7 Resource Reservation Protocol (RSVP)

Introduction

The Resource ReSerVation Protocol (RSVP) is a signaling protocol based on RFC 2205 that is used by a host or a switch to request specific Quality of Service (QoS) from IP networks for application data streams or flows. QoS is used for applications like multimedia that require continuous streaming of traffic without "bursts." Routers use RSVP to deliver QoS requests to all nodes along the path(s) of flows and to establish and maintain the state to provide the requested service.

RSVP is unidirectional and supports unicast and multicast traffic. It runs on top of IPv4 in place of a transport protocol. RSVP gets its route information from the routing tables in the switch. It works with GateD to determine next hop routing. For more information about GateD, see Chapter 3, "GateD Basics," in the *Advanced Routing User Manual*. If MrouteD (multicast routing) is enabled in the switch when RSVP is initialized, routing information will be exchanged between RSVP and MrouteD. For more information about MrouteD, see Chapter 2, "IP Multicast Routing," in the *Advanced Routing User Manual*.

Path Messages and Reservations

RSVP is used by sending stations (Senders) to advertise the particular requirements of a flow or path. This advertisement is called a *path message*. The RSVP path message contains a traffic specification (or *Tspec*) that describes the requirements of the flow the Sender will generate.

The Tspec takes the form of a token or "leaky" bucket, which is specified by a maximum token rate and a maximum bucket depth or size. The Tspec also includes a peak rate, minimum policed unit, and a maximum packet size.

End stations (Receivers) make requests or *reservations* on links in the network to fulfill the requirements of the Tspec in the path message. Routers along the path guarantee the delivery of a flow by accepting the reservation request. (The request may also be denied if the router is configured to deny RSVP reservation requests.)

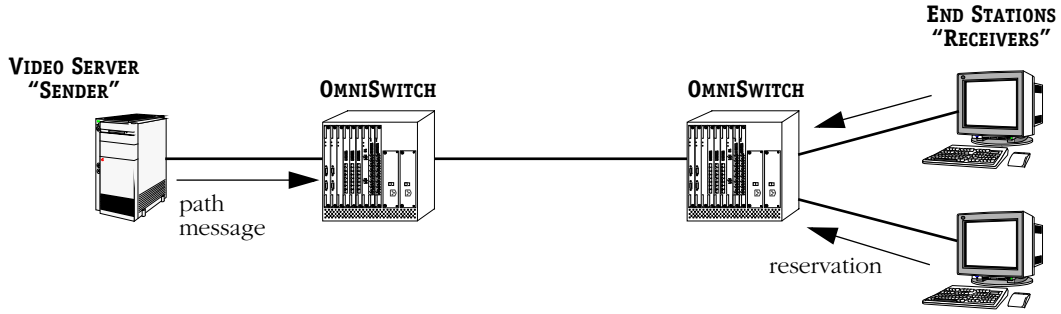
Using RSVP, initially a Sender (such as a video workstation) starts sending RSVP path messages through the network to advertise the requirements of the flow. When a Receiver receives the path message, it sends a reservation request for resources in the network it will need to receive the flow. In a multicast network, different Receivers may have different requirements for reserving resources. (In future releases, the switch may use an RSVP proxy to make the reservation on the Receiver's behalf since some hosts or end users may not support RSVP.)

The reservation request is passed to each node in the network, which then rejects or validates the request. If the reservation is validated, the desired resource reservation is made on that part of the link, and the request is sent to the next node. The reservation request is dynamic. It may be modified as it travels upstream because of traffic control mechanisms, or it may be merged with another similar reservation in the multicast tree.

Once the reservation request reaches the Sender it starts sending data packets. A confirmation message is sent to the Receiver.

RSVP maintains a "soft" state in the router, which means it is sensitive to changes in the network. Periodic refresh messages are sent along the reserved path or flow. If the flow is not received or refresh messages are no longer sent, reserved resources are then freed up.

In the illustration shown here, the video server sends a path message that specifies the requirements of the flow to the end stations. The end stations determine how they will be able to receive the flow and send reservation requests out to the switches. The switches deny or accept the reservations. If the reservations are accepted, the flow from the video server will be delivered to the end stations as specified in their respective reservation requests and as allowed by any RSVP policies in the Policy Manager or QoS Manager policy database.



RSVP Signaling

Relationship to QoS Manager

When the switch receives an RSVP path message, it sends the path message through the network to the Receiver(s). When the switch receives a reservation request, the QoS Manager accepts or denies the flow based on whether RSVP is enabled or disabled on the switch.

By default, RSVP traffic is accepted on the switch. Use the **qparams** command in the QoS Manager UI to change whether RSVP is enabled or disabled. See Chapter 5, "The QoS Manager," for more information about this command.

Policies configured for RSVP traffic may limit the size and number of RSVP flows. RSVP policies are configured through Alcatel's XWeb-Vision PolicyView application and are stored on an LDAP-enabled directory server in the network.

Policies for RSVP

Unlike provisioned flows, which are compared to configured conditions in the policy databases of the Policy Manager and the QoS Manager, RSVP flows signal the flow requirements to the switch. The switch then checks to see if it has a policy configured for the flow. If a policy is found, the switch makes sure the policy will allow the request. If the request exceeds the policy limits, the flow is denied on the switch. If the request is within the policy limits, the switch accepts the flow at the signaled rate.

Policies for RSVP may only be configured through the PolicyView application. Through PolicyView, you can configure the flow service type (controlled, guaranteed, or best effort service)

as well as the Tspec parameters (the token bucket size and rate). See the help text for the PolicyView application for more information about configuring these parameters in RSVP policies.

Software/Hardware Requirements

RSVP requires the following software/hardware:

- OmniSwitch, OmniStack, or Omni Switch/Router with at least 16MB of memory.
- QoS Manager—must be installed and enabled on the switch. See Chapter 5, "The QoS Manager," for more information about the QoS Manager.

Installing RSVP

To run RSVP, the **qos.img** file must be loaded on the switch. To upload the file, use standard FTP or ZMODEM procedures. Refer to your switch user manual for information about uploading the software. See Chapter 5, "The QoS Manager," for more information about installing the QoS Manager.

RSVP Configuration Overview

To run RSVP on the switch, follow these general steps.

1. Make sure any desired RSVP policies are configured through the PolicyView application. See Chapter 6, "The Policy Manager," for more information about PolicyView and how it works with the switch. See the PolicyView help screens for information about configuring RSVP policies.

2. Make sure the switch has RSVP and the QoS Manager enabled through the **qparams** command. The switch must be rebooted after RSVP is enabled through this command. See Chapter 5, "The QoS Manager," for more information about this command.

3. Set the default priority of RSVP queues through the **defrsvp** command in the Policy Manager UI. See Chapter 6, "The Policy Manager," for more information about this command.

RSVP UI Commands

When RSVP is loaded into the switch, it adds a submenu to the Networking menu of the User Interface (UI).

Commands in the UI are executed by typing the command and pressing **<Enter>**. On configuration screens, parameters may be changed by entering the number next to the relevant parameter, an equal sign, and the desired value at the prompt. After changes are made, press **<Enter>** to redraw the screen and see the changed value(s) or press **q** for quit to leave the screen.

♦ Note ♦

For general information about the UI, see your switch manual.

To display the RSVP submenu, enter **rsvp** at the system prompt.

If the UI is configured for terse mode, enter a **?** to display the submenu. In verbose mode, the UI automatically displays the submenu.

```
Command          RSVP Menu
---------------- ---------------------------------------
rsvpsess         Display RSVP sessions

    Main      File       Summary  VLAN      Networking
    Interface Security   System   Services  Help
```

The **rsvpsess** command is described in the next section.

Displaying RSVP Sessions

To display the current RSVP sessions, enter the following command:

```
rsvpsess
```

A screen displays similar to the following:

```
Session
9.0.2.72/4321
```

The **Session** parameter displays the IP address and the port number(s) associated with the RSVP flow.