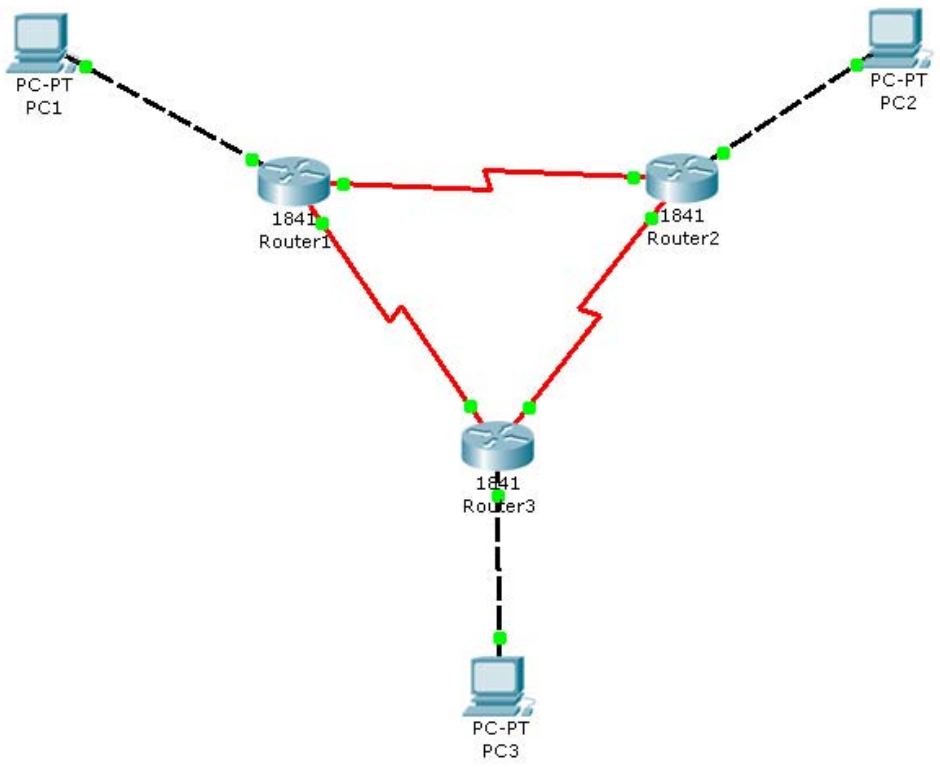
Manually Configuring IPv6 Addressing on Routers and PCs



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.

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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 2^{16} 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.

a. 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**.

b. 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

c. 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.

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

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```
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
```

b. Repeat the connectivity test on R2 and R3.

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

a. On interface S0/0/0 of R1 configure the IPv6 address A:B:C:D:E:F:12:1/112.

b. On interface S0/1/0 of R1 configure the IPv6 address A:B:C:D:E:F:31:1/112.

c. On interface S0/0/0 of R2 configure the IPv6 address A:B:C:D:E:F:12:2/112.

d. On interface S0/0/1 of R2 configure the IPv6 address A:B:C:D:E:F:23:2/112.

e. On interface S0/0/1 of R3 configure the IPv6 address A:B:C:D:E:F:23:3/112.

f. 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.

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