Report No: 05

Experiment Name: Two LANs connected by two router in Cisco Packet Tracer,

Objective:

The objective of this project is to design and simulate a basic network topology using Cisco Packet Tracer that demonstrates the interconnection of two Local Area Networks (LANs) through two routers. This simulation aims to:

- Understand the configuration and functionality of routers in inter-LAN communication.
- Learn how to assign IP addresses and subnet masks correctly for different network segments.
- Enable communication between two LANs using static routing or dynamic routing protocols.
- Practice basic network troubleshooting using Cisco CLI tools (e.g., ping, traceroute).
- Enhance hands-on skills in network design, addressing, and router configuration in a simulated environment.

Components:

Software:

Cisco Packet Tracer – for designing, simulating, and testing network configurations.

Devices:

Router (2 unit), Switch (2 units) , PCs or Laptops (4–6 units).

Wires:

• Ethernet Cables (Straight-Through):

Used to connect PCs/laptops to switches and switches to routers.

• Ethernet Cables (Crossover):

Used to connect similar devices, such as PC to PC or router to router.

Theory

A Local Area Network (LAN) is a group of computers and devices connected within a limited geographical area, such as a home, school, office, or campus. LANs are used to share resources like files, printers, and internet connections among connected devices. They can range in size from a small home network to an enterprise-level network supporting thousands of devices. A LAN is confined to a

specific area, unlike Wide Area Networks (WANs) **or** Metropolitan Area Networks (MANs)**,** which span broader geographic regions and often interconnect multiple LANs.

A Route**r** is a critical network device used to connect different networks and manage traffic between them. Operating at the Network Layer (Layer 3) of the OSI model, it forwards data packets based on their **IP addresses**. Routers are essential for enabling communication between devices on different networks or subnets. In this experiment, two routers are used to connect two separate LANs, allowing them to communicate with each other through routing configurations.

A Switch is another vital networking device used within a LAN. It connects multiple devices, such as PCs, printers, and servers, allowing them to communicate efficiently. Operating at the Data Link Layer **(**Layer 2) of the OSI model, a switch uses MAC addresses to forward data frames to the appropriate devices. It plays a central role in managing traffic within the LAN and reducing network congestion by directing data only where it's needed.

In this project setup, each LAN includes end devices (like PCs) connected to a switch. These switches are then connected to their respective routers. The routers are configured to establish communication between the two LANs, enabling data exchange across network boundaries using either static or dynamic routing.

Figure:

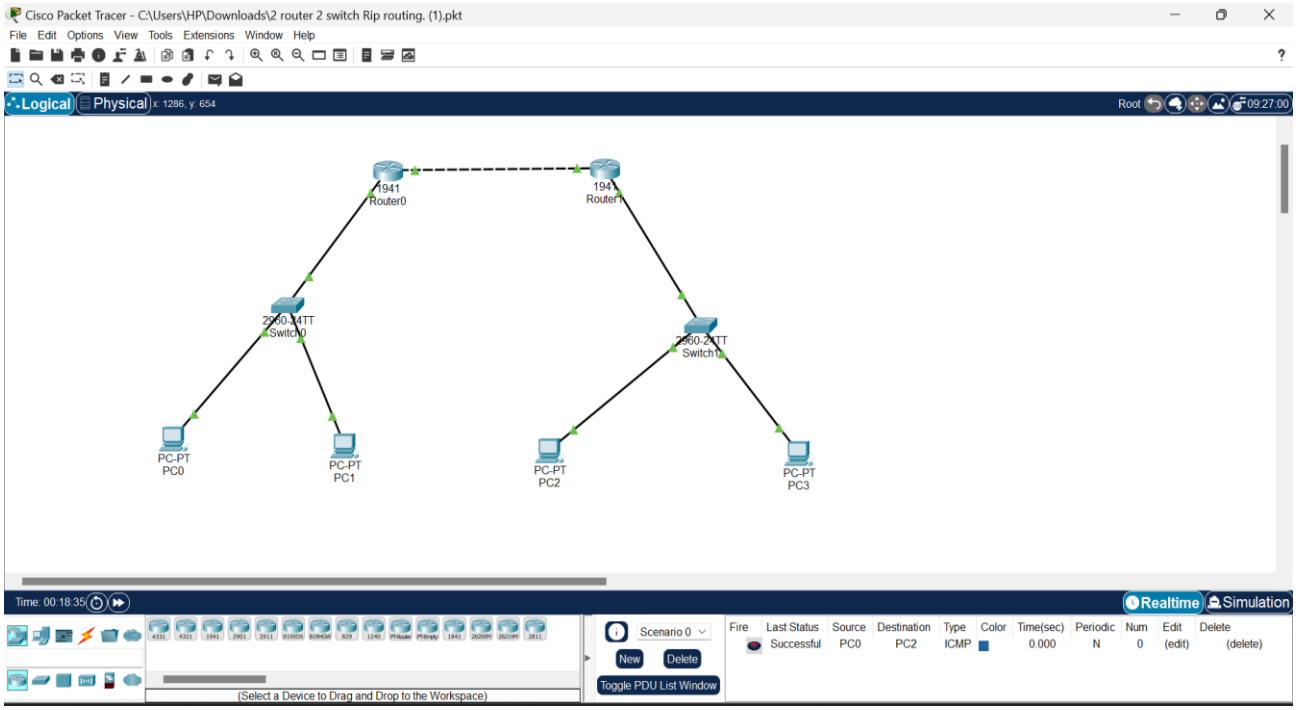

Figure: Router Configuration.

Description

This project involves the design and simulation of a network topology using Cisco Packet Tracer to demonstrate the interconnection of two separate Local Area Networks (LANs) through two routers. Each LAN consists of multiple end devices such as personal computers connected to a switch. The switches are then connected to individual routers, which are linked together via a direct connection using a serial or Ethernet cable. The primary goal is to enable communication between the two LANs by configuring proper IP addressing schemes and routing methods. Static routing is used to direct traffic between networks, ensuring that packets are delivered correctly from one LAN to another. The simulation also includes network testing using commands like ping and trace route to verify successful connectivity. This setup represents a simplified version of how organizations with multiple departments or branches maintain internal and external communication using routers and structured IP addressing.

Conclusion

In conclusion, this project successfully demonstrates how two distinct LANs can be interconnected using routers in a simulated networking environment. The configuration highlights the role of routers in forwarding data between different networks based on IP addressing, as well as the importance of switches in managing communication within a LAN. Through the simulation, it becomes evident how crucial it is to assign correct IP addresses, configure routing tables, and ensure all devices are properly connected. The use of Cisco Packet Tracer provides valuable hands-on experience in network design, device configuration, and basic troubleshooting techniques. This foundational understanding prepares students for more advanced networking concepts and real-world applications in network administration and design.