


# LAB7: OSPF – IPv4

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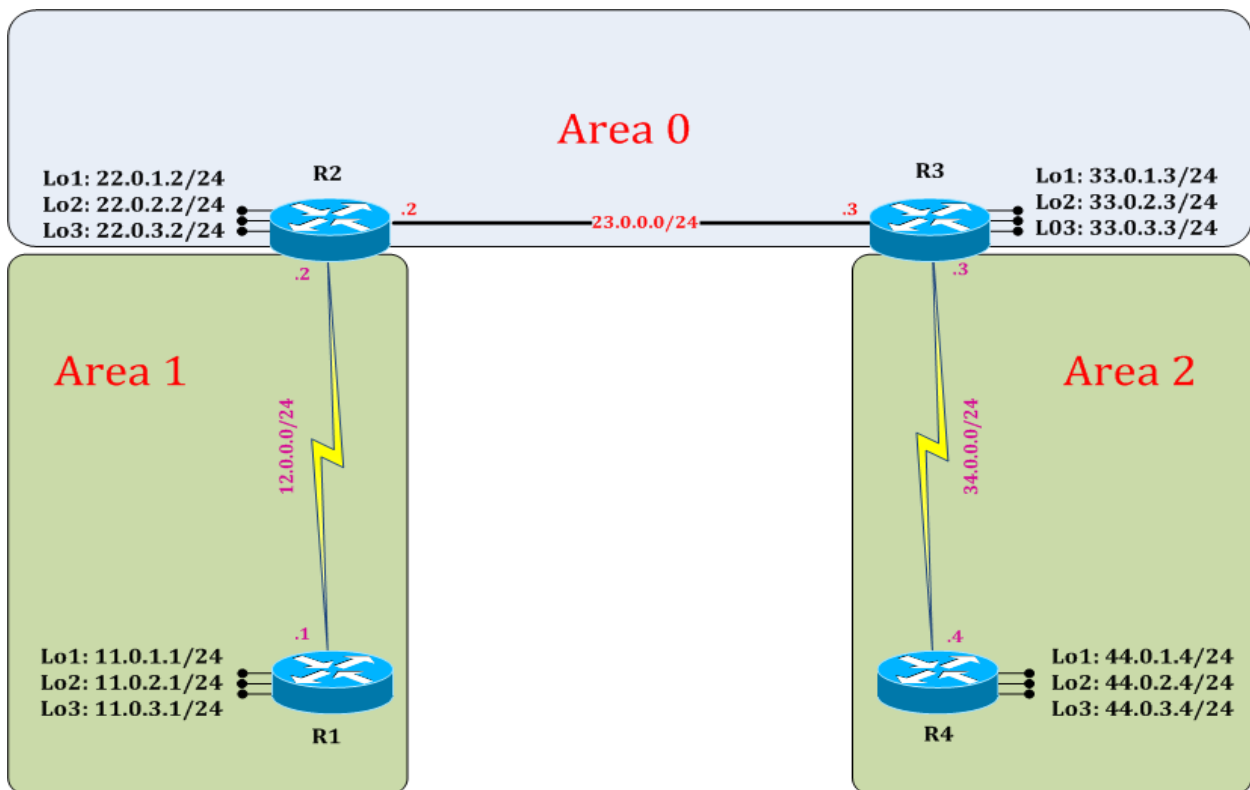
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OSPF: Not So Stubby Area

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# LAB 7: Diagram

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



# LAB 7: OSPF Not So Stubby Area (NSSA):

## Task 1: Configure OSPF Not So Stubby Area (NSSA)

Step 1 In the configuration mode of router configure loopbacks & redistribute these connected network in OSPF process:

```
R1:  
interface loopback 50  
ip address 50.0.0.1 255.255.255.0  
exit
```

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

```
R2#show ip route  
! (Shows router's routing table and IPv4 routes entries)
```

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
E1 - OSPF external type 1, E2 - OSPF external type 2  
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2  
ia - IS-IS inter area, \* - candidate default, U - per-user static route  
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP  
+ - replicated route, % - next hop override

