Cisco IOS IP Routing: RIP Command Reference

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C O N T E N T S

Introduction

This book describes the commands used to configure and monitor Routing Information Protocol (RIP) routing capabilities and features.

For RIP configuration information and examples, refer to the *Cisco IOS IP Routing: RIP Configuration Guide*.

Routing Information Protocol Commands

auto-summary (RIP)

To restore the default behavior of automatic summarization of subnet routes into network-level routes, use the **auto-summary** command in router configuration mode. To disable this function and send subprefix routing information across classful network boundaries, use the **no** form of this command.

auto-summary

no auto-summary

Syntax Description   This command has no arguments or keywords.

Command Default   Enabled (the software summarizes subprefixes to the classful network boundary when crossing classful network boundaries).

Command Modes   Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   Route summarization reduces the amount of routing information in the routing tables.

RIP Version 1 always uses automatic summarization. If you are using RIP Version 2, you can turn off automatic summarization by specifying the **no auto-summary** command. Disable automatic summarization if you must perform routing between disconnected subnets. When automatic summarization is off, subnets are advertised.

Examples   In the following example, network numbers are not summarized automatically:

```
router rip
 version 2
 no auto-summary
```

bfd all-interfaces

To enable Bidirectional Forwarding Detection (BFD) for all interfaces participating in the routing process, use the **bfd all-interfaces** command in router configuration or address-family interface configuration mode. To disable BFD for all neighbors on a single interface, use the **no** form of this command.

> **bfd all-interfaces**

> **no bfd all-interfaces**

Syntax Description This command has no arguments or keywords.

Command Default BFD is disabled on the interfaces participating in the routing process.

Command Modes Router configuration (config-router) and address-family interface configuration (config-router-af)

Command History

Release	Modification
12.2(18)SXE	This command was introduced.
12.0(31)S	This command was integrated into Cisco IOS Release 12.0(31)S.
12.4(4)T	This command was integrated into Cisco IOS Release 12.4(4)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS Release 2.1 XE	This command was integrated into Cisco IOS Release 2.1 XE and implemented on the Cisco ASR 1000 Series Aggregation Services Routers.
12.2(33)SRE	This command was modified. Support for IPv6 was added.
15.0(1)M	This command was modified. The **bfd all-interfaces** command in named router configuration mode was replaced by the **bfd** command in address-family interface mode.
15.1(2)T	This command was modified. Support for IPv6 was added.
Cisco IOS XE Release 3.3	This command was modified. Support for the Routing Information Protocol was added.

Usage Guidelines There are two methods to configure routing protocols to use BFD for failure detection. To enable BFD for all interfaces, enter the **bfd all-interfaces** command in router configuration mode. In Cisco IOS Release 12.4(24)T, Cisco IOS 12.2(33)SRA and earlier releases, the **bfd all-interfaces** command works in router configuration mode and address-family interface mode.

In Cisco IOS Release 15.0(1)M and later releases, the **bfd all-interfaces** command in named router configuration mode is replaced by the **bfd** command in address-family interface configuration mode. Use the **bfd** command in address-family interface configuration mode to achieve the same functionality as that of the **bfd all interfaces** command in router configuration mode.

Examples   The following example shows how to enable BFD for all Enhanced Interior Gateway Routing Protocol (EIGRP) neighbors:

```
Router> enable
Router# configure terminal
Router(config)# router eigrp 123
Router(config-router)# bfd all-interfaces
Router(config-router)# end
```

The following example shows how to enable BFD for all Intermediate System-to-Intermediate System (IS-IS) neighbors:

```
Router> enable
Router# configure terminal
Router(config)# router isis tag1
Router(config-router)# bfd all-interfaces
Router(config-router)# end
```

The following example shows how to enable BFD for all Open Shortest Path First (OSPF) neighbors:

```
Router> enable
Router# configure terminal
Router(config)# router ospf 123
Router(config-router)# bfd all-interfaces
Router(config-router)# end
```

The following example shows how to enable BFD for all EIGRP neighbors, using the **bfd** command in address-family interface configuration mode:

```
Router> enable
Router# configure terminal
Router(config)# router eigrp my_eigrp
Router(config-router)# address-family ipv4 autonomous-system 100
Router(config-router-af)# af-interface FastEthernet 0/0
Router(config-router-af-interface)# bfd
```

The following example shows how to enable BFD for all Routing Information Protocol (RIP) neighbors:

```
Router> enable
Router# configure terminal
Router(config)# router rip
Router(config-router)# bfd all-interfaces
Router(config-router)# end
```

Related Commands

Command	Description
bfd	Sets the baseline BFD session parameters on an interface.

Routing Information Protocol Commands

default

default-information originate (RIP)

To generate a default route into Routing Information Protocol (RIP), use the **default-information originate** command in router configuration mode. To disable this feature, use the **no** form of this command.

default-information originate [**on-passive** | **route-map** *map-name*]

no default-information originate

Syntax Description

on-passive	(Optional) Sends default routes only on RIP passive interfaces.
route-map *map-name*	(Optional) Specifies that the routing process will generate the default route if the route map is satisfied.

