About

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Intro

RIP is a standardized **Distance Vector Protocol** for small networks. It was one of the first true distance vector routing protocols being developed in 1969 part of ARPANET. RIP uses a distributed version if the **Bellman-Ford Algorithm** to calculate the network topology.

Each node calculates the distance between itself and all the other nodes within the AS and stores this information as a table. Each node sends its table to all neighboring nodes. When a node receives distance tables from its neighbors it calculates the shortest routes to all other nodes and updates its own table.

Each router periodically shares its knowledge about the entire network with its neighbors. The knowledge it may have may be little to none at the beginning but it sends whatever it has. Through this a bigger picture of the topology is created. **These updates are sent out every 30 seconds** and RIP uses **distance as a metric (hop-count)**. Each hop in a path from source to destination is assigned a hop count value, which is typically 1. The *metric can be a positive integer from **1 to 15***.

When a router receives a routing update that contains a new or changed destination network entry, the router **adds 1 to the metric value indicated in the update** and enters the network in the routing table. The IP address of the sender is used as the next hop. RIP specifies that once a router learns a route from another router, it must keep that route until it learns a better one. If multiple paths exist to the same destination, with the same metric, RIP will load balance (up to 6 routes). RIP uses the Round Robin System to load balance which can lead to pinhole congestion.

Round-robin load balancing is a simple method for distributing traffic across interfaces. The router would go down a list of interfaces, sending traffic out to each interface, one at a time. Once it reaches the end of the list, it would return to the top of the list and begin going down again. For example, if you have one link that is a 56KB switched link and a T1 running at 1.544Mbps, there would be some inefficiency when sending equal data through both pathways. This is known as **pinhole congestion**. To overcome pinhole congestion, you have to design a network with equal bandwidth links or use a routing protocol that takes bandwidth into account.

RIP has an administrative distance (**AD) of 120** and RIP uses **UDP port 520 or 521** depending on the version. RIP has a **maximum hop count of 15** meaning RIP does not scale well. Changes in the network topology are not reflected quickly since updates are sent node by node which leads to other issues such as counting to infinity.

RIP partitions participants (node within the AS) into active and passive (slient) nodes. **Active** routers **advertise their routes to others**; **passive node just listen and updates their routes based on the advertisements**. **Passive nodes do not advertise**. Only routers can run RIP in active mode; other host run RIP in passive mode. We can specify specific interfaces as neighbors so updates are sent via unicast with the neighbor X.X.X.X command.

RIP uses numerous timers to regulate its performance. These include a **routing-update timer**, a **route-timeout timer**, and a **route-flush timer**. The routing-update timer clocks the interval between periodic routing updates, each router periodically transmits it entire routing table to all the other routers on the network (Default 30secs). Each routing table entry has a route-timeout timer associated with it. When the route-timeout timer expires(180 seconds), the route is marked invalid but is retained in the table until the route-flush timer expires (240 seconds).RIP timers must be identical on all routers on the RIP network, otherwise massive instability will occur.

RIP has evolved over time being so old and has many versions; RIPv1 RIPv2 and RIPng

RIPv1 (RFC 1058) **is classful**, and thus **does not include the subnet mask with its routing table updates**. Because of this, RIPv1 does **not support Variable Length Subnet Masks (VLSMs)**. When using RIPv1, networks must be contiguous, and subnets of a major network must be configured with identical subnet masks. Otherwise, route table inconsistencies (or worse) will occur. RIPv1 *sends updates as broadcasts to address 255.255.255.255*.

RIPv2 (RFC 2543) is classless, and thus does include the subnet mask with its routing table updates. RIPv2 fully supports VLSMs, allowing discontinuous networks and varying subnet masks to exist. Updates are sent via 224.0.0.9 using multicast instead of broadcast. Encrypted authentication can be setup between RIPv2 routers. Route tagging is also supported which carries information such as the Autonomous System Number (AS) which enables RIP to receive info from an exterior routing table. The Next hop address can also be sent.

RIPng (RFC2080) is the new generation of Ripv2, and it is used in IPv6 networks; and functions like RIPv2. However always remember RIPng is an entirely different protocol and does not support IPv4. RIPng sends and receives the Routing Protocol messages at UDP port 521. The multicast IPv6 address used by RIPng is FF02::9.

Packet Format

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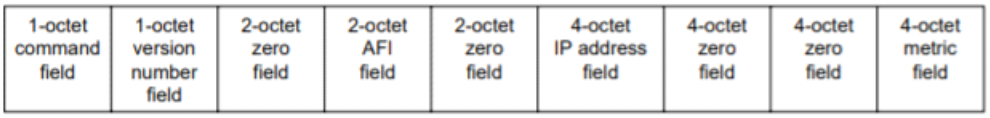
RIPv1

Figure 47-1 An IP RIP Packet Consists of Nine Fields

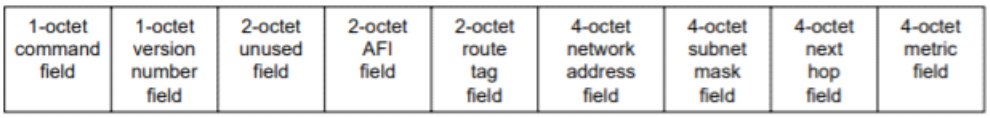


The following descriptions summarize the IP RIP packet format fields illustrated in Figure 47-1:

- Command—Indicates whether the packet is a request or a response. The request asks that a router send all or part of its routing table. The response can be an unsolicited regular routing update or a reply to a request. Responses contain routing table entries. Multiple RIP packets are used to convey information from large routing tables.
- Version number—Specifies the RIP version used. This field can signal different potentially incompatible versions.
- Zero—This field is not actually used
- Address-family identifier (AFI)—Specifies the address family used. RIP is designed to carry routing information for several different protocols. Each entry has an address-family identifier to indicate the type of address being specified. **The AFI for IP is 2**.
- Address—Specifies the IP address for the entry.
- Metric—Indicates how many internetwork hops (routers) have been traversed in the trip to the destination. This value is between 1 and 15 for a valid route, or 16 for an unreachable route.

