Computer Network Lab

LAB-2   **Date-5/8/24**

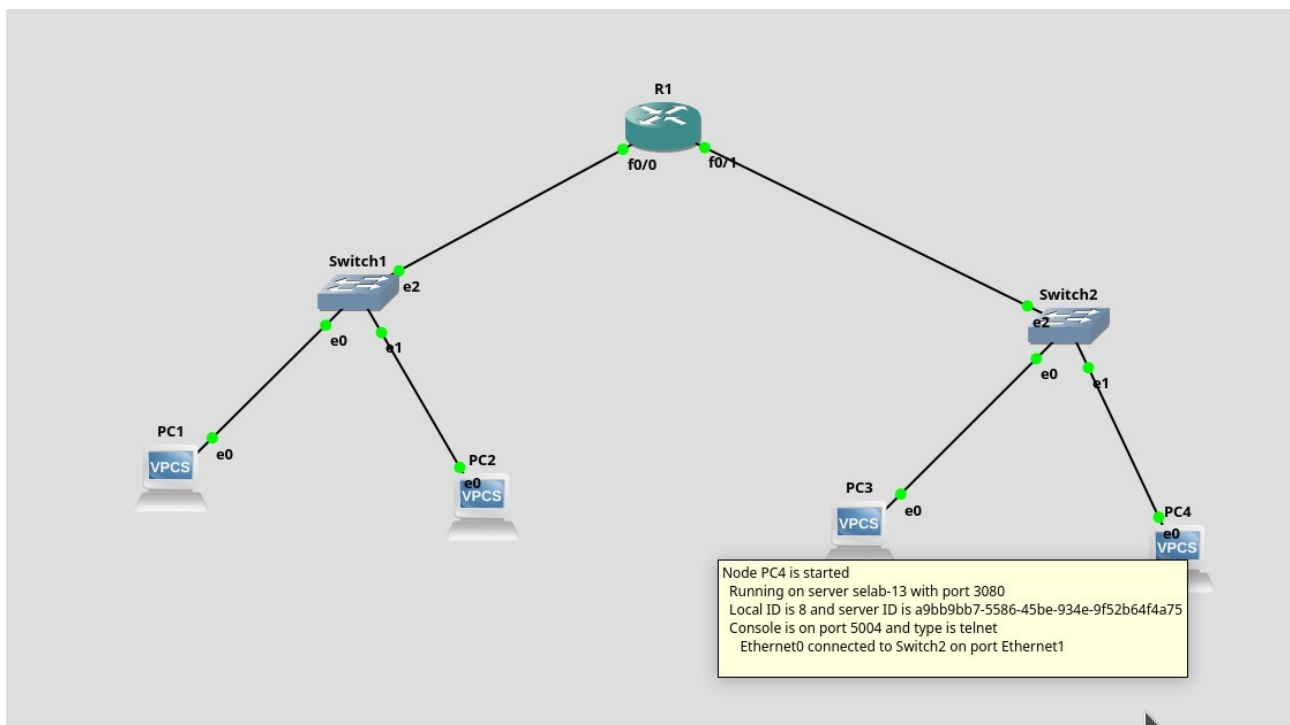**Name-Aditya Agarwal**   **Roll No-14**   **Section-CSE B**

Objective:

Objective of this experiment is to configure and interconnect multiple PCs using switches and routers and analyze network performance.

Equipments:

Four PCs
Two Switches
One Router
GNS3 Software
Wireshark (for network analysis)
Cisco IOS image

Network Topology:

In this experiment we use four PCs connected through two switches and one router. The diagram below represents the network setup:

Configuration Details:

The following details outline the IP addressing scheme, subnetting, and configuration for each device:

PC Configuration:

PC1:
   IP Address: 192.168.100.1/24
   Gateway: 192.168.100.254

PC2:
   IP Address: 192.168.100.2/24
   Gateway: 192.168.100.254

PC3:
   IP Address: 150.50.0.1/16
   Gateway: 150.50.254.254

PC4:
   IP Address: 150.50.0.1/16
   Gateway: 150.50.254.254

Switch Configuration:

Switch1:
   Connected to PC1, PC2, and Router

Switch2:
   Connected to PC3, PC4, and Router

Router Configuration:
   Interfaces configured to connect with the switches and manage the routing between the networks.

