ZebOS-XP®
Network Platform

Version 1.4
Extended Performance

Routing Information Protocol
Command Reference

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Preface

This document describes the ZebOS-XP commands for Routing Information Protocol (RIP).

Audience

This document is intended for network administrators and other engineering professionals who configure and manage RIP.

Conventions

Table P-1 shows the conventions used in this guide.

Table P-1: Conventions

Convention	Description
Italics	Emphasized terms; titles of books
Note:	Special instructions, suggestions, or warnings
`monospaced type`	Code elements such as commands, functions, parameters, files, and directories

Contents

This document contains these chapters and appendix:

- Chapter 1, *Command Line Interface*
- Chapter 2, *Routing Information Protocol Commands*
- Chapter 3, *RIPng Commands*
- Chapter 4, *Routing Information Protocol VPN Commands*
- Appendix A, *Routing Information Protocol Authentication*

Related Documents

The following guides are related to this document:

- *Routing Information Protocol Developer Guide*
- *Unicast Configuration Guide*
- *Installation Guide*

Note: All ZebOS-XP technical manuals are available to licensed customers at http://www.ipinfusion.com/support/document_list.

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CHAPTER 1 Command Line Interface

This chapter introduces the ZebOS-XP Command Line Interface (CLI) and how to use its features.

Overview

You use the CLI to configure, monitor, and maintain ZebOS-XP devices. The CLI is text-based and each command is usually associated with a specific task.

You can give the commands described in this manual locally from the console of a device running ZebOS-XP or remotely from a terminal emulator such as `putty` or `xterm`. You can also use the commands in scripts to automate configuration tasks.

Starting the Command Line Interface

You must start daemons as described in this section before you can use the CLI. The general steps are listed below. For details about the ZebOS-XP daemons, see the *Installation Guide.*

1. Start your terminal emulator and connect to the device or go to the console of the device running ZebOS-XP.
2. Connect to the directory where you installed the ZebOS-XP executables.
3. Start the Network Services Module (NSM).
   ```
   # ./nsm -d
   ```
4. Start the protocol module daemons that your organization uses, such as `mstpd`, `ospf6d`, or `ripd`.
   ```
   # ./mstpd -d
   ```
5. Start the Integrated Management Interface (IMI) daemon.
   ```
   # ./imi -d
   ```
6. Start the IMI shell.
   ```
   # ./imish
   ```
   Note: Your organization may use a ZebOS-XP build that does not include `imish`. If that is the case, you must connect to a port on which a protocol daemon is listening. For details, see the *Installation Guide.*

You can now begin using the CLI.

Command Line Interface Help

You access the CLI help by entering a full or partial command string and a question mark “?”. The CLI displays the command keywords or parameters along with a short description. For example, at the CLI command prompt, type:

```
> show ?
```

The CLI displays this keyword list with short descriptions for each keyword:

```
show ?
  application-priority            Application Priority
```

```
  arp                              Internet Protocol (IP)
  bfd                              Bidirectional Forwarding Detection (BFD)
  bgp                              Border Gateway Protocol (BGP)
  bi-lsp                           Bi-directional lsp status and configuration
  bridge                           Bridge group commands
  ce-vlan                          COS Preservation for Customer Edge VLAN
  class-map                        Class map entry
  cli                              Show CLI tree of current mode
  clns                             Connectionless-Mode Network Service (CLNS)
  control-adjacency                Control Adjacency status and configuration
  control-channel                  Control Channel status and configuration
  cspf                             CSPF Information
  customer                         Display Customer spanning-tree
  cvlan                            Display CVLAN information
  debugging                        Debugging functions (see also 'undebug')
  dot1x                            IEEE 802.1X Port-Based Access Control
  etherchannel                     LACP etherchannel
  ethernet                         Layer-2
...
```

If you type the ? in the middle of a keyword, the CLI displays help for that keyword only.

```
> show de?
debugging  Debugging functions (see also 'undebug')
```

If you type the ? in the middle of a keyword, but the incomplete keyword matches several other keywords, ZebOS-XP displays help for all matching keywords.

```
> show i? (CLI does not display the question mark).
interface  Interface status and configuration
ip         IP information
isis       ISIS information
```

Command Completion

The CLI can complete the spelling of a command or a parameter. Begin typing the command or parameter and then press the tab key. For example, at the CLI command prompt type `sh`:

```
> sh
```

Press the tab key. The CLI displays:

```
> show
```

If the spelling of a command or parameter is ambiguous, the CLI displays the choices that match the abbreviation. Type `show i` and press the tab key. The CLI displays:

```
> show i
  interface  ip         ipv6       isis
> show i
```

The CLI displays the `interface` and `ip` keywords. Type `n` to select `interface` and press the tab key. The CLI displays:

```
> show in
> show interface
```

Type ? and the CLI displays the list of parameters for the `show interface` command.

```
> show interface
  IFNAME  Interface name
  |       Output modifiers
```



```
>       Output redirection
<cr>
```

The CLI displays the only parameter associated with this command, the `IFNAME` parameter.

Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands. For example:

```
> sh in eth0
```

is an abbreviation for:

```
> show interface eth0
```

Command Line Errors

Any unknown spelling causes the CLI to display the error `Unrecognized command` in response to the ?. The CLI displays the command again as last entered.

```
> show dd?
% Unrecognized command
> show dd
```

When you press the Enter key after typing an invalid command, the CLI displays:

```
(config)#router ospf here
                          ^
% Invalid input detected at '^' marker.
```

where the ^ points to the first character in error in the command.

If a command is incomplete, the CLI displays the following message:

```
> show
% Incomplete command.
```

Some commands are too long for the display line and can wrap mid-parameter or mid-keyword, as shown below. This does *not* cause an error and the command performs as expected:

```
area 10.10.0.18 virtual-link 10.10.0.19 authent
ication-key 57393
```

Command Negation

Many commands have a `no` form that resets a feature to its default value or disables the feature. For example:

- The `ip address` command assigns an IPv4 address to an interface
- The `no ip address` command removes an IPv4 address from an interface

Syntax Conventions

Table 1-1 describes the conventions used to represent command syntax in this reference.

Table 1-1: Syntax conventions

Convention	Description	Example
`monospaced font`	Command strings entered on a command line	`show ip rip`
`lowercase`	Keywords that you enter exactly as shown in the command syntax.	`show ip rip`
`UPPERCASE`	See Variable Placeholders	`IFNAME`
`()`	Optional parameters, from which you must select one. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>)`
`()`	Optional parameters, from which you select one or none. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>|)`
`()`	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	`(IFNAME|)`
`{}`	Optional parameters, from which you must select one or more. Vertical bars delimit the selections. Do not enter the braces or vertical bars as part of the command.	`{intra-area <1-255>|inter-area <1-255>|external <1-255>}`
`[]`	Optional parameters, from which you select zero or more. Vertical bars delimit the selections. Do not enter the brackets or vertical bars as part of the command. A '?' before a parameter in square brackets limits that parameter to one occurrence in a command string.	`[<1-65535>|AA:NN|internet|local-AS|no-advertise|no-export]`
`.`	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	`set as-path prepend .<1-65535>`

Variable Placeholders

Table 1-2 shows the tokens used in command syntax use to represent variables for which you supply a value.

Table 1-2: Variable placeholders

Token	Description
`WORD`	A contiguous text string (excluding spaces)
`LINE`	A text string, including spaces; no other parameters can follow this parameter
`IFNAME`	Interface name whose format varies depending on the platform; examples are: `eth0`, `Ethernet0`, `ethernet0`, `xe0`
`A.B.C.D`	IPv4 address
`A.B.C.D/M`	IPv4 address and mask/prefix
`X:X::X:X`	IPv6 address
`X:X::X:X/M`	IPv6 address and mask/prefix
`HH:MM:SS`	Time format
`AA:NN`	BGP community value
`XX:XX:XX:XX:XX:XX`	MAC address

`<1-5>`
`<1-65535>`
`<0-2147483647>`
`<0-4294967295>`
	Numeric range

Command Description Format

Table 1-3 explains the sections used to describe each command in this reference.

Table 1-3: Command descriptions

Section	Description
Command Name	The name of the command, followed by what the command does and when should it be used
Command Syntax	The syntax of the command
Parameters	Parameters and options for the command
Default	The state before the command is executed
Command Mode	The mode in which the command runs; see Command Modes
Example	An example of the command being executed

Keyboard Operations

Table 1-4 lists the operations you can perform from the keyboard.

