

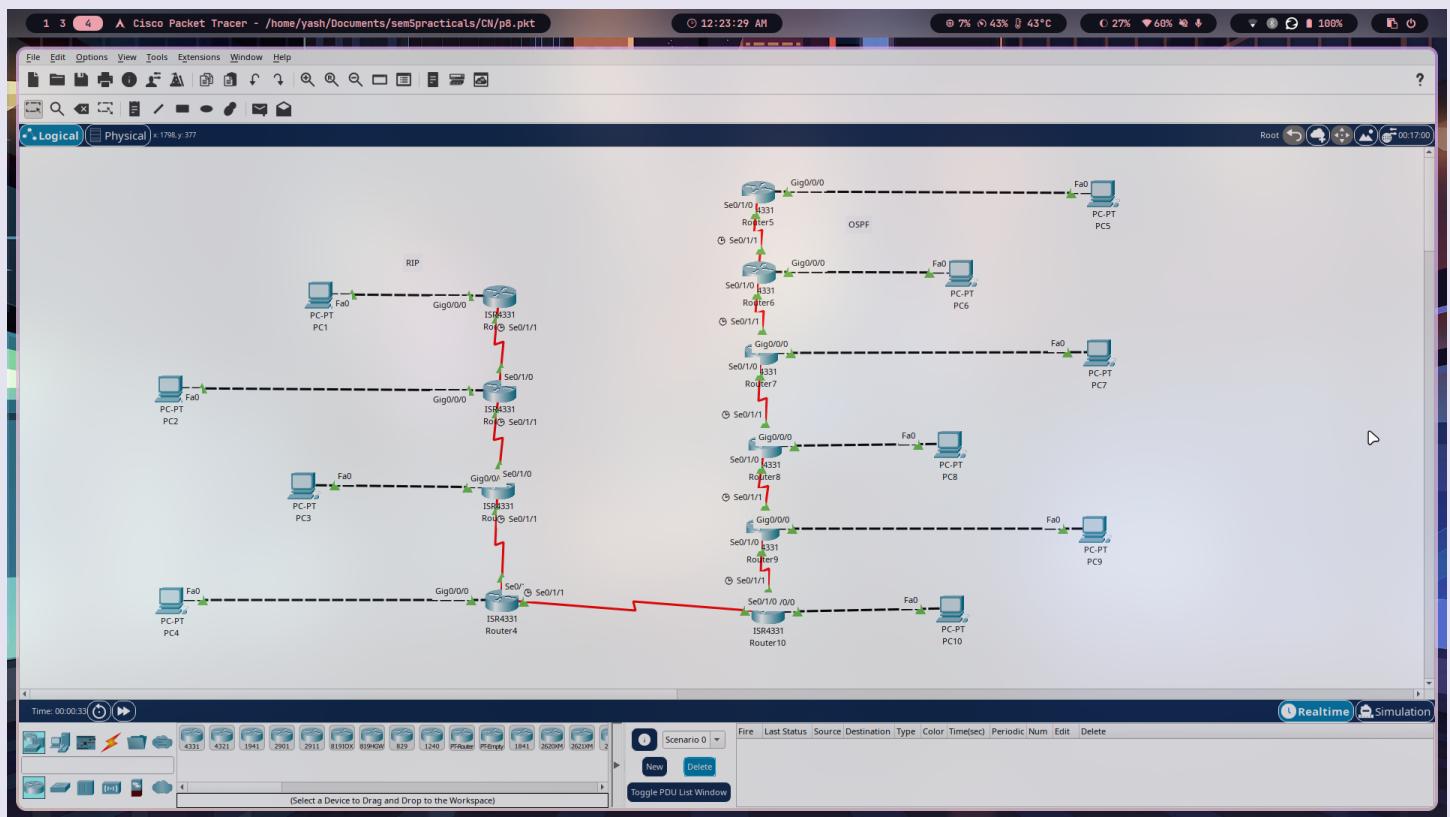
Practical 8

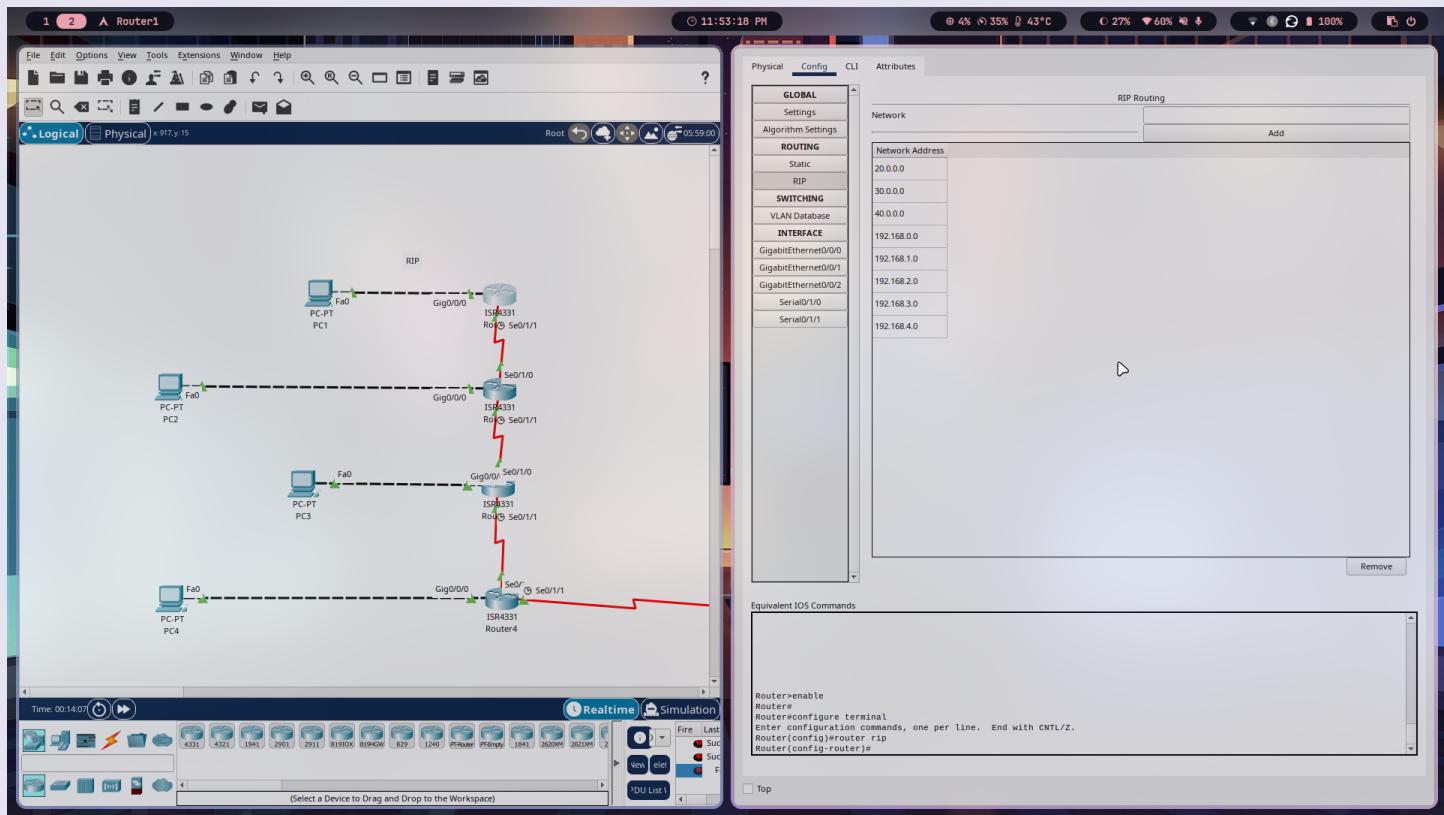
Aim : To design a network using Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) Protocol.

