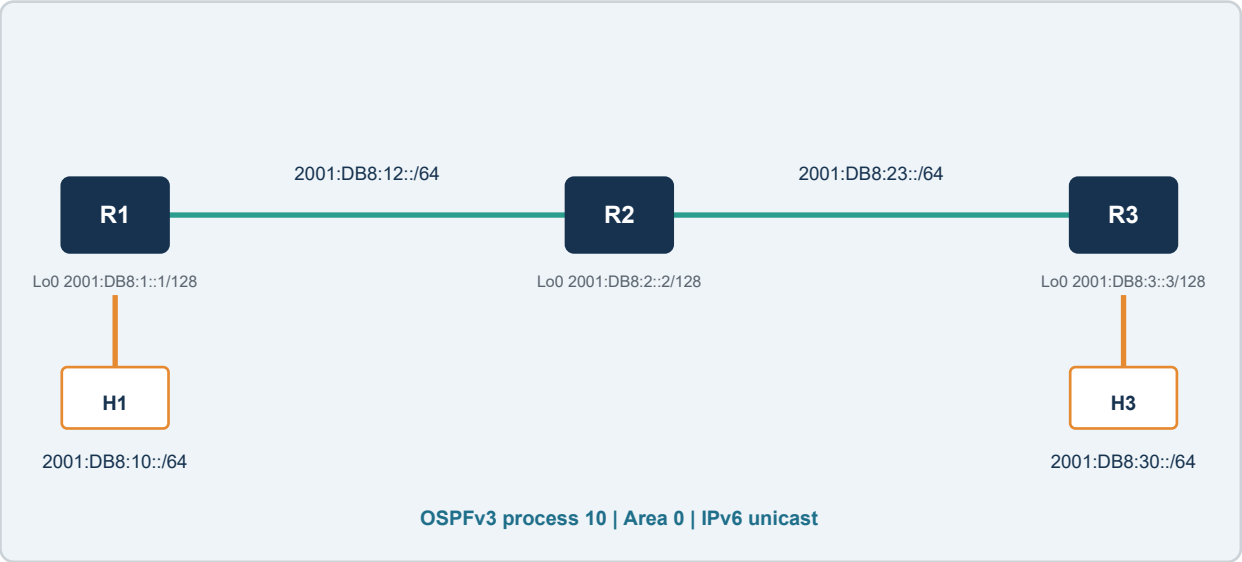
CCNP ENARSI

Lab 06

OSPFv3 IPv6 Address Families & Reachability



Guided workbook | 5 approved IOL L3 nodes

Build IPv6 OSPFv3, read link-local route evidence and prove bidirectional endpoint reachability.

Blueprint	Level	Estimated time	Validated platform
1.10, 1.10.a	Intermediate	100-140 min	EVE-NG / approved IOL L3

CLI annotations: GREEN - expected healthy result; YELLOW - warning or interpretation required; RED - fault or failed requirement. Colors are workbook annotations, not native CLI colors. Variable timers and ages may differ. Yellow/red items include a one-line reason.

1. Objective and production context

A dual-site enterprise already has IPv6 subnets but no intersite IPv6 route exchange. Build OSPFv3 over a three-router transit, validate both control-plane neighbors and client forwarding, and distinguish a valid IPv6 connected ping from learned reachability. Cisco ENARSI v1.1 blueprint 1.10 and 1.10.a.

2. Observable learning outcomes

Identify each OSPFv3 router ID and link-local neighbor address, require FULL on the two transit links, find OSPFv3 learned /64 LANs and /128 loopbacks, and prove forward and return IPv6 client connectivity. Diagnose an address-family mismatch from actual CLI evidence without fabricating a fault.

3. Enterprise scenario and interview value

R1 serves Site 1, R2 is transit, and R3 serves Site 3. H1 and H3 are isolated IOL L3 endpoint nodes representing production hosts; they have IPv6 addresses and default routes but do not run OSPFv3. An interview explanation must separate IPv6 global unicast addressing, IPv6 forwarding, OSPFv3 interface activation, passive client interfaces, IPv4-format router IDs and link-local next hops. A FULL neighbor is necessary but cannot substitute for checking actual /64 routes and client traffic.

