Experiment-1

AIM: To establish peer to peer network connection

PROCEDURE:
A peer-to-peer (P2P) network connection refers to a type of network where each computer or device on the network has equal status and can communicate directly with one another without the need for a centralized server. In a peer-to-peer network, all devices are considered peers, and they can both share resources and use resources shared by others.

Key characteristics of a peer-to-peer network connection include:

1. Decentralization: Unlike client-server models where a central server manages resources and communication, a peer-to-peer network distributes these functions across all connected devices. Each device has equal status and can act as both a client and a server.

2. Resource Sharing: Devices in a peer-to-peer network can share files, printers, and other resources directly with each other. This sharing occurs without relying on a central server to mediate the process.

3. Collaborative Environment: Peer-to-peer networks are often found in environments where collaboration and resource sharing among devices are important. Examples include small home or office networks, where users want to easily share files or printers without the need for a dedicated server.

4. Simplicity: Peer-to-peer networks are generally simpler to set up and maintain compared to client-server networks, as they don't require a central server and complex infrastructure.

5. Scalability: Peer-to-peer networks can be easily scaled by adding more devices without the need for a significant restructuring of the network architecture.

However, peer-to-peer networks may have limitations in terms of scalability and security compared to more complex client-server architectures. They are commonly used in small-scale environments where simplicity and ease of setup are prioritized over advanced network management features. Examples of peer-to-peer networks include home networks, small businesses, and certain types of file-sharing systems.

Installing Cisco Packet Tracer involves the following steps:

Step 1: Begin by downloading and installing the latest version of Cisco Packet Tracer from the internet.

Step 2: Once the installation is complete, open the terminal and execute the following commands:

- Run: `sudo dpkg -i CiscoPacketTracer_811_Ubuntu_64bit.deb`
- Accept the software license agreement by pressing "OK."
- Agree to the End-User License Agreement (EULA) terms by pressing Enter on "Yes."
- In case of missing dependent packages, address the issue by running: `sudo apt install -f`
- Launch Cisco Packet Tracer by typing: `packet tracer` in the terminal.

Step 3: Create an account and log in to the system to start using Cisco Packet Tracer.

1. Begin by establishing the network topology:
    - Drag and drop two end devices, such as PCs or laptops, from the "End Devices" category onto the workspace. Arrange them as needed.

2. Connect the devices:
    - Choose the "Copper Straight-Through" cable from the "Copper" category in the device palette.
    - Select one of the end devices and click on its Ethernet port (typically labeled as "FastEthernet").
    - Connect the other end device by clicking on its Ethernet port as well. This step emulates the physical connection between the two devices.

3. Configure IP addresses:
    - Double-click on the configuration window of the first end device.
    - Navigate to the "Desktop" tab.
    - Click on "IP Configuration."
    - Provide the device with an IP address, subnet mask, and default gateway:
        - IP Address: 10.10.10.68
        - Subnet Mask: 255.255.255.0
        - Default Gateway: Leave this blank for a peer-to-peer connection.
    - Click "OK" to save the configuration changes.

4. Testing the Connection:

    - Open a command prompt or terminal on each end device, typically found in the "Desktop" tab as "Command Prompt" or "Terminal."

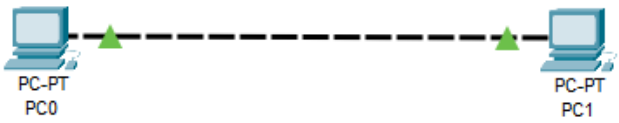
- Utilize the "ping" command to assess the connection between the two devices. For instance, from one device, ping the other using its IP address.

MAC Address:

A MAC address, short for Media Access Control address, serves as a unique identifier assigned to a Network Interface Controller/Card (NIC). This address is either 48 bits or 64 bits in length and is associated with the network adapter of a device. Expressed in hexadecimal format, a MAC address is typically presented in six sets of two digits or characters, separated by colons.

IP Address:

An IP address functions as a distinctive label for a network connection, commonly referred to as the 'Logical Address.' It is assigned to a device within a network and plays a crucial role in facilitating communication between devices on the Internet. IP addresses enable the control of how devices communicate over the Internet and define the routing behavior of internet routers.



ipconfig /all

PC0

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.....: 0001.4285.CC96
   Link-local IPv6 Address.....: FE80::201:42FF:FE85:CC96
   IP Address.....: 10.10.10.68
   Subnet Mask.....: 255.0.0.0
   Default Gateway.....: 0.0.0.0
   DNS Servers.....: 0.0.0.0
   DHCP Servers.....: 0.0.0.0
   DHCPv6 Client DUID.....: 00-01-00-01-A5-
DE-9A-70-00-01-42-85-CC-96

