Configuring OSPF for IPv6
(Optional – Not to be graded)

Equipments – Same as in the Preliminary Lab.
Each reservation is for a 3-hour period.

The Assignment:

The complete assignment follows this page. From the experience in the preliminary lab you should be able make reservations and access the devices. Note that the assignment may not state every step (such as using *enable* to get into the privileged mode and *configure terminal* to get into the configuration mode. You should be able to figure that out from the handouts on Cisco configurations). It's a good idea to read through the assignment first and have a good understanding before attempting the lab. Have fun!

Deliverables (No need to submit but this is what I would ask for if this is to be graded):

- For steps include screen shots or outputs which demonstrate you have completed the step.
- When you are done with all the configurations, do a "show run" for each router and copy them into a text file.
- Please put all the above in a single file, or in separate files and submit a zip file.

Support:

- Useful information can be found under the Lab Resources link on http://lanlab.cdm.depaul.edu)
- If you encounter problems with the DLPods, please check the following pages first: FAQs and Lab Documentation, as they provide guidelines for fixing some common problems.
- If a problem still cannot be solved after consulting the aforementioned pages, email an error report to lanlab@cdm.depaul.edu and cc me, achung@cdm.depaul.edu **Please clearly indicate the course (TDC 563) and lab number in the subject line.** Responses normally given during lab hours. Lab assistants will be available if you work in the lab.
- **Lab hours are: 12-10pm M-F, 12-6pm Sa and Su. You may work on the DL Pods any time, but lab assistants are only available during the lab hours.**

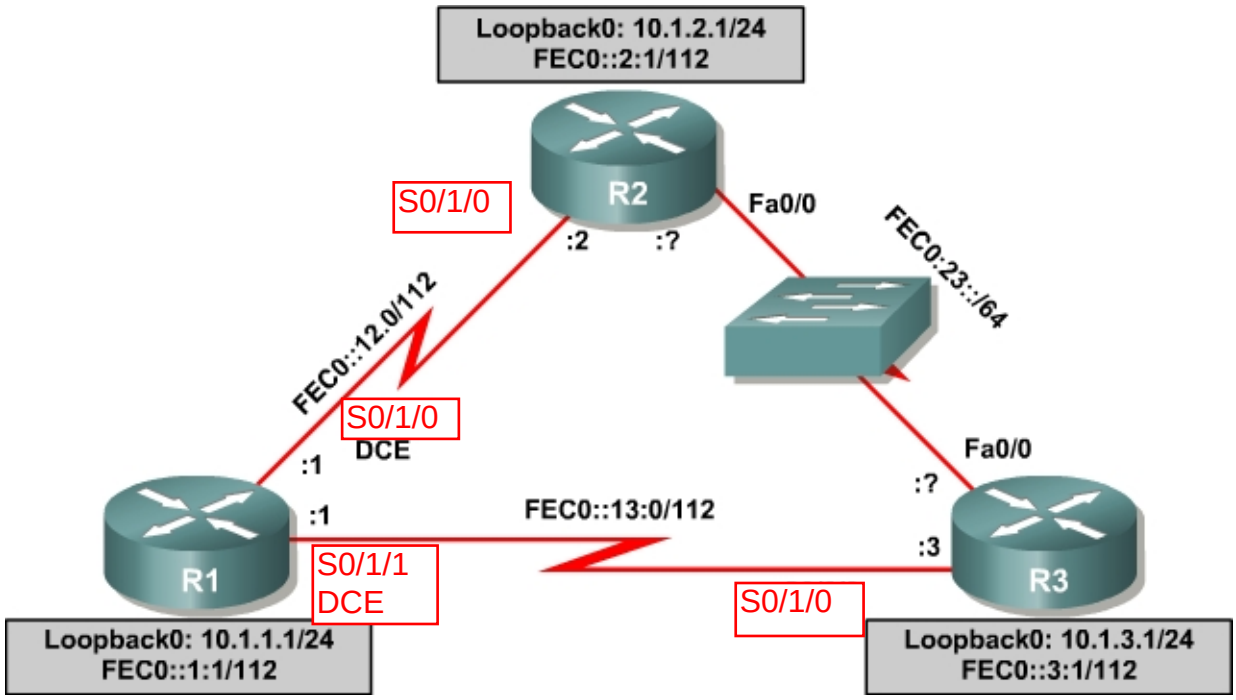
Lab 8-1 Configuring OSPF for IPv6

Note: This is modified from the original Cisco Manual

Learning Objectives

- Configure a static IPv6 address on an interface
- Change the default-link local address on an interface
- Configure an EUI-64 IPv6 address on an interface
- Enable IPv6 routing and CEF
- Configure and verify single-area OSPFv3 operation

Topology Diagram



Scenario

For this lab, you will configure IPv6 addresses on interfaces, both static addresses and EUI-64 addresses. Then, you will configure OSPFv3 to route between the IPv6 networks.