Table 1-4: Keyboard operations

Key combination	Operation
Left arrow or Ctrl+b	Moves one character to the left. When a command extends beyond a single line, you can press left arrow or Ctrl+b repeatedly to scroll toward the beginning of the line, or you can press Ctrl+a to go directly to the beginning of the line.
Right arrow or Ctrl-f	Moves one character to the right. When a command extends beyond a single line, you can press right arrow or Ctrl+f repeatedly to scroll toward the end of the line, or you can press Ctrl+e to go directly to the end of the line.
Esc, b	Moves back one word
Esc, f	Moves forward one word
Ctrl+e	Moves to end of the line
Ctrl+a	Moves to the beginning of the line
Ctrl+u	Deletes the line
Ctrl+w	Deletes from the cursor to the previous whitespace
Alt+d	Deletes the current word
Ctrl+k	Deletes from the cursor to the end of line
Ctrl+y	Pastes text previously deleted with Ctrl+k, Alt+d, Ctrl+w, or Ctrl+u at the cursor

Table 1-4: Keyboard operations (Continued)

Key combination	Operation
Ctrl+t	Transposes the current character with the previous character
Ctrl+c	Ignores the current line and redisplays the command prompt
Ctrl+z	Ends configuration mode and returns to exec mode
Ctrl+l	Clears the screen
Up Arrow or Ctrl+p	Scroll backward through command history
Down Arrow or Ctrl+n	Scroll forward through command history

Show Command Modifiers

You can use two tokens to modify the output of a `show` command. Enter a question mark to display these tokens:

```
# show users ?
  | Output modifiers
  > Output redirection
```

You can type the | (vertical bar character) to use output modifiers. For example:

```
> show rsvp | ?
  begin     Begin with the line that matches
  exclude   Exclude lines that match
  include   Include lines that match
  redirect  Redirect output
```

Begin Modifier

The `begin` modifier displays the output beginning with the first line that contains the input string (everything typed after the `begin` keyword). For example:

```
# show run | begin eth1
...skipping
interface eth1
 ipv6 address fe80::204:75ff:fee6:5393/64
!
interface eth2
 ipv6 address fe80::20d:56ff:fe96:725a/64
!
line con 0
 login
!
end
```

You can specify a regular expression after the `begin` keyword, This example begins the output at a line with either “eth3” or “eth4”:

```
# show run | begin eth[3-4]

...skipping
interface eth3
```

```
 shutdown
!
interface eth4
 shutdown
!
interface svlan0.1
 no shutdown
!
route-map myroute permit 3
!
route-map mymap1 permit 10
!
route-map rmap1 permit 3
!
line con 0
 login
line vty 0 4
 login
!
end
```

Include Modifier

The `include` modifier includes only those lines of output that contain the input string. In the output below, all lines containing the word “input” are included:

```
# show interface eth1 | include input
    input packets 80434552, bytes 2147483647, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 1, missed 0
```

You can specify a regular expression after the `include` keyword. This examples includes all lines with “input” or “output”:

```
#show int eth0 | include (in|out)put
    input packets 597058, bytes 338081476, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    output packets 613147, bytes 126055987, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
```

Exclude Modifier

The `exclude` modifier excludes all lines of output that contain the input string. In the following output example, all lines containing the word “input” are excluded:

```
# show interface eth1 | exclude input
Interface eth1
  Scope: both
  Hardware is Ethernet, address is 0004.75e6.5393
  index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Administrative Group(s): None
  DSTE Bandwidth Constraint Mode is MAM
  inet6 fe80::204:75ff:fee6:5393/64
    output packets 4438, bytes 394940, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    collisions 0
```

You can specify a regular expression after the `exclude` keyword. This example excludes lines with “output” or “input”:


```
# show interface eth0 | exclude (in|out)put
Interface eth0
  Scope: both
  Hardware is Ethernet  Current HW addr: 001b.2139.6c4a
  Physical:001b.2139.6c4a  Logical:(not set)
  index 2 metric 1 mtu 1500 duplex-full arp ageing timeout 3000
  <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Bandwidth 100m
  DHCP client is disabled.
  inet 10.1.2.173/24 broadcast 10.1.2.255
  VRRP Master of :  VRRP is not configured on this interface.
  inet6 fe80::21b:21ff:fe39:6c4a/64
    collisions 0
```

Redirect Modifier

The `redirect` modifier writes the output into a file. The output is not displayed.

```
# show history | redirect /var/frame.txt
```

The output redirection token (>) does the same thing:

```
# show history >/var/frame.txt
```

Command Modes

Commands are grouped into modes arranged in a hierarchy. Each mode has its own set of commands. Table 1-5 lists the command modes common to all protocols.

Table 1-5: Common command modes

Name	Description
Executive mode	Also called *view* mode, this is the first mode to appear after you start the CLI. It is a base mode from where you can perform basic commands such as `show`, `exit`, `quit`, `help`, `list`, and `enable`.
Privileged executive mode	Also called *enable* mode, in this mode you can run additional basic commands such as `debug`, `write`, and `show`.
Configure mode	Also called *configure terminal* mode, in this mode you can run configuration commands and go into other modes such as interface, router, route map, key chain, and address family.
Interface mode	In this mode you can configure protocol-specific settings for a particular interface. Any setting you configure in this mode overrides a setting configured in router mode.
Router mode	This mode is used to configure router-specific settings for a protocol such as RIP or OSPF.

Command Mode Tree

The diagram below shows the common command mode hierarchy.

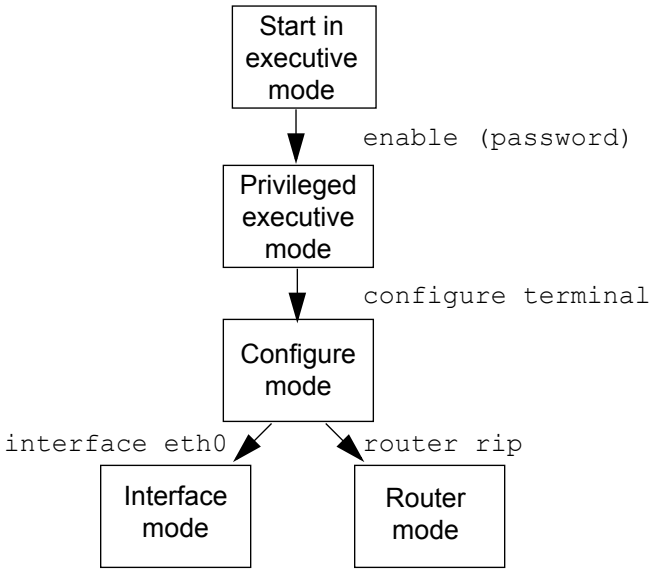

Figure 1-1: Common command modes

To change modes:

1. Enter privileged executive mode by entering `enable` in Executive mode.
2. Enter configure mode by entering `configure terminal` in Privileged Executive mode.

The example below shows starting `imish` and then moving from executive mode to privileged executive mode to configure mode and finally to router mode:

```
# ./imish
> enable mypassword
# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
(config)# router rip
(config-router)#
```

Note: Each protocol can have modes in addition to the common command modes. See the command reference for the respective protocol for details.

Debug Command

Whether the settings you make for a `debug` command persist between sessions depends on the mode where you make the settings:

- When you make settings for a `debug` command in executive mode, the configuration is valid for the current session only and is not saved in the `ZebOS.conf` file.
- When you make settings for a `debug` command in configuration mode, the configuration is retained and saved in `ZebOS.conf` and used even after the session restarts.

CHAPTER 2 Routing Information Protocol Commands

This chapter provides an alphabetized reference for each of the Routing Information Protocol (RIP) commands, which support IPv4. It includes the following commands:

- accept-lifetime on page 21
- cisco-metric-behavior on page 23
- clear ip rip route on page 24
- debug rip on page 25
- default-information originate on page 27
- default-metric on page 28
- distance on page 29
- distribute-list on page 30
- ip rip authentication key-chain on page 31
- ip rip authentication mode on page 32
- ip rip authentication string on page 33
- ip rip receive-packet on page 34
- ip rip receive version on page 35
- ip rip send-packet on page 36
- ip rip send version on page 37
- ip rip split-horizon on page 38
- key on page 40
- key chain on page 39
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- route on page 50
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- send-lifetime on page 52
- show debugging rip on page 53
- show ip protocols rip on page 54

- show ip rip on page 55
- show ip rip interface on page 56
- show ip rip statistics on page 57
- snmp restart rip on page 58
- timers basic on page 59
- version on page 60

accept-lifetime

Use this command to specify the time period during which the authentication key on a key chain is received as valid.

Use the `no` option with this command to disable it.

See Appendix A, *Routing Information Protocol Authentication* for information on how this command is related to the other authentication commands.

