Ripng Configuration

Table of Contents

Chapter 1   Configuring RIPNG

1.1   Overview

Routing Information Protocol of next generation (RIPng) is the RIP of version 6. In the equipment RIPng and RIP are two completely independent modules that are in charge of the learning and management of the routing information in version 6 and version 4 respectively.

RIPng is same to RIP in the internal working mechanism. RIPng switches the routing information through the UDP broadcast. In a router the update of the routing information is transmitted every 30 seconds. If a router has not received the routing update from its neighboring router in 180 seconds, the router will label this route unavailable in its routing table. And in the following 120 second this router will remote this route from its routing table.

RIPng can also be applied in small-scale networks. It uses the hop count to weigh the weights of different routes. This hop count means the number of routers that a packet has passed from a signal source to another signal source. The routing weight of the directly connected network is 0 and that of the unreachable network is 16. Since the route weight used by RIPng has a small range, it is unsuitable for the large-scale networks.

If a router has a default route, RIPng declares the route to the fake network 0::0/0. In fact, network **0::0/0** does not exist and it is just used to realize the default route in RIPng. If RIPng learns a default route or a router sets the default gateway and the default weight, the router will declare the default network.

RIPng sends the route update to the interface that is covered by instances. If an interface is not set to be an IPv6 interface, it will not be covered by an RIPng instance.

The RIPng protocol in our routers supports multiple instances. On an interface up to four instances can be set and one instance can cover up to 4 interfaces.

1.2   Setting RIPng Configuration Task List

Before setting RIPng, you have finished the following tasks. Among these tasks, you have to activate RIPng, but to other tasks, you can choose to do them according actual requirements.

- Allowing to Set the Unicast Routing Protocol

- Enabling RIPng

- Allowing the RIPng route to update the unicasting broadcast of a packet

- Applying the Offset on the Routing Weight

- Filtering the received or transmitted routes

- Setting the Management Distance

- Adjusting the Timer

- Redistributing the Routes of an Unlocal Instance

- Summarizing the Routes Manually

- Maximum Number of Routes

- Activating or Forbidding Horizontal Fragmentation

- Monitoring and Maintaining RIPng

1.3   RIPng Configuration Tasks

1.3.1   Allowing to Set the Unicast Routing Protocol

To set the RIPng, you must first run the following command to allow to set the switch of a unicast route.

Command	Purpose
Ipv6 unicast-routing	Enables to set the unicast routing protocol on a device.

1.3.2   Enabling a RIPng Case

To enable the RIPng instance, run the following command in interface configuration mode:

Command	Purpose
ipv6 rip *instance-name* **enable**	Enables RIPng on an interface.

To enter the RIPng instance, run the following command in global configuration mode:

Command	Purpose
router ripng *instance-name*	Enters the RIPng instance and its configuration mode.

Note: Users can enable a RIPng instance on an interface. If the RIPng instance does not exist, a RIPng instance will be generated. The system can directly enter the RIPng instance in global configuration mode and a RIPng instance will be generated if this RIPng instance does not exist.

Users can enable up to 4 RIPng instances on an interface and a RIPng instance can cover up to 4 interfaces.

1.3.3   Redistributing the Routes of an Unlocal Instance

RIPng can redistribute the routing information of an unlocal instance to the routing information database of the local instance, and then conducts route interaction with

other devices through the routes in the routing database of this instance. To reach the aim above, run the following command in RIPng configuration mode:

Command	Purpose
Redistribute *protocol [instance-name	process-id]*	Redistributes static routes, other ospfv6 processes, and other RIPng instances.

1.3.4   Allowing the RIPng Route to Update the Unicasting Broadcast of a Packet

RIPng is generally a multicast protocol. To enable RIPng routing updates to reach the non-broadcast network, users must make configuration on a router to allow the switching of routing information. To reach the aim above, run the following command in RIPng configuration mode:

Command	Purpose
neighbor *ipv6-address*	Defines a neighboring router and switches the routing information with this neighboring router.

1.3.5   Applying the Offset on the Routing Weight

The offset list is used to add an offset for an incoming or outgoing route which RIPng learns. In this case, a local mechanism is provided to add the routing weight. Additionally, you can also use the access list or an interface to limit the offset list. To add the routing weight, run the following command in RIPng configuration mode:

Command	Purpose
offset {[interface-type number]|* } {**in**|**out**} *access-list-name o*ffset *value*	Adds an offset to a routing weight.

1.3.6   Filtering the Received or Transmitted Routes

Through settings the RIPng instance can filter the received or transmitted routes on the corresponding interface, in which flexible configuration policies can be flexibly realized. Run the following command in RIPng configuration mode:

Command	Purpose
filter *interface-type interface-number* {**in	out}** access-list	gateway	prefix-list	Filters the received or transmitted routing information.