4. Required prior knowledge

Know IPv6 /64 subnetting, /128 loopbacks, global versus link-local addresses, ICMPv6, IPv6 neighbor discovery, OSPF areas and router IDs, passive-interface semantics, and how to read a routing table. Complete Labs 01-03 for OSPF control-plane habits. The router ID still uses 32-bit dotted-decimal syntax even though the payload is IPv6.

5.1 Deep analysis: OSPFv3 address family and identity

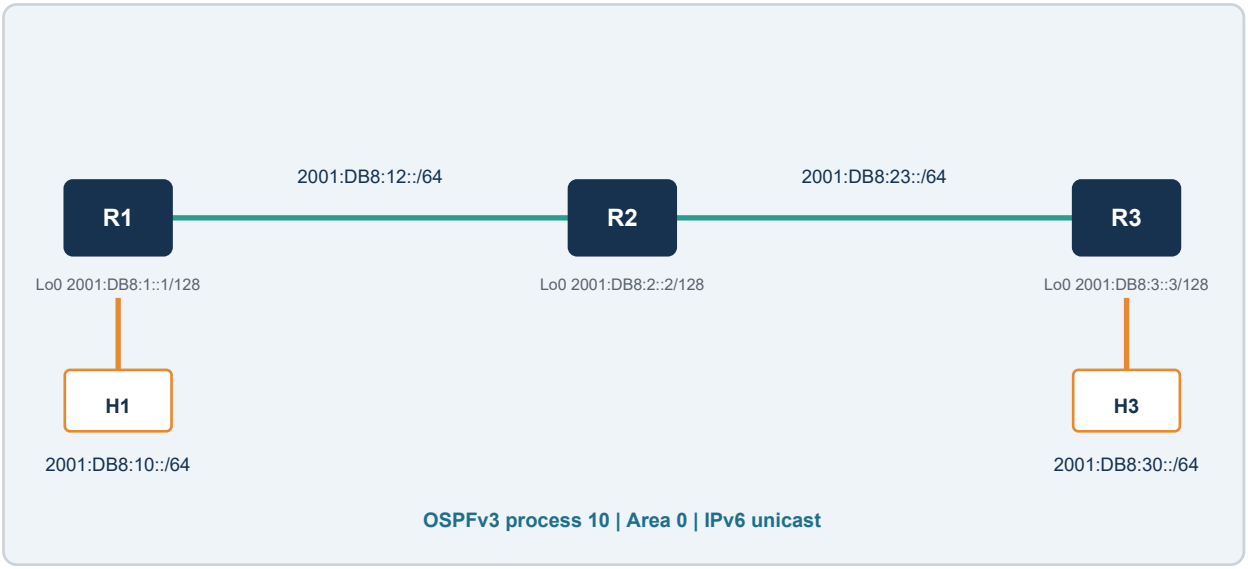
The ENARSI blueprint explicitly covers OSPFv2/v3 address families. In this approved IOL image, the classic ipv6 router ospf process provides the IPv6 unicast OSPFv3 exercise. The process ID is locally significant; the router ID identifies the OSPF speaker and is not an IPv6 next hop. Each transit interface has its own global IPv6 address and automatically has a link-local address. OSPFv3 peers can use link-local next hops; therefore read the outgoing interface alongside the next-hop address. The two branch /64s become OSPF-learned at the opposite site. A local IPv6 ping to a directly attached peer establishes only one link and cannot demonstrate intersite routing.

5.2 Deep analysis: routes, forwarding and safe validation

OSPFv3 neighbors exchange link-state information; the SPF result must install remote /64 and /128 routes. The passive LAN interfaces advertise their prefixes while suppressing Hellos toward endpoints. H1 and H3 use only a static IPv6 default route; they never form OSPF neighbors. Verify show ipv6 ospf neighbor, show ipv6 ospf interface, show ipv6 route ospf, and bidirectional endpoint traffic in that order. If a route is missing, check interface IPv6 address, ipv6 unicast-routing, process activation, area, passive state and neighbor FULL before changing configuration. Do not treat an OSPF neighbor alone as end-to-end success. This guided lab has no injected incident; troubleshooting challenges are scheduled separately.

