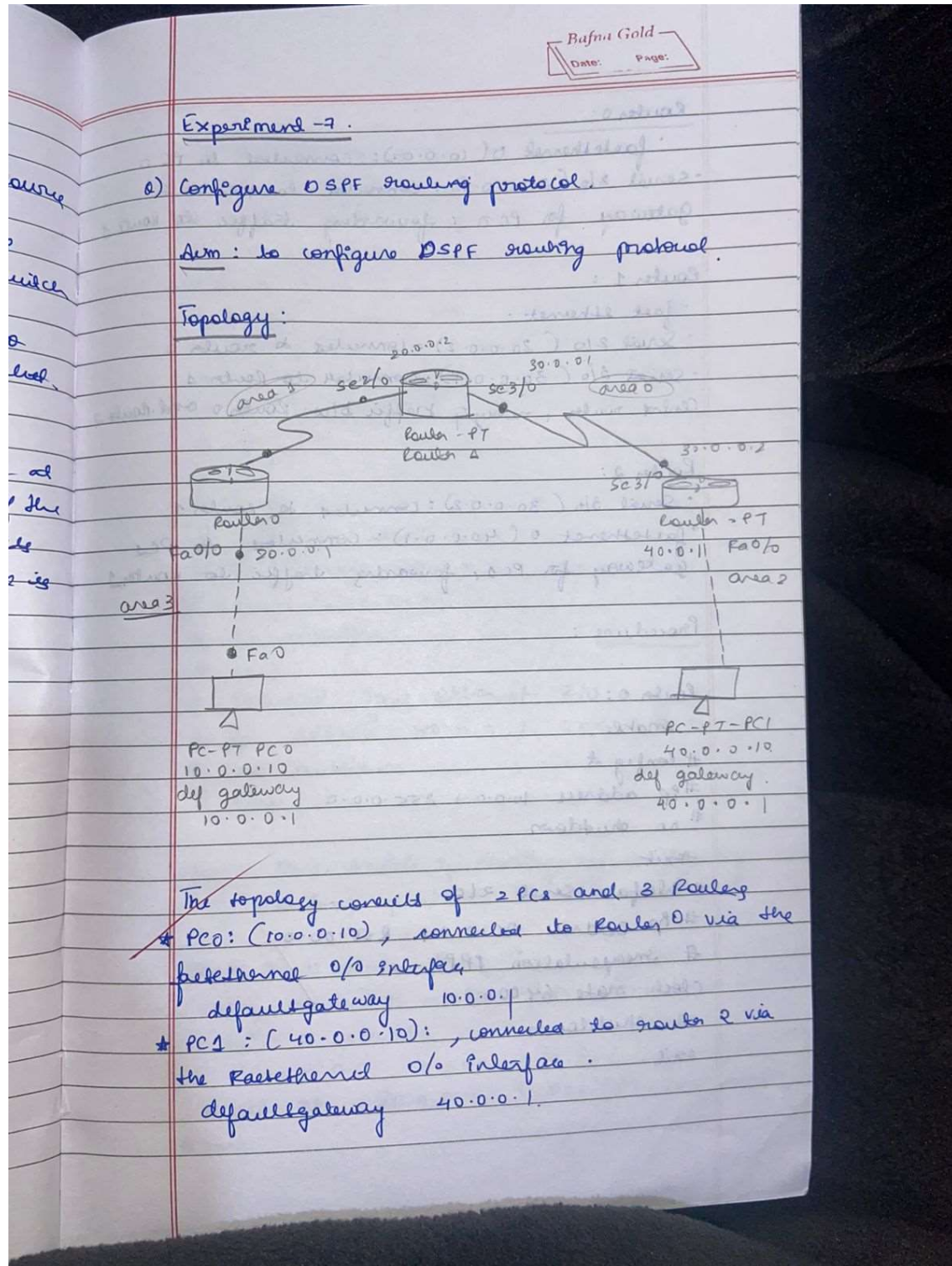


Avani.A (1BM22CS059)

