RSVP Refresh Reduction and Reliable Messaging

The RSVP Refresh Reduction and Reliable Messaging feature includes refresh reduction, which improves the scalability, latency, and reliability of Resource Reservation Protocol (RSVP) signalling to enhance network performance and message delivery.

Feature Specifications for RSVP Refresh Reduction and Reliable Messaging

Feature History	
Release	**Modification**
12.2(13)T	This feature was introduced.
Supported Platforms	
For supported platforms in Cisco IOS Release 12.2(13)T, consult Cisco Feature Navigator.	

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that are supported on specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

http://www.cisco.com/register

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

http://www.cisco.com/go/fn

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

Contents

Prerequisites for RSVP Refresh Reduction and Reliable Messaging

RSVP must be configured on two or more routers within the network before you can use the RSVP Refresh Reduction and Reliable Messaging feature.

Restrictions for RSVP Refresh Reduction and Reliable Messaging

Multicast flows are not supported for the reliable messages and summary refresh features.

Information About RSVP Refresh Reduction and Reliable Messaging

To configure RSVP Refresh Reduction and Reliable Messaging, you need to understand the following concepts:

Feature Design of RSVP Refresh Reduction and Reliable Messaging

RSVP is a network-control, soft-state protocol that enables Internet applications to obtain special qualities of service (QoS) for their data flows. As a soft-state protocol, RSVP requires that state be periodically refreshed. If refresh messages are not transmitted during a specified interval, RSVP state automatically times out and is deleted.

In a network using RSVP signalling, reliability and latency problems occur when an RSVP message is lost in transmission. A lost RSVP setup message can cause a delayed or failed reservation; a lost RSVP refresh message can cause a delay in the modification of a reservation, or in a reservation timeout. Intolerant applications can fail as a result.

Reliability problems can also occur when there is excessive RSVP refresh message traffic caused by a large number of reservations in the network. Using summary refresh messages can improve reliability by significantly reducing the amount of RSVP refresh traffic.

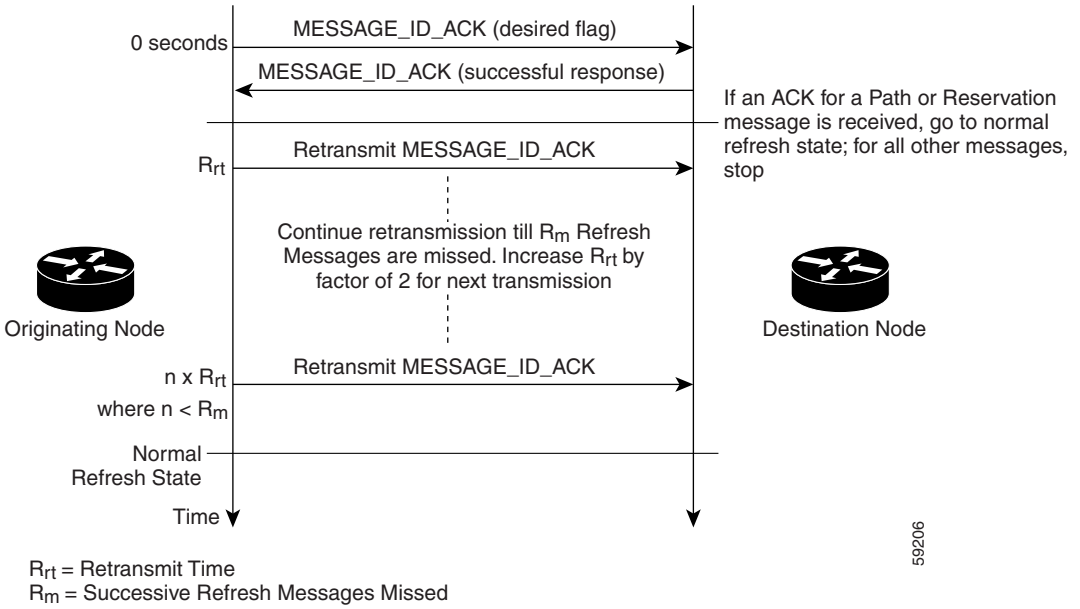
Note RSVP packets consist of headers that identify the types of messages, and object fields that contain attributes and properties describing how to interpret and act on the content.

Types of Messages in RSVP Refresh Reduction and Reliable Messaging

The RSVP Refresh Reduction and Reliable Messaging feature (Figure 1) includes refresh reduction, which improves the scalability, latency, and reliability of RSVP signalling by introducing the following extensions:

- Reliable messages (MESSAGE_ID, MESSAGE_ID_ACK objects, and ACK messages)
- Bundle messages (reception and processing only)
- Summary refresh messages (MESSAGE_ID_LIST and MESSAGE_ID_NACK objects)

Figure 1 RSVP Refresh Reduction and Reliable Messaging



Reliable Messages

The reliable messages extension supports dependable message delivery among neighboring routers by implementing an acknowledgment mechanism that consists of a MESSAGE_ID object and a MESSAGE_ID_ACK object. The acknowledgments can be transmitted in an ACK message or piggybacked in other RSVP messages.

Each RSVP message contains one MESSAGE_ID object. If the ACK_Desired flag field is set within the MESSAGE_ID object, then the receiver transmits a MESSAGE_ID_ACK object to the sender to confirm delivery.

Bundle Messages

A bundle message consists of several standard RSVP messages grouped into a single RSVP message.

A bundle message must contain at least one submessage. A submessage can be any RSVP message type other than another bundle message. Submessage types include Path, PathErr, Resv, ResvTear, ResvErr, ResvConf, and ACK.

Bundle messages are addressed directly to the RSVP neighbor. The bundle header immediately follows the IP header, and there is no intermediate transport header.

When a router receives a bundle message that is not addressed to one of its local IP addresses, it forwards the message.

Note In this release, bundle messages can be received, but not sent.

Summary Refresh Messages

A summary refresh message supports the refreshing of RSVP state without the transmission of conventional Path and Resv messages. Therefore, the amount of information that must be transmitted and processed to maintain RSVP state synchronization is greatly reduced.

A summary refresh message carries a set of MESSAGE_ID objects that identify the Path and Resv states that should be refreshed. When an RSVP node receives a summary refresh message, the node matches each received MESSAGE_ID object with the locally installed Path or Resv state. If the MESSAGE_ID objects match the local state, the state is updated as if a standard RSVP refresh message were received. However, if a MESSAGE_ID object does not match the receiver's local state, the receiver notifies the sender of the summary refresh message by transmitting a MESSAGE_ID_NACK object.

When a summary refresh message is used to refresh the state of an RSVP session, the transmission of conventional refresh messages are suppressed. The summary refresh extension cannot be used for a Path or Resv message that contains changes to a previously advertised state. Also, only a state that was previously advertised in Path or Resv messages containing MESSAGE_ID objects can be refreshed by using a summary refresh message.

Benefits of RSVP Refresh Reduction and Reliable Messaging

Enhanced Network Performance

Refresh reduction reduces the volume of steady-state network traffic generated, the amount of CPU resources used, and the response time, thereby enhancing network performance.

Improved Message Delivery

The MESSAGE_ID and the MESSAGE_ID_ACK objects ensure the reliable delivery of messages and support rapid state refresh when a network problem occurs. For example, MESSAGE_ID_ACK objects are used to detect link transmission losses.

How to Configure RSVP Refresh Reduction and Reliable Messaging

This section contains the following procedures:

- Enable RSVP on an Interface, page 5 (required)
- Enable RSVP Refresh Reduction, page 6 (required)
- Verify RSVP Refresh Reduction and Reliable Messaging, page 8 (optional)

Enable RSVP on an Interface

Perform these tasks to enable RSVP on an interface.

SUMMARY STEPS

1. **enable**
2. **configure** {**terminal** | **memory** | **network**}

3. **interface** [*type number*]
4. **ip rsvp bandwidth** [*interface-kbps* [*sub-pool*]]
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. Enter your password if prompted.
Step 2	**configure** {**terminal** | **memory** | **network**} **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** [*type number*] **Example:** `Router(config-if)# interface Ethernet1`	Enters interface configuration mode. • The *type number* argument identifies the interface to be configured.
Step 4	**ip rsvp bandwidth** [*interface-kbps* [*sub-pool*]] **Example:** `Router(config-if)# ip rsvp bandwidth 7500 7500`	Enables RSVP on an interface. • The optional *interface-kbps* and *sub-pool* arguments specify the amount of bandwidth that can be allocated by RSVP flows or to a single flow, respectively. Values are from 1 to 10,000,000, and 0 to 10,000,000, respectively.
Step 5	**end** **Example:** `Router(config-if)# end`	Exits to privileged EXEC mode.

Enable RSVP Refresh Reduction

Perform these tasks to enable RSVP refresh reduction.

SUMMARY STEPS

1. **enable**
2. **configure** {**terminal** | **memory** | **network**}
3. **ip rsvp signalling refresh reduction**
4. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. Enter your password if prompted.
Step 2	**configure** {**terminal** | **memory** | **network**} **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ip rsvp signalling refresh reduction** **Example:** `Router(config)# ip rsvp signalling refresh reduction`	Enables refresh reduction.
Step 4	**end** **Example:** `Router(config)# end`	Exits to privileged EXEC mode.

Verify RSVP Refresh Reduction and Reliable Messaging

Perform these tasks to verify that the RSVP Refresh Reduction and Reliable Messaging feature is functioning.

SUMMARY STEPS

1. **enable**
2. **clear ip rsvp counters** [**confirm**]
3. **show ip rsvp**
4. **show ip rsvp counters** [**interface** *interface_unit* | **summary** | **neighbor**]
5. **show ip rsvp interface** [*interface-type interface-number*] [**detail**]
6. **show ip rsvp neighbor** [**detail**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. Enter your password if prompted.
Step 2	**clear ip rsvp counters [confirm]** **Example:** `Router# clear ip rsvp counters`	(Optional) Clears (sets to zero) all IP RSVP counters that are being maintained by the router.
Step 3	**show ip rsvp** **Example:** `Router# show ip rsvp`	(Optional) Displays RSVP rate-limiting, refresh-reduction, and neighbor information.
Step 4	**show ip rsvp counters** [**interface** *interface_unit* | **summary** | **neighbor**] **Example:** `Router# show ip rsvp counters summary`	(Optional) Displays the number of RSVP messages that were sent and received on each interface. • The optional **summary** keyword displays the cumulative number of RSVP messages sent and received by the router over all interfaces.
Step 5	**show ip rsvp interface** [*interface-type interface-number*] [**detail**] **Example:** `Router# show ip rsvp interface detail`	(Optional) Displays information about interfaces on which RSVP is enabled including the current allocation budget and maximum available bandwidth. • The optional **detail** keyword displays the bandwidth and signalling parameters.
Step 6	**show ip rsvp neighbor** [**detail**] **Example:** `Router# show ip rsvp neighbor detail`	(Optional) Displays RSVP-neighbor information including IP addresses. • The optional **detail** keyword displays the current RSVP neighbors and identifies if the neighbor is using IP, User Datagram Protocol (UDP), or RSVP encapsulation for a specified interface or all interfaces.

