



## Using IP Multicast Tools

This chapter describes IP multicast tools that allow you to trace a multicast path or test a multicast environment. It includes the following sections:

- Monitoring IP Multicast Routing
- Configuring Multicast Routing Monitor

For a complete description of the commands in this chapter, refer to the “IP Multicast Tools Commands” chapter in the *Cisco IOS IP and IP Routing Command Reference* publication.

### Monitoring IP Multicast Routing

Use the following commands in EXEC mode to monitor IP multicast routers, packets, and paths:

Command	Purpose
Router# <b>mrinfo</b> [hostname   address] [source-address   interface]	Query a multicast router about which neighboring multicast routers are peering with it.
Router# <b>mstat</b> source [destination] [group]	Display IP multicast packet rate and loss information.
Router# <b>mtrace</b> source [destination] [group]	Traces the path from a source to a destination branch for a multicast distribution tree for a given group.

### Configuring Multicast Routing Monitor

The Multicast Routing Monitor (MRM) feature is a management diagnostic tool that provides network fault detection and isolation in a large multicast routing infrastructure. It is designed to notify a network administrator of multicast routing problems in near real time.

MRM has three components that play different roles: the Manager, the Test Sender, and the Test Receiver. To test a multicast environment using test packets, perhaps before an upcoming multicast event, you need all three components.

You create a test based on various test parameters, name the test, and start the test. The test runs in the background and the command prompt returns.

If the Test Receiver detects an error (such as packet loss or duplicate packets), it sends an error report to the router configured as the Manager. The Manager immediately displays the error report. Also, by issuing a certain **show** command, you can see the error reports, if any. You then troubleshoot your

multicast environment as normal, perhaps using the **mtrace** command from the source to the Test Receiver. If the **show** command displays no error reports, the Test Receiver is receiving test packets without loss or duplicates from the Test Sender.

Cisco's implementation of MRM supports Internet-Draft of *Multicast Routing Monitor (MRM)*, IETF, March 1999.

## Benefits

The benefits of the MRM feature are as follows:

- Find fault in multicast routing in near real time—If a problem exists in the multicast routing environment, you will find out about it right away.
- Can verify a multicast environment prior to an event—You need not wait for real multicast traffic to fail in order to find out that a problem exists. You can test the multicast routing environment before a planned event.
- Easy diagnostics—The error information is easy for the user to understand.
- Scalable—This diagnostic tool works well for many users.

## Restrictions

You must make sure the underlying multicast forwarding network being tested has no access lists or boundaries that deny the MRM data and control traffic. Specifically, consider the following:

- MRM test data are User Datagram Protocol (UDP) and Real-Time Transport Protocol (RTP) packets addressed to the configured multicast group address.
- MRM control traffic between the Test Sender, Test Receiver, and Manager is addressed to the 224.0.1.111 multicast group, which all three components join.

## Configuration and Testing Tasks

Perform the following tasks to configure and use the MRM feature:

- Configuring a Test Sender and Test Receiver (Required)
- Configuring a Manager (Required)
- Conducting an MRM Test (Required)

## Configuring a Test Sender and Test Receiver

You must configure a Test Receiver on a router or host. To do so, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# <b>interface</b> <i>type number</i>	Specifies an interface.

	Command	Purpose
Step 2	Router(config-if)# <b>ip mrm test-receiver</b>	Configures the interface to be a Test Receiver.
Step 3	Router(config)# <b>ip mrm accept-manager</b> { <i>access-list-name</i>   <i>access-list-number</i> }	Optionally, specifies that the Test Receiver can accept status report requests only from Managers specified by the access list.

To use MRM on test packets instead of actual IP multicast traffic, you must also use the following commands to configure a Test Sender *on a different router or host* from where you configured the Test Receiver. Use the following command beginning in global configuration mode:

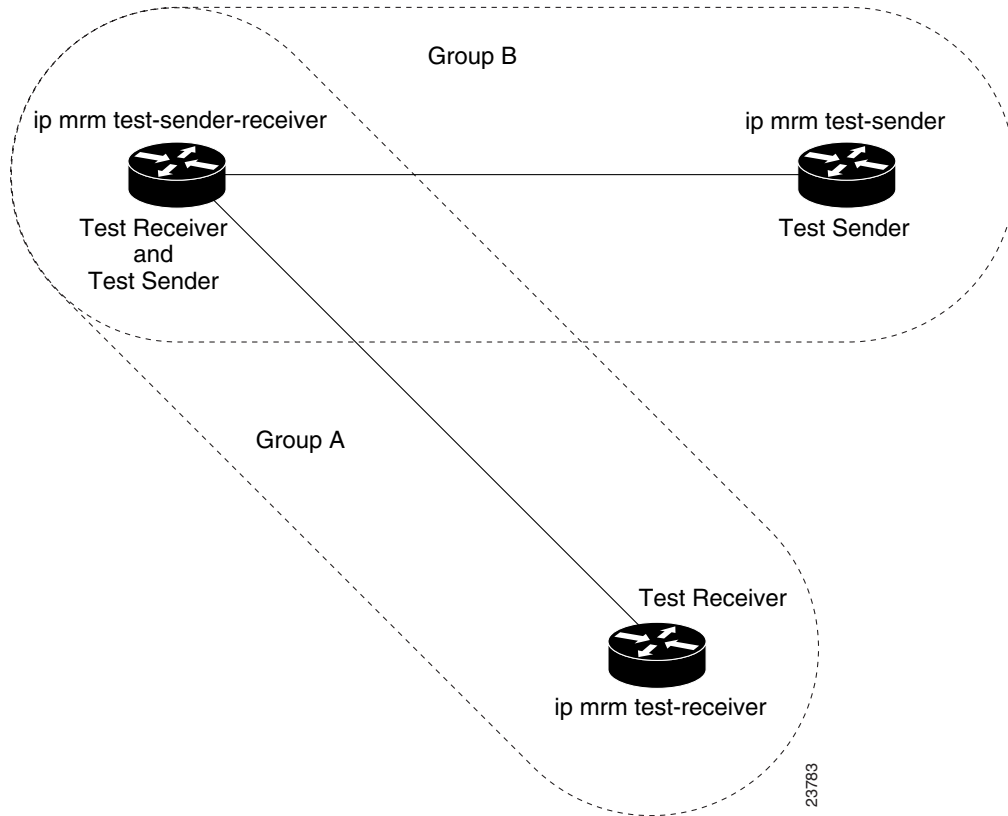
	Command	Purpose
Step 1	Router(config)# <b>interface</b> <i>type number</i>	Specifies an interface.
Step 2	Router(config-if)# <b>ip mrm test-sender</b>	Configures the interface to be a Test Sender.
Step 3	Router(config)# <b>ip mrm accept-manager</b> { <i>access-list-name</i>   <i>access-list-number</i> }	Optionally, specifies that the Test Sender can accept status report requests only from Managers specified by the access list.

## Monitoring Multiple Groups

If you have more than one multicast group to monitor, you could configure an interface that is a Test Sender for one group and a Test Receiver for another group.

Figure 67 illustrates an environment where the router on the left is the Test Sender for Group A and the Test Receiver for Group B.

**Figure 67** Test Sender and Test Receiver for Different Groups on One Router



In this case, you would configure the Test Sender in Group B and the Test Receiver in Group A separately, as already discussed. You would also configure the following commands on the router or host that belongs to both Group A and Group B (in the upper left of Figure 67).

	Command	Purpose
<b>Step 1</b>	Router(config)# <b>interface</b> <i>type number</i>	Specifies an interface.
<b>Step 2</b>	Router(config-if)# <b>ip mrm test-sender-receiver</b>	Configures the interface to be a Test Sender for one group and a Test Receiver for another group.
<b>Step 3</b>	Router(config)# <b>ip mrm accept-manager</b> { <i>access-list-name</i>   <i>access-list-number</i> }[ <b>test-sender</b>   <b>test-receiver</b> ]	Optionally, specifies that the Test Sender or Test Receiver can accept status report requests only from Managers specified by the access list. By default, the command applies to both the Sender and Receiver. Because this device is both, you might need to specify that the restriction applies to only the Sender or only the Receiver.

