** [**destination** *ip-addr* | *hostname*] [**source** *ip-addr* | *hostname*] [**dst-port** *port*] [**src-port** *port*]] **Example:** `Router# show ip rsvp sender detail`	Displays RSVP PATH-related sender information currently in the database. • The optional **detail** keyword displays additional output. **Note** The optional **filter** keyword is supported in Cisco IOS Releases 12.0S and 12.2S only.
Step 4	**show ip rsvp reservation** [**detail**] [**filter** [**destination** *ip-addr* | *hostname*] [**source** *ip-addr* | *hostname*] [**dst-port** *port*] [**src-port** *port*]] **Example:** `Router# show ip rsvp reservation detail`	Displays RSVP-related receiver information currently in the database. • The optional **detail** keyword displays additional output. **Note** The optional **filter** keyword is supported in Cisco IOS Releases 12.0S and 12.2S only.
Step 5	**exit** **Example:** `Router# exit`	(Optional) Exits privileged EXEC mode and returns to user EXEC mode.

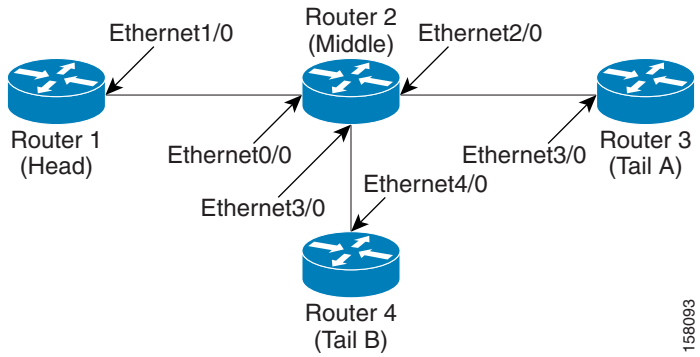
Configuration Examples for RSVP Interface-Based Receiver Proxy

This section provides configuration examples for the RSVP Interface-Based Receiver Proxy feature.

Configuring RSVP Interface-Based Receiver Proxy: Examples

The four-router network in Figure 1 contains the following configurations:

Figure 1 Sample Network with an Interface-Based Receiver Proxy Configured



Configuring a Receiver Proxy (Listener) on a Middle Router on Behalf of Tailend Routers

The following example configures a receiver proxy, also called a listener, on the middle router (Router 2) on behalf of the two tailend routers (Routers 3 and 4):

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# interface ethernet 2/0
Router(config-if)# ip rsvp listener outbound reply
Router(config-if)# exit
Router(config)# interface ethernet 3/0
Router(config-if)# ip rsvp listener outbound reject
Router(config-if)# end
```

Configuring PATH Messages from a Headend Router to Tailend Routers to Test the Receiver Proxy

Note If you do not have another headend router generating RSVP PATH messages available, configure one in the network for the specific purpose of testing RSVP features such as the receiver proxy. Note that these commands are not expected (or supported) in a final deployment.

The following example configures four PATH messages from the headend router (Router 1) to the tailend routers (Routers 3 and 4):

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ip rsvp sender-host 10.0.0.5 10.0.0.1 TCP 2 2 100 10
Router(config)# ip rsvp sender-host 10.0.0.5 10.0.0.1 UDP 1 1 100 10
Router(config)# ip rsvp sender-host 10.0.0.7 10.0.0.1 TCP 4 4 100 10
Router(config)# ip rsvp sender-host 10.0.0.7 10.0.0.1 UDP 3 3 100 10
Router(config)# end
```

Verifying RSVP Interface-Based Receiver Proxy: Examples

This section contains the following verification examples:

Verifying the PATH Messages in the Database

The following example verifies that the PATH messages you configured are in the database:

```
Router# show ip rsvp sender

To              From            Pro DPort Sport Prev Hop        I/F      BPS
10.0.0.5        10.0.0.1        TCP 2     2     none            none     100K
10.0.0.5        10.0.0.1        UDP 1     1     none            none     100K
10.0.0.7        10.0.0.1        TCP 4     4     none            none     100K
10.0.0.7        10.0.0.1        UDP 3     3     none            none     100K
```

The following example verifies that a PATH message has been terminated by a receiver proxy configured to reply.

