

LAB18: OSPF – IPv6

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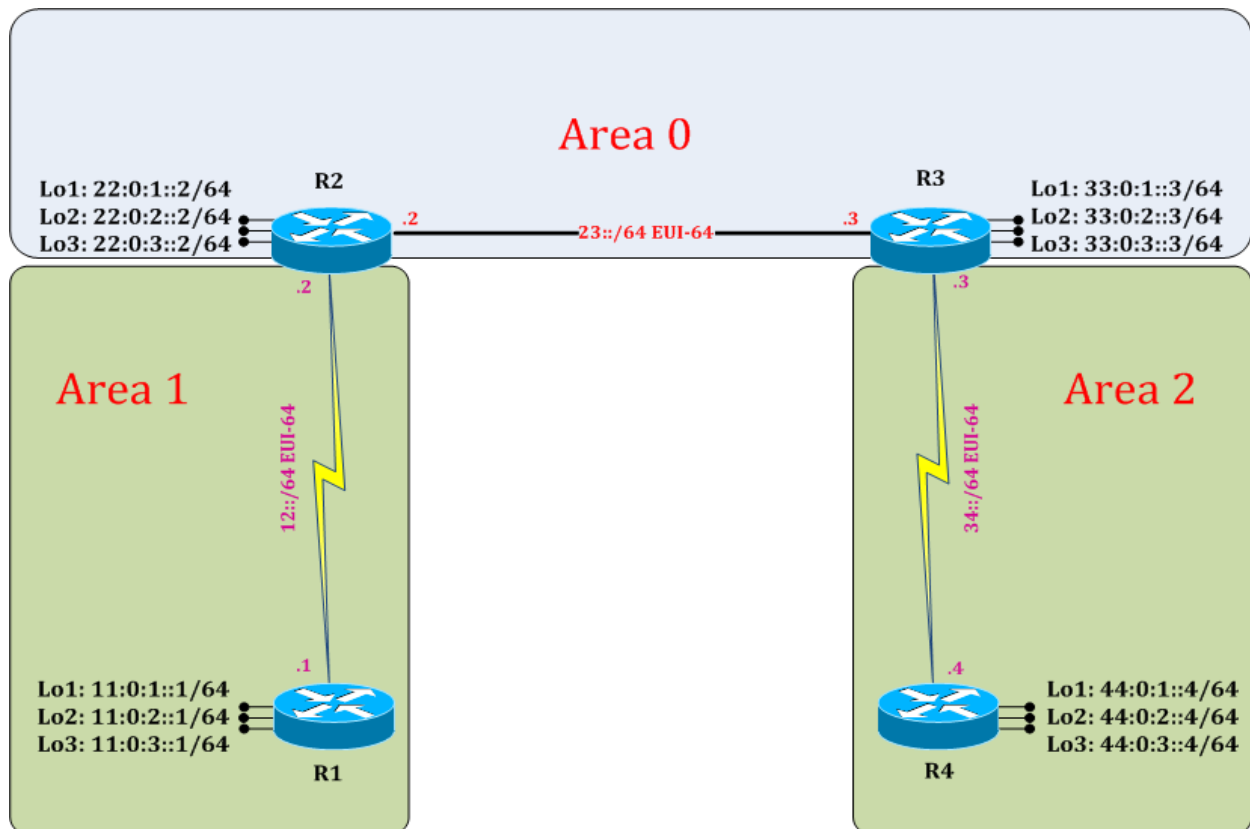
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OSPF: Summarization on ASBR

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LAB 18: Diagram

Note: This Lab was developed on Cisco IOS Version 15.2(4) M1 ADVENTERPRISEK9-M.



LAB 18: IPv6 OSPF Summarization on ASBR

Task 1: Configure IPv6 OSPF Summarization

Step 1 In the configuration mode of router configure 4 loopbacks with network address in sequence

```
R1:
interface loopback 100
ipv6 address 100:0:0::1/64
exit
interface loopback 101
ipv6 address 100:0:1::1/64
exit
interface loopback 102
ipv6 address 100:0:2::1/64
exit
interface loopback 103
ipv6 address 100:0:3::1/64
exit
```

Step 2 Redistribute external 100 network on ASBR.

```
R1:
ipv6 router ospf 1
redistribute connected subnets
exit
```

(Redistributed connected will redistribute its connected network. Subnet will allow classless routes in OSPF process.)

Step 3 Verify routes on neighbor router routing table

```
R2#show ipv6 route
! (Shows router's routing table and IPv6 entries)
```

```
IPv6 Routing Table - default - 26 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       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 - LISP
O 11:0:1::1/128 [110/64]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
O 11:0:2::1/128 [110/64]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
```

