



## Multicast VLAN Registration (MVR)

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### Note

- For complete syntax and usage information for the commands used in this chapter, see these publications:  
[http://www.cisco.com/en/US/products/ps11846/prod\\_command\\_reference\\_list.html](http://www.cisco.com/en/US/products/ps11846/prod_command_reference_list.html)
- Cisco IOS Release 15.1SY supports only Ethernet interfaces. Cisco IOS Release 15.1SY does not support any WAN features or commands.



### Tip

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

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## Restrictions for MVR

None.

## Restrictions for MVR

- Only one MVR VLAN can be present in a switch, and you should configure the same VLAN as the MVR VLAN for all the switches in the same network.
- Source ports must be in the MVR VLAN.

- Receiver ports on a switch can be in different VLANs, but must not be in the MVR VLAN.
- Receiver ports can only be access ports; they cannot be trunk ports.
- When using private VLANs, you cannot configure a secondary VLAN as the MVR VLAN.
- Do not connect a multicast router to a receiver port.
- The MVR VLAN must not be a reverse path forwarding (RPF) interface for any multicast route.
- MVR data received on an MVR receiver port is not forwarded to MVR source ports.
- The maximum number of multicast entries (MVR group addresses) that can be configured on a switch (that is, the maximum number of television channels that can be received) is 8000.
- MVR is available only on native systems.
- VTP pruning should be disabled if the MVR VLAN number is between 1 and 1000.
- MVR can coexist with IGMP snooping on a switch.
- MVR supports IGMPv3 messages.

## Information About MVR

- [MVR Overview, page 17-2](#)
- [Using MVR in a Multicast Television Application, page 17-3](#)

## MVR Overview

MVR is designed for applications that use wide-scale deployment of multicast traffic across an Ethernet ring-based service-provider network (for example, the broadcast of multiple television channels over a service-provider network). MVR allows a subscriber on a port to subscribe and unsubscribe to a multicast stream on the network-wide multicast VLAN. It allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs. MVR provides the ability to continuously send multicast streams in the multicast VLAN, but to isolate the streams from the subscriber VLANs for bandwidth and security reasons.

MVR assumes that subscriber ports subscribe and unsubscribe (join and leave) these multicast streams by sending out IGMP join and leave messages. These messages can originate from an IGMP Version-2-compatible host with an Ethernet connection. Although MVR operates on the underlying mechanism of IGMP snooping, the two features operate independently of each other. One feature can be enabled or disabled without affecting the operation of the other feature. However, if IGMP snooping and MVR are both enabled, MVR reacts only to join and leave messages from multicast groups configured under MVR. Join and leave messages from all other multicast groups are managed by IGMP snooping.

MVR does the following:

- Identifies the MVR IP multicast streams and their associated IP multicast group in the Layer 2 forwarding table.
- Intercepts the IGMP messages.
- Modifies the Layer 2 forwarding table to include or remove the subscriber as a receiver of the multicast stream, even though the receivers might be in a different VLAN from the source.