Command Syntax

```
accept-lifetime HH:MM:SS <1-31> MONTH <1993-2035> HH:MM:SS <1-31> MONTH <1993-2035>
accept-lifetime HH:MM:SS <1-31> MONTH <1993-2035> HH:MM:SS MONTH <1-31> <1993-2035>
accept-lifetime HH:MM:SS MONTH <1-31> <1993-2035> HH:MM:SS <1-31> MONTH <1993-2035>
accept-lifetime HH:MM:SS MONTH <1-31> <1993-2035> HH:MM:SS MONTH <1-31> <1993-2035>
accept-lifetime HH:MM:SS <1-31> MONTH <1993-2035> infinite
accept-lifetime HH:MM:SS MONTH <1-31> <1993-2035> infinite
accept-lifetime HH:MM:SS <1-31> MONTH <1993-2035> duration <1-2147483646>
accept-lifetime HH:MM:SS MONTH <1-31> <1993-2035> duration <1-2147483646>
no accept-lifetime
```

Parameters

`HH:MM:SS`	Specify the start time of accept-lifetime in hours, minutes and seconds.
`<1-31>`	Specify the day of the month to start.
`MONTH`	Specify the month of the year to start (the first three letters of the month, for example, `Jan.`).
`<1993-2035`	Specify the year to start.
`HH:MM:SS`	Specify the time when accept-lifetime expires in hours, minutes and seconds.
`<1-31>`	Specify the day of the month to expire.
`MONTH`	Specify the month of the year to expire (the first three letters of the month, for example, `Jan.`).
`<1993-2035>`	Specify the year to expire.
`duration`	Specify the duration of the key in seconds <1-2147483646>.
`infinite`	Specify the end time to never expire.

Command Mode

Keychain-key mode

Examples

The following example shows the setting of accept-lifetime for `key1` on the key chain named `mychain`.

```
#configure terminal
(config)#key chain mychain
(config-keychain)#key 1
(config-keychain-key)#accept-lifetime 03:03:01 Dec 3 2004 04:04:02 Oct 6 2006
```

```
(config)#key chain mychain
(config-keychain)#key 1
(config-keychain-key)#no accept-lifetime
```

cisco-metric-behavior

Use this command to enable the metric update consistent with Cisco.

Use either the `no` or `disable` parameter with this command to disable this feature.

Command Syntax

```
cisco-metric-behavior (enable|disable)
no cisco-metric-behavior
```

Parameters

`enable`	Enable updating the metric consistent with Cisco.
`disable`	Disable updating the metric consistent with Cisco.

Default

By default, the Cisco metric-behavior is disabled.

Command Mode

Router mode

Example

This example shows how to enable the metric update behavior to be consistent with Cisco in the Router mode.

```
#configure terminal
(config)#router rip
 (config-router)#cisco-metric-behavior enable
```

clear ip rip route

Use this command to clear specific data from the RIP routing tables.

Using this command with the `all` parameter, clears the RIP table of all the routes. If you do not want that your RIP network to be deleted, use the `redistribute connected` command and make the RIP network a connected route. To delete the RIP routes learned from neighbor and also keep the RIP network intact, use the `rip` (`clear ip rip route rip`) parameter with this command.

Command Syntax

```
clear ip rip route (A.B.C.D/M|rip|kernel|connected|static|ospf|isis|bgp|all)
```

Parameters

`A.B.C.D/M`	Removes entries which exactly match this destination address from RIP routing table.
`bgp`	Removes only BGP routes from the RIP routing table.
`connected`	Removes entries for connected routes from the RIP routing table.
`isis`	Removes only IS-IS routes from the RIP routing table
`kernel`	Removes kernel entries from the RIP routing table.
`ospf`	Removes only OSPF routes from the RIP routing table.
`rip`	Removes only RIP routes from the RIP routing table.
`static`	Removes static entries from the RIP routing table.
`all`	Removes the entire RIP routing table.

Command Mode

Privileged Exec mode

Examples

```
#clear ip rip route 10.0.0.0/8
#clear ip rip route ospf
```

debug rip

Use this command to specify the options for the displayed debugging information for RIP events, RIP packets and RIP NSM.

Use the `no` parameter with this command to disable all debugging. The `undebug` alias command can also be used.

Command Syntax

```
debug rip (all|)
debug rip bfd
debug rip events
debug rip nsm
debug rip packet (recv|send|) (detail|)
debug rip rib
no debug rip (all|)
no debug rip bfd
no debug rip events
no debug rip nsm
no debug rip packet (recv|send|) (detail|)
no debug rip rib
undebug rip (all|)
undebug rip bfd
undebug rip events
undebug rip nsm
undebug rip packet (recv|send|) (detail|)
undebug rip rib
```

Parameters

`all`	Debug all RIP information.
`bfd`	Debug all RIP and BFD information.
`events`	Debug RIP events.
`nsm`	Debug RIP and NSM communications.
`packet`	Debug RIP packets, only
`recv`	Debug received packets.
`rib`	Debug RIP and RIB communications.
`send`	Debug sent packets.
`detail`	Display detailed information for the sent or received packet.

Default

Disabled

Command Mode

Privileged Exec mode and Configure mode

Examples

```
#debug rip events
#debug rip packet send detail
#debug rip nsm
```

default-information originate

Use this command to add default routes to the RIPng updates.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
default-information originate (always | route-map)
no default-information originate
```

Parameters

`always`	Always advertise default route
`route map`	Route map reference

Default

Disabled

Command Mode*

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#default-information originate route-map pmap
```

default-metric

Use this command to specify the metrics to be assigned to redistributed routers.

This command is used in conjunction with the `redistribute` command to make the routing protocol use the specified metric value for all redistributed routes. A default metric is useful in redistributing routes with incompatible metrics. Every protocol has different metrics and can not be compared directly. Default metric provides the standard to compare. All routes that are redistributed will use the default metric.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
default-metric <1-16>
no default-metric (<1-16>|)
```

Parameter

`<1-16>`	Specify the default metric.

Default

By default, the metric value is set to 1.

Command Mode

Router mode

Examples

This example assigns the cost of 30 to the OSPF routes which are redistributed into RIP.

```
#configure terminal
(config)#router rip
(config-router)#redistribute ospf
(config-router)#default-metric 10
```

distance

Use this command to set the administrative distance. The administrative distance is a feature used by the routers to select the path when there are two or more different routes to the same destination from two different routing protocols. A smaller administrative distance indicating a more reliable protocol.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
distance <1-255>
distance <1-255> A.B.C.D/M (WORD|)
no distance (<1-255>|)
no distance <1-255> A.B.C.D/M (WORD|)
```

Parameters

`<1-255>`	Specify the administrative distance value.
`A.B.C.D./M`	Specify the network prefix and length
`WORD`	Specify the access list name.

Default

By default, the administrative distance is 120.

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#distance 8 10.0.0.0/8 mylist
```

distribute-list

Use this command to filter incoming or outgoing route updates using an access list or a prefix list. You can filter out incoming or outgoing route updates using an access list or a prefix list. If you do not specify the name of the interface, the filter will be applied to all the interfaces.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
distribute-list WORD (in|out) (IFNAME|)
distribute-list prefix WORD (in|out) (IFNAME|)
no distribute-list WORD (in|out) (IFNAME|)
no distribute-list prefix WORD (in|out) (IFNAME|)
```

Parameters

`WORD`	Specify the IPv4 access-list number or name to use.
`prefix`	Filter prefixes in routing updates.
`WORD`	Specify the name of the IPv4 prefix-list to use.
`in`	Filter incoming routing updates.
`out`	Filter outgoing routing updates.
`IFNAME`	Specify the name of the interface on which distribute-list applies.

Default

Disabled

Command Mode

Router mode

Example

```
#configure terminal
(config)#router rip
(config-router)#distribute-list prefix myfilter in eth0
```

ip rip authentication key-chain

Use this command to enable RIPv2 authentication on an interface and specify the name of the key chain to be used. If you do not configure a key chain results in no authentication.

Use the `no` parameter with this command to disable this function.

See Appendix A, *Routing Information Protocol Authentication* for information on how this command is related to the other authentication commands.

Command Syntax

```
ip rip authentication key-chain LINE
no ip rip authentication key-chain
```

Parameters

`LINE`	Specify the name of the key chain.

Command Mode

Interface mode

Examples

In the following example, interface eth0 is configured key-chain authentication and the name is specified as `mykey`. This name is used to enter the key-chain mode to specify the password. See the `key` command.

```
#configure terminal
(config)#interface eth0
(config-if)#ip rip authentication key-chain mykey
```

ip rip authentication mode

Use this command to specify the type of authentication mode used for RIP v2 packets.

Use the `no` parameter with this command to restore clear text authentication.

See Appendix A, *Routing Information Protocol Authentication* for information on how this command is related to the other authentication commands.

Command Syntax

```
ip rip authentication mode md5
ip rip authentication mode text
no ip rip authentication mode
```

Parameters

`md5`	Uses the keyed MD5 authentication algorithm.
`text`	Specify the clear text or simple password authentication.

Default

Text authentication is enabled

Command Mode

Interface mode

Examples

The following example shows `md5` authentication configured on the `eth1` interface, ensuring authentication of RIP packets received.

```
#configure terminal
(config)#interface eth1
(config-if)#ip rip authentication mode md5
```

ip rip authentication string

Use this command to specify the authentication string or password used by a key.