Configuration Examples for RSVP Refresh Reduction and Reliable Messaging

This section provides the following configuration example:

RSVP Refresh Reduction and Reliable Messaging Example

In the following example, RSVP refresh reduction is enabled:

```
Router# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# interface Ethernet1

Router(config-if)# ip rsvp bandwidth 7500 7500

Router(config-if)# exit

Router(config)# ip rsvp signalling refresh reduction

Router(config)# end
```

The following example verifies that RSVP refresh reduction is enabled:

```
Router# show running-config

Building configuration...
Current configuration : 1503 bytes

!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
service internal
!
hostname router
!
no logging buffered
logging rate-limit console 10 except errors
!
ip subnet-zero
ip cef
!
ip multicast-routing
no ip dhcp-client network-discovery
lcp max-session-starts 0
mpls traffic-eng tunnels
!
!
interface Loopback0
 ip address 192.168.1.1 255.255.255.0
 ip rsvp bandwidth 1705033 1705033
!
interface Tunnel777
```

```
 no ip address
 shutdown
!
interface Ethernet0
 ip address 192.168.0.195 255.0.0.0
 no ip mroute-cache
 media-type 10BaseT
!
interface Ethernet1
 ip address 192.168.5.2 255.255.255.0
 no ip redirects
 no ip proxy-arp
 ip pim dense-mode
 no ip mroute-cache
 media-type 10BaseT
 ip rsvp bandwidth 7500 7500
!
interface Ethernet2
 ip address 192.168.1.2 255.255.255.0
 no ip redirects
 no ip proxy-arp
 ip pim dense-mode
 no ip mroute-cache
 media-type 10BaseT
 mpls traffic-eng tunnels
 ip rsvp bandwidth 7500 7500
!
interface Ethernet3
 ip address 192.168.2.2 255.255.255.0
 ip pim dense-mode
 media-type 10BaseT
 mpls traffic-eng tunnels
!
!
router eigrp 17
 network 192.168.0.0
 network 192.168.5.0
 network 192.168.12.0
 network 192.168.30.0
 auto-summary
 no eigrp log-neighbor-changes
!
ip classless
no ip http server
ip rsvp signalling refresh reduction
!
!
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 login
 transport input pad v120 telnet rlogin udptn
!
end
```

Additional References

The following sections provide additional references related to the RSVP Refresh Reduction and Reliable Messaging feature:

Related Documents

Related Topic	Document Title
RSVP commands: complete command syntax, command mode, defaults, usage guidelines, and examples	*Cisco IOS Quality of Service Solutions Command Reference, Release 12.2*
QoS features including signalling, classification, and congestion management	*Cisco IOS Quality of Service Solutions Configuration Guide, Release 12.2*

Standards

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

MIBs

MIBs[1]	MIBs Link
• RFC 2206, *RSVP Management Information Base using SMIv2* • RFC 2702, *Requirements for Traffic Engineering over MPLS*	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

1. Not all supported MIBs are listed.

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

http://www.cisco.com/register

RFCs

RFCs[1]	Title
RFC 2205	*Resource Reservation Protocol*
RFC 2209	*RSVP—Version 1 Message Processing Rules*
RFC 2210	*The Use of RSVP with IETF Integrated Services*
RFC 2211/2212	*Specification of the Controlled-Load Network Element Service*
RFC 2749	*Common Open Policy Service (COPS) Usage for RSVP*
RFC 2750	*RSVP Extensions for Policy Control*
RFC 2814	*SBM Subnet Bandwidth Manager: A Protocol for RSVP-based Admission Control over IEEE 802-style networks*
RFC 2961	*RSVP Refresh Overhead Reduction Extensions*
RFC 2996	*Format of the RSVP DCLASS Object*

1. Not all supported RFCs are listed.

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and lots more. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

New Commands

- **clear ip rsvp signalling refresh reduction**
- **debug ip rsvp dump-messages**
- **debug ip rsvp rate-limit**
- **debug ip rsvp reliable-msg**
- **debug ip rsvp summary-refresh**
- **ip rsvp listener**
- **ip rsvp signalling initial-retransmit-delay**
- **ip rsvp signalling patherr state-removal**
- **ip rsvp signalling refresh reduction**
- **ip rsvp signalling refresh reduction ack-delay**
- **show ip rsvp listeners**
- **show ip rsvp signalling**
- **show ip rsvp signalling blockade**
- **show ip rsvp signalling rate-limit**
- **show ip rsvp signalling refresh reduction**

Modified Commands

- **clear ip rsvp counters**
- **clear ip rsvp msg-pacing**
- **clear ip rsvp signalling rate-limit**
- **debug ip rsvp**
- **ip rsvp msg-pacing**
- **ip rsvp signalling rate-limit**
- **show ip rsvp**
- **show ip rsvp counters**
- **show ip rsvp interface**
- **show ip rsvp neighbor**

Obsolete and Replaced Commands

Table 1 lists those commands that have been replaced in Cisco IOS Release 12.2(13)T:

Table 1 Replaced IOS Commands

Command in Cisco IOS Release 12.0(14)ST	Replacement Command in Cisco IOS Release 12.2(13)T
clear ip rsvp msg-pacing	clear ip rsvp signalling rate-limit
ip rsvp msg-pacing	ip rsvp signalling rate-limit

clear ip rsvp counters

To clear (set to zero) all IP Resource Reservation Protocol (RSVP) counters that are being maintained by the router, use the **clear ip rsvp counters** command in EXEC mode.

clear ip rsvp counters [**confirm**]

Syntax Description

confirm	(Optional) Requests a confirmation that all IP RSVP counters were cleared.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.0(14)ST	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

Use the **clear ip rsvp counters** command to reset all IP RSVP counters to zero so that you can see changes easily.

Examples

The following command shows that all IP RSVP counters that are being maintained are cleared:

```
Router# clear ip rsvp counters

Clear rsvp counters [confirm]
```

Note The following sample outputs show how you can use the **show ip rsvp counters** and the **clear ip rsvp counters** commands together.

The following command shows the non-zero counters for the interfaces that have RSVP enabled:

```
Router# show ip rsvp counters

POS0/0                  Recv      Xmit                       Recv      Xmit
    Path                   0       300    Resv                 371         0
    PathError              0         0    ResvError              0         0
    PathTear               0       150    ResvTear               0         0
    ResvConf               0         0    RTearConf              0         0
    Ack                   20        28    Srefresh              10        10
    DSBM_WILLING           0         0    I_AM_DSBM              0         0
    Unknown                0         0    Errors                 0         0
POS1/0                  Recv      Xmit                       Recv      Xmit
    Path                 300         0    Resv                   0       300
    PathError              0         0    ResvError              0         0
    PathTear             150         0    ResvTear               0         0
    ResvConf               0         0    RTearConf              0         0
```

```
    Ack                   19         20    Srefresh              10         10
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
POS1/1                  Recv       Xmit                        Recv       Xmit
    Path                   0          0    Resv                   0          0
    PathError              0          0    ResvError              0          0
    PathTear               0          0    ResvTear               0          0
    ResvConf               0          0    RTearConf              0          0
    Ack                    0          0    Srefresh               0          0
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
POS1/2                  Recv       Xmit                        Recv       Xmit
    Path                   0          0    Resv                   0          0
    PathError              0          0    ResvError              0          0
    PathTear               0          0    ResvTear               0          0
    ResvConf               0          0    RTearConf              0          0
    Ack                    0          0    Srefresh               0          0
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
POS1/3                  Recv       Xmit                        Recv       Xmit
    Path                   0          0    Resv                   0          0
    PathError              0          0    ResvError              0          0
    PathTear               0          0    ResvTear               0          0
    ResvConf               0          0    RTearConf              0          0
    Ack                    0          0    Srefresh               0          0
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
Loopback0               Recv       Xmit                        Recv       Xmit
    Path                   0          0    Resv                   0          0
    PathError              0          0    ResvError              0          0
    PathTear               0          0    ResvTear               0          0
    ResvConf               0          0    RTearConf              0          0
    Ack                    0          0    Srefresh               0          0
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
Non RSVP i/f's          Recv       Xmit                        Recv       Xmit
    Path                   0          0    Resv                   0          0
    PathError              0          0    ResvError              0          0
    PathTear               0          0    ResvTear               0          0
    ResvConf               0          0    RTearConf              0          0
    Ack                    0          0    Srefresh               0          0
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
All Interfaces          Recv       Xmit                        Recv       Xmit
    Path                 300        300    Resv                 371        300
    PathError              0          0    ResvError              0          0
    PathTear             150        150    ResvTear               0          0
    ResvConf               0          0    RTearConf              0          0
    Ack                   39         48    Srefresh              20         20
    DSBM_WILLING           0          0    I_AM_DSBM              0          0
    Unknown                0          0    Errors                 0          0
```

Table 2 describes the fields shown in the display.

Table 2 show ip rsvp counters Command Field Descriptions

Field	Description
POS0/0, POS0/1...All Interfaces	Interface name; types of RSVP messages on a specified interface or all interfaces.
Recv	Number of messages received on the specified interface or on all interfaces.
Xmit	Number of messages transmitted from the specified interface or from all interfaces.

The following command shows that the counters have been cleared:

```
Router# clear ip rsvp counters

Clear rsvp counters [confirm]
```

The following sample output shows a system message that verifies the counters are cleared.

Note The system message lets you see if someone else cleared the counters while you were logged in.

```
00:06:33:%RSVP-5-CLEAR_COUNTERS:Clear rsvp message counters by console
```

The following command shows that all counters are now set to zero:

```
Router# show ip rsvp counters

POS0/0                 Recv      Xmit                       Recv      Xmit
    Path                  0         0    Resv                  0         0
    PathError             0         0    ResvError             0         0
    PathTear              0         0    ResvTear              0         0
    ResvConf              0         0    RTearConf             0         0
    Ack                   0         0    Srefresh              0         0
    DSBM_WILLING          0         0    I_AM_DSBM             0         0
    Unknown               0         0    Errors                0         0
POS1/0                 Recv      Xmit                       Recv      Xmit
    Path                  0         0    Resv                  0         0
    PathError             0         0    ResvError             0         0
    PathTear              0         0    ResvTear              0         0
    ResvConf              0         0    RTearConf             0         0
    Ack                   0         0    Srefresh              0         0
    DSBM_WILLING          0         0    I_AM_DSBM             0         0
    Unknown               0         0    Errors                0         0
POS1/1                 Recv      Xmit                       Recv      Xmit
    Path                  0         0    Resv                  0         0
    PathError             0         0    ResvError             0         0
    PathTear              0         0    ResvTear              0         0
    ResvConf              0         0    RTearConf             0         0
    Ack                   0         0    Srefresh              0         0
    DSBM_WILLING          0         0    I_AM_DSBM             0         0
    Unknown               0         0    Errors                0         0
POS1/2                 Recv      Xmit                       Recv      Xmit
    Path                  0         0    Resv                  0         0
    PathError             0         0    ResvError             0         0
    PathTear              0         0    ResvTear              0         0
    ResvConf              0         0    RTearConf             0         0
    Ack                   0         0    Srefresh              0         0
```

```
    DSBM_WILLING            0         0    I_AM_DSBM               0         0
    Unknown                 0         0    Errors                  0         0
POS1/3                  Recv      Xmit                        Recv      Xmit
    Path                    0         0    Resv                    0         0
    PathError               0         0    ResvError               0         0
    PathTear                0         0    ResvTear                0         0
    ResvConf                0         0    RTearConf               0         0
    Ack                     0         0    Srefresh                0         0
    DSBM_WILLING            0         0    I_AM_DSBM               0         0
    Unknown                 0         0    Errors                  0         0
Loopback0               Recv      Xmit                        Recv      Xmit
    Path                    0         0    Resv                    0         0
    PathError               0         0    ResvError               0         0
    PathTear                0         0    ResvTear                0         0
    ResvConf                0         0    RTearConf               0         0
    Ack                     0         0    Srefresh                0         0
    DSBM_WILLING            0         0    I_AM_DSBM               0         0
    Unknown                 0         0    Errors                  0         0
Non RSVP i/f's          Recv      Xmit                        Recv      Xmit
    Path                    0         0    Resv                    0         0
    PathError               0         0    ResvError               0         0
    PathTear                0         0    ResvTear                0         0
    ResvConf                0         0    RTearConf               0         0
    Ack                     0         0    Srefresh                0         0
    DSBM_WILLING            0         0    I_AM_DSBM               0         0
    Unknown                 0         0    Errors                  0         0
All Interfaces          Recv      Xmit                        Recv      Xmit
    Path                    0         0    Resv                    0         0
    PathError               0         0    ResvError               0         0
    PathTear                0         0    ResvTear                0         0
    ResvConf                0         0    RTearConf               0         0
    Ack                     0         0    Srefresh                0         0
    DSBM_WILLING            0         0    I_AM_DSBM               0         0
    Unknown                 0         0    Errors                  0         0
```

Table 3 describes the fields shown in the display.