Command Default No default routes are generated into RIP.

Command Modes Router configuration (config-router)

Command History

Release	Modification
11.2	This command was introduced.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1(2)S	This command was modified. The **on-passive** keyword was added.

Usage Guidelines The route map referenced in the **default-information originate** command cannot use an extended access list; it can use a standard access list.

When you configure the **default-information originate on-passive** command, RIP sends the default route on a passive interface. A default route is the network route with which a router communicates when no other known route exists for a given IP packet's destination address. Before a RIP provider edge (PE) router can send the default route to the customer edge (CE) router, you must configure the interfaces facing the CE as passive interfaces by using the **default-information originate on-passive** command.

Once you configure the **default-information originate on-passive** command, the output of the **show ip protocols** command displays that RIP default routes are sent on passive interfaces.

Applying a condition to determine when the default route is originated is called conditional default origination.

Examples The following example shows how to originate a default route (0.0.0.0/0) over a certain interface when 172.17.0.0/16 is present. In this example a route map condition is applied.

```
router rip
 version 2
```

```
 network 172.17.16.0
 default-information originate route-map condition
!
 route-map condition permit 10
 match ip address 10
 set interface s1/0
!
access-list 10 permit 172.17.16.0 0.0.0.255
!
```

Related Commands	Command	Description
	access-list	Configures the access list mechanism for filtering frames by protocol type or vendor code.
	match ip address	Distributes any routes that have a destination network number address that is permitted by a standard access list, an extended access list, or a prefix list, or performs policy routing on packets.
	route-map	Defines the conditions for redistributing routes from one routing protocol into another routing protocol, or to enable policy routing.
	router rip	Configures the RIP routing process.
	set interface	Indicates where to forward packets that pass a match clause of a route map for policy routing.
	show ip protocols	Displays the parameters and the current state of the active routing protocol process.

default-metric (RIP)

To set default metric values for Routing Information Protocol (RIP), use the **default-metric** command in router configuration mode. To return to the default state, use the **no** form of this command.

> **default-metric** *number-value*

> **no default-metric** [*number-value*]

Syntax Description

number-value	Default metric value.

Defaults

Built-in, automatic metric translations, as appropriate for each routing protocol

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **default-metric** command is used in conjunction with the **redistribute** router configuration command to cause the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics. Whenever metrics do not convert, using a default metric provides a reasonable substitute and enables the redistribution to proceed.

Examples

The following example shows a router in autonomous system 109 using both the RIP and the Open Shortest Path First (OSPF) routing protocols. The example advertises OSPF-derived routes using RIP and assigns the OSPF-derived routes a RIP metric of 10.

```
router rip
 default-metric 10
 redistribute ospf 109
```

Related Commands

Command	Description
redistribute (IP)	Redistributes routes from one routing domain into another routing domain.

flash-update-threshold

To suppress regularly scheduled flash updates, use the **flash-update-threshold** command in router configuration mode. To return to the default state, use the **no** form of this command.

flash-update-threshold *seconds*

no flash-update-threshold

Syntax Description		
seconds		The time interval in seconds for which the suppression of flash updates can be configured. The range is from 1 to 30 seconds.

Defaults

This command is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
12.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command suppresses flash updates when the arrival of a regularly scheduled update matches the number of seconds that is configured with the *seconds* argument. The range of seconds that can be configure is from 0 to 30 seconds. If the number of seconds matches the number of seconds or is less than the number seconds that is configured with the *seconds* argument, the flash update is suppressed. If the numbers seconds until the flash update arrives exceeds the number of seconds that is configured with the *seconds* argument, the flash update is not suppressed. The regular scheduled interval for flash updates and the configuration of the suppression of flash updates can be verified with the **show ip protocol** command.

Examples

The following example configures a router to suppress a regularly scheduled flash update if the update is due in 10 seconds or less:

```
router rip
 flash-update-threshold 10
```

Related Commands

Command	Description
show ip protocols	Displays the parameters and current state of the active routing protocol process.

input-queue

The **input-queue** command defines the number of received, but not yet processed RIP update packets contained in the Routing Information Protocol (RIP) input queue. Use the **input-queue** command in router configuration mode. To remove the configured depth and restore the default depth, use the **no** form of this command.

input-queue *depth*

no input-queue

Syntax Description

depth	Numerical value associated with the maximum number of packets in the RIP input queue. The larger the numerical value, the larger the depth of the queue. The range is from 0 to 1024. The default is 50.

Defaults

A depth of 50.

Command Modes

Router configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Consider using the **input-queue** command if you have a high-end router that is sending at high speed to a low-speed router that might not be able to receive at the high speed. Configuring this command will help prevent the routing table from losing information.

Another way to prevent the routing table from losing information is to use the **output-delay** command to change the interpacket delay for RIP updates.