Scenario : Design a network having 10 routers. Among them the 4 routers are used in a company's network and others are used to provide the connectivity to the outer networks. Use RIP and OSPF routing protocols in the design. Make sure all the devices are able to communicate with each other. Also make sure that the routers utilized outside the organization are using Classless Inter-Domain Routing (CIDR). So, assign the IP addresses accordingly.

Procedure :

1. Design the network with 2 Autonomous systems as follows and implement the RIP routing in 4 routers as shown





- After implementing the RIP routing in AS-1 via RIP settings in Router settings do OSPF routing in the others via CIDR subnetting :

Subnetting : (for less wastage of IP addresses)

Requirement $\leq 2^{n-2}$

$10 \leq 16 - 2$

Taking $n=4$, $10 \leq 14$

So only 4 IP address wastage instead of many

Old Subnet Mask : 255.255.255.0

New Subnet Mask : 255.255.255.240 (also simply by 255-15)

Subnet 1:

Network ID: 164.164.5.0/28

First IP: 164.164.5.1/28

Last IP: 164.164.5.14/28

Broadcast ID: 164.164.5.15/28

Subnet 2:

Network ID: 164.164.5.16/28
First IP: 164.164.5.17/28
Last IP: 164.164.5.30/28
Broadcast ID: 164.164.5.31/28

Subnet 3:

Network ID: 164.164.5.32/28
First IP: 164.164.5.33/28
Last IP: 164.164.5.46/28
Broadcast ID: 164.164.5.47/28

Subnet 4:

Network ID: 164.164.5.48/28
First IP: 164.164.5.49/28
Last IP: 164.164.5.62/28
Broadcast ID: 164.164.5.63/28

Subnet 5:

Network ID: 164.164.5.64/28
First IP: 164.164.5.65/28
Last IP: 164.164.5.78/28
Broadcast ID: 164.164.5.79/28

Subnet 6:

Network ID: 164.164.5.80/28
First IP: 164.164.5.81/28
Last IP: 164.164.5.94/28
Broadcast ID: 164.164.5.95/28

Subnet 7:

Network ID: 164.164.5.96/28
First IP: 164.164.5.97/28
Last IP: 164.164.5.110/28
Broadcast ID: 164.164.5.111/28

Subnet 8:

Network ID: 164.164.5.112/28

First IP: 164.164.5.113/28

Last IP: 164.164.5.126/28

Broadcast ID: 164.164.5.127/28

Subnet 9:

Network ID: 164.164.5.128/28

First IP: 164.164.5.129/28

Last IP: 164.164.5.142/28

Broadcast ID: 164.164.5.143/28

Subnet 10:

Network ID: 164.164.5.144/28

First IP: 164.164.5.145/28

Last IP: 164.164.5.158/28

Broadcast ID: 164.164.5.159/28

Subnet 11:

Network ID: 164.164.5.160/28

First IP: 164.164.5.161/28

Last IP: 164.164.5.174/28

Broadcast ID: 164.164.5.175/28

3. Setup OSPF routing in all routers with single ID by these CLI commands :

Initialize :

en

config t

Then : (first IP and second of neighbour router)

