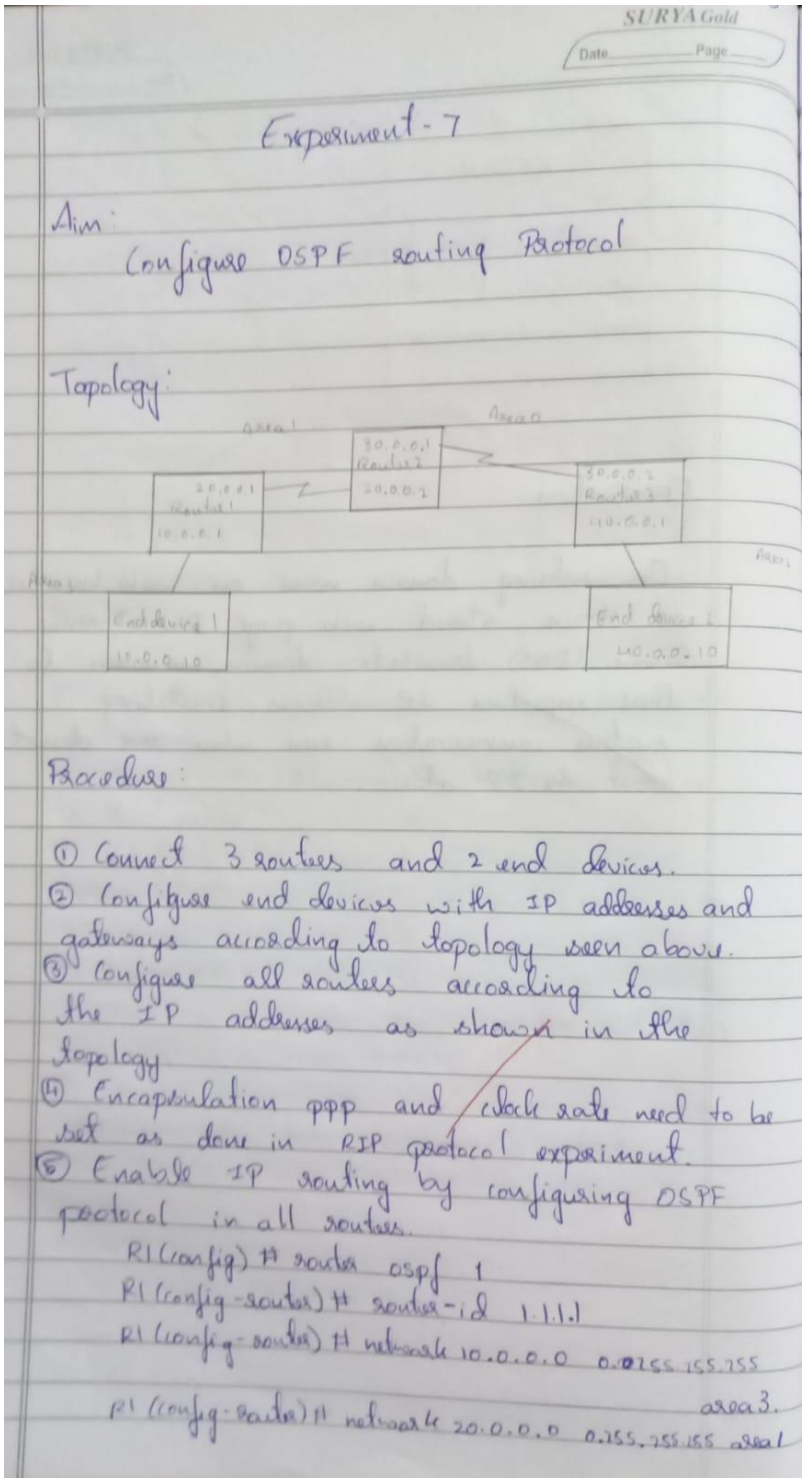
EXPERIMENT-7

Configure OSPF routing protocol.



SURYA Gold

Date Page

Experiment - 7

Aim:

Configure OSPF routing Protocol

Topology:

Procedure:

① Connect 3 routers and 2 end devices.
② Configure end devices with IP addresses and gateways according to topology seen above.
③ Configure all routers according to the IP addresses as shown in the topology
④ Encapsulation ppp and clock rate need to be set as done in RIP protocol experiment.
⑤ Enable IP routing by configuring OSPF protocol in all routers.

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

R1(config-router)# exit.

In 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-router)# network 30.0.0.0 0.255.255.255 area 0.
R2(config-router)# exit

In Router R3,
R3(config)# router ospf 1
R3(config-router)# router-id 3.3.3.3
R3(config-router)# 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.

⑤ Create loopback on interfaces. Only consider router-router interfaces.

