Experiment- 7

Aim: Configure OSPF routing protocol

Topology:

Se2/0 — 20.0.0.2 — Se2/0 — Se3/0 — 30.0.0.2 — Se3/0

Fa0/0

10.0.0.1   Router-PT
           Router0

20.0.0.1

Router-P;
Router1

30.0.0.1

Rou Fa0/0 F 40.0.0.1
Router2

Fa0

PC-PT
PC0

10.0.0.10

Fa0

PC-PT
PC1

40.0.0.10

Router2

Physical | Config | CLI
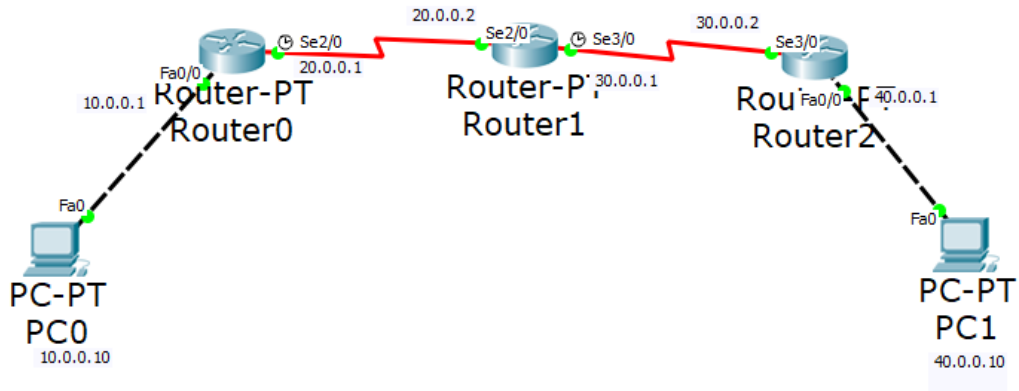
IOS Command Line Interface

```
Loading Done


Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

O IA 10.0.0.0/8 [110/129] via 30.0.0.1, 00:00:33, Serial3/0
O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:00:43, Serial3/0
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, Serial3/0
C       30.0.0.1/32 is directly connected, Serial3/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0
C    172.16.0.0/16 is directly connected, Loopback0
Router#
```

Copy | Paste

PC0

Physical | Config | **Desktop** | Custom Interface

Command Prompt ⊠

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:

Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=7ms TTL=128
Reply from 10.0.0.10: bytes=32 time=7ms TTL=128
Reply from 10.0.0.10: bytes=32 time=8ms TTL=128

Ping statistics for 10.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 8ms, Average = 6ms

PC>
```
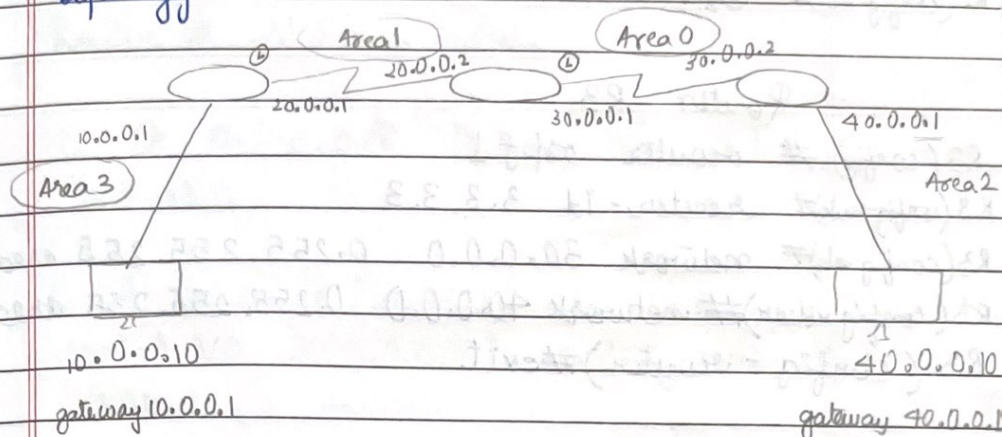
OSPF

open shortest path first - Link state algo.

Aim : Configure OSPF routing protocol

Topology:

Area 1
20.0.0.2
20.0.0.1
10.0.0.1
Area 3
10.0.0.0.10
gateway 10.0.0.1

Area 0
30.0.0.2
30.0.0.1
40.0.0.1
Area 2
40.0.0.10
gateway 40.0.0.1

area 0 — backbone network

Procedure:

- Configure the PC's with the IP address & gateway
- Configure each of the routers acc to the ip address as shown in the topology
- Encapsulation ppp and clock rate need its be set as done in rip protocol.

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

loopback 0 → software interface.
virtual interface

Router R2

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-rout)# network 30.0.0.0 0.255.255.255 area 0
R2(config-rou)# exit

Router R3
R3(config) # router ospf 1
R3(config-route)# router-id 3.3.3.3
R3(config-rou)# 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.

interface loop back   → create copy

R1(config-if) # interface loopback 0
R1(config-if) # ip address 172.16.1.252 255.255.
R1(config-if) # no shutdown

R2(config-if) # interface loopback 0
R2(config-if) # ip address 172.16.1.253 255.x0.0
R2(config-if) # no shut.

R3(config-if) #interface loopback 0
R3(config-if) # ip address 172.16.1.254 255.255.
R3(config-if) # no shut.

virtual link b/w R10, R2

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 - routr) # area 1 virtual-link 1.1.

    R2 (config-router) # exit

Finally show ip route

Router #   show ip route

O   IA 10.0.0.0/8 [110/129] via 30.0.0.1, 00:00:33,
serial3/0

O IA   20.0.0.0/8 [110/128] via 30.0.0.1 , 00:00:43
serial 3/0   30.0.0.0/8 is variably subnetted ; 2
subnets , 2 marks

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

C   30.0.0.1/32 is directly connected, Serial 3/0

C   40.0.0.0/8 is directly connected, Fast Ethernet 0/0

C   172.16.0.0/16 is directly connected, loopback0

PC> Ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:

Reply from 10:0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 times=4ms TTL = 128
Reply from 10.0.0.10: bytes=32 time=8ms TTL= 128

Reply from 10.0.0.10: bytes=32 time=8ms TTL=78

Ping statistics for 10.0.0.10:
  Packets: Sent =4, Recieved =4, Lost=0 (0% loss)
  Approximate round trip times in milli-seconds:
    Minimum =4ms, Maximum =8ms, Average =6ms