



HFC RIP Relay

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The cable modem HFC RIP Relay feature allows the delivery of Routing Information Protocol (RIP) messages from a Cisco IOS router containing an integrated cable modem to the Hybrid Fiber-Coaxial (HFC) Cable Modem Termination System (CMTS) when they are on different subnets. The integrated cable modem may be physically integrated into the router or via a cable modem High-Speed WAN Interface Card (HWIC). In previous Cisco IOS releases, RIP messages were rejected by the CMTS because the interface on the Cisco IOS router was in a different subnet from the CMTS. The solution involves trapping and handling RIP messages by the cable modem and ensuring that the RIP messages are forwarded to the router. The cable modem HFC RIP Relay feature enhances the scalability, security, and certification requirements of cable operators who require RIP to provision and manage customer cable modems.

In addition, support is added for configuring a static IP address on the cable modem interface.

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 HFC RIP Relay”](#) section on page 11.

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.

Contents

- [Prerequisites for HFC RIP Relay, page 2](#)
- [Restrictions for HFC RIP Relay, page 2](#)
- [Information About HFC RIP Relay, page 2](#)
- [How to Configure HFC RIP Relay, page 3](#)



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- [Configuration Examples for HFC RIP Relay, page 8](#)
- [Where to Go Next, page 9](#)
- [Additional References, page 9](#)
- [Command Reference, page 10](#)
- [Feature Information for HFC RIP Relay, page 11](#)

Prerequisites for HFC RIP Relay

The HFC RIP Relay feature requires an Integrated Services Router (ISR) with an integrated cable modem and Cisco IOS Release 12.4(15)XY, 12.4(20)T, or later release and one of the following:

- Cable modem firmware version filename of C21031014bFU07192007.CDF in the United States
- Cable modem firmware version filename of C21041014bFU07192007.CDF in Europe and Japan.

ISR cable products include the Cisco 815, Cisco 1805, and the cable modem HWIC in the Cisco 1800, 2800, and 3800 series routers.

Restrictions for HFC RIP Relay

The HFC RIP Relay feature does not support multiple cable modem HWICs in a single router.

Information About HFC RIP Relay

To configure the HFC RIP Relay feature, you should understand the following concepts:

- [Cable HFC, page 2](#)
- [HFC RIP Relay, page 2](#)

Cable HFC

Cable technology has been adapting to the deployment of fiber since 1994, leading to hybrid solutions known as hybrid fiber-coaxial (HFC). HFC networks contain both optical-fiber and coaxial cable lines. Optical fiber is deployed from the cable headend to cable operator subscribers with up to 2000 subscribers. Coaxial cable is deployed from the optical-fiber feeders to each subscriber. Hybrid networks provide the bandwidth and reliability of optical fiber at a lower cost than a pure fiber network.

HFC RIP Relay

In the provisioning systems used by some cable operators, when a Cisco IOS router containing an integrated cable modem is connected to a CMTS, RIP messages are rejected because the IP address derived from a Dynamic Host Configuration Protocol (DHCP) request for the router is from a different pool of IP addresses than for the cable modems. The RIP messages are rejected by the CMTS because the interface on the Cisco IOS router is in a different subnet from the CMTS. Without requiring additional configuration on the CMTS, the HFC RIP Relay feature enables the cable modem to bridge the RIP messages between the Cisco IOS router and the CMTS.

The cable modem HFC RIP Relay feature is implemented in Cisco IOS Release 12.4(15)XY, 12.4(20)T, and later releases. The feature requires the cable modem firmware version filename of C21031014bFU07192007.CDF in the United States or the cable modem firmware version filename of C21041014bFU07192007.CDF in Europe and Japan, and the feature is turned off by default. To enable HFC RIP relay, use the new **service-module ip rip relay** command-line interface (CLI) command.

Configuring a static IP address for the Cisco IOS router with an integrated cable modem is also supported in Cisco IOS Release 12.4(15)XY, 12.4(20)T, and later releases, using the **ip address** command.

