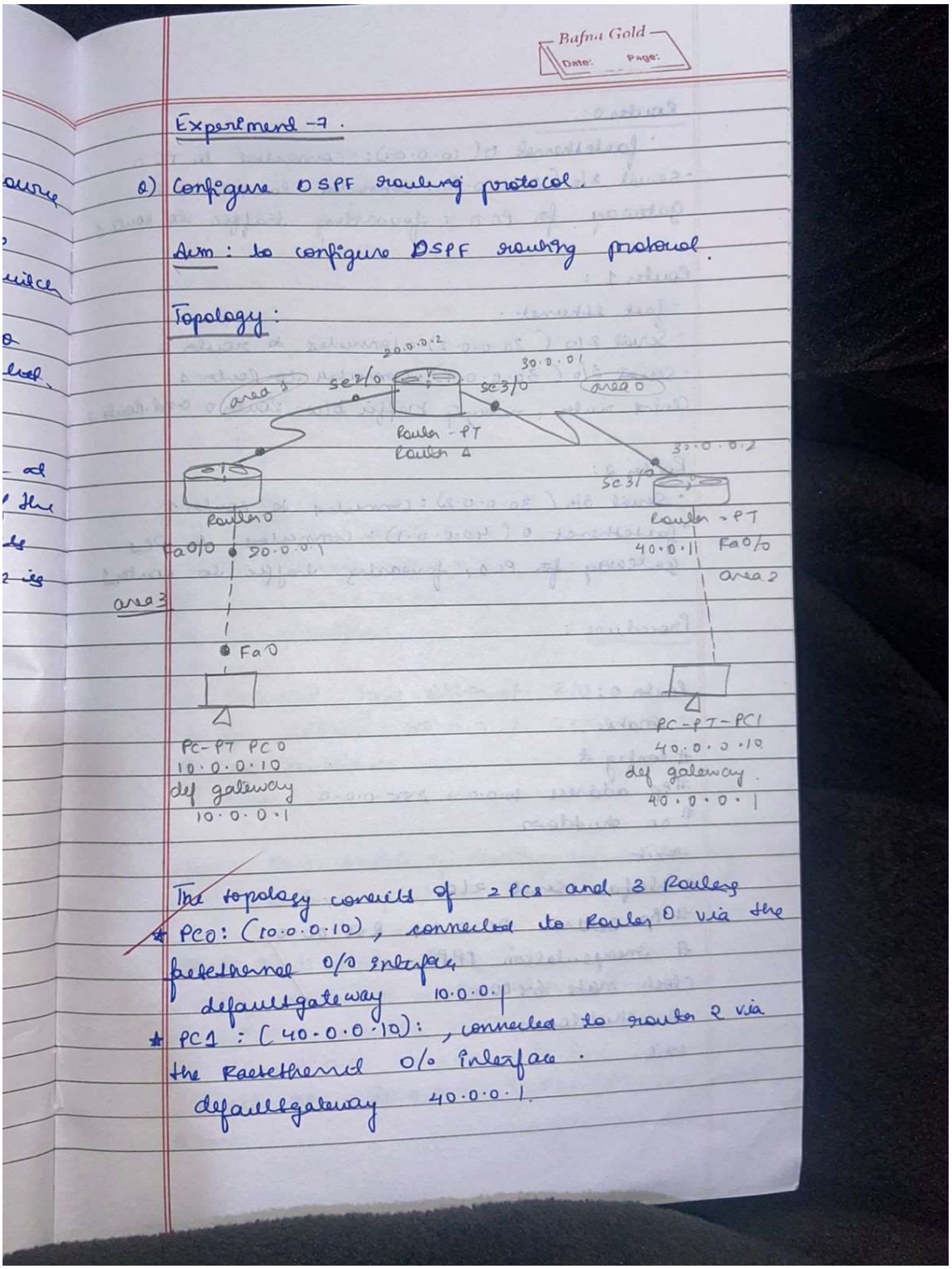
Avani.A (1BM22CS059)

EXPERIMENT-7

Aim:Configure OSPF routing protocol .

