Chapter 12

Examining RSVP Error Messages

The Resource Reservation Protocol (RSVP) uses the messages listed in Table 20 to report errors in a Multiprotocol Label Switching (MPLS) network. The RSVP tracing log file provides useful information about RSVP traffic in the network. This chapter describes the purpose of each RSVP error message that can appear in the output of the rsvp-log file configured at the [edit protocols rsvp traceoptions] hierarchy level.

For information on RSVP log messages, see "Examining RSVP Log Messages" on page 123.

Table 20: Checklist for Examining RSVP Error Messages

Examining RSVP Error Messages Tasks	Possible Action or Command
Examining the PathErr Message on page 144	monitor start *filename* monitor stop
Examining the ResvErr Message on page 147	monitor start *filename* monitor stop
Understanding RSVP Error Message Codes on page 150	

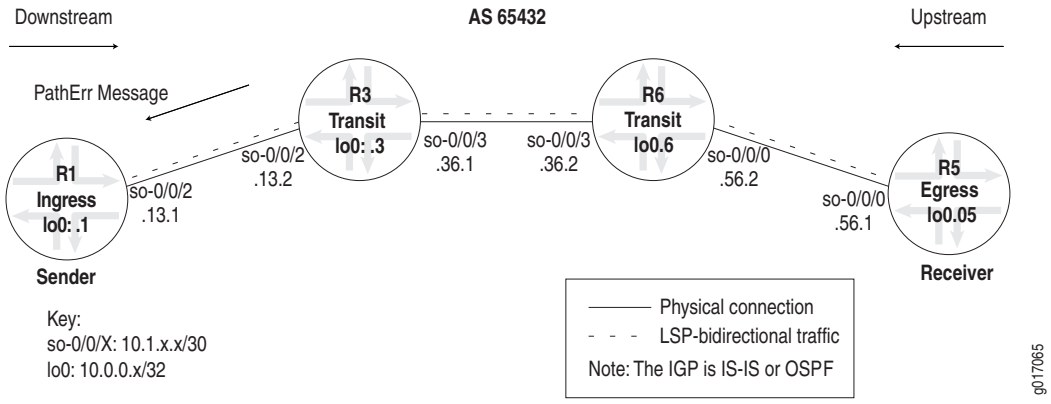
NOTE: To display tracing output, make sure that RSVP trace options are enabled. See "Working with RSVP Tracing" on page 113, for information on configuring RSVP tracing.

Examining the PathErr Message

Purpose When path errors occur (usually because of parameter problems in a Path message), the router sends a unicast PathErr message to the sender that issued the Path message. PathErr messages are advisory; these messages do not alter any path state along the way.

Figure 16 shows an RSVP PathErr message that flows upstream toward the destination address (10.1.13.1) on ingress router (R1). From the perspective of the upstream flow, the destination address is the next-hop interface (so-0/0/2 on R1). This message notifies the sending node (R1) that an error occurred during label-switched path (LSP) signaling. This RSVP PathErr message originates at R3 (even though R1 had the problem), and is destined for R1.

Figure 16: RSVP PathErr Message



The RSVP PathErr message contains the session and sender information, the error code, and the requested bandwidth information. For more information on RSVP PathErr messages, see the *JUNOS MPLS Applications Configuration Guide.*

To ensure that PathErr messages are displayed in the output, include the error flag at the [edit protocols rsvp traceoptions] hierarchy level.

Action To examine PathErr messages, enter the following JUNOS command-line interface (CLI) command:

user@R1> **monitor start** *filename*

Sample Output 1

```
[edit protocols rsvp]
user@R1# show
traceoptions {
    file rsvp-log;
    flag packets detail;
    flag error detail;
}
interface so-0/0/2.0;
interface fxp0.0 {
    disable;
}
```