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Physical Address.....: 0001.63B7.68E9
   Link-local IPv6 Address.....: ::
   IP Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: 0.0.0.0
   DNS Servers.....: 0.0.0.0
 --More--
```

Top

PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.....: 00E0.A3AE.3DE9
   Link-local IPv6 Address.....: FE80::2E0:A3FF:FEAE:3DE9
   IP Address.....: 10.10.10.31
   Subnet Mask.....: 255.0.0.0
   Default Gateway.....: 0.0.0.0
   DNS Servers.....: 0.0.0.0
   DHCP Servers.....: 0.0.0.0
   DHCPv6 Client DUID.....: 00-01-00-01-96-40-C4-2E-00-E0-A3-
AE-3D-E9

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Physical Address.....: 0060.2F6E.51BA
   Link-local IPv6 Address.....: ::
   IP Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: 0.0.0.0
   DNS Servers.....: 0.0.0.0
 --More--
```

Top

ping [destination IP address]

```
C:\>ping 10.10.10.68

Pinging 10.10.10.68 with 32 bytes of data:

Reply from 10.10.10.68: bytes=32 time<1ms TTL=128
Reply from 10.10.10.68: bytes=32 time<1ms TTL=128
Reply from 10.10.10.68: bytes=32 time=3ms TTL=128
Reply from 10.10.10.68: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>
```

Top

```
C:\>ping 10.10.10.31

Pinging 10.10.10.31 with 32 bytes of data:

Reply from 10.10.10.31: bytes=32 time=1ms TTL=128
Reply from 10.10.10.31: bytes=32 time<1ms TTL=128
Reply from 10.10.10.31: bytes=32 time<1ms TTL=128
Reply from 10.10.10.31: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Setting IP address

PC0

Physical | Config | Desktop | Programming | Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration
- DHCP
- Static
- IP Address: 10.10.10.68
- Subnet Mask: 255.0.0.0
- Default Gateway: 0.0.0.0
- DNS Server: 0.0.0.0

IPv6 Configuration
- DHCP
- Auto Config
- Static
- IPv6 Address:
- Link Local Address: FE80::201:42FF:FE85:CC96
- IPv6 Gateway:
- IPv6 DNS Server:

802.1X
- Use 802.1X Security
- Authentication: MD5
- Username:

Top

PC1

Physical | Config | Desktop | Programming | Attributes

IP Configuration

Interface: FastEthernet0

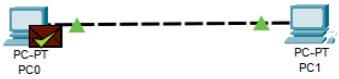
IP Configuration
- DHCP
- Static
- IP Address: 10.10.10.31
- Subnet Mask: 255.0.0.0
- Default Gateway: 0.0.0.0
- DNS Server: 0.0.0.0

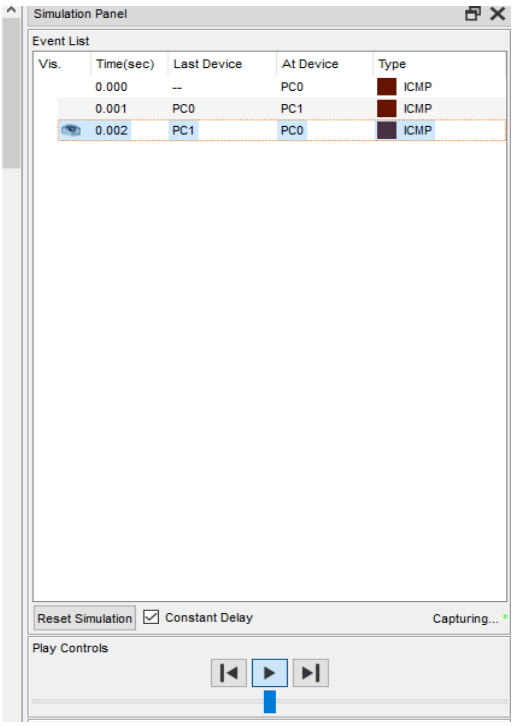
IPv6 Configuration
- DHCP
- Auto Config
- Static
- IPv6 Address:
- Link Local Address: FE80::2E0:A3FF:FEAE:3DE9
- IPv6 Gateway:
- IPv6 DNS Server:

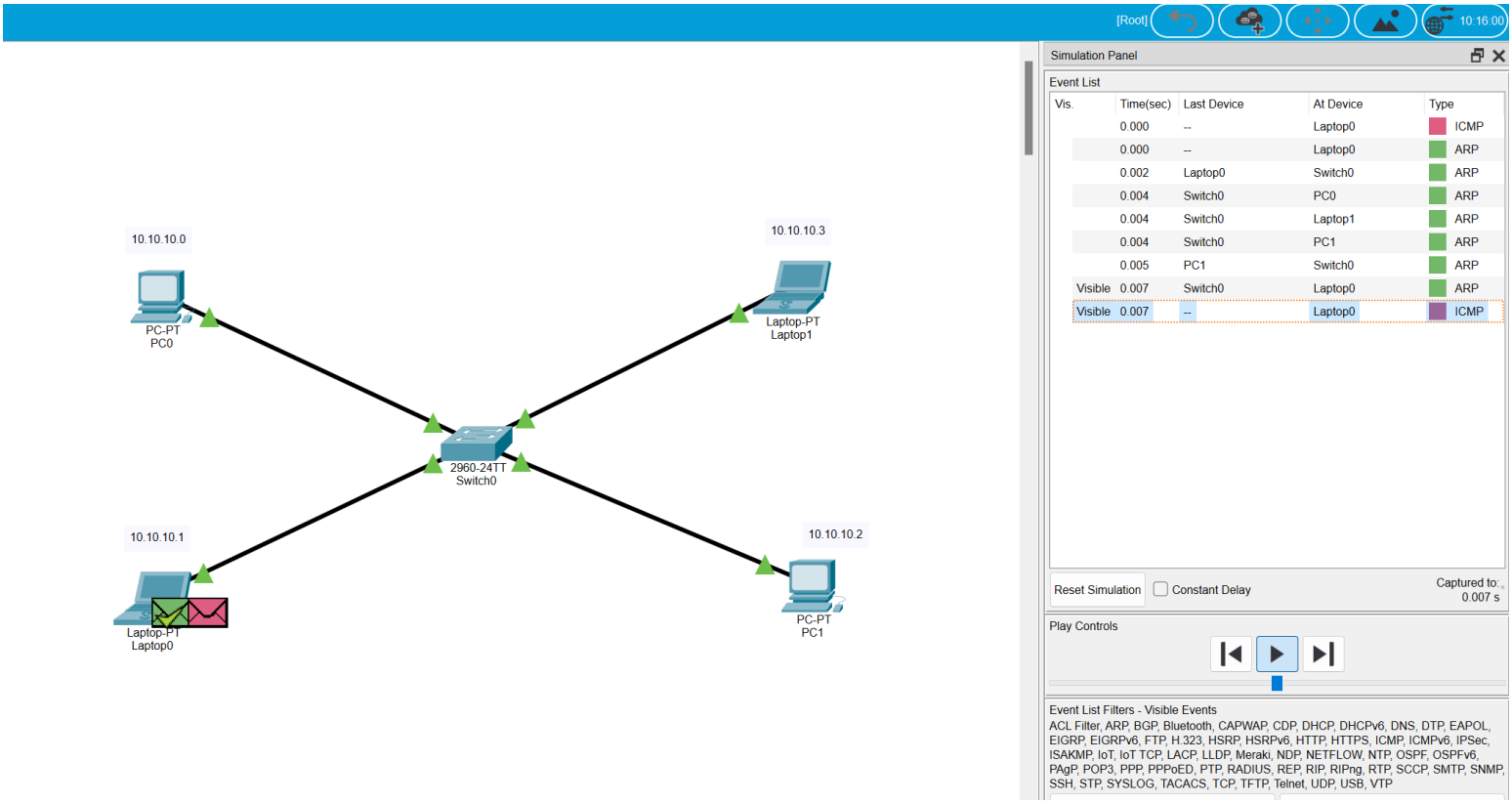
802.1X
- Use 802.1X Security
- Authentication: MD5
- Username:

Top

Realtime and Simulation







ROUTERS :

Create the Network Topology:

- Drag one or more routers from the "Routers" category in the device palette onto the workspace. Place them anywhere on the canvas.
- Drag end devices (e.g., PCs or laptops) and intermediary devices (e.g., switches) onto the workspace as needed. Connect these devices to the router(s) by clicking on their Ethernet ports and then clicking on the router's available ports. This simulates the physical connections.

Configure the Router:

- Double-click on the router to open its configuration window.
- Go to the "CLI" tab (Command Line Interface).
- Add a switch and two PCs.
- Connect them using a straight copper wire and FastEthernet cable.
- Enter an IP Address for all the PCs.
- Set default gateway for all pcs with the IP Config of the switch that they connect to.
- We have successfully created a LAN. Make one more.

• Add a router.

• Connect the two LANs to the router using GigabitEthernet . Set the IP Configuration of the respective switches.

• To check connection ping or simulate.

Testing the Configuration:

• Connect a PC or end device to one of the router's interfaces.

• Configure the IP address and default gateway of the PC to match the network where it's connected.

• Test connectivity by pinging other devices in the network