router ospf 1

network 164.164.5.0 0.0.0.15 area 0

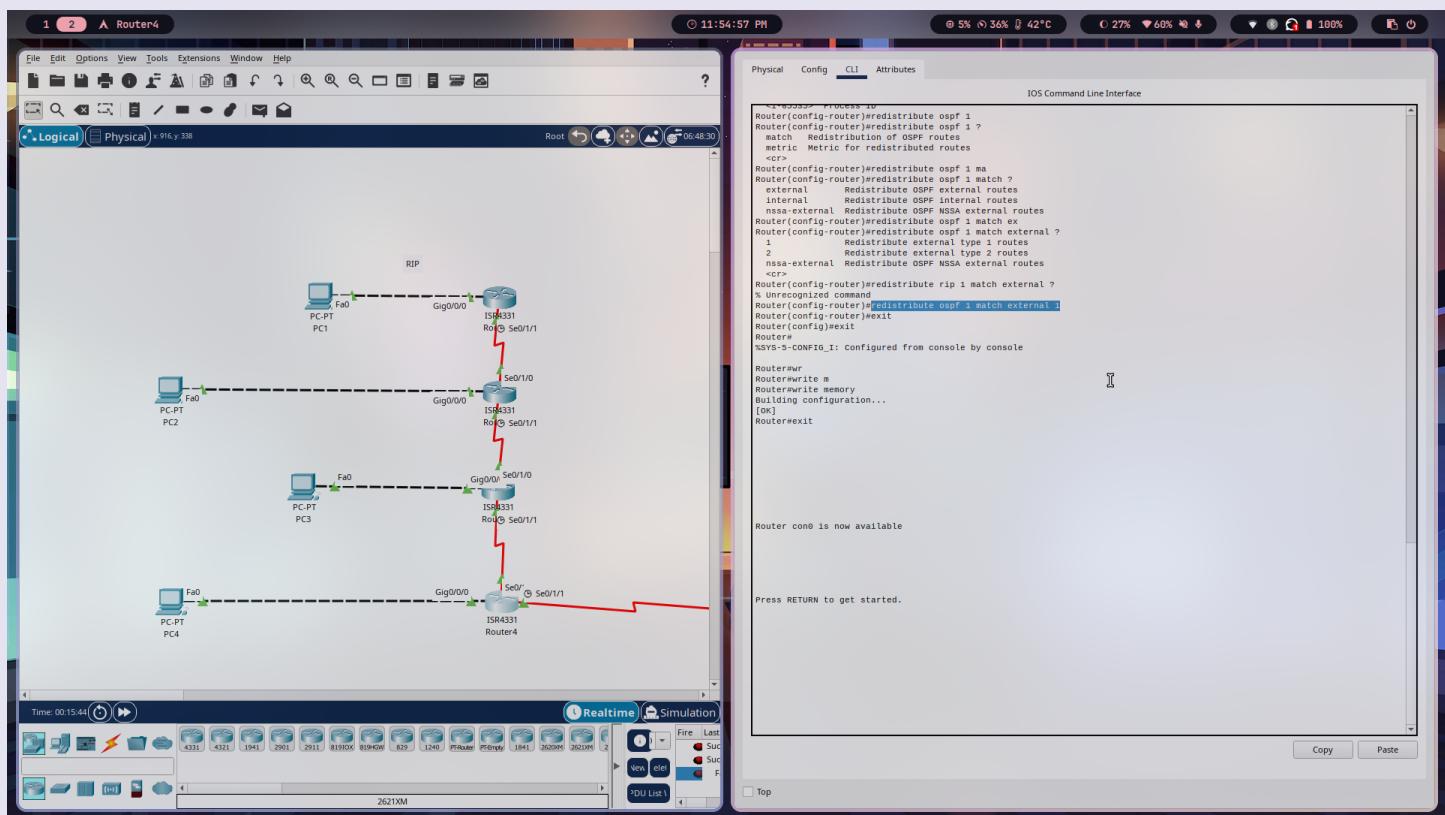
network 164.164.5.96 0.0.0.15 area 0

Afterwards :