O 11:0:3::1/128 [110/64]
 via FE80::A8BB:CCFF:FE00:100, Serial2/0
 O 12::/61 [110/128]
 via FE80::A8BB:CCFF:FE00:100, Serial2/0
 C 12::/64 [0/0]
 via Serial2/0, directly connected
 L 12::A8BB:CCFF:FE00:200/128 [0/0]
 via Serial2/0, receive
 C 22:0:1::/64 [0/0]
 via Loopback1, directly connected
 L 22:0:1::2/128 [0/0]
 via Loopback1, receive
 C 22:0:2::/64 [0/0]
 via Loopback2, directly connected
 L 22:0:2::2/128 [0/0]
 via Loopback2, receive
 C 22:0:3::/64 [0/0]
 via Loopback3, directly connected
 L 22:0:3::2/128 [0/0]
 via Loopback3, receive
 C 23::/64 [0/0]
 via Ethernet0/0, directly connected
 L 23::A8BB:CCFF:FE00:200/128 [0/0]
 via Ethernet0/0, receive
 O 33:0:1::3/128 [110/10]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 O 33:0:2::3/128 [110/10]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 O 33:0:3::3/128 [110/10]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 OI 34::/64 [110/74]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 OI 44:0:1::4/128 [110/74]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 OI 44:0:2::4/128 [110/74]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 OI 44:0:3::4/128 [110/74]
 via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
 OE2 100::/64 [110/20]
 via FE80::A8BB:CCFF:FE00:100, Serial2/0
 OE2 100:0:1::/64 [110/20]
 via FE80::A8BB:CCFF:FE00:100, Serial2/0
 OE2 100:0:2::/64 [110/20]
 via FE80::A8BB:CCFF:FE00:100, Serial2/0
 OE2 100:0:3::/64 [110/20]
 via FE80::A8BB:CCFF:FE00:100, Serial2/0
 L FF00::/8 [0/0]
 via Null0, receive

(E2 means External route type 2, in which will not change cost after every hop throughout the OSPF.)

Step 4 Summarize external routes on ASBR router

! (In external route summary is always done on Autonomous System Border Router (ASBR))

R1:

```
ipv6 router ospf 1
summary-prefix 100::/16
exit
```

Task 2: Verification

Step 1 Verify receipt of summary route in neighbor routing table & verify creation of null interface in routing table by following command:

R1#show ipv6 route

```
IPv6 Routing Table - default - 30 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, I - LISP
C 11:0:1::/64 [0/0]
  via Loopback1, directly connected
L 11:0:1::1/128 [0/0]
  via Loopback1, receive
C 11:0:2::/64 [0/0]
  via Loopback2, directly connected
L 11:0:2::1/128 [0/0]
  via Loopback2, receive
C 11:0:3::/64 [0/0]
  via Loopback3, directly connected
L 11:0:3::1/128 [0/0]
  via Loopback3, receive
C 12::/61 [0/0]
  via Serial2/0, directly connected
O 12::/64 [110/128]
  via FE80::A8BB:CCFF:FE00:200, Serial2/0
L 12::A8BB:CCFF:FE00:100/128 [0/0]
  via Serial2/0, receive
OI 22:0:1::2/128 [110/64]
  via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 22:0:2::2/128 [110/64]
  via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 22:0:3::2/128 [110/64]
```

```

    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 23::/64 [110/74]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 33:0:1::3/128 [110/74]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 33:0:2::3/128 [110/74]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 33:0:3::3/128 [110/74]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 34::/64 [110/138]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 44:0:1::4/128 [110/138]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 44:0:2::4/128 [110/138]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
OI 44:0:3::4/128 [110/138]
    via FE80::A8BB:CCFF:FE00:200, Serial2/0
O 100::/16 [254/20]
    via Null0, directly connected
C 100::/64 [0/0]
    via Loopback100, directly connected
L 100::1/128 [0/0]
    via Loopback100, receive
C 100:0:1::/64 [0/0]
    via Loopback101, directly connected
L 100:0:1::1/128 [0/0]
    via Loopback101, receive
C 100:0:2::/64 [0/0]
    via Loopback102, directly connected
L 100:0:2::1/128 [0/0]
    via Loopback102, receive
C 100:0:3::/64 [0/0]
    via Loopback103, directly connected
L 100:0:3::1/128 [0/0]
    via Loopback103, receive
L FF00::/8 [0/0]
    via Null0, receive

```

(When summarization is configured on a router; same router immediately created a routing point to Null 0 for loop prevention.)

R2#show ipv6 route

! (Shows router's routing table and IPv6 routes entries)

IPv6 Routing Table - default - 23 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP

H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea

IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

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 - LISP

```

O 11:0:1::1/128 [110/64]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
O 11:0:2::1/128 [110/64]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
O 11:0:3::1/128 [110/64]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
O 12::/61 [110/128]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
C 12::/64 [0/0]
  via Serial2/0, directly connected
L 12::A8BB:CCFF:FE00:200/128 [0/0]
  via Serial2/0, receive
C 22:0:1::/64 [0/0]
  via Loopback1, directly connected
L 22:0:1::2/128 [0/0]
  via Loopback1, receive
C 22:0:2::/64 [0/0]
  via Loopback2, directly connected
L 22:0:2::2/128 [0/0]
  via Loopback2, receive
C 22:0:3::/64 [0/0]
  via Loopback3, directly connected
L 22:0:3::2/128 [0/0]
  via Loopback3, receive
C 23::/64 [0/0]
  via Ethernet0/0, directly connected
L 23::A8BB:CCFF:FE00:200/128 [0/0]
  via Ethernet0/0, receive
O 33:0:1::3/128 [110/10]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
O 33:0:2::3/128 [110/10]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
O 33:0:3::3/128 [110/10]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
OI 34::/64 [110/74]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
OI 44:0:1::4/128 [110/74]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
OI 44:0:2::4/128 [110/74]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
OI 44:0:3::4/128 [110/74]
  via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
OE2 100::/16 [110/20]
  via FE80::A8BB:CCFF:FE00:100, Serial2/0
L FF00::/8 [0/0]
  via Null0, receive
  
```

(Summarized routes are received from external route.)