You can configure authentication for a single key or multiple keys at different times. Use this command to specify password for a single key on an interface.

Use the `no` parameter with this command to disable this feature.

See Appendix A, *Routing Information Protocol Authentication* for how this command is related to the other authentication commands.

Command Syntax

```
ip rip authentication string LINE
no ip rip authentication string
```

Parameters

`LINE`	Specify the authentication string or password used by a key.

Command Mode

Interface mode

Examples

In the following example, the interface `eth1` is configured to have an authentication string as `guest`, any receiving RIP packet in that interface should have the same string as password.

```
#configure terminal
(config)#interface eth1
(config-if)#ip rip authentication string guest
```

ip rip receive-packet

Use this command to configure the interface to enable the reception of RIP packets.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
ip rip receive-packet
no ip rip receive-packet
```

Parameters

None

Default

Receive-packet is enabled

Command Mode

Interface mode

Example

This example shows packet receiving being turned on for interface `eth0`.

```
#configure terminal
(config)#interface eth0
(config-if)#ip rip receive-packet
```

ip rip receive version

Use this command to receive specified version of RIP packets on an interface basis using version control, and override the setting of the version command.

Use the `no` form of this command to use the setting established by the version command.

Command Syntax

```
ip rip receive version (1|2)
ip rip receive version 1 2
ip rip receive version 2 1
no ip rip receive version
```

Parameters

`1`	Specify acceptance of RIP version 1 packets on the interface.
`2`	Specify acceptance of RIP version 2 packets on the interface.
`1 2`	Specify acceptance of RIP version 1 and version 2 packets on the interface.
`2 1`	Specify acceptance of RIP version 2 and version 1 packets on the interface.

Default

Version 2

Command Mode

Interface mode

Examples

In the following example, interface eth1 in configured to receive both RIP version 1 and 2 packets.

```
#configure terminal
(config)#interface eth1
(config-if)#ip rip receive version 1 2
```

ip rip send-packet

Use this command to enable sending RIP packets through the current interface.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
ip rip send-packet
no ip rip send-packet
```

Parameters

None

Default

Send packet is enabled.

Command Mode

Interface mode

Example

This example shows packet sending being turned on for interface `eth0`.

```
#configure terminal
(config)#interface eth0
(config-if)#ip rip send-packet
```

ip rip send version

Use this command to send RIP packets on an interface using version control. In addition to version 1 and version 2, compatible version packets can be specified. With the parameter 1-compatible, a version 2 RIP interface will broadcast the packets instead of multicasting them.

This command applies to a specific interface and overrides any the version specified by the `version` command.

Use the `no` parameter with this command to use the global RIP version control rules.

Command Syntax

```
ip rip send version (1|2|1-compatible)
ip rip send version 1 2
ip rip send version 2 1
no ip rip send version
```

Parameters

`1`	Specify sending RIP version 1 packets out of an interface.
`2`	Specify sending RIP version 2 packets out of an interface.
`1-compatible`	Specify sending RIP version 1 compatible packets from a version 2 RIP interface.

Default

Version 2

Command Mode

Interface mode

Examples

In the following example, interface eth1 is configured to send both RIP version 1 and 2 packets.

```
#configure terminal
(config)#interface eth1
(config-if)#ip rip send version 1 2
```

ip rip split-horizon

Use this command to perform the split-horizon action on the interface

This command helps avoid including routes in updates sent to the same gateway from which they were learned. Using the `split horizon` command omits routes learned from one neighbor, in updates sent to that neighbor. Using the `poisoned` parameter with this command includes such routes in updates, but sets their metrics to infinity. Thus, advertising that these routes are not reachable.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
ip rip split-horizon
ip rip split-horizon poisoned
no ip rip split-horizon
```

Parameter

`poisoned`	Performs split-horizon with poisoned reverse.

Default

Split horizon poisoned

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#ip rip split-horizon poisoned
```

key chain

Use this command to enter the key chain management mode and configure a key chain with a key chain name. This command allows you to enter the Keychain mode to specify keys on this key chain.

Command Syntax

```
key chain WORD
no key chain WORD
```

Parameters

WORD	Specify the name of the key chain to manage.

Command Mode

Configure mode

Examples

The following example shows the creation of a key chain named `mychain` and the change to keychain mode:

```
#configure terminal
(config)#key chain mychain
(config-keychain)#
```

key

Use this command to manage, add or delete authentication keys in a key-chain. This command allows you to enter the Keychain-key mode to set a password for the key.

Use the no option with this command to disable this feature.

See Appendix A, *Routing Information Protocol Authentication* for information on how this command is related to the other authentication commands.

Command Syntax

```
key <0-2147483647>
no key <0-2147483647>
```

Parameters

`<0-2147483647>` Specify a key identifier.

Default

By default, RIP uses level-1-2 if there is no Level-2 instance nor a Level-1-2 instance. Otherwise, it uses level-1.

Command Mode

Keychain mode

Examples

In the following example, the password for `key 1` in the key chain named `mychain` is set to `prime`:

```
#configure terminal
(config)#key chain mychain
(config-keychain)#key 1
(config-keychain-key)#key-string prime

(config-keychain)#key 1
(config-keychain-key)#no key-string
```

key chain

Use this command to enter the key chain management mode and to configure a key chain with a key chain name. This command allows you to enter the keychain mode to specify keys on this key chain.

Use the no option with this command to disable this feature.

See Appendix A, *Routing Information Protocol Authentication* for information on how this command is related to the other authentication commands.

Command Syntax

```
key chain WORD
no key chain WORD
```

Parameter

`WORD`	Specify the name of the key chain to manage.

Command Mode

Configure mode and Keychain mode

Examples

The following example shows the creation of a key chain named `mychain` and the change into `keychain` mode prompt.

```
#configure terminal
(config)#key chain mychain
(config-keychain)#
```

The following example shows the creation of a key chain named `mykeychain3` in the Keychain mode and the addition of an authentication key `key10` in the same mode.

```
(config-keychain)#key chain mykeychain3
(config-keychain)#key 10
(config-keychain-key)#
```

key-string

Use this command to define a password to be used by a key.

Use the `no` parameter with this command to disable this feature.

See Appendix A, *Routing Information Protocol Authentication* for information on how this command is related to the other authentication commands.

Command Syntax

```
key-string LINE
no key-string
```

Parameters

`LINE`	Specify a string of characters to be used as a password by the key.

Command Mode

Keychain-key mode

Examples

In the following example, the password for `key 1` in the key chain named `mychain` is set to `prime`:

```
#configure terminal
(config)#key chain mychain
(config-keychain)#key 1
(config-keychain-key)#key-string prime

(config-keychain)#key 1
(config-keychain-key)#no key-string
```

maximum-prefix

Use this command to configure the maximum prefix.

Use the `no` parameter with this command to disable the limiting of the number of RIP routes in the routing table.

Command Syntax

```
maximum-prefix <1-65535> (<1-100>|)
no maximum-prefix
```

Parameters

`<1-65535>`	The maximum number of RIP routes allowed.
`<1-100>`	Percentage of maximum routes to generate a warning. The default threshold is 75%.

Default

None

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#maximum-prefix 150
```

neighbor

Use this command to specify a neighbor router. It is used for each connected point-to-point link. This command to exchanges non-broadcast routing information. It can be used multiple times for additional neighbors.

`Passive-interface` command disables sending routing updates on an interface. Use the `neighbor` command in conjunction with the `passive-interface` command to send routing updates to specific neighbors.

Use the `no` parameter with this command to disable the specific router.

Command Syntax

```
neighbor A.B.C.D
no neighbor A.B.C.D
```

Parameter

`A.B.C.D`	An IP address of a neighboring router with which the routing information will be exchanged.

Default

Disabled

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#neighbor 10.7.1.12
```

network

Use this command to specify a network as one that runs RIP. This command specifies the networks to which routing updates will be sent and received. If a network is not specified, the interfaces in that network will not be advertised in any RIP update.

Use the `no` parameter with this command to remove the specified network as one that runs RIP.

Command Syntax

```
network A.B.C.D/M
network IFNAME
no network A.B.C.D/M
no network IFNAME
```

Parameters

`A.B.C.D/M`	The IP address prefix and length of this IP network.
`IFNAME`	Alphanumeric string that defines the interface name.

