Exp 2 : Build simple LANs, perform basic configurations for switches using simulator

Aim

To design and configure a simple Local Area Network (LAN) using a network simulator and perform basic switch configurations.

Objective

- To understand how LANs are built using switches and hosts
- To perform basic switch configurations like hostname, VLAN and port settings
- To test en-to-end connectivity between devices using tools like ping

Software Required

- Cisco Packet Tracer
- Alternative: GNS3 or Boson Netsim
- Laptop/PC with administrative access

Background Theory

A Local Area Network (LAN) is a group of interconnected devices in a limited area (e.g., home, office, lab). LAN uses network switches to connect devices, enabling them to share resources and communicate efficiently.

Switches operate at the Data link layer (layer 2) of the OSI model. They learn MAC addresses and forward frames only to the intended destination, making them more efficient than hubs.

Basic Switch configuration includes:

- Setting a hostname
- Enabling ports
- Assigning ports to VLAN’s
- Saving configurations

Simulators like Cisco packet tracer provide a safe, environment to build networks and practice configurations without physical devices.

Algorithm

1. Launch the network simulator (e.g., packet tracer)
2. Place atleast 2 PCs and 1 switch on the workplace
3. Connect PCs to the switch using copper straight-through cables
4. Configure IP address on PCs
5. Configure basic switch settings using the CLI (Command Line Interface)

6. Test Connectivity using the ping command between PCs

Step-by-Step Procedure

1. Designing the LAN Topology

- Open Cisco Packet Tracer
- Drag and Drop
    i. 1 switch (e.g., 2960)
    ii. 2 PCs
- Use copper straight through cables to connect each PC to a switch port (e.g., FastEthernet0/1 and 0/2)

2. Configure IP Addresses on PCs

1. Click on PC1 → Desktop → IP Configuration
   IP Address: 192.168.1.1
   Subnet Mask: 255.255.255.0
2. Click on PC2 → Desktop → IP Configuration
   IP Address: 192.168.1.2
   Subnet Mask: 255.255.255.0

3. Basic Switch Configuration

Click on switch → CLI tab and enter

4. Test Connectivity

Click on PC1 → Desktop → Command prompt

Ping 192.168.1.2

Expected Output

- Both PCs can ping each other successfully
- The switch is named **Labswitch** and has active ports
- Green link lights are visible between PCs and switch ports

Result

A basic LAN was created and the switch was configured successfully. End to end connectivity between devices was verified.

Pre Viva questions

1. What is the purpose of a switch in LAN?
2. What type of cable is used to connect a PC to a switch?
3. What command is used to assign a hostname to a switch?
4. What does VLAN 1 represents in a switch?
5. How do you test network connectivity?

Post Viva Questions

1. What is the difference between a switch and a hub?
2. Why do we use VLAN in a switch?
3. What happens if two PCs have the same IP?
4. What does the command **switchport** mode access do?
5. How can you configure remote access (e.g., telnet or SSH) on a switch?