Step 1: Lab Preparation

Start this lab by clearing out your configurations and reloading your routers. Once your routers are reloaded, set up the appropriate hostnames.

Step 2: Configuring the Loopback Interfaces

Configure the loopback interface on each router with both the IPv4 address and IPv6 address given in the diagram. The IPv4 address is configured the traditional way with **ip address *address mask***. The IPv6 address configuration is similar, using the command **ipv6 address *address/mask***. IPv6 addresses let you put in the mask length with a /mask, rather than typing the whole mask out in hexadecimal (imagine typing up to 128 bits worth of 1's).

You also can put in the abbreviated form of an IPv6 address. IPv6 addresses normally are 8 groups of 16 bit groups of hexadecimal, separated by colons. You can abbreviate any continuous group of 0's with "::". You can only use this abbreviation once per address. For example, FEC0:0:0:0:0:0:12:1 /112 can be shortened to FEC0::12:1 /112.

```
R1(config)# interface loopback0
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address FEC0::1:1/112

R2(config)# interface loopback0
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# ipv6 address FEC0::2:1/112

R3(config)# interface loopback0
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FEC0::2:1/112
```

If you accidentally put the wrong IPv6 address on an interface, make sure you take it off with the **no** version of the command you entered. Unlike IPv4 addresses, where the **ip address** command overwrites the existing address, multiple IPv6 addresses can exist on an interface. Putting in the command **ipv6 address** multiple times will add more addresses, not replace them.

Also, notice that we put both an IPv4 and IPv6 address on the same interface, and neither conflict with each other. This is because they are different layer 3 protocols and they run independently.

Step 3: Configuring Static IPv6 Addresses

Now, configure the two serial links with IPv6 addresses. Use the **ipv6 address *address/mask*** command again to configure the interfaces with the addresses given in the diagram. Remember to set the clockrates where appropriate and put a **no shutdown** on the interfaces. Verify with **ping** for local subnet connectivity.

```
R1(config)# interface serial0/1/0
R1(config-if)# ipv6 address FEC0::12:1/112
R1(config-if)# clockrate 64000
R1(config-if)# no shutdown
R1(config-if)# interface s0/1/1
R1(config-if)# ipv6 address FEC0::13:1/112
R1(config-if)# clockrate 64000
```



```
R1(config-if)# no shutdown

R2(config)# interface serial0/1/0
R2(config-if)# ipv6 address FEC0::12:2/112
R2(config-if)# no shutdown

R3(config)# interface serial0/1/0
R3(config-if)# ipv6 address FEC0::13:3/112
R3(config-if)# no shutdown


R1#ping FEC0::12:2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0::12:2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/28/28 ms
R1#ping FEC0::13:3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0::13:3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/28/28 ms

R2#ping FEC0::12:1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0::12:1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/28/28 ms

R3#ping FEC0::13:1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0::13:1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/28/28 ms
```

Step 4: Changing the Link-Local Address on an Interface

Use the command **show ipv6 interface** to look at IPv6 related properties of the router interfaces. You can also specify a specific type/number of an interface with this command to see the output for only that interface.

```
R1#show ipv6 interface serial 0/1/0
Serial0/1/0 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::219:6FF:FE23:4380
  No Virtual link-local address(es):
  Global unicast address(es):
    FEC0::12:1, subnet is FEC0::12:0/112
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF12:1
    FF02::1:FF23:4380
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is enabled, number of DAD attempts: 1
```



```
  ND reachable time is 30000 milliseconds

R2#show ipv6 interface serial 0/1/0
Serial0/1/0 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::218:B9FF:FE92:28D8
  Global unicast address(es):
    FEC0::12:2, subnet is FEC0::12:0/112
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF12:2
    FF02::1:FF92:28D8
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
```

