

Analysis and Simulation Research of RIP

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Abstract

This paper specifies a RIPng routing protocol for an IPV6 internet. RIP is an protocols which is currently in wide use in the IPV4 Internet. This describes the future routing protocol called the Routing Information Protocol Next Generation (RIPng), the term Next Generation(NG), is used to describe protocols that support the Internet Protocol Version 6 (IPV6) this document will give information of RIP protocol and its type ,IPV6 and how the RIP protocol works on the IPV6

KEYWORDS: *Internet Protocol, Ipv4., IPV6, RIP , RIPng*

I. INTRODUCTION

The Distance vector algorithm is a Dynamic Algorithm and RIP is one of a class of this algorithms .Routing that is done by a routing protocol is the most important process on the Internet. RIP controls the transmission of IP packet to reach destination network. Routing process includes packet forwarding and routing table updating. Routing protocol specifies that how the network routers communicate to each other also it a specifies how distribution of information is done. This enables them to select routes which are in between any two nodes on a network. The purposes of these protocols development are to reduce the time delay. RIP is defined as a routing protocol which is dynamic. RIP is widely used in local andd also in wide area networks. it is as an interior gateway protocol (IGP).

II. PROBLEM STATEMENT

To configure a basic RIPng network, configure a routing policy to advertise direct routes using the policy statement advertise-routes-through RIPng .RIPng (RIP next generation), is an extension of RIPv2 for support of IPv6, subsequent generation Internet Protocol. RIPng Support of IPv6 networking. While RIPv2 supports RIPv1 updates authentication, RIPng doesn't . IPv6 routers were, at the time, alleged to use IPsec for authentication. The main contributions are: to style two network models that are configured respectively with RIP so as to guage the RIP performance. To simulate these network models with packets transfer and to observe how the performance of RIP network. To report the simulated results and to research them.

III. NEED OF STUDY

The main goal is to Implement RIPing. This evaluation is performed theoretically and by simulation. To have a router exchange routes with other routers, you must configure RIPng groups and neighbours. RIPng routes received from routers not configured as RIPng neighbours are ignored. Likewise, RIPng routes are advertised only to routers configured as RIPng neighbors. To use RIPng on the device, configure RIPng on all of the RIPng interfaces within the network.

IV. RESEARCH METHODOLOGY

The main contributions of this project are: To design two network models that are configured respectively with RIP in order to evaluate the RIP performance. To simulate these network models with packets transfer and to observe how the performance of RIP network. To report the simulated results and to analyze them. It carry out the network simulations, CISCO Packet tracer 5.0 simulator is used

V. WHAT IS RIP?

RIP is classful Protocol RIP has been extended and updated to RIPv6 which is RIPv6 (As RIP has been updated to IPV6 networks, which is known as a standard RIP next generation RIPv6). The all RIP versions are still being used today. This versions have been technically supported by more advanced techniques such as Open Shortest Path First (OSPF) and the OSI protocol IS-IS[1]. RIP is easy to understand and easy to configure because of support of all routers for RIP , also supports load balancing and the most advantage is that RIP is free from looping. RIP is For Small networks as it is slow for larger networks due to its configuration, and also the scalability of RIP is also less because of 15 hop count. RIP has AD value 120 and works on the application layer of OSI model. RIP uses port number 520. RIP uses the hop count as a routing metric which is used to find the best path between the source network and the destination network.

What is Hop Count

Hop count is the number of routers which are between the two networks i.e the source network and Destination network[7]. The path with all-time low hop count is taken into account as the best route to achieve a destination network and thus placed within the routing table. RIP prevents routing infinite loops by limiting the amount of hops allowed during a path from source and destination. The maximum hop count allowed for RIP protocol is 15 and hop count of 16 not taken in consideration.

Features

- A. The Updates of the RIP are exchanged at a particular period in the network.
- B. Always broadcast of routing information is done by RIP protocol.
- C. In updates the full routing table of router are sent to neighbour routers.
- D. Routing Information which is received from neighbour routers is the information on which the routers are dependent also known as Routing on rumours.

RIPv1

As because of RIP is an open standard protocol and also because of version 1 it works on many vendors routers

RIPv1 is an classful routing protocol and the updates are always broadcasted the administrative distance (ad) value is 120 . The protocol having less ad value the more better and reliable that protocol is.