How to Configure HFC RIP Relay

This section contains the following tasks:

- [Enabling HFC RIP Relay, page 3](#)
- [Enabling HFC RIP Relay for a Single Subnet and Disabling Split-Horizon, page 5](#)
- [Verifying the Configuration of HFC RIP Relay, page 7](#)

Enabling HFC RIP Relay

Perform this task to enable RIP relay on an integrated cable modem. In this task, a static IP address is configured for the cable modem interface and RIP relay is enabled on the interface. Validation of the source IP address of incoming RIP routing updates is disabled to allow RIP updates from unknown sources. RIP is defined as the routing protocol to be used on all interfaces that are connected to networks 10.0.0.0 and 172.18.0.0.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ip address** *ip-address mask* [**secondary**]
5. **service-module ip rip relay**
6. **exit**
7. **router rip**
8. **version** { **1** | **2** }
9. **no validate-update-source**
10. **network** *ip-address*
11. **network** *ip-address*
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface <i>type number</i> Example: Router(config)# interface cable-modem 0/3/0	Configures an interface type and enters interface configuration mode. <ul style="list-style-type: none"> In this example, cable-modem interface 0/3/0 is configured.
Step 4	ip address <i>ip-address mask [secondary]</i> Example: Router(config-if)# ip address 10.5.5.5 255.255.255.0	Sets a primary or secondary IP address for an interface. <ul style="list-style-type: none"> In this example, a static IP address of 10.5.5.5 is configured under the cable modem interface.
Step 5	service-module ip rip relay Example: Router(config-if)# service-module ip rip relay	Enables RIP relay in the ISR cable modem driver.
Step 6	exit Example: Router(config-if)# exit	Exits interface configuration mode and returns to global configuration mode.
Step 7	router rip Example: Router(config)# router rip	Enters router configuration mode for the specified routing process. <ul style="list-style-type: none"> In this example, a RIP routing process is configured.
Step 8	version {1 2} Example: Router(config-router)# version 2	Specifies a RIP version used globally by the router. <ul style="list-style-type: none"> In this example, the software sends and receives RIP version 2 packets.
Step 9	no validate-update-source Example: Router(config-router)# no validate-update-source	Disables the validation of the source IP address of incoming RIP routing updates. <ul style="list-style-type: none"> When the validation check is enabled, the software ensures that the source IP address of incoming routing updates is on the same IP network as one of the addresses defined for the receiving interface. In this example, the router is configured not to perform validation checks on the source IP address of incoming RIP updates.

	Command or Action	Purpose
Step 10	network <i>ip-address</i> Example: Router(config-router)# network 10.0.0.0	Specifies a list of networks for the RIP routing process. <ul style="list-style-type: none"> In this example, RIP is defined as the routing protocol to be used on all interfaces connected to network 10.0.0.0.
Step 11	network <i>ip-address</i> Example: Router(config-router)# network 172.18.0.0	Specifies a list of networks for the RIP routing process. <ul style="list-style-type: none"> In this example, RIP is defined as the routing protocol to be used on all interfaces connected to network 172.18.0.0.
Step 12	end Example: Router(config-router)# end	Exits router configuration mode and returns to privileged EXEC mode.

Enabling HFC RIP Relay for a Single Subnet and Disabling Split-Horizon

Perform this task to enable RIP relay on an ISR cable modem. In this task, a static IP address is configured for the cable modem interface and RIP relay is enabled on the interface. Split-horizon is disabled, and RIP is defined as the routing protocol to be used on all interfaces connected to network 10.0.0.0.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ip address** *ip-address mask* [secondary]
5. **service-module ip rip relay**
6. **no ip split-horizon**
7. **exit**
8. **router rip**
9. **version** {1 | 2}
10. **no validate-update-source**
11. **network** *ip-address*
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables higher privilege levels, such as privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface <i>type number</i> Example: Router(config)# interface cable-modem 0/3/0	Configures an interface type and enters interface configuration mode. • In this example, cable-modem interface 0/3/0 is configured.
Step 4	ip address <i>ip-address mask [secondary]</i> Example: Router(config-if)# ip address 10.5.5.5 255.255.255.0	Sets a primary or secondary IP address for an interface. • In this example, a static IP address of 10.5.5.5 is configured under the cable modem interface.
Step 5	service-module ip rip relay Example: Router(config-if)# service-module ip rip relay	Enables RIP relay in the ISR cable modem driver.
Step 6	no ip split-horizon Example: Router(config-if)# no ip split-horizon	Disables split horizon, allowing routing updates to be sent from the interface over which the route was learned.
Step 7	exit Example: Router(config-if)# exit	Exits interface configuration mode and returns to global configuration mode.
Step 8	router rip Example: Router(config)# router rip	Enters router configuration mode for the specified routing process. • In this example, a RIP routing process is configured.
Step 9	version {1 2} Example: Router(config-router)# version 2	Specifies a RIP version used globally by the router. • In this example, the software sends and receives RIP version 2 packets.