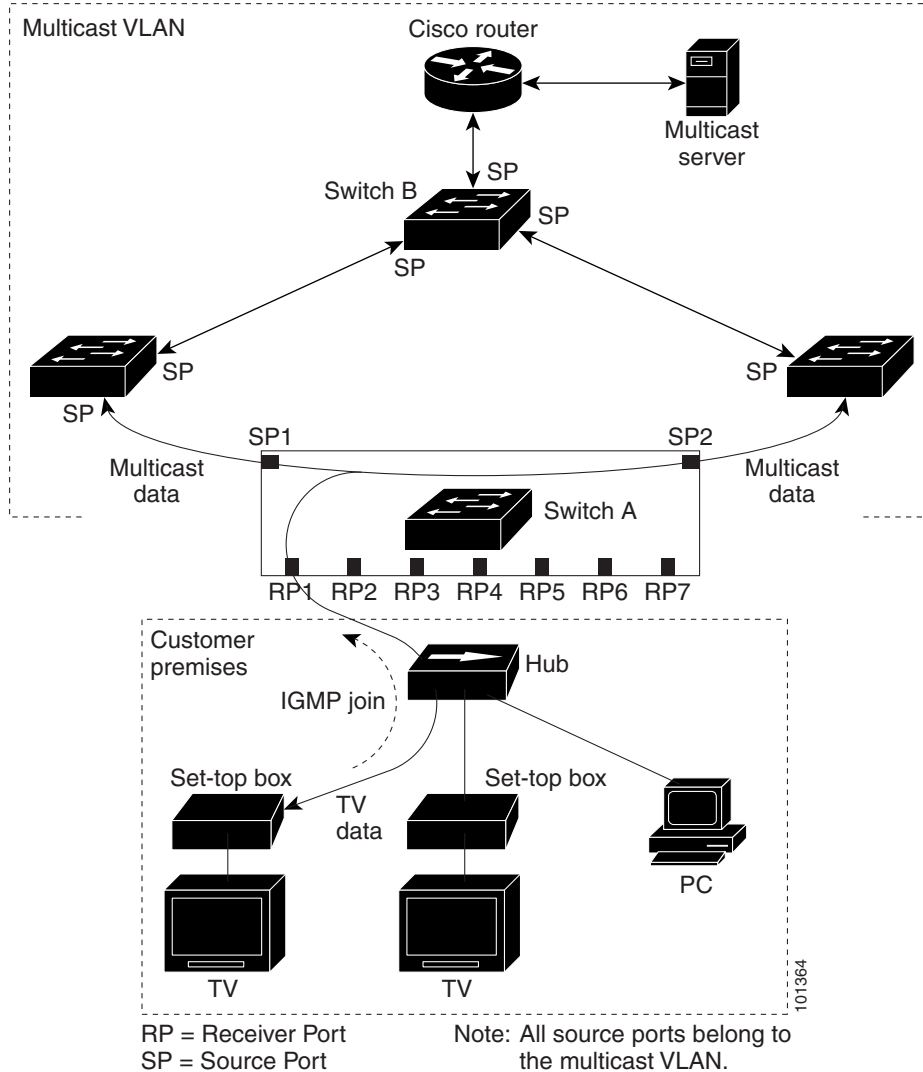
This forwarding behavior selectively allows traffic to cross between different VLANs.

The switch will forward multicast data for MVR IP multicast streams only to MVR ports on which hosts have joined, either by IGMP reports or by MVR static configuration. The switch will forward IGMP reports received from MVR hosts only to the source (uplink) port. This eliminates using unnecessary bandwidth on MVR data port links.

Only Layer 2 ports participate in MVR. You must configure ports as MVR receiver ports. Only one MVR multicast VLAN per switch.

## Using MVR in a Multicast Television Application

In a multicast television application, a PC or a television with a set-top box can receive the multicast stream. Multiple set-top boxes or PCs can be connected to one subscriber port, which is a switch port configured as an MVR receiver port. [Figure 17-1](#) is an example configuration. DHCP assigns an IP address to the set-top box or the PC. When a subscriber selects a channel, the set-top box or PC sends an IGMP report to Switch A to join the appropriate multicast. If the IGMP report matches one of the configured IP multicast group addresses, the switch modifies the hardware address table to include this receiver port and VLAN as a forwarding destination of the specified multicast stream when it is received from the multicast VLAN. Uplink ports that send and receive multicast data to and from the multicast VLAN are called MVR source ports.

**Figure 17-1 Multicast VLAN Registration Example**

When a subscriber changes channels or turns off the television, the set-top box sends an IGMP leave message for the multicast stream. The switch sends a MAC-based general query through the receiver port VLAN. If there is another set-top box in the VLAN still subscribing to this group, that set-top box must respond within the maximum response time specified in the query. If the CPU does not receive a response, it eliminates the receiver port as a forwarding destination for this group.