6. Topology and addressing

R1 Ethernet0/0 to R2 Ethernet0/0 uses 2001:DB8:12::/64. R2 Ethernet0/1 to R3 Ethernet0/0 uses 2001:DB8:23::/64. R1 Ethernet0/1 to H1 Ethernet0/0 uses 2001:DB8:10::/64; R3 Ethernet0/1 to H3 Ethernet0/0 uses 2001:DB8:30::/64. Each routing-core node has Loopback0 2001:DB8:N::N/128. All five nodes use the approved IOL L3 image and remain below the seven-node limit.



Node roles and addresses

Node	Role	Loopback / client address
R1	Site 1 gateway	2001:DB8:1::1/128
R2	Transit	2001:DB8:2::2/128
R3	Site 3 gateway	2001:DB8:3::3/128
H1	Site 1 endpoint	2001:DB8:10::10/64
H3	Site 3 endpoint	2001:DB8:30::10/64

Physical interface map

Endpoint A	Endpoint B	IPv6 subnet
R1 Ethernet0/0	R2 Ethernet0/0	2001:DB8:12::/64
R2 Ethernet0/1	R3 Ethernet0/0	2001:DB8:23::/64
R1 Ethernet0/1	H1 Ethernet0/0	2001:DB8:10::/64
R3 Ethernet0/1	H3 Ethernet0/0	2001:DB8:30::/64

IPv6 address plan

Link	Router A	Router B / client
R1-R2	2001:DB8:12::1/64	2001:DB8:12::2/64
R2-R3	2001:DB8:23::1/64	2001:DB8:23::2/64
Site 10 LAN	2001:DB8:10::1/64	2001:DB8:10::10/64
Site 30 LAN	2001:DB8:30::1/64	2001:DB8:30::10/64

7. Starting states

raw has only the connected topology. save-ip-configuration has device names, IPv6 addressing and static default routes on H1/H3 but no OSPFv3. save-config is the completed healthy network; independently boot it and run section 12 without entering configuration. All variants share nodes, interface mappings, links and canvas positions.

Item	raw	save-ip-configuration	save-config
Topology	Same	Same	Same
Names / IPv6	Absent	Present	Present
OSPFv3	Absent	Absent	Healthy
Learner action	Build all	Build routing	Verify only

8.1 Configure R1 IPv6 baseline

Assign the documented name and IPv6 addresses. H1/H3 additionally need a default route to their local gateway. These prerequisites do not implement OSPFv3.

R1

```
enable
conf t
hostname R1
no ip domain lookup
ipv6 unicast-routing
interface Loopback0
description OSPF_ROUTER_ID_ANCHOR
ipv6 address 2001:DB8:1::1/128
interface Ethernet0/0
description TO_R2_AREA0
ipv6 address 2001:DB8:12::1/64
no shutdown
interface Ethernet0/1
description CLIENT_LAN
ipv6 address 2001:DB8:10::1/64
no shutdown
end
```

8.2 Configure R2 IPv6 baseline

Assign the documented name and IPv6 addresses. H1/H3 additionally need a default route to their local gateway. These prerequisites do not implement OSPFv3.

R2

```
enable
conf t
hostname R2
no ip domain lookup
ipv6 unicast-routing
interface Loopback0
description OSPF_ROUTER_ID_ANCHOR
ipv6 address 2001:DB8:2::2/128
interface Ethernet0/0
description TO_R1_AREA0
ipv6 address 2001:DB8:12::2/64
no shutdown
interface Ethernet0/1
description TO_R3_AREA0
ipv6 address 2001:DB8:23::1/64
no shutdown
end
```

8.3 Configure R3 IPv6 baseline

Assign the documented name and IPv6 addresses. H1/H3 additionally need a default route to their local gateway. These prerequisites do not implement OSPFv3.

R3

```
enable
conf t
hostname R3
no ip domain lookup
ipv6 unicast-routing
interface Loopback0
description OSPF_ROUTER_ID_ANCHOR
ipv6 address 2001:DB8:3::3/128
interface Ethernet0/0
description TO_R2_AREA0
ipv6 address 2001:DB8:23::2/64
no shutdown
interface Ethernet0/1
description CLIENT_LAN
ipv6 address 2001:DB8:30::1/64
no shutdown
end
```

8.4 Configure H1 IPv6 baseline

Assign the documented name and IPv6 addresses. H1/H3 additionally need a default route to their local gateway. These prerequisites do not implement OSPFv3.

