

Lab Practical #04: Installation of Network Simulator (Packet Tracer) and Implement different LAN topologies

Student Name: Dhairya Adroja

Enrollment No: 24010101602

Course: B.Tech. CSE

Aim/Objective

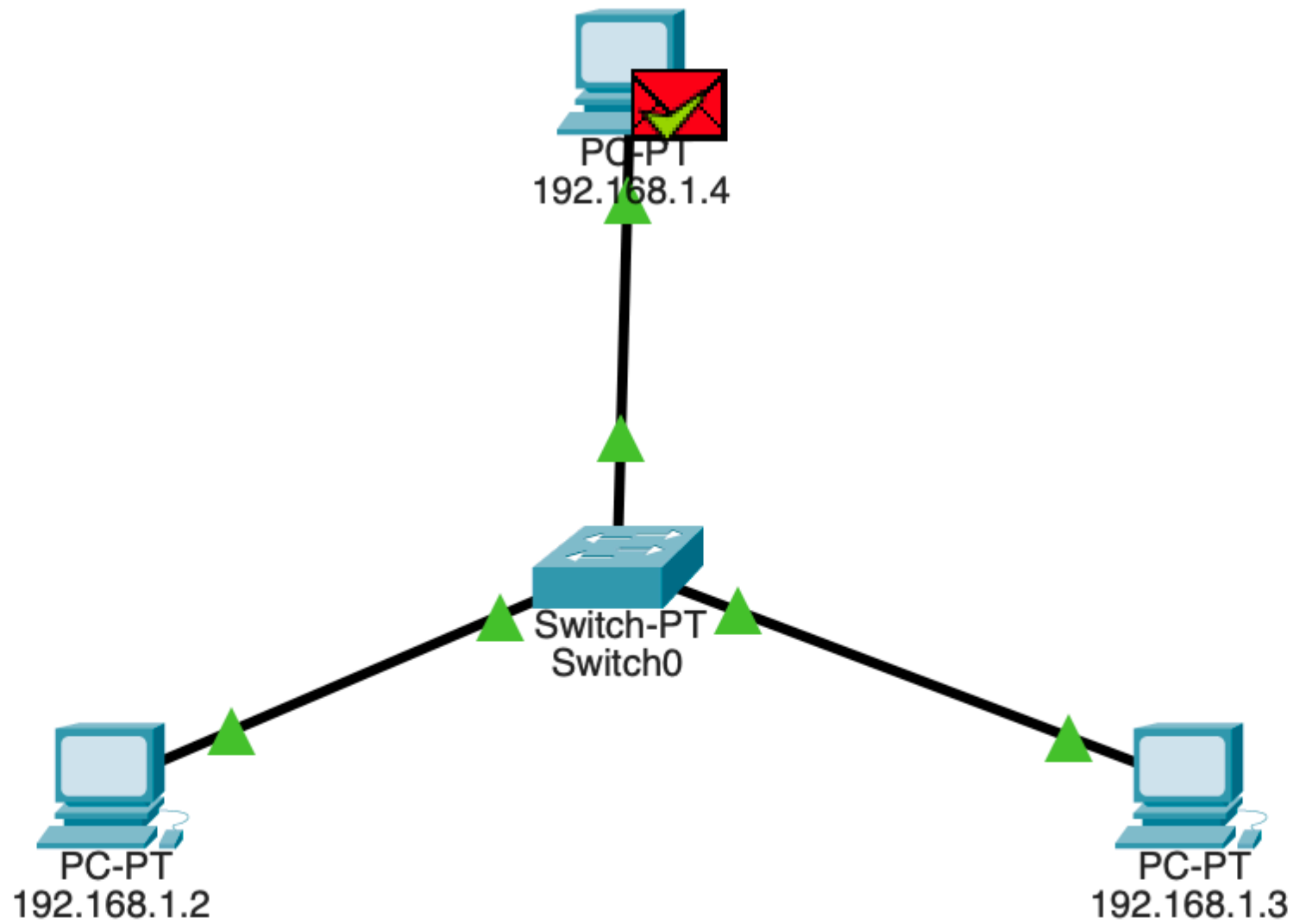
To install Network Simulator (Packet Tracer) and implement different LAN topologies. Check connectivity between devices using ping command or PDU utility.