Examples

The following example sets the depth of the RIP input queue to 100:

```
router rip
 input-queue 100
```

Related Commands

Command	Description
output-delay	Changes the interpacket delay for RIP updates sent.

ip rip authentication key-chain

To enable authentication for Routing Information Protocol (RIP) Version 2 packets and to specify the set of keys that can be used on an interface, use the **ip rip authentication key-chain** command in interface configuration mode. To prevent authentication, use the **no** form of this command.

ip rip authentication key-chain *name-of-chain*

no ip rip authentication key-chain [*name-of-chain*]

Syntax Description

name-of-chain	Enables authentication and specifies the group of keys that are valid.

Defaults

No authentication is provided for RIP packets.

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If no key chain is configured with the **key-chain** command, no authentication is performed on the interface (not even the default authentication).

Examples

The following example configures the interface to accept and send any key belonging to the key chain named trees:

```
ip rip authentication key-chain trees
```

Related Commands

Command	Description
key chain	Enables authentication for routing protocols.

ip rip authentication mode

To specify the type of authentication used in Routing Information Protocol (RIP) Version 2 packets, use the **ip rip authentication mode** command in interface configuration mode. To restore clear text authentication, use the **no** form of this command.

ip rip authentication mode {**text** | **md5**}

no ip rip authentication mode

Syntax Description		
text	Clear text authentication.	
md5	Keyed Message Digest 5 (MD5) authentication.	

Defaults   Clear text authentication is provided for RIP packets.

Command Modes   Interface configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   RIP Version 1 does not support authentication.

Examples   The following example configures the interface to use MD5 authentication:

```
ip rip authentication mode md5
```

Related Commands

Command	Description
ip rip authentication key-chain	Enables authentication for RIP Version 2 packets and specifies the set of keys that can be used on an interface.
key chain	Enables authentication for routing protocols.

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

delay	The number of seconds to wait before sending the first MD5 authentication packet to the RIPv2 neighbor. The range is from 0 to 1800.

Command Default

The delay of RIPv2 neighbor sessions is not configured.

Command Modes

Interface configuration (config-if)
Subinterface configuration (config-subif)

Command History

Release	Modification
12.4(12)	This command was introduced.
Cisco IOS XE Release 2.6	This command was integrated into Cisco IOS XE Release 2.6.

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. This ensures 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 POS 0/1/0
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.

ip rip receive version

To specify a Routing Information Protocol (RIP) version to receive on an interface basis, use the **ip rip receive version** command in interface configuration mode. To follow the global **version** rules, use the **no** form of this command.

ip rip receive version [**1**] [**2**]

no ip rip receive version

Syntax Description	**1**	(Optional) Accepts only RIP Version 1 packets on the interface.
	2	(Optional) Accepts only RIP Version 2 packets on the interface.

Defaults This command is disabled by default.

Command Modes Interface configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines Use this command to override the default behavior of RIP as specified by the **version** command. This command applies only to the interface being configured. You can configure the interface to accept both RIP versions.

Examples The following example configures the interface to receive both RIP Version 1 and Version 2 packets:

```
ip rip receive version 1 2
```

The following example configures the interface to receive only RIP Version 1 packets:

```
ip rip receive version 1
```

Related Commands

Command	Description
key chain	Enables authentication for routing protocols.
ip rip authentication key-chain	Enables authentication for RIP Version 2 packets and specifies the set of keys that can be used on an interface.

ip rip send version	Specifies a RIP version to send on an interface basis.
version	Specifies a RIP version used globally by the router.

ip rip send version

To specify a Routing Information Protocol (RIP) version to send on an interface basis, use the **ip rip send version** command in interface configuration mode. To follow the global **version** rules, use the **no** form of this command.

> **ip rip send version** [**1**] [**2**]

> **no ip rip send version**

Syntax Description		
1		(Optional) Sends only RIP Version 1 packets out the interface.
2		(Optional) Sends only RIP Version 2 packets out the interface.

Defaults

This command is disabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command to override the default behavior of RIP as specified by the **version** command. This command applies only to the interface being configured.

Examples

The following example configures the interface to send both RIP Version 1 and Version 2 packets out the interface:

```
ip rip send version 1 2
```

The following example configures the interface to send only RIP Version 2 packets out the interface:

```
ip rip send version 2
```

Related Commands

Command	Description
ip rip receive version	Specifies a RIP version to receive on an interface basis.
version	Specifies a RIP version used globally by the router.

ip rip triggered

To enable triggered extensions to Routing Information Protocol (RIP), use the **ip rip triggered** command in interface configuration mode. To disable triggered extensions to RIP, use the **no** form of this command.

    ip rip triggered

    no ip rip triggered

Syntax Description   This command has no arguments or keywords.

Defaults   This command is disabled by default.

Command Modes   Interface configuration

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   When triggered extensions to RIP are enabled, routing updates are sent on the WAN only if one of the following events occurs:

- The router receives a specific request for a routing update. (Full database is sent.)
- Information from another interface modifies the routing database. (Only latest changes are sent.)
- The interface comes up or goes down. (Partial database is sent.)
- The router is first powered on, to ensure that at least one update is sent. (Full database is sent.)