Default

Disabled

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#network 10.0.0.0/8
(config-router)#network eth0
```

offset-list

Use this command to add an offset to in and out metrics to routes learned through RIP. This command specifies the offset value that is added to the routing metric. When the networks match the access list the offset is applied to the metrics. No change occurs if the offset value is zero.

Use the `no` parameter with this command to remove the offset list.

Command Syntax

```
offset-list WORD (in|out) <0-16> (IFNAME|)
no offset-list WORD (in|out) <0-16> (IFNAME|)
```

Parameters

`WORD`	Specify the access-list number or names to apply.
`in`	Indicates the access list will be used for metrics of incoming advertised routes.
`out`	Indicates the access list will be used for metrics of outgoing advertised routes.
`<0-16>`	Specify that the offset is used for metrics of networks matching the access list.
`IFNAME`	An alphanumeric string that specifies the interface to match.

Default

The default `offset value` is the interface metric value which is defined by the operating system.

Command Mode

Router mode

Examples

In this example the router examines the RIP updates being sent out from interface eth0 and adds 16 hops to the routes matching the ip addresses specified in the access list `accesslist1`.

```
#configure terminal
(config)#router rip
(config-router)#offset-list accesslist1 in 16 eth0
```

passive-interface

Use this command to block RIP broadcast on the interface.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
passive-interface IFNAME
no passive-interface IFNAME
```

Parameters

`IFNAME`	Specify the interface name.

Default

Disabled

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#passive-interface eth0
```

recv-buffer-size

Use this command to run-time configure the RIP UDP receive-buffer size.

Use the `no` parameter with this command to return to the default value.

Command Syntax

```
recv-buffer-size <8192-2147483647>
no recv-buffer-size (<8192-2147483647>|)
```

Parameters

`<8192-2147483647>`

Specify the RIP UDP receive buffer size value.

Default

The default value of the RIP UDP receive-buffer size is 8192.

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#recv-buffer-size 150000
```

redistribute

Use this command to redistribute information from other routing protocols.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
redistribute (kernel|connected|static|ospf|isis|bgp)
redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16>
redistribute (kernel|connected|static|ospf|isis|bgp) route-map WORD
redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16> route-map WORD
no redistribute (kernel|connected|static|ospf|isis|bgp)
no redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16>
no redistribute (kernel|connected|static|ospf|isis|bgp) route-map WORD
no redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16> route-map
  WORD
```

Parameters

`bgp`	Redistribute from BGP routes
`connected`	Redistribute from connected routes
`isis`	Redistribute from ISO IS-IS routes
`kernel`	Redistribute from kernel routes
`ospf`	Redistribute from OSPFv3 routes
`static`	Redistribute from static routes
`metric`	Metric value
`<0-16>`	Specify a metric value
`route-map`	Route map reference
`WORD`	Specify name of the route-map

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#redistribute kernel


#configure terminal
(config)#router rip
(config-router)#redistribute kernel route-map myroutemap
```

route

Use this command to configure static RIP routes.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
route A.B.C.D/M
no route A.B.C.D/M
```

Parameter

`A.B.C.D/M`	Specify the IP address prefix and length.

Default

No route is added.

Command Mode

Router mode

Examples

Use this command to add a static RIP route. This command is used most often for debugging purposes and does not show up in the kernel routing table. After adding the RIP route, it can be checked in the RIP routing table.

```
#configure terminal
(config)#router rip
(config-router)#version 1
(config-router)#network 10.10.10.0/24
(config-router)#network 10.10.11.0/24
(config-router)#neighbor 10.10.10.10
(config-router)#route 10.10.10.0/24

(config-router)#version 1
(config-router)#network 10.10.10.0/24
(config-router)#network 10.10.11.0/24
(config-router)#route 10.10.10.0/24
```

router rip

Use this global command to enable a RIP routing process.

Use the `no` parameter with this command to disable RIP routing.

Command Syntax

```
router rip
no router rip
```

Parameter

None

Command Mode

Configure mode

Examples

This command is used to begin the RIP routing process.

```
#configure terminal
(config)#router rip
(config-router)#version 1
(config-router)#network 10.10.10.0/24
(config-router)#network 10.10.11.0/24
(config-router)#neighbor 10.10.10.10
```

send-lifetime

Use this command to specify the time period during which the authentication key on a key chain can be sent.

Use the `no` parameter with this command to negate this command.

Command Syntax

```
send-lifetime HH:MM:SS <1-31> MONTH <1993-2035> HH:MM:SS <1-31> MONTH <1993-2035>
send-lifetime HH:MM:SS <1-31> MONTH <1993-2035> HH:MM:SS MONTH <1-31> <1993-2035>
send-lifetime HH:MM:SS MONTH <1-31> <1993-2035> HH:MM:SS <1-31> MONTH <1993-2035>
send-lifetime HH:MM:SS MONTH <1-31> <1993-2035> HH:MM:SS MONTH <1-31> <1993-2035>
send-lifetime HH:MM:SS <1-31> MONTH <1993-2035> infinite
send-lifetime HH:MM:SS MONTH <1-31> <1993-2035> infinite
send-lifetime HH:MM:SS <1-31> MONTH <1993-2035> duration <1-2147483646>
send-lifetime HH:MM:SS MONTH <1-31> <1993-2035> duration <1-2147483646>
no send-lifetime
```

Parameters

`<HH:MM:SS`	Specify the start time of send-lifetime in hours, minutes and seconds.
`<1-31>`	Specify the day of the month to start.
`MONTH`	Specify the month of the year to start (the first three letters of the month, for example, `Jan.`).
`<1993-2035`	Specify the year to start.
`HH:MM:SS`	Specify the time when send-lifetime expires in hours, minutes and seconds.
`<1-31>`	Specify the day of the month to expire.
`MONTH`	Specify the month of the year to expire (the first three letters of the month, for example, `Jan.`).
`<1993-2035>`	Specify the year to expire.
`duration`	Specify the duration of the key in seconds <1-2147483646>.
`infinite`	Specify the end time to never expire.

Command Mode

Keychain-key mode

Examples

The following example shows the setting of `send-lifetime` for `key 1` on the key chain named `mychain`:

```
#configure terminal
(config)#key chain mychain
(config-keychain)#key 1
(config-keychain-key)#send-lifetime 03:03:01 Jan 3 2004 04:04:02 Dec 6 2006
```

show debugging rip

Use this command to display the RIP debugging status for these debugging options: nsm debugging, RIP event debugging, RIP packet debugging and RIP nsm debugging.

Command Syntax

```
show debugging rip
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show debugging rip
RIP debugging status:
```

show ip protocols rip

Use this command to display RIP process parameters and statistics.

Command Syntax

```
show ip protocols
show ip protocols rip
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

This is an example of the output from the `show ip protocols rip` command:

```
#show ip protocols rip
Routing Protocol is "rip"
Sending updates every 30 seconds with +/-50%, next due in 12 seconds
Timeout after 180 seconds, garbage collect after 120 seconds
Outgoing update filter list for all interface is not set
Incoming update filter list for all interface is not set
Default redistribution metric is 1
Redistributing: connected static
Default version control: send version 2, receive version 2
Interface        Send  Recv   Key-chain
     eth0               2   2
Routing for Networks:
  10.10.0.0/24
Routing Information Sources:
  Gateway          BadPackets BadRoutes  Distance Last Update
Distance: (default is 120)
#
```

show ip rip

Use this command to show RIP routes.

Command Syntax

```
show ip rip (database|)
```

Parameters

`database`	Specify to display information about the IP RIP database.

Command Mode

Exec mode and Privileged Exec mode

Example

The following output displays the RIP routing table with the destination network, nexthop and metric to reach it.

```
#show ip rip
Codes: R - RIP, K - Kernel, C - Connected, S - Static, O - OSPF, I - IS-IS,
B - BGP
Network Next Hop Metric From If Time
K 0.0.0.0/0 10.0.1.1 16 eth1 01:58
C 10.0.1.0/24 1 eth1
S 10.10.10.0/24 1 eth0
C 10.10.11.0/24 1 eth0
S 192.168.101.0/24 1 eth0
R 192.192.192.0/24 1 --
```

show ip rip interface

Use this command to display information about RIP interfaces. You can specify an interface name to display information about a specific interface.

Command Syntax

```
show ip rip interface (IFNAME|)
```

Parameters

IFNAME	Name of the interface for which information is to be displayed.

Command Mode

Exec mode and Privileged Exec mode

Example

The following output displays the RIP routing table with the destination network, nexthop and metric to reach it.

```
#show ip rip interface
lo is up, line protocol is up
RIP is not enabled on this interface
eth0 is up, line protocol is up
RIP is not enabled on this interface
eth1 is down, line protocol is down
RIP is not enabled on this interface
eth2 is up, line protocol is up
Routing Protocol: RIP
Receive RIP packets
Send RIPv1 Compatible
Passive interface: Disabled
Split horizon: Enabled with Poisoned Reversed
IP interface address:
10.10.1.1/24
10.10.2.1/24
```

show ip rip statistics

Use this command to display information about RIP statistics. You can specify an interface name to display information about a specific interface.

Command Syntax

```
show ip rip statistics (IFNAME|)
```

Parameters

IFNAME	Name of the interface for which information is to be displayed.

