LAB 4  
OSPF AND REDISTRIBUTION

**Objective 1: OSPF Single Area**

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**Objective 1: OSPF single area:**

The network diagram is in continuation to the previous lab. Remove static routes and rio from each of the routers

Before you start configuring OSPF let’s get comfortable with sub netting.

In the network diagram, each of the networks (A, B, C, D, E, F, G, ISP) are loopback

Use a single class C to design the following network:

Network A - 60 users.

Networks B, E & F - 20 users each.

Networks C, D, G & ISP - 10 users each.

1. Create a monitor session on the switch and sniff the ospf traffic.
2. Describe the different stages and the order by which OSPF neighbors are established.
3. Use appropriate OSPF commands to achieve network connectivity between all the loopbacks.

R1, R2, R3, and R4 should be a part of Area 0.

Make R1 as DR and R2 as BDR. R3 must not participate in election.

1. Include each OSPF configuration on your report.
2. Show the neighbor relationships from all the routers.
3. Identify ABR and ASBRs (if any present) in your network.
4. Identify which routers are fully adjacent.
5. Paste the appropriate ‘show’ command.
6. Report the routing advertisements being propagated by each router to each other (‘show ip route’)
7. Analyze a single OSPF route entry; explain each parameter listed.
8. Report result of the following commands on Router 3 & 4:

show ip ospf

show ip ospf database (Describe the type of LSAs you observe)

show ip ospf neighbor detail

show ip potocols

1. Also explain output of “debug ip ospf pkt/adj/hello” in brief.

**Objective 2: OSPF Multi Area**

1. Users on network B and F decide to split their networks in 3 different broadcast domains, they require a router (each) to be added to their network.

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b. You should make their routers parts of the OSPF domain, however you don’t want them as a part of area 0.

c. Make their routers part of an independent area each and use R2 and R4 as ABR

d. Adjust your OSPF configuration to achieve end to end connectivity.

e. Report OSPF configuration from R2, R4, R5 & R6.

f. Report any variations on the ABRs for the command ‘show ip ospf database’ (from previous section)

g. How are the routes internal to an area being propagated to other areas? (How are B routes visible at R2 and R5?) & (How are F routes visible at R4 and R6?)

h. Do you have a route to each network? Do you see any route summary?

**6. OSPF Virtual Link**

All areas in an Open Shortest Path First (OSPF) autonomous system must be physically connected to the backbone area (Area 0). In some cases, where this is not possible, you can use a virtual link to connect to the backbone through a non- backbone area. You can also use virtual links to connect two parts of a partitioned backbone through a non-backbone area. The area through which you configure the virtual link, known as a transit area, must have full routing information. The transit area cannot be a stub area.

1. Network E is now split into two parts and Network E1 and E2 is now part of an important segment of your company and now require connectivity to area 0 with minimal impact on the current network design (but remotely connected using virtual links).

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b. Your job is to create virtual links (one from R7 to area 0, and one from a R8 to area 0), so these routers can exchange routing information directly with other ABRs.

c. R1, R2, R3, R4, R7 and R8 should be part of area 0, R5 and R6 of their respective non-zero areas.

d. Analyze the results of the command ‘show ip ospf neighbor detail’ on routers R7 and R8. Do you see any interesting information? Explain.

e. Based on routing tables, manually trace a ping from network E1 to network E2, and vice versa.

Cisco Virtual Link Reference:

<https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/47866-ospfdb7.html>

**Objective 4: Redistribution:**

Select a different class C network for each of your broadcast domain

Use appropriate redistribution commands on each router to achieve end to end connectivity. You should be able to ping all the loopbacks from R1.

Report your router configurations and highlight the parameters you select on each of the different redistribution points.

Diagram

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