

Report No: 02

Experiment Name: Implementation of router configuration for two different LANs
In Cisco Packet Tracer.

Objective:

This experiment focuses on establishing communication between two separate LANs by configuring a router using Cisco Packet Tracer. In real-world networking, routers act as the bridges that connect different networks, enabling the smooth exchange of data across boundaries. Through this simulation, we explore the process of routing, interface configuration, and IP management, gaining insights into how routers make inter-network communication possible. This forms the foundation for building scalable and efficient network infrastructures.

- To design two separate LANs with appropriate network devices.
- To configure router interfaces and enable routing between LANs.
- To assign IP addresses and establish device-level connectivity.
- To verify successful communication across LANs using tools like `ping`.
- To understand the importance of routing in connecting isolated networks and analyze how routers operate in such setups.

Components:

• Software:

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

• Devices:

- Router (1 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:

Local Area Network (LAN): A local area network (LAN) is a collection of devices connected together in one physical location, such as a building, office, or home. A LAN can be small or large, ranging from a home network with one user to an enterprise network with thousands of users and devices in an office or school.

Regardless of size, a LAN's single defining characteristic is that it connects devices that are in a single, limited area. In contrast, a wide area network (WAN) or metropolitan area network (MAN) covers larger geographic areas. Some WANs and MANs connect many LANs together.



Figure: Local Area Network.

Router:

A router is a network device that connects multiple networks and forwards data packets between them based on their IP addresses. It operates at the Network Layer (Layer 3) of the OSI model and plays a crucial role in directing data to its destination when the source and destination are not within the same network.

In this experiment, two separate LANs are designed, each containing end devices like PCs or laptops connected to a switch. These switches are further connected to a single router, which is configured to allow communication between the two LANs.

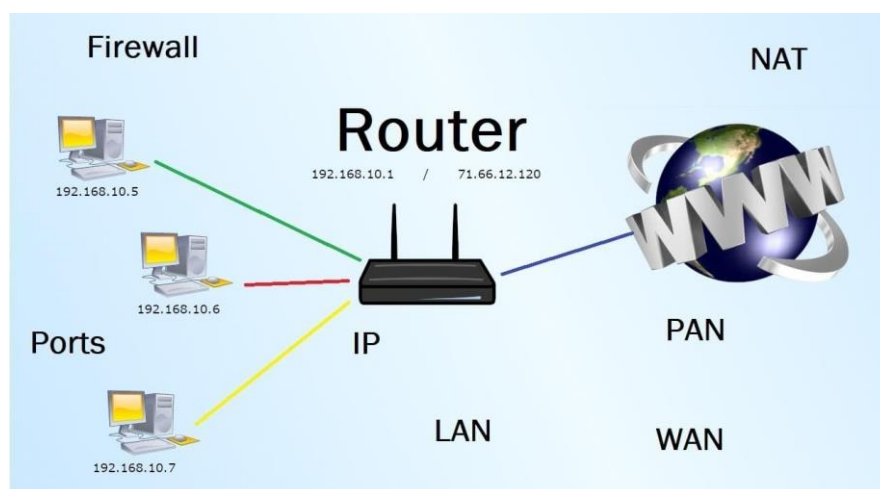


Figure: Router.

Switch:

A switch is a key networking device used to connect multiple devices within a Local Area Network (LAN). It operates at Layer 2 (Data Link Layer) of the OSI model and is responsible for forwarding data frames based on the MAC (Media Access Control) addresses of devices.



Figure: Switch.

Figure:

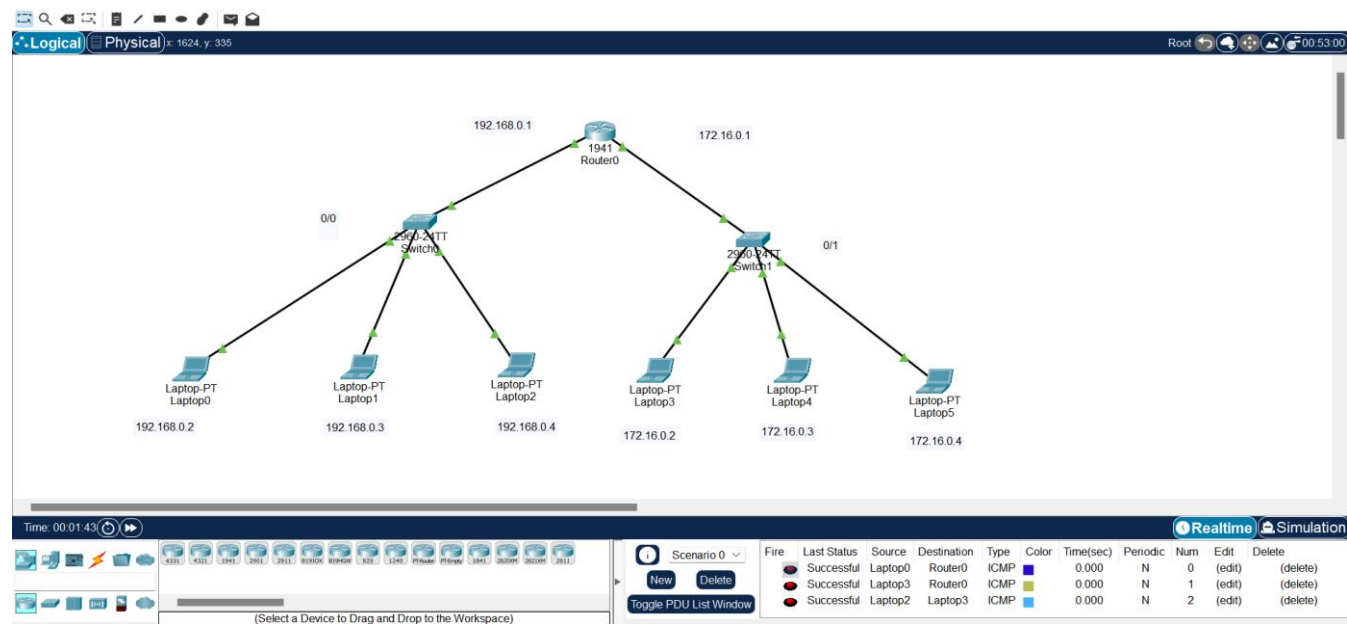
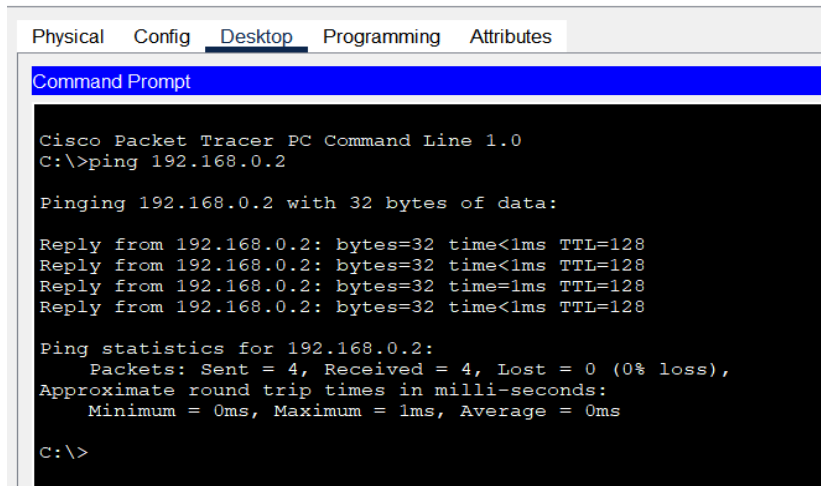


Figure: Implementing LAN using router.

A screenshot of the Cisco Packet Tracer PC Command Line interface. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with 'Desktop' selected. The title bar reads 'Command Prompt'. The command prompt shows the text 'Cisco Packet Tracer PC Command Line 1.0' and 'C:\>ping 192.168.0.2'. The output shows 'Pinging 192.168.0.2 with 32 bytes of data:' followed by four successful replies: 'Reply from 192.168.0.2: bytes=32 time<1ms TTL=128'. Below this, it shows 'Ping statistics for 192.168.0.2:' with 'Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)', and 'Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 1ms, Average = 0ms'. The prompt ends with 'C:\>'.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Reply from 192.168.0.2: bytes=32 time=1ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Figure: Ping Command.

Description:

This experiment involves the implementation of router configuration to connect two different LANs using Cisco Packet Tracer. Each LAN consists of multiple end devices connected through switches, and a router is used to enable communication between them. By assigning proper IP addresses, configuring router interfaces, and verifying connectivity through commands like ping, the experiment simulates real-world inter-network communication. It helps in understanding how routers operate as gateways between different network segments, and reinforces key networking concepts such as IP addressing, sub netting, and routing in a practical, visual environment.

Conclusion:

This experiment served as a gateway into the world of inter-network communication, where we brought two isolated LANs together through the magic of routing. By configuring IP addresses and router interfaces within Cisco Packet Tracer, we transformed individual network islands into a unified digital landscape. The seamless exchange of data between the LANs not only validated our configuration skills but also reflected real-world networking scenarios. This hands-on experience deepened our understanding of how routers act as the backbone of modern connectivity, enabling diverse systems to interact and collaborate in a shared network environment.