OSPF (Open Shortest Path First)

show ip route

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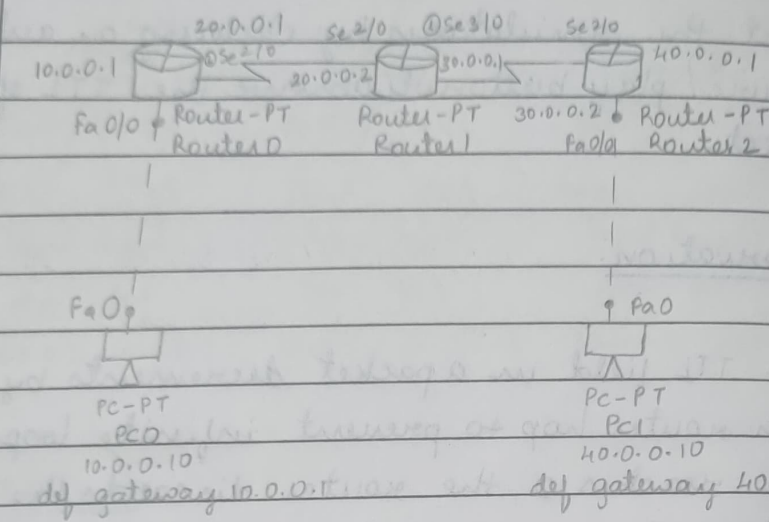
Experiment-7

Q How to configure OSPF Routing Protocol & connect areas

Aim: To configure OSPF routing protocol & connect areas



Topology:

1. Router 1 connected to Router 0 & Router 2 through interfaces Se 2/0 & Se 3/0

2. PC 0 connected to Router 0 via copper cross cable through Fa 0/0 interface with ip address 10.0.0.10

3. PC 1 connected to Router 2 via cross cable through Fa 0/0 interface, with ip address 40.0.0.10

Procedure:

Open cisco packet tracer & drag the following:
Router: Place 3 routers in the middle.
PC: Place 2 PCs, each connected to Router 0.

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& Router1 via Fa 0/0 interface

Configure all 3 routers:

- Router 0:

Router> enable
Router# config terminal
Router (config)> interface fastethernet 0/0
Router (config-if)> ip address 10.0.0.1 255.0.0.0
Router (config-if)> no shut

Router (config)> interface serial 2/0
Router (config-if)> ip address 20.0.0.1 255.0.0.0
Router (config-if)> encapsulation ppp
Router (config-if)> clock rate 64000
Router (config-if)> no shut

- Router 1:

Router (config)> interface serial 2/0
Router (config-if)> encapsulation ppp
Router (config-if)> ip address 20.0.0.2 255.0.0.0
Router (config)> interface serial 3/0
Router (config-if)> ip address 30.0.0.1 255.0.0.0
Router (config-if)> encapsulation ppp
Router (config-if)> clock rate 64000
Router (config-if)> no shut.

- Router 2:

Router (config)> interface serial 2/0
Router (config-if)> ip address 30.0.0.2 255.0.0.0
Router (config-if)> encapsulation ppp
Router (config-if)> clock rate 64000
Router (config-if)> no shut

Router (config) > interface fastethernet 0/0
Router (config-if) > ip address 40.0.0.1 255.0.0.0
Router (config-if) > no shut
Router (config) > exit

- PC1

Set ip address = 10.0.0.10
Subnet Mask = 255.0.0.0
Gateway = 10.0.0.1

- PC2

Set ip address = 40.0.0.10
Subnet Mask = 255.0.0.0
Gateway = 40.0.0.1

→ Enable ip routing for configuring ospf routing protocol in all routers

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

Router 1:
Router (config)# router ospf 1
Router (config)# router-id 2.2.2.2
Router (config)# network 20.0.0.0 0.255.255.255
Router (config)# network 30.0.0.0 0.255.255.255
Router (config) # exit.

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Router 2:

Router (config) # router ospf 1
Router (config) # router-id 3.3.3
Router (config) # network 30.0.0.0 0.255.255.255 area 0
Router (config) # network 40.0.0.0 0.255.255.255 area 2
Router (config) # exit

→ Configure loopback address to routers

R0 (config) # interface loopback 0
R0 (config) # ip address 172.16.1.252 255.255.0
R0 (config) # no shut

R1 (config) # interface loopback 0
R1 (config) # ip address 172.16.1.253 255.255.0
R1 (config) # no shut

R2 (config) # interface loopback 0
R2 (config) # ip address 172.16.1.254 255.255.0
R2 (config) # no shut

→ Create virtual link b/w R0, R1

a3

area 1

Router 0

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

Router 1

area 1
area 0

R1 (config) # router ospf 1
R1 (config) # area 1 virtual-link 1.1.1.1
R1 (config) # exit.

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Observation:

The experiment demonstrates how OSPF dynamically learns & advertises routes, enabling efficient & scalable routing across multiple areas.

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