Netlab6 – Part 1: Advanced Router Configuration – Dynamic IGP

Purpose: In this Lab exercise, we'll continue building up the topology from the previous lab. This time we are going to implement dynamic routing protocols.

Procedure

Make a copy of the topology from the previous lab (name it Lab6). The first task to do is to setup a Loopback interface in each router. Remember that this loopback interface is used to identify each router when communicating link-state advertisements over the network. You will use the following commands in each router (execute them in global configuration mode*):*

```
Rxx(config)# interface loopback 0
Rxx(config-if)# ip address [IP] [MASK]
Rxx(config-if)# end

Use the following IP addresses for the loopback:
R1 – 12.0.0.1/8     R2 – 12.0.0.2/8      R3 – 12.0.0.3/8
R4 – 12.0.0.4/8     R5 – 12.0.0.5/8
```

Note: confirm that your loopback interfaces are UP with the "show ip interface brief" command.

1. Now you should be ready to implement OSPF in your routers. You will use the following commands in each router (execute them in global configuration mode*): **Recall: in dynamic routing there is no need to know every single network in the system. Each router ONLY needs to know what networks are directly connected to it. This is one of the advantages of dynamic versus static routing.***

```
Rxx(config)# router ospf 1
Rxx(config-router)# network [network ID] [wildcard mask] area 0
                          |
   repeat this command for each network you need to configure
                          |
Rxx(config-router)# network [network ID] [wildcard mask] area 0

Rxx(config-router)# end
```

Note: the *wildcard mask* value is the complement of a normal or usual mask value. For example, the wildcard mask for the mask 255.255.255.0 would be 0.0.0.255. Another way to calculate the value would be to subtract each dotted value of the regular mask from 255:

```
  255.255.255.255
- 255.255.255.0   ←normal mask value
---------------------------
      0   .  0 .   0 . 255 ← wildcard mask value
```


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Execute the command to display the records in the forwarding table after all the routers are configured with OSPF for dynamic routing. You should notice the new routes displayed in the routing table. Explain the differences in the forwarding table from the previous lab. (attach a screenshot)

```
R1#show ip route
```

Answer the following questions:

After all your configurations are completed, is the system working properly? Do all ***ping commands*** work with no errors or drop packets?

What would happen if the link between routers 4 and 5 fails? Do you need to do any configuration changed to keep the topology functioning?

What would happen if the link between routers 2 and 5 fails? Do you need to do any configuration changed to keep the topology functioning?

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Netlab6 – Part 2:

Another advantage of dynamic routing is that changes in the topology are easy to implement. To see this advantage in action you will add a new network in the topology using one more VPC connected to router 4; use the NetID 172.28.255.0/26 for this new network. Make the required configurations in router 4.

Question: Is the new network reachable from all the rest of the network?

Run the command: *`show ip route`* in routers 1 and 3.
Describe the output (attach a screenshot):

Save your configurations in all devices. Shut down all the devices in the topology, export a portable project, and upload it to OneDrive. You Lab paper should be completed and uploaded in the Labs dropbox on beachboard.

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