RIPv2

Figure 47-2 An IP RIP 2 Packet Consists of Fields Similar to Those of an IP RIP Packet



- Version—Specifies the RIP version used. In a RIP packet implementing any of the RIP 2 fields or using authentication, this value is set to 2.
- Unused—Has a value set to zero.
- Address-family identifier (AFI)—Specifies the address family used. RIPv2's AFI field functions identically to RFC 1058 RIP's AFI field, with one exception: If the AFI for the first entry in the message is 0xFFFF, the remainder of the entry contains authentication information. Currently, the only authentication type is simple password.
- Route tag—Provides a method for distinguishing between internal routes (learned by RIP) and

external routes (learned from other protocols).

- IP address—Specifies the IP address for the entry.
- Subnet mask—Contains the subnet mask for the entry. If this field is zero, no subnet mask has been specified for the entry.

- Next hop—Indicates the IP address of the next hop to which packets for the entry should be forwarded.

- Metric—Indicates how many internetwork hops (routers) have been traversed in the trip to the destination. This value is between 1 and 15 for a valid route, or 16 for an unreachable route

Issues

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RIP Has its Issues:

- **Slow Convergence:** It takes a long time for all routers to get the same information, and in particular, it takes a long time for information about topology changes to propagate. Consider the worst-case situation of two networks separated by 15 routers. Since routers normally send *RIP Response* messages only every 30 seconds, a change to one of this pair of networks might not be seen by the router nearest the other one until many minutes have elapsed—an eternity in networking terms. The slow convergence problem is even more pronounced when it comes to the propagation of route failures. Failure of a route is only detected through the expiration of the 180-second *Timeout* timer, so that adds up to three minutes more delay before convergence can even begin.

- **Loops:** Routing loops occur when a packet is continually routed through the same routers over and over again, in an endless circle. Because they can render a network unusable, and lead to the count to infinity.

- **Count to Infinity:** Slow convergence can lead to a routing loop situation where one router passes bad information to another router, which sends more bad information to another router and so on. This causes a situation where the protocol is sometimes described as *unstable.*; the problem is called *counting to infinity*

- ***UDP Packet:*** The UDP packet has a max size of 512bytes which has room for 25 prefixes. If we need to advertise more than 25 well need more UDP packets.

- Diameter of RIP cannot exceed 15 routers

- RIP can consume a substantial amount of bandwidth in large networks

Examples

Count to Infinity

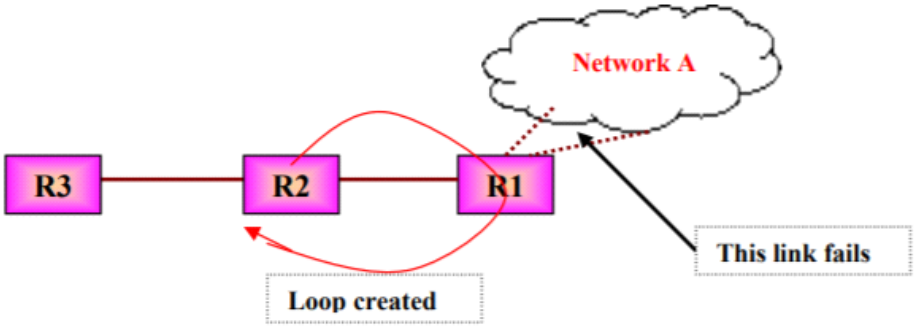

Figure 7.2.2 Count to infinity problem

If Router 1's link to network A fails, R1 will update its routing table immediately to make the distance 16 (infinite). In the next broadcast, R1 will report the higher cost route. Now suppose r2 advertise a route to Network A via R1 in its normal advertisement message, just after R1's connection to network A fails. If so R1 will receive this update message and sees that Router 2 has a two-hop link (which is actually via Router 1) to Network A, according to the normal vector-distance algorithm it will install a new route to network A via R2, of length 3.

After this, it would began advertising it has a three-hop link to Network A and then route all traffic to Network A through R2. This would create a routing loop, since when Router 2 (R2) sees that Router 1 get to Network A in three hops, it alters it own routing table entry to show it has a four-hop path to Network A.

This is known as *Count-to Infinity problem*, i.e. bad news travel slowly through the network and to advertise a bad news throughout the entire network will take a long time. This problem is also called as *slow convergence problem*.In the next section we shall discuss some of the possible solutions to this slow convergence problem

Let's assume no loop avoidance mechanisms are configured on either router. If the 172.18.0.0 network fails, Router B will send out an update to Router A within 30 seconds (whenever its update timer expires) stating that route is unreachable (metric = 16).

But what if an update from Router A reaches Router B *before* this can happen? Router A believes it can reach the 172.18.0.0 network in one hop (through Router B). This will cause Router B to believe it can reach the failed 172.18.0.0 network in **two hops**, through Router A. Both routers will continue to increment the metric for the network until they reach a hop count of **16**, which is unreachable. This behavior is known as **counting to infinity**.

Solutions

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Hop Count

RIP prevents routing loops from continuing indefinitely by implementing a limit on the number of hops allowed in a path from the source to a destination. **The maximum number of hops in a path is 15**. If a router receives a routing update that contains a new or changed entry, and if increasing the metric value by 1 causes the metric to be infinity (that is, 16), the network destination is considered unreachable. The downside of this stability feature is that it limits the maximum diameter of a RIP network.