R1(config-if)# interface loopback 0
R1(config-if)# ip address 172.16.1.252 255.255.0.0
R1(config-if)# no shutdown

R2(config-if)# interface loopback 0
R2(config-if)# ip address 172.16.1.253 255.255.0.0
R2(config-if)# no shutdown

R3(config-if)# interface loopback 0
R3(config-if)# ip address 172.16.1.254 255.255.0.0
R3(config-if)# no shutdown

④ Create virtual link between R_1, R_2 to connect to area 0.

In Router 1,

R1 (config)# router ospf 1
R1 (config-router)# area 1 virtual-link 2.2.2.2

In Router 2,

R2 (config)# router ospf 1
R2 (config-router)# area 1 virtual-link 1.1.1.1

⑤ To test the connection, ping end devices.

Result:

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=10ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Reply from 40.0.0.10: bytes=32 time=9ms TTL=125

Ping statistics from 40.0.0.10:
Packets: Sent=4, Recieved=3, Lost=1 (25% loss)
Approximate round trip times in milliseconds:
Minimum=2ms, Maximum=10ms, Average=7ms

Router 1:

show ip route

O IA 10.0.0.0/8 [110/65] via 20.0.0.1 00:00:11, Serial2/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial2/0
C 20.0.0.1/32 is directly connected, Serial2/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial3/0
C 30.0.0.2/32 is directly connected, Serial3/0
O IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:04:44, Serial3/0
C 172.16.0.0/16 is directly connected, Loopback0.

Observation:

OSPF (Open Shortest Path First) protocol is a dynamic routing protocol that uses Dijkstra Algorithm to calculate shortest path to reach a destination network. OSPF routers share information about their directly connected networks. OSPF router interfaces are assigned an area and routers exchange OSPF information only within their assigned area.

