RIP Routing with IPv6

Introduction

The Routing Information Protocol next generation (RIPng) is an interior gateway protocol (IGP) that uses a distance-vector algorithm to determine the best route to a destination, using hop count as the metric. RIPng is an extension of RIP developed for support of IPv6.

Objective(s)

In this lab the student will:

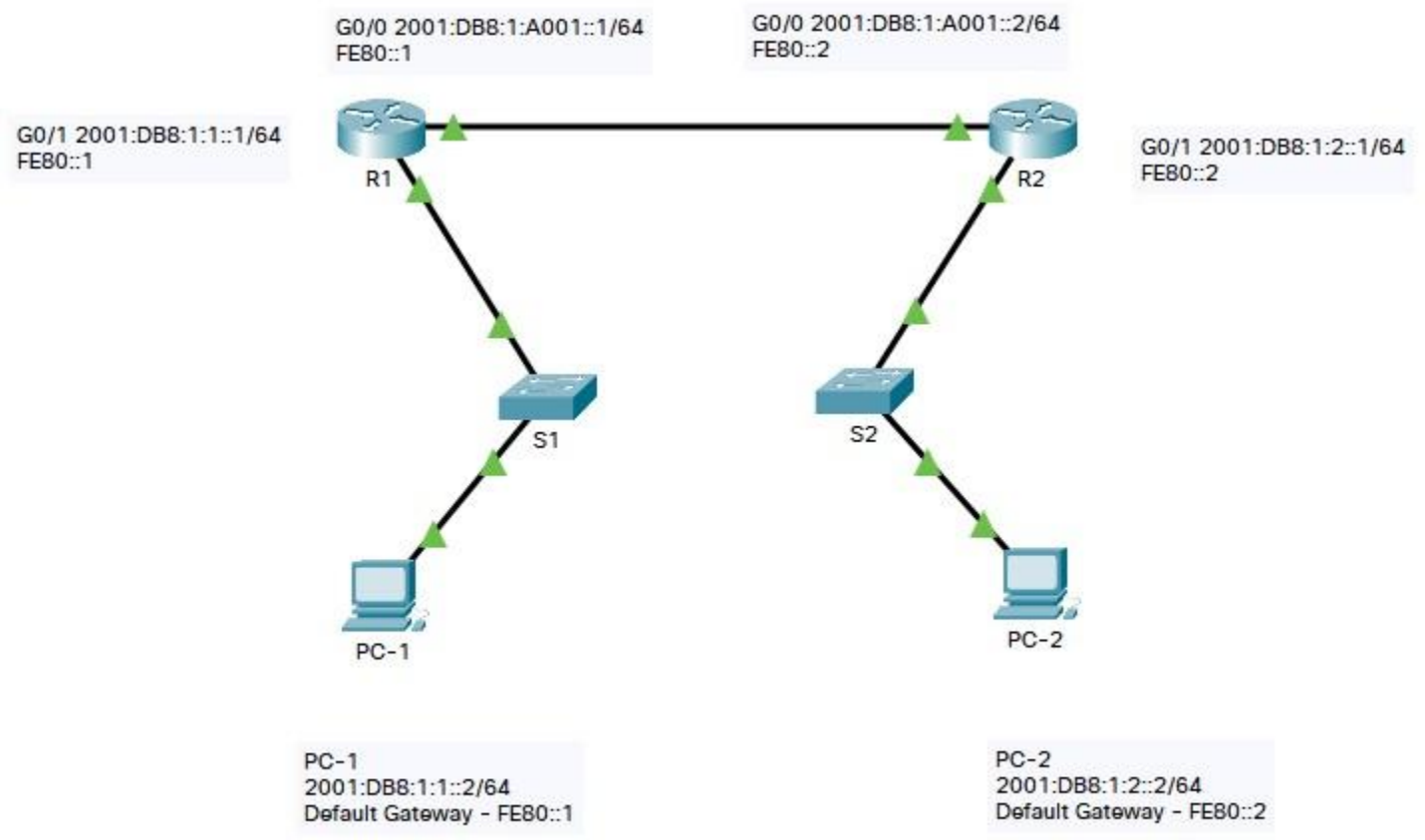
- Implement and verify dynamic Ipv6 RIP routing protocols for correct data forwarding across a communication network environment

Equipment/Supplies Needed

If working in a physical environment:

- 2 Cisco 2911 Routers
- 2 Cisco 2960 Switches
- 2 Lab workstations (may be VPCs)
- Cable(s) [if working in physical environment]
- Terminal Emulation Software (Putty / TeraTerm/ Hyperterm)

Topology



Procedure

Perform the steps in this lab in the order they are presented to you. Answer all questions and record the requested information in a file.

Part 1: Set up Network Configuration

If working online, create a new Packet Tracer file as well as a text file to document your work and answers. If working on live equipment in a lab, document your work in a text file.

1. Use the CLI to set up initial configuration on the city's routers as shown in the figure, and add the description **RIPLab** to each interface.