Hold Downs

Hold-downs prevent inappropriately reinstating a route that has gone bad when routers broadcast their regular update messages. Hold downs tell routers to hold on to any changes that might affect recently removed routes for a certain period of time, usually calculated just to be greater than the period of time necessary to update the entire network with a route change. This prevents count-to-infinity problem.

Split Horizon

It is never useful to send information about a route back in the direction from which it came and thus split horizons is used to prevent updates that are redundant to the network. For this purpose **Router records the interface over which it received a particular route and does not propagates its information about that route back to the same interface.**

Route Poisoning & Poison Reverse

Route poisoning and reverse poisoning are routing loop prevention techniques used by distance vector routing protocols. Route Poisoning is setting a route's metric to infinity (16). **Once a connection disappears, the router advertising the connection retains the entry for several update periods, and include an infinite cost in the broadcast** (Hop Count = 16) . So The updates are sent to remove the downed route and place it in hold-down. So in basic English, with route poisoning, a router tells its neighbor that a particular network is no longer reachable, and it marks the hop count to 16 so the route should be remove from the routing table.

Poison reverse is the process of breaking the split horizon rule and sending a poisoned route back over the same interface from which it was Learned. Routers with a route with a better metric (hop count) to the network ignore the destination unreachable update.

Triggered Updates

To make Poison reverse more efficient, it must be combined with Triggered Updates. **Triggered updates force a router to send an immediate broadcast when an update happens**. If there is no change, the routes are sent out at the usual 30 seconds, but the second a change happens, the poison revers updates are sent out.

END

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Despite RIP's age and the emergence of more sophisticated routing protocols, it is far from obsolete. RIP is mature, stable, widely supported, and easy to configure. Its simplicity is well suited for use in stub networks and in small autonomous systems that do not have enough redundant paths to warrant the overheads of a more sophisticated protocol. There is little overhead in terms of memory, consumption, bandwidth (if in a small network) and processor load.

COMMANDS

Wednesday, September 19, 2018 11:30

RIP Commands

This module describes the commands used to configure and monitor the Routing Information Protocol (RIP).

For detailed information about RIP concepts, configuration tasks, and examples, see the *Implementing RIP on* module in the *Routing Configuration Guide for Cisco NCS 6000 Series Routers*.

authentication keychain mode (RIP)

To enable an authentication keychain mechanism on RIP interfaces, use the **authentication keychain mode** command in interface configuration mode. To disable authentication keychain configuration on RIP interfaces, use the **no** form of this command.

authentication keychain keychain_name mode {md5|text}
no authentication keychain keychain_name mode {md5|text}

Syntax Description

keychain-name	Specifies the name of the keychain configured using the keychain command. **Note** All keychains need to be configured in Cisco IOS XR keychain database using the keychain configuration commands described in *Implementing Keychain Management* module of *System Security Configuration Guide for Cisco NCS 6000 Series Routers*
md5	Specifies that the authentication keychain mode is keyed message digest (md5).
text	Specifies that the authentication keychain mode is clear text.

Command Default

Keychain authentication is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

All keychains need to be configured in Cisco IOS XR keychain database using the keychain configuration commands described in *Implementing Keychain Management* module of *System Security Configuration Guide for Cisco NCS 6000 Series Routers*

Task ID

Task ID	Operation
rip	read, write

Related Commands

Command	Description
router rip, on page 24	Configures a routing process and enters router configuration mode for a Routing Information Protocol (RIP) process.

Command	Description
key chain (key chain)	Creates or modifies a keychain. Refer *System Security Command Reference for Cisco NCS 6000 Series Routers* for complete command reference information.
key (key chain)	Creates or modifies a keychain key. Refer *System Security Command Reference for Cisco NCS 6000 Series Routers* for complete command reference information.
key-string (keychain)	Specifies text string for the key. Refer *System Security Command Reference for Cisco NCS 6000 Series Routers* for complete command reference information.

auto-summary (RIP)

To enable the automatic summarization of subnet routes into network-level routes, use the **auto-summary** command in the appropriate 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

Disabled

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **auto-summary** command to turn on route summarization. Route summarization reduces the amount of routing information in the routing tables.

Disable automatic summarization if you must perform routing between disconnected subnets. When automatic summarization is off, subnets are advertised. Automatic summarization is disabled by default.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to turn on RIP auto-summarization:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# auto-summary
```

broadcast-for-v2

To send Routing Information Protocol (RIP) Version 2 output packets to a broadcast address, use the **broadcast-for-v2** command in the appropriate configuration mode. To disable this feature, use the **no** form of this command.

broadcast-for-v2
no broadcast-for-v2

Syntax Description

This command has no arguments or keywords.

Command Default

RIPv2 output packets are not broadcasted.

Command Modes

Router configuration

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to send RIP v2 output messages to a broadcast address for all RIP interfaces:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# broadcast-for-v2
```

default-information originate (RIP)

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

default-information originate [**route-policy** *name*]
no default-information originate

Syntax Description

route-policy *name*	Route policy name that indicates criteria for the default route.

