Aim-7

7. Configure OSPF routing protocol

Topology:

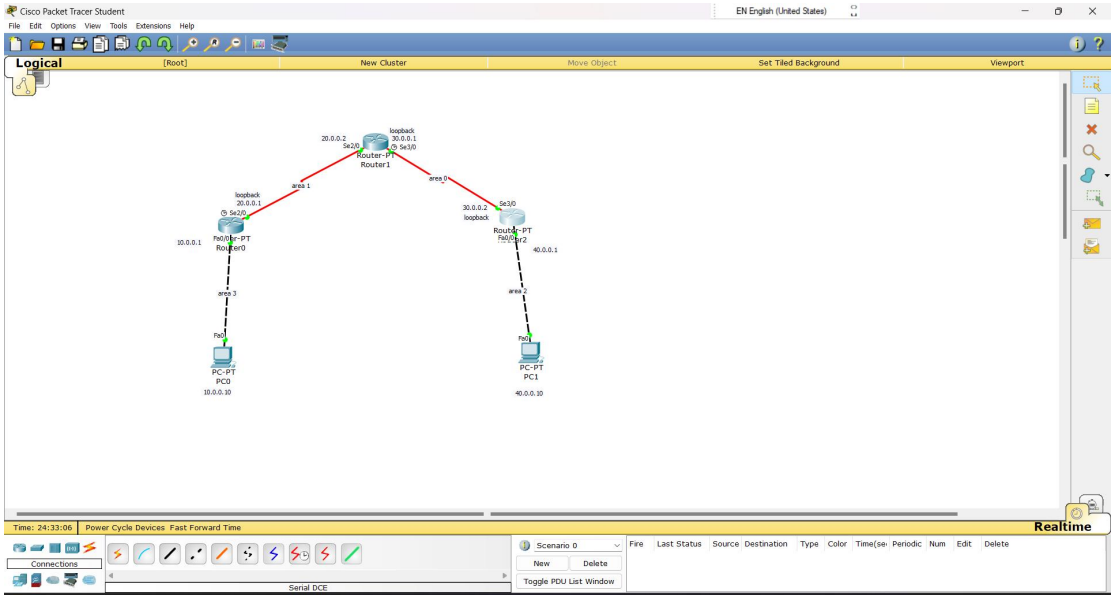

Fig 1: Topology

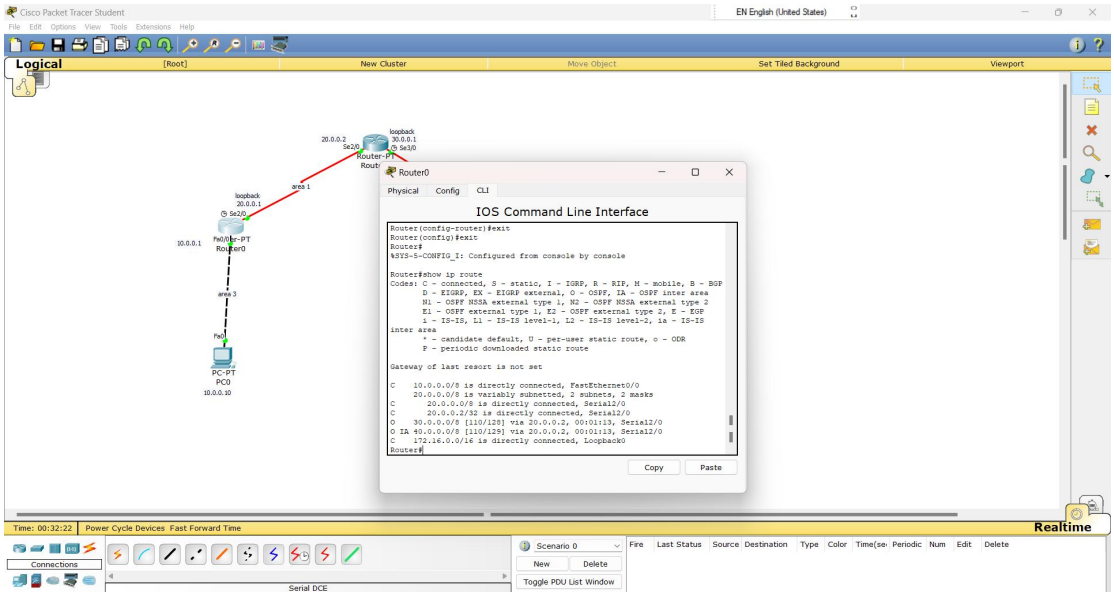

Fig 2: Routing table of Router 0