Theory

Network topology refers to the arrangement of devices in a computer network. Each topology has specific characteristics and use cases in network design.

Procedure

1. Simple Network with Switch and PCs



Configuration:

- PC1: 192.168.1.10/24
- PC2: 192.168.1.11/24
- PC3: 192.168.1.12/24
- Switch: Catalyst 2960

Testing: Ping successful between all PCs.

2. Bus Topology

```
graph LR; S0[Switch-PT Switch0] --- S1[Switch-PT Switch1]; S1 --- S2[Switch-PT Switch2]; P1[PC-PT 192.168.1.1] --- S0; P2[PC-PT 192.168.1.2] --- S1; P3[PC-PT 192.168.1.3] --- S2; P4[PC-PT] --- Bus[ ]; style Bus fill:none,stroke:none
```

PDU Information at Device: 192.168.1.1

OSI Model

Inbound PDU Details

At Device: 192.168.1.1
Source: 192.168.1.1
Destination: 192.168.1.2

In Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.1.1
ICMP Message Type: 0

Layer 2: Ethernet II Header
0090.2B6E.D254 >> 00E0.F76D.
7828

Layer 1: Port FastEthernet0

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer3

Layer2

Layer1

1. FastEthernet0 receives the frame.

Challenge Me

<< Previous Layer

Next Layer >>

Configuration:

- PC1: 192.168.2.10/24
- PC2: 192.168.2.11/24
- PC3: 192.168.2.12/24
- PC4: 192.168.2.13/24

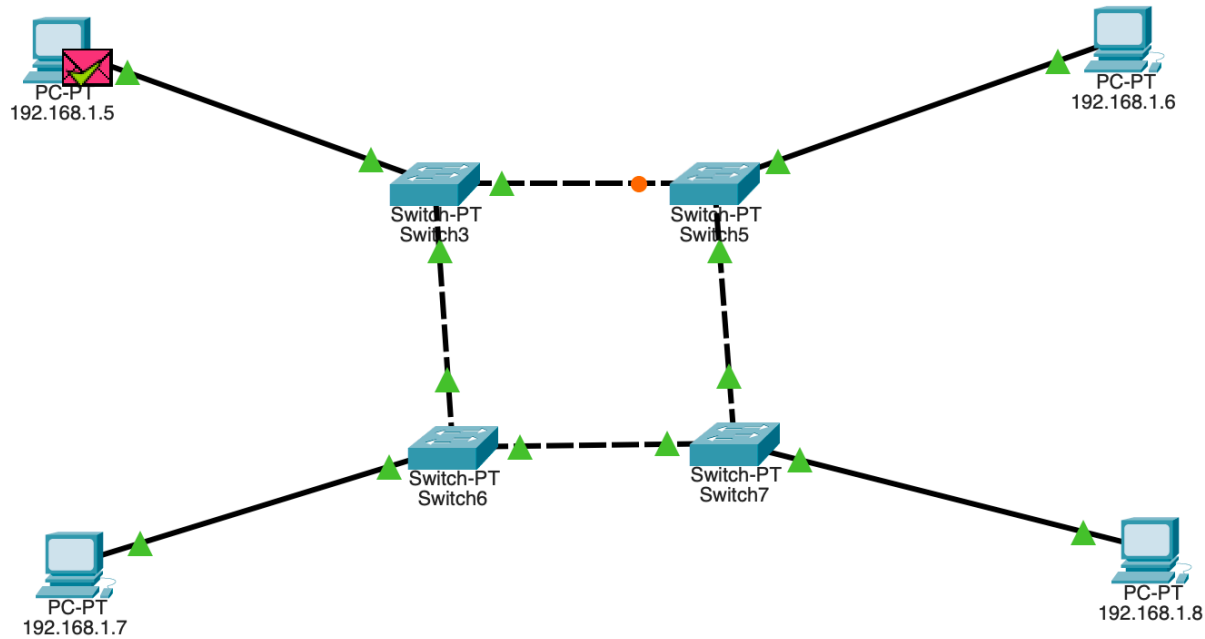
Characteristics:

- Single backbone cable
- Cost-effective for small networks
- Single point of failure

Testing: PDU simulation successful along backbone.