You might want to enable this feature if you are using an on-demand circuit and you are charged for usage time. Fewer routing updates will incur lower usage costs.

Entries in the routing database can be either temporary or semipermanent. Entries learned from broadcasts on LANs are temporary; they will expire if not periodically refreshed by more broadcasts.

Entries learned from a triggered response on the WAN are semipermanent; they do not time out like other entries. Certain events can cause these routes to time out, such as the interface going down, or if the outgoing interface is the same as the incoming interface. Neighbor updates of the routes with a metric of 16 (infinity) mean the route is unreachable, and those routes are eventually removed from the routing table.

Examples   The following example enables triggered extensions to RIP:

```
interface serial 0
 ip rip triggered
```

Related Commands

Command	Description
show ip rip database	Displays the contents of the RIP private database when triggered extensions to RIP are enabled.

ip rip v2-broadcast

To allow Routing Information Protocol (RIP) Version 2 update packets to be sent as broadcast packets instead of multicast packets, use the **ip rip v2-broadcast** command in interface configuration mode. To disable the broadcast of IP RIP Version 2 update packets that are sent as broadcast packets, use the **no** form of this command.

ip rip v2-broadcast

no ip rip v2-broadcast

Syntax Description   This command has no arguments or keywords.

Command Default   This command is disabled by default. Unless the **ip rip v2-broadcast** commend is entered, RIP Version 2 update packets are sent as multicast packets.

Command Modes   Interface configuration (config-if)

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   Use the **ip rip v2-broadcast** command to broadcast RIP Version 2 broadcast updates to hosts that do not listen to multicast broadcasts. Version 2 updates (requests and responses) will be sent to the IP broadcast address 255.255.255.255 instead of the IP multicast address 224.0.0.9.

In order to reduce unnecessary load on those hosts that are not listening to RIP Version 2 broadcasts, the system uses an IP multicast address for periodic broadcasts. The IP multicast address is 224.0.0.9.

Note   It is not necessary to configure Internet Group Management Protocol (IGMP) because the periodic broadcasts are interrouter messages that are not forwarded.

Examples   The following example configures Version 2 IP broadcast updates on RIP Ethernet interface 3/1:

```
Router(config) interface ethernet3/1
Router(config-if) ip address 172.16.1.1 255.255.255.0
Router(config-if) ip rip v2-broadcast
.
.
.
```

```
Router(config-if) router rip
Router(config-if) version 2
Router(config-if) network 172.0.0.0
```

Enter **debug ip rip** command to verify that RIP Version 2 IP broadcast updates are being sent to the IP broadcast address 255.255.255 instead of IP multicast address 224.0.0.9:

```
Router# debug ip rip
14:41:59: RIP: sending v2 update to 255.255.255.255 via Ethernet3/1 (172.16.1.1)
```

If the **ip rip v2-broadcast** command has not been entered, the output from the **debug ip rip** command verifies that the RIP Version 2 IP broadcast updates are being sent to the IP multicast address 224.0.0.9:

```
Router# debug ip rip
15:45:16: RIP: sending v2 update to 224.0.0.9 via Ethernet3.1 (172.16.1.1)
```

Related Commands	Command	Description
	debug ip rip	Displays information on RIP routing transactions.

ip split-horizon (RIP)

To enable the split horizon mechanism, use the **ip split-horizon** command in interface configuration mode. To disable the split horizon mechanism, use the **no** form of this command.

> **ip split-horizon**

> **no ip split-horizon**

Syntax Description   This command has no arguments or keywords.

Defaults   Default behavior varies with media type.

Command Modes   Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   For all interfaces except those for which either Frame Relay or Switched Multimegabit Data Service (SMDS) encapsulation is enabled, the default condition for this command is **ip split-horizon**; in other words, the split horizon feature is active. If the interface configuration includes either the **encapsulation frame-relay** or **encapsulation smds** command, then the default is for split horizon to be disabled. Split horizon is not disabled by default for interfaces using any of the X.25 encapsulations.

Note   For networks that include links over X.25 packet switched networks (PSNs), the **neighbor** router configuration command can be used to defeat the split horizon feature. You can as an alternative *explicitly* specify the **no ip split-horizon** command in your configuration. However, if you do so you *must* similarly disable split horizon for all routers in any relevant multicast groups on that network.

Note   If split horizon has been disabled on an interface and you want to enable it, use the **ip split-horizon** command to restore the split horizon mechanism.

Note   In general, changing the state of the default for the **ip split-horizon** command is not recommended, unless you are certain that your application requires a change in order to properly advertise routes. If split horizon is disabled on a serial interface (and that interface is attached to a PSN), you *must* disable split horizon for all routers and access servers in any relevant multicast groups on that network.

