Prac -2 Setup a wired LAN using Layer 2 Switch. It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and demonstrating the PING packets captured traces using Wireshark Packet Analyzer Tool.

Aim

- To set up a wired LAN using a Layer 2 switch.
- To assign IP addresses to PCs and test connectivity using **PING**.
- To capture and analyze network packets using **Packet Tracer Simulation Mode** (similar to Wireshark).

Materials Required

- Cisco Packet Tracer software
- PCs (3–4)
- Layer 2 Switch
- Copper Straight-Through Cables
- Line Tester (for real hardware setups)
- IP Configuration knowledge
- ICMP utility (PING)

Learning Objectives

After completing this experiment, you will be able to:

1. Understand and configure a **Layer 2 switch LAN**.
2. Assign **IP addresses** to network devices.
3. Test connectivity using the **PING** command.
4. Capture and analyze network packets using **Packet Tracer Simulation Mode**.
5. Understand **how switches forward frames based on MAC addresses**.
6. Distinguish between wired LAN, IP addressing, and packet flow in a network.

Theory

- **Layer 2 Switch:** Operates at the **Data Link Layer** of the OSI model and forwards frames based on **MAC addresses**.
- **LAN (Local Area Network):** A network that connects devices within a limited area such as a building.
- **IP Address:** Unique network layer address assigned to each device to enable communication.

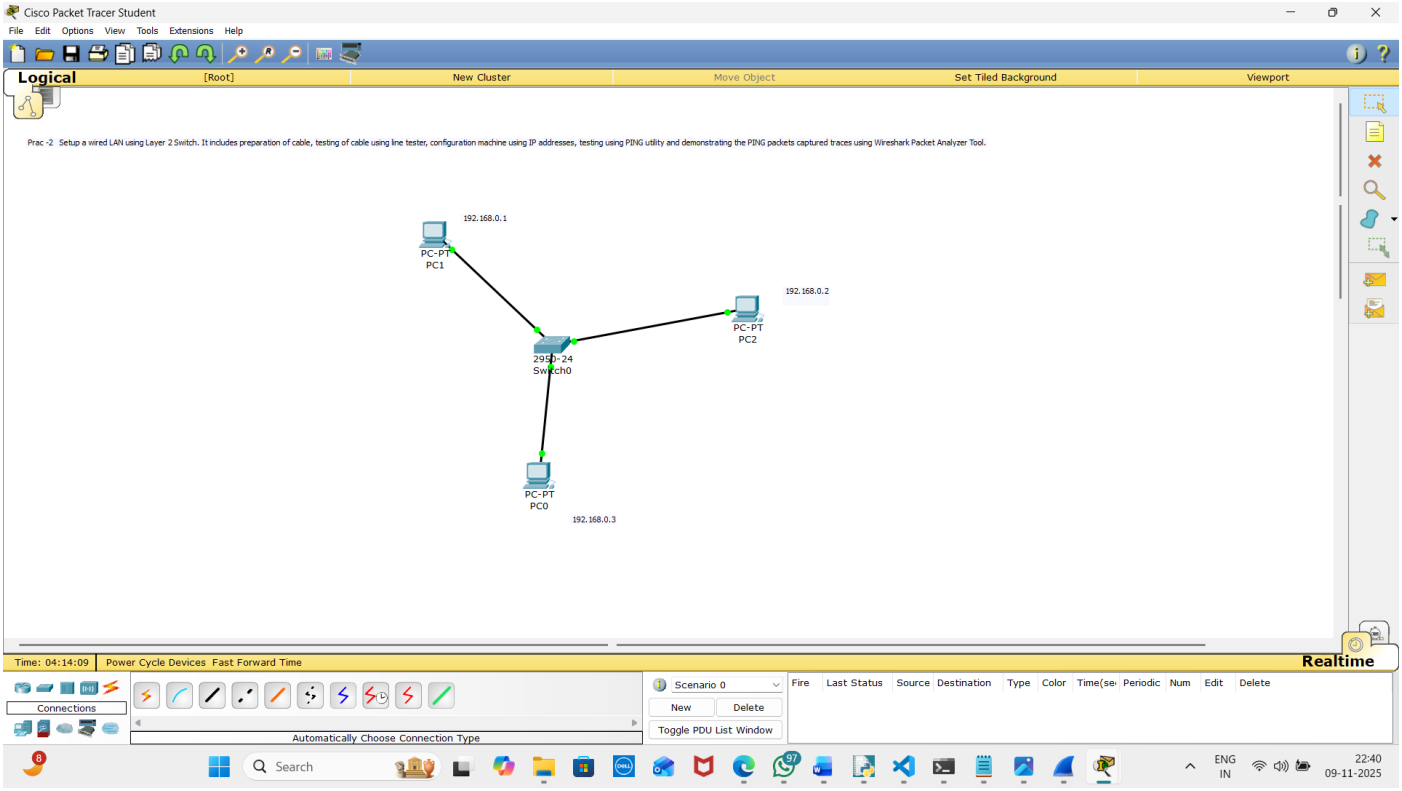
- **PING Command:** Utility to test network connectivity using **ICMP protocol**.
- **Packet Capture (Simulation Mode in Packet Tracer):** Allows visualization of data packets, their source and destination MAC addresses, IP addresses, and protocol type.
- **Cabling:**
    - **PC → Switch:** Use straight-through cable.
    - **PC → PC (if direct):** Use crossover cable.
- **Line Tester (for real networks):** Ensures cable continuity and correct wiring.

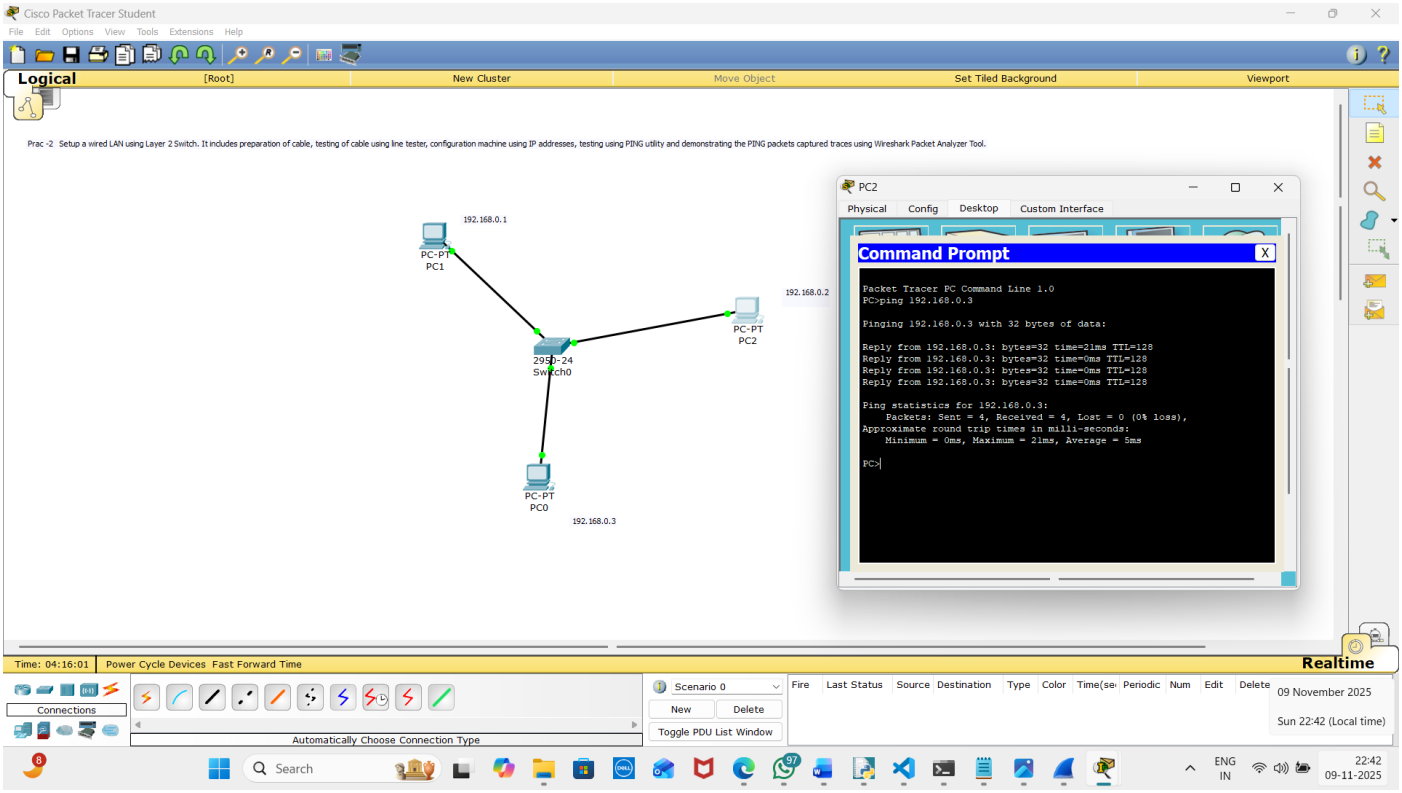
Steps in Theory Context:

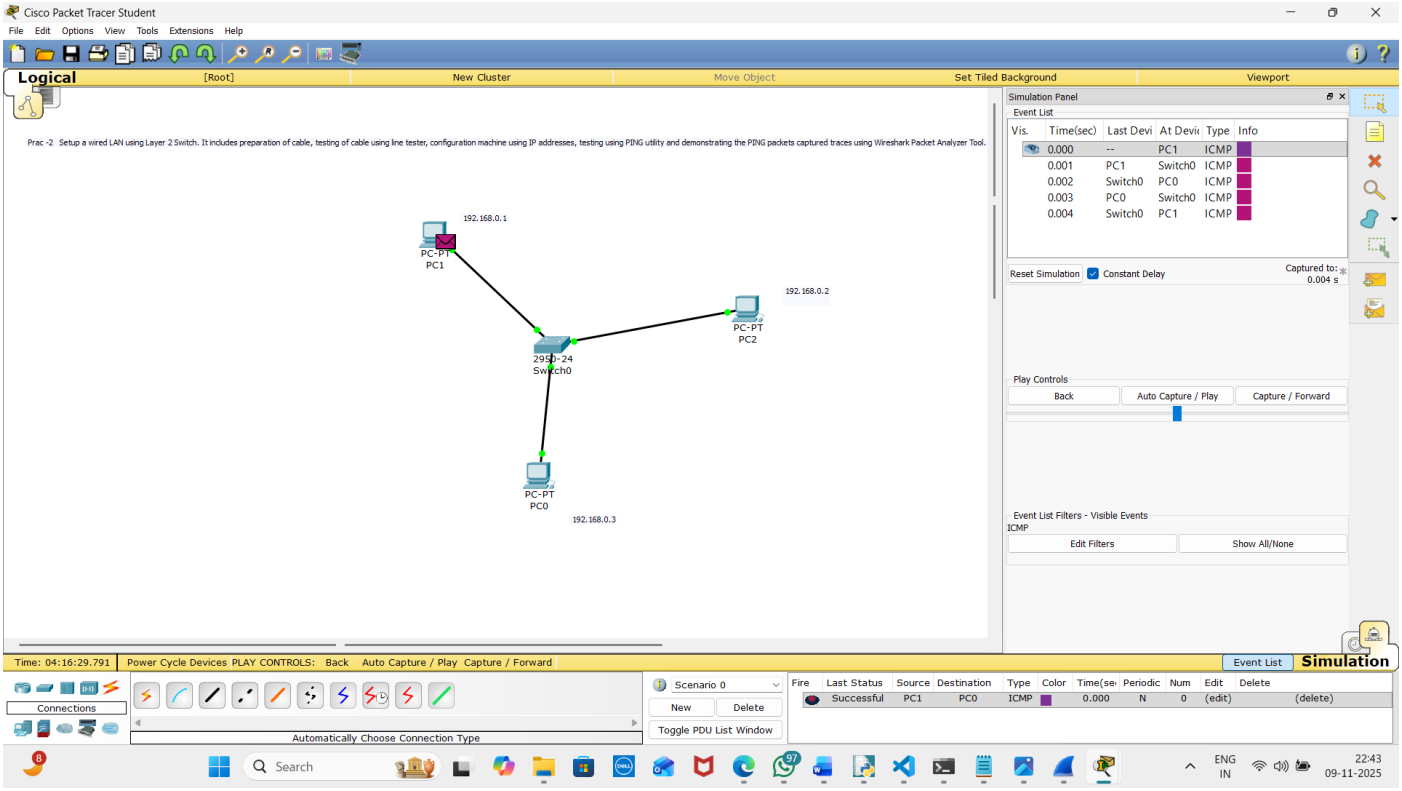
1. Connect PCs to the switch with proper cables.
2. Assign IP addresses and subnet masks to PCs.
3. Test connectivity using PING.
4. Capture and analyze packet transmission in simulation mode to observe MAC and IP-based forwarding.