3. Ring Topology

Logical Physical x: 1144, y: 493



PDU Information at Device: 192.168.1.5

OSI Model Inbound PDU Details

At Device: 192.168.1.5
Source: 192.168.1.5
Destination: 192.168.1.8

In Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP:
192.168.1.8, Dest. IP: 192.168.1.5
ICMP Message Type: 0
Layer 2: Ethernet II Header
0001.9750.8B2C >>
0090.0C76.C29C
Layer 1: Port FastEthernet0

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

1. FastEthernet0 receives the frame.

Challenge Me

<< Previous Layer

Next Layer >>

Configuration:

- PC1: 192.168.3.10/24
- PC2: 192.168.3.11/24
- PC3: 192.168.3.12/24

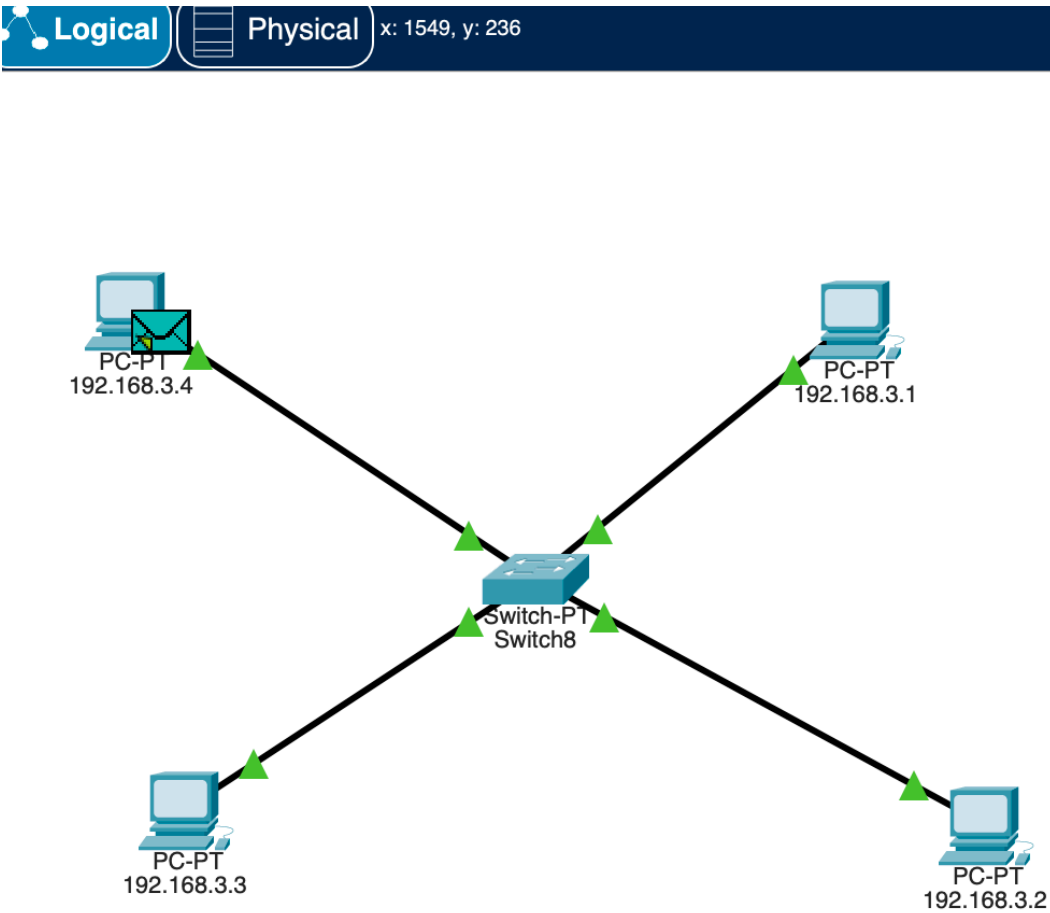
- PC4: 192.168.3.13/24

Characteristics:

- Circular connection pattern
- Token passing mechanism
- Deterministic access

Testing: Token circulation verified.