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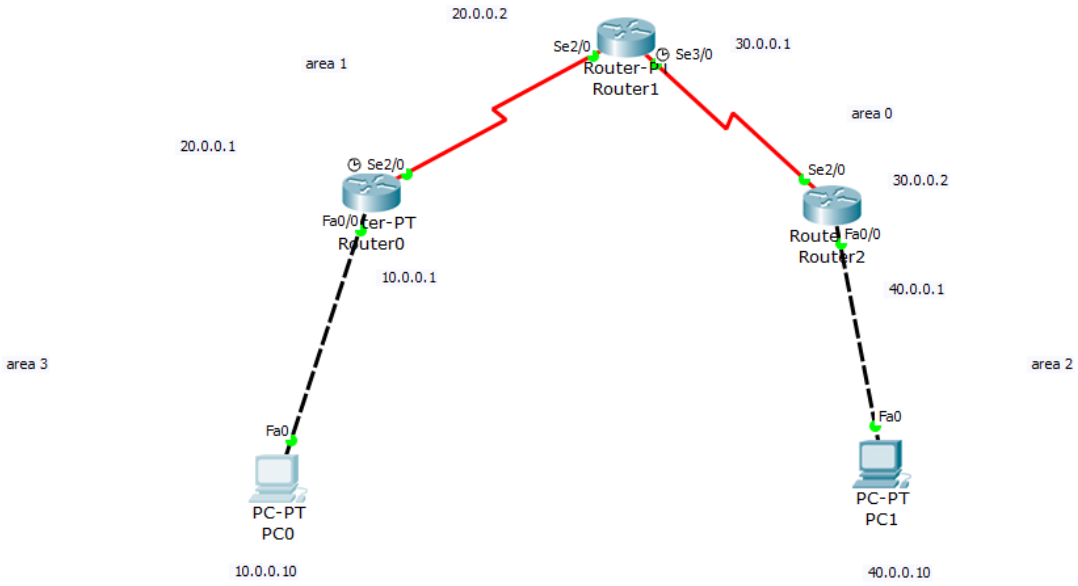
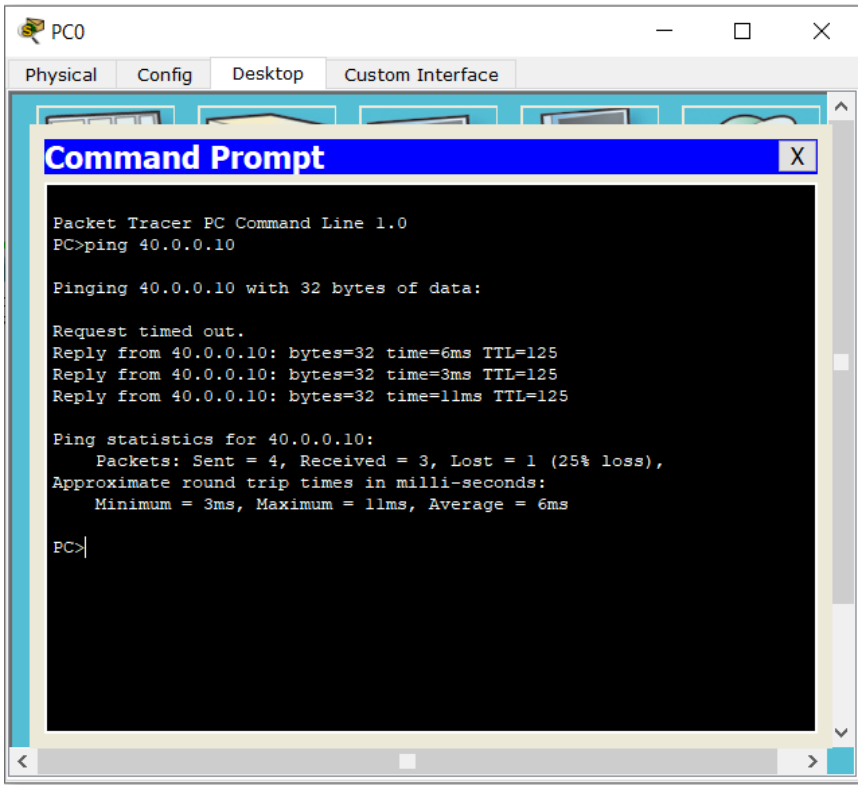
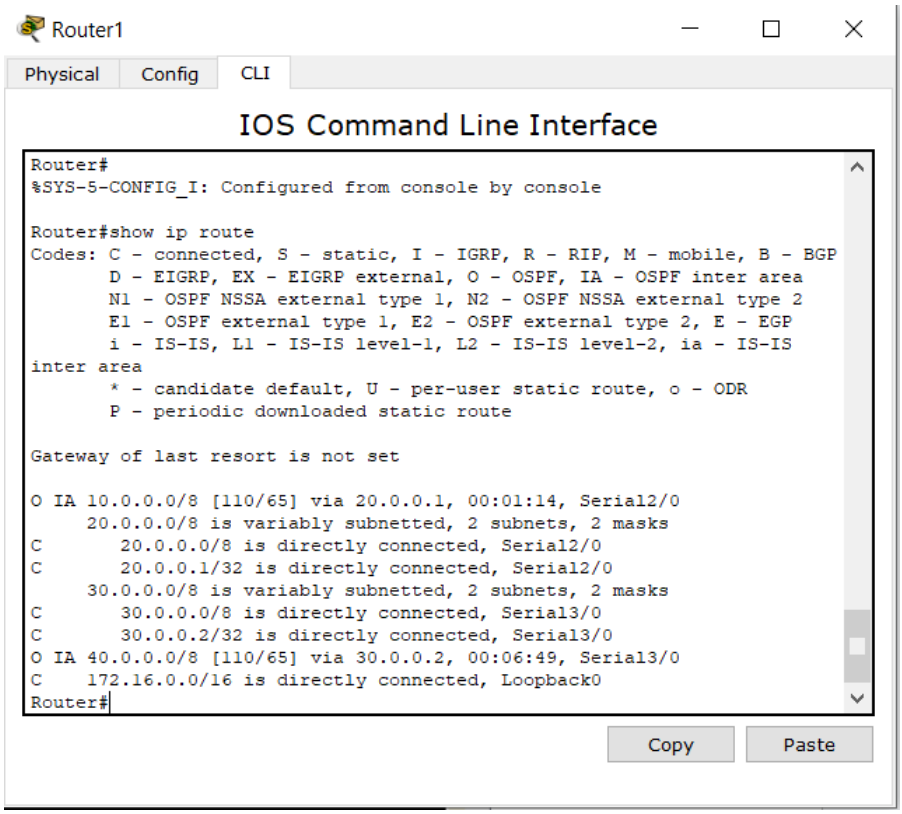
Topology:


20.0.0.2
Se2/0
Se3/0
30.0.0.1
area 1
Router-PT
Router1
area 0
20.0.0.1
Se2/0
Se2/0
30.0.0.2
Fa0/0
Router-PT
Router0
Router-PT
Router2
Fa0/0
10.0.0.1
40.0.0.1
area 3
area 2
Fa0
Fa0
PC-PT
PC0
PC-PT
PC1
10.0.0.10
40.0.0.10

Result:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>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=6ms TTL=125
Reply from 40.0.0.10: bytes=32 time=3ms TTL=125
Reply from 40.0.0.10: bytes=32 time=11ms 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 = 3ms, Maximum = 11ms, Average = 6ms
PC>


Router1
Physical
Config
CLI
IOS Command Line Interface
Router#
%SYS-5-CONFIG_I: Configured from console by console
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 [110/65] via 20.0.0.1, 00:01:14, Serial2/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial2/0
C 20.0.0.1/32 is directly connected, Serial2/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial3/0
C 30.0.0.2/32 is directly connected, Serial3/0
O IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:06:49, Serial3/0
C 172.16.0.0/16 is directly connected, Loopback0
Router#
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