Manually Configuring IPv6 Addressing on Routers and PCs

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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 Ethernet interface on the connected PC.

Objective

Configure device interfaces manually with static IPv6 addresses to enable point-to-point IPv6 connectivity.

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

Step 1: Configure Rx’s Fast Ethernet 0/0 interface

Configure Rx’s F0/0 interface with the global unicast IPv6 address A:B:C:D:E:F:x:1/112 (where x = 1, 2, or 3). The commands are:

Rx> **enable**

Rx# **configure terminal**

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

Rx(config-if)# **ipv6 address A:B:C:D:E:F:x:1/112**

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

Note that with the /112 subnet mask there are 16 “free” bits, amounting to 216 host addresses for the subnet. Since each of the eight components of the IPv6 address separated by the seven “:” symbols support up to four hexadecimal characters, each of the eight components constitutes 16 bits of information. So the first seven components form the network portion of the 128-bit addresses above, and the last component forms the host portion of the addresses.

* A:B:C:D:E:F:x:0 is the network portion of the address A:B:C:D:E:F:x:1/112
* 0:0:0:0:0:0:0:1 is the host portion of the address A:B:C:D:E:F:x:1/112

Use the **show ipv6 interface brief** command on R1. Note that when the global unicast address was manually configured on interface Fa0/0, an EUI-64 link-local address was automatically configured.

R1# **show ipv6 interface brief**

FastEthernet0/0 [up/up]

 FE80::201:97FF:FE72:B401

 A:B:C:D:E:F:1:1

FastEthernet0/1 [administratively down/down]

Serial0/0/0 [up/up]

Serial0/0/1 [down/down]

Serial0/1/0 [up/up]

Serial0/1/1 [down/down]

Vlan1 [administratively down/down]

Step 2: Repeat the following steps for each PC.

**Note:** In the directions below, replace x with the router number to which the respective PC connects.

1. Under the **Config** tab for PCx, configure the IPv6 Gateway with **A:B:C:D:E:F:x:1** under **Gateway/DNS IPv6**. Ensure that the **Static** radio button is selected under **Gateway/DNS IPv6**.
2. Click the **FastEthernet** button and configure PCx with the address **A:B:C:D:E:F:x:2** and a 112-bit mask under **IPv6 Configuration**. Ensure that the **Static** radio button is selected under IPv6 Configuration.
* A:B:C:D:E:F:x:0 is the network portion of the address A:B:C:D:E:F:x:2/112
* 0:0:0:0:0:0:0:2 is the host portion of the address A:B:C:D:E:F:x:2/112
1. Under the **Desktop** tab, select the **Command Prompt** button. Type the **ipv6config** command to verify the PC’s IPv6 address and Default Gateway.

Step 3: Test connectivity.

1. At the user EXEC or privileged EXEC prompt of R1, ping PC1. The output should resemble:

R1> **ping A:B:C:D:E:F:1:2**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to A:B:C:D:E:F:1:2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 31/31/32 ms

1. Repeat the connectivity test on R2 and R3.

Step 4: Configure the IPv6 addresses on the serial interfaces of the routers.

1. On interface S0/0/0 of R1 configure the IPv6 address A:B:C:D:E:F:12:1/112.
2. On interface S0/1/0 of R1 configure the IPv6 address A:B:C:D:E:F:31:1/112.
3. On interface S0/0/0 of R2 configure the IPv6 address A:B:C:D:E:F:12:2/112.
4. On interface S0/0/1 of R2 configure the IPv6 address A:B:C:D:E:F:23:2/112.
5. On interface S0/0/1 of R3 configure the IPv6 address A:B:C:D:E:F:23:3/112.
6. On interface S0/1/0 of R3 configure the IPv6 address A:B:C:D:E:F:31:3/112.

For example, here are the configuration commands on R1:

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

R1(config-if)# **ipv6 address A:B:C:D:E:F:12:1/112**

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

R1(config-if)# **ipv6 address A:B:C:D:E:F:31:1/112**

Step 5: Verify point-to-point IPv6 connectivity between the routers.

For example, on R1:

R1# **ping A:B:C:D:E:F:12:2**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to A:B:C:D:E:F:12:2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 16/28/32 ms

R1# **ping A:B:C:D:E:F:31:3**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to A:B:C:D:E:F:31:3, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 17/28/32 ms

At this point, there is point-to-point IPv6 connectivity between every pair of neighboring devices in the topology.