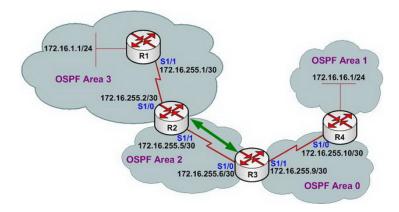
OSPF Lab7 - Configuring OSPF Virtual-Link

?Lab Objectives?

- 1. To master the principle of OSPF virtual link and when to use virtual links.
- 2. To master the methods to configure the OSPF virtual link.

?Lab Topology?



?Lab Steps?

- 1. Configure the router's IP address, and use the Ping command to confirm the connect's interoperability of each router.
- 2. First of all, configure the OSPF protocol for R2, R3, R4, pay attention to the area number during the process of the configuration. In addition: at the beginning, not to add IP logo for network s1/0 interface in the R2 in the OSPF protocol for R2. To ensure that the OSPF of area 2, area 0 and the area 1 to work properly. The OSPF configuration of router R2 is shown as the following:

R2(config)#router ospf 1
R2(config-router)#network 172.16.255.4 0.0.0.3 area 2
R2(config-router)#exit
R2(config)#exit

3. Check the routing table of R2

R2#show ip route

Gateway of last resort is not set

172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks C 172.16.255.0/30 is directly connected, Serial1/0

C 172.16.255.4/30 is directly connected, Serial1/1
O IA 172.16.255.8/30 [110/128] via 172.16.255.6, 00:00:27, Serial1/1
O IA 172.16.16.1/32 [110/129] via 172.16.255.6, 00:00:04, Serial1/1

4. Configure the OSPF protocol for R1 and R2 again, and the configuration is shown as below:

R1(config)#router ospf 1
R1(config-router)#network 172.16.255.0 0.0.0.3 area 3
R1(config-router)#network 172.16.1.0 0.0.0.255 area 3
R1(config-router)#exit
R1(config)#exit

R2(config)#router ospf 1
R2(config-router)#network 172.16.255.0 0.0.0.3 area 3
R2(config-router)#exit
R2(config)#exit

5. Check the OSPF's neighbor table of R1 and R2

R1#show ip ospf neighbor Neighbor ID Pri State Dead Time Address Interface 172.16.255.5 1 FULL/ - 00:00:38 172.16.255.2 Serial1/1 R2#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface 172.16.255.9 1 FULL/ - 00:00:37 172.16.255.6 Serial1/1 172.16.1.1 1 FULL/ - 00:00:30 172.16.255.1 Serial1/0

6. Check the routing table of R1

R1#show ip route

Gateway of last resort is not set

172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks C 172.16.255.0/30 is directly connected, Serial1/1 C 172.16.1.0/24 is directly connected, Loopback0

By observing the routing table of R1, Router of R1 can not learn the router of backbone area ?area 1 and area 2.

The main reason causing the problem is: area 3 and backbone area 0 were divided.

Configuration rules of OSPF areas: general areas must be connected to backbone areas.

7. When such problems arise, can configure the virtual link to solve. Virtual link can be used to ensure that non-direct area will logically admit that it has been linked directly to the backbone area. To configure the virtual link in the R2 and R3 as the below:

R2(config)#router ospf 1
R2(config-router)#area 2 virtual-link 172.16.255.9
R2(config-router)#exit
R2(config)#exit

R3(config)#router ospf 1 R3(config-router)#area 2 virtual-link 172.16.255.5 R3(config-router)#exit R3(config)#exit

8. Check the neighbor table of R2

R2#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface 172.16.255.9 1 FULL/ - 00:00:30 172.16.255.6 Serial1/1 172.16.1.1 1 FULL/ - 00:00:33 172.16.255.1 Serial1/0

9. Check the routing table of R1, and confirm that router R1 has learned the other areas' routes.

R1#show ip route

Gateway of last resort is not set

172.16.0.0/16 is variably subnetted, 5 subnets, 3 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, 00:08:40, Serial1/1 O IA 172.16.255.8/30 [110/192] via 172.16.255.2, 00:06:20, Serial1/1 O IA 172.16.16.1/32 [110/193] via 172.16.255.2, 00:06:20, Serial1/1 C 172.16.1.0/24 is directly connected, Loopback0

10. Use command ping to confirm the validity of the routing:

R1#ping 172.16.16.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.16.16.1, timeout is 2 seconds:

Success rate is 100 percent (5/5), round-trip min/avg/max = 152/251/312 ms

This page was exported from - Free Cisco Training & Resources - Certification Exam Preparation Export date: Tue Nov 4 22:37:10 2025 / +0000 GMT
11. Lab completed.
Hope to helpful for you!