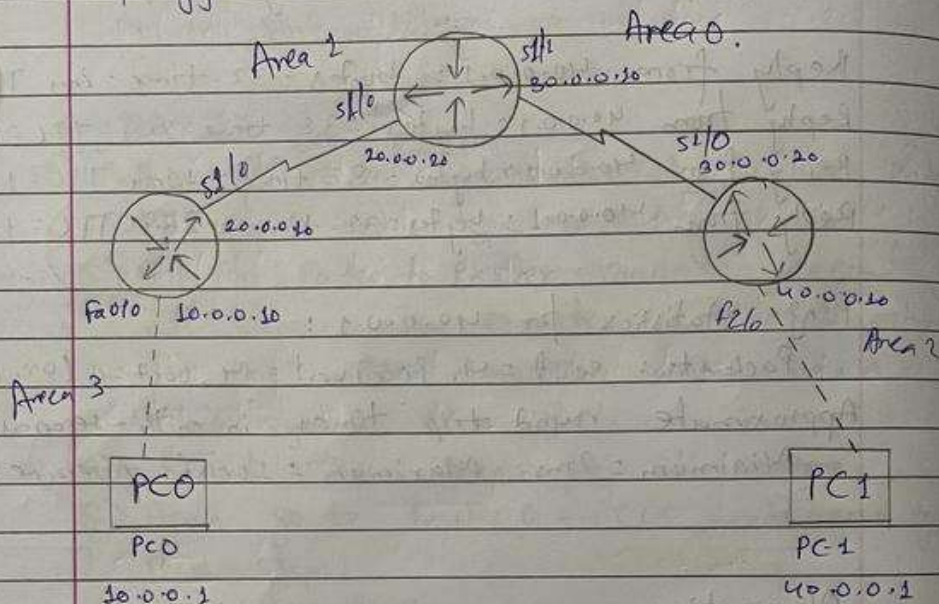


Experiment: 7

Aim: Configure OSPF routing Protocol.

Topology:



Procedure

- 1) Configure the IP address and gateway according to the topology seen above.
- 2) Configure each of the routers according to the IP address given in topology.
- 3) Encapsulation ppp and clock rate need to be set as done in RIP protocol experiment.

Router 1:

```

R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 10.0.0.0 0.255.255.255 area 3
R1(config-router)#network 20.0.0.0 0.255.255.255 area 1
R1(config-router)#exit
  
```

Router 2:

```
R2 (config)# router ospf 1
R2 (config-router)# router-id 2.2.2.2
R2 (config-router)# network 20.0.0.0 0.255.255.255 area 1
R2 (config-router)# network 30.0.0.0 0.255.255.255 area 0
R2 (config-router)# exit
```

Router 3:

```
R3 (config)# router ospf 1
R3 (config-router)# router-id 3.3.3.3
R3 (config-router)# network 30.0.0.0 0.255.255.255 area 0
R3 (config-router)# network 40.0.0.0 0.255.255.255 area 2
R3 (config-router)# exit
```

4) To keep the routers Active we have to configure interface loopback.

Router 1:

```
R1 (config-if)# interface loopback 0
R1 (config-if)# ip address 172.16.1.252 255.255.0.0
R1 (config-if)# no shutdown.
```

Router 2:

```
R2 (config-if)# interface loopback 0
R2 (config-if)# ip address 172.16.1.253 255.255.0.0
R2 (config-if)# no shutdown.
```

Router 3:

```
R3 (config-if)# interface loopback 0
R3 (config-if)# ip address 172.16.1.254 255.255.0.0
R3 (config-if)# no shutdown.
```


5.) Create virtual link between R1, R2 by this we can create a virtual link to connect to Area 0.

Router 1:

```
R1(config)# router ospf 1
R1(config-router)# area 1 virtual-link 2.2.2.2
```

Router 2:

```
R2(config)# router ospf 1
R2(config-router)# area 1 virtual-link 1.1.1.1
R2(config-router)# exit.
```

Finally, after creating virtual link, show ip route for all routers.

Result

PC > ping 40.0.0.1

pinging 40.0.0.1 with 32 bytes of data:

Request timed out.

Reply from 40.0.0.1: bytes = 32 time = 10ms TTL = 125

Reply from 40.0.0.1: bytes = 32 time = 2ms TTL = 125

Reply from 40.0.0.1: bytes = 32 time = 9ms TTL = 125

ping statistics for 40.0.0.1:

Packets: sent = 4, received = 3, lost = 1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 10ms, Average = 7ms.

Router 1

show ip route

- O IA 10.0.0.0/8 [110/65] via 20.0.0.1 00:00:11, serial 2/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
- C 20.0.0.0/8 is directly connected, serial 2/0.
- C 20.0.0.1/32 is directly connected, serial 2/0
- 30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks.
- C 30.0.0.0/8 is directly connected, serial 3/0
- C 30.0.0.1/32 is directly connected, serial 3/0
- O IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:04:44, serial 3/0
- C 172.16.0.0/16 is directly connected, loopback 0.

Observation.

The OSPF protocol is a link-state routing protocol which means that the router exchange topology information with their nearest neighbour.

It is an intra domain protocol, which means that it is used within an area. Each router contains the information of every domain and based on this information it determines shortest path. The goal of routing is to learn routers. The OSPF achieves by learning about every router and subnet within the entire network.

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