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Configuring RIP

SYSTEM ADMINISTRATOR GUIDE

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Contents

1	**Overview**	**1**
2	**Configuration and Operations Tasks**	**3**
2.1	Configuring RIP	3
2.2	Configuring RIPng	5
2.3	RIP and RIPng Operations	7
3	**Configuration Examples**	**9**
3.1	Example: Configuring a RIP Instance	9
3.2	Example: Enabling RIP in a Network	9
3.3	Example: Configuring RIPng Route Redistribution and Aggregation	10

1 Overview

RIP is a distance-vector protocol that uses a hop count as its metric. Relatively old, RIP is still commonly used, especially in small homogeneous networks. Our implementation supports RIP Version 2 and provides for multiple RIP instances. Each instance maintains its own routing table and set of interfaces. Each interface can only be assigned to, at most, one RIP instance.

RIP is documented in RFC 1058, *Routing Information Protocol*, and RFC 1723,*RIP Version 2, Carrying Additional Information.*

RIP next generation (RIPng) is an enhanced version of RIP that supports IP Version 6 (IPv6)-based network routing. RIPng is documented in RFC 2080, *RIPng for IPv6*. For a description of IPv6 addressing and the types of IPv6 addresses, see RFC 3513, *Internet Protocol Version 6 (IPv6) Addressing Architecture*.

Note: When IP Version 6 (IPv6) addresses are not referenced or explicitly specified, the term, IP address, can refer generally to IP Version 4 (IPv4) addresses, IPv6 addresses, or IP addressing. In instances where IPv6 addresses are referenced or explicitly specified, the term, IP address, refers only to IPv4 addresses.

This document applies to both the Ericsson SmartEdge® and SM family routers. However, the software that applies to the SM family of systems is a subset of the SmartEdge OS; some of the functionality described in this document may not apply to SM family routers.

For information specific to the SM family chassis, including line cards, refer to the SM family chassis documentation.

For specific information about the differences between the SmartEdge and SM family routers, refer to the Technical Product Description *SM Family of Systems* (part number 5/221 02-CRA 119 1170/1) in the **`Product Overview`** folder of this Customer Product Information library.

2 Configuration and Operations Tasks

This section provides information on how to configure RIP and RIPng. It also provides a list of the operation that are possible when RIP or RIPng is configured.

Note: In this section, the command syntax in the task tables displays only the root command.

2.1 Configuring RIP

The sections that follow describe how to configure a RIP routing instance and a RIP interface.

2.1.1 Configuring a RIP Routing Instance

To configure a RIP routing instance, perform the tasks described in Table 1. Enter all commands in RIP router configuration mode, unless otherwise noted.

Table 1 Configure a RIP Routing Instance

Task	Root Command	Notes
Configure an instance of the RIP routing process and enter RIP router configuration mode.	*router rip*	Enter this command in context configuration mode.
Inject the default route (0.0.0.0) into the RIP instance.	*default-information originate*	—
Set the default metric for the RIP instance.	*default-metric (RIP)*	The default value is used when a route with incompatible metrics is received into the RIP instance; for example, when a route from a different routing domain is imported into RIP.
Modify the administrative distance for the RIP instance.	*distance (RIP)*	Administrative distance specifies how desirable a route obtained from RIP is compared to the same route obtained from another protocol. The lower the value for the distance argument in comparison to other routes obtained from other protocols, the more desirable the RIP route becomes.
Apply a prefix list to RIP packets.	*distribute-list*	—

Table 1 Configure a RIP Routing Instance

Task	Root Command	Notes
Modify the minimum interval between consecutive RIP flash updates.	*flash-update-threshold*	Each flash update contains only those routes that have been changed since the most recent update.
Modify the number of multiple equal-cost RIP routes that can be used as the best paths for load balancing outgoing traffic packets.	*maximum-paths (RIP)*	The SmartEdge® router enables load balancing among these RIP paths if, in the routing table, they are the best paths among paths provided by all running routing protocols.
Configure a RIP offset list.	*offset-list*	A RIP offset list adds to the cost metric of inbound or outbound routes learned or advertised by RIP.
Add a delay time between packets sent in multipacket RIP updates.	*output-delay*	This feature is useful for situations where a high-speed router is sending updates to a low-speed router.
Redistribute routes learned through protocols other than RIP into the RIP instance.	*redistribute (RIP)*	You must enter multiple redistribute commands to redistribute routes from several different kinds of routing protocols into the RIP routing instance. See Example: Configure RIP Route Redistribution and Aggregation for an example of how to configure route redistribution and aggregation for a RIP instance.
Modify RIP timers for the specified RIP instance.	*timers basic*	—

2.1.2 Configuring a RIP Interface

To configure a RIP interface, perform the tasks described in Table 2. Enter all commands in RIP interface configuration mode, unless otherwise noted.