Gateway of last resort is not set

```
11.0.0.0/32 is subnetted, 3 subnets  
O    11.0.1.1 [110/65] via 12.0.0.1, 01:20:34, Serial2/0  
O    11.0.2.1 [110/65] via 12.0.0.1, 01:20:34, Serial2/0  
O    11.0.3.1 [110/65] via 12.0.0.1, 01:20:34, Serial2/0  
12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C    12.0.0.0/24 is directly connected, Serial2/0  
L    12.0.0.2/32 is directly connected, Serial2/0  
22.0.0.0/8 is variably subnetted, 6 subnets, 2 masks  
C    22.0.1.0/24 is directly connected, Loopback1  
L    22.0.1.2/32 is directly connected, Loopback1  
C    22.0.2.0/24 is directly connected, Loopback2  
L    22.0.2.2/32 is directly connected, Loopback2  
C    22.0.3.0/24 is directly connected, Loopback3  
L    22.0.3.2/32 is directly connected, Loopback3  
  
23.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C    23.0.0.0/24 is directly connected, Ethernet0/0
```

```

L   23.0.0.2/32 is directly connected, Ethernet0/0
   33.0.0.0/32 is subnetted, 3 subnets
O   33.0.1.3 [110/11] via 23.0.0.3, 01:19:50, Ethernet0/0
O   33.0.2.3 [110/11] via 23.0.0.3, 01:19:50, Ethernet0/0
O   33.0.3.3 [110/11] via 23.0.0.3, 01:19:50, Ethernet0/0
   34.0.0.0/24 is subnetted, 1 subnets
O IA 34.0.0.0 [110/74] via 23.0.0.3, 01:19:50, Ethernet0/0
   44.0.0.0/32 is subnetted, 3 subnets
O IA 44.0.1.4 [110/75] via 23.0.0.3, 00:09:14, Ethernet0/0
O IA 44.0.2.4 [110/75] via 23.0.0.3, 00:09:14, Ethernet0/0
O IA 44.0.3.4 [110/75] via 23.0.0.3, 00:09:14, Ethernet0/0
   50.0.0.0/24 is subnetted, 1 subnets
O E2 50.0.0.0 [110/20] via 12.0.0.1, 00:00:26, Serial2/0

```

Step 2 Configure OSPF Not So Stubby Area:

! (When loop50 is redistributed in stub area, external routes LSA 5 will no propagate in stub area and hence cannot be seen in any other router's routing table. To make seen this redistributed route to all other routers, replace stub area to Not So Stubby Area.)

R1:

```

router ospf 1
area 1 nssa
exit

```

R2:

```

router ospf 1
area 1 nssa
exit

```

## Task 2: Verification:

Step 1 Verify routes on neighbor router routing table:

R2#show ip route

! (Shows router's routing table and IPv4 routes entries)

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
E1 - OSPF external type 1, E2 - OSPF external type 2  
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2  
ia - IS-IS inter area, \* - candidate default, U - per-user static route  
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP  
+ - replicated route, % - next hop override