Command Default

This command is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to originate a default route in RIP updates based on the result of running the route policy on the routing table:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# default-information originate route-policy policy1
```

Related Commands

Command	Description
route-policy (RIP), on page 26	Applies a routing policy to updates advertised to or received from a RIP neighbor.

default-metric (RIP)

To set default metric values for routes redistributed from other protocols into Routing Information Protocol (RIP), use the **default-metric** command in the appropriate configuration mode. To return to the default state, use the **no** form of this command.

default-metric *number-value*
no default-metric

Syntax Description

number-value	Default metric value. Range is 1 to 15.

Command Default

Default metrics are not set.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **default-metric** command with the **redistribute** command to cause RIP to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics by providing a reasonable substitute and enables redistribution to proceed. If you want to set different metrics for other redistributed protocols, use the **route-policy** option in the **redistribute** command.

The RIP metric used for redistributed routes is determined by the route policy. If a route policy is not configured or the route policy does not set the RIP metric, the metric is determined based on the redistributed protocol.

In all other cases (BGP, IS-IS, OSPF, EIGRP, connected, static), the metric set by the **default-metric** command is used. If a valid metric cannot be determined, then redistribution does not happen.

Task ID

Task ID	Operations
rip	read, write

Related Commands

Command	Description
redistribute (RIP), on page 21	Redistributes routes from one routing domain into RIP.

distance (RIP)

To define the administrative distance assigned to routes discovered by the Routing Information Protocol (RIP), use the **distance admin-distance** command in the appropriate configuration mode. To remove the distance definition from the configuration file and restore the system to its default condition, use the **no** form of this command.

distance *admin-distance* [{*prefix prefix-length*|*prefix mask*}]
no distance *admin-distance*

Syntax Description

admin-distance	Administrative distance to be assigned to RIP routes. Range is 0 to 255.
prefix	(Optional) Network IP address about which routing information should be displayed.
prefix-length	(Optional) The *prefix-length* argument specifies the length of the IP prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value. Range is 0 to 32 for IPv4 addresses.
mask	(Optional) Network mask specified in either of two ways: • Network mask can be a four-part, dotted decimal address. For example, 255.0.0.0 indicates that each bit equal to 1 means the corresponding address bit is a network address. • Network mask can be indicated as a slash (/) and number. For example, /8 shows that the first 8 bits of the mask are ones, and the corresponding bits of the address are the network address.

Command Default

admin-distance : 120

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **distance** command to change the preference of RIP routes over other protocol routes. When administrative distance and redistribution features are used to together, routing behavior may be affected for routes accepted from and advertised to RIP neighbors.

Numerically, an administrative distance is an integer from 0 to 255. In general, the higher the value, the lower the trust rating. An administrative distance of 255 means that the routing information source cannot be trusted at all and should be ignored.

The order in which you enter distance commands can affect the assigned administrative distances in unexpected ways.

This table lists default administrative distances.

Table 1: Default Administrative Distances of Routing Protocols

Routing Protocol	Administrative Distance Value
Connected interface	0
Static route out an interface	0
Static route to next-hop	1
EIGRP Summary Route	5
External BGP	20
Internal EIGRP	90
OSPF	110
IS-IS	115
RIP Versions 1 and 2	120
External EIGRP	170
Internal BGP	200
Unknown	255

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to set the administrative distance for a particular prefix:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# distance 85 192.168.10.0/24
```

Related Commands

Command	Description
redistribute (RIP), on page 21	Redistributes routes from one routing domain into RIP.

interface (RIP)

To define the interfaces on which the Routing Information Protocol (RIP) runs and enter interface configuration mode, use the **interface** command in router configuration mode. To disable RIP routing for interfaces, use the **no** form of this command.

interface *type interface-path-id*
no interface *type interface-path-id*

Syntax Description

type	Interface type. For more information, use the question mark (**?**) online help function.
interface-path-id	Physical interface or a virtual :interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.

Command Default

When you do not specify this command in configuration mode, RIP routing for interfaces is not enabled.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **interface** command to associate a specific interface with a RIP process. The interface remains associated with the process even when the IPv4 address of the interface changes.

This command places the router in interface configuration mode, from which you can configure interface-specific settings. Commands configured under this mode (such as the broadcast-for-v2, on page 5 command) are automatically bound to that interface.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to enter interface configuration mode for a RIP process, and send RIP Version 2 messages to the broadcast address on the GigabitEthernet interface 0/1/0/0:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
```

```
RP/0/RP0/CPU0:router(config-rip-if)# ?

  broadcast-for-v2    Specify broadcast address for RIP v2 output packet
  commit              Commit the configuration changes to running
  describe            Describe a command without taking real actions
  do                  Run an exec command
  exit                Exit from this submode
  metric-zero-accept  Accept rip update with metric 0 to compensate a common bug
  no                  Negate a command or set its defaults
  passive-interface   Suppress routing updates on this interface
  poison-reverse      Enable poison reverse
  receive             Advertisement reception
  route-policy        Apply route policy to routing updates
  send                Advertisement transmission
  show                Show contents of configuration
  site-of-origin      SOO community for prefixes learned over this interface
  split-horizon       Disable split horizon
RP/0/RP0/CPU0:router(config-rip-if)# broadcast-for-v2
```

Related Commands

Command	Description
broadcast-for-v2, on page 5	Sends RIP Version 2 output packets to a broadcast address.

maximum-paths (RIP)

To configure the maximum number of equal cost parallel routes that the Routing Information Protocol (RIP) will install into the routing table, use the **maximum-paths** command in the appropriate configuration mode. To remove the **maximum-paths** command from the configuration file and restore the system to its default condition with respect to RIP, use the **no** form of this command.

maximum-paths *maximum*
no maximum-paths

Syntax Description

maximum	Maximum number of parallel routes that RIP can install in a routing table. Range is 1 to 32..

Command Default

4 paths

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to allow a maximum of 16 equal cost paths to a destination:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# maximum-paths 16
```

metric-zero-accept

To allow RIP to accept routing entries from RIP updates with a metric set to zero (0), use the **metric-zero-accept** command in interface configuration mode. To remove the **metric-zero-accept** command from the configuration file and restore the system to its default condition with respect to RIP, use the **no** form of this command.

metric-zero-accept
no metric-zero-accept

Syntax Description

This command has no arguments or keywords.

