

IP-RIP Delay Start

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Some non-Cisco routers will not allow an MD5-authenticated RIPv2 neighbor session to start when the sequence number of the first MD5 packet received from the Cisco router is greater than 0. The IP-RIP Delay Start feature is used on Cisco routers to delay the initiation of RIPv2 neighbor sessions until the network connectivity between the neighbor routers is fully operational, thereby ensuring that the sequence number of the first MD5 packet that the router sends to the non-Cisco neighbor router is 0.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. 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 IP-RIP Delay Start”](#) section on page 13.

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 IP-RIP Delay Start

Your router must be running Cisco IOS Release 12.4(12) or a later release.

Restrictions for IP-RIP Delay Start

The IP-RIP Delay Start feature is required only when your Cisco router is configured to establish a RIPv2 neighbor relationship with a non-Cisco device and you want to use MD5 neighbor authentication.

Information About Neighbor Router Authentication and About IP-RIP Delay Start

For more information about neighbor router authentication and the IP-RIP Delay Start feature, see the following sections:

- [Neighbor Router Authentication, page 2](#)
- [IP-RIP Delay Start, page 2](#)

Neighbor Router Authentication

You can prevent your router from receiving fraudulent route updates by configuring neighbor router authentication. When configured, neighbor authentication occurs whenever routing updates are exchanged between neighbor routers. This authentication ensures that a router receives reliable routing information from a trusted source.

Without neighbor authentication, unauthorized or deliberately malicious routing updates could compromise the security of your network traffic. A security compromise could occur if an unfriendly party diverts or analyzes your network traffic. For example, an unauthorized router could send a fictitious routing update to convince your router to send traffic to an incorrect destination. This diverted traffic could be analyzed to learn confidential information about your organization or merely used to disrupt your organization's ability to effectively communicate using the network. Neighbor authentication prevents any such fraudulent route updates from being received by your router.

For more information about neighbor router authentication, see the [“Neighbor Router Authentication” module](#), Cisco IOS Release 12.4.

IP-RIP Delay Start

The IP-RIP Delay Start feature is used on Cisco routers to delay the initiation of RIPv2 neighbor sessions until the network connectivity between the neighbor routers is fully operational, thereby ensuring that the sequence number of the first MD5 packet that the router sends to the non-Cisco neighbor router is 0. The default behavior for a router configured to establish RIPv2 neighbor sessions with a neighbor router using MD5 authentication is to start sending MD5 packets when the physical interface is up.

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Frame Relay

The IP-RIP Delay Start feature is often used when a Cisco router is configured to establish a RIPv2 neighbor relationship using MD5 authentication with a non-Cisco device over a Frame Relay network. When RIPv2 neighbors are connected over Frame Relay, it is possible for the serial interface connected to the Frame Relay network to be up while the underlying Frame Relay circuits are not yet ready to transmit and receive data. When a serial interface is up and the Frame Relay circuits are not yet operational, any MD5 packets that the router attempts to transmit over the serial interface are dropped. When MD5 packets are dropped because the Frame Relay circuits over which the packets need to be transmitted are not yet operational, the sequence number of first MD5 packet received by the neighbor router after the Frame Relay circuits become active will be greater than 0. Some non-Cisco routers will not allow an MD5-authenticated RIPv2 neighbor session to start when the sequence number of the first MD5 packet received from the other router is greater than 0.

The differences in vendor implementations of MD5 authentication for RIPv2 are probably a result of the ambiguity of the relevant RFC (RFC #2082) with regards to packet loss. RFC #2082 suggests that routers should be ready to accept either a sequence number of 0 or a sequence number higher than the last sequence number received. For more information about MD5 message reception for RIPv2, see section 3.2.2 of RFC #2082 at the following url: <http://www.ietf.org/rfc/rfc2082.txt>.

**Timesaver**

Cisco routers allow an MD5-authenticated RIPv2 neighbor session to start when the sequence number of the first MD5 packet received from the other router is greater than 0. If you are using only Cisco routers in your network, you do not need to use the IP-RIP Delay Start feature.

**Note**

The IP-RIP Delay Start feature is supported over other interface types such as Fast Ethernet and Gigabit Ethernet. If your Cisco router cannot establish RIPv2 neighbor sessions using MD5 authentication with a non-Cisco device, the IP-RIP Delay Start feature might resolve the problem.

How to Configure IP-RIP Delay Start for Routers Connected by a Frame Relay Network

The tasks in this section explain how to configure a router to use the IP-RIP Delay Start feature on a Frame Relay interface.

- [Configuring RIPv2, page 3](#) (required)
- [Configuring Frame Relay on a Serial Subinterface, page 5](#) (required)
- [Configuring IP, MD5 Authentication for RIPv2 and the IP-RIP Delay Start Feature on a Frame Relay Subinterface, page 6](#) (required)

Configuring RIPv2

This required task configures RIPv2 on the router.