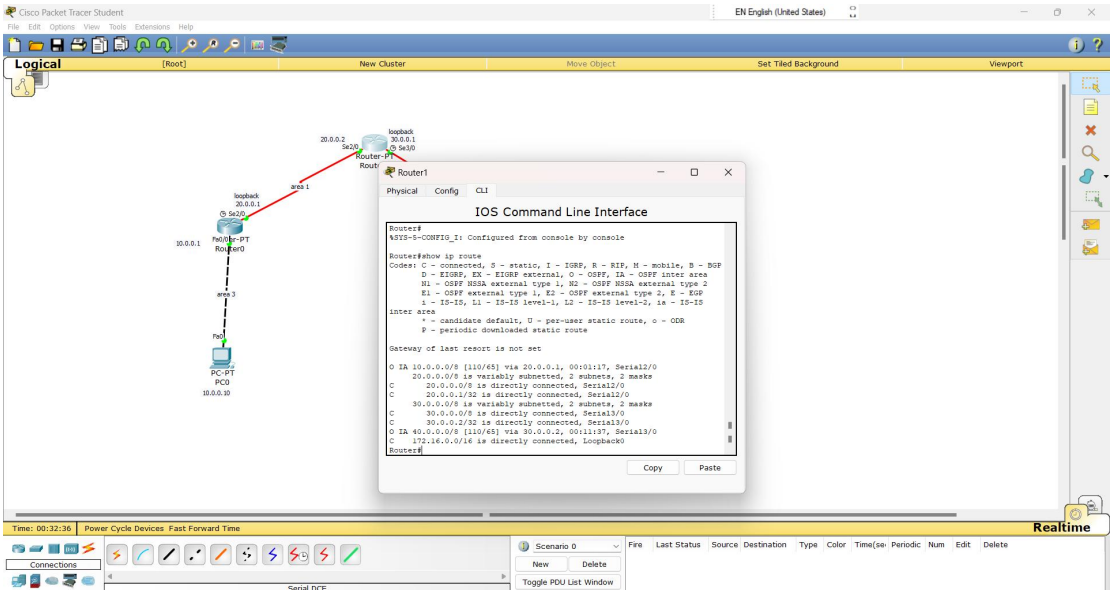

Fig 3: Routing table of Router 1

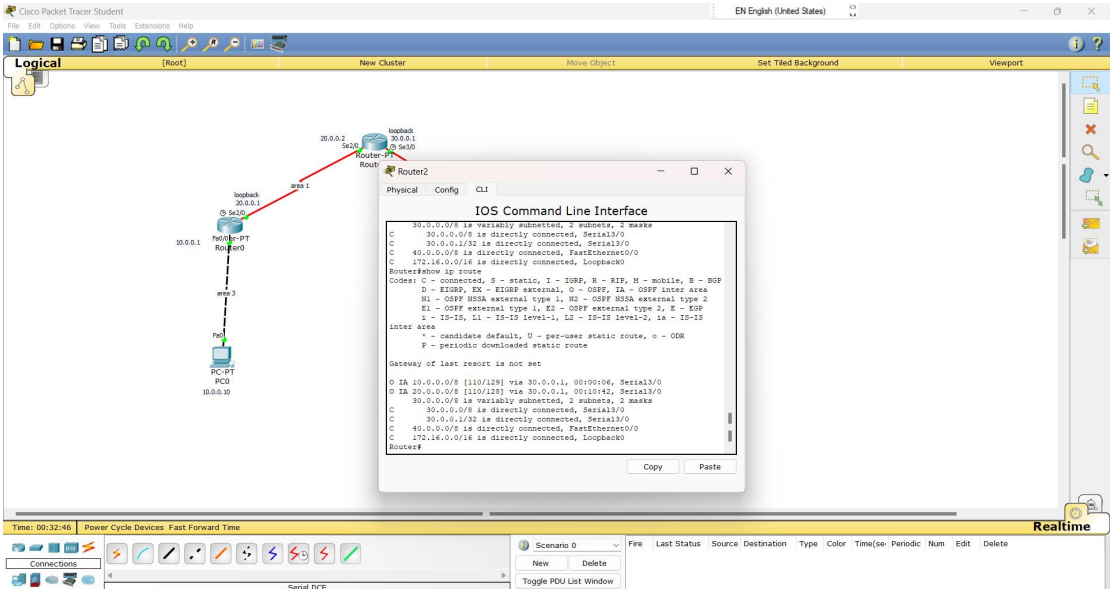

Fig 4: Routing table of Router 2

Procedure and Observations:

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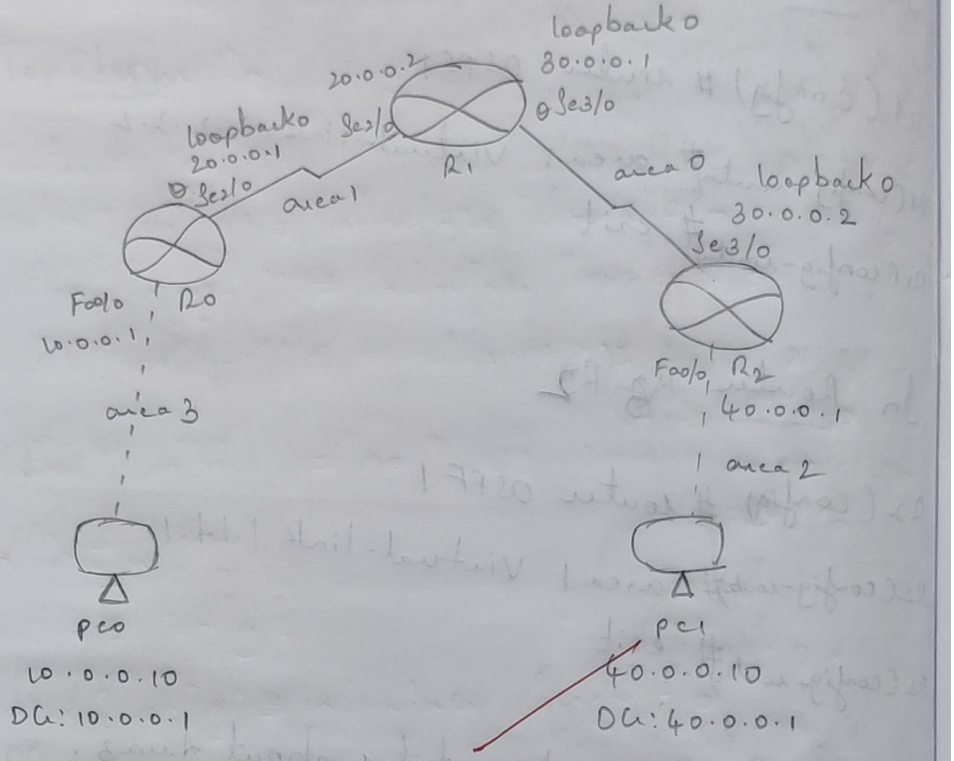
Aim-7

7. Configure OSPF routing Protocol.

Topology:



Procedure:

=> Configure PCs & the routers with IP address & default gateway according to the topology seen above.

=> Configure the routers as seen in the topology to be set as done in rip routing protocol experiment.

-> Now enable ip routing by configuring OSPF routing protocol in all routers.

In Router R0

R0(config)# router ospf 1
R0(config-router)# router-id 1.1.1.1
R0(config-router)# network 10.0.0.0 0.255.255.255 area 3
R0(config-router)# network 20.0.0.0 0.255.255.255 area 1
R0(config-router)# exit

In Router R1

R1(config)# router ospf 1
R1(config-router)# router-id 2.2.2.2
R1(config-router)# network 20.0.0.0 0.255.255.255 area 1
R1(config-router)# network 30.0.0.0 0.255.255.255 area 0
R1(config-router)# exit

In Router R2

R2(config)# router ospf 1
R2(config-router)# router-id 3.3.3.3
R2(config-router)# network 30.0.0.0 0.255.255.255 area 0

R2 (config-router) # network 40.0.0.0 0.255.255.255 area 2

R2 (config-router) # exit

=> Now Configuring the Virtual interface (loopback)