Notice that in addition to the address you already configured, there is a link local address starting with FE80. Your actual address may vary. You can change this on the link between R1 and R2 by putting the link-local address FE80::1 on R1 and FE80::2 on R2. There is no subnet mask on link-local addresses, because they are not routed; hence the term “link-local”. To configure this, use the command **ipv6 address *address* link-local**. Verify that you can ping the link local address on the other side. When pinging link local addresses, you must specify an outgoing interface because the addresses are not routed and not in the routing table.

```
R1(config)# interface serial0/1/0
R1(config-if)# ipv6 address FE80::1 link-local

R2(config)# interface serial0/1/0
R2(config-if)# ipv6 address FE80::2 link-local

R1#ping FE80::2
Output Interface: Serial0/1/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FE80::2, timeout is 2 seconds:
Packet sent with a source address of FE80::1
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/28/28 ms

R2#ping FE80::1
Output Interface: Serial0/1/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FE80::1, timeout is 2 seconds:
Packet sent with a source address of FE80::2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/28/28 ms
```

Verify the link local addresses with the command **show ipv6 interface**.

```
R1#show ipv6 interface serial 0/1/0
Serial0/1/0 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::1
  No Virtual link-local address(es):
  Global unicast address(es):
```



```
    FEC0::12:1, subnet is FEC0::12:0/112
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF00:1
    FF02::1:FF12:1
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds

R2#show ipv6 interface serial 0/1/0
Serial0/1/0 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::2
  Global unicast address(es):
    FEC0::12:2, subnet is FEC0::12:0/112
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF00:2
    FF02::1:FF12:2
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
```

Step 5: Configuring EUI-64 Addresses

EUI-64 IPv6 addresses are addresses where the first 64 bits are the network portion of the address and specified, and the second 64 bits are the host portion of the address and automatically generated by the device. To configure IPv6 EUI-64 addresses on an interface, use **ipv6 address *address/mask* eui-64**. Configure this on the FastEthernet interfaces of R2 and R3 with the subnet given in the diagram. Also, make sure you put a **no shutdown** on the interfaces. Find out the IPv6 addresses of the interfaces with **show ipv6 interface** or **show ipv6 interface brief**, and then ping the other side of the link.

```
R2(config)# interface fastethernet0/0
R2(config-if)# ipv6 address FEC0:23::/64 eui-64
R2(config-if)# no shutdown

R3(config)# interface fastethernet0/0
R3(config-if)# ipv6 address FEC0:23::/64 eui-64
R3(config-if)# no shutdown

R2#show ipv6 interface brief
FastEthernet0/0            [up/up]
    FE80::218:B9FF:FE92:28D8
    FEC0:23::218:B9FF:FE92:28D8
FastEthernet0/1            [administratively down/down]
Serial0/1/0                [up/up]
    FE80::2
    FEC0::12:2
Serial0/0/1                [administratively down/down]
Serial0/0/0                [administratively down/down]
Serial0/1/1                [administratively down/down]
```



```
Loopback0                  [up/up]
    FE80::218:B9FF:FE92:28D8
    FEC0::2:1

R3#show ipv6 interface brief
FastEthernet0/0            [up/up]
    FE80::218:B9FF:FECD:BEF0
    FEC0:23::218:B9FF:FECD:BEF0
FastEthernet0/1            [administratively down/down]
Serial0/1/0                [up/up]
    FE80::218:B9FF:FECD:BEF0
    FEC0::13:3
Serial0/0/1                [administratively down/down]
Serial0/0/0                [administratively down/down]
Serial0/1/1                [administratively down/down]
Loopback0                  [up/up]
    FE80::218:B9FF:FECD:BEF0
    FEC0::3:1

R2#ping FEC0:23::218:B9FF:FECD:BEF0

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0:23::218:B9FF:FECD:BEF0, timeout is 2
seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/4 ms

R3#ping FEC0:23::218:B9FF:FE92:28D8

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0:23::218:B9FF:FE92:28D8, timeout is 2
seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

WARNING: Your addresses will be different from the addresses displayed in the example, because EUI-64 addresses include the MAC address of the interface in them, which will be unique per interface.

At this point in the lab you should have local subnet connectivity.

Step 6: Enabling IPv6 Routing and CEF

As of the time of this writing, the current IOS version has IPv6 routing and CEF disabled by default. To enable IPv6 routing, use the global configuration command **ipv6 unicast-routing**. To enable IPv6 CEF, use the command **ipv6 cef**. Use these commands on all three routers.