Sample Output 2

```
user@R1> clear log rsvp-log

user@R1> monitor start rsvp-log

user@R1>
*** rsvp-log ***
[...Output truncated...]
Jun 30 13:52:30 RSVP recv PathErr 10.1.13.2->10.1.13.1 Len=160 so-0/0/2.0
Jun 30 13:52:30   Session7 Len 16 10.0.0.5(port/tunnel ID 26679) Proto 0
Jun 30 13:52:30   Error    Len 12 code 24 value 7 flag 0 by 10.1.36.1
Jun 30 13:52:30   Sender7  Len 12 10.0.0.1(port/lsp ID  2)
Jun 30 13:52:30   Tspec    Len 36 rate 0bps size 0bps peak Infbps m 20 M 1500
Jun 30 13:52:30   ADspec   Len 48 MTU 1500
Jun 30 13:52:30   RecRoute Len 28  10.1.36.2 10.1.36.1 10.1.13.1
```

What It Means

Sample Output 1 shows the configuration of RSVP tracing on ingress router R1. The packets and error flags are included at the [edit protocols rsvp traceoptions] hierarchy level to provide slightly different information about RSVP traffic. For more information about RSVP tracing flags, see Table 17 on page 116. The detail option is included to show granular details about the configured flags.

Sample Output 2 shows clear commands, the output for the rsvp-log file, and that monitoring was started and then stopped.

The first line of the output from the rsvp-log file indicates that this is a PathErr message. The source address of the IP packet is 10.1.13.2 (R3). The destination address of the IP packet is 10.1.13.1 (R1). The incoming interface on R1 is so-0/0/2.0.

All subsequent lines of sample output indicate object values for this PathErr message and are indented in the output. To facilitate this discussion, each line of output for each object is displayed before the corresponding explanation.

- Session7 Len 16 10.0.0.5(port/tunnel ID 26679) Proto 0

  The Session object indicates the session ID for the LSP that experienced the error condition (R1-to-R5). The session ID consists of the destination IP address (10.0.0.5) of the LSP, a protocol value (Proto 0), and a 16-bit tunnel ID (26679).

- Error Len 12 code 24 value 7 flag 0 by 10.1.36.1

  The Error object indicates the error (code 24 value 7) and the source IP address (10.1.36.1) of the interface with the error. In this case, R3 has a routing problem (24) in which the record route object (RRO), in the output of the show mpls lsp extensive command, indicates a routing loop (07). For more information on error codes, see Table 21 on page 150.

  PathErr messages report a wide variety of problems by means of different code and subcode numbers. You can find a complete list of these PathErr messages in RFC 2205, *Resource Reservation Protocol (RSVP), Version 1, Functional Specification;* and RFC 3209, *RSVP-TE: Extensions to RSVP for LSP Tunnels*.

- Sender7 Len 12 10.0.0.1(port/lsp ID 2)

  The Sender object indicates the sender of the message. The number 7 indicates the C-Type defined in RFC 3209. This object contains the source address of the LSP (10.0.0.1) and the LSP ID (2). The LSP ID can change, depending upon the signaling path.

- Tspec Len 36 rate 0bps size 0bps peak Infbps m 20 M 1500

  The Tspec object indicates the allocated bandwidth and is the same information contained in the Tspec object in the Path message. This RSVP session uses the default of 0, no bandwidth is reserved. The Tspec object includes two different types of RSVP bandwidth allocations: controlled load and guaranteed delivery.

  - Controlled load specifies a maximum transmission rate and a maximum burst size. The peak value is always set to infinity (Inf), unless guaranteed delivery is specified. RFC 3209 recommends support only for null service and controlled load bandwidth services. Guaranteed delivery is not currently recommended, so there should never be a value for Inf in the Tspec object.

  - Guaranteed delivery specifies a peak transmission rate. The JUNOS software does not support guaranteed delivery. Instead you can specify a maximum transmission rate; for example, 45 Mbps. Because it is possible to burst at the maximum rate, the size parameter indicates a maximum burst size of 45 Mbps. The lowercase m (m20) and uppercase M (M 1500) indicate the minimum and maximum sizes for the RSVP maximum transmission unit (MTU) rate. RSVP treats any packet smaller than m20 as 20 bytes, and any packet larger than M1500 as 1500 bytes.