4. Star Topology



Configuration:

PDU Information at Device: 192.168.3.4

OSI Model Inbound PDU Details

At Device: 192.168.3.4
Source: 192.168.3.4
Destination: 192.168.3.2

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer 3: IP Header Src. IP: 192.168.3.2, Dest. IP: 192.168.3.4 ICMP Message Type: 0	Layer3
Layer 2: Ethernet II Header 0003.E497.8AEE >> 0010.11B2.BB07	Layer2
Layer 1: Port FastEthernet0	Layer1

1. FastEthernet0 receives the frame.

Challenge Me << Previous Layer Next Layer >>

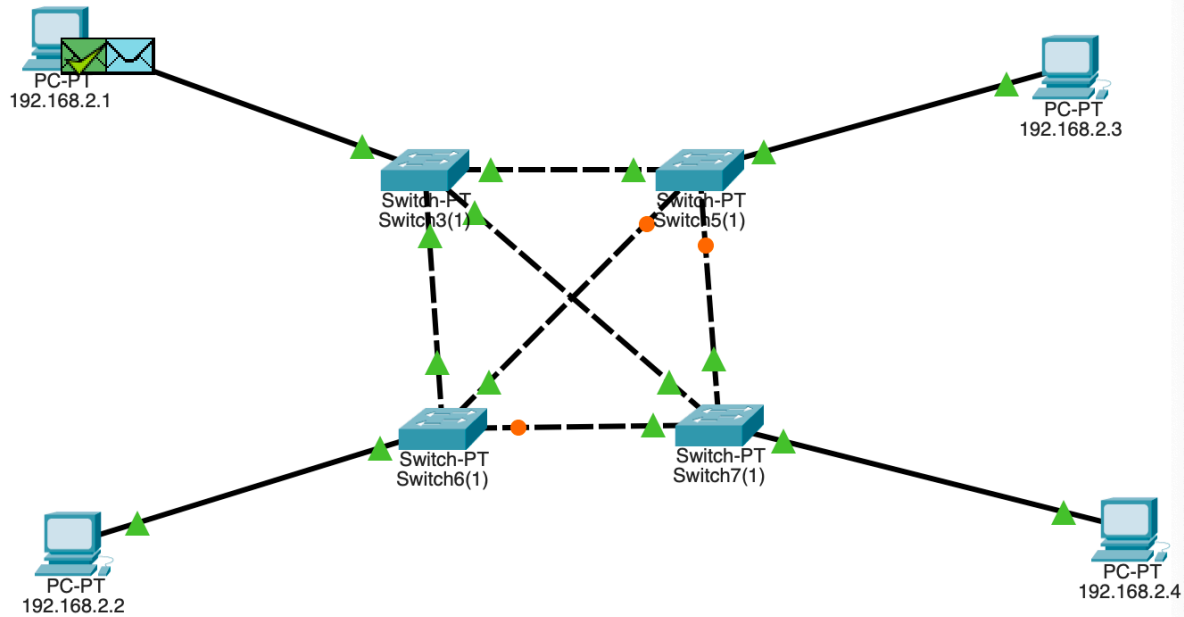
- PC1: 192.168.4.10/24
- PC2: 192.168.4.11/24
- PC3: 192.168.4.12/24
- PC4: 192.168.4.13/24

Characteristics:

- Central hub/switch
- Most common in LANs
- Easy troubleshooting

Testing: All pings successful.