Conclusion

- The **Layer 2 switch successfully connects multiple devices** in a LAN.
- **IP configuration and PING tests** verify network connectivity.
- **Simulation mode** in Packet Tracer allows observation of packet flow, showing **ICMP requests and replies**.
- Layer 2 switches forward data frames based on **MAC addresses**, not IP addresses.
- This experiment helps understand **wired LAN design, troubleshooting, and network monitoring**.


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Prac -2 Setup a wired LAN using Layer 2 Switch. It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and demonstrating the PING packets captured traces using Wireshark Packet Analyzer Tool.
192.168.0.1
PC-PT PC1
192.168.0.2
PC-PT PC2
2950-24 Switch0
PC-PT PC0
192.168.0.3
Time: 04:14:09
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
Search
ENG IN
22:40
09-11-2025


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Prac -2 Setup a wired LAN using Layer 2 Switch. It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and demonstrating the PING packets captured traces using Wireshark Packet Analyzer Tool.
192.168.0.1
PC-PT PC1
192.168.0.2
PC-PT PC2
2950-24 Switch0
PC-PT PC0
192.168.0.3
PC2
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.0.3
Pinging 192.168.0.3 with 32 bytes of data:
Reply from 192.168.0.3: bytes=32 time=21ms TTL=128
Reply from 192.168.0.3: bytes=32 time=0ms TTL=128
Reply from 192.168.0.3: bytes=32 time=0ms TTL=128
Reply from 192.168.0.3: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 21ms, Average = 5ms
PC>
Time: 04:16:01
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
09 November 2025
Sun 22:42 (Local time)
Search
ENG IN
22:42
09-11-2025


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Prac -2 Setup a wired LAN using Layer 2 Switch. It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and demonstrating the PING packets captured traces using Wireshark Packet Analyzer Tool.
192.168.0.1
PC-PT
PC1
192.168.0.2
PC-PT
PC2
2950-24
Switch0
PC-PT
PC0
192.168.0.3
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devic Type Info
0.000 -- PC1 ICMP
0.001 PC1 Switch0 ICMP
0.002 Switch0 PC0 ICMP
0.003 PC0 Switch0 ICMP
0.004 Switch0 PC1 ICMP
Reset Simulation
Constant Delay
Captured to:
0.004 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ICMP
Edit Filters
Show All/None
Time: 04:16:29.791
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(se Periodic Num Edit Delete
Successful PC1 PC0 ICMP 0.000 N 0 (edit) (delete)
Search
ENG
IN
22:43
09-11-2025