- ADspec Len 48 MTU 1500

  The Adspec object carries a summary of available services, delay and bandwidth estimates, and operating parameters (MTU 1500) used by specific quality-of-service (QoS) control services.

- RecRoute Len 28 10.1.36.2 10.1.36.1 10.1.13.1

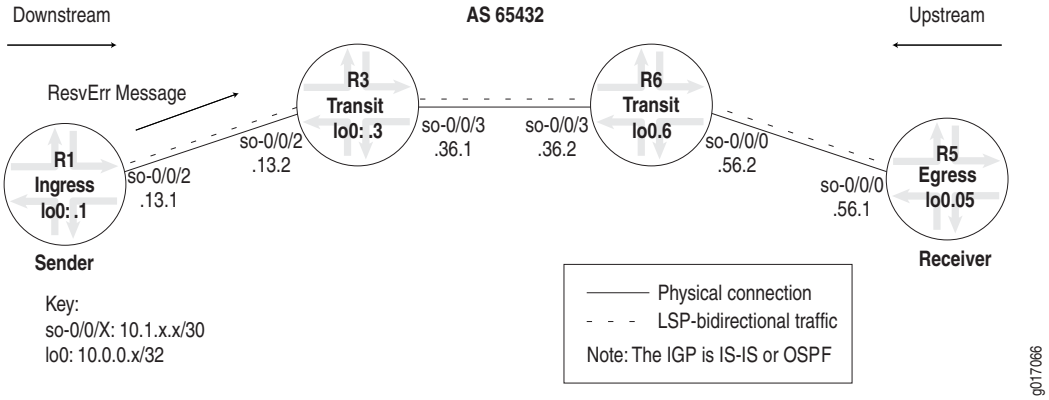
  The record route object (RecRoute) indicates the list of addresses this Path message has transited, in this case, 10.1.36.1 (R6), to 10.1.36.1 (R3), to 10.1.13.1 (R1).

Examining the ResvErr Message

Purpose When a reservation request fails, a ResvErr error message is delivered to all the receivers involved. ResvErr messages are advisory; these messages do not alter any reservation state along the way.

Figure 17 shows an RSVP ResvErr message that flows downstream to the destination address of the LSP 10.0.0.5 (R5), indicating that an error with the reservation allocation occurred while sending Resv messages back to the ingress node. The destination address of the ResvErr message is the interface from R1 to R3 (so-0/0/2.0), which the Resv message just left.

Figure 17: RSVP ResvErr Message



To ensure that ResvErr messages are displayed in the output, include the error flag at the [edit protocols rsvp traceoptions] hierarchy level.

Action To examine the ResvErr message, enter the following JUNOS CLI command:

```
user@R1> monitor start filename
```

Sample Output 1

```
[edit protocols rsvp]
user@R1# show
traceoptions {
    file rsvp-log;
    flag packets detail;
    flag error detail;
}
interface so-0/0/2.0;
interface fxp0.0 {
    disable;
}
```

Sample Output 2

```
user@R1> clear log rsvp-log

user@R1> monitor start rsvp-log
```

```
user@R1>
*** rsvp-log ***
[...Output truncated...]
Jan 15 15:44:57 RSVP send ResvErr 10.1.13.1->10.0.13.2 Len=104 so-0/0/2.0
Jan 15 15:44:57  Session7 Len 16 10.0.0.5(port/tunnel ID 13527) Proto 0
Jan 15 15:44:57  Hop Len 12 10.0.13.1/0x08554198
Jan 15 15:44:57  Error Len 12 code 4 value 0 flag 0 by 10.0.16.1
Jan 15 15:44:57  Style   Len  8 FF
Jan 15 15:44:57  Flow Len 36 rate 0bps size 0bps peak Infbps m 20 M 1500
Jan 15 15:44:57  Filter7 Len 12 10.0.0.1(port/lsp ID  2)
monitor stop
```

What It Means Sample Output 1 shows the configuration of RSVP tracing on ingress router R1. The packets and error flags are included at the [edit protocols rsvp traceoptions] hierarchy level to provide slightly different information about RSVP traffic. For more information about RSVP tracing flags, see Table 17 on page 116. The detail option is included to show granular details about the configured flags.