Unless the Immediate Leave feature is enabled, when the switch receives an IGMP leave message from a subscriber on a receiver port, it sends out an IGMP query on that port and waits for IGMP group membership reports. If no reports are received in a configured time period, the receiver port is removed from multicast group membership. With the Immediate Leave feature enabled, an IGMP query is not sent from the receiver port on which the IGMP leave was received. As soon as the leave message is received, the receiver port is removed from multicast group membership, which speeds up leave latency. Enable the Immediate Leave feature only on receiver ports to which a single receiver device is connected.

MVR eliminates the need to duplicate television-channel multicast traffic for subscribers in each VLAN. Multicast traffic for all channels is only sent around the VLAN trunk once—only on the multicast VLAN. The IGMP leave and join messages are in the VLAN to which the subscriber port is assigned.

These messages dynamically register for streams of multicast traffic in the multicast VLAN on the Layer 3 device, Switch B. The access layer switch, Switch A, modifies the forwarding behavior to allow the traffic to be forwarded from the multicast VLAN to the subscriber port in a different VLAN, selectively allowing traffic to cross between two VLANs.

IGMP reports are sent to the same IP multicast group address as the multicast data. The Switch A CPU must capture all IGMP join and leave messages from receiver ports and forward them to the multicast VLAN of the source (uplink) port.

## Default MVR Configuration

- MVR: Disabled globally and per interface
- Multicast addresses: None configured
- Query response time: 1 second
- Multicast VLAN: VLAN 1
- Interface (per port) default: Neither a receiver nor a source port
- Immediate Leave: Disabled on all ports

## How to Configure MVR

- [Configuring MVR Global Parameters, page 17-5](#)
- [Configuring MVR Interfaces, page 17-6](#)
- [Displaying MVR Information, page 17-8](#)
- [Clearing MVR Counters, page 17-8](#)

## Configuring MVR Global Parameters

To configure the MVR global parameters, perform this task:

	Command	Purpose
<b>Step 1</b>	Router# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	Router(config)# <b>mvr</b>	Enables MVR on the switch.
<b>Step 3</b>	Router(config)# <b>mvr max-groups</b> <i>max-groups</i>	Specifies the maximum number of MVR groups. The range is 1 to 8000. The default is 1000.
<b>Step 4</b>	Router(config)# <b>mvr group</b> <i>ip-address</i> [ <i>count</i> ]	Configures an IP multicast address on the switch or uses the <i>count</i> parameter to configure a contiguous series of MVR group addresses (the range for <i>count</i> is 1 to 256; the default is 1). Any multicast data sent to this address is sent to all source ports on the switch and all receiver ports that have elected to receive data on that multicast address. Each multicast address would correspond to one television channel.

	Command	Purpose
Step 5	Router(config)# <b>mvr querytime</b> <i>value</i>	(Optional) Defines the maximum time to wait for IGMP report memberships on a receiver port before removing the port from multicast group membership. The value is in units of tenths of a second. The range is 1 to 100, and the default is 10 tenths or one second.
Step 6	Router(config)# <b>mvr vlan</b> <i>vlan-id</i>	(Optional) Specifies the VLAN in which multicast data is received; all source ports must belong to this VLAN. The VLAN range is 1 to 1001 and 1006 to 4094. The default is VLAN 1.
Step 7	Router(config)# <b>end</b>	Returns to privileged EXEC mode.

You do not need to set the optional MVR parameters if you choose to use the default settings. Before changing the default parameters (except for the MVR VLAN), you must first enable MVR.

To return the switch to its default settings, use the **no mvr [group ip-address | querytime | vlan]** global configuration command.

This example shows how to enable MVR, configure the group address, set the query time to 1 second (10 tenths), and specify the MVR multicast VLAN as VLAN 22:

```
Router(config)# mvr
Router(config)# mvr group 228.1.23.4
Router(config)# mvr querytime 10
Router(config)# mvr vlan 22
Router(config)# end
```

You can use the **show mvr groups** privileged EXEC command to verify the MVR multicast group addresses on the switch.