	Command or Action	Purpose
Step 10	<p>no validate-update-source</p> <p>Example: Router(config-router)# no validate-update-source</p>	<p>Disables the validation of the source IP address of incoming RIP routing updates.</p> <ul style="list-style-type: none"> When the validation check is enabled, the software ensures that the source IP address of incoming routing updates is on the same IP network as one of the addresses defined for the receiving interface. In this example, the router is configured not to perform validation checks on the source IP address of incoming RIP updates.
Step 11	<p>network ip-address</p> <p>Example: Router(config-router)# network 10.0.0.0</p>	<p>Specifies a list of networks for the RIP routing process.</p> <ul style="list-style-type: none"> In this example, RIP is defined as the routing protocol to be used on all interfaces connected to network 10.0.0.0.
Step 12	<p>end</p> <p>Example: Router(config-router)# end</p>	<p>Exits router configuration mode and returns to privileged EXEC mode.</p>

Verifying the Configuration of HFC RIP Relay

Use the following steps to verify the local configuration of HFC RIP relay on a router.

SUMMARY STEPS

- enable**
- show running-config [options]**

DETAILED STEPS

Step 1 enable

Enables privileged EXEC mode. Enter your password if prompted.

```
Router> enable
```

Step 2 show running-config [options]

Displays the running configuration on the local router. The output will display the configuration of the **service-module ip rip relay** command in the cable modem interface section and the RIP commands under the RIP protocol section.

```
Router# show running-config
.
.
.
interface Cable-Modem0/3/0
 ip address 172.20.0.2 255.255.255.0
 service-module ip rip relay
 no ip split-horizon
```

```
.  
. .  
router rip  
  version 2  
  no validate-update-source  
  network 10.0.0.0  
  network 172.18.0.0  
. . .
```

Configuration Examples for HFC RIP Relay

This section contains the following examples:

- [Enabling HFC RIP Relay: Example, page 8](#)
- [Enabling HFC RIP Relay for a Single Subnet and Disabling Split-Horizon: Example, page 8](#)

Enabling HFC RIP Relay: Example

The following example enables RIP relay on an ISR cable modem. A static IP address is configured for the cable-modem interface, and RIP relay is enabled on the interface. Validation of the source IP address of incoming RIP routing updates is disabled to allow RIP updates from unknown sources. RIP is defined as the routing protocol to be used on all interfaces connected to networks 10.0.0.0 and 172.18.0.0.

```
interface Cable-Modem0/3/0  
  ip address 10.5.5.5 255.255.255.0  
  service-module ip rip relay  
  exit  
router rip  
  version 2  
  no validate-update-source  
  network 10.0.0.0  
  network 172.18.0.0
```

Enabling HFC RIP Relay for a Single Subnet and Disabling Split-Horizon: Example

The following example enables RIP relay on an ISR cable modem. A static IP address is configured for the cable-modem interface, and RIP relay is enabled on the interface. Validation of the source IP address of incoming RIP routing updates is disabled to allow RIP updates from unknown sources, and split-horizon is disabled. RIP is defined as the routing protocol to be used on all interfaces connected to network 172.20.0.0.

```
interface Cable-Modem0/3/0  
  ip address 172.20.0.2 255.255.255.0  
  service-module ip rip relay  
  no ip split-horizon  
  exit  
router rip  
  version 2
```

```
no validate-update-source
network 172.20.0.0
```

Where to Go Next

For more details about the configuration of cable modem HWIC cards, see the [Cisco Cable Modem High-Speed WAN Interface Cards Configuration Guide](#).

Additional References

The following sections provide references related to the HFC RIP Relay feature.

Related Documents

Related Topic	Document Title
Cable modem HWIC card configuration	Cisco Cable Modem High-Speed WAN Interface Cards Configuration Guide
RIP commands: complete command syntax, command mode, defaults, command history, usage guidelines, and examples	Cisco IOS IP Routing Protocols Command Reference

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

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>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.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/techsupport</p>

Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS IP Routing Protocols Command Reference* at http://www.cisco.com/en/US/docs/ios/iproute/command/reference/irp_book.html. For information about all Cisco IOS commands, use the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or the *Cisco IOS Master Command List, All Releases*, at http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html.

- **service-module ip rip relay**

Feature Information for HFC RIP Relay

Table 1 lists the release history for this feature.

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 HFC RIP Relay

Feature Name	Releases	Feature Information
HFC RIP Relay	12.4(15)XY 12.4(20)T	<p>The HFC RIP Relay feature allows the delivery of Routing Information Protocol (RIP) messages from a Cisco IOS router containing a cable High-Speed WAN Interface Card (HWIC) to the Hybrid Fiber-Coaxial (HFC) Cable Modem Termination System (CMTS) when they are on different subnets. Configuring a static IP address is now also supported on a cable modem interface.</p> <p>The following command was introduced by this feature: service-module ip rip relay.</p>

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