## Configuring a Manager

You must configure a router as a Manager in order for MRM to function; a host cannot be a Manager. Perform the following steps:

	Command	Purpose
Step 1	Router(config)# <b>ip mrm manager</b> <i>test-name</i>	Identifies a test by name, and places the router in manager configuration mode. The name is used to start, stop, and monitor a test.
Step 2	Router(config-mrm-manager)# <b>manager</b> <i>type number</i> <b>group</b> <i>ip-address</i>	Specifies which interface on the router is the Manager, and specifies the multicast group address the Test Receiver will listen to.
Step 3	Router(config-mrm-manager)# <b>beacon</b> [ <b>interval</b> <i>seconds</i> ] [ <b>holdtime</b> <i>seconds</i> ] [ <b>ttl</b> <i>hops</i> ]	Changes the frequency, duration, or scope of beacon messages that the Manager sends to the Test Sender and Test Receiver.
Step 4	Router(config-mrm-manager)# <b>udp-port</b> [ <b>test-packet</b> <i>port-number</i> ] [ <b>status-report</b> <i>port-number</i> ]	Changes UDP port numbers to which the Test Sender sends test packets or the Test Receiver sends status reports.
Step 5	Router(config-mrm-manager)# <b>senders</b> { <i>access-list-number</i>   <i>access-list-name</i> } [ <b>packet-delay</b> <i>milliseconds</i> ] [ <b>rtp</b>   <b>udp</b> ] [ <b>target-only</b>   <b>all-multicasts</b>   <b>all-test-senders</b> ]	Configures Test Sender parameters.
Step 6	Router(config-mrm-manager)# <b>receivers</b> { <i>access-list-name</i>   <i>access-list-number</i> } [ <b>sender-list</b> { <i>access-list-name</i>   <i>access-list-number</i> }] [ <b>packet-delay</b> ] [ <b>window</b> <i>seconds</i> ] [ <b>report-delay</b> <i>seconds</i> ] [ <b>loss</b> <i>percentage</i> ] [ <b>no-join</b> ] [ <b>monitor</b>   <b>poll</b> ]	<ul style="list-style-type: none"> <li>• Establishes Test Receivers for MRM.</li> <li>• Specifies which Test Senders the Test Receivers will listen to.</li> <li>• Specifies which sources the Test Receivers monitor.</li> <li>• Specifies the packet delay.</li> <li>• Changes Test Receiver parameters.</li> </ul>

## Verifying a Manager

Use the `show ip mrm manager` command to display the Manager configuration.

## Conducting an MRM Test

Use the following command in EXEC mode to start and subsequently stop your MRM test.

Command	Purpose
Router# <b>mrm</b> <i>test-name</i> { <b>start</b>   <b>stop</b> }	Starts or stops the MRM test.

When the test begins, the Manager sends a unicast control packet to the Test Sender and Test Receiver, and then the Manager starts sending beacons. The Test Sender and Test Receiver send acknowledgments to the Manager and begin sending or receiving test packets. If an error occurs, the Test Receiver sends an error report to the Manager, which immediately displays the report.

You cannot change the Manager parameters while the test is in progress.

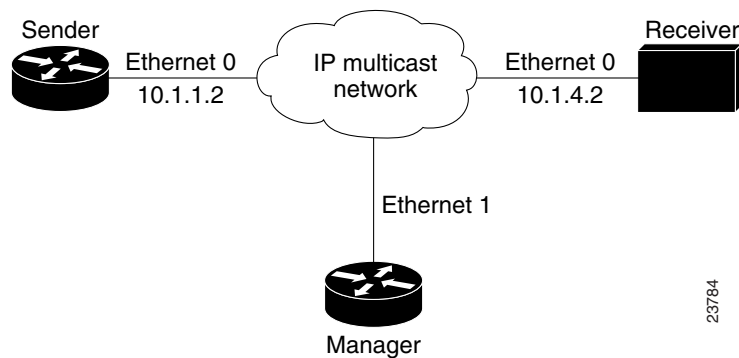
## Monitoring and Maintaining MRM

Command	Purpose
Router# <code>clear ip mrm status-report [ip-address]</code>	Clears the status report cache buffer.
Router# <code>show ip mrm interface [interface-unit]</code>	Displays Test Sender and Test Receiver information.
Router# <code>show ip mrm manager [test-name]</code>	Displays MRM test information.
Router# <code>show ip mrm status-report [ip-address]</code>	Displays the status reports (errors) in the circular cache buffer.

## MRM Configuration Example

Figure 68 illustrates a Test Sender, a Test Receiver, and a Manager in an MRM environment. The partial configurations for the three devices follow the figure.

**Figure 68 Multicast Routing Monitor Example**



### Test Sender

```
interface Ethernet 0
 ip mrm test-sender
```

### Test Receiver

```
interface Ethernet 0
 ip mrm test-receiver
```

**Manager**

```
ip mrm manager test1
manager Ethernet 1 group 239.1.1.1
senders 1
receivers 2 sender-list 1
!
access-list 1 permit 10.1.1.2
access-list 2 permit 10.1.4.2
```