## Configuring MVR Interfaces

To configure Layer 2 MVR interfaces, perform this task:

	Command	Purpose
Step 1	Router# <b>configure terminal</b>	Enters global configuration mode.
Step 2	Router(config)# <b>mvr</b>	Enables MVR on the switch.
Step 3	Router(config)# <b>interface</b> <i>interface-id</i>	Specifies the Layer 2 port to configure, and enters interface configuration mode.

	Command	Purpose
Step 4	Router(config-if)# <b>mvr type</b> {source   receiver}	<p>Configures an MVR port as one of these types of ports:</p> <ul style="list-style-type: none"> <li>• <b>source</b>—Configures uplink ports that receive and send multicast data as source ports. Subscribers cannot be directly connected to source ports. All source ports on a switch belong to the single multicast VLAN.</li> <li>• <b>receiver</b>—Configures a port as a receiver port if it is a subscriber port and should only receive multicast data. It does not receive data unless it becomes a member of the multicast group, either statically or by using IGMP leave and join messages. Receiver ports cannot belong to the multicast VLAN.</li> </ul> <p>If you attempt to configure a non-MVR port with MVR characteristics, the operation fails. The default configuration is as a non-MVR port.</p>
Step 5	Router(config-if)# <b>mvr immediate</b>	<p>(Optional) Enables the Immediate Leave feature of MVR on the port. The Immediate Leave feature is disabled by default.</p> <p><b>Note</b> This command applies to only receiver ports and should only be enabled on receiver ports to which a single receiver device is connected.</p>
Step 6	Router(config-if)# <b>end</b>	Returns to privileged EXEC mode.

To return the interface to its default settings, use the **no mvr [type | immediate]** interface configuration commands.

This example shows how to configure a source port and a receiver port and to configure Immediate Leave on the receiver port:

```
Router(config)# mvr
Router(config)# interface gigabitethernet 3/48
Router(config-if)# switchport
Router(config-if)# switchport access vlan 22
Router(config-if)# mvr type source
Router(config-if)# exit
Router(config)# interface gigabitethernet 3/47
Router(config-if)# switchport
Router(config-if)# switchport access vlan 30
Router(config-if)# mvr type receiver
Router(config-if)# mvr immediate
Router(config-if)# exit
```

## Clearing MVR Counters

You can clear MVR join counters for the switch, for source or receiver ports, or for a specified interface. To clear MVR counters, perform this task:

Command	Purpose
Router# <b>clear mvr counters</b> [[ <b>receiver-ports</b>   <b>source-ports</b> ] [ <i>type module/port</i> ]]	Clears the join counters of all the MVR ports, or source or receiver ports, or of a specified MVR interface port.

This example clears the join counters for the receiver port on GigabitEthernet port 1/7:

```
Router# clear mvr receiver-ports GigabitEthernet 1/7
Router# show mvr receiver-ports GigabitEthernet 1/7
Joins: v1,v2,v3 counter shows total IGMP joins
       v3 counter shows IGMP joins received with both MVR and non-MVR groups
Port   VLAN Status      Immediate      Joins
      (v1,v2,v3) (v3)
-----
Gi1/7  202 INACTIVE/UP  ENABLED        0          0
```

## Displaying MVR Information

You can display MVR information for the switch or for a specified interface. To display MVR configurations, perform one or more of these tasks:

Command	Purpose
Router# <b>show mvr</b>	Displays MVR status and these values for the switch: whether MVR is enabled or disabled, the multicast VLAN, the configured maximum and current number of multicast groups, and the query response time.
Router# <b>show mvr groups</b>	Displays the MVR group configuration.
Router# <b>show mvr interface</b> [ <i>type module/port</i> ]	Displays all MVR interfaces and their MVR configurations. When a specific interface is entered, displays this information: <ul style="list-style-type: none"> <li>Type—Receiver or Source</li> <li>Status—One of these: <ul style="list-style-type: none"> <li>Active—At least one IGMP join has been received for an MVR group on the port.</li> <li>Inactive—The port is not participating in any MVR groups.</li> <li>Up/Down—The port is forwarding (Up) or nonforwarding (Down).</li> </ul> </li> <li>Immediate Leave—Enabled or Disabled</li> </ul>
Router# <b>show mvr members</b> [[ <b>vlan</b> <i>vlan-id</i> ]   [ <i>type module/port</i> ]]	Displays details of all MVR members or MVR members on a specified VLAN or port.