Sample Output 2 shows clear commands, the output for the rsvp-log file, and that monitoring was started and then stopped.

The first line of sample output from the rsvp-log file indicates that this is a ResvErr message. The source address of the IP packet is 10.1.13.1 (R1) and the destination address is 10.1.13.2 (R3). The outgoing interface on R1 is interface so-0/0/2.0. The ResvErr message is in response to a Resv message indicating an error with the reserved LSP allocation.

All subsequent lines of sample output indicate object values for this ResvErr message and are indented in the output. To facilitate this discussion, each line of output for each object is displayed before the corresponding explanation.

- Session7 Len 16 10.0.0.5(port/tunnel ID 13527) Proto 0

  The Session object indicates the session ID for the LSP (R1-to-R5) that experienced the error condition (R5). The session ID consists of the destination IP address (10.0.0.5) of the LSP, a protocol value (Proto 0), and a 16-bit tunnel ID (13527).

- Hop Len 12 10.0.13.1/0x08554198

  The Hop object indicates the last IP address (10.1.13.1) visited by this ResvErr message.

- Error Len 12 code 4 value 0 flag 0 by 10.0.16.1

  The Error object indicates the error code for the message. In this case, error code 4 value 0 flag 0 is defined by RFC 2205, *Resource ReSerVation Protocol (RSVP), Version 1, Functional Specification*. The definition specifies that there is no sender information for this Resv message. Although there is path state for this session, it does not include the sender matching some flow descriptor contained in the Resv message. Therefore, the Resv message cannot be forwarded.

- Style Len 8 FF

  The Style object indicates the reservation style. The reservation style for this ResvErr message is fixed filter (FF), indicating that the bandwidth allocation in an Resv message cannot be shared with any other session, or sender/filter combination. Each different physical path is identified by an LSP ID, listed in the Filter object. A reservation message that indicates a fixed filter style consists of distinct reservations among explicit senders. For this session, the router cannot share the bandwidth with any other RSVP LSP signaling messages that share the same session ID and have different LSP IDs.

  Other available reservation styles are shared explicit (SE) and wildcard filter (WF). For more information on reservation styles, see the *MPLS Applications Configuration Guide*.

- Flow Len 36 rate 0bps size 0bps peak Infbps m 20 M 1500

  The Flow object indicates the allocated bandwidth and is the same information contained in the Tspec object in the Path message. In the upstream direction (the direction in which the Resv message flowed), the flow object indicates the bandwidth requested and the minimum and maximum packet sizes. In this case, this RSVP session uses the default of 0, no bandwidth is reserved. The flow object includes two different types of RSVP bandwidth allocations: controlled load and guaranteed delivery.

  - Controlled load specifies a maximum transmission rate and a maximum burst size. The peak value is always set to infinity (Inf), unless guaranteed delivery is specified. RFC 3209 recommends support only for null service and controlled load bandwidth services. Guaranteed delivery is not currently recommended, so there should never be a value for Inf in the Flow object.

  - Guaranteed delivery specifies a peak transmission rate. The JUNOS software does not support guaranteed delivery. Instead you can specify a maximum transmission rate; for example, 45 Mbps. Because it is possible to burst at the maximum rate, the size parameter indicates a maximum burst size of 45 Mbps. The lowercase m (m20) and uppercase M (M 1500) indicate the minimum and maximum sizes for the RSVP MTU rate. RSVP treats any packet smaller than m20 as 20 bytes, and any packet larger than M1500 as 1500 bytes.

- Filter7 Len 12 10.0.0.1(port/lsp ID 2)

  The Filter object defines the source (ingress) of the session 10.0.0.1 (R1). The number 7 after Filter indicates that this is C-Type 7 for IPv4, defined in RFC 3209. It contains the source address of the LSP and the LSP ID. The LSP ID changes, depending on the signaling path. The Filter object contains the same information as the Sender object of the Path message.