Steps to configure router

1-Type config t
R1# config t

2-Click on show/hide interface

3-Type int f0/0(whatever connected to router)
R1(config)# int f0/0

4-**R1(config)# ip address 192.168.100.254 255.255.255.0**

5-**R1(config)# no shut**

6-**end**

7-**R1# config t**

9-**R1(config)# int f0/1**

10-**ip address 192.168.100.254 255.255.255.0**

11-**no shut**

Testing and Verification:

To verify several ping tests were made:

Ping Tests:
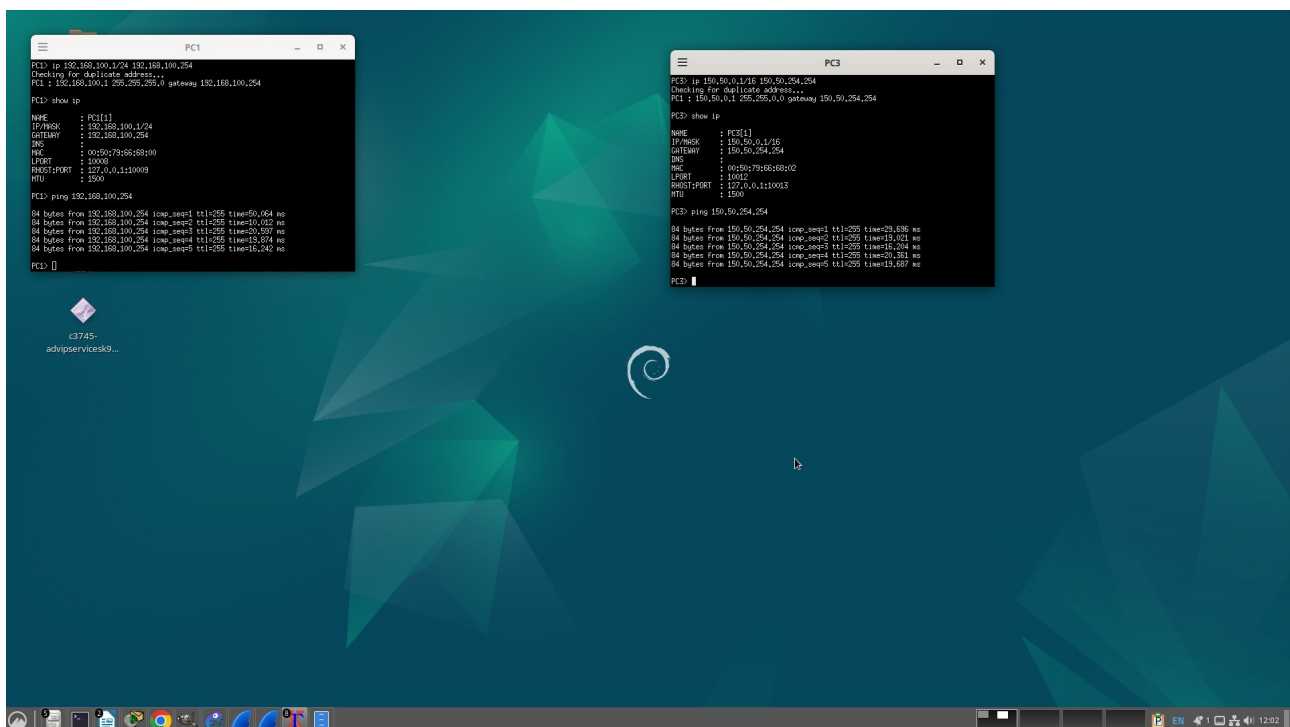From PC1 to its Gateway (192.168.100.254)
From PC3 to its Gateway (150.50.254.254)
From PC1 to PC3 through the router (150.50.0.1)

Screenshots:

Screenshots of ping results and commands:

PC1 and PC3 Configuration and Ping Results:

Analysis and Conclusion:

The tests confirmed connectivity between the PCs and the router. The results demonstrated the correct configuration of IP addresses, gateways, and routing paths.This experiment shows the configuration and interconnection of multiple PCs using switches and routers, providing idea of network performance and troubleshooting.