Table 2 Configure a RIP Interface

Task	Root Command	Notes
Enable an interface to both send and receive RIP packets, and to access RIP interface configuration mode.	*interface (RIP)*	Enter this command in RIP router configuration mode.

Table 2 Configure a RIP Interface

Task	Root Command	Notes
Enable authentication and specify the authentication scheme for the RIP interface.	*authentication (RIP)*	—
Configure the RIP interface to originate the default route (0.0.0.0).	*default-information originate*	—
Modify the cost value of an interface.	*interface-cost*	The cost value is used by RIP as a metric for route selection. The lower the cost, the more likely an interface is to be used to forward data traffic.
Enable an interface to receive and process RIP packets.	*listen*	—
Enable RIP split-horizon processing on an interface.	*split-horizon*	Simple split-horizon processing is enabled by default.
Summarize routes in RIP update packets on the specified interface.	*summary-address (RIP)*	—
Enable an interface to send RIP packets.	*supply*	—
Modify RIP timers for the specified interface.	*timers basic*	—

2.2 Configuring RIPng

The sections that follow describe how to configure a RIPng routing instance and a RIPng interface.

2.2.1 Configuring a RIPng Routing Instance

To configure a RIPng routing instance, perform the tasks described in Table 3. Enter all commands in RIPng router configuration mode, unless otherwise noted.

Table 3 Configure a RIPng Routing Instance

Task	Root Command	Notes
Create an instance of the RIPng routing process and enter RIPng router configuration mode.	*router ripng*	Enter this command in context configuration mode.
Inject the default route (::/0) into the RIPng instance.	*default-information originate*	—

Table 3 Configure a RIPng Routing Instance

Task	Root Command	Notes
Set the default metric for the RIPng instance.	*default-metric (RIP)*	The default value is used when a route with incompatible metrics is received into the RIPng instance; for example, when a route from a different routing domain is imported into RIPng.
Modify the administrative distance for the RIPng instance.	*distance (RIP)*	Administrative distance specifies how desirable a route obtained from RIPng is compared to the same route obtained from another protocol. The lower the value for the distance argument in comparison to other routes obtained from other protocols, the more desirable the RIP route becomes.
Apply a prefix list to RIPng packets.	*distribute-list*	—
Modify the minimum interval between consecutive RIPng flash updates.	*flash-update-threshold*	Each flash update contains only those routes that have been changed since the most recent update.
Modify the number of multiple equal-cost RIPng routes that can be used as the best paths for load balancing outgoing traffic packets.	*maximum-paths (RIP)*	The SmartEdge router enables load balancing among these RIPng paths if, in the routing table, they are the best paths among paths provided by all running routing protocols.
Add a delay time between packets sent in multipacket RIPng updates.	*output-delay*	This feature is useful for situations where a high-speed router is sending updates to a low-speed router.
Redistribute routes learned through protocols other than RIPng into the RIPng instance.	*redistribute (RIP)*	You must enter multiple redistribute commands to redistribute routes from several different kinds of routing protocols into the RIPng routing instance. See Example: Configure RIP Route Redistribution and Aggregation for an example of how to configure route redistribution and aggregation for a RIP instance
Modify RIPng timers for the specified RIPng instance.	*timers basic*	—

2.2.2 Configuring a RIPng Interface

To configure a RIPng interface, perform the tasks described in Table 4. Enter all commands in RIPng interface configuration mode, unless otherwise noted.

Table 4 Configure a RIPng Interface

Task	Root Command	Notes
Enable an interface to both send and receive RIP packets, and to enter RIPng interface configuration mode.	*interface (RIP)*	Enter this command in RIPng router configuration mode.
Configure the RIPng interface to originate the default route (::/0).	*default-information originate*	—
Modify the cost value of an interface.	*interface-cost*	The cost value is used by RIPng as a metric for route selection. The lower the cost, the more likely an interface is to be used to forward data traffic.
Enable an interface to receive and process RIPng packets.	*listen*	—
Enable RIPng split-horizon processing on an interface.	*split-horizon*	Simple split-horizon processing is enabled by default.
Summarize routes in RIPng update packets on the specified interface.	*summary-address (RIP)*	—
Enable an interface to send RIPng packets.	*supply*	—
Modify RIPng timers for the specified interface.	*timers basic*	—

2.3 RIP and RIPng Operations

To manage RIP and RIPng functions, perform the appropriate tasks described in Table 5. Enter the **`show`** commands in any mode; enter the **`debug`** command (in exec mode).