Understanding RSVP Error Message Codes

Table 21 lists and describes the RSVP error message codes from RFC 2205, *Resource ReSerVation Protocol (RSVP), Version 1, Functional Specification* and RFC 3209, *RSVP-TE: Extensions to RSVP for LSP Tunnels*. The following error codes appear predominantly in the error object of the ResvErr message. A few of these error codes appear in the PathErr message.

Table 21: RSVP Error Codes

Error Code	Name	Meaning/Value	RSVP Message
00	Confirmation	Value = 00	ResvConf
01	Admission Control Failure Subcode: ■ 1 Delay bound cannot be met ■ 2 Requested bandwidth unavailable ■ 3 MTU in flowspec larger than interface MTU	Reservation request was rejected by admission control due to unavailable resources. The 16 bits of the Error Value field are: ssur cccc cccc cccc. If ssur = 0, the low order bits contain a subcode.	ResvErr
02	Policy Control Failure	Path or Resv message rejected for administrative reason; for example, preemption.	PathErr, ResvErr
03	No Path Information	No Path state exists for this session; Resv message cannot be forwarded.	ResvErr
04	No Sender Information	Path state does not include sender information that matches the flow descriptor; Resv message cannot be forwarded.	ResvErr
05	Conflicting	Reservation style conflicts with existing reservation style; Resv message cannot be forwarded.	ResvErr
06	Unknown Reservation Style	Reservation style unknown; Resv message cannot be forwarded.	ResvErr
07	Conflicting Destination Port	RSVP sessions with identical destination address and protocol values have zero and non-zero destination port values.	PathErr, ResvErr
08	Conflicting Sender Ports	RSVP sessions with identical destination address and protocol values have zero and non-zero sender ports.	PathErr
09 to 11	Reserved		
12	Service Preempted Subcode: Reserved for future definition	The service request defined by the style object and the flow descriptor has been administratively preempted. Value=ssur cccc cccc cccc. If ssur=0, low order bits contain subcode.	ResvErr

Error Code	Name	Meaning/Value	RSVP Message
13	Unknown Object Class	Contains a 16-bit value composed of Class-Num and C-Type of the unknown object. This error is sent only if RSVP will reject the message, as determined by the high-order bits of the Class-Num.	PathErr, ResvErr
14	Unknown Object C-Type	Comprised of Class_Num, C-Type of object.	ResvErr
15-19	Reserved		
20	Reserved for API	Contains an API error code that was detected asynchronously and must be reported by upcall.	ResvErr
21	Traffic Control Error Subcode: ■ 01 Service Conflict—Trying to merge two incompatible service requests. ■ 02 Service Unsupported—Traffic control can't provide requested service or acceptable replacement. ■ 03 Bad Flowspec—Malformed or unreasonable request. ■ 04 Bad Tspec— Malformed or unreasonable request. ■ 05 Bad Adspec—Malformed or unreasonable request.	Traffic control failed due to format or parameters. Path or Resv message cannot be forwarded. Value=ss00 cccc cccc cccc; ss bits=00.	ResvErr
22	Traffic Control System Error	System error detected; RSVP is not expected to interpret this value.	ResvErr
23	RSVP System Error	Implementation-dependent value; RSVP is not expected to interpret this value.	ResvErr

Error Code	Name	Meaning/Value	RSVP Message
24	Routing Problem Subcode: ■ 01Bad Explicit Route Object ■ 02 Bad Strict node ■ 03 Bad loose node ■ 04 Bad initial sub-object ■ 05 No route available toward destination ■ 06 Unacceptable label value ■ 07 RRO indicated routing loops ■ 08 MPLS being negotiated, but non-RSVP capable router stands in the path ■ 09 MPLS label allocation failure ■ 10 Unsupported L3PID	For information on this error code, see RFC 3209, *RSVP-TE: Extensions to RSVP for LSP Tunnels*.	PathErr ResvErr
25	Notify Error subcode: ■ 01 RRO too large for MTU ■ 02 RRO notification ■ 03 Tunnel locally required	For information on this error code, see RFC 3209, *RSVP-TE: Extensions to RSVP for LSP Tunnels*.	ResvErr