RIPv2

As there was some deficiencies in the RIPv1 to remove that in 1993 RIPv2 was developed as previous protocol was classful, this RIPv2 is classless routing protocol. RIPv2 supports CIDR and also having ability of carrying subnet information In routing table subnet mask are included

RIPv6

RIPv6 is an extension of RIPv2 which support IPV6. it is the next generation Internet Protocol with capability of supporting IPV6

RIP timers

Timer	Description
Update timers	After every 30 seconds, all the routers configured with RIP does send their update to the neighbouring routers.
Hold-Down timer	After period 90 sec a route from routing table is withdrawn to prevent a loop
Timeout timer	The router which got disconnected from the Network timer waits for 180 sec if it hears update timer gets reset else it goes to flush timer
Flush timer	After Timeout it waits for 120 sec to delete a rout

What are Advantages of using RIP

- A. RIP is an standard protocol.
- B. Configuration of the RIP protocol is very easy.
- C. Update is not required when network topology change.
- D. Almost every router supports RIP.
- E. Triggered updates are sent when network is changed.
- F. There is no complexity in using RIP.
- G. It also supports VSLM.

What are disadvantages

- A. In RIP slow convergence is there because a lot of time are wasted on the network path finding
- B. Bandwidth utilization of the RIP Protocol is very high because it broadcast after every 30 seconds.
- C. RIP cannot be Scalable because of only 15 hop count .no more routers can join the network if required, which can create a problem.
- D. RIP only works on the hop count metric
- E. The Entire routing Table is shared with the joined neighbouring router every 30 seconds

VI. RIPng WITH IPV6

IPV6

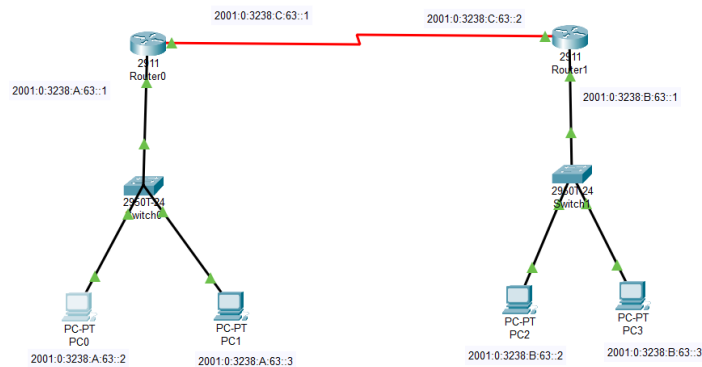
The latest version of the Internet Protocol is IPV6, this protocol identifies devices across the internet so the location can be Identified. Every device which uses internet always identified from its own IP address. This IP addresses are used for communication work on the internet. As day by day there is an increase in devices, Ipv4 Addresses quantity are less because the pool bit is 32 i.e. 2^{32} so for this problem IPV6 was created .IPV6 has space of addresses of 128-bits (2^{128}) which contains 340,282,366,920,938,463,463,374,607,431,768,211,456 IPV6 addresses this is more than sufficient devices[5]. However, because of growth of internet, increase in personal computers, smart phones and now Internet of Things devices for which world need more addresses.

RIPng with IPV6

While IPv4 protocol which is almost depleted, IPV6 is fast emerging standard for device addressing[3].

IPV6 architecture and IPv4 architecture are different thus on devices which only supports IPv4 should have to migrate to device supporting IPV6 and also Routing protocol should also be supported. As the RIPv2 only supports IPv4 so for that development of the RIPng was led. As RIPng is based on RIPv2 but we can say that it is completely different Protocol as it doesn't support IPv4 . RIPng and RIPv2 uses same timers and all procedures.

VII. CONFIGURATIONS



Router0 configuration

```
Router>enable
```

```
Router#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)#interface GigabitEthernet0/0
```

```
Router(config-if)#ipv6 address 2001:0:3238:A:63::1/64
```

```
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
```

```
Router(config-if)#interface Serial0/0/0
```

```
Router(config-if)#ipv6 address 2001:0:3238:C:63::1/64
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
```

```
Router>enable
```

```
Router#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)#ipv6 unicast-routing
```

```
Router(config)#ipv6 router rip test
```

```
Router(config-rtr)#interface GigabitEthernet0/0
```

```
Router(config-if)#ipv6 rip test enable
```

```
Router(config-if)#interface Serial0/0/0
```

```
Router(config-if)#ipv6 rip test enable
```

```
Router(config-if)#exit
```

```
Router(config)#exit
```

```
Router#show ipv6 protocols
```

```
IPv6 Routing Protocol is "connected"
```

```
IPv6 Routing Protocol is "ND"
```

```
IPv6 Routing Protocol is "rip test"
```

```
Interfaces:
```

```
GigabitEthernet0/0
```

```
Serial0/0/0
```