Examples   The following simple example disables split horizon on a serial link. The serial link is connected to an X.25 network.

```
interface serial 0
 encapsulation x25
 no ip split-horizon
```

Related Commands

Command	Description
neighbor (RIP)	Defines a neighboring router with which to exchange routing information.

ip summary-address rip

To configure a summary aggregate address under an interface for the Routing Information Protocol (RIP), use the **ip summary-address rip** command in interface configuration mode. To disable summarization of the specified address or subnet, use the **no** form of this command.

ip summary-address rip *ip-address ip-network-mask*

no ip summary-address rip *ip-address ip-network-mask*

Syntax Description		
	ip-address	IP address to be summarized.
	ip-network-mask	IP network mask that drives route summarization for the specified IP address.

Command Default

RIP automatically summarizes to classful network boundaries.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(6)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **ip summary-address rip** command is used to summarize an address or subnet under a specific interface. RIP automatically summarizes to classful network boundaries. Only one summary address can be configured for each classful subnet.

Examples

In the following example the major network is 10.0.0.0. The summary address 10.2.0.0 overrides the autosummary address of 10.0.0.0, so that 10.2.0.0 is advertised out Ethernet interface 1 and 10.0.0.0 is not advertised.

Note   If split horizon is enabled, neither autosummary nor interface summary addresses (those configured with the **ip summary-address rip** command) are advertised.

```
interface Ethernet1
 ip address 10.1.1.1 255.255.255.0
 ip summary-address rip 10.2.0.0 255.255.0
 exit
```

```
router rip
 network 10.0.0.0
 end
```

Related Commands	Command	Description
	auto-summary (RIP)	Restores the default behavior of automatic summarization of subnet routes into network-level routes.
	ip split-horizon (RIP)	Enables the split horizon mechanism.

neighbor (RIP)

To define a neighboring router for exchanging routing information, use the **neighbor** command in router configuration mode. To remove a neighboring router entry, use the **no** form of this command.

neighbor *ip-address* [**bfd**]

no neighbor *ip-address* [**bfd**]

Syntax Description

ip-address	IP address of a peer router with which the routing information is exchanged.
bfd	(Optional) Sets the baseline Bidirectional Forwarding Detection (BFD) session parameters on an interface.

Command Default

No neighboring routers are defined.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 3.3	This command was modified and integrated into Cisco IOS XE Release 3.3S and implemented on the Cisco ASR 1000 Series Aggregation Services Routers. The **bfd** keyword was added.
15.1(2)S	This command was integrated into Cisco IOS Release 15.1(2)S.

Usage Guidelines

This command permits point-to-point (nonbroadcast) exchange of routing information. When it is used in combination with the **passive-interface** command, routing information can be exchanged between a subset of routers and access servers on a LAN.

Use multiple **neighbor** commands to specify additional neighbors or peers.

Examples

In the following example, RIP updates are sent to all interfaces on network 10.108.0.0 except Ethernet interface 1. However, in this case, a **neighbor** router configuration command is included. This command permits the sending of routing updates to specific neighbors. One copy of the routing update is generated per neighbor.

```
Router> enable
Router# configure terminal
Router(config)# router rip
Router(config-router)# network 10.108.0.0
Router(config-router)# passive-interface Ethernet 1
Router(config-router)# neighbor 10.108.20.4
Router(config-router)# end
```

The following example shows how to enable BFD for RIP neighbors:

```
Router> enable
Router# configure terminal
Router(config)# neighbor 10.0.0.1 bfd
Router(config-router)# end
```

Related Commands	Command	Description
	passive-interface	Disables sending routing updates on an interface.

network (RIP)

To specify a list of networks for the Routing Information Protocol (RIP) routing process, use the **network** command in router configuration mode. To remove an entry, use the **no** form of this command.

> **network** *ip-address*

> **no network** *ip-address*

Syntax Description

ip-address	IP address of the network of directly connected networks.

Defaults

No networks are specified.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The network number specified must not contain any subnet information. There is no limit to the number of **network** commands you can use on the router. RIP routing updates will be sent and received only through interfaces on this network.

RIP sends updates to the interfaces in the specified networks. Also, if the network of an interface is not specified, the interface will not be advertised in any RIP update.

Examples

The following example defines RIP as the routing protocol to be used on all interfaces connected to networks 10.99.0.0 and 192.168.7.0:

```
router rip
 network 10.99.0.0
 network 192.168.7.0
```

Related Commands

Command	Description
router rip	Configures the RIP routing process.

offset-list (RIP)

To add an offset to incoming and outgoing metrics to routes learned via Routing Information Protocol (RIP), use the **offset-list** command in router configuration mode. To remove an offset list, use the **no** form of this command.