Command Default

RIP routes received with a metric of zero (0) are ignored.

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

After the **metric-zero-accept** command is configured on routing entries from RIP updates, RIP accepts these routes and then sets the metric to one (1).

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to set the RIP interface to accept metric zero on routing entries:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# metro-zero-accept
```

neighbor (RIP)

To define a neighboring router with which to exchange Routing Information Protocol (RIP) information, use the **neighbor** command in the appropriate configuration mode. To remove an entry, use the **no** form of this command.

neighbor *ip-address*
no neighbor *ip-address*

Syntax Description

ip-address	IP address of a peer router with which routing information is exchanged.

Command Default

No neighboring routers are defined.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **neighbor** command to permit the point-to-point (nonbroadcast) exchange of routing information. When the **neighbor** command is used in combination with the **passive-interface** command in router configuration mode, routing information can be exchanged between a subset of routers and access servers on a LAN.

Multiple **neighbor** commands can be used to specify additional neighbors or peers.

Task ID

Task ID	Operations
rip	read, write

Related Commands

Command	Description
passive-interface (RIP), on page 17	Suppresses the sending of RIP updates on an interface.

nsf (RIP)

To configure nonstop forwarding (NSF) on Routing Information Protocol (RIP) routes after a RIP process shutdown or restart, use the **nsf** command in the appropriate configuration mode. To remove this command from the configuration file and restore the system to its default condition, use the **no** form of this command.

nsf
no nsf

Syntax Description

This command has no arguments or keywords.

Command Default

NSF is disabled.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When you use the **nsf** command, NSF lifetime is automatically set to two times the update time (with a minimum value of 60 seconds). The RIP process must reconverge within this time. If the convergence exceeds the NSF lifetime, routes are purged from the Routing Information Base (RIB) and NSF may fail.

Task ID

Task ID	Operations
rip	read, write

output-delay

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

output-delay *delay*
no output-delay *delay*

Syntax Description

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

Command Default

The default is no delay.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **output-delay** command if you are sending at high speed to a low-speed router that might not be able to receive at the high speed. Configuring this command helps prevent the routing table from losing information.

Task ID

Task ID	Operations
rip	read, write

passive-interface (RIP)

To suppress the sending of Routing Information Protocol (RIP) updates on an interface, use the **passive-interface** command in interface configuration mode. To unsuppress updates, use the **no** form of this command.

passive-interface
no passive-interface

Syntax Description

This command has no arguments or keywords.

Command Default

RIP updates are sent on the interface.

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read, write

Related Commands

Command	Description
neighbor (RIP), on page 14	Defines a neighboring router with which to exchange RIP protocol information.

poison-reverse

POISON REVERSE COMMAND DESCRIPTION

To enable poison reverse processing of Routing Information Protocol (RIP) router updates, use the **poison-reverse** command in interface configuration mode. To disable poison reverse processing of RIP updates, use the **no** form of this command.

poison-reverse
no poison-reverse

Syntax Description

This command has no arguments or keywords.

Command Default

Poison reverse processing is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Route poisoning prevents routing loops by communicating to other routers that a route is no longer reachable, effectively removing these routes from other router's routing tables. The system default, **split horizon** , provides that routes learned through RIP are not advertised from the interface over which they were learned.

The **poison-reverse** command enables poison reverse processing of RIP router updates. A router that receives route poisoning information sends the poisoning information back to the sending router, a process called poison reverse. This process ensures that all routers on the same interface have received the poisoned route information.

If both **poison-** reverse and split horizon are configured, then simple split horizon behavior (suppression of routes from the interface over which they were learned) is replaced by poison reverse behavior. If split horizon is disabled, the poison reverse configuration is ignored.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to enable poison reverse processing for an interface running RIP:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# poison-reverse
```

Related Commands

Command	Description
split-horizon disable (RIP), on page 40	Disables the split horizon mechanism.

receive version

To configure the Routing Information Protocol (RIP) interface to accept version-specific packets, use the **receive version** command in interface configuration mode. To revert to the default setting, use the **no** form of this command.