Command	Purpose
Router# <b>show mvr</b>	Displays MVR status and these values for the switch: whether MVR is enabled or disabled, the multicast VLAN, the configured maximum and current number of multicast groups, and the query response time.
Router# <b>show mvr groups</b>	Displays the MVR group configuration.
Router# <b>show mvr members</b> [[ <b>vlan</b> <i>vlan-id</i> ]   [ <b>type</b> <i>module/port</i> ]] <b>count</b>	Displays number of MVR members in all active MVR groups, or on a specified VLAN or port.
Router# <b>show mvr</b> { <b>receiver-ports</b>   <b>source-ports</b> } [ <b>type</b> <i>module/port</i> ]	Displays all receiver or source ports that are members of any IP multicast group or those on the specified interface port.

This example displays MVR status and values for the switch:

```
Router# show mvr
MVR Running: TRUE
MVR multicast vlan: 22
MVR Max Multicast Groups: 1000
MVR Current multicast groups: 256
MVR Global query response time: 10 (tenths of sec)
```

This example displays the MVR group configuration:

```
Router# show mvr groups
MVR max Multicast Groups allowed: 8000
MVR current multicast groups: 8000
MVR groups:
      Group start      Group end      Type  Count/Mask
      -----
      225.0.7.226      225.0.7.226      count 1
      225.0.7.227      225.0.7.227      count 1
      225.0.7.228      225.0.7.228      count 1
      225.0.7.229      225.0.7.229      count 1
      225.0.7.230      225.0.7.230      count 1
      225.0.7.231      225.0.7.231      count 1
      236.8.7.0         236.8.7.255      mask 255.255.255.0
      237.8.7.0         237.8.7.255      mask 255.255.255.0
      237.8.8.0         237.8.8.255      mask 255.255.255.0
```

This example displays all MVR interfaces and their MVR configurations:

```
Router# show mvr interface
Port      VLAN  Type      Status      Immediate Leave
----      -
Gi1/20    2    RECEIVER  ACTIVE/UP    DISABLED
Gi1/21    2    SOURCE    ACTIVE/UP    DISABLED
```

This example displays all MVR members on VLAN 2:

```
Router# show mvr members vlan 2
MVR Group IP      Status  Members
-----
224.0.0.001.001    ACTIVE  Gi1/20(u),Gi1/21(u)
224.0.0.001.002    ACTIVE  Gi3/2(d),Gi1/12(u)
```

This example displays the number of MVR members on all MVR VLANs:

```
Router# show mvr members count
```

```
Count of active MVR groups:
Vlan 490: 400
```

## ■ Displaying MVR Information

```
Vlan 600: 400
Vlan 700: 0
Vlan 950: 0
```

This example displays all receiver ports that are members of any IP multicast group:

```
Router# show mvr receiver-ports
```

```
Joins: v1,v2,v3 counter shows total IGMP joins
```

```
v3 counter shows IGMP joins received with both MVR and non-MVR groups
```

Port	VLAN	Status	Immediate Leave	Joins (v1,v2,v3)	(v3)
Gi1/7	202	INACTIVE/UP	ENABLED	305336	0
Gi1/8	202	ACTIVE/UP	DISABLED	4005	0
Gi1/9	203	INACTIVE/DOWN	DISABLED	53007	0
Gi1/10	203	ACTIVE/UP	DISABLED	6204	0
Gi1/11	204	ACTIVE/UP	DISABLED	0	940
Gi1/12	205	INACTIVE/UP	ENABLED	8623	0

**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

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