In Router R0

Router # config t
router (config) # interface Serial 2/0
router (config-if) # interface loopback 0
router (config-if) # ip address 172.16.1.252 255.255.0.0
router (config-if) # no shut

In Router R1

router # config t
router (config) # interface Serial 3/0
router (config-if) # interface loopback 0
router (config-if) # ip address 172.16.1.253 255.255.0.0
router (config-if) # no shut

In Router R2

router # config t
router (config) # interface Serial 3/0
router (config-if) # interface loopback 0

router (config-if) # ip address 172.16.1.254 255.255.0.0

router (config-if) # no shut

=> Create virtual line between R1, R2 by this we create a virtual link to connect area 3 to area 0.

In Router R0

router # config t

router (config) # router OSPF 1

router (config-router) # area 1 virtual-link 2.2.2.2

router (config-router) # exit

In Router R1

router # config t

router (config) # router OSPF 1

router (config-router) # area 1 virtual-link 1.1.1.1

router (config-router) # exit

=> R1 & R2 get updates about Area 3. Now, check routing table of R2.

router

In Router R1

router (config) # exit

Router # show ip route

C 10.0.0.0/8 is directly Connected, FastEthernet 0/0

20.0.0.0/8 is directly variably Subnetted, 2 subnets, 2 masks

C 20.0.0.0/8 is directly Connected, Serial 2/0

C 20.0.0.2/32 is directly Connected, Serial 2/0

O 30.0.0.0/8 (110/128) Via 20.0.0.2, 00:01:13, Serial 2/0

O IA 40.0.0.0/8 (110/129) Via 20.0.0.2, 00:01:13, Serial 2/0

C 172.16.0.0/16 is directly Connected, Loopback 0.

=> Now check routing table of R1 & R2.

In Router R1

router (config) # exit

router # show ip route

O IA 10.0.0.0/8 (110/65) Via 20.0.0.1, 00:01:17, 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 30.0.0.2/32 is directly connected, Serial 3/0

O IA 40.0.0.0/8 (110/65) via 30.0.0.2, 00:11:37, Serial 3/0

C 172.16.0.0/16 is directly connected, Loopback0

In Router R2

router (config)# exit

router # show ip route

O IA 10.0.0.0/8 (110/129) via 30.0.0.1, 00:01:5, Serial 3/0

O IA 20.0.0.0/8 (110/128) via 30.0.0.1, 00:12:26, Serial 3/0

30.0.0.0/8 is Variably Subnetted, 2 Subn-ets, 2 masks

C 30.0.0.0/8 is directly connected, Serial

C 30.0.0.1/32 is directly connected, Serial 3

C 40.0.0.0/8 is directly connected, FastEthernet 0/0

C 172.16.0.0/16 is directly connected, Loopback0

=> Pinging from PC0 to PC1

=> Ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Request timed out

Reply from 40.0.0.10: bytes=32 time=2ms
TTL=125

Reply from 40.0.0.10: byte=32 time=7ms
TTL=125

Reply from 40.0.0.10: bytes=32 time=6ms
TTL=125

Ping statistics for 40.0.0.10:

Packets: Sent=4, Received=3, Lost=1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 7ms, Average = 5ms

=> Pinging from PC1 to PC0

-> Ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:

10

Reply from 10.0.0.10: bytes = 32 time = 2ms
TTL = 125

Reply from 10.0.0.10: bytes = 32 time = 2ms
TTL = 125

Reply from 10.0.0.10: bytes = 32 time = 2ms
TTL = 125

Reply from 10.0.0.10: bytes = 32 time = 2ms
TTL = 125

Ping statistics for 10.0.0.10:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds

Minimum = 2ms, Maximum = 2ms, Average = 8 ms.

Observation:

-> OSPF (Open Shortest Path First)

-> It is a open standard routing protocol

-> link state routing protocol

-> Algorithm uses is "Dijkstra", to find shortest path.