1.3.7   Setting the Management Distance

Trough setting the management distance, you can change the credibility of the route of RIPng instance. In general, the bigger the value is, the more incredible the value is. To set the management distance, run the following command in RIPng configuration mode:

Command	Purpose
distance *weight* [*X:X:X:X::X/<0-128>*	Sets the management distance of the RIPng

| [Acc-list_name] | instance's route. |

1.3.8 Adjusting the Timer

The routing protocol needs several timers to judge the transmission frequency of routing updates and how long it takes for a route to become invalid. You can adjust these timers to make the performance of a routing protocol more suitable for the requirements of network interconnecting.

You can also adjust the routing protocols to speed up the convergence time of the IPv6 algorithm and make fast backup of the redundancy router, guaranteeing a maximum breakup for a terminal user when quick recovery is needed. To adjust the timer, run the following command in RIPng configuration mode:

Command	Purpose
timers holddown *value*	Means how long it takes for a route to be removed from the routing table.
timers garbage *value*	Means how long it takes for a route to be declared invalid.
timers update *value*	Means the transmission frequency of routing updates, whose unit is second.

1.3.9 Summarizing the Routes Manually

RIPng must summarize the routing information manually to reduce the number of the routes that interact with neighbors. To summarize the routing information, run the following command in the RIPng configuration mode:

Command	Purpose
aggregate-address *ipv6-prefix/prefixlen*	Summarizes the routing information.

1.3.10 Activating or Forbidding Horizontal Fragmentation

In normal cases, a router that connects the broadcast IPv6 network and uses the distance vector routing protocol takes the horizontal fragmentation to reduce the possibility of route loopback. The horizontal fragmentation blocks the routing information from being declared to the interface that receives this routing information. In this way the communication between multiple routers can be optimized, especially when the loopback is broken. However, this solution is not so good to those un-broadcast networks. In these networks, you have to forbid horizontal fragmentation.

To activate or disable horizontal fragmentation, run the following commands in VLAN configuration mode:

Command	Purpose
Ipv6 rip split-horizon	Activates horizontal fragmentation.
no ipv6 rip split-horizon	Forbids horizontal fragmentation.

By default, horizontal fragmentation is activated on those point-to-point interfaces and forbidden on those point-to-multipoint interfaces.

Note:

In normal cases, you are not recommended to change the default state unless you are sure that the routes can be correctly declared after the state of your application program is changed. If horizontal fragmentation is forbidden on a serial interface that connects a packet switching network, you have to disable horizontal fragmentation on routers of any related multicast group on a network.

1.3.11   Monitoring and Maintaining RIPng

Through monitoring and maintaining RIPng, you can get the statistic information of a network, including the parameters of RIPng, the network usage information and the real communication-tracing information.   This kind of information can help users to judge the usage of network resources and solve network problems. From the statistics information, you can also know the reachablity of a network node.

To display all kinds of statistics information, run the following commands in EXEC mode:

Command	Purpose
show ipv6 rip *instance-name* summary	Displays the total routing information about a RIPng instance.
show ipv6 rip *instance-name* database	Displays all routes of a RIPng instance.
show ipv6 rip *instance-name* interface	Displays all interfaces that a RIPng instance covers.

To trace the information about the routing protocols, run the following commands in EXEC mode:

Command	Purpose
debug ipv6 rip *instance-name* database	Traces that a route of a RIPng instance is added to, removed from or changed in a routing table.
debug ipv6 rip *instance-name* event	Traces the abnormity that occurs in the running of a RIPng instance and the whole process of redistributing a RIPng instance.
debug ipv6 rip *instance-name* send	Traces the process that a RIPng instance transmits packets.
debug ipv6 rip *instance-name* recv	Traces the process that a RIPng instance receives packets.
debug ipv6 rip *instance-name* msg	Traces the important events that lead to the termination of the startup of a RIPng instance.
debug ipv6 rip *instance-name* all	Traces all the information about a RIPng instance.

1.4   RIPng Configuration Example

This section shows some RIPng configuration example:

Connect device A and device B directly and make the following settings:

Device A:

interface VLAN2
 no ip address
 no ip directed-broadcast
 ipv6 address 4444::4444/64
 ipv6 enable
 ipv6 rip dang2 enable
 ipv6 rip dang2 split-horizon
!
router ripng dang2
 redistribute static
 exit
!
!

Device B:

interface Ethernet1/1
 no ip address
 no ip directed-broadcast
 duplex half
 ipv6 address 4444::2222/64
 ipv6 enable
 ipv6 rip dang enable
 ipv6 rip dang split-horizon
!
router ripng dang
 redistribute static
 exit
!

In this way both device A and device B learns the static routing information from each other.