Command Mode

Exec mode and Privileged Exec mode

Example

The following output displays the RIP routing table with the destination network, nexthop and metric to reach it.

```
#show ip rip statistics eth1
Interface Name : eth1
  Sent Multicast Updates  : 3
  Sent Multicast Requests : 1
  Sent Unicast Updates    : 0
  Sent Unicast Requests   : 0
  Recv Multicast Updates  : 3
  Recv Multicast Requests : 0
  Recv Unicast Updates    : 1
  Recv Unicast Requests   : 0
  Recv Bad Packets        : 0
  Recv Bad Routes         : 0
```

snmp restart rip

Use this command to restart SNMP in Routing Information Protocol (RIP)

Command Syntax

```
snmp restart rip
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp restart rip
```

timers basic

Use this command to adjust routing network timers.

This command adjusts the RIP timing parameters. Every 30 seconds, an update is sent out containing the complete routing table to every neighboring router. When the time specified by the timeout parameter expires, the route is no longer valid. However, it is retained in the routing table for a short time so that neighbors are notified that the route has been dropped. When the time specified by the garbage parameter expires, the route is finally removed from the routing table. Until the garbage time expires, the route is included in all updates sent by the router.

All routers in the network must have the same timers to allow RIP to execute a distributed and asynchronous routing algorithms. The timers should not be synchronized as it might lead to unnecessary collisions on the network.

Use the `no` parameter with this command to restore the default routing network timers.

Command Syntax

```
timers basic <5-2147483647> <5-2147483647> <5-2147483647>
no timers basic
```

Parameters

`<5-2147483647>`	Specify the routing table update timer in seconds. The default is 30 seconds.
`<5-2147483647>`	Specify the routing information timeout timer in seconds. The default is 180 seconds. After this interval has elapsed and no updates for a route are received, the route is declared invalid.
`<5-2147483647>`	Specify the routing garbage collection timer in seconds. The default is 120 seconds.

Default

Enabled

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#timers basic 30 180 120

(config)#router rip
(config-router)#no timers basic
```

version

Use this command to specify a RIP version used globally by the router. RIP can be run in version 1 as well as version 2 mode. Version 2 has more features than version 1 including authentication. Once the rip version is set, rip packets of that version will be received and sent on all the rip-enabled interfaces.

Use the `no` parameter with this command to restore the default version.

Note: The `ip rip receive version` command and the `ip rip send version` command override the value set by the `version` command.

Command Syntax

```
version <1-2>
no version
```

Parameters

`<1-2>`	Specify the version of RIP processing.

Default

Version 2

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router rip
(config-router)#version 1
(config-router)#network 10.10.10.0/24
(config-router)# network 10.10.11.0/24

#configure terminal
(config)#router rip
(config-router)#address-family ipv4 vrf ipi
(config-router-af)#version 2
```

CHAPTER 3 RIPng Commands

This chapter provides an alphabetized reference for each of the Routing Information Protocol next generation (RIPng) commands, which support IPv6. It includes the following commands:

- aggregate-address on page 62
- cisco-metric-behavior on page 63
- clear ipv6 rip route on page 64
- debug ipv6 rip on page 65
- default-information originate on page 67
- default-metric on page 68
- distance on page 69
- distribute-list on page 70
- ipv6 rip metric-offset on page 71
- ipv6 rip split-horizon on page 72
- ipv6 router rip on page 73
- neighbor on page 74
- offset-list on page 75
- passive-interface on page 76
- recv-buffer-size on page 77
- redistribute on page 78
- route on page 79
- route-map on page 80
- router ipv6 rip on page 81
- show debugging ipv6 rip on page 82
- show ipv6 protocols rip on page 83
- show ipv6 rip on page 84
- show ipv6 rip interface on page 85
- timers basic on page 86

aggregate-address

Use this command to set an aggregate RIPng route announcement.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
aggregate-address X:X::X:X/M
no aggregate-address X:X::X:X/M
```

Parameter

`X:X::X:X/M`	Specify an aggregate network (IPv6 address prefix and length).

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#aggregate-address 3ffe:8088::/32

(config)#router ipv6 rip
(config-router)#no aggregate-address 3ffe:8088::/32
```

cisco-metric-behavior

Use this command to enable or disable the metric update as Cisco.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
cisco-metric-behavior (enable|disable)
no cisco-metric-behavior
```

Parameters

`enable`	Enable updating the metric consistent with Cisco.
`disable`	Disable updating the metric consistent with Cisco.

Default

By default, the Cisco metric-behavior is disabled.

Command Mode

Router mode

Example

This example shows how to enable the metric update behavior to be consistent with Cisco in the Router mode.

```
#configure terminal
(config)#router ipv6 rip
(config-router)#cisco-metric-behavior enable
```

clear ipv6 rip route

Use this command to clear specific data from the RIPng routing table.

Command Syntax

```
clear ipv6 rip route (X:X::X:X/M|rip|kernel|connected|static|ospf6|isis|bgp|all)
```

Parameters

`X:X::X:X/M`	Removes entries which exactly match this destination address from the RIPng routing table.
`bgp`	Removes only BGP routes from the RIP routing table.
`connected`	Removes entries for connected routes from the RIP routing table.
`isis`	Removes only IS-IS routes from the RIP routing table
`kernel`	Removes kernel entries from the RIP routing table.
`ospf`	Removes only OSPF routes from the RIP routing table.
`static`	Removes static entries from the RIP routing table.
`all`	Removes the entire RIP routing table.

Command Mode

Privileged Exec mode

Example

```
#clear ipv6 rip route isis
#clear ipv6 rip route 3ffe:ffff::/16
```

debug ipv6 rip

Use this command to specify the options for the displayed debugging information for RIPng events, RIPng packets and RIPng NSM communications.

Use the `no` option with this command to turn off debugging options for RIPng. The `undebug` alias command can also be used.

Command Syntax

```
debug ipv6 rip (all|)
debug ipv6 rip bfd
debug ipv6 rip events
debug ipv6 rip nsm
debug ipv6 rip packet (recv|send|) (detail|)
debug ipv6 rip rib
no ipv6 debug rip (all|)
no ipv6 debug rip bfd
no ipv6 debug rip events
no ipv6 debug rip nsm
no ipv6 debug rip packet (recv|send|) (detail|)
no ipv6 debug rip rib
undebug ipv6 rip (all|)
undebug ipv6 rip bfd
undebug ipv6 rip events
undebug ipv6 rip nsm
undebug ipv6 rip packet (recv|send|) (detail|)
undebug ipv6 rip rib
```

Parameters

`all`	Debug all RIP information.
`bfd`	Debug all RIP and BFD information.
`events`	Debug RIP events.
`nsm`	Debug RIP and NSM communications.
`packet`	Debug RIP packets, only Routing Information Protocol
`recv`	Debug received packets.
`rib`	Debug RIP and RIB communications.
`send`	Debug sent packets.
`detail`	Display detailed information for the sent or received packet.

Default

Disabled

Command Mode

Privileged Exec mode and Configure mode

Examples

```
#debug ipv6 rip events
#debug ipv6 rip packet send detail
#debug ipv6 rip nsm
```

default-information originate

Use this command to generate a default route into the RIPng.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
default-information originate
no default-information originate
```

Parameters

None

Default

Disabled

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#default-information originate
```

default-metric

Use this command to specify the metrics to be assigned to redistributed routes.

Use the `no` parameter with this command to disable this feature.

For more details about this command, see the IPv4 version of this command (default-metric).

Command Syntax

```
default-metric <1-16>
no default-metric (<1-16>|)
```

Parameter

`<1-16>`	Specify the default metric.

Default

By default, the metric value is set to 1.

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#default-metric 8
```

distance

Use this command to set the administrative distance for RIP.

Use the no option with this command to disable this function.

For more details about this command, see the IPv4 version of this command (distance).

Command Syntax

```
distance <1-255>
no distance (<1-255>|)
```

Parameter

<1-255>	Specify the administrative distance value.

Default

By default, the administrative distance is 120.

Command Mode

Router mode

Example

```
#configure terminal
(config)#router ipv6 rip
(config-router)#distance 100
```

distribute-list

Use this command to filter incoming or outgoing route updates using the access-list or the prefix-list. You can filter out incoming or outgoing route updates using access-list or prefix-list. If you do not specify the name of the interface, the filter will be applied to all the interfaces.

Use the `no` parameter with this command to disable this feature.

Command Syntax

```
distribute-list WORD (in|out) (IFNAME|)
distribute-list prefix WORD (in|out) (IFNAME|)
no distribute-list WORD (in|out) (IFNAME|)
no distribute-list prefix WORD (in|out) (IFNAME|)
```

Parameters

`WORD`	Specify the IPv6 access-list number or name to use.
`prefix`	Filter prefixes in routing updates.
`WORD`	Specify the name of the IPv6 prefix-list to use.
`in`	Filter incoming routing updates.
`out`	Filter outgoing routing updates.
`IFNAME`	Specify the name of the interface on which distribute-list applies.