Gateway of last resort is not set

```

11.0.0.0/32 is subnetted, 3 subnets

```

```

O    11.0.1.1 [110/65] via 12.0.0.1, 00:00:14, Serial2/0
O    11.0.2.1 [110/65] via 12.0.0.1, 00:00:14, Serial2/0
O    11.0.3.1 [110/65] via 12.0.0.1, 00:00:14, Serial2/0
    12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    12.0.0.0/24 is directly connected, Serial2/0
L    12.0.0.2/32 is directly connected, Serial2/0
    22.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C    22.0.1.0/24 is directly connected, Loopback1
L    22.0.1.2/32 is directly connected, Loopback1
C    22.0.2.0/24 is directly connected, Loopback2
L    22.0.2.2/32 is directly connected, Loopback2
C    22.0.3.0/24 is directly connected, Loopback3
L    22.0.3.2/32 is directly connected, Loopback3
    23.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    23.0.0.0/24 is directly connected, Ethernet0/0
L    23.0.0.2/32 is directly connected, Ethernet0/0
    33.0.0.0/32 is subnetted, 3 subnets
O    33.0.1.3 [110/11] via 23.0.0.3, 00:00:29, Ethernet0/0
O    33.0.2.3 [110/11] via 23.0.0.3, 00:00:29, Ethernet0/0
O    33.0.3.3 [110/11] via 23.0.0.3, 00:00:29, Ethernet0/0
    34.0.0.0/24 is subnetted, 1 subnets
O IA  34.0.0.0 [110/74] via 23.0.0.3, 00:00:29, Ethernet0/0
    44.0.0.0/32 is subnetted, 3 subnets
O IA  44.0.1.4 [110/75] via 23.0.0.3, 00:00:29, Ethernet0/0
O IA  44.0.2.4 [110/75] via 23.0.0.3, 00:00:29, Ethernet0/0
O IA  44.0.3.4 [110/75] via 23.0.0.3, 00:00:29, Ethernet0/0
    50.0.0.0/24 is subnetted, 1 subnets
O N2  50.0.0.0 [110/20] via 12.0.0.1, 00:00:14, Serial2/0

```

(R2 receives external routes E2 through Not so Stubby Area (NSSA) and marked as N2.)

R3#show ip route

! (Shows router's routing table and IPv4 routes entries)

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
E1 - OSPF external type 1, E2 - OSPF external type 2  
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2  
ia - IS-IS inter area, \* - candidate default, U - per-user static route  
o - ODR, P - periodic downloaded static route, + - replicated route

Gateway of last resort is not set

```

    11.0.0.0/32 is subnetted, 3 subnets
O IA  11.0.1.1 [110/66] via 23.0.0.2, 00:11:01, FastEthernet0/0
O IA  11.0.2.1 [110/66] via 23.0.0.2, 00:11:01, FastEthernet0/0
O IA  11.0.3.1 [110/66] via 23.0.0.2, 00:11:01, FastEthernet0/0
    12.0.0.0/24 is subnetted, 1 subnets

```

```

O IA 12.0.0.0 [110/65] via 23.0.0.2, 00:58:33, FastEthernet0/0
      22.0.0.0/32 is subnetted, 3 subnets
O    22.0.1.2 [110/2] via 23.0.0.2, 00:58:33, FastEthernet0/0
O    22.0.2.2 [110/2] via 23.0.0.2, 00:58:33, FastEthernet0/0
O    22.0.3.2 [110/2] via 23.0.0.2, 00:58:33, FastEthernet0/0
      23.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    23.0.0.0/24 is directly connected, FastEthernet0/0
L    23.0.0.3/32 is directly connected, FastEthernet0/0
      33.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C    33.0.1.0/24 is directly connected, Loopback1
L    33.0.1.3/32 is directly connected, Loopback1
C    33.0.2.0/24 is directly connected, Loopback2
L    33.0.2.3/32 is directly connected, Loopback2
C    33.0.3.0/24 is directly connected, Loopback3
L    33.0.3.3/32 is directly connected, Loopback3
      34.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    34.0.0.0/24 is directly connected, Serial1/0
L    34.0.0.3/32 is directly connected, Serial1/0
      44.0.0.0/32 is subnetted, 3 subnets
O    44.0.1.4 [110/65] via 34.0.0.4, 00:56:11, Serial1/0
O    44.0.2.4 [110/65] via 34.0.0.4, 00:56:01, Serial1/0
O    44.0.3.4 [110/65] via 34.0.0.4, 00:56:01, Serial1/0
      50.0.0.0/24 is subnetted, 1 subnets
O E2 50.0.0.0 [110/20] via 23.0.0.2, 00:11:01, FastEthernet0/0

```

(R3 receives external routes E2 through Not so Stubby Area (NSSA) forwarded by ABR R2 and marked as E2.)