H1

```
enable
conf t
hostname H1
no ip domain lookup
ipv6 unicast-routing
interface Ethernet0/0
description CLIENT_LINK_TO_R1
ipv6 address 2001:DB8:10::10/64
no shutdown
ipv6 route ::/0 2001:DB8:10::1
end
```

8.5 Configure H3 IPv6 baseline

Assign the documented name and IPv6 addresses. H1/H3 additionally need a default route to their local gateway. These prerequisites do not implement OSPFv3.

H3

```
enable
conf t
hostname H3
no ip domain lookup
ipv6 unicast-routing
interface Ethernet0/0
description CLIENT_LINK_TO_R3
ipv6 address 2001:DB8:30::10/64
no shutdown
ipv6 route ::/0 2001:DB8:30::1
end
```

Wait at least 20 seconds for routing convergence before the next observation.

8.6 Verify R1 baseline

Confirm interface IPv6 addresses and up/up status, then confirm that the OSPFv3 process has not yet been configured.

R1

```
enable
terminal length 0
show ipv6 interface brief
show running-config | section ipv6 router ospf
```

Actual CLI output - R1

```
R1# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:12::1
Ethernet0/1            [up/up]
    2001:DB8:10::1
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
Loopback0              [up/up]
    2001:DB8:1::1
```

Actual CLI output - R1

```
R1# show running-config | section ipv6 router ospf
```

8.7 Verify R2 baseline

Confirm interface IPv6 addresses and up/up status, then confirm that the OSPFv3 process has not yet been configured.

R2

```
enable
terminal length 0
show ipv6 interface brief
show running-config | section ipv6 router ospf
```

Actual CLI output - R2

```
R2# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:12::2
Ethernet0/1            [up/up]
    2001:DB8:23::1
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
Loopback0              [up/up]
    2001:DB8:2::2
```

Actual CLI output - R2

```
R2# show running-config | section ipv6 router ospf
```

8.8 Verify R3 baseline

Confirm interface IPv6 addresses and up/up status, then confirm that the OSPFv3 process has not yet been configured.

R3

```
enable
terminal length 0
show ipv6 interface brief
show running-config | section ipv6 router ospf
```

Actual CLI output - R3

```
R3# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:23::2
Ethernet0/1            [up/up]
    2001:DB8:30::1
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
Loopback0              [up/up]
    2001:DB8:3::3
```

Actual CLI output - R3

```
R3# show running-config | section ipv6 router ospf
```

8.9 Verify H1 baseline

Confirm endpoint name, /64 interface and static default route. The directly connected local gateway must answer.

H1

```
enable
terminal length 0
show ipv6 interface brief
show ipv6 route ::/0
ping 2001:DB8:10::1 source Ethernet0/0
```

Actual CLI output - H1

```
H1# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:10::10
Ethernet0/1            [administratively down/down]
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
```

Actual CLI output - H1

```
H1# show ipv6 route ::/0
Routing entry for ::/0
  Known via "static", distance 1, metric 0
  Route count is 1/1, share count 0
  Routing paths:
    2001:DB8:10::1
      Route metric is 0, traffic share count is 1
      Last updated 00:00:18 ago
```

Actual CLI output - H1

```
H1# ping 2001:DB8:10::1 source Ethernet0/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:10::1, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:10::10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/3/10 ms
```

8.10 Verify H3 baseline

Confirm endpoint name, /64 interface and static default route. The directly connected local gateway must answer.

H3

```
enable
terminal length 0
show ipv6 interface brief
show ipv6 route ::/0
ping 2001:DB8:30::1 source Ethernet0/0
```

Actual CLI output - H3

```
H3# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:30::10
Ethernet0/1            [administratively down/down]
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
```

Actual CLI output - H3

```
H3# show ipv6 route ::/0
Routing entry for ::/0
  Known via "static", distance 1, metric 0
  Route count is 1/1, share count 0
  Routing paths:
    2001:DB8:30::1
      Route metric is 0, traffic share count is 1
      Last updated 00:00:18 ago
```

Actual CLI output - H3

```
H3# ping 2001:DB8:30::1 source Ethernet0/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:30::1, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:30::10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/9 ms
```

9.1 Activate OSPFv3 on R1

Create process 10 with an explicit router ID. Keep client LANs passive; enable Hellos only on router-to-router interfaces. Activate Area 0 on transit, loopback and local LAN interfaces. Point-to-point mode matches the dedicated /64 transit links.