Note A receiver proxy that is configured to reject does not cause any state to be stored in the RSVP database; therefore, this **show** command does not display these PATHS. Only one PATH message is shown.

```
Router# show ip rsvp sender detail

PATH:
  Destination 10.0.0.5, Protocol_Id 17, Don't Police , DstPort 1
  Sender address: 10.0.0.1, port: 1
  Path refreshes:
    arriving: from PHOP 10.1.2.1 on Et0/0 every 30000 msecs
  Traffic params - Rate: 100K bits/sec, Max. burst: 10K bytes
    Min Policed Unit: 0 bytes, Max Pkt Size 2147483647 bytes
  Path ID handle: 01000402.
  Incoming policy: Accepted. Policy source(s): Default
  Status: Proxy-terminated
  Output on Ethernet2/0. Policy status: NOT Forwarding. Handle: 02000401
    Policy source(s):
  Path FLR: Never repaired
```

Verifying the Running Configuration

The following example verifies the configuration for Ethernet interface 2/0:

```
Router# show running-config interface Ethernet2/0

Building configuration...

Current configuration : 132 bytes
!
interface Ethernet2/0
 ip address 172.16.0.1 255.0.0.0
 no cdp enable
 ip rsvp bandwidth 2000
 ip rsvp listener outbound reply
end
```

The following example verifies the configuration for Ethernet interface 3/0:

```
Router# show running-config interface Ethernet3/0

Building configuration...

Current configuration : 133 bytes
!
interface Ethernet3/0
 ip address 172.16.0.2 255.0.0.0
```

```
 no cdp enable
 ip rsvp bandwidth 2000
 ip rsvp listener outbound reject
end
```

Verifying the Listeners (Proxies)

The following example verifies the listeners (proxies) that you configured on the middle router (Router 2) on behalf of the two tailend routers (Routers 3 and 4):

```
To                Protocol   DPort   Description                Action    OutIf
10.0.0.0          0          0       RSVP Proxy                 reply     Et2/0
10.0.0.0          0          0       RSVP Proxy                 reject    Et3/0
```

Verifying the Reservations

The following example displays reservations established by the middle router (Router 2) on behalf of the tailend routers (Routers 3 and 4) as seen from the headend router (Router 1):

```
Router# show ip rsvp reservation

To            From          Pro DPort Sport Next Hop      I/F      Fi Serv BPS
10.0.0.7      10.0.0.1      TCP 4     4     10.0.0.2      Et1/0    FF RATE 100K
10.0.0.7      10.0.0.1      UDP 3     3     10.0.0.2      Et1/0    FF RATE 100K
```

The following example verifies that a reservation is locally generated (proxied). Only one reservation is shown:

```
Router# show ip rsvp reservation detail

RSVP Reservation. Destination is 10.0.0.7, Source is 10.0.0.1,
  Protocol is UDP, Destination port is 1, Source port is 1
  Next Hop: 10.2.3.3 on Ethernet2/0
  Reservation Style is Fixed-Filter, QoS Service is Guaranteed-Rate
  Resv ID handle: 01000405.
  Created: 09:24:24 EST Fri Jun 2 2006
  Average Bitrate is 100K bits/sec, Maximum Burst is 10K bytes
  Min Policed Unit: 0 bytes, Max Pkt Size: 0 bytes
  Status: Proxied
  Policy: Forwarding. Policy source(s): Default
```

Verifying CAC on an Outbound Interface

The following example verifies that the proxied reservation performed CAC on the local outbound interface:

```
Router# show ip rsvp installed

RSVP: Ethernet3/0 has no installed reservations
RSVP: Ethernet2/0
BPS    To              From            Protoc DPort  Sport
100K   10.0.0.7        10.0.0.1        UDP    1       1
```

Additional References

The following sections provide references related to the RSVP Interface-Based Receiver Proxy feature.

