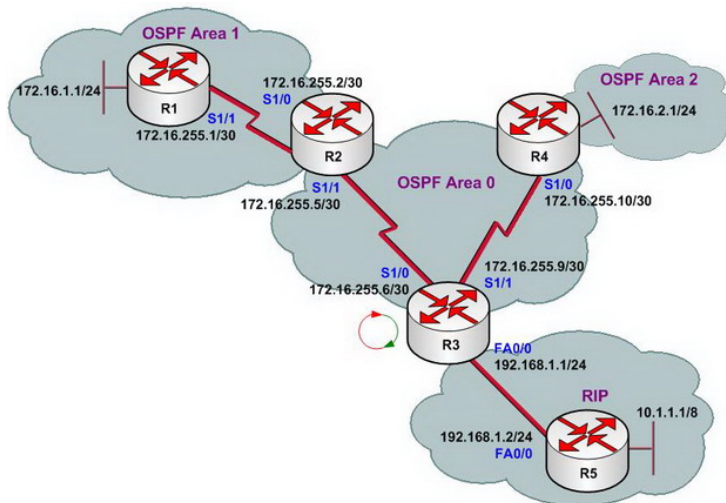


OSPF Lab4 - Configuring OSPF Stub Area

?Lab Objectives?

1. Learn LSA function of type1, type2, type3, type 4 and type5.
2. Learn OSPF Stub area features
3. Learn OSPF Stub area configuration methods
4. Learn OSPF Stub area configuration requirements: Stub area has at least one ABR, but no ASBR

?Lab Topology?



?Lab Steps?

1. Configure IP addresses of every router, and use ping command to confirm the direct interface connectivity of every router.
2. Configure OSPF and RIP protocol, and use ping and show ip route command to confirm that protocol can work normally
3. Configure redistribution on R3 to complete lab requirements. Configure as follows:

```
R3(config)#router ospf 1
R3(config-router)#redistribute rip subnets metric 200
R3(config-router)#exit
R3(config)#
R3(config)#router rip
R3(config-router)#redistribute ospf 1 metric 10
R3(config-router)#exit
R3(config)#exit
```

4. Check routing table of R1.

R1#show ip route

Gateway of last resort is not set

```
172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
C 172.16.255.0/30 is directly connected, Serial1/1
O IA 172.16.255.4/30 [110/128] via 172.16.255.2, 00:07:32, Serial1/1
O IA 172.16.255.8/30 [110/192] via 172.16.255.2, 00:06:57, Serial1/1
C 172.16.1.0/24 is directly connected, Loopback0
O IA 172.16.2.0/24 [110/193] via 172.16.255.2, 00:06:05, Serial1/1
O E2 10.0.0.0/8 [110/200] via 172.16.255.2, 00:02:01, Serial1/1
O E2 192.168.1.0/24 [110/200] via 172.16.255.2, 00:02:01, Serial1/1
R1#
R1#ping 10.1.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 672/788/984 ms
R1#
```

5. Check link status database of R1

R1#show ip ospf database

OSPF Router with ID (172.16.1.1) (Process ID 1)

Router Link States (Area 1)

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.16.1.1	172.16.1.1	682	0x80000003	0x003BE1	3
172.16.255.5	172.16.255.5	677	0x80000003	0x0035B1	2

Summary Net Link States (Area 1)

Link ID	ADV Router	Age	Seq#	Checksum
172.16.2.0	172.16.255.5	581	0x80000001	0x004CEE
172.16.255.4	172.16.255.5	668	0x80000001	0x009BE1
172.16.255.8	172.16.255.5	633	0x80000001	0x00F543

Summary ASB Link States (Area 1)

Link ID	ADV Router	Age	Seq#	Checksum
192.168.1.1	172.16.255.5	342	0x80000001	0x008648

Type-5 AS External Link States

Link ID	ADV Router	Age	Seq#	Checksum	Tag
---------	------------	-----	------	----------	-----

```
10.0.0.0 192.168.1.1 348 0x80000001 0x005B1B 0
192.168.1.0 192.168.1.1 348 0x80000001 0x0021F4 0
R1#
```

6. We notice that R1 has learnt all the routes in this lab, but R1 need not to learn all the network routes. Too much route entries will enlarge the size of router, not using route query or network convergence. OSPF network routes are broadcasted through LSA. We may limit LSA flooding area and use proper summary routes, thus reduce the size of routing table, make it easy for network convergence, and strengthen network stability.

7. Configure area 1 as stub area on R1 and R2.

```
R1(config)#router ospf 1
R1(config-router)#area 1 stub
R1(config-router)#exit
R1(config)#exit
```

```
R2(config)#router ospf 1
R2(config-router)#area 1 stub
R2(config-router)#exit
R2(config)#
```

8. check again link status database of R1.

```
R1#show ip ospf database
```

OSPF Router with ID (172.16.1.1) (Process ID 1)

Router Link States (Area 1)

Link ID	ADV Router	Age	Seq#	Checksum	Link count
---------	------------	-----	------	----------	------------

172.16.1.1	172.16.1.1	155	0x80000005	0x0055C7	3
------------	------------	-----	------------	----------	---

172.16.255.5	172.16.255.5	155	0x80000005	0x004F97	2
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Summary Net Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

0.0.0.0 172.16.255.5 168 0x80000001 0x00017B
172.16.2.0 172.16.255.5 168 0x80000002 0x0068D3
172.16.255.4 172.16.255.5 168 0x80000002 0x00B7C6
172.16.255.8 172.16.255.5 168 0x80000002 0x001228

R1#

By checking R1 database we find that LSA of type4 and type5 is refused, thus limit LSA flooding area.

9. Check routing table of R1, and confirm the changes of routing table. With the default route sent by R2, R1 need not to receive LSA of type3, i.e. need not to know ASBR location.

R1#show ip route

Gateway of last resort is 172.16.255.2 to network 0.0.0.0

172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
C 172.16.255.0/30 is directly connected, Serial1/1
O IA 172.16.255.4/30 [110/128] via 172.16.255.2, 00:04:19, Serial1/1
O IA 172.16.255.8/30 [110/192] via 172.16.255.2, 00:04:19, Serial1/1
C 172.16.1.0/24 is directly connected, Loopback0
O IA 172.16.2.0/24 [110/193] via 172.16.255.2, 00:04:19, Serial1/1
O*IA 0.0.0.0/0 [110/65] via 172.16.255.2, 00:04:19, Serial1/1

R1#

10. Use ping command to confirm route efficiency

R1#ping 10.1.1.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 240/393/684 ms

R1#

11. From the above configuration, we have to learn that: stub area refused LSA of type4 and type5.
12. Lab finished.

Hope to helpful for you!