Table 3 show ip rsvp counters Command Field Descriptions

Field	Description
POS0/0, POS0/1...All Interfaces	Interface name; type of RSVP messages on a specified interface or all interfaces.
Recv	Number of messages received on the specified interface or on all interfaces.
Xmit	Number of messages transmitted from the specified interface or from all interfaces.

Related Commands

Command	Description
show ip rsvp counters	Displays the number of RSVP messages that were sent and received.

clear ip rsvp msg-pacing

The **clear ip rsvp msg-pacing** command is replaced by the **clear ip rsvp signalling rate-limit** command. See the clear **clear ip rsvp signalling rate-limit** command for more information.

clear ip rsvp signalling rate-limit

To clear (set to zero) the number of Resource Reservation Protocol (RSVP) messages that were dropped because of a full queue, use the **clear ip rsvp signalling rate-limit** command in EXEC mode.

clear ip rsvp signalling rate-limit

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was changed from **clear ip rsvp msg-pacing** to **clear ip rsvp signalling rate-limit**.

Usage Guidelines

Use the **clear ip rsvp signalling rate-limit** command to clear the counters recording dropped messages.

This command replaces the **clear ip rsvp msg-pacing** command.

Examples

The following command shows how all dropped messages are cleared:

```
Router# clear ip rsvp signalling rate-limit
```

Related Commands

Command	Description
debug ip rsvp rate-limit	Displays debug messages for RSVP rate-limiting events.
ip rsvp signalling rate-limit	Controls the transmission rate for RSVP messages sent to a neighboring router during a specified amount of time.
show ip rsvp signalling rate-limit	Displays rate-limiting parameters for RSVP messages.

clear ip rsvp signalling refresh reduction

To clear (set to zero) the counters associated with the number of retransmissions and the number of out-of-order Resource Reservation Protocol (RSVP) messages, use the **clear ip rsvp signalling refresh reduction** command in EXEC mode.

clear ip rsvp signalling refresh reduction

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **clear ip rsvp signalling refresh reduction** command to clear the counters recording retransmissions and out-of-order RSVP messages.

Examples

The following command shows how all the retransmissions and out-of-order messages are cleared:

```
Router# clear ip rsvp signalling refresh reduction
```

Related Commands

Command	Description
ip rsvp signalling refresh reduction	Enables refresh reduction.
show ip rsvp signalling refresh reduction	Displays refresh-reduction parameters for RSVP messages.

debug ip rsvp

Caution Use this command with a small number of tunnels or RSVP reservations. Too much data can overload the console.

To display debug messages for Resource Reservation Protocol (RSVP) categories, use the **debug ip rsvp** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip rsvp [**all** | **database** | **dump-messages** | **fast-reroute** | **filter** | **handles** | **messages** | **msg-mgr** | **path** | **policy** | **proxy** | **rate-limit** | **reliable-msg** | **resv** | **routing** | **sbm** | **signalling** | **snmp** | **summary-refresh** | **svc** | **timer** | **tos** | **traffic-control** | **wfq**]

no debug ip rsvp

Syntax Description

all	(Optional) RSVP messages for all categories.
database	(Optional) RSVP database debugging.
dump-messages	(Optional) dump RSVP message contents.
fast-reroute	(Optional) RSVP fast-reroute support for label-switched paths (LSPs).
filter	(Optional) RSVP debug message filter.
handles	(Optional) RSVP database handles event.
messages	(Optional) Brief information about all RSVP messages that are sent and received via IP debugging.
msg-mgr	(Optional) RSVP message-manager events.
path	(Optional) RSVP path messages.
policy	(Optional) RSVP policy information.
proxy	(Optional) RSVP proxy application programming interface (API) trace.
rate-limit	(Optional) RSVP rate-limiting events.
reliable-msg	(Optional) RSVP reliable messages events.
resv	(Optional) RSVP reservation (Resv) messages.
sbm	(Optional) RSVP subnet bandwidth manager (SBM) messages.
signalling	(Optional) RSVP signalling (Path and Resv) messages.
snmp	(Optional) RSVP Simple Network Management Protocol (SNMP) events.
summary-refresh	(Optional) RSVP summary refresh and bundle messages events.
svc	(Optional) RSVP switched virtual circuit (SVC) events.
timer	(Optional) RSVP timer events.
tos	(Optional) RSVP type of service (TOS) events.
traffic-control	(Optional) RSVP traffic control events.
wfq	(Optional) RSVP weighted fair queueing (WFQ) events.

Defaults

This command is disabled by default.

Command Modes Privileged EXEC

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(13)T	The **dump-messages, msg-mgr, proxy**, **rate-limit**, **reliable-msg**, and **summary-refresh** keywords were added.

Examples The following commands show how to enable debugging for RSVP categories, signalling and messages:

```
Router# debug ip rsvp signalling

RSVP signalling messages (Summary) debugging is on

Router# debug ip rsvp messages

RSVP messages (sent/received via IP) debugging is on
```

In the following output, RSVP signalling-related events that include sending and receiving Path and Resv messages, admitting new reservations, establishing sessions, sending and receiving acknowledgments (ACKS), and sending and receiving summary refresh messages appear:

```
01:14:56:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:Received Path message from
140.20.1.1 (on sender host)
01:14:56:RSVP:new path message passed parsing, continue...
01:14:56:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:Refresh Path psb = 61646BB0
refresh interval = 0mSec
01:14:56:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:Sending Path message to 140.4.4.2
01:14:56:RSVP session 140.75.1.1_100[140.20.1.1]:Path sent by IP to 140.4.4.2 length=216
checksum=B1E4 TOS=0xC0 prerouted=YES
router_alert=YES udp=NO (Ethernet1)
01:14:56:RSVP:Resv received from IP layer  (IP HDR 140.4.4.2->140.4.4.1)
01:14:56:RSVP session 140.75.1.1_100[140.20.1.1]:Received RESV for 140.75.1.1 (Ethernet1)
from 140.4.4.2
01:14:56:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:reservation not found--new one
01:14:56:RSVP-RESV:Admitting new reservation:6165D0E4
01:14:56:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:RSVP bandwidth is available
01:14:56:RSVP-RESV:reservation was installed:6165D0E4
01:14:57:RSVP:Sending Unknown message to 140.4.4.2
01:14:57:RSVP:Ack sent by IP to 140.4.4.2 length=20 checksum=34A7 TOS=0x00 prerouted=NO
router_alert=NO udp=NO (Ethernet1)
01:14:57:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:Refresh Path psb = 61646BB0
refresh interval = 937mSec
01:14:58:%LINK-3-UPDOWN:Interface Tunnel100, changed state to up
01:14:59:%LINEPROTO-5-UPDOWN:Line protocol on Interface Tunnel100, changed state to up
01:15:26:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:Refresh Path psb = 61646BB0
refresh interval = 30000mSec
01:15:26:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:Sending Path message to 140.4.4.2
01:15:26:RSVP session 140.75.1.1_100[140.20.1.1]:Path sent by IP to 140.4.4.2 length=216
checksum=B1E4 TOS=0xC0 prerouted=YES
router_alert=YES udp=NO (Ethernet1)
01:15:26:RSVP:Resv received from IP layer  (IP HDR 140.4.4.2->140.4.4.1)
01:15:26:RSVP session 140.75.1.1_100[140.20.1.1]:Received RESV for 140.75.1.1 (Ethernet1)
from 140.4.4.2
01:15:26:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:reservation found--processing
possible change:6165D0E4
01:15:26:RSVP 140.20.1.1_19->140.75.1.1_100[140.20.1.1]:No change in reservation
```

```
01:15:27:RSVP:Sending Ack message to 140.4.4.2
01:15:27:RSVP:Ack sent by IP to 140.4.4.2 length=20 checksum=34A7 TOS=0x00 prerouted=NO
router_alert=NO udp=NO (Ethernet1)
01:15:56:RSVP:Sending Srefresh message to 140.4.4.2
01:15:56:RSVP:Srefresh sent by IP to 140.4.4.2 length=32 checksum=CA0D TOS=0x00
prerouted=NO router_alert=NO udp=NO (Ethernet1)
01:15:56:RSVP:Ack received from IP layer  (IP HDR 140.4.4.2->140.4.4.1)
01:15:56:RSVP:Srefresh received from IP layer  (IP HDR 140.4.4.2->140.4.4.1)
01:15:56:RSVP-RESV:Resv state is being refreshed for 0x91
01:15:56:RSVP:Sending Ack message to 140.4.4.2
01:15:56:RSVP:Ack sent by IP to 140.4.4.2 length=20 checksum=34A5 TOS=0x00 prerouted=NO
router_alert=NO udp=NO (Ethernet1)
01:16:26:RSVP:Sending Srefresh message to 140.4.4.2
01:16:26:RSVP:Srefresh sent by IP to 140.4.4.2 length=32 checksum=CA0C TOS=0x00
prerouted=NO router_alert=NO udp=NO (Ethernet1)
01:16:26:RSVP:Ack received from IP layer  (IP HDR 140.4.4.2->140.4.4.1)
01:16:26:RSVP:Srefresh received from IP layer  (IP HDR 140.4.4.2->140.4.4.1)
01:16:26:RSVP-RESV:Resv state is being refreshed for 0x91
01:16:26:RSVP:Sending Ack message to 140.4.4.2
01:16:26:RSVP:Ack sent by IP to 140.4.4.2 length=20 checksum=34A3 TOS=0x00 prerouted=NO
router_alert=NO udp=NO (Ethernet1)
```

Related Commands

Command	Description
ip rsvp signalling refresh reduction	Enables refresh reduction.
show debug	Displays active debug output.

debug ip rsvp dump-messages

Caution Use this command with a small number of tunnels or RSVP reservations. Too much data can overload the console.