> **offset-list** {*access-list-number* | *access-list-name*} {**in** | **out**} *offset* [*interface-type interface-number*]

> **no offset-list** {*access-list-number* | *access-list-name*} {**in** | **out**} *offset* [*interface-type interface-number*]

Syntax Description

access-list-number	Standard access list number to be applied. Access list number 0 indicates all access lists. If *offset* is 0, no action is taken. For IGRP, the offset is added to the delay component only.
access-list-name	Standard access list name to be applied.
in	Applies the access list to incoming metrics.
out	Applies the access list to outgoing metrics.
offset	Positive offset to be applied to metrics for networks matching the access list. If the offset is 0, no action is taken.
interface-type	(Optional) Interface type to which the offset list is applied.
interface-number	(Optional) Interface number to which the offset list is applied.

Defaults

This command is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
10.3	The *interface-type* and **interface-**number arguments were added.
11.2	The *access-list-name* argument was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The offset value is added to the routing metric. An offset list with an interface type and interface number is considered extended and takes precedence over an offset list that is not extended. Therefore, if an entry passes the extended offset list and the normal offset list, the offset of the extended offset list is added to the metric.

Examples　　　In the following example, the router applies an offset of 10 to the delay component of a router only to access list 21:

```
offset-list 21 out 10
```

In the following example, the router applies an offset of 10 to routes learned from Ethernet interface 0:

```
offset-list 21 in 10 ethernet 0
```

output-delay

To change the interpacket delay for Routing Information Protocol (RIP) updates sent, use the **output-delay** command in router configuration mode. To remove the delay, use the **no** form of this command.

output-delay *delay*

no output-delay

Syntax Description		
	delay	Delay between packets in a multiple-packet RIP update (in milliseconds). The range is from 8 to 50. The default is 0.

Command Default The default interpacket delay is 0 milliseconds.

Command Modes Router configuration

Command History	Release	Modification
	10.0	This command was introduced.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines Consider using this command if you have a high-end router that is sending at high speed to a low-speed router that might not be able to receive at the high speed. Configuring this command will help prevent the routing table from losing information.

Examples The following example sets the interpacket delay to 10 milliseconds:

```
router rip
 output-delay 10
```

router rip

To configure the Routing Information Protocol (RIP) routing process, use the **router rip** command in global configuration mode. To turn off the RIP routing process, use the **no** form of this command.

router rip

no router rip

Syntax Description   This command has no arguments or keywords.

Command Default   No RIP routing process is defined.

Command Modes   Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples   The following example shows how to begin the RIP routing process:

```
router rip
```

Related Commands

Command	Description
network (RIP)	Specifies a list of networks for the RIP process.

service-module ip rip relay

To enable the delivery of RIP update messages from a Cisco IOS router containing an integrated cable modem or a cable modem HWIC to a Hybrid Fiber-Coaxial (HFC) CMTS when they are on different subnets, use the **service-module ip rip relay** command in interface configuration mode. To disable RIP relay, use the **no** form of this command.

service-module ip rip relay

no service-module ip rip relay

Syntax Description   This command has no keywords or arguments.

Command Default   RIP relay is disabled.

Command Modes   Interface configuration (config-if)

Command History

Release	Modification
12.4(15)XY	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines   The **service-module ip rip relay** command is used to enable the HFC RIP Relay feature that allows the delivery of RIP messages from a Cisco IOS router containing an integrated cable modem or a cable modem High-Speed WAN Interface Card (HWIC) to the Cable Modem Termination system (CMTS) when they are on different subnets. In Cisco IOS releases prior to 12.4(15)XY and 12.4(20)T, RIP messages were rejected by the CMTS because the interface on the Cisco IOS router was in a different subnet from the CMTS.

Examples   The following example enables RIP relay on an Integrated Services Router (ISR) cable modem. A static IP address is configured for the cable modem interface, and RIP relay is enabled on the interface. To allow RIP updates from unknown sources, the normal validation of the source IP address of incoming RIP routing updates is disabled. 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.

```
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
```

Related Commands	**Command**	**Description**
	show controllers	Displays information that is specific to the hardware.

show ip rip database

To display summary address entries in the Routing Information Protocol (RIP) routing database entries if relevant are routes being summarized based upon a summary address, use the **show ip rip database** command in privileged EXEC mode.

> **show ip rip database** [*ip-address mask*]

Syntax Description

ip-address	(Optional) Address about which routing information should be displayed.
mask	(Optional) Argument for the subnet mask. The subnet mask must also be specified if the IP address argument is entered.

Command Default   No default behavior or values.

Command Modes   Privileged EXEC

Command History

Release	Modification
12.0(6)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   Summary address entries will appear in the database only if relevant child routes are being summarized. When the last child route for a summary address becomes invalid, the summary address is also removed from the routing table.

The RIP private database is populated only if triggered extensions to RIP are enabled with the **ip rip triggered** command.

Examples   The following output shows a summary address entry for route 10.11.0.0/16, with three child routes active:

```
Router# show ip rip database

10.0.0.0/8    auto-summary
10.11.11.0/24    directly connected, Ethernet2
10.1.0.0/8    auto-summary
10.11.0.0/16    int-summary
^^^^^^^^^^^^^^^^^^^^^^^^^^^^
10.11.10.0/24    directly connected, Ethernet3
10.11.11.0/24    directly connected, Ethernet4
10.11.12.0/24    directly connected, Ethernet5
```

The following is sample output from the **show ip rip database** command with a prefix and mask:

```
Router# show ip rip database 172.19.86.0 255.255.255.0

172.19.86.0/24
    [1] via 172.19.67.38, 00:00:25, Serial0
    [2] via 172.19.70.36, 00:00:14, Serial1
```

Table 1 describes the fields in the display.

