WEEK-7

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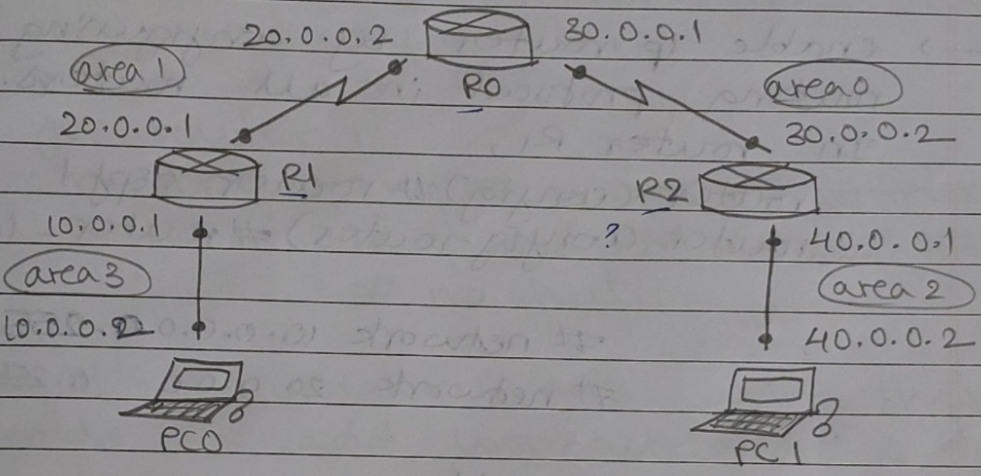
(1) Config. OSPF routing protocol & connect areas

- Topology:



- Procedure:

→ create topology w/ 2PC & 3 routers

→ config. ip address for PC as 10.0.0.2 & 40.0.0.2 ;

→ config. routers w/ ip address for all interfaces.

→ for all se ports of routers, config using cmd "encapsulation ppp" & give "clock rate 64000" command at ports having clock symbol.

⇒ for Router 2

router (config) # interface se 2/0
router (config-if) # ip encapsulation ppp
no shut
exit

router(config)# interface se 3/0
router (config-if)# encapsulation ppp
clock rate 64000
no shut

→ enable ip router by configuring OSPF routing protocol in all routers.
In router R1,
router (config)# router ospf 1
router (config-router)# router-id 1.1.1.1
area 3

network 10.0.0.0 0.255.255.255
network 20.0.0.0 0.255.255.255
area 1

exit
He config 4 to routers 2 & 3.

→ check routing table of R1
router # show ip route
codes C-connected, S-static, R-RIP, M-Mobile, B-BGP, O-OSPF, IA-OSPF, inter area N1-OSPF NSS A extend type 1.

gateway of last resort is not set
C 10.0.0.0/8 is directly connected, fa 2/0
C 20.0.0.0/8 is directly connected, se 2/0
OIA 40.0.0.0/8 via 20.0.0.2, 00:04:23, se 2/0
OIA 30.0.0.0/8 via 20.0.0.2, 00:07:29, se 2/0
R2 knows area 0, network 20.0.0.0 connected to R2 from R1, so R1 learns through this network.

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→ there must be 1 interface up to keep OSPF process up. So it's better to config. loopback address to routers. Its virtual interface, never goes down once we config. it.

for router 1:

```
router(config-if)# interface loopback 0
                  # ip add 172.16.1.252 255.255.0.0
                  # no shut
```

do ll^le for router 2 & 3. using these cmds we add loopback address to the routers.

→ If we check the routing table from R3,

```
R3 # show ip route
codes: C - connected, S - static, O - OSPF,
       IA - OSPF
gateway of last resort is not set
O IA  20.0.0.0/8 [110/128] via 30.0.0.1,
                  00:18:58, se 2/0
C    40.0.0.0/8 is directly connected; fa 0/0
C    30.0.0.0/8 is directly connected; se 0/0
```

R3 (router 3) doesn't know about area 3, so, we will create virtual link b/w R1 & R3.

→ we have to create virtual link b/w R1 & R2; with this we create a virtual link to connect area 3 to 0.

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In router R1:
router (config) # router OSPF 1
router (config-router) # area 1 virtual link 2.2.2.2

∵ R2 of virtual link 1.1.1.1
exit.

→ R2 & R3 get updates about area 3,
check routing table for R3.

router # show ip route
codes: C-connected, O-OSPF, IA-OSPF,
gateway of last resort is not set.

O/A 20.0.0.0/8 [110/128] via 80.0.0.1, 00:01:56, se2/0
C 40.0.0.0/8 is directly connected.
O/A 10.0.0.0/8 [110/128] via 30.0.0.1, 00:01:56, se2/0
C 30.0.0.0/8 is directly connected, se 2/0

→ Now, ping 10.0.0.2 to 40.0.0.2 for o/p.

- OUTPUT-
> ping 40.0.0.2 with 32 bytes of data:

reply from 40.0.0.2 : bytes=32 time=2ms TTL=125
reply from 40.0.0.2 : bytes=32 time=2ms TTL=125
reply from 40.0.0.2 : bytes=32 time=2ms TTL=125
reply from 40.0.0.2 : bytes=32 time=2ms TTL=125

ping statistics for 40.0.0.2:
packets: sent=4, recieved=4, lost=0

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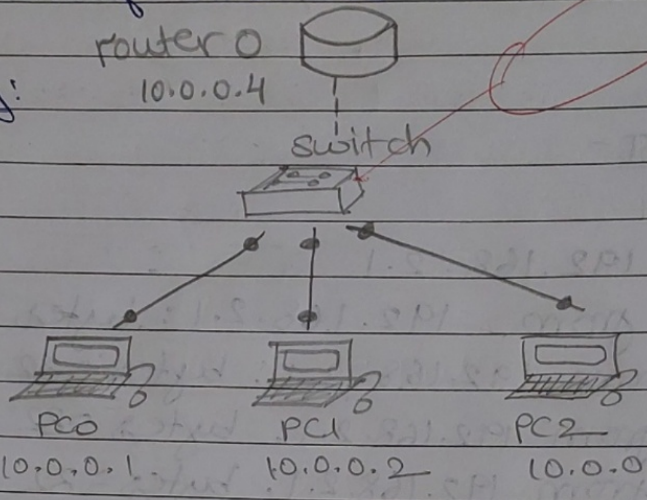
(I) Construct a LAN & understand the concept & operation of address resolution protocol (ARP)

- Topology:



- Steps:

→ configure IP: PC0 (CMD)

arp -a
ping 10.0.0.2
arp -a
arp -d

- OUTPUT:

arp -a (no ARP enteries found)

→ ping 10.0.0.2

reply from 10.0.0.2 bytes = 32 time 0ms TTL = 128
reply from 10.0.0.2 bytes = 32 time 0ms TTL = 128
reply from 10.0.0.2 bytes = 32 time 0ms TTL = 128

→ arp -a

internet address physical address type
10.0.0.2 0002.1615.9820 dynamic