Redistribution:
None

Router#show ipv6 int brief

```
GigabitEthernet0/0    [up/up]
  FE80::201:42FF:FE3A:EC01
  2001:0:3238:A:63::1
GigabitEthernet0/1    [administratively down/down]
  unassigned
GigabitEthernet0/2    [administratively down/down]
  unassigned
Serial0/0/0           [up/up]
  FE80::201:42FF:FE3A:EC01
  2001:0:3238:C:63::1
Serial0/0/1           [administratively down/down]
  unassigned
Vlan1                 [administratively down/down]
  unassigned
```

Router#show ipv6 route

IPv6 Routing Table - 6 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

U - Per-user Static route, M - MIPv6

I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

D - EIGRP, EX - EIGRP external

```
C 2001:0:3238:A::/64 [0/0]
  via GigabitEthernet0/0, directly connected
L 2001:0:3238:A:63::1/128 [0/0]
  via GigabitEthernet0/0, receive
R 2001:0:3238:B::/64 [120/2]
  via FE80::260:5CFF:FE60:A401, Serial0/0/0
C 2001:0:3238:C::/64 [0/0]
  via Serial0/0/0, directly connected
L 2001:0:3238:C:63::1/128 [0/0]
  via Serial0/0/0, receive
L FF00::/8 [0/0]
  via Null0, receive
```

Router1 configuration

Router>**enable**

Router#**configure terminal**

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#

Router(config)#**interface GigabitEthernet0/0**

Router(config-if)#**ipv6 address 2001:0:3238:B:63::1/64**

Router(config-if)#**no shutdown**

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#**interface Serial0/0/0**

```
Router(config-if)#ipv6 address 2001:0:3238:C:63::2/64  
Router(config-if)#no shutdown  
Router(config-if)#  
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
```

```
Router#show ipv6 protocols
```

```
IPv6 Routing Protocol is "connected"
```

```
IPv6 Routing Protocol is "ND"
```

```
IPv6 Routing Protocol is "rip test"
```

```
Interfaces:
```

```
  GigabitEthernet0/0
```

```
  Serial0/0/0
```

```
Redistribution:
```

```
  None
```

```
Router#show ipv6 int brief
```

```
GigabitEthernet0/0    [up/up]
```

```
  FE80::260:5CFF:FE60:A401
```

```
  2001:0:3238:B:63::1
```

```
GigabitEthernet0/1    [administratively down/down]
```

```
  unassigned
```

```
GigabitEthernet0/2    [administratively down/down]
```

```
  unassigned
```

```
Serial0/0/0           [up/up]
```

```
  FE80::260:5CFF:FE60:A401
```

```
  2001:0:3238:C:63::2
```

```
Serial0/0/1           [administratively down/down]
```

```
  unassigned
```

```
Vlan1                  [administratively down/down]
```

```
  unassigned
```

```
Router#show ipv6 route
```

```
IPv6 Routing Table - 6 entries
```

```
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
```

```
  U - Per-user Static route, M - MIPv6
```

```
  I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
```

```
  ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
```

```
  O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
```

```
  ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
```

```
  D - EIGRP, EX - EIGRP external
```

```
R 2001:0:3238:A::/64 [120/2]
```

```
  via FE80::201:42FF:FE3A:EC01, Serial0/0/0
```

```
C 2001:0:3238:B::/64 [0/0]
```

```
  via GigabitEthernet0/0, directly connected
```

```
L 2001:0:3238:B:63::1/128 [0/0]
```

```
  via GigabitEthernet0/0, receive
```

```
C 2001:0:3238:C::/64 [0/0]
```

```
  via Serial0/0/0, directly connected
```

```
L 2001:0:3238:C:63::2/128 [0/0]
```

```
  via Serial0/0/0, receive
```

```
L FF00::/8 [0/0]
```

```
  via Null0, receive
```


VIII. CONCLUSION

This paper shows all the aspects of RIPng, as what we have examined in this paper, we can clear that a good and established well-defined network can be created by RIPng (IPV6) protocols rather than ipv4. . RIPng Support of IPv6 networking. While RIPv2 supports RIPv1 updates authentication, RIPng does not.

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