Experiment 8: IP Subnetting

1. Aim:

a. To design subnets and implement Subnetting in a LAN using packet tracer.
b. Implement the subnetted LAN using Hardware.

2. Tools Used: Cisco packet tracer, Cisco Router and Switch (Hardware)

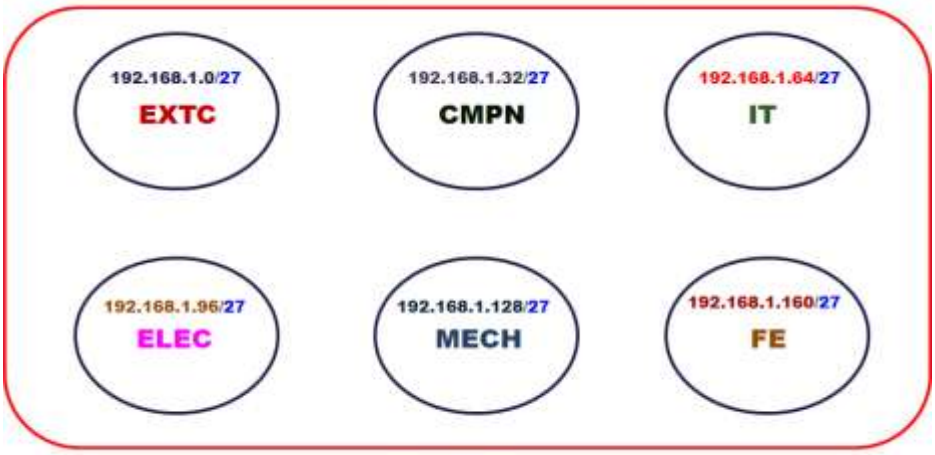
3. Related Theory:

A subnet is a logical subdivision of an IP network. The practice of dividing a network into two or more smaller networks is called subnetting. It increases routing efficiency, enhances the security of the network and reduces the size of the broadcast domain.

A single large network has following disadvantages:

- Single broadcast domain: All hosts are in same broadcast domain. A broadcast sent by any device on the network will be processed by all hosts, creating unnecessary traffic.
- Network security: Each device can reach any other device on the network, which can present security problems. For example, a server containing sensitive information shouldn't be in the same network as user's workstations.
- Organizational problems: In a large network, different departments are usually grouped into different subnets. For example, Group all devices from Accounting department in same subnet & then give access to sensitive financial data only to hosts from that subnet.

Subnetting solves above problems and help network admins manage network in a more efficient manner along with better and tighter security for crucial systems.



SFIT LAN

Fig: 1: Application of Subnetting

4. Laboratory Exercise:

Given Block of IPs: **192.168.10.0/24**

- Create a LAN of 8 PCs and 2 web servers and configure using above block of IPs.
- Demonstrate problem of broadcast in above network by sending broadcast traffic.
- Now divide the given block of IPs into 8 subnets using subnetting.
- Use any 2 subnets out of 8 created above to configure LANs as shown in fig 2.
- Observe broadcast messages reachability & benefits of subnetting.

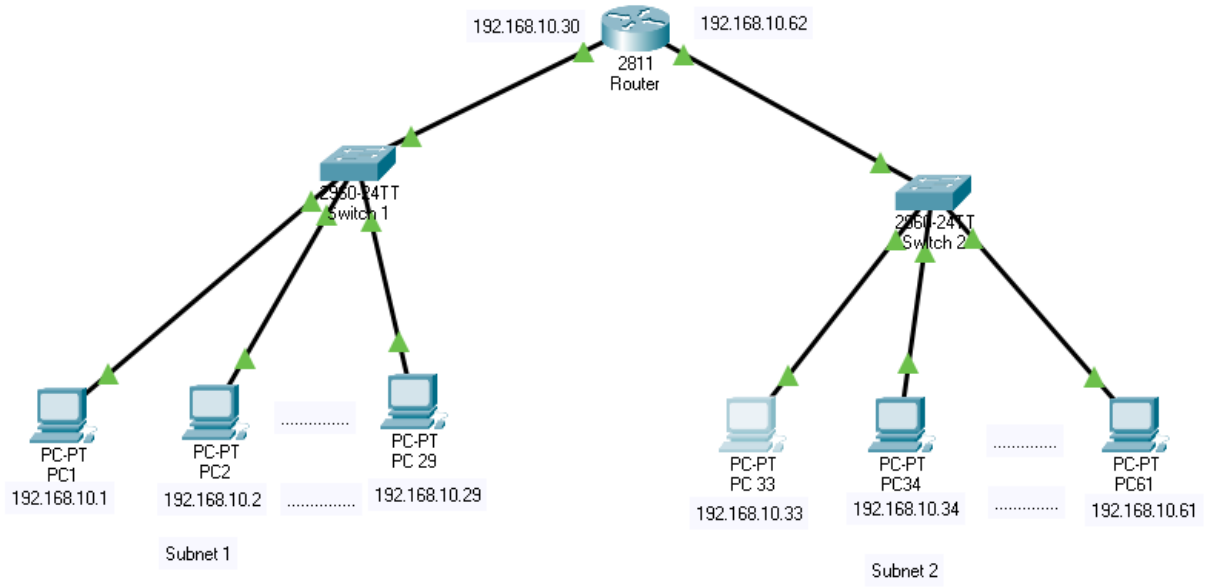


Fig. 2: Subnetting Implementation in LAN

5. Post-Experiment Exercise:

A. Conclusion

B. Questions:

1. Explain how problem of collision & Broadcast domain is solved using Subnetting.
2. What is VLSM in subnetting? Explain the use of VLSM with example.