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This task provides instructions for only one of the many possible permutations for configuring RIPv2 on your router. For more information about and instructions for configuring RIPv2, see the Configuring Routing Information Protocol chapter of the *Cisco IOS IP Routing Protocols Configuration Guide*, Cisco IOS Release 12.4.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router rip**
4. **network ip-network**
5. **version {1 | 2}**
6. **[no] auto-summary**

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	router rip Example: Router(config)# router rip	Enables a RIP routing process, which places you in router configuration mode.
Step 4	network ip-network Example: Router(config-router)# network 192.168.0.0	Associates a network with a RIP routing process.
Step 5	version {1 2} Example: Router (config-router)# version 2	Configures the software to receive and send only RIP Version 1 or only RIP Version 2 packets.
Step 6	[no] auto-summary Example: Router(config-router)# no auto-summary	Disables or restores the default behavior of automatic summarization of subnet routes into network-level routes.

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Configuring Frame Relay on a Serial Subinterface

This required task configures a serial subinterface for Frame Relay.

**Note**

This task provides instructions for only one of the many possible permutations for configuring Frame Relay on a subinterface. For more information about and instructions for configuring Frame Relay, see the Configuring Frame Relay part of the *Cisco IOS Wide Area Networking Configuration Guide*, Cisco IOS Release 12.4.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *interface-type interface-number*
4. **no ip address**
5. **encapsulation frame-relay** {mfr | ietf}
6. **frame-relay lmi-type** {cisco | ansi | q933a}
7. **interface type number.subinterface-number** {point-to-point | multipoint}
8. **frame-relay interface-dlci** *dlci* [ietf | cisco]

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 serial3/0	Specifies an interface and enters interface configuration mode.
Step 4	no ip address Example: Router config-if)# no ip address	Removes a previously configured IP address from the interface.
Step 5	encapsulation frame-relay {mfr ietf} Example: Router(config-if)# encapsulation frame-relay ietf	Specifies the type of Frame Relay encapsulation for the interface.

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	Command or Action	Purpose
Step 6	<pre>frame-relay lmi-type {cisco ansi q933a}</pre> <p>Example: Router(config-if)# frame-relay lmi-type ansi</p>	Specifies the type of Frame Relay local management interface (LMI) for the interface.
Step 7	<pre>interface type number.subinterface-number {point-to-point multipoint}</pre> <p>Example: Router(config-if)# interface serial3/0.1 point-to-point</p>	Specifies a subinterface and the connection type for the subinterface and enters subinterface configuration mode.
Step 8	<pre>frame-relay interface-dlci dlci [ietf cisco]</pre> <p>Example: Router(config-subif)# frame-relay interface-dlci 100 ietf</p>	Assigns a data-link connection identifier (DLCI) to a Frame Relay subinterface.

Configuring IP, MD5 Authentication for RIPv2 and the IP-RIP Delay Start Feature on a Frame Relay Subinterface

This required task configures IP, MD5 authentication for RIPv2 and the IP-RIP Delay Start feature on a Frame Relay subinterface.

Authentication Key Management

Key management is a method of controlling authentication keys used by routing protocols. The steps for configuring an authentication key are included in this task. For more information about managing authentication keys see the “Managing Authentication Keys” chapter of the [Cisco IOS IP Routing Protocols Configuration Guide](#), Cisco IOS Release 12.4.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **key chain** *name-of-chain*
4. **key** *number*
5. **key-string** *string*
6. **exit**
7. **exit**
8. **interface** *type number.subinterface-number*
9. **no cdp** {**enable** | **log**}
10. **ip address** *ip-address subnet-mask*
11. **ip rip authentication mode** {**text** | **md5**}
12. **ip rip authentication key-chain** *name-of-chain*

EDIT REVIEW DRAFT – CISCO CONFIDENTIAL**13. ip rip initial-delay delay****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	key chain name-of-chain Example: Router(config)# key chain rip-md5	Specifies the name of a key chain, and enters key chain configuration mode.
Step 4	key number Example: Router(config-keychain)# key 123456	Specifies the key identifier, and enters key chain key configuration mode. Range: 0 to 2147483647.
Step 5	key-string string Example: Router(config-keychain-key)# key-string abcde	Configures the key string.
Step 6	exit Example: Router(config-keychain-key)# exit	Exits key chain key configuration mode.
Step 7	exit Example: Router(config-keychain)# exit	Exits key chain configuration mode.
Step 8	interface type number.subinterface-number Example: Router(config)# interface serial3/0.1	Specifies a subinterface and enters subinterface configuration mode. Note The connection type keyword is not required for this step in this task because the connection type for this subinterface was specified in the previous task.
Step 9	no cdp {enable log} Example: Router(config-subif)# no cdp enable	Disables Cisco Discovery Protocol (CDP) options on the interface. Note CDP is not supported by non-Cisco devices; and the IP-RIP Delay Start feature is required only when you are connecting to a non-Cisco router. Therefore you should disable CDP on any interfaces on which you want to configure the IP-RIP Delay Start feature.