5. Mesh Topology



PDU Information at Device: 192.168.2.1

[OSI Model](#) Inbound PDU Details

At Device: 192.168.2.1
Source: 192.168.2.1
Destination: Broadcast

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3
Layer 2: Ethernet II Header 0060.3E8E.477B >> 00E0.F909.0685 ARP Packet Src. IP: 192.168.1.6, Dest. IP: 192.168.1.5	Layer2
Layer 1: Port FastEthernet0	Layer1

1. FastEthernet0 receives the frame.

[Challenge Me](#) [<< Previous Layer](#) [Next Layer >>](#)

Configuration:

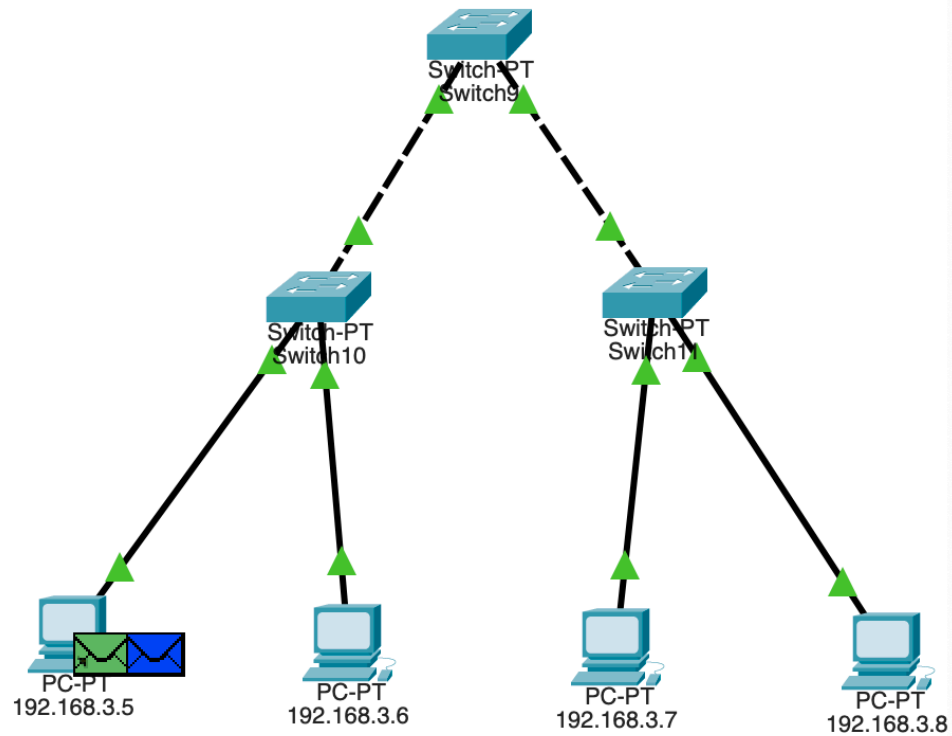
- PC1: 192.168.5.10/24
- PC2: 192.168.5.11/24
- PC3: 192.168.5.12/24
- PC4: 192.168.5.13/24

Characteristics:

- Every device connected to others
- Maximum redundancy
- High cost

Testing: Multiple paths verified.

6. Tree Topology



PDU Information at Device: 192.168.3.5

[OSI Model](#) Inbound PDU Details

At Device: 192.168.3.5
Source: 192.168.3.5
Destination: Broadcast

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3
Layer 2: Ethernet II Header 0001.63C3.EAD7 >> 0002.4AA6.3DA1 ARP Packet Src. IP: 192.168.1.3, Dest. IP: 192.168.1.1	Layer2
Layer 1: Port FastEthernet0	Layer1

1. FastEthernet0 receives the frame.

[Challenge Me](#) [<< Previous Layer](#) [Next Layer >>](#)

Configuration:

- PC1-PC2: 192.168.6.10-11/24

- PC3-PC4: 192.168.6.12-13/24

Characteristics:

- Hierarchical structure
- Scalable design
- Combined star-bus features

Testing: Inter-branch communication successful.

Steps to Create Networks in Packet Tracer

1. **Launch Packet Tracer**
2. **Add Devices:** Drag PCs, switches from device panel
3. **Connect:** Use appropriate cables between devices
4. **Configure IPs:** PC → Desktop → IP Configuration
5. **Test:** Use ping command or PDU utility

Conclusion

Successfully implemented all LAN topologies in Packet Tracer. Each topology serves different network requirements based on cost, scalability, and fault tolerance needs.