2. Set your privileged EXEC mode password to **security** (this password is not encrypted!)

3. Configure your router to allow login to telnet sessions on all 5 telnet lines. Set the telnet password to **cyber**.

4. Configure the PCs with the appropriate information.

   When you're finished, ping neighboring devices to test your connectivity.

Part 2: Set Up RIPng Routing Protocol

1. Configure RIPng (Distance Vector) Routing

   a. Ensure **unicast-routing** is enabled for forwarding of IPv6 packets.

   b. Create/Name the ipv6 Rip Routing process/tag. Name the process **ITNW2312** on both routers for the purpose of this lab.

      Example:

      Router1(config)# **ipv6 router rip ITNW2312**

Note: The network statement has been eliminated in RIPng. RIPng routing is enabled at the interface level instead, and is identified by the locally significant process name/tag. Configure the interfaces that will participate in the "ITNW2312" rip process.

Example:

Router1(config)# **interface g 0/0**

Router1(config-if)# **ipv6 rip ITNW2312 enable**

Router1(config-if)#**exit**

Router1(config)# **interface g 0/1**

Router1(config-if)# **ipv6 rip ITNW2312 enable**

Router1(config-if)#**exit**

2. Verify IPv6 RIPng routes using the **show ipv6 route rip** command. Record the RIPng route.

```
R1#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:DB8:1:1::/64 [0/0]
     via GigabitEthernet0/1, directly connected
L   2001:DB8:1:1::1/128 [0/0]
     via GigabitEthernet0/1, receive
R   2001:DB8:1:2::/64 [120/2]
     via FE80::2, GigabitEthernet0/0
C   2001:DB8:1:A001::/64 [0/0]
     via GigabitEthernet0/0, directly connected
L   2001:DB8:1:A001::1/128 [0/0]
     via GigabitEthernet0/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

a. Ping from the local PC to the Router1/Router 2 interfaces and to the remote PC. **Record the output showing success.**

```
C:\>ping 2001:DB8:1:2::1

Pinging 2001:DB8:1:2::1 with 32 bytes of data:

Reply from 2001:DB8:1:2::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:2::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:2::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:2::1: bytes=32 time<1ms TTL=255

Ping statistics for 2001:DB8:1:2::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 2001:DB8:1:A001::2

Pinging 2001:DB8:1:A001::2 with 32 bytes of data:

Reply from 2001:DB8:1:A001::2: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:A001::2: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:A001::2: bytes=32 time=4ms TTL=255
Reply from 2001:DB8:1:A001::2: bytes=32 time<1ms TTL=255

Ping statistics for 2001:DB8:1:A001::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms
```

```
C:\>ping 2001:DB8:1:1::1

Pinging 2001:DB8:1:1::1 with 32 bytes of data:

Reply from 2001:DB8:1:1::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:1::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:1::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:1::1: bytes=32 time<1ms TTL=255

Ping statistics for 2001:DB8:1:1::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 2001:DB8:1:A001::1

Pinging 2001:DB8:1:A001::1 with 32 bytes of data:

Reply from 2001:DB8:1:A001::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:A001::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:A001::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:1:A001::1: bytes=32 time<1ms TTL=255

Ping statistics for 2001:DB8:1:A001::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

b. Display the information about the current IPv6 RIP process using the show ipv6 rip database command. **Record the output.**

```
R1#show ipv6 rip database
RIP process "ITNW2312" local RIB
 2001:DB8:1:1::/64, metric 2
    GigabitEthernet0/0/FE80::2, expires in 154 sec
 2001:DB8:1:2::/64, metric 2, installed
    GigabitEthernet0/0/FE80::2, expires in 154 sec
 2001:DB8:1:A001::/64, metric 2
    GigabitEthernet0/0/FE80::2, expires in 154 sec
```

Submit Your Work:

Submit all text files, screenshots, or answers to questions to your instructor Using the most appropriate method below.

Packet Tracer:

Submit Packet Tracer file as well as your text file with your findings and notes.

1. Save the current Packet Tracer file as **RIPngLab2-2b_*YourName***.
2. Save the text file(s), and submit to the instructor for grading.
3. **Rubric**

Checklist/Single Point Mastery

Concerns Working Towards Proficiency	Criteria Standards for This Competency	Accomplished Evidence of Mastering Competency
	Criteria #1: Basic router and PC configs (20 pts)	Configure basic router configs needed for both routers. Passwords and ip addressing , telnet access . (20 pts)
	Criteria #2: Part 2: Set Up RIP Routing Protocol. (40 pts)	Configure RIPng routing needed for R1 and R2 routers to have full connectivity between all remote networks. (40 pts)
	Criteria #3:Test connectivity between all remote networks using ping. (20 pts)	Test connectivity between all remote networks using ping. (20 pts)
	Criteria #4:Document and submit screenshots and questions. (20 pts)	Document and submit routing tables of each router, and their running configs using notepad and/or screenshots. (20 pts)