Table 1   show ip rip database Field Descriptions

Field	Description
10.0.0.0/16 auto-summary	Summary address entry.
10.11.11.0/24 directly connected, Ethernet0	Directly connected entry for Ethernet 0.
172.19.65.0/24 [1] via 172.19.70.36, 00:00:17, Serial0 [2] via 172.19.67.38, 00:00:25, Serial1	The destination 172.19.65.0/24 is learned via RIP. There are two sources advertising it. One is 172.19.70.36 via Serial interface0, and it was updated 17 seconds ago. The other source is 172.19.67.38 via Serial interface 1, and it was updated 25 seconds ago.

Related Commands	Commands	Description
	ip rip triggered	Enables triggered extensions of RIP.
	ip summary-address rip	Configures a Cisco router running RIP Version 2 to advertise a summarized local IP address pool on a network access server so that the address pool can be provided to dialup clients, and specifies the IP address and network mask that identify the routes to be summarized.
	show ip protocols	Displays the parameters and current state of the active routing protocol process.

show ip rip neighbors

To display Routing Information Protocol (RIP) neighbors for which Bidirectional Forwarding Detection (BFD) sessions are created, use the **show ip rip neighbors** command in privileged EXEC mode.

show ip rip neighbors

Syntax Description	This command has no argument or keywords.

Command Modes	Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE Release 3.3	This command was introduced.
15.1(2)S	This command was integrated into Cisco IOS Release 15.1(2)S.

Usage Guidelines   Use the **show ip rip neighbors** command to display RIP neighbors for which BFD sessions are created.

Examples   The following is sample output from the **show ip rip neighbors** command:

```
Router# show ip rip neighbors

BFD sessions created for the RIP neighbors
Neighbor      Interface      SessionHandle
10.10.10.2    Ethernet0/0    1
10.10.20.2    Ethernet1/0    2
```

Table 2 describes the significant fields shown in the display.

Table 2   show ip rip neighbors Field Descriptions

Field	Description
Neighbor	A neighboring router for which BFD sessions are created.
Interface	The interface type of the neigboring router.
SessionHandle	The unique session handle number to track the neighbor. The BFD system provides this number.

Related Commands

Command	Description
show ip rip database	Displays summary address entries in the RIP database.

skeptical interval

To configure cautious Cisco nonstop forwarding (NSF) helper functionality with a neighbor with an interval, use the **skeptical interval** command in router configuration mode. To configure a cautious NSF helper with the default interval, use the **no** form of this command.

skeptical interval *minutes*

no skeptical interval

Syntax Description

minutes	Number of minutes for the interval. Range: 0 to 1440. Default: 5.

Command Default The default interval for configuring an NSF helper is 5 minutes.

Command Modes Router configuration (config-router)

Command History

Release	Modification
12.2(33)SXI	This command was introduced.

Usage Guidelines When the **skeptical interval** command is configured with an interval, NSF will not be supported with the neighbor during this period. If you configure the **skeptical interval 0** command, it means that you always support NSF with the neighbor. Whenever you configure the **skeptical interval** command, you should also configure the **nsf interval** command.

Examples The following example configures the skeptical interval to 30 minutes:

```
Router(config)# router isis
Router(config-router)# skeptical interval 30
```

Related Commands

Command	Description
nsf interval	Configures the minimum time between Cisco nonstop forwarding (NSF) restart attempts.
router isis	Configures an ISIS routing process for IP on an interface and attaches an area designator to the routing process.

throttle (router configuration)

To enable throttle for Routing Information Protocol (RIP) requests, use the **throttle** command in router configuration mode. To disable the configuration, use the **no** form of this command.

> **throttle**

> **no throttle**

Syntax Description   This command has no arguments or keywords.

Command Default   Throttle is not enabled by default.

Command Modes   Router configuration (config-router)

Command History

Release	Modification
12.2(31)SB14	This command was introduced.

Usage Guidelines   You can use the **throttle** command if you are using RIP as a routing protocol to serve a large number of routers. This command prevents RIP from generating update packets in response to RIP requests from a faulty neighbor. Because only one RIP request per minute will be serviced from a neighbor, incoming regular updates are less likely to be dropped.

You can configure the **throttle** command only when the interpacket delay is configured using the **output-delay** command.