```
R1(config)# ipv6 unicast-routing
R1(config)# ipv6 cef

R2(config)# ipv6 unicast-routing
R2(config)# ipv6 cef

R3(config)# ipv6 unicast-routing
R3(config)# ipv6 cef
```


Step 7: Setting up OSPFv3

Unlike IPv4 OSPF, where networks are added to the OSPF process with **network** statements under the routing protocol configuration prompt, IPv6 OSPF uses the interface level command **ipv6 ospf *process* area *area*** to add an interface to an area. This method has both its advantages and disadvantages compared to the old method. Add all interfaces shown on the diagram into OSPF process 1, area 0. Once you add the interfaces to the OSPF process with this command, the OSPF process will start automatically. If the adjacencies don't come up after a reasonable period of time, troubleshoot using the debug commands **debug ipv6 ospf adjacency** and **debug ipv6 packet**. Make sure that the packets are being sent to their destination and that adjacencies are forming correctly.

```
R1(config)#interface loopback0
R1(config-if)#ipv6 ospf 1 area 0
R1(config-if)#interface serial0/1/0
R1(config-if)#ipv6 ospf 1 area 0
R1(config-if)#interface serial0/1/1
R1(config-if)#ipv6 ospf 1 area 0

R2(config)#interface loopback0
R2(config-if)#ipv6 ospf 1 area 0
R2(config-if)#interface serial0/1/0
R2(config-if)#ipv6 ospf 1 area 0
R2(config-if)#interface fastethernet0/0
R2(config-if)#ipv6 ospf 1 area 0

R3(config)#interface loopback0
R3(config-if)#ipv6 ospf 1 area 0
R3(config-if)#interface serial0/1/0
R3(config-if)#ipv6 ospf 1 area 0
R3(config-if)#interface fastethernet0/0
R3(config-if)#ipv6 ospf 1 area 0
```

Verify that you have OSPFv3 neighbors with the command **show ipv6 ospf neighbor**.

```
R1#show ipv6 ospf neighbor

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
10.1.3.1          1   FULL/  -        00:00:39    6               Serial0/1/1
10.1.2.1          1   FULL/  -        00:00:34    6               Serial0/1/0

R2#show ipv6 ospf neighbor

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
10.1.3.1          1   FULL/DR         00:00:39    4
FastEthernet0/0
10.1.1.1          1   FULL/  -        00:00:32    6               Serial0/1/0

R3#show ipv6 ospf neighbor

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
10.1.2.1          1   FULL/BDR        00:00:39    4
FastEthernet0/0
10.1.1.1          1   FULL/  -        00:00:39    7               Serial0/1/0
```


The router IDs for each router are created the same way that they are in OSPFv2 or BGP. Without any IPv4 addresses on the router, the OSPFv3 process will not start unless you manually set the router IDs. This is why the loopback interfaces have both IPv4 and IPv6 addresses.

Take a look at the routing table on all three routers with the command **show ipv6 route**.

```
R1#show ipv6 route
IPv6 Routing Table - 11 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route
       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
L   FE80::/10 [0/0]
     via ::, Null0
C   FEC0::1:0/112 [0/0]
     via ::, Loopback0
L   FEC0::1:1/128 [0/0]
     via ::, Loopback0
O   FEC0::2:1/128 [110/64]
     via FE80::2, Serial0/1/0
O   FEC0::3:1/128 [110/64]
     via FE80::218:B9FF:FECD:BEF0, Serial0/1/1
C   FEC0::12:0/112 [0/0]
     via ::, Serial0/0/0
L   FEC0::12:1/128 [0/0]
     via ::, Serial0/0/0
C   FEC0::13:0/112 [0/0]
     via ::, Serial0/0/1
L   FEC0::13:1/128 [0/0]
     via ::, Serial0/0/1
O   FEC0:23::/64 [110/65]
     via FE80::2, Serial0/0/0
     via FE80::218:B9FF:FECD:BEF0, Serial0/1/1
L   FF00::/8 [0/0]
     via ::, Null0

R2#show ipv6 route
IPv6 Routing Table - 11 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route
       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
L   FE80::/10 [0/0]
     via ::, Null0
O   FEC0::1:1/128 [110/64]
     via FE80::1, Serial0/1/0
C   FEC0::2:0/112 [0/0]
     via ::, Loopback0
L   FEC0::2:1/128 [0/0]
     via ::, Loopback0
O   FEC0::3:1/128 [110/1]
     via FE80::218:B9FF:FECD:BEF0, FastEthernet0/0
C   FEC0::12:0/112 [0/0]
     via ::, Serial0/0/0
L   FEC0::12:2/128 [0/0]
     via ::, Serial0/0/0
```