Default

Disabled

Command Mode

Router mode

Example

```
#configure terminal
(config)#router ipv6 rip
(config-router)#distribute-list prefix myfilter in eth0
```

ipv6 rip metric-offset

Use this command to set RIP metric offset.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
ipv6 rip metric-offset <1-16>
no ipv6 rip metric-offset <1-16>
```

Parameter

`<1-16>`	Set a metric value

Default

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#ipv6 rip metric-offset 1

(config)#interface eth0
(config-if)#no ipv6 rip metric-offset 1
```

ipv6 rip split-horizon

Use this command to perform the split-horizon action on the interface.

Use the `no` parameter with this command to disable this function.

For more details about this command, see the IPv4 version of this command (ip rip split-horizon).

Command Syntax

```
ipv6 rip split-horizon
ipv6 rip split-horizon poisoned
no ipv6 rip split-horizon
```

Parameter

`poisoned`	Performs split-horizon with poisoned reverse.

Default

Split horizon poisoned

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#ipv6 rip split-horizon

(config)#interface eth1
(config-if)#no ipv6 rip split-horizon
```

ipv6 router rip

Use this command to enable RIPng routing on the interface.

Use the `no` parameter with this command to disable RIPng routing.

Command Syntax

```
ipv6 router rip
no ipv6 router rip
```

Parameters

None

Default

None

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth0
(config-if)#ipv6 router rip
```

neighbor

Use this command to specify a neighbor router.

Use the `no` parameter with this command to disable the specific router.

For more details about this command, see the IPv4 version of this command (neighbor).

Command Syntax

```
neighbor X:X::X:X IFNAME
no neighbor X:X::X:X IFNAME
```

Parameters

`X:X::X:X`	Specify a link-local IP address of a neighboring router with which the routing information is exchanged.
`IFNAME`	Specify the name of the interface.

Default

Disabled

Command Mode

Router mode

Example

```
#configure terminal
(config)#router ipv6 rip
(config-router)#neighbor 80::1 eth0
```

offset-list

Use this command to add an offset to in and out metrics to routes learned through RIPng.

Use the `no` parameter with this command to remove this function.

For more details about this command, see the IPv4 version of this command (offset-list).

Command Syntax

```
offset-list WORD (in|out) <0-16> (IFNAME|)
no offset-list (WORD) in|out <0-16> (IFNAME|)
```

Parameters

`WORD`	Specify the access-list number or names to apply.
`in`	Indicates the access list will be used for metrics of incoming advertised routes.
`out`	Indicates the access list will be used for metrics of outgoing advertised routes.
`<0-16>`	Specify that the offset is used for metrics of networks matching the access list.
`IFNAME`	An alphanumeric string that specifies the interface to match.

Default

The default offset value is the metric value of the interface which is defined by the operating system.

Command Mode

Router mode

Examples

In this example the router examines the RIP updates being sent out from interface eth0 and adds 16 hops to the routes matching the ip addresses specified in the access list `accesslist1`.

```
#configure terminal
(config)#router ipv6 rip
(config-router)#offset-list accesslist1 in 16 eth0
```

passive-interface

Use this command to suppress routing updates on an interface.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
passive-interface IFNAME
no passive-interface IFNAME
```

Parameters

`IFNAME`	Specify the interface name.

Default

Disabled

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#passive-interface eth0
```

recv-buffer-size

Use this command to run-time configure the RIPng UDP receive-buffer size.

Use the `no` parameter with this command to return to the default value.

Command Syntax

```
recv-buffer-size <8192-2147483647>
no recv-buffer-size (<8192-2147483647>|)
```

Parameters

`<8192-2147483647>`

Specify the RIP UDP receive buffer size value.

Default

The default value of the RIP UDP receive-buffer size is 8192.

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#recv-buffer-size 150000
```

redistribute

Use this command to redistribute information from other routing protocols.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
redistribute (kernel|connected|static|ospf|isis|bgp)
redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16>
redistribute (kernel|connected|static|ospf|isis|bgp) route-map WORD
redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16> route-map WORD
no redistribute (kernel|connected|static|ospf|isis|bgp)
no redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16>
no redistribute (kernel|connected|static|ospf|isis|bgp) route-map WORD
no redistribute (kernel|connected|static|ospf|isis|bgp) metric <0-16> route-map
  WORD
```

Parameters

`bgp`	Redistribute from BGP routes
`connected`	Redistribute from connected routes
`isis`	Redistribute from ISO IS-IS routes
`kernel`	Redistribute from kernel routes
`ospf`	Redistribute from OSPF routes (version 3)
`static`	Redistribute from static routes
`metric`	Metric value
`<0-16>`	Specify a metric value
`route-map`	Route map reference
`WORD`	Specify name of the route-map

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#redistribute kernel route-map mymap
(config-router)#redistribute kernel metric 8
```

route

Use this command to debug the specified route advertisement. Use this command to configure static RIPng routes.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
route X:X::X:X/M
no route X:X::X:X/M
```

Parameter

`X:X::X:X/M`	Specify the IPv6 address prefix and length.

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#route 3ffe:1234:5678::1/64
```

route-map

Use this command to set a route map for input or output filtering on a specified interface.

Use the `no` parameter with this command to disable this function.

Command Syntax

```
route-map WORD (in|out) IFNAME
no route-map WORD (in|out) IFNAME
```

Parameters

`WORD`	Specify a route map name
`in`	Specify to set the route map for input filtering
`out`	Specify to set the route map for output filtering
`IFNAME`	Specify an interface name to which to associate the route map

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#route-map IPIroutemap10 in eth1
```

router ipv6 rip

Use this global command to enable a RIPng routing process.

Use the `no` parameter with this command to disable the RIPng routing process.

Command Syntax

```
router ipv6 rip
no router ipv6 rip
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#
```

show debugging ipv6 rip

Use this command to display the RIPng debugging status for RIPng NSM, RIPng events, and RIPng packets.

Command Syntax

```
show debugging ipv6 rip
```

Parameters

None

Command Mode

Exec Mode and Privileged Exec Mode

Example

```
#show debugging ipv6 rip
 RIPng packet debugging is on
```

show ipv6 protocols rip

Use this command to display RIPng process parameters and statistics.

Command Syntax

```
show ipv6 protocols rip
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

The following is a sample output from the `show ipv6 protocols rip` command.

```
#show ipv6 protocols rip
Routing Protocol is "ripng"
  Sending updates every 30 seconds with +/-50%, next due in 10 seconds
  Timeout after 180 seconds, garbage collect after 120 seconds
  Outgoing update filter list for all interface is not set
  Incoming update filter list for all interface is not set
  Default redistribute metric is 1
  Redistributing: connected
  Routing for Networks:
    3ffe:1::/64
#
```

show ipv6 rip

Use this command to show RIP routes.

Command Syntax

```
show ipv6 rip (database|)
```

Parameters

`database`	Specify to display information about the IPv6 RIP database.

Command Mode

Exec mode and Privileged Exec mode

Example

The following is a sample output from the show ipv6 rip database command.

```
#show ipv6 rip database
Codes: R - RIP, K - Kernel, C - Connected, S - Static, O - OSPF, I - IS-IS,
B - BGP, a - aggregate, s - suppressed
Network Next Hop If Met Tag Time
R 3ffe:1234:5678::/64 fe80::3 eth1 3 0 02:28
C 3ffe:ffff:1::/64 :: eth0 1 0
Ra 3ffe:ffff:2::/48 -- 1 0
Rs 3ffe:ffff:2::/48 fe80::3 eth1 3 0 02:32
Cs 3ffe:ffff:2::/64 :: eth1 1 0
R 3ffe:ffff:ffff:ffff::/64 fe80::3 eth1 3 0 02:28
```

show ipv6 rip interface

Use this command to display information about the RIPng interfaces. You can specify an interface name to display information about a specific interface.

Command Syntax

```
show ipv6 rip interface (IFNAME|)
```

Parameters

`IFNAME`	Name of the interface for which information is to be displayed.

Command Mode

Exec mode and Privileged Exec mode

Example

The following is a sample output from the `show ipv6 rip interface` command.