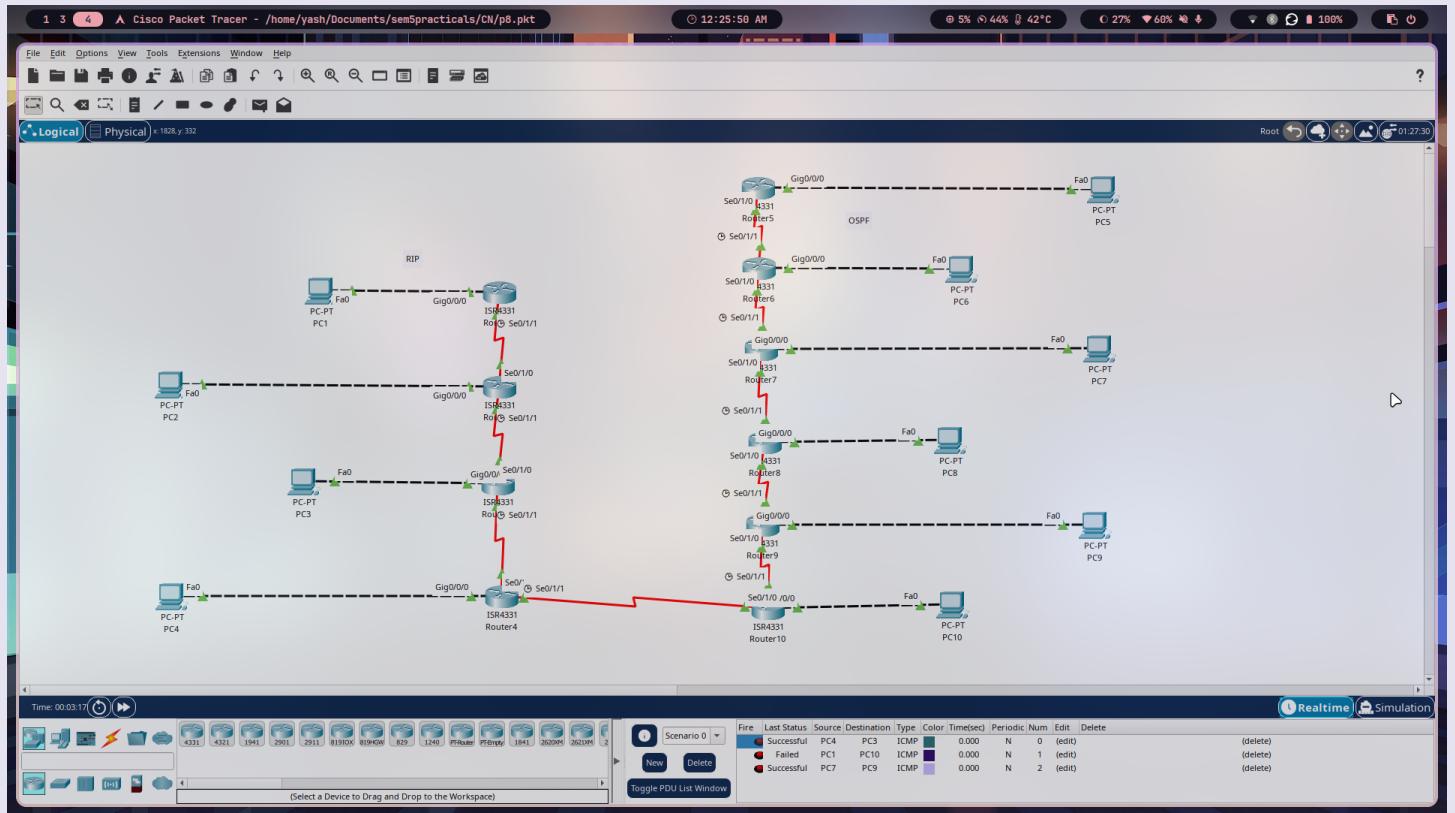
exit

wr mem

4. Now, redistribute between RIP and OSPF



5. Check if the successful attempts are there in communication among the hosts in the Autonomous Systems.



Conclusion : From this experiment, the two routing algorithms RIP and OSPF are implemented and understood. RIP routing is the easiest but with the limit of max 15 hops, while OSPF has advantages over RIP as unlike simple networks in RIP, OSPF can handle larger networks.