To display debug messages for all Resource Reservation Protocol (RSVP) events, use the **debug ip rsvp dump-messages** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip rsvp dump-messages [**hex** | **path** | **resv** | **sbm** | **signalling**]

no debug ip rsvp

Syntax Description

hex	(Optional) Hex dump of packet contents.
path	(Optional) Contents of Path messages.
resv	(Optional) Contents of Resv messages.
sbm	(Optional) Contents of SBM messages.
signalling	(Optional) Contents of all signalling (Path and Resv) messages.

Defaults

This command has no default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Examples

The following command shows how to enable debugging for RSVP events:

```
Router# debug ip rsvp dump-messages

RSVP message dump debugging is on
```

In the following output, notice that a Path message is transmitted and an ACK_DESIRED flag is set for ID: 0x26 Epoch: 0x76798A. In response, a Resv message is sent and an ACK is issued for ID: 0x26 Epoch: 0x76798A indicating the RSVP state is established on the neighboring router:

```
00:37:15:RSVP:version:1 flags:0000 type:PROXY_PATH cksum:0000 ttl:255 reserved:0
length:212
00:37:15: SESSION              type 7 length 16:
00:37:15:      Destination 140.75.1.1, TunnelId 100, Source 140.20.1.1, Protocol 0, Flags
0000
00:37:15: HOP                  type 1 length 12:
00:37:15:      Neighbor 140.20.1.1, LIH 0x00000000
```

```
00:37:15: TIME_VALUES          type 1 length 8 :
00:37:15:      Refresh period is 30000 msecs
00:37:15: SENDER_TEMPLATE      type 7 length 12:
00:37:15:      Source 140.20.1.1, tunnel_id 9
00:37:15: SENDER_TSPEC         type 2 length 36:
00:37:15:      version=0, length in words=7
00:37:15:      Token bucket fragment (service_id=1, length=6 words
00:37:15:          parameter id=127, flags=0, parameter length=5
00:37:15:          average rate=1250 bytes/sec, burst depth=1000 bytes
00:37:15:          peak rate   =1250 bytes/sec
00:37:15:          min unit=0 bytes, max pkt size=4294967295 bytes
00:37:15: ADSPEC               type 2 length 48:
00:37:15: version=0  length in words=10
00:37:15: General Parameters  break bit=0  service length=8
00:37:15:                                           IS Hops:0
00:37:15:                 Minimum Path Bandwidth (bytes/sec):2147483647
00:37:15:                        Path Latency (microseconds):0
00:37:15:                                          Path MTU:-1
00:37:15: Controlled Load Service  break bit=0  service length=0
00:37:15: LABEL_REQUEST        type 1 length 8 :
00:37:15:      Layer 3 protocol ID:2048
00:37:15: EXPLICIT_ROUTE       type 1 length 36:
00:37:15:      (#1) Strict IPv4 Prefix, 8 bytes, 140.20.1.1/32
00:37:15:      (#2) Strict IPv4 Prefix, 8 bytes, 140.4.4.2/32
00:37:15:      (#3) Strict IPv4 Prefix, 8 bytes, 140.70.1.1/32
00:37:15:      (#4) Strict IPv4 Prefix, 8 bytes, 140.70.1.2/32
00:37:15: SESSION_ATTRIBUTE    type 7 length 28:
00:37:15:        Session name:tagsw4500-21_t100
00:37:15:        Setup priority:7, reservation priority:7
00:37:15:        Status:May-Reroute
00:37:15:
00:37:15:RSVP:version:1 flags:0001 type:Path cksum:D61E ttl:255 reserved:0 length:216
00:37:15: MESSAGE_ID           type 1 length 12:
00:37:15:      ID:0x26 Epoch:0x76798A
00:37:15:      Flags:ACK_DESIRED
00:37:15: SESSION              type 7 length 16:
00:37:15:      Destination 140.75.1.1, TunnelId 100, Source 140.20.1.1, Protocol 0, Flags
0000
00:37:15: HOP                  type 1 length 12:
00:37:15:      Neighbor 140.4.4.1, LIH 0x10000401
00:37:15: TIME_VALUES          type 1 length 8 :
00:37:15:      Refresh period is 30000 msecs
00:37:15: EXPLICIT_ROUTE       type 1 length 28:
00:37:15:      (#1) Strict IPv4 Prefix, 8 bytes, 140.4.4.2/32
00:37:15:      (#2) Strict IPv4 Prefix, 8 bytes, 140.70.1.1/32
00:37:15:      (#3) Strict IPv4 Prefix, 8 bytes, 140.70.1.2/32
00:37:15: LABEL_REQUEST        type 1 length 8 :
00:37:15:      Layer 3 protocol ID:2048
00:37:15: SESSION_ATTRIBUTE    type 7 length 28:
00:37:15:        Session name:tagsw4500-21_t100
00:37:15:        Setup priority:7, reservation priority:7
00:37:15:        Status:May-Reroute
00:37:15: SENDER_TEMPLATE      type 7 length 12:
00:37:15:      Source 140.20.1.1, tunnel_id 9
00:37:15: SENDER_TSPEC         type 2 length 36:
00:37:15:      version=0, length in words=7
00:37:15:      Token bucket fragment (service_id=1, length=6 words
00:37:15:          parameter id=127, flags=0, parameter length=5
00:37:15:          average rate=1250 bytes/sec, burst depth=1000 bytes
00:37:15:          peak rate   =1250 bytes/sec
00:37:15:          min unit=0 bytes, max pkt size=4294967295 bytes
00:37:15: ADSPEC               type 2 length 48:
00:37:15: version=0  length in words=10
00:37:15: General Parameters  break bit=0  service length=8
```

```
00:37:15:                                                IS Hops:1
00:37:15:                  Minimum Path Bandwidth (bytes/sec):1250000
00:37:15:                         Path Latency (microseconds):0
00:37:15:                                               Path MTU:1500
00:37:15: Controlled Load Service  break bit=0  service length=0
00:37:15:
00:37:15:RSVP:version:1 flags:0001 type:Resv cksum:DADF ttl:255 reserved:0 length:132
00:37:15: MESSAGE_ID_ACK       type 1 length 12:
00:37:15:      Type:ACK
00:37:15:      ID:0x26 Epoch:0x76798A
00:37:15:      Flags:None
00:37:15: MESSAGE_ID           type 1 length 12:
00:37:15:      ID:0x43 Epoch:0xE1A1B7
00:37:15:      Flags:ACK_DESIRED
00:37:15: SESSION              type 7 length 16:
00:37:15:      Destination 140.75.1.1, TunnelId 100, Source 140.20.1.1, Protocol 0, Flags
0000
00:37:15: HOP                  type 1 length 12:
00:37:15:      Neighbor 140.4.4.2, LIH 0x10000401
00:37:15: TIME_VALUES          type 1 length 8 :
00:37:15:      Refresh period is 30000 msecs
00:37:15: STYLE                type 1 length 8 :
00:37:15:      Shared-Explicit (SE)
00:37:15: FLOWSPEC             type 2 length 36:
00:37:15:      version = 0 length in words = 7
00:37:15:      service id = 5, service length = 6
00:37:15:      tspec parameter id = 127, flags = 0, length = 5
00:37:15:      average rate = 1250 bytes/sec, burst depth = 1000 bytes
00:37:15:      peak rate    = 1250 bytes/sec
00:37:15:      min unit = 0 bytes, max pkt size = 0 bytes
00:37:15: FILTER_SPEC          type 7 length 12:
00:37:15:      Source 140.20.1.1, tunnel_id 9
00:37:15: LABEL                type 1 length 8 :
00:37:15:      Labels:16
00:37:15:
00:37:15:RSVP:version:1 flags:0001 type:Ack cksum:34F5 ttl:255 reserved:0 length:20
00:37:15: MESSAGE_ID_ACK       type 1 length 12:
00:37:15:      Type:ACK
00:37:15:      ID:0x43 Epoch:0xE1A1B7
00:37:15:      Flags:None
00:37:15:
00:37:17:%LINK-3-UPDOWN:Interface Tunnel100, changed state to up
00:37:18:%LINEPROTO-5-UPDOWN:Line protocol on Interface Tunnel100, changed state to up
```

Related Commands

Command	Description
ip rsvp signalling refresh reduction	Enables refresh reduction.
show debug	Displays active debug output.

debug ip rsvp rate-limit

To display debug messages for Resource Reservation Protocol (RSVP) rate-limiting events, use the **debug ip rsvp rate-limit** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip rsvp rate-limit

no debug ip rsvp rate-limit

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Examples

The following command shows how to enable debugging for RSVP rate-limiting and message manager events:

```
Router# debug ip rsvp rate-limit

RSVP rate-limit debugging is on

Router# debug ip rsvp msg-mgr

RSVP msg-mgr debugging is on
```

In the following output, RSVP process information including messages, timers, neighbor's IP addresses, and message IDs, appear:

```
01:00:19:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_message
01:00:19:RSVP-MSG-MGR (140.4.4.2):Starting timer msg-pacing interval 20
01:00:19:RSVP-MSG-MGR (140.4.4.2):Enqueue element 27000405 of type 3 on msg-pacing TAIL
01:00:19:RSVP-RATE-LIMIT:rsvp_msg_pacing_timer - timer expired
01:00:19:RSVP-MSG-MGR (140.4.4.2):Dequeueing element 27000405 of type 3 from msg-pacing
01:00:19:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_qe:sending psb (qe 27000405)
01:00:21:%LINK-3-UPDOWN:Interface Tunnel100, changed state to up
01:00:22:%LINEPROTO-5-UPDOWN:Line protocol on Interface Tunnel100, changed state to up
01:01:03:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_message
01:01:03:RSVP-MSG-MGR (140.4.4.2):Starting timer msg-pacing interval 20
01:01:03:RSVP-MSG-MGR (140.4.4.2):Enqueue element 27000405 of type 3 on msg-pacing TAIL
01:01:03:RSVP-RATE-LIMIT:rsvp_msg_pacing_timer - timer expired
01:01:03:RSVP-MSG-MGR (140.4.4.2):Dequeueing element 27000405 of type 3 from msg-pacing
01:01:03:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_qe:sending psb (qe 27000405)
01:01:42:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_message
```

```
01:01:42:RSVP-MSG-MGR (140.4.4.2):Starting timer msg-pacing interval 20
01:01:42:RSVP-MSG-MGR (140.4.4.2):Enqueue element 27000405 of type 3 on msg-pacing TAIL
01:01:42:RSVP-RATE-LIMIT:rsvp_msg_pacing_timer - timer expired
01:01:42:RSVP-MSG-MGR (140.4.4.2):Dequeueing element 27000405 of type 3 from msg-pacing
01:01:42:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_qe:sending psb (qe 27000405)
01:02:09:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_message
01:02:09:RSVP-MSG-MGR (140.4.4.2):Starting timer msg-pacing interval 20
01:02:09:RSVP-MSG-MGR (140.4.4.2):Enqueue element 27000405 of type 3 on msg-pacing TAIL
01:02:09:RSVP-RATE-LIMIT:rsvp_msg_pacing_timer - timer expired
01:02:09:RSVP-MSG-MGR (140.4.4.2):Dequeueing element 27000405 of type 3 from msg-pacing
01:02:09:RSVP-RATE-LIMIT:rsvp_msg_pacing_send_qe:sending psb (qe 27000405)
```

Related Commands

Command	Description
ip rsvp signalling rate-limit	Controls the transmission rate for RSVP messages sent to a neighboring router during a specified interval.
show debug	Displays active debug output.