```
#show ipv6 rip interface
lo is up, line protocol is up
RIPng is not enabled on this interface
eth0 is up, line protocol is up
RIPng is not enabled on this interface
eth1 is down, line protocol is down
RIPng is not enabled on this interface
eth2 is up, line protocol is up
Routing Protocol: RIPng
Passive interface: Disabled
Split horizon: Enabled with Poisoned Reversed
IP interface address:
3ffe:ffff::1/64
3ffe:fffe::1/64
```

timers basic

Use this command to adjust routing network timers.

Use the `no` parameter with this command to restore the defaults.

For more details about this command, see the IPv4 version of this command (timers basic).

Command Syntax

```
timers basic <5-2147483647> <5-2147483647> <5-2147483647>
no timers basic
```

Parameters

`<5-2147483647>`	Specify the routing table update timer in seconds. The default is 30 seconds.
`<5-2147483647>`	Specify the routing information timeout timer in seconds. The default is 180 seconds. After this interval has elapsed and no updates for a route are received, the route is declared invalid.
`<5-2147483647>`	Specify the routing garbage collection timer in seconds. The default is 120 seconds.

Command Mode

Router mode

Examples

```
#configure terminal
(config)#router ipv6 rip
(config-router)#timers basic 30 180 120

(config)#router ipv6 rip
(config-router)#no timers basic
```

CHAPTER 4 Routing Information Protocol VPN Commands

This chapter provides information about RIP VPN commands. These commands are available when the RIP Provider Edge (PE) and Customer Edge (CE) feature is supported. Using these commands, VPN you can use RIP to receive information which the CE-router places into the connected Virtual Routing and Forwarding (VRF) from the receiving interface. The information is then advertised across the MPLS/VPN backbone between PE-routers.

To provide a VPN service, the PE-router needs to be configured so that any routing information learned from a VPN customer interface can be associated with a particular VRF. This is achieved using any standard routing protocol process (RIP, OSPF, BGP or static routes etc).

To enable the RIP PE-CE feature, an Address Family sub-mode is used. Most of the RIP commands that are available in Router and Interface mode are also available in Address Family mode. Additionally, all RIP debug commands display additional VRF information when the RIP PE-CE feature is supported.

This chapter contains the following commands:

- address-family ipv4 vrf on page 88
- address-family ipv6 vrf on page 89
- exit-address-family on page 90
- show ip rip interface vrf on page 91
- show ip rip vrf on page 92
- show ip vrf on page 93

address-family ipv4 vrf

Use this command to enable the exchanging of VRF routing information and to enter the Address Family mode. This command configures the routing exchange between PE and CE devices. Configure a RIP address family for each VRF configured on the PE router.

To use this command, you must first create a VRF-Name in the NSM using the `ip vrf` command. Associate the same name with the RIP process using this command.

Use the `no` parameter with this command to disable it.

Command Syntax

```
address-family ipv4 vrf NAME
no address-family ipv4 vrf NAME
```

Parameters

`NAME`	Specify the name for the VRF instance

Command Mode

Router mode

Examples

The following example places the router in Address Family mode and specifies VRF1 as the name of the VRF instance to associate with subsequent IP Version 4 Address Family mode commands:

```
#configure terminal
(config)#router rip
(config-router)#address-family ipv4 vrf VRF1
(config-router-af)#
```

address-family ipv6 vrf

Use this command to enable the exchanging of VRF routing information and to enter the Address Family mode. This command configures the routing exchange between PE and CE devices. Configure a RIP address family for each VRF configured on the PE router.

To use this command, you must first create a VRF-Name in the NSM using the `ip vrf` command. Associate the same name with the RIP process using this command.

Use the `no` parameter with this command to disable it.

Command Syntax

```
address-family ipv6 vrf NAME
no address-family ipv6 vrf NAME
```

Parameters

`NAME`	Specify the name for the VRF instance.

Command Mode

Router mode

Examples

The following example places the router in Address Family mode and specifies VRF1 as the name of the VRF instance to associate with subsequent IP Version 6 Address Family mode commands:

```
#configure terminal
(config)#router ipv6 rip
(config-router)#address-family ipv6 vrf VRF1
(config-router-af)#
```

exit-address-family

Use this command to exit the Address Family mode. This command is supported in RIP and RIPng (IPv4 and IPv6).

Command Syntax

```
exit-address-family
```

Parameters

None

Command Mode

Address Family mode

Examples

The following examples show the change in prompt after using the `exit-address-family` command to exit the `Address Family` mode.

```
(config)#router rip
(config-router)#address-family ipv4 vrf IPI
(config-router-af)#exit-address-family
(config-router)#

(config)#router ipv6 rip
(config-router)#address-family ipv6 vrf VRF1
(config-router-af)#exit-address-family
(config-router)#
```

show ip rip interface vrf

Use this command to display VRF information. This command is supported in RIP and RIPng (IPv4 and IPv6).

Command Syntax

```
show ip rip interface vrf WORD (IFNAME|)
```

Parameters

WORD	Specify the name for the VRF instance.
IFNAME	Specify name for the interface.

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ip rip interface vrf IPI

eth1 is up, line protocol is up
  Routing Protocol: RIP
    VPN Routing/Forwarding: IPI
    Receive RIP packets
    Send RIP packets
    Passive interface: Disabled
    Split horizon: Enabled with Poisoned Reversed
    IP interface address:
      1.1.1.92/24
eth3 is up, line protocol is up
  RIP is not enabled on this interface
```

show ip rip vrf

Use this command to display VRF information. This command is supported in RIP and RIPng (IPv4 and IPv6).

Command Syntax

```
show ip rip (database) vrf WORD
```

Parameters

`database`	Specify to display information about the IP RIP database.
`WORD`	Specify the name for the VRF instance.

Command Mode

Privileged Exec mode and Exec mode

Examples

```
#show ip rip database vrf IPI
Codes: R - RIP, Rc - RIP connected, Rs - RIP static, K - Kernel,
       C - Connected, S - Static, O - OSPF, I - IS-IS, B - BGP

   Network            Next Hop         Metric From            If     Time
Rc 1.1.1.0/24                            1                    eth1
S  72.72.75.0/24      98.98.8.2          1                    eth3
```

show ip vrf

Use this command to display VRF information. This command is supported in RIP and RIPng (IPv4 and IPv6).

Command Syntax

```
show ip vrf
show ip vrf WORD
```

Parameters

WORD	Specify the name for the VRF instance.

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ip vrf IPI

VRF IPI, FIB ID 1
Router ID: 1.1.1.2 (config)
Interfaces:
  eth1
  eth3
VRF IPI; (id=1); RIP enabled Interfaces:
  eth1
```

Appendix A Routing Information Protocol Authentication

To support RIPv2 message authentication, you can choose plain text or MD5 authentication, with the option for a single key or multiple keys in different modes and stages.

Single Key Authentication

Use the following steps to configure route to enable RIPv2 authentication using a single key or password:

1. Define the authentication string or password

   In the Interface mode, specify the authentication string or password used by the key using the following command:

   ```
   ip rip authentication string LINE
   ```

   where `LINE` is the authentication string or password

2. Specify mode of authentication for the interface

   In the Interface mode, specify either text or MD5 authentication using the following command:

   ```
   ip rip authentication mode md5|text
   ```

Example

```
#configure terminal
(config)#interface eth0
(config-if)#ip rip authentication string mykey
(config-if)#ip rip authentication mode md5
```

Multiple Keys Authentication

Use the following steps to configure route to enable RIPv2 authentication using multiple keys at different times:

1. Define a key chain

   In the Configure mode, identify a key chain with a key chain name using the following command:

   ```
   key chain KEYNAME
   ```

   where `KEYNAME` is the name of the chain to manage.

2. Define the key(s)

   In the Keychain mode, specify a key on this key chain using the following command:

   ```
   key KEYID
   ```

   where `KEYID` = `<1-2147483647>` Key Identifier number

3. Define the authentication string or password

   In the Keychain-key mode, define the password used by a key, using the following command:

   ```
   key-string LINE
   ```

   where `LINE` is a string of characters to be used as a password by the key.

4. Set key management options

This step can be performed at this stage or later when multiple keys are used. The options are configured in the `keychain-key` command mode.

- Set the time period during which the authentication key on a key chain is received as valid, using the following command:

```
accept-lifetime START END
```

where `START` and `END` are the beginning and end of the time period.

- Set the time period during which the authentication key on a key chain can be sent using the following command:

```
send-lifetime START END
```

where `START` and `END` are the beginning and end of the time period.

5. Enable authentication on an interface

   In the Interface mode, enable authentication on an interface and specify the key chain to be used, using the following command:

```
ip rip authentication key-chain CHAINNAME
```

   where `CHAINNAME` is a set of valid authentication keys

6. Specify mode of authentication for the interface

   In the Interface mode, specify either text or MD5 authentication using the following command:

```
ip rip authentication mode md5|text
```

Example

In the following example, a password `toyota` is set for a `key 1` in a key chain `cars`. On Interface `eth0` authentication is enabled and the authentication mode is set as `MD5`.

```
#configure terminal
(config)#key chain cars
(config-keychain)#key 1
(config-keychain-key)#keystring toyota
(config-keychain-key)#accept-lifetime 10:00:00 Oct 08 2002 duration 43200
(config-keychain-key)#send-lifetime 10:00:00 Oct 8 2002 duration 43200
(config-keychain-key)#exit
(config-keychain)#exit
(config)#interface eth0
(config-if)#ip rip authentication key-chain cars
(config-if)#ip rip authentication mode md5
(config-if)#exit
```

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