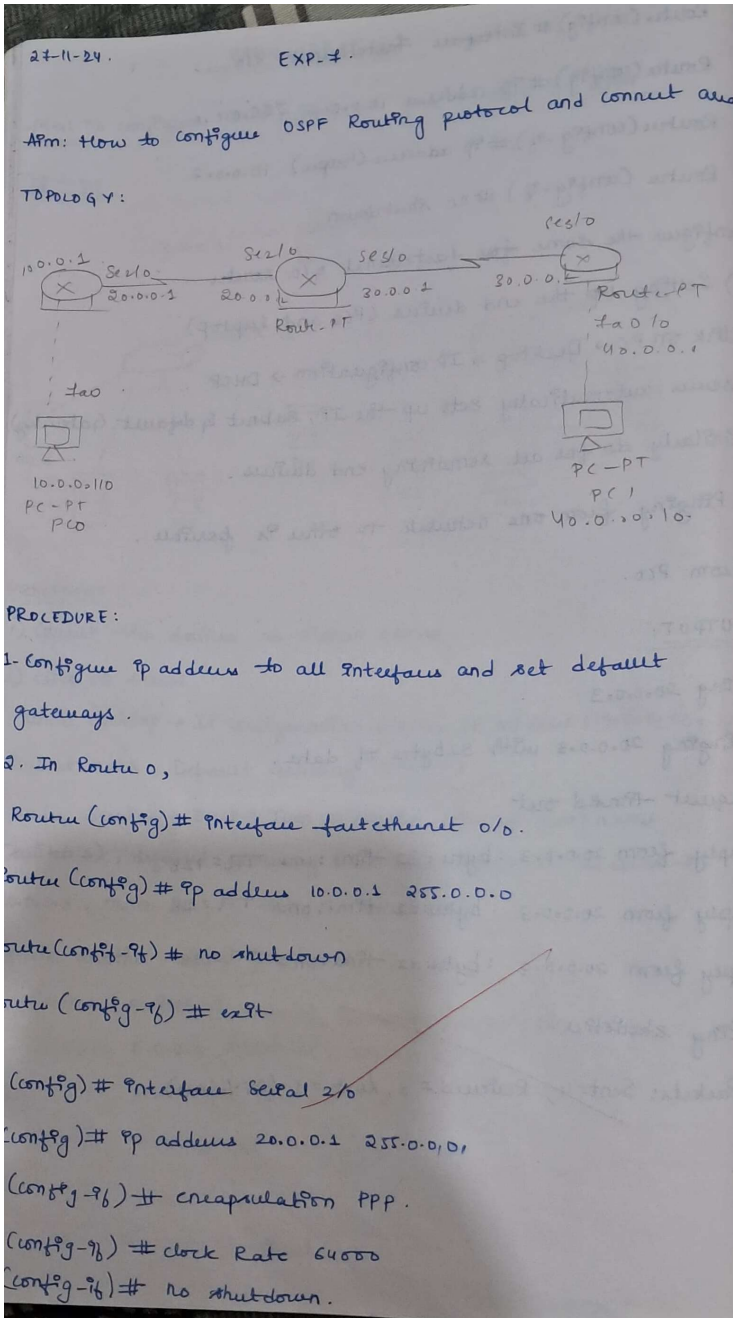
Program-8

Configure OSPF routing protocol

Topology, Procedure and Observation:



PROCEDURE:

1- Configure ip address to all interfaces and set default gateways.

2. In Router 0,

Router (config)# interface fastethernet 0/0.

Router (config)# ip address 10.0.0.1 255.0.0.0

Router (config-if)# no shutdown

Router (config-if)# exit

(config)# interface serial 2/0

(config)# ip address 20.0.0.1 255.0.0.0

(config-if)# encapsulation PPP.

(config-if)# clock Rate 64000

(config-if)# no shutdown.

Similarly we set up the IP's of R1 and R2 while the setup of fast ethernet remains same, the setting up of serial connections has 2 extra lines (encapsulation PPP, clock rate 64000) clock Rate 64000 must only be written if the serially connected port shows 'clock' symbol. Here, we write clock rate command for R0, serial 2/0, R1 Serial 3/0. After this step, all the connections must have turned green.

3. To enable IP routing by configuring OSPF routing protocol on all routers.

Router R0 → CLI

R0(config)# router OSPF 1

R0(config-router)# router-id 1.1.1.1

R0(config-router)# network 10.0.0.0 255.255.255. area 3.

R0(config-router)# network 20.0.0.0 255.255.255 area 1

R0(config-router)# exit.

Router R1 → CLI

R1(config)# router OSPF 1

R1(config-router)# router-id 2.2.2.2

R1(config-router)# network 20.0.0.0 255.255.255 area 1

R1(config-router)# network 30.0.0.0 255.255.255 area 0

R1(config-router)# exit

Router R_2 → CLI

Carry out the same by changing router-id to 3.3.3.3, network to 30.0.0.0, area 0, 40.0.0.0, area 2.

4. Once the setting up of networking area is done, we configure loopback address to router.

R0(config)# interface loopback 0.

R0(config-if)# ip address 172.16.5.252 255.255.0.0

R0(config-if)# no shutdown.

R1(config-if)# interface loopback 0

R1(config-if)# ip add 17.16.1.253 255.255.0.0.

R1(config-if)# no shutdown.

R2(config-if)# interface loopback 0.

R2(config-if)# ip add 172.16.1.254 255.255.0.0.

R2(config-if)# no shutdown.

5. On checking routing table of R_2 using show ip route. we can see that R_3 doesn't know about area 3. Gateway of last resort is not set.

O IA 20.0.0.0/8 [110/128] via 30.0.0.1 Serial 1/0.

C 40.0.0.0/8 is directly connected, fast ethernet 0/0.

C 30.0.0.0/8. is directly connected, Serial 2/0

Since R_3 doesn't know about area 3 we have to

Create a virtual link between R0 and R1.

6. Creating virtual link between R1, R0

In Router R0

R0 (config) # router ospf 1

R0(config router) # area 1 virtual-link 2.2.2.2

R0(config-router) # exit

7. Now, Check routing table of R3, once all these steps are completed, the message can now be pinged from 1 end-device to other.

OBSERVATION

In R2

Router # show ip route.

O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:57:25 Serial 2/0.

C 40.0.0.0/8 is directly connected, fast ethernet 0/0.

O IA 10.0.0.0/8 [110/129] via 30.0.0.1 00:57:25 Serial 2/0.

C 30.0.0.0/8 is directly connected, Serial 2/0

C 172.16.0.0/16 is directly connected, loopback.

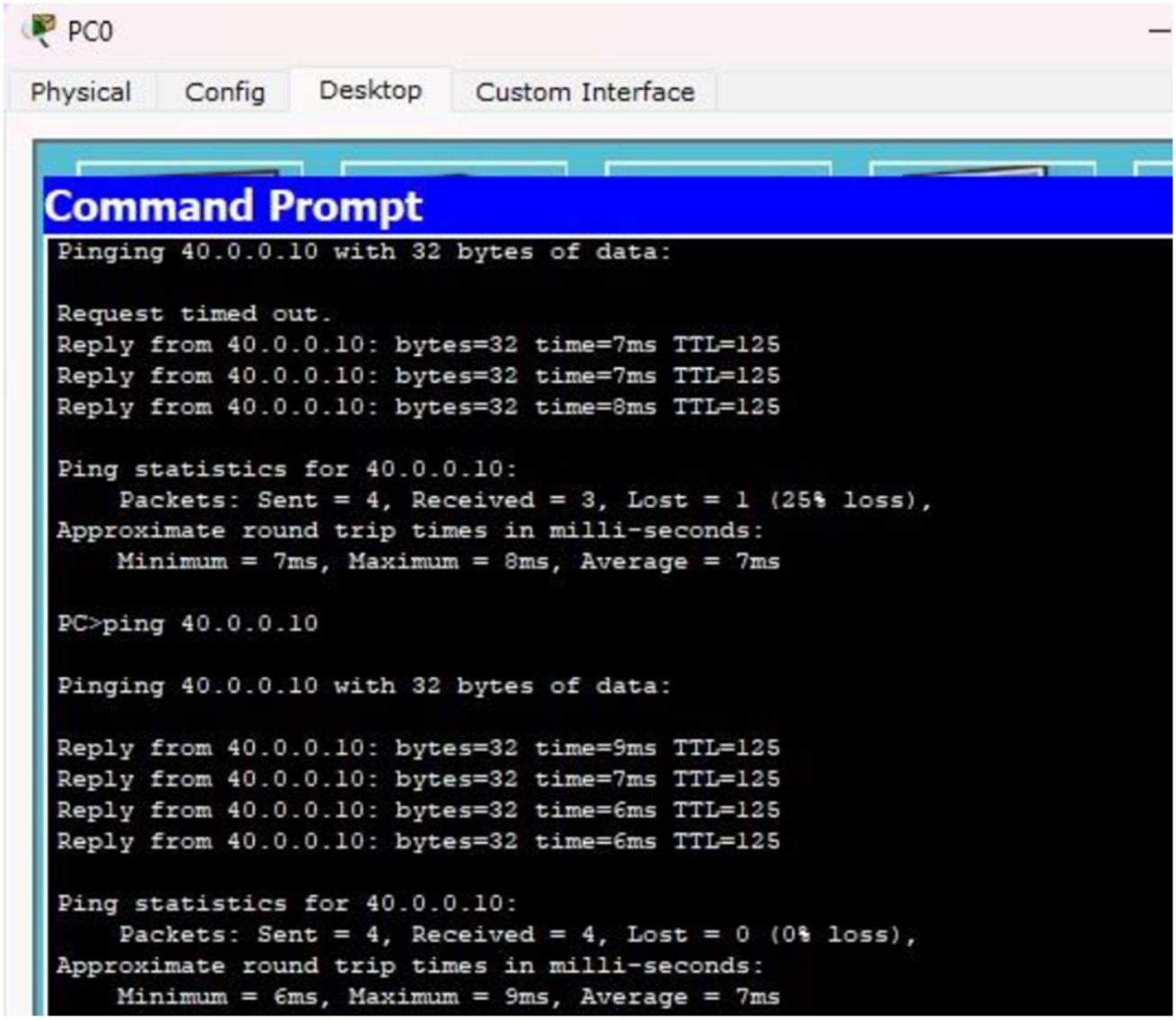
Similarly the output is shown for Router 0 and 1.

Ping output

(from PC0 to PC1)

PC0 → Command prompt.

Screenshots:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Pinging 40.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.10: bytes=32 time=7ms TTL=125
Reply from 40.0.0.10: bytes=32 time=7ms TTL=125
Reply from 40.0.0.10: bytes=32 time=8ms 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 = 7ms, Maximum = 8ms, Average = 7ms
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Reply from 40.0.0.10: bytes=32 time=9ms TTL=125
Reply from 40.0.0.10: bytes=32 time=7ms TTL=125
Reply from 40.0.0.10: bytes=32 time=6ms 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 = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 9ms, Average = 7ms