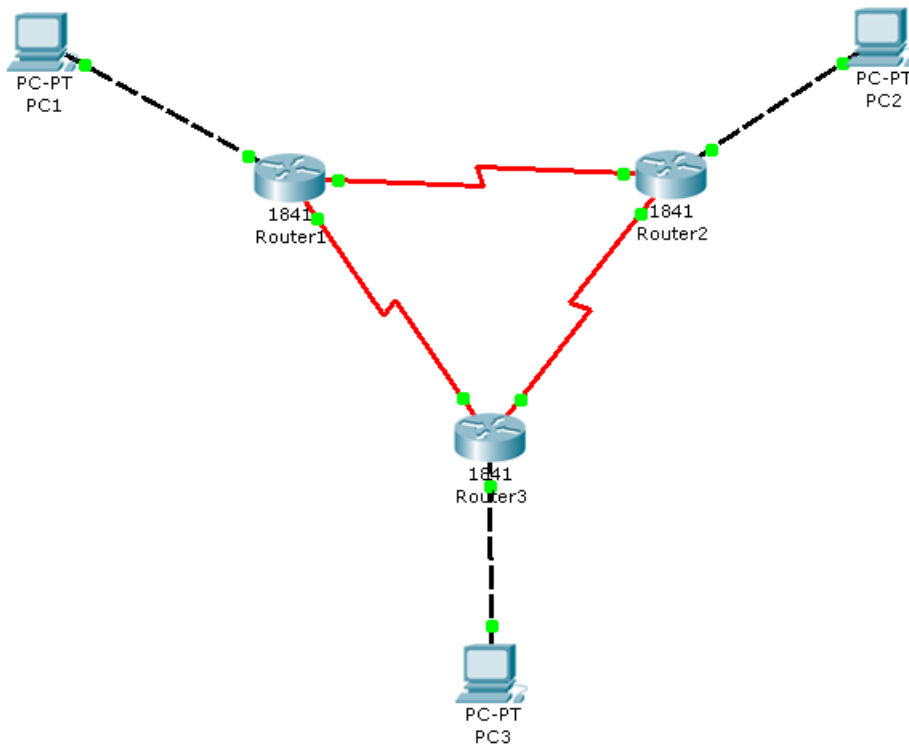


Configure IPv6 Static Routes



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 static routes to facilitate internetworking.

Note: Router x in the PT topology has been preconfigured with hostname “R x ” for $x=1,2,3$.

Step 1: Enable IPv6 unicast routing on each router.

- a. Configure EUI-64 network addresses on each FastEthernet segment. Enable stateless auto-configuration on each PC. Configure global unicast 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: FA00::12:0/112 (use host address ::x for Rx, x=1,2)
 - R2-to-R3 Serial: FA00::23:0/112 (use host address ::x for Rx, x=2,3)
 - R3-to-R1 Serial: FA00::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 FA00::12:1/112
```

- b. Repeat the parallel commands on R2 and R3.

Step 2: Determine global unicast IPv6 addresses.

- a. 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
    FA00::12:1
Serial0/0/1              [administratively down/down]
Serial0/1/0              [up/up]
    FE80::207:ECFF:FE56:BE01
    FA00::31:1
Serial0/1/1              [administratively down/down]
Vlan1                    [administratively down/down]
```

- b. 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
    FA00::12:2
Serial0/0/1              [up/up]
```

```
FE80::2E0:F7FF:FE24:2402
FA00::23:2
Serial0/1/0          [administratively down/down]
Serial0/1/1          [administratively down/down]
Vlan1                [administratively down/down]
```

- c. 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
FA00::23:3
Serial0/1/0          [up/up]
FE80::201:C7FF:FED8:4801
FA00::31:3
Serial0/1/1          [administratively down/down]
Vlan1                [administratively down/down]
```

Step 3: On each router, configure static routes to the three remote networks.

It is allowed to use the exit interface in lieu of the next-hop IPv6 address, but (just for practice) we use the IPv6 next-hop addresses which are useful in a multiaccess environment, such as Ethernet.

- a. For the remote serial network, enter two static routes for load balancing.

```
R1(config)# ipv6 route 2011:314:271:2::/64 FA00::12:2
R1(config)# ipv6 route 2011:314:271:3::/64 FA00::31:3
R1(config)# ipv6 route FA00::23:0/112 FA00::12:2
R1(config)# ipv6 route FA00::23:0/112 FA00::31:3
```

- b. Repeat the parallel commands on R2 and R3.

Step 4: Verify routing tables.

- a. 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   2001:314:271:1::/64 [0/0]
    via ::, FastEthernet0/0
L   2001:314:271:1:201:97FF:FE72:B401/128 [0/0]
    via ::, FastEthernet0/0
S   2011:314:271:2::/64 [1/0]
    via FA00::12:2
S   2011:314:271:3::/64 [1/0]
    via FA00::31:3
```

CCNPv6 ROUTE

```
C   FA00::12:0/112 [0/0]
    via ::, Serial0/0/0
L   FA00::12:1/128 [0/0]
    via ::, Serial0/0/0
S   FA00::23:0/112 [1/0]
    via FA00::12:2
    via FA00::31:3
C   FA00::31:0/112 [0/0]
    via ::, Serial0/1/0
L   FA00::31:1/128 [0/0]
    via ::, Serial0/1/0
L   FF00::/8 [0/0]
    via ::, Null0
```

- b. Repeat for routers R2 and R3.

Step 5: Verify connectivity.

On R1, verify connectivity to PC2, PC3, and network FA00::23:0/112.

- a. 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
```

- b. 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
```

- c. Ping the FA00::23:0/112 networks from R1.

```
R1# ping fa00::23:2
```

CCNPv6 ROUTE

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to fa00::23:2, timeout is 2 seconds:  
!!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/31/62 ms
```

```
R1# ping fa00::23:3
```

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to fa00::23:3, timeout is 2 seconds:  
!!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 31/37/48 ms
```

- d. 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.