Table 5 RIP and RIPng Operations Tasks

Task	Root Command
Enable the generation of RIP debug messages.	*debug rip*
Display the current RIP configuration for the current context.	*show configuration rip*
Display the current RIPng configuration for the current context.	*show configuration ripng*
Display enabled RIP debug settings.	*show rip debug*
Display enabled RIP and RIPng debug settings.	*show ripng debug*

Table 5 RIP and RIPng Operations Tasks

Task	**Root Command**
Display information for all RIP instances, or only for a particular RIP instance.	*show rip instance*
Display information for all RIPng instances, or only for a particular RIPng instance.	*show ripng instance*
Display information for all RIP interfaces, or only for interfaces within a particular RIP instance.	*show rip interface*
Display information for all RIPng interfaces, or only for interfaces within a particular RIPng instance. Routing Information Protocol next generation (RIPng) information.	*show ripng interface*
Display information about all RIP routes, or only for routes within a particular RIP instance.	*show rip route*
Display information about all RIPng routes, or only for routes within a particular RIPng instance.	*show ripng route*

3 Configuration Examples

The sections that follow provides examples for configuring and enabling RIP in your system.

3.1 Example: Configuring a RIP Instance

The following example configures one RIP instance, adjusts the maximum number of equal-cost paths to **4**, originates a default route, and redistributes static routes into RIP with a metric of **10**. It then enables RIP on interface **fe1:**

```
[local]Redback#configure
[local]Redback(config)#context local
[local]Redback(config-ctx)#router rip edge
[local]Redback(config-rip)#maximum-paths 4
[local]Redback(config-rip)#default-information originate
[local]Redback(config-rip)#redistribute static metric 10
[local]Redback(config-rip)#interface fe1
[local]Redback(config-rip-if)#end
```

3.2 Example: Enabling RIP in a Network

The following example configures two RIP instances in the **local** context, and enables one RIP instance edge and a RIP instance backbone on interface **fe1**. An IP prefix list, **prefixList1**, is also applied on the outbound updates on interface **fe1:**

```
[local]Redback#configure
[local]Redback(config)#context local
[local]Redback(config-ctx)#router rip edge
[local]Redback(config-rip)#redistribute static metric 10
[local]Redback(config-rip)#interface fe1
[local]Redback(config-rip-if)#exit
[local]Redback(config-rip)#exit
[local]Redback(config-ctx)#router rip backbone
[local]Redback(config-rip)#distribute-list prefixList1 out fe1
[local]Redback(config-rip)#interface fe1
[local]Redback(config-rip-if)#end
```

3.3 Example: Configuring RIPng Route Redistribution and Aggregation

The following example configures route redistribution and aggregation for a RIPng routing instance.

First, configure a list of aggregate IP prefixes:

```
[local]Router(config-ctx)#ipv6 prefix-list test1-aggregate
[local]Router(config-ipv6-prefix-list)#seq 10 permit 4001:101:101:106::/64 ge 64
[local]Router(config-ipv6-prefix-list)#seq 20 permit 5001:101:101:106::/64 ge 64
[local]Router(config-ipv6-prefix-list)#seq 30 permit 6001:101:101:106::/64 ge 64
[local]Router(config-ipv6-prefix-list)#seq 40 permit 7001:101:101:106::/64 ge 64
[local]Router(config-ipv6-prefix-list)#seq 50 permit 2001:101:101::/48 ge 48
```

Next, configure a route map called **test1** that aggregates the IPv6 prefixes in the aggregate prefix list called **test1-aggregate**:

```
[local]Router(config-ctx)#route-map test1 permit 10
[local]Router(config-route-map)#match ipv6 address prefix-list test1-aggregate
[local]Router(config-route-map)#set ipv6 aggregate test1-aggregate
```

Specify that routes selected for redistribution are summarized only if they contain any of the prefixes specified in the IPv6 prefix list called **test1**:

```
[local]Redback(config-ctx)#router ripng edge
[local]Redback(config-rip)#redistribute subscriber static route-map test1
```

Configure the static routes. In this example, the routes match the aggregate prefix 2001:101:101::/48:

```
[local]Redback(config-ctx)#ipv6 route 2001:101:101:303::/64 80::2
[local]Redback(config-ctx)#ipv6 route 2001:101:101:304::/64 80::2
[local]Redback(config-ctx)#ipv6 route 2001:101:101:305::/64 80::2
[local]Redback(config-ctx)#ipv6 route 2001:101:101:306::/64 80::2
[local]Redback(config-ctx)#ipv6 route 2001:101:101:307::/64 80::2
```

Note: When an IP prefix list is used for aggregation, the **ge** and **le** parameters (configured with the **seq** command) are ignored and the prefix list entries match any route subsumed by the prefix. In such cases, the **ge** parameter is implicit.