R1

```
enable
conf t
ipv6 router ospf 10
router-id 1.1.1.1
passive-interface default
no passive-interface Ethernet0/0
exit
interface Loopback0
ipv6 ospf 10 area 0
interface Ethernet0/0
ipv6 ospf network point-to-point
ipv6 ospf 10 area 0
interface Ethernet0/1
ipv6 ospf 10 area 0
end
```

9.2 Activate OSPFv3 on R2

Create process 10 with an explicit router ID. Keep client LANs passive; enable Hellos only on router-to-router interfaces. Activate Area 0 on transit, loopback and local LAN interfaces. Point-to-point mode matches the dedicated /64 transit links.

R2

```
enable
conf t
ipv6 router ospf 10
router-id 2.2.2.2
passive-interface default
no passive-interface Ethernet0/0
no passive-interface Ethernet0/1
exit
interface Loopback0
ipv6 ospf 10 area 0
interface Ethernet0/0
ipv6 ospf network point-to-point
ipv6 ospf 10 area 0
interface Ethernet0/1
ipv6 ospf network point-to-point
ipv6 ospf 10 area 0
end
```

9.3 Activate OSPFv3 on R3

Create process 10 with an explicit router ID. Keep client LANs passive; enable Hellos only on router-to-router interfaces. Activate Area 0 on transit, loopback and local LAN interfaces. Point-to-point mode matches the dedicated /64 transit links.

R3

```
enable
conf t
ipv6 router ospf 10
router-id 3.3.3.3
passive-interface default
no passive-interface Ethernet0/0
exit
interface Loopback0
ipv6 ospf 10 area 0
interface Ethernet0/0
ipv6 ospf network point-to-point
ipv6 ospf 10 area 0
interface Ethernet0/1
ipv6 ospf 10 area 0
end
```

Wait at least 40 seconds for routing convergence before the next observation.

10.1 Verify R1 OSPFv3 neighbors

Require the expected FULL neighbors and inspect the actual link-local address and outgoing interface. OSPFv3 uses the IPv4-format router ID as a protocol identifier.

R1

```
enable
terminal length 0
show ipv6 ospf neighbor
show ipv6 ospf interface brief
```

Actual CLI output - R1

```
R1# show ipv6 ospf neighbor
            OSPFv3 Router with ID (1.1.1.1) (Process ID 10)
Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
2.2.2.2           0   FULL/  -        00:00:39    1               Ethernet0/0
```

Actual CLI output - R1

```
R1# show ipv6 ospf interface brief
Interface    PID   Area            Intf ID    Cost  State Nbrs F/C
Lo0          10    0               8          1     LOOP  0/0
Et0/1        10    0               3          10    DR    0/0
Et0/0        10    0               2          10    P2P   1/1
```

10.2 Verify R2 OSPFv3 neighbors

Require the expected FULL neighbors and inspect the actual link-local address and outgoing interface. OSPFv3 uses the IPv4-format router ID as a protocol identifier.

R2

```
enable
terminal length 0
show ipv6 ospf neighbor
show ipv6 ospf interface brief
```

Actual CLI output - R2

```
R2# show ipv6 ospf neighbor
            OSPFv3 Router with ID (2.2.2.2) (Process ID 10)
Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
3.3.3.3           0   FULL/  -        00:00:39    1               Ethernet0/1
1.1.1.1           0   FULL/  -        00:00:36    1               Ethernet0/0
```

Actual CLI output - R2

```
R2# show ipv6 ospf interface brief
Interface    PID   Area            Intf ID    Cost  State Nbrs F/C
Lo0          10    0               8          1     LOOP  0/0
Et0/1        10    0               3          10    P2P   1/1
Et0/0        10    0               2          10    P2P   1/1
```

10.3 Verify R3 OSPFv3 neighbors

Require the expected FULL neighbors and inspect the actual link-local address and outgoing interface. OSPFv3 uses the IPv4-format router ID as a protocol identifier.