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	Command or Action	Purpose
Step 10	ip address <i>ip-address subnet-mask</i> Example: Router (config-subif)# ip address 172.16.10.1 255.255.255.0	Configures an IP address for the Frame Relay subinterface.
Step 11	ip rip authentication mode { <i>text</i> <i>md5</i> } Example: Router(config-subif)# ip rip authentication mode md5	Specifies the mode for RIPv2 MD5 authentication.
Step 12	ip rip authentication key-chain <i>name-of-chain</i> Example: Router (config-subif)# ip rip authentication key-chain rip-md5	Specifies a previously configured key chain for RIPv2 MD5 authentication.
Step 13	ip rip initial-delay <i>delay</i> Example: Router(config-subif)# ip rip initial-delay 45	Configures the IP-RIP Delay Start feature on the interface. The router will delay sending the first MD5 authentication packet to the RIPv2 neighbor for the number of seconds specified by the <i>delay</i> argument. Range: 0 to 1800.

Configuration Examples for IP-RIP Delay Start

The following example shows you how to configure the IP-RIP Delay Start feature on a Frame Relay interface.

- [Configuring IP-RIP Delay Start on a Frame Relay Interface: Example, page 8](#)

Configuring IP-RIP Delay Start on a Frame Relay Interface: Example

This excerpt from a router configuration file contains the minimum commands required to configure the IP-RIP Delay Start feature on your router.

```

!
key chain rip-md5
  key 123456
  key-string abcde
!
router rip
  version 2
  network 172.16.0.0
  no auto-summary
!
interface Serial13/0
  no ip address
  encapsulation frame-relay ietf
  frame-relay lmi-type ansi

```

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```
!  
interface Serial3/0.1 point-to-point  
 ip address 172.16.10.1 255.255.255.0  
 ip rip initial-delay 45  
 ip rip authentication mode md5  
 ip rip authentication key-chain rip-md5  
 frame-relay interface-dlci 100  
!
```

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Additional References

The following sections provide references related to the IP-RIP Delay Start feature.

Related Documents

Related Topic	Document Title
Configuring RIP	“Configuring Routing Information Protocol”
Configuring protocol-independent routing features	“Configuring IP Routing Protocol-Independent Features”
Configuring Frame Relay	“Configuring Frame Relay”
Configuring neighbor router authentication	“Neighbor Router Authentication”

Standards

Standard	Title
There are no standards associated with this feature.	—

MIBs

MIB	MIBs Link
There are no MIBs associated with 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
RFC #2082	<i>RIP-2 MD5 Authentication</i>
RFC #2453	<i>RIP Version 2</i>

Technical Assistance

Description	Link
The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and technical documentation. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

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Command Reference

This section documents new commands only.

- [ip rip initial-delay](#), page 12

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ip rip initial-delay

To delay the initiation of RIPv2 neighbor sessions using MD5 authentication until the network connectivity between the neighbor routers is fully operational, use the **ip rip initial-delay** command in interface, or subinterface configuration mode. To remove the configured delay, use the **no** form of this command.

ip rip initial-delay *delay*

no ip rip initial-delay

Syntax Description	<i>delay</i>	The number of seconds to wait before sending the first MD5 authentication packet to the RIPv2 neighbor. Range: 0 to 1800.
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Command Default This command is not enabled by default.

Command Modes Interface
Subinterface configuration

Command History	Release	Modification
	12.4(12)	This command was introduced.

Usage Guidelines Some non-Cisco routers will not allow an MD5-authenticated RIPv2 neighbor session to start when the sequence number of the first MD5 packet received from the Cisco router is greater than 0. The IP-RIP Delay Start feature is used on Cisco routers to delay the initiation of RIPv2 neighbor sessions using MD5 authentication until the network connectivity between the neighbor routers is fully operational thereby ensuring that the sequence number of the first MD5 packet that the router sends to the non-Cisco neighbor router is 0.

Examples The following example configures the router to wait 45 seconds before sending the first MD5 authentication packet to a non-Cisco device:

```
Router(config)# interface serial 3/0.1
Router(config-subif)# ip rip initial-delay 45
```

Related Commands	Command	Description
	debug ip rip	Displays information on Routing Information Protocol (RIP) routing transactions.
	show ip rip database	Displays information about the IP route entries in the RIP database.

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Feature Information for IP-RIP Delay Start

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.

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**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 IP-RIP Delay Start

Feature Name	Releases	Feature Information
IP-RIP Delay Start	12.4(12)	<p>The IP-RIP Delay Start feature is used on Cisco routers to delay the initiation of RIPv2 neighbor sessions using MD5 authentication over Frame Relay interfaces until the Frame Relay interface is fully operational, thereby ensuring that the sequence number of the first MD5 packet that the router sends to the non-Cisco neighbor router is 0.</p> <p>The following command was introduced by this feature: ip rip initial-delay.</p>

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