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Output:

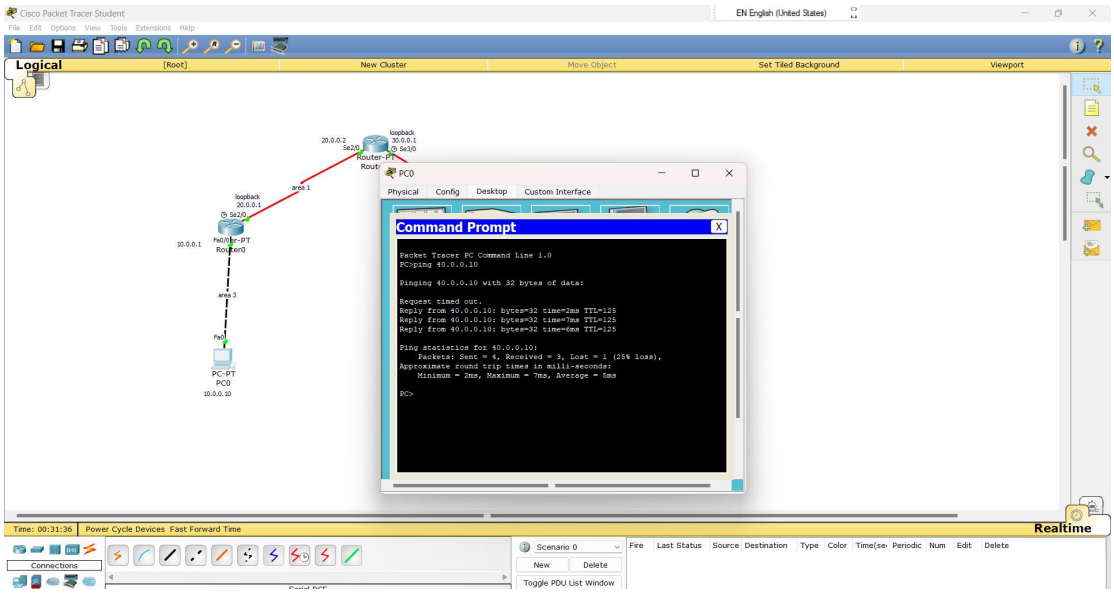

Fig 5: Pinging from Pc0 to Pc1

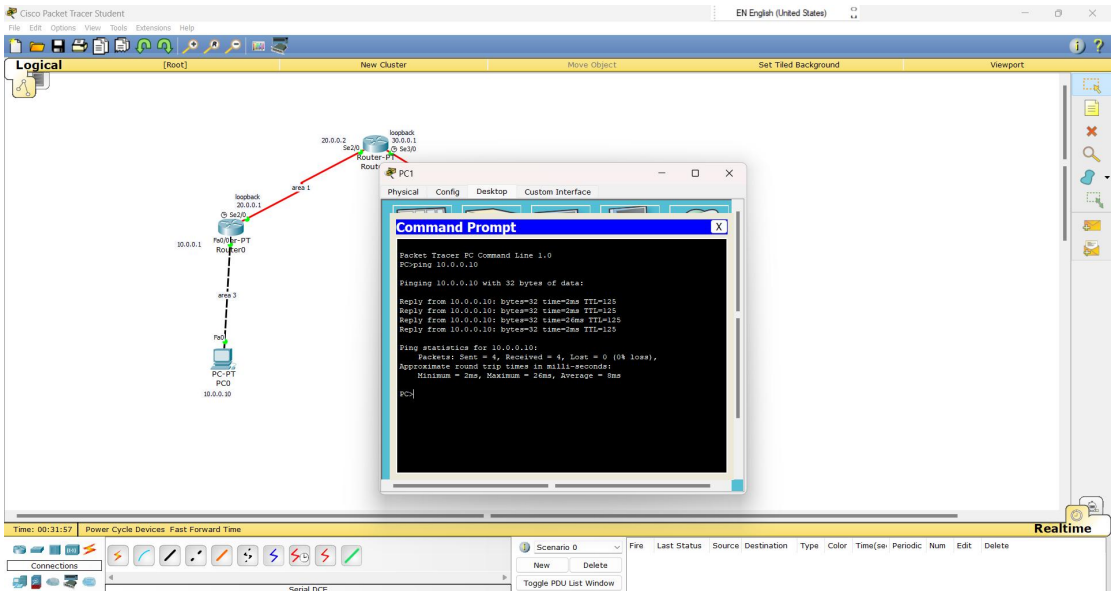

Fig 6: Pinging from Pc1 to Pc0