receive version {**1**|**2**|**1 2**}
no receive version {**1**|**2**|**1 2**}

Syntax Description

1	Version 1 packets.
2	Version 2 packets.
1 2	Both versions 1 and 2 packets.

Command Default

Version 2

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **receive version** command to override the default behavior of RIP. This command applies only to the interface being configured.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to configure an interface to accept both RIP Version 1 and 2 packets:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# receive version 1 2
```

Related Commands

Command	Description
send version, on page 27	Configures the RIP interface to send version specific packets.

redistribute (RIP)

To redistribute routes from another routing domain into Routing Information Protocol (RIP), use the **redistribute** command in the appropriate configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition in which the software does not redistribute routes, use the **no** form of this command.

Border Gateway Protocol (BGP)
redistribute bgp *process-id* [**route-policy** *name*] [{**external**|**internal**|**local**}]
no redistribute bgp *process-id*

Connected Interface Routes
redistribute connected [**route-policy** *name*]
no redistribute connected

Enhanced Interior Gateway Routing Protocol (EIGRP)
redistribute eigrp *process-id* [**route-policy** *name*]
no redistribute eigrp *process-id*

Intermediate System-to-Intermediate System (ISIS)
redistribute isis *process-id* [**route-policy** *name*] [{**level-1**|**level-1-2**|**level-2**}]
no redistribute isis *process-id*

Open Shortest Path First (OSPF)
redistribute ospf *process-id* [**route-policy** *name*] [**match** {**external** [{**1**|**2**}]|**internal**|**nssa-external** [{**1**|**2**}]}]
no redistribute ospf *process-id*

IP Static Routes
redistribute static [**route-policy** *name*]
no redistribute static

Syntax Description

bgp	Distributes routes from the BGP protocol.

process-id	• For the **bgp** keyword:
	  • Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535.
	  • Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295.
	  • Range for 4-byte Autonomous system numbers (ASNs) is asdot format is 1.0 to 65535.65535.
	• For the **eigrp** keyword, an EIGRP instance name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.
	• For the **isis** keyword, an IS-IS instance name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.
	• For the **ospf** keyword, an OSPF instance name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.

external	(Optional) Specifies BGP external routes only.
internal	(Optional) Specifies BGP internal routes only.
local	(Optional) Specifies BGP local routes only.
route-policy *name*	(Optional) Specifies the identifier of a configured policy. A policy is used to filter the importation of routes from this source routing protocol to RIP.
level-1	(Optional) Redistributes Level 1 IS-IS routes into other routing protocols independently.
level-1-2	(Optional) Distributes both Level 1 and Level 2 IS-IS routes into other routing protocols.
level-2	(Optional) Distributes Level 2 IS-IS routes into other routing protocols independently.
[**match** { **external** [**1** | **2**] | **internal** | **nssa-external** [**1** | **2**]} [**route-policy** *name*]	(Optional) Specifies the criteria by which OSPF routes are redistributed into other routing domains. It can be one or more of the following: • **internal** —Routes that are internal to a specific autonomous system (intra- and inter-area OSPF routes). • **external** [**1** | **2**]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 external routes. • **nssa-external** [**1** | **2**]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 not-so-stubby area (NSSA) external routes. For the external and nssa-external options, if a type is not specified, then both Type 1 and Type 2 are assumed. If no match is specified, the default is no filtering.
static	Redistributes IP static routes.

Command Default

Route redistribution is disabled.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Note When you are redistributing routes (into RIP) using both command keywords for setting or matching of attributes and a route policy, the routes are run through the route policy first, followed by the keyword matching and setting.

Redistributed routing information may be filtered by the **route-policy** *name* keyword and argument. This filtering ensures that only those routes intended by the administrator are redistributed by RIP.

The RIP metric used for redistributed routes is determined by the route policy. If a route policy is not configured or the route policy does not set the RIP metric, the metric is determined based on the redistributed protocol.

In all other cases (BGP, IS-IS, OSPF, EIGRP, connected, static), the metric set by the **default-metric** command is used. If a valid metric cannot be determined, then redistribution does not happen.

For information about routing policies, see the *Routing Policy Commands on* module of the *Routing Command Reference*.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to cause BGP routes to be redistributed into a RIP process:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# redistribute bgp 100
```

Related Commands

Command	Description
default-metric (RIP), on page 7	Sets default metric values for routes redistributed from other protocols into RIP.

router rip

To configure a routing process and enter router configuration mode for a Routing Information Protocol (RIP) process, use the **router rip** command in XR Config 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 router process is defined.

Command Modes

XR Config

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to configure a router process for RIP:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)#
```

The following example shows how to enter router configuration mode for RIP and identify commands that can be issued from that mode.

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# ?

  auto-summary            Enable automatic network number summarization
  broadcast-for-v2        Send RIP v2 output packets to broadcast address
  commit                  Commit the configuration changes to running
  default-information     Control distribution of default information
  default-metric          Set metric of redistributed routes
  describe                Describe a command without taking real actions
  distance                Define an administrative distance
  do                      Run an exec command
```

```
exit                    Exit from this submode
interface               Enter the RIP interface configuration submode
maximum-paths           Maximum number of paths allowed per route
neighbor                Specify a neighbor router
no                      Negate a command or set its defaults
nsf                     Enable Cisco Non Stop Forwarding
output-delay            Interpacket delay for RIP updates
redistribute            Redistribute information from another routing protocol
route-policy            Apply route policy to routing updates
show                    Show contents of configuration
timers                  Adjust routing timers
validate-update-source  Validate source address of routing updates
RP/0/RP0/CPU0:router(config-rip)#
```

route-policy (RIP)

To apply a routing policy to updates advertised to or received from a Routing Information Protocol (RIP) neighbor, use the **route-policy** command in the appropriate configuration mode. To disable applying routing policy to updates, use the **no** form of this command.

route-policy *name* {**in**|**out**}
no route-policy *name* {**in**|**out**}

Syntax Description

name	Name of route policy.
in	Applies policy to inbound routes.
out	Applies policy to outbound routes.

Command Default

No policy is applied.

Command Modes

Router configuration

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **route-policy** command to specify a routing policy for an inbound or outbound route. The policy can be used to filter routes or modify route attributes.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to filter routing updates received on an interface:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# route-policy updpol-1 in
```

send version

To configure the Routing Information Protocol (RIP) interface to send version specific packets, use the **send version** command in interface configuration mode. To revert to the default setting, use the **no** form of this command.

send version {**1**|**2**|**1 2**}
no send version {**1**|**2**|**1 2**}

Syntax Description

1	Version 1 packets.
2	Version 2 packets.
1 2	Both Version 1 and Version 2 packets.

Command Default

Version 2

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **send version** command to override the default behavior of RIP. This command applies only to the interface being configured.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to configure an interface to send only RIP Version 2 packets:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# send version 2
```

Related Commands

Command	Description
receive version, on page 20	Configures the RIP interface to accept version-specific packets.

show protocols (RIP)

To display information about the Routing Information Protocol (RIP) process configuration, use the **show protocols** command in XR EXEC mode.

show protocols [{**ipv4**|**afi-all**}] [{**all***protocol*}] [{**default-context**}] **[private]**

Syntax Description

ipv4	(Optional) Specifies an IPv4 address family.
afi-all	(Optional) Specifies all address families.
all	(Optional) Specifies all protocols for a given address family.
protocol	(Optional) Specifies a routing protocol. • For the IPv4 address family, the options are **eigrp** , **bgp** , **isis** , **ospf** , and **rip** .
default-context	(Optional) Displays default context information. This keyword is available when the **eigrp** or **rip** protocol is specified.
private	(Optional) Displays private EIGRP data. This keyword is available when the **eigrp** protocol is specified.

