Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks

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When a multicast-capable internetwork is between two subnets with broadcast-only-capable hosts, you can convert broadcast traffic to IP multicast traffic at the first hop router and convert it back to broadcast traffic at the last hop router to deliver the packets to the broadcast clients. You can thus take advantage of the multicast capability of an intermediate IP multicast helper. Configuring an intermediate IP multicast helper allows the transport of broadcast packets across an IP multicast-enabled network, thereby preventing unnecessary replication at the intermediate routers.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks" section on page 9.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

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

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Prerequisites for Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks

- You understand the concepts documented in the "IP Multicast Technology Overview" module.
- You have IP multicast configured in your network environment and your IP multicast network is between broadcast-only networks. See the "Configuring Basic IP Multicast" module for more information about configuring IP multicast.

Information About Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks

To configure an intermediate IP multicast helper between broadcast-only networks, you should be familiar with the following concept:

Intermediate IP Multicast Helper Capability

An intermediate IP multicast helper allows the transport of broadcast packets across an IP multicast-enabled network, thereby preventing unnecessary replication at the intermediate routers.

When configuring an intermediate IP multicast helper between broadcast-only networks, you must configure the first hop router to convert broadcast traffic to IP multicast traffic and the last hop router to convert IP multicast traffic back to broadcast traffic.

How to Configure an Intermediate IP Multicast Helper Between Broadcast-Only Networks

This section contains the following procedures:

Configuring the First Hop Router to Convert Broadcast Traffic to IP Multicast Traffic

Perform this task to convert broadcast traffic to IP multicast traffic on the first hop router. The first hop router is on the border between the broadcast-only network and IP multicast network.

Prerequisites

- This task assumes that you have an IP multicast network configured between two broadcast-only networks. For more information about configuring IP multicast, see the "Configuring Basic IP Multicast" module.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **access-list** *access-list-number* {**deny** | **permit**} **udp** {**any** | [**host**] *source-address source-wildcard*} [*operator* [*port*]] {**any** | [**host**] *destination-address destination-wildcard*} [*operator* [*port*]]
4. **interface** *type number*
5. **ip multicast helper-map broadcast** *group-address access-list*
6. **exit**
7. **ip forward-protocol udp** [*port*]
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**access-list** *access-list-number* {**deny** | **permit**} **udp** {**any** | [**host**] *source-address source-wildcard*} [*operator* [*port*]] {**any** | [**host**] *destination-address destination-wildcard*} [*operator* [*port*]] **Example:** `Router# access-list 105 permit udp host 126.1.22.199 host 126.1.22.255 eq 4000`	Creates an extended IP access list to control which UDP broadcast packets are translated.

	Command or Action	Purpose
Step 4	**interface** *type number* **Example:** `Router(config)# interface ethernet 0`	Enters interface configuration mode. • For the *type* and *number* arguments, select an incoming interface on the first hop router that is receiving broadcast-only traffic
Step 5	**ip multicast helper-map broadcast** *group-address access-list* **Example:** `Router(config-if)# ip multicast helper-map broadcast 239.254.2.5 105`	Allows IP multicast routing in a multicast-capable internetwork between two broadcast-only internetworks. • In the configuration on the first hop router, the **ip multicast helper-map** command is used with the **broadcast** keyword and *group-address* argument to specify the traffic to be converted from broadcast to multicast. The multicast group address specified for the *group-address* argument is the address to which the converted traffic will be directed. • For the *access-list* argument, specify the name or number of the access list created in Step 3 of this task.
Step 6	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns to global configuration mode.
Step 7	**ip forward-protocol udp** [*port*] **Example:** `Router(config)# ip forward-protocol udp 4000`	Configures the forwarding of UDP broadcast messages destined for the specified port.
Step 8	**end** **Example:** `Router(config)# end`	Exits global configuration mode and enters privileged EXEC mode.