debug ip rsvp reliable-msg

To display debug messages for Resource Reservation Protocol (RSVP) reliable messages events, use the **debug ip rsvp reliable-msg** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip rsvp reliable-msg

no debug ip rsvp reliable-msg

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Examples

The following command shows how to enable debugging for RSVP reliable messages events:

```
Router# debug ip rsvp reliable-msg

RSVP reliable-msg debugging is on
```

In the following output, message IDs, acknowledgments (ACKs), and message processes including retransmissions, appear:

```
01:07:37:RSVP-RMSG:Inserted msg id(0x46, 0x48000403) on local msgid db
01:07:37:RSVP-RMSG:rsvp_rmsg_process_acks, Handle:000C1701 neighbor:140.4.4.2
01:07:37:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1432 num_objs:0 obj_len:0
nbr:140.4.4.2
01:07:39:%LINK-3-UPDOWN:Interface Tunnel100, changed state to up
01:07:40:%LINEPROTO-5-UPDOWN:Line protocol on Interface Tunnel100, changed state to up
01:08:07:RSVP-RMSG:rsvp_rmsg_process_acks, Handle:000C1701 neighbor:140.4.4.2
01:08:07:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1432 num_objs:0 obj_len:0
nbr:140.4.4.2
01:08:37:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1424 num_objs:1 obj_len:8
nbr:140.4.4.2
01:08:37:RSVP-RMSG:rsvp_rmsg_process_immediate_tmb, Handle:2D000404 neighbor:140.4.4.2
01:08:37:RSVP-RMSG:Inserted msg id(0x47, 0x2D000404) on local msgid db
01:08:37:RSVP-RMSG:current queue:immed next_queue:rxmt-1 (qe 2D000404s)
01:08:37:RSVP-RMSG:rsvp_rmsg_process_acks, Handle:000C1701 neighbor:140.4.4.2
01:08:37:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1432 num_objs:0 obj_len:0
nbr:140.4.4.2
01:08:38:RSVP-RMSG:rsvp_rmsg_process_rxmt_tmb, Handle:2D000404 neighbor:140.4.4.2
01:08:38:RSVP-RMSG:An ack was received for tmb 2D000404 on neighbor 140.4.4.2
```

```
01:09:07:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1424 num_objs:1 obj_len:8
nbr:140.4.4.2
01:09:07:RSVP-RMSG:rsvp_rmsg_process_immediate_tmb, Handle:2E000404 neighbor:140.4.4.2
01:09:07:RSVP-RMSG:Inserted msg id(0x48, 0x2E000404) on local msgid db
01:09:07:RSVP-RMSG:current queue:immed next_queue:rxmt-1 (qe 2E000404s)
01:09:07:RSVP-RMSG:rsvp_rmsg_process_acks, Handle:000C1701 neighbor:140.4.4.2
01:09:07:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1432 num_objs:0 obj_len:0
nbr:140.4.4.2
01:09:08:RSVP-RMSG:rsvp_rmsg_process_rxmt_tmb, Handle:2E000404 neighbor:140.4.4.2
01:09:08:RSVP-RMSG:An ack was received for tmb 2E000404 on neighbor 140.4.4.2
01:09:37:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1424 num_objs:1 obj_len:8
nbr:140.4.4.2
01:09:37:RSVP-RMSG:rsvp_rmsg_process_immediate_tmb, Handle:2F000404 neighbor:140.4.4.2
01:09:37:RSVP-RMSG:Inserted msg id(0x49, 0x2F000404) on local msgid db
01:09:37:RSVP-RMSG:current queue:immed next_queue:rxmt-1 (qe 2F000404s)
01:09:37:RSVP-RMSG:rsvp_rmsg_process_acks, Handle:000C1701 neighbor:140.4.4.2
01:09:37:RSVP-RMSG:max_ids:1 q_sz:1 msg_sz:1500 ids_len:1432 num_objs:0 obj_len:0
nbr:140.4.4.2
01:09:38:RSVP-RMSG:rsvp_rmsg_process_rxmt_tmb, Handle:2F000404 neighbor:140.4.4.2
01:09:38:RSVP-RMSG:An ack was received for tmb 2F000404 on neighbor 140.4.4.2
```

Related Commands

Command	Description
ip rsvp signalling refresh reduction	Enables refresh reduction.
show debug	Displays active debug output.

debug ip rsvp summary-refresh

To display debug messages for Resource Reservation Protocol (RSVP) summary-refresh messages events, use the **debug ip rsvp summary-refresh** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip rsvp summary-refresh

no debug ip rsvp summary-refresh

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Examples

The following command shows how to enable debugging for RSVP summary-refresh messages events:

```
Router# debug ip rsvp summary-refresh

RSVP summary-refresh debugging is on
```

In the following output, the IP addresses, the interfaces, the types of RSVP messages (Path and Resv), message IDs, and epoch identifiers (for routers) for which RSVP summary-refresh events occur are shown:

```
01:11:00:RSVP-SREFRESH:Incoming message from nbr 140.4.4.2 with epoch:0xE1A1B7 msgid:0x84
on Ethernet1
01:11:00:RSVP-SREFRESH 140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Created msgid 0x84 for
nbr 140.4.4.2
01:11:02:%LINK-3-UPDOWN:Interface Tunnel100, changed state to up
01:11:03:%LINEPROTO-5-UPDOWN:Line protocol on Interface Tunnel100, changed state to up
01:11:30:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Path, ID:0x4C :Start
using Srefresh to 140.4.4.2
01:11:31:RSVP-SREFRESH:Incoming message from nbr 140.4.4.2 with epoch:0xE1A1B7 msgid:0x84
on Ethernet1
01:11:31:RSVP-SREFRESH:State exists for nbr:140.4.4.2 epoch:0xE1A1B7 msgid:0x84
01:12:00:RSVP-SREFRESH:Preparing to Send Srefresh(es) to 140.4.4.2, 1 IDs Total
01:12:00:RSVP-SREFRESH:Sending 1 IDs in this Srefresh
01:12:00:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Path, ID:0x4C
01:12:01:RSVP-SREFRESH:Incoming message from nbr 140.4.4.2 with epoch:0xE1A1B7 msgid:0x86
on Ethernet1
01:12:01:RSVP-SREFRESH:Rec'd 1 IDs in Srefresh from 140.4.4.2 (on Ethernet1),
epoch:0xE1A1B7 msgid:0x86
01:12:01:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Resv, ID:0x84
```

```
01:12:30:RSVP-SREFRESH:Preparing to Send Srefresh(es) to 140.4.4.2, 1 IDs Total
01:12:30:RSVP-SREFRESH:Sending 1 IDs in this Srefresh
01:12:30:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Path, ID:0x4C
01:12:31:RSVP-SREFRESH:Incoming message from nbr 140.4.4.2 with epoch:0xE1A1B7 msgid:0x88
on Ethernet1
01:12:31:RSVP-SREFRESH:Rec'd 1 IDs in Srefresh from 140.4.4.2 (on Ethernet1),
epoch:0xE1A1B7 msgid:0x88
01:12:31:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Resv, ID:0x84
01:13:00:RSVP-SREFRESH:Preparing to Send Srefresh(es) to 140.4.4.2, 1 IDs Total
01:13:00:RSVP-SREFRESH:Sending 1 IDs in this Srefresh
01:13:00:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Path, ID:0x4C
01:13:01:RSVP-SREFRESH:Incoming message from nbr 140.4.4.2 with epoch:0xE1A1B7 msgid:0x8A
on Ethernet1
01:13:01:RSVP-SREFRESH:Rec'd 1 IDs in Srefresh from 140.4.4.2 (on Ethernet1),
epoch:0xE1A1B7 msgid:0x8A
01:13:01:RSVP-SREFRESH:140.20.1.1_18->140.75.1.1_100[140.20.1.1]:Resv, ID:0x84
```

Note In the preceding output, notice the message IDs that correspond to Path or Resv state being refreshed. Because the entire message does not have to be transmitted, there is less data and network performance is improved.

Related Commands

Command	Description
ip rsvp signalling refresh reduction	Enables refresh reduction.
show debug	Displays active debug output.

ip rsvp listener

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

ip rsvp listener *dst* {**UDP** | **TCP** | **any** | *number*} {**any** | *dst-port*} {**announce** | **reply** | **reject**}

no ip rsvp listener

Syntax Description

dst	IP address of the receiving interface.
UDP | **TCP** | **any** | *number*	User Datagram Protocol (UDP), Transmission Control Protocol (TCP) or any protocol to be used on the receiving interface and the UDP or TCP source port number. **Note** If you select *number*, the range is 0 to 255 and the protocol is IP.
any | *dst-port*	Any destination port or a port number from 0 to 65535 for the receiving interface.
announce | **reply** | **reject**	Receiver announces the arrival of the flow at its destination, or sender requests a reply when flow is received, or router sends a PathError (reject) message in response to an incoming Path message that matches specified listener parameters.

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **ip rsvp listener** command to find Path messages so that the router can proxy reservations.

This command is similar to the **ip rsvp reservation** and **ip rsvp reservation-host** commands. However, they do not allow you to specify more than one port or protocol per command so that you may have to enter many commands to proxy for a set of ports and protocols. In contrast, the **ip rsvp listener** command allows you to use a wildcard for a set of ports and protocols by using just that one command.

Examples

In the following example, the sender is requesting that the receiver reply with a Resv message for the flow:

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
```

```
Router(config)# ip rsvp listener 192.168.2.1 any any reply
```

Related Commands

Command	Description
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.

ip rsvp msg-pacing

The **ip rsvp msg-pacing** command is replaced by the **ip rsvp signalling rate-limit** command. See the **ip rsvp signalling rate-limit** command for more information.

ip rsvp signalling initial-retransmit-delay

To configure the minimum amount of time that a Resource Reservation Protocol (RSVP) configured router waits for an acknowledgment (ACK) message before retransmitting the same message, use the **ip rsvp signalling initial-retransmit-delay** command in global configuration mode. To reset the delay value to its default (1.0 sec), use the **no** form of this command.

ip rsvp signalling initial-retransmit-delay *delay value*

no ip rsvp signalling initial-retransmit-delay

Syntax Description

delay value	Minimum amount of time that a router waits for an acknowledgment (ACK) message before the first retransmission of the same message. The delay value ranges from 500 to 30,000 milliseconds (ms).

Defaults

The default value is 1000 ms (1.0 sec).

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **ip rsvp signalling initial-retransmit-delay** command to configure the minimum amount of time that a router waits for an acknowledgment (ACK) message before retransmitting the same message.

If an ACK is not received for a state, the first retransmit occurs after the initial retransmit interval. If no ACK is received after the first retransmit, a second retransmit occurs. The message continues to be retransmitted, with the gap between successive retransmits being twice the previous interval, until an ACK is received. Then the message drops into normal refresh schedule if it needs to be refreshed (Path and Resv messages), or is processed (Error or Tear messages). If no ACK is received after five retransmits, the message is discarded as required.

Examples

The following command shows how to set the initial-retransmit-delay to 2 seconds:

```
Router# ip rsvp signalling initial-retransmit-delay 2000
```

The following command shows how to reset the initial-retransmit-delay to the default (1.0 sec)