Command Modes

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **show protocols** command to get information about the protocols running on the router and to quickly determine which protocols are active. The command summarizes the important characteristics of the running protocol, and command output varies depending on the specific protocol selected.

For RIP, the command output lists the instance number, default AS context, router ID, default networks, distance, maximum paths, and so on.

Task ID

Task ID	Operations
RIP	read

show rip

To display configuration and status of Routing Information Protocol (RIP), use the **show rip** command in XR EXEC mode.

show rip

Command Default

No default behavior or values

Command Modes

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read

Examples

The following example shows sample output from the **show rip** command:

```
RP/0/RP0/CPU0:router# show rip

RIP config:
Active?:                    Yes
Added to socket?:           Yes
Out-of-memory state:        Normal
Version:                    2
Default metric:             Not set
Maximum paths:              4
Auto summarize?:            No
Broadcast for V2?:          No
Packet source validation?:  Yes
NSF:                        Disabled
Timers: Update:             30 seconds (25 seconds until next update)
        Invalid:            180 seconds
        Holddown:           180 seconds
        Flush:              240 seconds
```

This table describes the significant fields shown in the display.

Table 2: show rip Field Descriptions

Field	Description
Active?	Active state setting.

Field	Description
Out-of-memory state	Out-of-memory state for RIP can be one of the following: Normal, Minor, Severe, or Critical.
Version	Version number is 2.
Default metric	Default metric value, if configured. Otherwise Not set.
Maximum paths	Number of maximum paths allowed per RIP route.
Auto summarize?	Auto-summarize state setting.
Broadcast for V2?	RIP Version 2 broadcast setting.
Packet source validation?	Validation setting for the source IP address of incoming routing updates to RIP.
Timers	RIP network timer settings.

show rip database

To display database entry information from the Routing Information Protocol (RIP) topology table, use the **show rip database** command in XR EXEC mode.

show rip database [{*prefix prefix-length*|*prefix mask*}]

Syntax Description

prefix	(Optional) Network IP address about which routing information should be displayed.
prefix-length	(Optional) The *prefix-length* argument specifies the length of the IP prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash between must precede the decimal value. Range is 0 to 32 for IPv4 addresses.
prefix-mask	(Optional) Network mask specified in either of two ways: • Network mask can be a four-part, dotted decimal address. For example, 255.0.0.0 indicates that each bit equal to 1 means the corresponding address bit is a network address. • Network mask can be indicated as a slash (/) and number. For example, /8 shows that the first 8 bits of the mask are ones, and the corresponding bits of the address are the network address.

Command Default

No default behavior or values

Command Modes

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

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

Task ID

Task ID	Operations
rip	read

Examples

The following is sample output from the **show rip database** command:

```
RP/0/RP0/CPU0:router# show rip database

Routes held in RIP's topology database:
    10.0.0.0/24
```

```
    [0]    directly connected, GigabitEthernet0/6/0/0
10.0.0.0/8    auto-summary
12.0.0.0/24
    [5] distance: 20    redistributed
12.0.0.0/8    auto-summary
50.50.0.0/24
    [1] via 10.0.0.20, next-hop 10.0.0.20, Uptime: 1s, GigabitEthernet0/6/0/0
50.50.1.0/24 (inactive)
    [1] via 10.0.0.20, next-hop 10.0.0.20, Uptime: 1s, GigabitEthernet0/6/0/0
50.0.0.0/8    auto-summary
90.90.0.0/24
    [5] distance: 20    redistributed
90.90.1.0/24
    [5] distance: 20    redistributed
```

This table describes the significant fields shown in the display.

Table 3: show rip database Field Descriptions

Field	Description
10.0.0.0/24 [0] directly connected, GigabitEthernet0/6/0/0	Prefix and prefix length for a RIP connected route. 10.0.0.0/24 is directly connected to GigabitEthernet 0/6/0/0. The [0] represents the metric.
10.0.0.0/8 auto-summary	10.0.0.0/8 is a summary route entry.
12.0.0.0/24 [5] distance: 20 redistributed	12.0.0.0/24 is a redistributed route. The metric is 5, and the distance is 20.
50.50.0.0/24 [1] via 10.0.0.20, next-hop 10.0.0.20, Uptime: 1s, GigabitEthernet0/6/0/0	The destination route 50.50.0.0/24 is learned through RIP, and the source 10.0.0.20 advertised it from GigabitEthernet 0/6/0/0. The route was last updated one second ago.
50.50.1.0/24 (inactive) [1] via 10.0.0.20, next hop 10.0.0.20, Uptime: 1s, GigabitEthernet0/6/0/0	The destination route 50.50.1.0/24 is not active in the routing table.

show rip interface

To display interface entry information from the Routing Information Protocol (RIP) topology table, use the **show rip interface**command in XR EXEC mode.

show rip interface [*type interface-path-id*]

Syntax Description

interface	(Optional) Specifies the interface from which to clear topology entries.
type	Interface type. For more information, use the question mark (**?**) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.

