IPv6 Routing Information Protocol



Equipment

The physical topology is preconfigured in Packet Tracer using three 1841s and three PCs.

The 1841 routers have two WIC-2T cards inserted. Interfaces S0/0/0, S0/0/1, and S0/1/0 are used to interconnect the three routers:

* S0/0/0 interfaces connect Router1 (DCE) and Router2 – the clock rate is 4,000,000 bits/sec
* S0/0/1 interfaces connect Router2 (DCE) and Router3 – the clock rate is 4,000,000 bits/sec
* S0/1/0 interfaces connect Router3 (DCE) and Router1 – the clock rate is 4,000,000 bits/sec

The built-in F0/0 interface on each router connects to the FastEthernet interface on the connected PC.

Objective

Configure IPv6 RIP to facilitate internetworking.

**Note: Routerx** in the PT topology has been preconfigured with hostname “**Rx**” for x=1,2,3.

Step 1: Enable IPv6 unicast routing on each router.

1. Configure EUI-64 network addresses on each FastEthernet segment. Enable stateless auto-configuration on each PC. Configure global unicast and unique local IPv6 networks on the serial links. Use the following network addresses:
* R1 Fast Ethernet: 2011:314:271:1::/64.
* R2 Fast Ethernet: 2011:314:271:2::/64
* R3 Fast Ethernet: 2011:314:271:3::/64
* R1-to-R2 Serial: FC00::12:0/112 (use host address ::x for Rx, x=1,2)
* R2-to-R3 Serial: FC00::23:0/112 (use host address ::x for Rx, x=2,3)
* R3-to-R1 Serial: FC00::31:0/112 (use host address ::x for Rx, x=3,1)

For example, here is the configuration for R1:

R1> **enable**

R1# **configure terminal**

R1(config)# **ipv6 unicast-routing**

R1(config)# **interface FastEthernet 0/0**

R1(config-if)# **ipv6 address 2011:314:271:1::/64 eui-64**

R1(config-if)# **ipv6 enable**

R1(config-if)# **interface Serial 0/0/0**

R1(config-if)# **ipv6 address FC00::12:1/112**

1. Repeat the parallel commands on R2 and R3.

Step 2: Determine global unicast IPv6 addresses.

1. On each router, determine the global unicast IPv6 address for the FastEthernet interface. Record the address.

R1# **show ipv6 interface brief**

FastEthernet0/0 [up/up]

 FE80::201:97FF:FE72:B401

 2011:314:271:1:201:97FF:FE72:B401

FastEthernet0/1 [administratively down/down]

Serial0/0/0 [up/up]

 FE80::202:16FF:FEEB:3D01

 FC00::12:1

Serial0/0/1 [administratively down/down]

Serial0/1/0 [up/up]

 FE80::207:ECFF:FE56:BE01

 FC00::31:1

Serial0/1/1 [administratively down/down]

Vlan1 [administratively down/down]

1. Find and record the global unicast IPv6 address on R2.

R2# **show ipv6 interface brief**

FastEthernet0/0 [up/up]

 FE80::260:70FF:FE8A:4501

 2011:314:271:2:260:70FF:FE8A:4501

FastEthernet0/1 [administratively down/down]

Serial0/0/0 [up/up]

 FE80::2E0:F7FF:FE24:2401

 FC00::12:2

Serial0/0/1 [up/up]

 FE80::2E0:F7FF:FE24:2402

 FC00::23:2

Serial0/1/0 [administratively down/down]

Serial0/1/1 [administratively down/down]

Vlan1 [administratively down/down]

1. Find and record the global unicast IPv6 address on R3.

R3# **show ipv6 interface brief**

FastEthernet0/0 [up/up]

 FE80::290:CFF:FED5:8D01

 2011:314:271:3:290:CFF:FED5:8D01

FastEthernet0/1 [administratively down/down]

Serial0/0/0 [administratively down/down]

Serial0/0/1 [up/up]

 FE80::2D0:97FF:FEA2:3202

 FC00::23:3

Serial0/1/0 [up/up]

 FE80::201:C7FF:FED8:4801

 FC00::31:3

Serial0/1/1 [administratively down/down]

Vlan1 [administratively down/down]

Step 3: On each router, configure IPv6 RIP routes for each of the three connected networks.

1. Configure the connected networks on R1. Enable the RIPng process “JINJA”.

R1(config)# **interface F0/0**

R1(config-if)# **ipv6 rip JINJA enable**

R1(config-if)# **interface Serial0/0/0**

R1(config-if)# **ipv6 rip JINJA enable**

R1(config-if)# **interface Serial0/1/0**

R1(config-if**)# ipv6 rip JINJA** **enable**

1. Repeat the parallel commands on R2 and R3.

Step 4: Verify routing tables.

1. Verify the configuration with the command **show ipv6 route**.

R1# **show ipv6 route**

IPv6 Routing Table - 10 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

 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 2011:314:271:1::/64 [0/0]

 via ::, FastEthernet0/0

L 2011:314:271:1:201:97FF:FE72:B401/128 [0/0]

 via ::, FastEthernet0/0

R 2011:314:271:2::/64 [120/1]

 via FE80::2E0:F7FF:FE24:2401, Serial0/0/0

R 2011:314:271:3::/64 [120/1]

 via FE80::201:C7FF:FED8:4801, Serial0/1/0

C FC00::12:0/112 [0/0]

 via ::, Serial0/0/0

L FC00::12:1/128 [0/0]

 via ::, Serial0/0/0

R FC00::23:0/112 [120/1]

 via FE80::2E0:F7FF:FE24:2401, Serial0/0/0

 via FE80::201:C7FF:FED8:4801, Serial0/1/0

C FC00::31:0/112 [0/0]

 via ::, Serial0/1/0

L FC00::31:1/128 [0/0]

 via ::, Serial0/1/0

L FF00::/8 [0/0]

 via ::, Null0

1. Repeat for routers R2 and R3.

Step 5: Verify connectivity.

On R1, verify connectivity to PC2, PC3, and network FC00::23:0/112.

1. To determine the IPv6 addresses of PC2 and PC3, click the PC, click the **Desktop** tab, click the **Command Prompt** button, and then type the command **ipv6config** to view the PC’s IPv6 address (results will vary). Record the addresses.

PC2:

PC> **ipv6config**

IPv6 Address....................: 2011:314:271:2:260:5CFF:FE74:4CD4/64

Default Gateway.................: FE80::260:70FF:FE8A:4501

PC3:

PC> **ipv6config**

IPv6 Address....................: 2011:314:271:3:250:FFF:FE13:A3C7/64

Default Gateway.................: FE80::290:CFF:FED5:8D01

1. Ping PC2 and PC3 address from R1.

R1# **ping 2011:314:271:2:260:5CFF:FE74:4CD4**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2011:314:271:2:260:5CFF:FE74:4CD4, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 62/62/63 ms

R1# **ping 2011:314:271:3:250:fff:fe13:a3c7**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2011:314:271:3:250:fff:fe13:a3c7, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 62/62/63 ms

1. Ping the interface addresses on the FC00::23:0/112 network from R1.

R1# **ping fc00::23:2**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to FC00::23:2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 16/31/62 ms

R1# **ping fc00::23:3**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to FC00::23:3, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 31/37/48 ms

1. Repeat verification from R2 and R3 to all other PCs and networks.

At this point, there is IPv6 connectivity between all devices in the topology.