Examples   The following example shows how to enable throttle for RIP requests:

```
Router# configure terminal
Router(config-router)# network 192.0.2.1
Router(config-router)# output-delay 20
Router(config-router)# throttle
```

Related Commands

Command	Description
output-delay	Changes the interpacket delay for RIP updates sent.

timers basic (RIP)

To adjust Routing Information Protocol (RIP) network timers, use the **timers basic** command in router configuration mode. To restore the default timers, use the **no** form of this command.

timers basic *update invalid holddown flush*

no timers basic

Syntax Description		
	update	Rate (in seconds) at which updates are sent. This is the fundamental timing parameter of the routing protocol. The default is 30 seconds.
	invalid	Interval of time (in seconds) after which a route is declared invalid; it should be at least three times the value of the *update* argument. A route becomes invalid when there is an absence of updates that refresh the route. The route then enters into a *holddown* state. The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets. The default is 180 seconds.
	holddown	Interval (in seconds) during which routing information regarding better paths is suppressed. It should be at least three times the value of the *update* argument. A route enters into holdown state on receiving an update with a hop count higher than the metric already existing in the routing table. The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets. When holddown expires, routes advertised by other sources are accepted and the route is no longer inaccessible. The default is 180 seconds.
	flush	Amount of time (in seconds) that must pass before the route is removed from the routing table; the interval specified should be greater than the value of the *invalid* argument. If the interval specified is less than the value of the *invalid* argument, the proper *holddown* interval cannot elapse, which results in a new route being accepted before the *holddown* interval expires. The default is 240 seconds.

Command Default   No RIP network timers are adjusted.

Command Modes   Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2S, 12.4T	This command was enhanced to allow for the explicit specification of timers for an address family (VRF).
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   The basic timing parameters for RIP are adjustable. Because RIP is executing a distributed, asynchronous routing algorithm, these timers must be the same for all routers and access servers in the network.

> **Note**   The current and default timer values can be seen by inspecting the output of the **show ip protocols** EXEC command. The relationships of the various timers should be preserved as described previously.

In addition, an address family can have explicitly specified timers that apply to that address-family (or VRF) only. The **timers basic** command must be specified for an address family or the system defaults for the **timers basic** command are used regardless of what is configured for RIP routing. The VRF does not inherit the timer values from the base RIP configuration. The VRF will always use the system default timers unless explicitly changed using the **timers basic** command.

Examples   The following example sets updates to be broadcast every 5 seconds. If a router is not heard from in 15 seconds, the route is declared unusable. Further information is suppressed for an additional 15 seconds. At the end of the suppression period, the route is flushed from the routing table.

```
router rip
 timers basic 5  15  15  30
```

> **Note**   By setting a short update period, you run the risk of congesting slow-speed serial lines. A short update period can be a concern on faster-speed Ethernets and T1-rate serial lines. Also, if you have many routes in your updates, you can cause the routers to spend an excessive amount of time processing updates.

The following example show adjusting address family timers.

```
router rip
 version 2
 timers basic 5 10 15 20
 redistribute connected
 network 5.0.0.0
 default-metric 10
  no auto-summary
  !
  address-family ipv4 vrf foo
  timers basic 10 20 20 20
  redistribute connected
  network 10.0.0.0
  default-metric 5
  no auto-summary
  version 2
  exit-address-family
  !
  address-family ipv4 vrf bar
  timers basic 20 40 60 80
  redistribute connected
  network 20.0.0.0
  default-metric 2
  no auto-summary
  version 2
  exit-address-family
  !
```

validate-update-source

To have the Cisco IOS software validate the source IP address of incoming routing updates for Routing Information Protocol (RIP) and Interior Gateway Routing Protocol (IGRP) routing protocols, use the **validate-update-source** command in router configuration mode. To disable this function, use the **no** form of this command.

> **validate-update-source**

> **no validate-update-source**

Syntax Description   This command has no arguments or keywords.

Defaults   The behavior of this command is enabled by default.

Command Modes   Router configuration

Command History

Release	Modification
10.0	This command was introduced.\
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   This command is applicable only to RIP and IGRP. 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.

Disabling split horizon on the incoming interface will also cause the system to perform this validation check.

For unnumbered IP interfaces (interfaces configured as IP unnumbered), no checking is performed.

Examples   The following example configures a router not to perform validation checks on the source IP address of incoming RIP updates:

```
router rip
 network 10.105.0.0
 no validate-update-source
```

version

To specify a Routing Information Protocol (RIP) version used globally by the router, use the **version** command in router configuration mode. To restore the default value, use the **no** form of this command.

> **version** {**1** | **2**}

> **no version**

Syntax Description

1	Specifies RIP Version 1.
2	Specifies RIP Version 2.

Command Default   The software receives RIP Version 1 and Version 2 packets, but sends only Version 1 packets.

Command Modes   Router configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines   To specify RIP versions used on an interface basis, use the **ip rip receive version** and **ip rip send version** commands.

Examples   The following example enables the software to send and receive RIP Version 2 packets:

```
version 2
```

Related Commands

Command	Description
ip rip receive version	Specifies a RIP version to receive on an interface basis.
ip rip send version	Specifies a RIP version to send on an interface basis.
show ip protocols	Displays the parameters and current state of the active routing protocol process.