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 2
- 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 20.0.0.1 255.0.0.0

encapsulation PPP

clock rate 64000

no shutdown

exit

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step 3

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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
perf routing protocol in all routers

Router 0: # router perf 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 serf 1
# router -id 2.2.2.2
# network 20.0.0.0 0.255.255.255 area 1
# exit
# network 30.0.0.0 0.255.255.255 area 0
# exit
```

Router 2:

```
# router serf 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, Fa 0/0
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 30.0.0.2,
00:07:29, serial 3/0
```

Configure loopback:

Router 0:

```
Router # interface loopback 0
# ip add 172.16.1.253 255.255.0.0
```

Router 1:

```
# interface loopback 0
# ip add 172.16.1.253 255.255.0.0
# no shutdown
```

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Router 2:

interface loopback0
ip add 172.16.1.254 255.255.0
no shutdown.

step 5: now, check routing table of R3

→ show ip route

O/A 90.0.0.0/8 [100/128] via 30.0.0.1, 00:18,
eth0 3/0

C 40.0.0.8/8 is directly connected, Fa2/0

C 30.0.0.8/8 is directly connected, eth0 3/0

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

Router 0:

router id 1

area 0 virtual-link 2.2.2.2

Router # 4 Feb 10
from LOADING to full, clearing config

Router 3:

Router (Router-config) # router id 3

area 3 virtual-link 1.1.1.1

exit

step 7: R2 and R3 get updates about Area 3

Router 2: show ip route

O/A 20.0.0.0/8 [110/128] via 30.0.0.1,

00:00:00; 56, serial 2/0

O/A 10.0.0.0/8 [110/128] via 30.0.0.1,

00:00:56, eth0 1/0

C 30.0.0.0/8 is directly connected, serial 3/0

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 with 32 bytes of data:

Reply from 40.0.0.10: bytes=32 time=23ms

TTL=125.

Reply from 40.0.0.10:

Ping statistics for 40.0.0.10:

Packets: sent=4, Received=4, Loss=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 0/0 indicating inter-area routes.

Expected

results

Diagram:

operation

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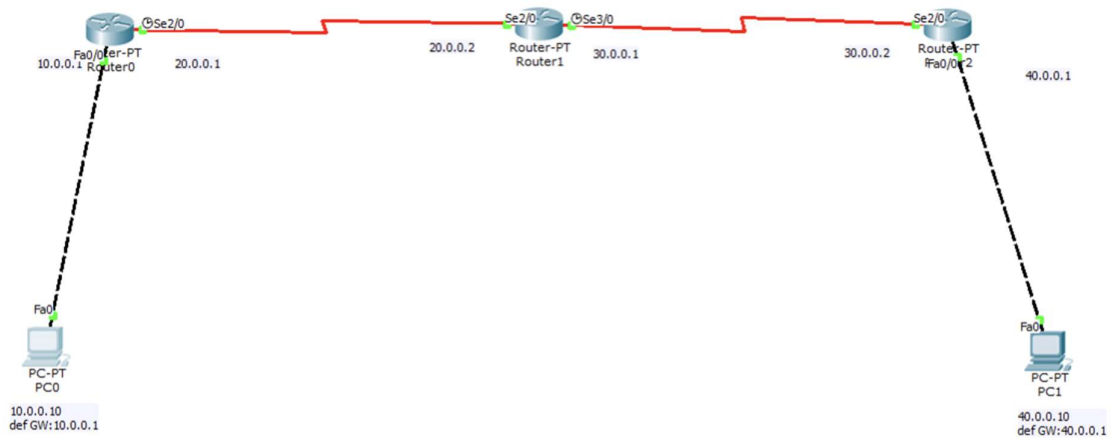
Serial

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3. v

Screenshots:



PC0

Physical Config Desktop Custom Interface

```
Command Prompt
X
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

PC>
```