R3

```
enable
terminal length 0
show ipv6 ospf neighbor
show ipv6 ospf interface brief
```

Actual CLI output - R3

```
R3# show ipv6 ospf neighbor
            OSPFv3 Router with ID (3.3.3.3) (Process ID 10)
Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
2.2.2.2           0   FULL/  -        00:00:35    2               Ethernet0/0
```

Actual CLI output - R3

```
R3# show ipv6 ospf interface brief
Interface    PID   Area            Intf ID    Cost  State Nbrs F/C
Lo0          10    0               8          1     LOOP  0/0
Et0/1        10    0               3          10    DR    0/0
Et0/0        10    0               2          10    P2P   1/1
```

11.1 Inspect R1 IPv6 routes

Compare local connected entries with OSPFv3 learned LAN and loopback prefixes. The route next hop may be link-local; the outgoing interface gives the required context.

R1

```
enable
terminal length 0
show ipv6 route ospf
show ipv6 route 2001:DB8:10::/64
show ipv6 route 2001:DB8:30::/64
```

Actual CLI output - R1

```
R1# show ipv6 route ospf
O   2001:DB8:2::2/128 [110/10]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
O   2001:DB8:3::3/128 [110/20]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
O   2001:DB8:23::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
O   2001:DB8:30::/64 [110/30]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
```

Actual CLI output - R1

```
R1# show ipv6 route 2001:DB8:10::/64
Routing entry for 2001:DB8:10::/64
  Known via "connected", distance 0, metric 0, type connected
  Route count is 1/1, share count 0
  Routing paths:
    directly connected via Ethernet0/1
      Route metric is 0, traffic share count is 1
      Last updated 00:01:10 ago
```

Actual CLI output - R1

```
R1# show ipv6 route 2001:DB8:30::/64
Routing entry for 2001:DB8:30::/64
  Known via "ospf 10", distance 110, metric 30, type intra area
  Route count is 1/1, share count 0
  Routing paths:
    FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
      Route metric is 30, traffic share count is 1
      From FE80::A8BB:CCFF:FE00:2000
      Last updated 00:00:41 ago
```

11.2 Inspect R2 IPv6 routes

Compare local connected entries with OSPFv3 learned LAN and loopback prefixes. The route next hop may be link-local; the outgoing interface gives the required context.

R2

```
enable
terminal length 0
show ipv6 route ospf
show ipv6 route 2001:DB8:10::/64
show ipv6 route 2001:DB8:30::/64
```

Actual CLI output - R2

```
R2# show ipv6 route ospf
O   2001:DB8:1::1/128 [110/10]
     via FE80::A8BB:CCFF:FE00:1000, Ethernet0/0
O   2001:DB8:3::3/128 [110/10]
     via FE80::A8BB:CCFF:FE00:3000, Ethernet0/1
O   2001:DB8:10::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:1000, Ethernet0/0
O   2001:DB8:30::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:3000, Ethernet0/1
```

Actual CLI output - R2

```
R2# show ipv6 route 2001:DB8:10::/64
Routing entry for 2001:DB8:10::/64
  Known via "ospf 10", distance 110, metric 20, type intra area
  Route count is 1/1, share count 0
  Routing paths:
    FE80::A8BB:CCFF:FE00:1000, Ethernet0/0
      Route metric is 20, traffic share count is 1
      From FE80::A8BB:CCFF:FE00:1000
      Last updated 00:00:43 ago
```

Actual CLI output - R2

```
R2# show ipv6 route 2001:DB8:30::/64
Routing entry for 2001:DB8:30::/64
  Known via "ospf 10", distance 110, metric 20, type intra area
  Route count is 1/1, share count 0
  Routing paths:
    FE80::A8BB:CCFF:FE00:3000, Ethernet0/1
      Route metric is 20, traffic share count is 1
      From FE80::A8BB:CCFF:FE00:3000
      Last updated 00:00:41 ago
```

11.3 Inspect R3 IPv6 routes

Compare local connected entries with OSPFv3 learned LAN and loopback prefixes. The route next hop may be link-local; the outgoing interface gives the required context.