Topology , Procedure and Observation:



Router 0:
- fastethernet 0 (10.0.0.1): connected to PC 0
- Serial 2/0 (20.0.0.1): connected to Router 1

gateway for PC 0, forwarding traffic to Router 1

Router 1:
- fast ethernet.
- Serial 2/0 (20.0.0.2): connected to router 0
- Serial 3/0 (30.0.0.1): connected to Router 1

Central router, relaying traffic b/w Router 0 and Router 2

Router 2:
- Serial 3/0 (30.0.0.2): connected to Router 1
- fastethernet 0 (40.0.0.1): connected to PC 1

gateway for PC 1, forwarding traffic to Router 1

Procedure:

Router 0:
enable.
config t
ip address 10.0.0.1 255.0.0.0
no shutdown
exit
Interface Serial 2/0
ip address 20.0.0.1 255.00.0
encapsulation PPP
clock rate 64000
no shutdown
exit.

In Router 1 :

interface serial 2/0
ip address 20.0.0.2 255.0.0.0
encapsulation ppp
no shutdown
exit
interface serial 3/0
ip address 30.0.0.1 255.0.0.0
encapsulation ppp
no shutdown
exit

In Router 2 :

interface serial 3/0
ip address 30.0.0.2 255.0.0.0
encapsulation ppp.
no shutdown
exit
interface fast ethernet 2/0
ip address 40.0.0.1 255.0.0.0
no shutdown
exit

step 3 : Now, enable ip routing by configuring ospf routing protocol in all routers.

Router 0 : # router ospf 1
(config-router) # router-id 1.1.1.1
Router. # network
10.0.0.0 0.255.255.255 area 3
network 20.0.0.0 0.255.255.255 area 1
exit

Router 1:

router ospf 1.
router-id 2.2.2.2
network 20.0.0.0 0.255.255.255 area 1
network
30.0.0.0 0.255.255.255 area 0
exit

Router 2:

router ospf 1.
router-id : 3.3.3.3.
network 30.0.0.0 0.255.255.255 area 0
exit

step 4: now check router table of R1.

show ip route.
C 10.0.0.0/8 is directly connected, Fa2/0
C 20.0.0.0/8 is directly connected, serial 2/0
OIA 40.0.0.0/8 [40/129] via 20.0.0.2,
00:04:23, serial 2/0
OIA 30.0.0.0/8 [110/129] via 20.0.0.2,
00:07:29, serial 3/0

Configure loopback:

Router 0:

Route # interface loopback 0
ip add 172.10.1 255.255.255.0.0

Router 1:

interface loopback 0
ip add 172.10.1.253.255.255.0.0
no shutdown.

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Router 2:
interface loopback0
ip add 172.16.1.25 4.255.255.0
no shutdown.

Step 5: now, check Routing table of R3
→ show ip route
OIA 90.0.0.0/8 [100/128] via 30.0.0.1, 00:18,
serial 3/0
C 40.0.0.8/8 is directly connected, Fa2/0
C 30.0.0.8/8 is directly connected, serial 3/0

Step 6: create vertical link between R1, R2,, by this
we create a vertical link to connect area 3
to area 0.

Router 0:
router ospf 1
area 1 vertical-link 2.2.2.2
Router # * Feb 10 - - - - -
from LOADING to full, loading done

Router 1:
Router (Router-config) # router ospf 1
area 1 vertical-link 1.1.1.1
exit

Step 7: R2 and R8 get updates about Area 3
Router 2: show ip route
OIA 20.0.0.0/8 [110/128] via 30.0.0.1,
00:00:00:56, serial 2/0
OIA 10.0.0.0/8 [110/128] via 30.0.0.1,
00:01:56, serial 1/0

