RSVP Multicast CAC

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This module describes how to configure the Resource Reservation Protocol (RSVP) Mulicast Call Admission Control (CAC) to permit or denie multicast flows on interfaces based on RSVP messages.

Finding Feature Information

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

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

Prerequisites for RSVP Multicast CAC

- IP multicast must be enabled and all Protocol Independent Multicast (PIM) interfaces must be configured. See the "Configuring Basic IP Multicast" module of the *IP Multicast PIM Configuration Guide* for configuration information.
- In order for a device to participate in RSVP, RSVP must be enabled on the appropriate interfaces by using the **ip rsvp bandwidth** command in interface configuration mode. See the *QoS: RSVP Configuration Guide* for configuration information.
- ACLs to be subject to RSVP must be configured by using the **ip access-list** command.

Restrictions for RSVP Multicast CAC

If an application is not RSVP compliant, it will neither be blocked nor reserved by RSVP multicast CAC, but will be forwarded best-effort.

Information About RSVP Multicast CAC

RSVP Multicast CAC

Multicast architecture separates control and forwarding by using a Multicast Routing Information Base (MRIB) database, which regulates communication, including the writing (by owners) and notifying (to interested parties) of various (S,G) entries and interface flags, between its clients. MRIB provides modularity and separation between the multicast control plane, Protocol Independent Multicast (PIM) and Internet Group Management Protocol (IGMP), and the Multicast Forwarding Information Base (MFIB) forwarding plane. Multicast data packet forwarding is controlled by MFIB using F flags.

Multicast protocols, such as PIM, decide on which interfaces to forward a flow. At any node in the network, the multicast state can have multiple outgoing interfaces. Some interfaces may or may not have RSVP bandwidth available for an RSVP compliant application. If an RSVP application decides to stop sending because of insufficient RSVP bandwidth, the chance to forward over outgoing interfaces that have sufficient RSVP bandwidth is missed. The RSVP Multicast CAC feature enables the network, rather than the application, to decide where to block or forward a flow based upon RSVP reservations. RSVP multicast CAC acts only upon interfaces that are in an outgoing interface list that is maintained by PIM. RSVP multicast CAC cannot alter, add, or remove an outgoing interface list.

When RSVP notifies about adding (permits) the reservation for a flow, multicast sets the F flag in the MFIB database to forward the flow on the given interface, on the entry in the outgoing interface list that corresponds to the given source and destination. Conversely, when RSVP deletes (denies) the reservation, multicast clears the F flag to block the flow. If a sender explicitly tears down a reservation, multicast sets the F flag to forward again on all outgoing interfaces. This mechanism results in forwarding if, and only if, the flow is RSVP reserved or if no reservation is requested. Just like for unicast, the RSVP subsystem arranges with the forwarding classification subsystems to forward best-effort when no reservation is required.

If a flow does not match the configured ACL, it is not subject to outgoing interface blocking by RSVP multicast CAC. A flow that is not subject to RSVP multicast CAC will forward best-effort if it does not have a reservation. Conversely, a previously blocked interface will be unblocked after an ACL is reconfigured and the matching state changes.

Reconfiguring an ACL can result in oversubscription when, for example, initially two flows (F1 and F2) match and one flow (F2) is blocked. Then, after reconfiguration, F2 no longer matches and is unblocked. RSVP does not know about the ACL and does not know it would be better to block F1 now. Note that not matching an ACL is equivalent to not requesting a reservation.

How to Configure RSVP Multicast CAC

Configuring RSVP for Controlling Multicast Flows

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip rsvp policy preempt**
4. **ip mulicast** [**vrf** *vrf -name*] **rsvp** *access-list*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip rsvp policy preempt** **Example:** `Device(config)# ip rsvp policy preempt`	Enables the preemption parameter for all configured local and remote policies.
Step 4	**ip mulicast** [**vrf** *vrf -name*] **rsvp** *access-list* **Example:** `Device(config)# ip multicast rsvp mcast-rsvp`	Specifies which multicast flows are to be blocked on all interfaces when no RSVP reservation is available and which are to be forwarded when an RSVP reservation is available, depending on the configuration of the ACL. Repeat this step to specify each ACL that is to be subject to RSVP.
Step 5	**exit** **Example:** `Device(config)# exit`	Exits from global configuration mode to privileged EXEC mode.

Viewing Blocked Outbound Interfaces

SUMMARY STEPS

1. **enable**
2. **show ip mroute** [**vrf** *vrf-name*] [**interface** *type number*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

Step 2	**show ip mroute** [**vrf** *vrf-name*] [**interface** *type number*]
	
	Example:
	`Device# show ip mroute 192.0.2.2`
	
	Example:
	`Device# show ip mroute 192.0.2.2`
	
	`IP Multicast Routing Table`
	`Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,`
	`L - Local, P - Pruned, R - RP-bit set, F - Register flag,`
	`T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,`
	`X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,`
	`U - URD, I - Received Source Specific Host Report,`
	`Z - Multicast Tunnel, z - MDT-data group sender,`
	`Y - Joined MDT-data group, y - Sending to MDT-data group,`
	`V - RD & Vector, v - Vector`
	`Outgoing interface flags: H - Hardware switched, A - Assert winner`
	`Timers: Uptime/Expires`
	`Interface state: Interface, Next-Hop or VCD, State/Mode`
	
	`(*, 192.0.2.2), 00:05:38/00:02:57, RP 200.0.0.2, flags: S`
	`Incoming interface: Null, RPF nbr 0.0.0.0`
	`Outgoing interface list:`
	`Ethernet0/1, Forward/Sparse-Dense, 00:05:38/00:02:57`
	
	`(205.165.201.2, 192.0.2.2), 00:04:34/00:03:15, flags: T`
	`Incoming interface: Ethernet0/0, RPF nbr 40.0.1.1`
	`Outgoing interface list:`
	`Ethernet0/1, Forward/Sparse-Dense, 00:04:34/00:02:57`
	`Ethernet0/2, Forward/Sparse-Dense, 00:04:16/00:02:33 Blocked`
		Displays contents of mroute table.

Configuration Examples for RSVP Multicast CAC

Example RSVP Multicast CAC

Note IP multicast must be enabled and all Protocol Independent Multicast (PIM) interfaces must be configured. RSVP must be enabled on the appropriate interfaces for a device to participate in RSVP.

The following example shows how to configure a standard ACL named mcast-rsvp:

```
Device> enable
Device# configure terminal
Device(config)# ip access-list standard mcast-rsvp
Device(config-std-nacl)# permit 192.0.2.0 0.0.0.255
Device(config-std-nacl)# permit 10.88.0.0 0.0.255.255
Device(config-std-nacl)# permit 10.0.0.0 0.255.255.255
```

The following example shows how to enable RSVP multicast CAC. The specified ACL will be subject to RSVP.

```
Device(config-std-nacl)# exit
Device(config)# ip rsvp policy preempt
Device(config)# ip multicast rsvp mcast-rsvp
```

The following partial sample output from the **show running- config** command shows how to permit all flows from all devices on network 192.0.2.0 (ACL mcast-rsvp) when an RSVP reservation is available:

```
Device# show running-config
.
.
.
ip rsvp policy preempt
!
ip access-list standard mcast-rsvp
 permit   192.0.2.0 0.0.0.255
 permit 10.88.0.0 0.0.255.255
 permit 10.0.0.0 0.255.255.255
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*
Cisco IP multicast commands	*Cisco IOS IP Multicast Command Reference*
RSVP Quality of Service (QoS)	*QoS: RSVP Configuration Guide*
IP multicast configuration information	"Configuring Basic IP Multicast" module of the *IP Multicast PIM Configuration Guide*

Technical Assistance

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

Feature Information for RSVP Multicast CAC

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

Table 1 Feature Information for RSVP Multicast CAC

Feature Name	Releases	Feature Information
RSVP Multicast CAC	15.2(3)T	Provides multicast Call Admission Control (CAC) functionality based on Resource Reservation Protocol (RSVP) messages. The following commands were introduced or modified: **clear ip multicast rsvp**, **ip multicast**, **show ip mroute**, **show ip multicast**.