R3

```
enable
terminal length 0
show ipv6 route ospf
show ipv6 route 2001:DB8:10::/64
show ipv6 route 2001:DB8:30::/64
```

Actual CLI output - R3

```
R3# show ipv6 route ospf
O   2001:DB8:1::1/128 [110/20]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
O   2001:DB8:2::2/128 [110/10]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
O   2001:DB8:10::/64 [110/30]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
O   2001:DB8:12::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
```

Actual CLI output - R3

```
R3# show ipv6 route 2001:DB8:10::/64
Routing entry for 2001:DB8:10::/64
  Known via "ospf 10", distance 110, metric 30, type intra area
  Route count is 1/1, share count 0
  Routing paths:
    FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
      Route metric is 30, traffic share count is 1
      From FE80::A8BB:CCFF:FE00:2010
      Last updated 00:00:42 ago
```

Actual CLI output - R3

```
R3# show ipv6 route 2001:DB8:30::/64
Routing entry for 2001:DB8:30::/64
  Known via "connected", distance 0, metric 0, type connected
  Route count is 1/1, share count 0
  Routing paths:
    directly connected via Ethernet0/1
      Route metric is 0, traffic share count is 1
      Last updated 00:01:08 ago
```

11.5 Verify H1 remote reachability

A remote endpoint probe exercises static default route, local gateway, OSPFv3 forward path and return route. Read the actual CLI reply; one-sided router adjacency is insufficient.

H1

```
enable
terminal length 0
ping 2001:DB8:30::10 source Ethernet0/0
```

Actual CLI output - H1

```
H1# ping 2001:DB8:30::10 source Ethernet0/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:30::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:10::10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/3/4 ms
```

11.6 Verify H3 remote reachability

A remote endpoint probe exercises static default route, local gateway, OSPFv3 forward path and return route. Read the actual CLI reply; one-sided router adjacency is insufficient.

H3

```
enable
terminal length 0
ping 2001:DB8:10::10 source Ethernet0/0
```

Actual CLI output - H3

```
H3# ping 2001:DB8:10::10 source Ethernet0/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:10::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:30::10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/4/7 ms
```

12.1 Final R1 regression

Check expected FULL adjacency, learned remote prefixes and both client destinations from a loopback source. This verifies both control plane and routed forwarding.

R1

```
enable
terminal length 0
show ipv6 ospf neighbor
show ipv6 route ospf
ping 2001:DB8:10::10 source Loopback0
ping 2001:DB8:30::10 source Loopback0
```

Actual CLI output - R1

```
R1# show ipv6 ospf neighbor
            OSPFv3 Router with ID (1.1.1.1) (Process ID 10)
Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
2.2.2.2           0   FULL/  -        00:00:36    1               Ethernet0/0
```

Actual CLI output - R1

```
R1# show ipv6 route ospf
O   2001:DB8:2::2/128 [110/10]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
O   2001:DB8:3::3/128 [110/20]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
O   2001:DB8:23::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
O   2001:DB8:30::/64 [110/30]
     via FE80::A8BB:CCFF:FE00:2000, Ethernet0/0
```

Actual CLI output - R1

```
R1# ping 2001:DB8:10::10 source Loopback0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:10::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:1::1
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

Actual CLI output - R1

```
R1# ping 2001:DB8:30::10 source Loopback0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:30::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:1::1
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

12.2 Final R2 regression

Check expected FULL adjacency, learned remote prefixes and both client destinations from a loopback source. This verifies both control plane and routed forwarding.

R2

```
enable
terminal length 0
show ipv6 ospf neighbor
show ipv6 route ospf
ping 2001:DB8:10::10 source Loopback0
ping 2001:DB8:30::10 source Loopback0
```

Actual CLI output - R2

```
R2# show ipv6 ospf neighbor
            OSPFv3 Router with ID (2.2.2.2) (Process ID 10)
Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
3.3.3.3           0   FULL/  -        00:00:35    1               Ethernet0/1
1.1.1.1           0   FULL/  -        00:00:39    1               Ethernet0/0
```

Actual CLI output - R2

```
R2# show ipv6 route ospf
O   2001:DB8:1::1/128 [110/10]
     via FE80::A8BB:CCFF:FE00:1000, Ethernet0/0
O   2001:DB8:3::3/128 [110/10]
     via FE80::A8BB:CCFF:FE00:3000, Ethernet0/1
O   2001:DB8:10::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:1000, Ethernet0/0
O   2001:DB8:30::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:3000, Ethernet0/1
```

Actual CLI output - R2

```
R2# ping 2001:DB8:10::10 source Loopback0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:10::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:2::2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

Actual CLI output - R2

```
R2# ping 2001:DB8:30::10 source Loopback0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:30::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:2::2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

12.3 Final R3 regression

Check expected FULL adjacency, learned remote prefixes and both client destinations from a loopback source. This verifies both control plane and routed forwarding.