```
Router# no ip rsvp signalling initial-retransmit-delay
```

ip rsvp signalling patherr state-removal

To reduce the amount of Resource Reservation Protocol (RSVP) traffic messages in a network, use the **ip rsvp signalling patherr state-removal** command in global configuration mode. To disable this feature, use the **no** form of this command.

ip rsvp signalling patherr state-removal [**neighbor** *acl*]

no ip rsvp signalling patherr state-removal

Syntax Description

neighbor	(Optional) Adjacent routers that are part of a particular traffic engineering tunnel.
acl	(Optional) A simple access list with values of 1 to 99.

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **ip rsvp signalling patherr state-removal** command to allow routers to delete Path state automatically when forwarding a PathError message, thereby eliminating the need for a subsequent PathTear message.

This command is most effective when all network nodes support this feature. All nodes need to have the latest version of Cisco IOS software configured.

This command applies only to label-switched path (LSP) flows.

Examples

The following command shows how to enable **ip rsvp signalling patherr state-removal**:

```
Router(config)# ip rsvp signalling patherr state-removal
```

The following command shows how to disable **ip rsvp signalling patherr state-removal**:

```
Router(config)# no ip rsvp signalling patherr state-removal
```

The following command shows how to enable **ip rsvp signalling patherr state-removal** based on an ACL:

```
Router(config)# ip rsvp signalling patherr state-removal neighbor 98
```

The following command shows how to disable **ip rsvp signalling patherr state-removal** based on an ACL:

```
Router(config)# no ip rsvp signalling patherr state-removal neighbor 98
```

ip rsvp signalling rate-limit

To control the transmission rate for Resource Reservation Protocol (RSVP) messages sent to a neighboring router during a specified amount of time, use the **ip rsvp signalling rate-limit** command in global configuration mode. To disable this feature, use the **no** form of this command.

ip rsvp signalling rate-limit [*burst*][*maxsize*][*period*]

no ip rsvp signalling rate-limit

Syntax Description

burst	(Optional) Maximum number of RSVP messages allowed to be sent to a neighboring router during this interval. Range is 1 to 5000 messages. Default is 4 messages.
maxsize	(Optional) Maximum size of the message queue in bytes. Range is 1 to 5000 bytes. Default is 500 bytes.
period	(Optional) Length of the interval (timeframe) in milliseconds (ms). Range is 10 to 5000 ms. Default is 20 ms.

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was changed from **ip rsvp msg-pacing** to **ip rsvp signalling rate-limit**.

Usage Guidelines

Use the **ip rsvp signalling rate-limit** command to prevent a burst of RSVP traffic engineering signalling messages from overflowing the input queue of a receiving router, which would cause the router to drop some messages. Dropped messages substantially delay the completion of signalling.

This command replaces the **ip rsvp msg-pacing** command.

Examples

The following command shows how every 10 ms 6 messages with a message queue of 500 bytes are sent to any neighboring router:

```
Router(config)# ip rsvp signalling rate-limit 10 6 500
```

Related Commands

Command	Description
debug ip rsvp rate-limit	Displays debug messages for RSVP rate-limiting events.

ip rsvp signalling refresh reduction

To enable Resource Reservation Protocol (RSVP) refresh reduction, use the **ip rsvp signalling refresh reduction** command in global configuration mode. To disable refresh reduction, use the **no** form of this command.

ip rsvp signalling refresh reduction

no ip rsvp signalling refresh reduction

Syntax Description

This command has no arguments or keywords.

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

RSVP refresh reduction is a set of extensions to reduce the messaging load imposed by RSVP and to help it scale to support larger numbers of flows.

The following features of the refresh reduction standard (RFC 2961) are supported and will be turned on with this command:

- Setting the refresh-reduction-capable bit in message headers
- Message-ID usage
- Reliable messaging with rapid retransmit, ACK messages, and MESSAGE_ID objects
- Summary refresh extension
- Bundle messages (reception only)

Refresh reduction requires the cooperation of the neighbor to operate; for this purpose, the neighbor must also support the standard. If the router detects that a directly connected neighbor is not supporting the refresh reduction standard (either through observing the refresh-reduction-capable bit in messages received from the next hop, or by sending a MESSAGE_ID object to the next hop and receiving an error), refresh reduction will not be used on this link irrespective of this command.

Examples

The following command shows how to enable RSVP refresh reduction:

```
Router(config)# ip rsvp signalling refresh reduction
```

The following command shows how to disable RSVP refresh reduction:

```
Router(config)# no ip rsvp signalling refresh reduction
```

Related Commands

Command	Description
show ip rsvp interface	Displays RSVP-related interface information.
show ip rsvp signalling refresh reduction	Displays refresh-reduction parameters for RSVP messages.

ip rsvp signalling refresh reduction ack-delay

To configure the maximum amount of time that a Resource Reservation Protocol (RSVP) configured router holds on to an acknowledgment (ACK) message before sending it, use the **ip rsvp signalling refresh reduction ack-delay** command in global configuration mode. To reset the ack-delay value to its default (0.25 sec), use the **no** form of the command.

ip rsvp signalling refresh reduction ack-delay *delay-value*

no ip rsvp signalling refresh reduction ack-delay

Syntax Description

delay-value	Maximum amount of time that a router holds on to an acknowledgment (ACK) message before sending it. Values range from 100 to 10,000 milliseconds (ms).

Defaults

The default value is 250 ms (0.25 sec).

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **ip rsvp signalling refresh reduction ack-delay** command to configure the maximum amount of time that an RSVP-configured router keeps an acknowledgment (ACK) message before sending it.

Examples

The following command shows how to set the ack-delay value to 1 second:

```
Router# ip rsvp signalling refresh reduction ack-delay 1000
```

The following command shows how to set the ack-delay value to the default (0.25 sec) value:

```
Router# no ip rsvp signalling refresh reduction ack-delay
```

show ip rsvp

To display specific information for Resource Reservation Protocol (RSVP) categories, use the **show ip rsvp** command in EXEC mode.

show ip rsvp [**atm-peak-rate-limit | counters | host | installed | interface | listeners | neighbor | policy | precedence | request | reservation | sbm | sender | signalling | tos**]

Syntax Description

atm-peak-rate-limit	(Optional) RSVP peak rate limit.
counters	(Optional) RSVP statistics.
host	(Optional) RSVP endpoint senders and receivers.
installed	(Optional) RSVP installed reservations.
interface	(Optional) RSVP interface information.
listeners	(Optional) RSVP listeners.
neighbor	(Optional) RSVP neighbor information.
policy	(Optional) RSVP policy information.
precedence	(Optional) RSVP precedence settings.
request	(Optional) RSVP reservations upstream.
reservation	(Optional) RSVP reservation requests from downstream.
sender	(Optional) RSVP path state information.
sbm	(Optional) RSVP subnet bandwidth manager (SBM) information.
signalling	(Optional) RSVP signalling information.
tos	(Optional) RSVP type of service (TOS) settings.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.2(13)T	The **listeners** and **policy** keywords were added. This command was also modified to display RSVP global settings when no keywords or arguments are entered.

Examples

The following command shows RSVP rate-limiting, refresh-reduction, and neighbor information:

```
Router# show ip rsvp

Rate Limiting:enabled
  Max msgs per interval:4
  Interval length (msec):20
  Max queue size:500
```

```
  Max msgs per second:200

Refresh Reduction:enabled
  ACK delay (msec):250
  Initial retransmit delay (msec):1000
  Local epoch:0x16528C
  Message IDs:in use 580, total allocated 3018, total freed 2438

Neighbors:1
  RSVP encap:1 UDP encap:0 RSVP and UDP encap:0

Local policy:
COPS:

Generic policy settings:
    Default policy:Accept all
    Preemption:    Disabled
```

Table 4 describes the fields shown in the display.

Table 4 show ip rsvp Command Field Descriptions

Field	Description
Rate Limiting: enabled (active) or disabled (not active)	The RSVP rate-limiting parameters in effect including the following: • Max msgs per interval = number of messages allowed to be sent per interval (timeframe). • Interval length (msecs) = interval (timeframe) length in milliseconds. • Max queue size = maximum size of the message queue in bytes. • Max msgs per second = maximum number of messages allowed to be sent per second.
Refresh Reduction: enabled (active) or disabled (not active)	The RSVP refresh-reduction parameters in effect including the following: • ACK delay (msec) = how long in milliseconds before the receiving router sends an acknowledgment (ACK). • Initial retransmit delay (msec) = how long in milliseconds before the router retransmits a message. • Local epoch = the RSVP message ID number space identifier; randomly generated each time a node reboots or the RSVP process restarts. • Message IDs = the number of message IDs in use, the total number allocated, and the total number available (freed).
Neighbors	The total number of neighbors and the types of encapsulation in use including RSVP and User Datagram Protocol (UDP).
Local policy	The local policy currently configured.

Table 4 show ip rsvp Command Field Descriptions (continued)

Field	Description
COPS	The Common Open Policy Service (COPS) currently in effect.
Generic policy settings	Policy settings that are not specific to COPS or the local policy. Default policy: Accept all means all RSVP messages are accepted and forwarded. Reject all means all RSVP messages are rejected. Preemption: Disabled means RSVP is not prioritizing reservations and allocating bandwidth accordingly. Enabled means RSVP is prioritizing reservations and allocating more bandwidth to those with the highest priority.

Related Commands

Command	Description
debug ip rsvp	Displays debug messages for RSVP categories.

show ip rsvp counters

To display the number of Resource Reservation Protocol (RSVP) messages that were sent and received on each interface, use the **show ip rsvp counters** command in EXEC mode.

show ip rsvp counters [**interface** *interface_unit* | **summary** | **neighbor**]

Syntax Description

interface *interface_unit*	(Optional) Number of RSVP messages sent and received for the specified interface name.
summary	(Optional) Cumulative number of RSVP messages sent and received by the router over all interfaces.
neighbor	(Optional) Number of RSVP messages sent and received by the specified neighbor.

Defaults

If you enter the **show ip rsvp counters** command without a keyword, the command displays the number of RSVP messages that were sent and received for each interface on which RSVP is configured.

Command Modes

EXEC

Command History

Release	Modification
12.0(14)ST	This command was introduced.
12.2(13)T	The **neighbor** keyword was added, and the command was integrated into Cisco IOS Release 12.2(13)T.

Examples

The following command shows the values for the number of RSVP messages of each type that were sent and received by the router over all interfaces:

```
Router# show ip rsvp counters summary

All Interfaces          Recv      Xmit                      Recv      Xmit
    Path                23284        0    Resv                 0     23258
    PathError               0        0    ResvError            0         0
    PathTear                6        0    ResvTear             0         6
    ResvConf                0        0    RTearConf            0         0
    Ack                   186       86    Srefresh            85        93
    DSBM_WILLING            0        0    I_AM_DSBM            0         0
    Unknown                 0        0    Errors               0         0
```

Table 5 describes the fields shown in the display.

Table 5 show ip rsvp counters summary Command Field Descriptions

Field	Description
All Interfaces	Types of messages displayed for all interfaces.
Recv	Number of messages received on the specified interface or on all interfaces.
Xmit	Number of messages transmitted from the specified interface or from all interfaces.

Related Commands

Command	Description
clear ip rsvp counters	Clears (sets to zero) all IP RSVP counters that are being maintained.

show ip rsvp interface

To display Resource Reservation Protocol (RSVP)-related interface information, use the **show ip rsvp interface** command in EXEC mode.

show ip rsvp interface [*interface-type interface-number*] [**detail**]

Syntax Description

interface-type	(Optional) Type of the interface.
interface-number	(Optional) Number of the interface.
detail	(Optional) Additional information about interfaces.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(2)T	The **detail** keyword was added**.**
12.2(13)T	Rate-limiting and refresh-reduction information was added to the output. Blockade information was added to the output when the **detail** keyword is used.

Usage Guidelines

Use the **show ip rsvp interface** command to display information about interfaces on which RSVP is enabled, including the current allocation budget and maximum available bandwidth. Enter the optional **detail** keyword for additional information, including bandwidth and signalling parameters and blockade state.

Examples

The following command shows information for each interface on which RSVP is enabled:

```
Router# show ip rsvp interface

interface    allocated  i/f max  flow max sub max
PO0/0        0          200M     200M     0
PO1/0        0          50M      50M      0
PO1/1        0          50M      50M      0
PO1/2        0          50M      50M      0
PO1/3        0          50M      50M      0
Lo0          0          200M     200M     0
```

Table 6 describes the fields shown in the display.

Table 6 show ip rsvp interface Command Field Descriptions

Field	Description
interface	Interface name.
allocated	Current allocation budget.
i/f max	Maximum allocatable bandwidth.
flow max	Largest single flow allocatable on this interface.
sub max	Largest sub-pool value allowed on this interface.

The following command shows detailed RSVP information for each interface on which RSVP is enabled:

```
Router# show ip rsvp interface detail

PO0/0:
   Bandwidth:
     Curr allocated:0 bits/sec
     Max. allowed (total):200M bits/sec
     Max. allowed (per flow):200M bits/sec
     Max. allowed for LSP tunnels using sub-pools:0 bits/sec
     Set aside by policy (total):0 bits/sec
   Signalling:
     DSCP value used in RSVP msgs:0x3F
     Number of refresh intervals to enforce blockade state:4
     Number of missed refresh messages:4
     Refresh interval:30

 PO1/0:
   Bandwidth:
     Curr allocated:0 bits/sec
     Max. allowed (total):50M bits/sec
     Max. allowed (per flow):50M bits/sec
     Max. allowed for LSP tunnels using sub-pools:0 bits/sec
     Set aside by policy (total):0 bits/sec
   Signalling:
     DSCP value used in RSVP msgs:0x3F
     Number of refresh intervals to enforce blockade state:4
     Number of missed refresh messages:4
     Refresh interval:30

 PO1/1:
   Bandwidth:
     Curr allocated:0 bits/sec
     Max. allowed (total):50M bits/sec
     Max. allowed (per flow):50M bits/sec
     Max. allowed for LSP tunnels using sub-pools:0 bits/sec
     Set aside by policy (total):0 bits/sec
   Signalling:
     DSCP value used in RSVP msgs:0x3F
     Number of refresh intervals to enforce blockade state:4
     Number of missed refresh messages:4
     Refresh interval:30

 PO1/2:
   Bandwidth:
     Curr allocated:0 bits/sec
     Max. allowed (total):50M bits/sec
     Max. allowed (per flow):50M bits/sec
```

```
    Max. allowed for LSP tunnels using sub-pools:0 bits/sec
    Set aside by policy (total):0 bits/sec
  Signalling:
    DSCP value used in RSVP msgs:0x3F
    Number of refresh intervals to enforce blockade state:4
    Number of missed refresh messages:4
    Refresh interval:30

PO1/3:
  Bandwidth:
    Curr allocated:0 bits/sec
    Max. allowed (total):50M bits/sec
    Max. allowed (per flow):50M bits/sec
    Max. allowed for LSP tunnels using sub-pools:0 bits/sec
    Set aside by policy (total):0 bits/sec
  Signalling:
    DSCP value used in RSVP msgs:0x3F
    Number of refresh intervals to enforce blockade state:4
    Number of missed refresh messages:4
    Refresh interval:30

Lo0:
  Bandwidth:
    Curr allocated:0 bits/sec
    Max. allowed (total):200M bits/sec
    Max. allowed (per flow):200M bits/sec
    Max. allowed for LSP tunnels using sub-pools:0 bits/sec
    Set aside by policy (total):0 bits/sec
  Signalling:
    DSCP value used in RSVP msgs:0x3F
    Number of refresh intervals to enforce blockade state:4
    Number of missed refresh messages:4
    Refresh interval:30
```

Table 7 describes the significant fields shown in the display for interface PO0/0. The fields for the other interfaces are similar.

Table 7 show ip rsvp interface detail Command Field Descriptions

Field	Description
PO0/0	Interface name.

Table 7 show ip rsvp interface detail Command Field Descriptions (continued)

Field	Description
Bandwidth	The RSVP bandwidth parameters in effect including the following: • Curr allocated = amount of bandwidth currently allocated in bits per second. • Max. allowed (total) = maximum amount of bandwidth allowed in bits per second. • Max. allowed (per flow) = maximum amount of bandwidth allowed per flow in bits per second. • Max. allowed for LSP tunnels using sub-pools = maximum amount of bandwidth allowed for label switched path (LSP) tunnels in bits per second. • Set aside by policy (total) = the amount of bandwidth set aside by the local policy in bits per second.
Signalling	The RSVP signalling parameters in effect including the following: • DSCP value used in RSVP msgs = differentiated services code point (DSCP) used in RSVP messages. • Number of refresh intervals to enforce blockade state = how long in milliseconds before the blockade takes effect. • Number of missed refresh messages = how many refresh messages until the router state expires. • Refresh interval = how long in milliseconds until a refresh message is sent.

Related Commands

Command	Description
show ip rsvp neighbor	Displays information about RSVP neighbors.

show ip rsvp listeners

To display Resource Reservation Protocol (RSVP) listeners for a specified port or protocol, use the **show ip rsvp listeners** command in EXEC mode.

show ip rsvp listeners [*dst* | **any**] [**UDP** | **TCP** | **any** | *protocol*] [*dst-port* | **any**]

Syntax Description

dst | **any**	(Optional) A particular destination or any destination for an RSVP message.
UDP | **TCP** | **any** | *protocol*	(Optional) User Datagram Protocol (UDP), Transmission Control Protocol (TCP) or any protocol to be used on the receiving interface and the UDP or TCP source port number. **Note** If you select *protocol*, the range is 0 to 255 and the protocol is IP.
dst-port | **any**	(Optional) A particular destination port from 0 to 65535 or any destination for an RSVP message.

Defaults

If you enter **show ip rsvp listeners** command without a keyword or an argument, the command displays all the listeners that were sent and received for each interface on which RSVP is configured.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **show ip rsvp listeners** command to display the number of listeners that were sent and received for each interface on which RSVP is configured.

Examples

The following command shows the current listeners:

```
Router# show ip rsvp listeners

To              Protocol   DPort   Description              Action
145.10.2.1      any        any     RSVP Proxy               reply
```

Table 8 describes the fields shown in the display.

Table 8 show ip rsvp listeners Command Field Descriptions

Field	Description
To	IP address of the receiving interface.
Protocol	Protocol used.

Table 8 show ip rsvp listeners Command Field Descriptions (continued)

Field	Description
DPort	Destination port on the receiving router.
Description	Cisco IOS component that requested RSVP to do the listening; for example, RSVP proxy and LSP tunnel signalling.
Action	Action taken when a flow arrives at its destination. The choices include: • Announce—The arrival of the flow is announced. • Reply—After the flow arrives at its destination, the sender receives a reply.

Related Commands

Command	Description
ip rsvp listener	Configures an RSVP router to listen for Path messages.

show ip rsvp neighbor

To display current Resource Reservation Protocol (RSVP) neighbors, use the **show ip rsvp neighbor** command in EXEC mode.

show ip rsvp neighbor [**detail**]

Syntax Description

detail	(Optional) Additional information about neighbors.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(13)T	The *interface-type interface-number* arguments were deleted. The **detail** keyword was added to the command, and rate-limiting and refresh-reduction information was added to the output.

Usage Guidelines

Use the **show ip rsvp neighbor** command to show the IP addresses for the current RSVP neighbors. Enter the **detail** keyword to display rate-limiting and refresh-reduction parameters for the RSVP neighbors.

Examples

The following command shows the current RSVP neighbors:

```
Router# show ip rsvp neighbor

 21.0.0.1        RSVP
 22.0.0.2        RSVP
```

Table 9 describes the fields shown in the display.

Table 9 show ip rsvp neighbor Command Field Descriptions

Field	Description
21.0.0.1	IP address of neighboring router.
RSVP	Type of encapsulation being used.

The following command shows the rate-limiting and refresh reduction parameters for the current RSVP neighbors:

```
Router# show ip rsvp neighbor detail
```

```
Neighbor:21.0.0.1
    Encapsulation:RSVP
    Rate-Limiting:
      Dropped messages:0
    Refresh Reduction:
      Remote epoch:0x1BFEA5
      Out of order messages:0
      Retransmitted messages:0
      Highest rcvd message id:1059
      Last rcvd message:00:00:04

  Neighbor:22.0.0.2
    Encapsulation:RSVP
    Rate-Limiting:
      Dropped messages:0
    Refresh Reduction:
      Remote epoch:0xB26B1
      Out of order messages:0
      Retransmitted messages:0
      Highest rcvd message id:945
      Last rcvd message:00:00:05
```

Table 10 describes the fields shown in the display.

Table 10 show ip rsvp neighbor detail Command Field Descriptions

Field	Description
Neighbor	IP address of the neighboring router.
Encapsulation	Type of encapsulation being used.
Rate-Limiting	The rate-limiting parameters in effect including: • Dropped messages = number of messages dropped by the neighbor.
Refresh Reduction	The refresh-reduction parameters in effect including: • Remote epoch = the RSVP message ID number space identifier; randomly generated whenever the node reboots or the RSVP process restarts. • Out of order messages = messages that were dropped because they are out of sequential order. • Retransmitted messages = number of messages retransmitted to the neighbor. • Highest rcvd message id = highest message ID number sent by the neighbor. • Last rcvd message= time delta in hours, minutes, and seconds when last message was received by the neighbor.

Related Commands

Command	Description
show ip rsvp interface	Displays RSVP-related interface information.

show ip rsvp signalling

To display Resource Reservation Protocol (RSVP) signalling information that optionally includes rate-limiting and refresh-reduction parameters for RSVP messages, use the **show ip rsvp signalling** command in EXEC mode.

show ip rsvp signalling [**rate-limit | refresh reduction**]

Syntax Description

rate-limit	(Optional) Rate-limiting parameters for signalling messages.
refresh reduction	(Optional) Refresh-reduction parameters and settings.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **show ip rsvp signalling** command with either the **rate-limit** or the **refresh reduction** keyword to display rate-limiting parameters or refresh-reduction parameters, respectively.

Examples

The following command shows rate-limiting parameters:

```
Router# show ip rsvp signalling rate-limit

Rate Limiting:enabled
  Max msgs per interval:4
  Interval length (msec):20
  Max queue size:500
  Max msgs per second:200
  Max msgs allowed to be sent:37
```

Table 11 describes the fields shown in the display.

Table 11 show ip rsvp signalling rate-limit Command Field Descriptions

Field	Description
Rate Limiting: enabled (active) or disabled (not active)	The RSVP rate-limiting parameters in effect including the following: • Max msgs per interval = number of messages allowed to be sent per interval (timeframe). • Interval length (msecs) = interval (timeframe) length in milliseconds. • Max queue size = maximum size of the message queue in bytes. • Max msgs per second = maximum number of messages allowed to be sent per second.

The following command shows refresh-reduction parameters:

```
Router# show ip rsvp signalling refresh reduction

Refresh Reduction:enabled
  ACK delay (msec):250
  Initial retransmit delay (msec):1000
  Local epoch:0x74D040
  Message IDs:in use 600, total allocated 3732, total freed 3132
```

Table 12 describes the fields shown in the display.

Table 12 show ip rsvp signalling refresh reduction Command Field Descriptions

Field	Description
Refresh Reduction: enabled (active) or disabled (not active)	The RSVP refresh-reduction parameters in effect including the following: • ACK delay (msec) = how long in milliseconds before the receiving router sends an acknowledgment (ACK). • Initial retransmit delay (msec) = how long in milliseconds before the sending router retransmits a message. • Local epoch = the RSVP process identifier that defines a local router for refresh reduction and reliable messaging; randomly generated each time a node reboots or the RSVP process restarts. • Message IDs = the number of message IDs in use, the total number allocated, and the total number available (freed).

Related Commands

Command	Description
clear ip rsvp signalling rate-limit	Clears the counters recording dropped messages.
clear ip rsvp signalling refresh reduction	Clears the counters recording retransmissions and out-of-order messages.
debug ip rsvp rate-limit	Displays debug messages for RSVP rate-limiting events.
ip rsvp signalling rate-limit	Controls the transmission rate for RSVP messages sent to a neighboring router during a specified amount of time.
ip rsvp signalling refresh reduction	Enables refresh reduction.

show ip rsvp signalling blockade

To display the Resource Reservation Protocol (RSVP) sessions that are currently blockaded, use the **show ip rsvp signalling blockade** command in EXEC mode.

show ip rsvp signalling blockade [**detail**] [*name* | *address*]

Syntax Description

detail	(Optional) Additional blockade information.
name	(Optional) Name of the router being blockaded.
address	(Optional) IP address of the destination of a reservation.

Defaults

If you enter the **show ip rsvp signalling blockade** command without a keyword or an argument, the command displays all the blockaded sessions on the router.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

Use the **show ip rsvp signalling blockade** command to display the RSVP sessions that are currently blockaded.

An RSVP sender becomes blockaded when the corresponding receiver sends a Resv message that fails admission control on a router that has RSVP configured. A ResvError message with an admission control error is sent in reply to the Resv message, causing all routers downstream of the failure to mark the associated sender as blockaded. As a result, those routers do not include that contribution to subsequent Resv refreshes for that session until the blockade state times out.

Blockading solves a denial-of-service problem on shared reservations where one receiver can request so much bandwidth as to cause an admission control failure for all the receivers sharing that reservation, even though the other receivers are making requests that are within the limit.

Examples

The following example shows all the sessions currently blockaded:

```
Router# show ip rsvp signalling blockade

To              From            Pro DPort  Sport  Time Left  Rate
192.168.101.2   192.168.101.1   UDP 1000   1000   27         5K
192.168.101.2   192.168.101.1   UDP 1001   1001   79         5K
192.168.101.2   192.168.101.1   UDP 1002   1002   17         5K
225.1.1.1       192.168.104.1   UDP 2222   2222   48         5K
```

Table 13 describes the fields shown in the display.

Table 13 show ip rsvp signalling blockade Command Field Descriptions

Field	Description
To	IP address of the receiver.
From	IP address of the sender.
Pro	Protocol used.
DPort	Destination port number.
Sport	Source port number.
Time Left	Amount of time, in seconds, before the blockade expires.
Rate	The average rate, in bits per second, for the data.

The following example shows more detail about the sessions currently blockaded:

```
Router# show ip rsvp signalling blockade detail

Session address: 192.168.101.2, port: 1000. Protocol: UDP
Sender address:  192.168.101.1, port: 1000
  Admission control error location: 192.168.101.1
  Flowspec that caused blockade:
    Average bitrate:      5K bits/second
    Maximum burst:        5K bytes
    Peak bitrate:         5K bits/second
    Minimum policed unit: 0 bytes
    Maximum packet size:  0 bytes
    Requested bitrate:    5K bits/second
    Slack:                0 milliseconds
  Blockade ends in:       99 seconds

Session address: 192.168.101.2, port: 1001. Protocol: UDP
Sender address:  192.168.101.1, port: 1001
  Admission control error location: 192.168.101.1
  Flowspec that caused blockade:
    Average bitrate:      5K bits/second
    Maximum burst:        5K bytes
    Peak bitrate:         5K bits/second
    Minimum policed unit: 0 bytes
    Maximum packet size:  0 bytes
    Requested bitrate:    5K bits/second
    Slack:                0 milliseconds
  Blockade ends in:       16 seconds

Session address: 192.168.101.2, port: 1002. Protocol: UDP
Sender address:  192.168.101.1, port: 1002
  Admission control error location: 192.168.101.1
  Flowspec that caused blockade:
    Average bitrate:      5K bits/second
    Maximum burst:        5K bytes
    Peak bitrate:         5K bits/second
    Minimum policed unit: 0 bytes
    Maximum packet size:  0 bytes
    Requested bitrate:    5K bits/second
    Slack:                0 milliseconds
  Blockade ends in:       47 seconds

Session address: 225.1.1.1, port: 2222. Protocol: UDP
Sender address:  192.168.104.1, port: 2222
  Admission control error location: 192.168.101.1
  Flowspec that caused blockade:
    Average bitrate:      5K bits/second
    Maximum burst:        5K bytes
    Peak bitrate:         5K bits/second
    Minimum policed unit: 0 bytes
    Maximum packet size:  0 bytes
    Requested bitrate:    5K bits/second
    Slack:                0 milliseconds
  Blockade ends in:       124 seconds
```

Table 14 describes the fields shown in the display.

Table 14 show ip rsvp signalling blockade detail Command Field Descriptions

Field	Description
Session address	Destination IP address of the reservation affected by the blockade.
port	Destination port number of the reservation affected by the blockade.
Protocol	Protocol used by the reservation affected by the blockade; choices include User Datagram Protocol (UDP) and Transmission Control Protocol (TCP).
Sender address	Source IP address of the reservation affected by the blockade.
port	Source port number of the reservation affected by the blockade.
Admission control error location	IP address of the router where the admission control error occurred.
Flowspec that caused blockade	Parameters for the flowspec that caused the blockade.
Average bitrate	The average rate, in bits per second, for the flowspec.
Maximum burst	The maximum burst size, in bytes, for the flowspec.
Peak bitrate	The peak rate, in bps, for the flowspec.
Minimum policed unit	The minimum policed unit, in bytes, for the flowspec.
Maximum packet size	The maximum packet size, in bytes, for the flowspec.
Requested bitrate	The requested rate, in bits per second, for the flowspec.
Slack	Time, in milliseconds, allocated to a router for scheduling delivery of packets.
Blockade ends in	Time, in seconds, until the blockade expires.

show ip rsvp signalling rate-limit

To display the Resource Reservation Protocol (RSVP) rate-limiting parameters, use the **show ip rsvp signalling rate-limit** command in EXEC mode.

show ip rsvp signalling rate-limit

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Examples

The following command shows the rate-limiting parameters:

```
Router# show ip rsvp signalling rate-limit

Rate Limiting:
  Max msgs per interval: 4
  Interval length (msec): 20
  Max queue size: 500
  Max msgs per second: 200
```

Table 15 describes the fields shown in the display.

Table 15 show ip rsvp signalling rate-limit Command Field Descriptions

Field	Description
Rate Limiting	The RSVP rate-limiting parameters in effect including the following: • Max msgs per interval = number of messages allowed to be sent per interval (timeframe). • Interval length (msecs) = interval (timeframe) length in milliseconds. • Max queue size = maximum size of the message queue in bytes. • Max msgs per second = maximum number of messages allowed to be sent per second.

Related Commands

Command	Description
clear ip rsvp signalling rate-limit	Clears (sets to zero) the number of messages that were dropped because of a full queue.
debug ip rsvp rate-limit	Displays debug messages for RSVP rate-limiting events.
ip rsvp signalling rate-limit	Controls the transmission rate for RSVP messages sent to a neighboring router during a specified amount of time.

show ip rsvp signalling refresh reduction

To display the Resource Reservation Protocol (RSVP) refresh-reduction parameters, use the **show ip rsvp signalling refresh reduction** command in EXEC mode.

show ip rsvp signalling refresh reduction

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.2(13)T	This command was introduced.

Examples

The following command shows the refresh-reduction parameters:

```
Router# show ip rsvp signalling refresh reduction

Refresh Reduction:
  ACK delay (msec): 250
  Initial retransmit delay (msec): 1000
  Local epoch: 0xF2F6BC
  Message IDs: in use 1, total allocated 4, total freed 3
```

Table 16 describes the fields shown in the display.

Table 16 show ip rsvp signalling refresh reduction Command Field Descriptions

Field	Description
Refresh Reduction	The RSVP refresh-reduction parameters in effect including the following: • ACK delay (msec) = how long in milliseconds before the receiving router sends an acknowledgment (ACK). • Initial retransmit delay (msec) = how long in milliseconds before the sending router retransmits a message. • Local epoch = the RSVP message ID number space identifier; randomly generated each time a node reboots or the RSVP process restarts. • Message IDs = the number of message IDs in use, the total number allocated, and the total number available (freed).

Related Commands

Command	Description
clear ip rsvp signalling refresh reduction	Clears (sets to zero) the counters recording retransmissions and out-of-order messages.
ip rsvp signalling refresh reduction	Enables refresh reduction.

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.

latency—The delay between the time a device receives a packet and the time that packet is forwarded out the destination port.

LSP—Label-switched path. A sequence of hops in which a packet travels from one router to another router by means of label-switching mechanisms. A label-switched path can be established dynamically, based on normal routing mechanisms, or through configuration.

MPLS—Multiprotocol Label Switching (formerly known as tag switching). A method for directing packets primarily through Layer 2 switching rather than Layer 3 routing. In MPLS, packets are assigned short, fixed-length labels at the ingress to an MPLS cloud by using the concept of forwarding equivalence classes. Within the MPLS domain, the labels are used to make forwarding decisions mostly without recourse to the original packet headers.

packet—A logical grouping of information that includes a header containing control information and (usually) user data. Packets most often refer to network layer units of data.

refresh message—A message that represents a previously advertised state, contains the same objects and information as a previously transmitted message, and is sent over the same path.

Resource Reservation Protocol—See RSVP.

router—A network layer device that uses one or more metrics to determine the optimal path along which network traffic should be forwarded. Routers forward packets from one network to another based on network layer information.

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

soft state—The status that RSVP maintains in routers and end nodes so that they can be updated by certain RSVP messages. The soft state characteristic permits an RSVP network to support dynamic group membership changes and adapt to changes in routing.

sub pool—A division of bandwidth such that no one tunnel dominates.

tunnel—A secure communications path between two peers, such as routers.

Voice over IP—See VoIP.

VoIP—Voice over IP. The ability to carry normal telephony-style voice over an IP-based Internet maintaining telephone-like functionality, reliability, and voice quality.