Command Default

No default behavior or values

Command Modes

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
rip	read

Examples

This example is sample output from the **show rip interface** command:

```
RP/0/RP0/CPU0:router# show rip interface

GigabitEthernet0_6_0_0
Rip enabled?:                Yes
Out-of-memory state:         Normal
Broadcast for V2:            No
Accept Metric 0?:            No
Send versions:               2
Receive versions:            2
Interface state:             Up
IP address:                  10.0.0.12/24
Metric Cost:                 0
```

```
Split horizon:              Enabled
Poison Reverse:             Disabled


GigabitEthernet0_6_0_2
Out-of-memory state:        Normal
Rip enabled?:               Yes
Broadcast for V2:           No
Accept Metric 0?:           No
Send versions:              2
Receive versions:           2
Interface state:            Up
IP address:                 12.0.0.12/24
Metric Cost:                0
Split horizon:              Enabled
Poison Reverse:             Disabled


RIP peers attached to this interface:
    12.0.0.13
        uptime: 3    version: 2
        packets discarded: 0    routes discarded: 402
```

This table describes the significant fields shown in the display.

Table 4: show rip interface Field Descriptions

Field	Description
Rip enabled?	Specifies whether the RIP routing protocol is enabled on the interface.
Out-of-memory state	Specifies the current out-of-memory state on the interface.
Broadcast for V2	Specifies whether RIP Version 2 output packets are sent to a broadcast address on the interface.
Accept Metric 0?	Specifies whether this interface accepts routing entries from RIP updates with a metric set to zero (0).
Send versions:	Specifies which version RIP uses to send out packets on this interface.
Receive versions:	Specifies which version packets RIP accepts on this interface.
Interface state:	Specifies whether the interface is in an up or a down state.
IP address:	IP address of the interface.
Metric Cost:	Specifies metric cost value.
Split horizon:	Specifies whether split horizon is enabled on this interface.
Poison Reverse:	Specifies whether poison reverse is enabled on this interface.
RIP peers attached to this interface 12.0.0.13	List of RIP neighbors on this interface.
uptime: 3	Specifies how long this neighbor is up.

Field	Description
version: 2	Specifies which version packets are received from this neighbor.
packets discarded: 0	Specifies the number of packets discarded from this neighbor.
routes discarded: 402	Specifies the number of routes discarded from this neighbor.

show rip statistics

To display statistical entry information from the Routing Information Protocol (RIP) topology table, use the **show rip statistics** command in XR EXEC mode.

show rip statistics

Command Default	No default behavior or values
Command Modes	XR EXEC
Command History	**Release** **Modification**

Examples

The following example shows how to configure SoO filtering on a RIP interface:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip) interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# site-of-origin 10.0.0.1:20
```

SPLIT HORIZON COMMAND GUIDE

split-horizon disable (RIP)

To disable split horizon for a Routing Information Protocol (RIP) process, use the **split-horizon disable** command in interface configuration mode. To enable split horizon, use the **no** form of this command.

split-horizon disable
no split-horizon disable

Syntax Description

This command has no arguments or keywords.

Command Default

Split horizon is enabled for a RIP process.

Command Modes

Interface configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

You can explicitly specify the **split-horizon disable** command in your configuration.

If split horizon is disabled, the poison reverse configuration is ignored.

Note In general, we recommend that you do not change the default state of split horizon unless you are certain that your application requires the change to properly advertise routes.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to disable split horizon on a Packet-over-SONET/SDH link:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip)# interface GigabitEthernet 0/1/0/0
RP/0/RP0/CPU0:router(config-rip-if)# split-horizon disable
```

Related Commands

Command	Description
poison-reverse, on page 18	Enables poison reverse processing of RIP router updates.

timers basic

To adjust Routing Information Protocol (RIP) network timers, use the **timers basic** command in router configuration mode. To restore the timers default values, 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. Range is 5 to 50000.
invalid	Interval, 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 is advertised as unreachable. Range is 15 to 200000.
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 a holddown state when an update packet is received that indicates that the route is unreachable. The route is marked inaccessible and is advertised as unreachable. When holddown expires, routes advertised by other sources are accepted, and the route is no longer inaccessible. Range is 15 to 200000.
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 it is less than the invalid timer value, the proper holddown interval cannot elapse, which results in a new route being accepted before the holddown interval expires. Range is 16 to 250000.

Command Default

update : 30

invalid : 180

holddown : 180

flush : 240

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The basic timing parameters for RIP are adjustable. Because RIP is running a distributed, asynchronous routing algorithm, these timers must be the same for all routers in the network.

Note Use the **show rip** command to display the current and default timer values.

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to set 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 flush period, the route is flushed from the routing table.

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip) timers basic 5 15 15 30
```

Related Commands

Command	Description
show rip, on page 29	Displays configuration and status of RIP.

validate-update-source disable

To stop the Cisco IOS XR software from validating the source IP address of incoming routing updates for Routing Information Protocol (RIP), use the **validate-update-source disable** command in router configuration mode. To reenable this function, use the **no** form of this command.

validate-update-source disable
no validate-update-source disable

Syntax Description

This command has no arguments or keywords.

Command Default

The source IP address of incoming updates for RIP is always validated.

Command Modes

Router configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When the **validate-update-source disable** command is used, validation is not performed.

By default, 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.

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

Task ID

Task ID	Operations
rip	read, write

Examples

The following example shows how to disable source validation:

```
RP/0/RP0/CPU0:router(config)# router rip
RP/0/RP0/CPU0:router(config-rip) validate-update-source disable
```