Related Documents

Related Topic	Document Title
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	*Cisco IOS Quality of Service Solutions Command Reference*, Release 12.2SR
QoS configuration tasks	*Cisco IOS Quality of Service Solutions Configuration Guide*, Release 12.4
Error messages	*Cisco IOS Software System Messages*
Internet draft	*RSVP Proxy Approaches*, Internet draft, October 2006 [draft-lefaucheur-tsvwg-rsvp-proxy-00.txt]

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 IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 2205	*Resource ReSerVation Protocol (RSVP)*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register on Cisco.com.	http://www.cisco.com/techsupport

Command Reference

This section documents only commands that are new or modified.

- **ip rsvp listener outbound**

ip rsvp listener outbound

To configure a Resource Reservation Protocol (RSVP) router to listen for PATH messages sent through a specified interface, use the **ip rsvp listener outbound** command in interface configuration mode. To disable listening, use the **no** form of this command.

ip rsvp listener outbound {**reply** | **reject**}

no ip rsvp listener outbound {**reply** | **reject**}

Syntax Description

reply	For a PATH message that usually exits from a specified interface, the router does the following: • Installs local PATH state for the message. • Terminates the PATH message and does not forward it downstream. • Generates and sends a RESV (reply) message upstream on behalf of the PATH message with the following. – The objects in the RESV message are the same as those in the PATH message. – The policy objects, such as preemption and application IDs, are echoed back. – Shared explicit style is used.
reject	For a PATH message that usually exits from a specified interface, the router does the following: • Terminates the PATH message and does not forward it downstream. • Generates and sends a PATHERROR (reject) message upstream. • Does not install local PATH state and discards the PATH message.

Command Default

This command is disabled by default; therefore, no listeners are configured.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(18)SFX5	This command was introduced.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.

Usage Guidelines

Use the **ip rsvp listener outbound** command to match all PATH messages that are being sent from a specified interface.

When you configure an interface-based receiver proxy to reply, RSVP performs Call Admission Control (CAC) on the outbound (or egress) interface for the flow. If CAC fails, the reservation is not generated. This is the same behavior as for the global RSVP receiver proxy command.

The outbound interface that a flow uses is determined when the flow is set up, and the interface-based receiver proxy is consulted at that time. The interface-based receiver proxy is not consulted if there is a change in routing for an existing flow.

If the interface-based receiver proxy receives a RESVERR message with an admission control failure error or a policy reject error, the interface-based receiver proxy generates a PATHERR message with the same error to provide explicit notification to the sender of the reservation failure.

Examples

In the following example, PATH messages sent through Ethernet interface 3/0 are rejected and PATHERROR messages are generated:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# interface Ethernet3/0
Router(config-if)# ip rsvp listener outbound reject
```

Related Commands

Command	Description
ip rsvp listener	Configures an RSVP router to listen for PATH messages.
ip rsvp reservation	Enables a router to simulate receiving and forwarding RSVP RESV messages.
ip rsvp reservation-host	Enables a router to simulate a host generating RSVP RESV messages.
show ip rsvp listeners	Displays configured RSVP listeners.

Feature Information for RSVP Interface-Based Receiver Proxy

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for RSVP Interface-Based Receiver Proxy

Feature Name	Releases	Feature Information
RSVP Interface-Based Receiver Proxy	12.2(28)SXF5 12.2(33)SRB	The RSVP Interface-Based Receiver Proxy feature lets you configure a proxy router by outbound interface instead of configuring a destination address for each flow going through the same interface. In Cisco IOS Release 12.2(33)SRB, support was added for the Cisco 7600 series routers.

Glossary

flow—A stream of data traveling between two endpoints across a network (for example, from one LAN station to another). Multiple flows can be transmitted on a single circuit.

PE router—provider edge router. A router that is part of a service provider's network and is connected to a customer edge (CE) router.

proxy—A component of RSVP that manages all locally originated and terminated state.

receiver proxy—A configurable feature that allows a router to proxy RSVP RESV messages for local or remote destinations.

RSVP—Resource Reservation Protocol. A protocol for reserving network resources to provide quality of service guarantees to application flows.

set-top box—A computer that acts as a receiver and decodes the incoming signal from a satellite dish, a cable network, or a telephone line.

Note See *Internetworking Terms and Acronyms* for terms not included in this glossary.