Configuring the Last Hop Router to Convert the IP Multicast Traffic Back to Broadcast Traffic

Perform this task to convert the IP multicast traffic back to broadcast traffic on the last hop router. The last hop router is on the border between the intermediate IP multicast network and broadcast-only network.

Prerequisites

- This task assumes that you have an IP multicast network configured between two broadcast-only networks. For more information about configuring IP multicast, see the "Configuring Basic IP Multicast" module.

SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. **access-list** *access-list-number* {**deny** | **permit**} **udp** {**any** | [**host**] *source-address source-wildcard*} [*operator* [*port*]] {**any** | [**host**] *destination-address destination-wildcard*} [*operator* [*port*]]
4. **interface** *type number*
5. **ip multicast helper-map** *group-address broadcast-address access-list*
6. **exit**
7. **interface** *type number*
8. **ip directed-broadcast**
9. **exit**
10. **ip forward-protocol udp** [*port*]
11. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**access-list** *access-list-number* {**deny** | **permit**} **udp** {**any** | [**host**] *source-address source-wildcard*} [*operator* [*port*]] {**any** | [**host**] *destination-address destination-wildcard*} [*operator* [*port*]] **Example:** `Router# access-list 105 permit udp host 126.1.22.199 host 126.1.22.255 eq 4000`	Creates an extended IP access list to control which UDP broadcast packets are translated.
Step 4	**interface** *type number* **Example:** `Router(config)# interface ethernet 1`	Enters interface configuration mode. • For the *type* and *number* arguments, select an incoming interface on the last hop router that is receiving IP multicast traffic.

	Command or Action	Purpose
Step 5	**ip multicast helper-map** *group-address broadcast-address access-list* **Example:** `Router(config-if)# ip multicast helper-map 239.254.2.5 126.1.28.255 105`	Allows IP multicast routing in a multicast-capable internetwork between two broadcast-only internetworks. • In the configuration on the last hop router, the **ip multicast helper-map** command is used with the *group-address* and *broadcast-address* arguments to specify the traffic to be converted from IP multicast to broadcast. The multicast group address specified for the *group-address* argument is the address of the traffic to be converted from IP multicast to broadcast. The broadcast address specified for the *broadcast-address* argument is the address to which the broadcast traffic will be sent. • For the *access-list* argument, specify the name or number of the access list created in Step 3 of this task.
Step 6	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration and returns to global configuration mode.
Step 7	**interface** *type number* **Example:** `Router(config)# interface ethernet 2`	Enters interface configuration mode. • For the *type* and *number* arguments, select an outgoing interface on the last hop router that is facing the destination broadcast-only subnet.
Step 8	**ip directed-broadcast** **Example:** `Router(config-if)# ip directed-broadcast`	Enables the translation of a directed broadcast to physical broadcasts.
Step 9	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration and returns to global configuration mode.
Step 10	**ip forward-protocol udp** [*port*] **Example:** `Router(config)# ip forward-protocol udp 4000`	Configures the forwarding of UDP broadcast messages destined for the specified port.
Step 11	**end** **Example:** `Router(config)# end`	Exits global configuration mode and enters privileged EXEC mode.

Configuration Examples for an Intermediate IP Multicast Helper Between Broadcast-Only Networks

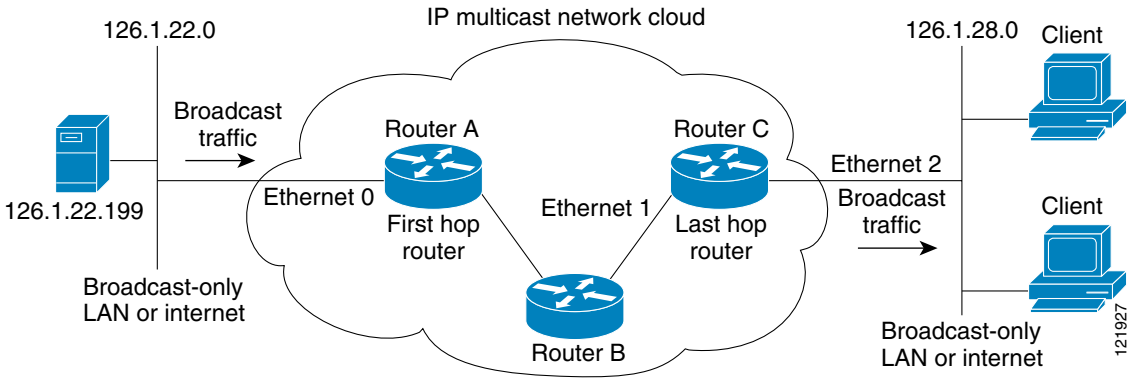
This section provides the following configuration example:

- "Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks: Example" section on page 7

Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks: Example

This example shows how to configure an intermediate IP multicast helper between broadcast-only networks. The topology used for this example is illustrated in Figure 1.

Figure 1 IP Multicast Helper Example Topology



In this example, a server on the LAN connected to Ethernet interface 0 of Router A is sending a UDP broadcast traffic with a source address of 126.1.22.199 and a destination address of 126.1.22.255:4000. The configuration on the first hop router converts the broadcast traffic arriving at incoming Ethernet interface 0 destined for UDP port 4000 to IP multicast traffic. The access list permits traffic being sent from the server at 126.1.22.199 being sent to 126.1.22.255:4000. The traffic is sent to group address 239.254.2.5. The **ip forward-protocol** command specifies the forwarding of broadcast messages destined for UDP port 4000.

Note This example primarily displays the configuration related to configuring an intermediate IP multicast helper. Protocol Independent Multicast-Sparse Mode (PIM-SM) is the multicast protocol used in this example. PIM-SM requires the use of a rendezvous point (RP). For more information about configuring RPs, see the "Configuring Basic IP Multicast" module in the Cisco IOS IP Multicast Configuration Guide.

The configuration on the last hop router converts the IP multicast traffic at incoming Ethernet interface 1 back to broadcast at outgoing Ethernet interface 2. Again, not all multicast traffic emerging from the multicast network should be converted from multicast to broadcast, only the traffic destined for 126.1.22.255:4000.

The configurations for Router A and Router C are as follows:

Router A—First Hop Router Configuration

```
interface ethernet 0
 ip address 126.1.22.1 255.255.255.0
 ip pim sparse-mode
 ip multicast helper-map broadcast 239.254.2.5 105
access-list 105 permit udp host 126.1.22.199 host 126.1.22.255 eq 4000
ip forward-protocol udp 4000
```

Router C—Last Hop Router Configuration

```
interface ethernet 1
 ip address 126.1.26.1 255.255.255.0
 ip pim sparse-mode
 ip multicast helper-map 239.254.2.5 126.1.28.255 105
!
interface ethernet 2
 ip address 126.1.28.1 255.255.255.0
 ip directed-broadcast
access-list 105 permit udp host 126.1.22.199 any eq 4000
ip forward-protocol udp 4000
```

Additional References

The following sections provide references related to configuring an intermediate IP multicast helper between broadcast-only networks.

Related Documents

Related Topic	Document Title
Basic IP multicast concepts, configuration tasks, and examples	"Configuring Basic IP Multicast" module
Overview of the IP multicast technology area	"IP Multicast TechnologyOverview" module
IP multicast commands: complete command syntax, command mode, command history, command defaults, usage guidelines, and examples	*Cisco IOS IP Multicast Command Reference*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for Configuring an Intermediate IP Multicast Helper Between Broadcast-Only Networks

Table 1 lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Releases 12.2(1) or 12.0(3)S or a later release appear in the table.

For information on a feature in this technology that is not documented here, see the "IP Multicast Features Roadmap."

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for Configuring an IP Multicast Helper Between Broadcast-Only Networks

Feature Name	Releases	Feature Information
This table is intentionally left blank because no features were introduced or modified in this module since Cisco IOS Release 12.2(1). This table will be updated when feature information is added to this module.	—	—