```
O   FEC0::13:0/112 [110/65]
     via FE80::218:B9FF:FECD:BEF0, FastEthernet0/0
C   FEC0:23::/64 [0/0]
     via ::, FastEthernet0/0
L   FEC0:23::218:B9FF:FE92:28D8/128 [0/0]
     via ::, FastEthernet0/0
L   FF00::/8 [0/0]
     via ::, Null0

R3#show ipv6 route
IPv6 Routing Table - 11 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route
       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
L   FE80::/10 [0/0]
     via ::, Null0
O   FEC0::1:1/128 [110/64]
     via FE80::219:6FF:FE23:4380, Serial0/1/0
O   FEC0::2:1/128 [110/1]
     via FE80::218:B9FF:FE92:28D8, FastEthernet0/0
C   FEC0::3:0/112 [0/0]
     via ::, Loopback0
L   FEC0::3:1/128 [0/0]
     via ::, Loopback0
O   FEC0::12:0/112 [110/65]
     via FE80::218:B9FF:FE92:28D8, FastEthernet0/0
C   FEC0::13:0/112 [0/0]
     via ::, Serial0/0/0
L   FEC0::13:3/128 [0/0]
     via ::, Serial0/0/0
C   FEC0:23::/64 [0/0]
     via ::, FastEthernet0/0
L   FEC0:23::218:B9FF:FECD:BEF0/128 [0/0]
     via ::, FastEthernet0/0
L   FF00::/8 [0/0]
     via ::, Null0
```

You can also look at per-interface OSPF behavior with **show ipv6 ospf interface**.

```
R1#show ipv6 ospf interface
Serial0/1/1 is up, line protocol is up
  Link Local Address FE80::219:6FF:FE23:4380, Interface ID 7
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.1.1
  Network Type POINT_TO_POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:06
  Index 1/3/3, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 2
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.1.3.1
  Suppress hello for 0 neighbor(s)
Serial0/1/0 is up, line protocol is up
  Link Local Address FE80::1, Interface ID 6
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.1.1
  Network Type POINT_TO_POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT_TO_POINT,
```



```
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:00
  Index 1/2/2, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 4
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.1.2.1
  Suppress hello for 0 neighbor(s)
Loopback0 is up, line protocol is up
  Link Local Address FE80::219:6FF:FE23:4380, Interface ID 20
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.1.1
  Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host

R2#show ipv6 ospf interface
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::218:B9FF:FE92:28D8, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.2.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 10.1.3.1, local address FE80::218:B9FF:FECD:BEF0
  Backup Designated router (ID) 10.1.2.1, local address
FE80::218:B9FF:FE92:28D8
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:04
  Index 1/3/3, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 2
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.1.3.1  (Designated Router)
  Suppress hello for 0 neighbor(s)
Serial0/1/0 is up, line protocol is up
  Link Local Address FE80::2, Interface ID 6
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.2.1
  Network Type POINT_TO_POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  Index 1/2/2, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 4
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.1.1.1
  Suppress hello for 0 neighbor(s)
Loopback0 is up, line protocol is up
  Link Local Address FE80::218:B9FF:FE92:28D8, Interface ID 17
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.2.1
  Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host

R3#show ipv6 ospf interface
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::218:B9FF:FECD:BEF0, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.3.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 10.1.3.1, local address FE80::218:B9FF:FECD:BEF0
  Backup Designated router (ID) 10.1.2.1, local address
FE80::218:B9FF:FE92:28D8
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
```



```
    Hello due in 00:00:09
  Index 1/3/3, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 4
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.1.2.1  (Backup Designated Router)
  Suppress hello for 0 neighbor(s)
Serial0/1/0 is up, line protocol is up
  Link Local Address FE80::218:B9FF:FECD:BEF0, Interface ID 6
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.3.1
  Network Type POINT_TO_POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  Index 1/2/2, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 4
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.1.1.1
  Suppress hello for 0 neighbor(s)
Loopback0 is up, line protocol is up
  Link Local Address FE80::218:B9FF:FECD:BEF0, Interface ID 17
  Area 0, Process ID 1, Instance ID 0, Router ID 10.1.3.1
  Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
```