R3

```
enable
terminal length 0
show ipv6 ospf neighbor
show ipv6 route ospf
ping 2001:DB8:10::10 source Loopback0
ping 2001:DB8:30::10 source Loopback0
```

Actual CLI output - R3

```
R3# show ipv6 ospf neighbor
            OSPFv3 Router with ID (3.3.3.3) (Process ID 10)
Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
2.2.2.2           0   FULL/  -        00:00:37    2               Ethernet0/0
```

Actual CLI output - R3

```
R3# show ipv6 route ospf
O   2001:DB8:1::1/128 [110/20]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
O   2001:DB8:2::2/128 [110/10]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
O   2001:DB8:10::/64 [110/30]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
O   2001:DB8:12::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:2010, Ethernet0/0
```

Actual CLI output - R3

```
R3# ping 2001:DB8:10::10 source Loopback0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:10::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:3::3
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/2/3 ms
```

Actual CLI output - R3

```
R3# ping 2001:DB8:30::10 source Loopback0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:30::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:3::3
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

12.4 Final H1 regression

Read saved /64 and default route, then prove connectivity to the opposite site with no configuration change.

H1

```
enable
terminal length 0
show ipv6 interface brief
show ipv6 route ::/0
ping 2001:DB8:30::10 source Ethernet0/0
```

Actual CLI output - H1

```
H1# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:10::10
Ethernet0/1            [administratively down/down]
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
```

Actual CLI output - H1

```
H1# show ipv6 route ::/0
Routing entry for ::/0
  Known via "static", distance 1, metric 0
  Route count is 1/1, share count 0
  Routing paths:
    2001:DB8:10::1
      Route metric is 0, traffic share count is 1
      Last updated 00:01:09 ago
```

Actual CLI output - H1

```
H1# ping 2001:DB8:30::10 source Ethernet0/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:30::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:10::10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/5 ms
```

12.5 Final H3 regression

Read saved /64 and default route, then prove connectivity to the opposite site with no configuration change.

H3

```
enable
terminal length 0
show ipv6 interface brief
show ipv6 route ::/0
ping 2001:DB8:10::10 source Ethernet0/0
```

Actual CLI output - H3

```
H3# show ipv6 interface brief
Ethernet0/0            [up/up]
    2001:DB8:30::10
Ethernet0/1            [administratively down/down]
Ethernet0/2            [administratively down/down]
Ethernet0/3            [administratively down/down]
```

Actual CLI output - H3

```
H3# show ipv6 route ::/0
Routing entry for ::/0
  Known via "static", distance 1, metric 0
  Route count is 1/1, share count 0
  Routing paths:
    2001:DB8:30::1
      Route metric is 0, traffic share count is 1
      Last updated 00:01:09 ago
```

Actual CLI output - H3

```
H3# ping 2001:DB8:10::10 source Ethernet0/0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:10::10, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:30::10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/5/8 ms
```

13.1 Save R1 verified state

Save only after the routing and endpoint tests pass. The separate save-config file must boot with this healthy state already present.

R1

```
enable
write memory
```

13.2 Save R2 verified state

Save only after the routing and endpoint tests pass. The separate save-config file must boot with this healthy state already present.

R2

```
enable
write memory
```

13.3 Save R3 verified state

Save only after the routing and endpoint tests pass. The separate save-config file must boot with this healthy state already present.

R3

```
enable
write memory
```

13.4 Save H1 verified state

Save only after the routing and endpoint tests pass. The separate save-config file must boot with this healthy state already present.

H1

```
enable
write memory
```

13.5 Save H3 verified state

Save only after the routing and endpoint tests pass. The separate save-config file must boot with this healthy state already present.

H3

```
enable
write memory
```

14. Interview and diagnostic review

Explain why the OSPFv3 router ID is dotted decimal, why link-local next hops can appear in the IPv6 route table, why passive LAN interfaces still advertise their prefixes, and why both client directions are checked. All outputs in this workbook must come from their matching live stage; success, warning and error labels describe observed facts only.

15. Validation scope and references

The displayed CLI excerpts come from the documented RAW stage on the approved IOL image in the specified pilot EVE-NG. Neighbor timers, link-local identifiers and packet timings vary by boot. The separate IP-start and complete-state release checks are recorded with the lab package.

Reference: Cisco 300-410 ENARSI v1.1 exam blueprint.