**Lab 16:**

**✅ Scenario – OSPFv3 with Link-Local Neighbors**

**🖧 Topology**

yaml

CopyEdit

[ PC1 ]──[ R1 ]────[ R2 ]────[ PC2 ]

IPv6 Network:

- R1 to PC1: 2001:1:1:1::/64

- R1 to R2: 2001:1:1:12::/64

- R2 to PC2: 2001:1:1:2::/64

**🛠️ Objective**

* Configure IPv6 addresses
* Enable OSPFv3 using link-local addressing
* Use OSPFv3 to establish adjacency and enable routing between R1 and R2

**🧪 Lab Steps**

**🔹 Step 1: Enable IPv6 Routing**

On **R1** and **R2**:

bash

CopyEdit

conf t

ipv6 unicast-routing

exit

**🔹 Step 2: Configure IPv6 Addresses**

**On R1:**

bash

CopyEdit

int g0/0

ipv6 address 2001:1:1:1::1/64

no shutdown

exit

int g0/1

ipv6 address 2001:1:1:12::1/64

no shutdown

exit

**On R2:**

bash

CopyEdit

int g0/0

ipv6 address 2001:1:1:12::2/64

no shutdown

exit

int g0/1

ipv6 address 2001:1:1:2::1/64

no shutdown

exit

**🔹 Step 3: Enable OSPFv3 on Interfaces**

**On R1:**

bash

CopyEdit

int g0/0

ipv6 ospf 10 area 0

exit

int g0/1

ipv6 ospf 10 area 0

exit

**On R2:**

bash

CopyEdit

int g0/0

ipv6 ospf 10 area 0

exit

int g0/1

ipv6 ospf 10 area 0

exit

OSPFv3 doesn't require network statements — it runs **per-interface**.

**🔹 Step 4: Verify OSPF Neighbors**

On both routers:

bash

CopyEdit

show ipv6 ospf neighbor

You should see the other router’s **link-local address** as the neighbor.

**🔹 Step 5: Verify IPv6 Routing**

Check routing table:

bash

CopyEdit

show ipv6 route

You should see OSPF routes (O):

cpp

CopyEdit

O 2001:1:1:2::/64 [110/10] via FE80::2, GigabitEthernet0/1

**🔹 Step 6: Test Connectivity**

On **R1**, ping **PC2’s IPv6** address:

bash

CopyEdit

ping 2001:1:1:2::10

✅ If routing works, you’ll get replies.

**✅ Notes:**

* OSPFv3 forms neighbor relationships using **link-local addresses** (FE80::/10)
* You don’t configure a router ID in basic setups, but you can set it manually:

bash

CopyEdit

router ospf 10

router-id 1.1.1.1

**Output:**

C:\>ping 2001:1:1:1::1

Pinging 2001:1:1:1::1 with 32 bytes of data:

Reply from FE80::240:BFF:FE4A:5302: Destination host unreachable.

Reply from FE80::240:BFF:FE4A:5302: Destination host unreachable.

Reply from FE80::240:BFF:FE4A:5302: Destination host unreachable.

Reply from FE80::240:BFF:FE4A:5302: Destination host unreachable.

Ping statistics for 2001:1:1:1::1:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>

C:\>ping 2001:1:1:2::1

Pinging 2001:1:1:2::1 with 32 bytes of data:

Reply from FE80::260:3EFF:FE3C:4501: Destination host unreachable.

Reply from FE80::260:3EFF:FE3C:4501: Destination host unreachable.

Reply from FE80::260:3EFF:FE3C:4501: Destination host unreachable.

Reply from FE80::260:3EFF:FE3C:4501: Destination host unreachable.

Ping statistics for 2001:1:1:2::1:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>