Q2-Network Infrastructure Design for a Small Organization

Objective

The goal is to design and implement a network infrastructure for a small organization with four distinct sections: Administration, Accounts and Finance, Information Technology (IT), and Database. The network should ensure efficient communication and data sharing among departments while maintaining security and scalability.
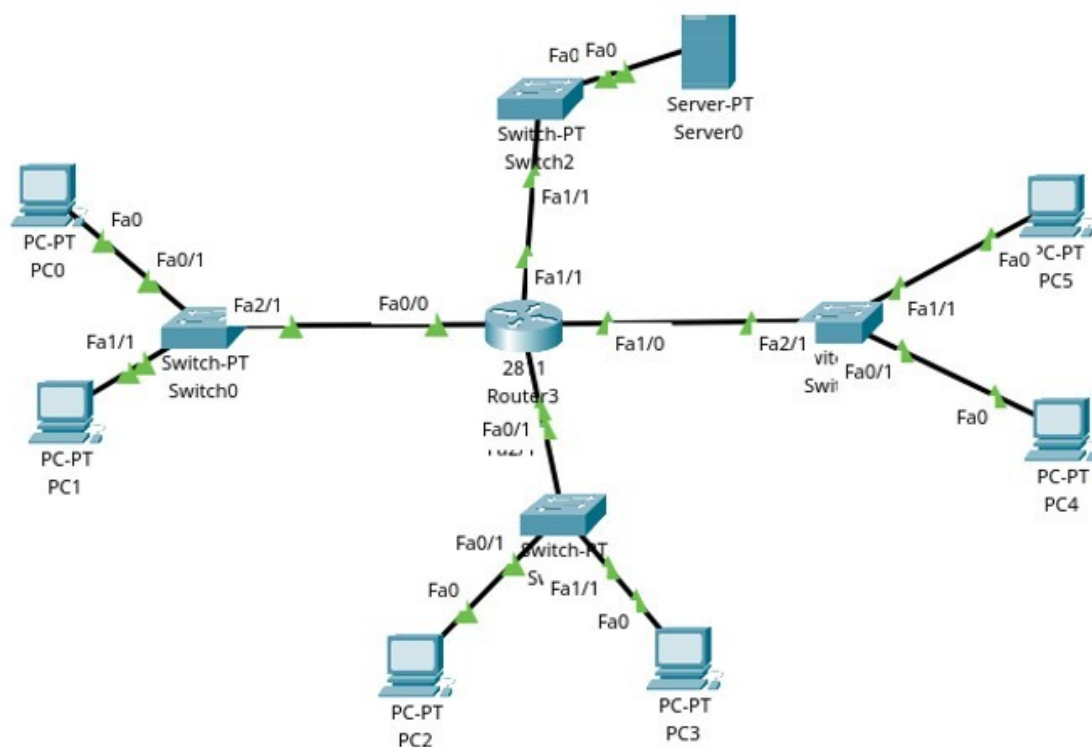
Network Design Overview

Topology consists of four sections connected to a central router. The design includes switches, routers, and end devices such as PCs and servers. Each section is assigned a unique IP address range to facilitate network management and security.

Sections and IP Addressing

1. **Administration Section**

    Devices: PC0, PC1
    IP Address Range: 192.168.2.0/24
    Switch: Switch0

2. **Accounts and Finance Section**

    Devices: PC2, PC3

IP Address Range: 192.168.3.0/24

Switch: Switch1

3. **Information Technology (IT) Section**

Devices: PC4, PC5

IP Address Range: 192.168.4.0/24

Switch: Switch2

4. **Database Section**

Devices: Server0

IP Address Range: 192.168.1.0/24

Switch: Switch3

Router Configuration

Each subnet is connected to the router via a specific interface, and static routes are configured to ensure inter-department communication.

Detailed Network Components

1. **Router0**

Interface Configuration:

`192.168.1.1` for Database Section

`192.168.2.1` for Administration Section

`192.168.3.1` for Accounts and Finance Section

`192.168.4.1` for IT Section

2. **Switch0 (Administration Section)**

Connected Devices: PC0 (192.168.2.3), PC1 (192.168.2.2)

Uplink to Router0: `192.168.2.1`

3. **Switch1 (Accounts and Finance Section)**

Connected Devices: PC2 (192.168.3.3), PC3 (192.168.3.2)

Uplink to Router0: `192.168.3.1`

4. **Switch2 (IT Section)**

Connected Devices: PC4 (192.168.4.3), PC5 (192.168.4.2)

Uplink to Router0: `192.168.4.1`

5. **Switch3 (Database Section)**

Connected Devices: Server0 (192.168.1.100)

Uplink to Router0: `192.168.1.1`

Steps

1. **Setup**: Connect the PCs, servers, switches, and router as per the topology.
2. **IP Configuration**: Assign IP addresses to all devices and configure the router interfaces.
3. **VLAN Configuration**: Configure VLANs on switches to segregate traffic within each section.
4. **Routing Configuration**: Set up static routes on the router to enable inter-department communication.

5. **Testing**: Test connectivity between devices within the same section and across different sections to ensure proper communication.

Conclusion

The designed network infrastructure provides efficient communication, data sharing for the small organization dividing the network into different sections help organization ensure smooth operations of its network.