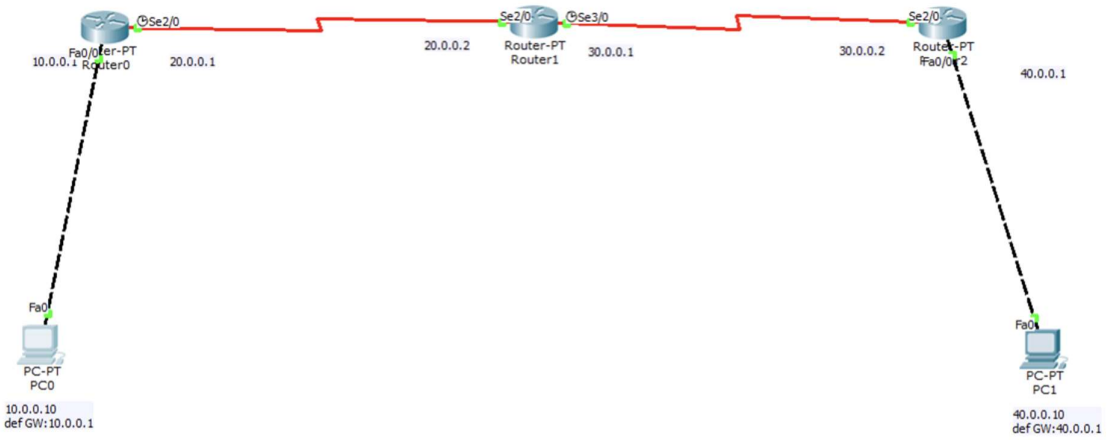
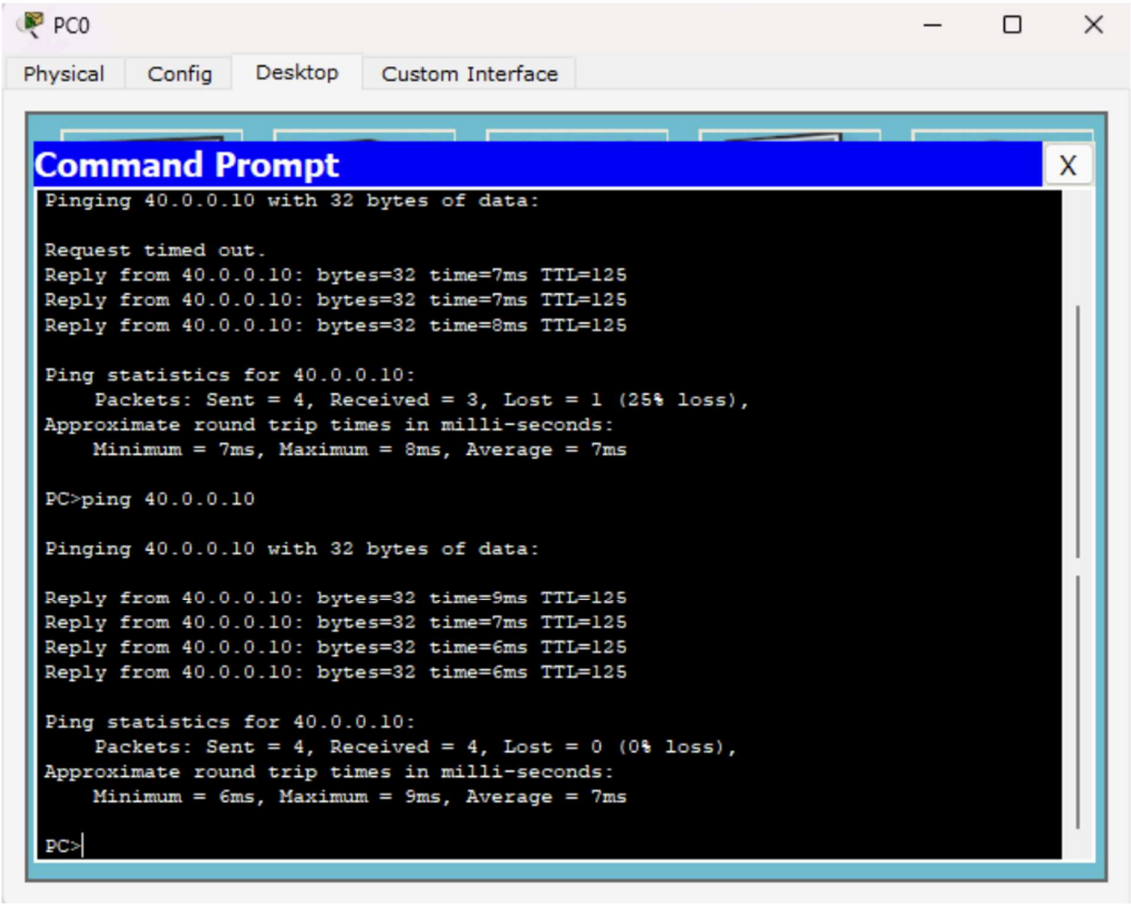
C 30.0.0.0/8 is directly connected, serial3/0

Steps: check connectivity between host 40.0.0.10 to 40.0.0.10

Now command prompt
PC> ping 40.0.0.10
pinging 40.0.0.10 w 32 bytes of data
Reply from 40.0.0.10: bytes=32 time=3ms TTL=125
;
Reply from 40.0.0.10

Ping statistics for 40.0.0.10.
Pkts: sent=4, received=4, lost=0 (0% loss)

Observation:
The expt demonstrates how OSPF dynamically learns & advertises routes, enabling efficient and scalable routing across multiple areas

→ Routing tables on all routers must display networks from all areas with O IA indicating inter-area routes

Screenshots: