Lab-1 Report: Introduction to Packet Tracer, Peer-to-Peer Communication, and Study of Network Cables

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Aim : The primary aim of this lab is to familiarize with Cisco Packet Tracer, set up a peer-to-peer communication network, and study different types of network cables along with their color codes.

Objective:

1. Understand the basics of using Cisco Packet Tracer.
2. Set up and test a basic P2P network configuration.
3. Research and document the different types of network cables and their color codes.
4. Document the entire process, save the network configuration, and submit the results.

Brief overview of the lab objectives:

1. Familiarization with Cisco Packet Tracer: The primary goal is to introduce students to Cisco Packet Tracer, a network simulation tool used for designing and configuring network topologies. By exploring the interface and available tools, students will gain confidence in using Packet Tracer for future networking tasks.

2. Peer-to-Peer Communication Setup: Students will set up a basic peer-to-peer (P2P) network by connecting two PCs directly using a copper straight-through cable. This exercise helps students understand the fundamentals of direct device communication and IP address configuration.

3. Study of Network Cables and Color Codes: The lab involves researching different types of network cables, such as copper straight-through, copper crossover, and fiber optic cables, along with their respective color codes. Students will learn the purpose of each cable type and how they are used in network setups.

4. Documentation and Submission: Students will document their network setup process, observations, and findings in a detailed report. They will also save the network configuration in a Packet Tracer project file and submit their work through a GitHub repository, demonstrating their ability to organize and present their work effectively.

Steps Taken to Set Up the Network:

1. Creating a New Network in Cisco Packet Tracer

- Open Cisco Packet Tracer: Launch the Cisco Packet Tracer application on your computer.
- Create a New Project : Start a new project by selecting “File” > “New” to create a blank workspace.

2. Adding Two PCs to the Workspace

- Add PC0: In the bottom-left section of the Packet Tracer interface, locate the “End Devices” category and select “PC.” Drag and drop the first PC (PC0) onto the workspace.
- Add PC1: Similarly, drag and drop a second PC (PC1) onto the workspace.

3. Connecting the PCs Using a Copper Straight-Through Cable

- Select the Copper Straight-Through Cable: From the “Connections” category, choose the “Copper Straight-Through” cable.
- Connect PC0 to PC1:
    - Click on PC0, then select the FastEthernet0 port.
    - Drag the cable to PC1 and connect it to the FastEthernet0 port.

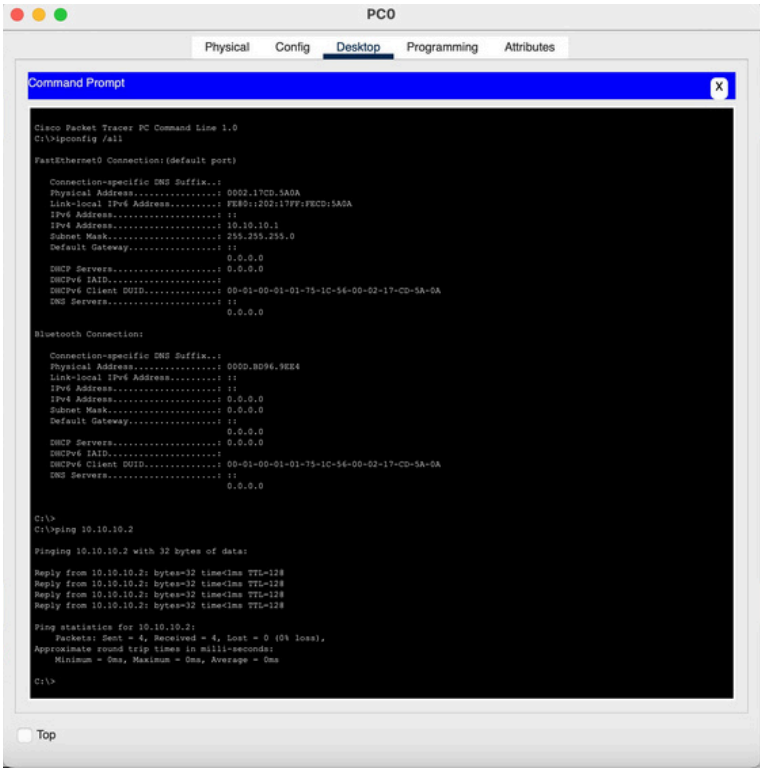
4. Assigning IP Addresses to the PCs

- Configure PC0 :
    - Click on PC0 to open its configuration window.
    - Go to the Desktop tab and open the IP Configuration tool.
    - Set the IP address to 192.168.1.1 and the Subnet Mask to 255.255.255.0.
- Configure PC1 :
    - Click on PC1 to open its configuration window.
    - Go to the Desktop tab and open the IP Configuration tool.

- Set the IP address to 192.168.1.2 and the Subnet Mask to 255.255.255.0.

5. Testing the Connection with a Ping Command

- Ping from PC0 to PC1：
  - On PC0, go to the Desktop tab and open the Command Prompt.
  - Type the command ping 192.168.1.2 and press Enter.
  - The ping should return successful replies, indicating that the two PCs are communicating with each other.



Detailed Information on Network Cables and Their Color Codes:

1. Copper Straight-Through Cable

- Description:
  - A copper straight-through cable is a type of twisted-pair Ethernet cable used to connect different types of devices, such as a computer to a switch, a switch to a router, or a computer to a hub.

  - This cable is the most common type used in local area networks (LANs).
- Color Codes:

- The color codes follow the TIA/EIA-568 standards, with two variations: TIA/EIA-568A and TIA/EIA-568B.
- TIA/EIA-568A Standard:
  - Pin 1: White/Green
  - Pin 2: Green
  - Pin 3: White/Orange
  - Pin 4: Blue
  - Pin 5: White/Blue
  - Pin 6: Orange
  - Pin 7: White/Brown
  - Pin 8: Brown

- Purpose:
  - Used to connect different types of network devices.
  - Common in connecting end devices to networking equipment.
- Usage:
  - PC to Switch
  - Switch to Router
  - PC to Hub

2. Copper Crossover Cable

- Description:
  - A copper crossover cable is a type of twisted-pair Ethernet cable used to connect similar devices directly without an intermediary device like a switch or hub.
  - The wiring is crossed, allowing for direct communication between the devices.
- Color Codes:
  - A crossover cable uses both the TIA/EIA-568A and TIA/EIA-568B standards, one on each end.
  - One End (TIA/EIA-568A Standard):
    - Pin 1: White/Green
    - Pin 2: Green
    - Pin 3: White/Orange
    - Pin 6: Orange
  - Other End (TIA/EIA-568B Standard):
    - Pin 1: White/Orange

- Pin 2: Orange
- Pin 3: White/Green
- Pin 6: Green

- Purpose:
  - Used to connect similar devices, such as connecting two computers or two switches directly without a switch or hub in between.
- Usage:
  - PC to PC
  - Switch to Switch
  - Router to Router

3. Fiber Optic Cable

- Description:
  - Fiber optic cables are made of glass or plastic fibers that transmit data as light pulses. They are known for their high speed and long-distance transmission capabilities.
  - These cables are immune to electromagnetic interference, making them ideal for environments with high electrical noise.
- Types:
  - Single-Mode Fiber (SMF) :
    - Uses a single light path (mode) for data transmission.
    - Ideal for long-distance communication, typically used in telecom and cable television.
  - Multi-Mode Fiber (MMF):
    - Uses multiple light paths (modes) for data transmission.
    - Suited for shorter distances, commonly used in data centers and local area networks (LANs).
- Purpose:
  - Used for high-speed data transmission over long distances. • Ideal for environments where electromagnetic interference is a concern.

- Usage:
  - Backbone networks
  - Long-distance telecommunications
  - High-speed data connections in data centers