

LAB-4

Introduction with network topologies

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Lab 06: Introduction of Network topologies

1. Introduction:

1.1 Network:

A computer network, or data network, is a digital telecommunications network which allows nodes to exchange data over the communication medium such as cable or wireless. In computer networks, computing devices exchange data with each other using connections (data links) between nodes.

1.2 Network Topology:

Network topology is the arrangement of the elements (links, nodes, etc.) of a communication network. Network topology is the topological structure of a network and may be depicted physically or logically.

1.3 Types of network topologies:

There are five common topologies in networks:

- 1- Mesh topology
- 2- Star topology
- 3- Bus topology
- 4- Ring topology
- 5- Tree topology

1.4 Mesh topology:

A network setup where each computer and network device are interconnected with one another, allowing for most transmissions to be distributed, even if one of the connections go down. It is a topology commonly used for wireless networks. Below is a visual example of a simple computer setup on a network using a mesh topology.

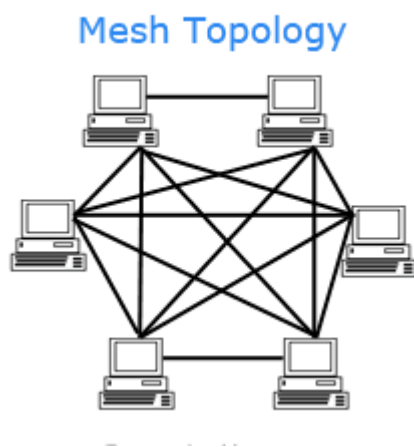


Figure 1: Depicting Mesh topology

1.5 Star topology:

A Star network is one of the most common computer network topologies. In its simplest form, a star network consists of one central hub which acts as a conduit to transmit messages. In star topology, every host is connected to a central hub. A star network is an implementation of a spoke–hub distribution paradigm in computer networks.

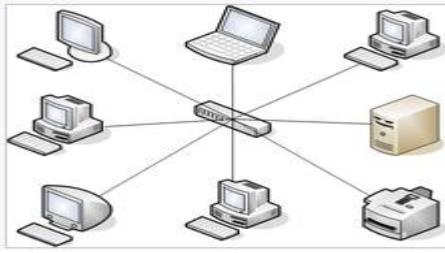


Figure 2: Depicting Star topology

1.6 Bus topology:

A bus network is a network topology in which nodes are directly connected to a common linear (or branched) half-duplex link called a bus.

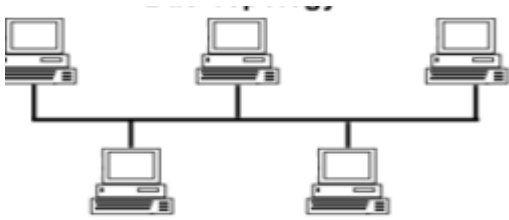


Figure 3: Depicting Bus topology

1.7 Ring topology:

A ring topology is a network configuration in which device connections create a circular data path. Each networked device is connected to two others, like points on a circle. Together, devices in a ring topology are referred to as a ring network.

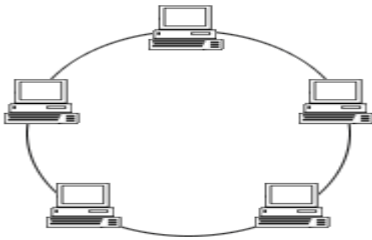


Figure 4: Depicting Ring topology

1.8 Tree topology:

A tree topology is a special type of structure in which many connected elements are arranged like the branches of a tree. For example, tree topologies are frequently used to organize the computers in a corporate network, or the information in a database.

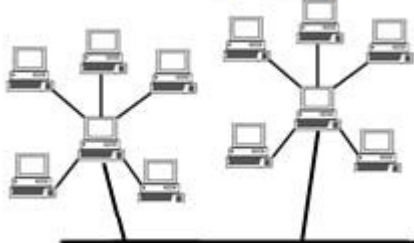


Figure 5: Depicting tree topology

2. Tools required:

- CISCO Packet tracer

3. Objective of the Experiment:

After completing this Lab student should able to:

- Make and construct Mesh topology on cisco packet tracer.
- Make and construct Star topology on cisco packet tracer.
- Make and construct Bus topology on cisco packet tracer.
- Make and construct Ring topology on cisco packet tracer.
- Make and construct Tree topology on cisco packet tracer.

4. Walk-through Tasks:

4.1 Create a bus topology by using four switches and four laptops assign them proper IP addresses, subnet masks and default gateways of the network.

For creating this topology follow these instructions:

- 1- Open cisco packet tracer.
- 2- Add four switches and four laptops.
- 3- Connect all switches with each other by using copper cross-over cable.
- 4- Connect laptops with switch by using copper straight through cable.
- 5- Until this stage you should have topology like this

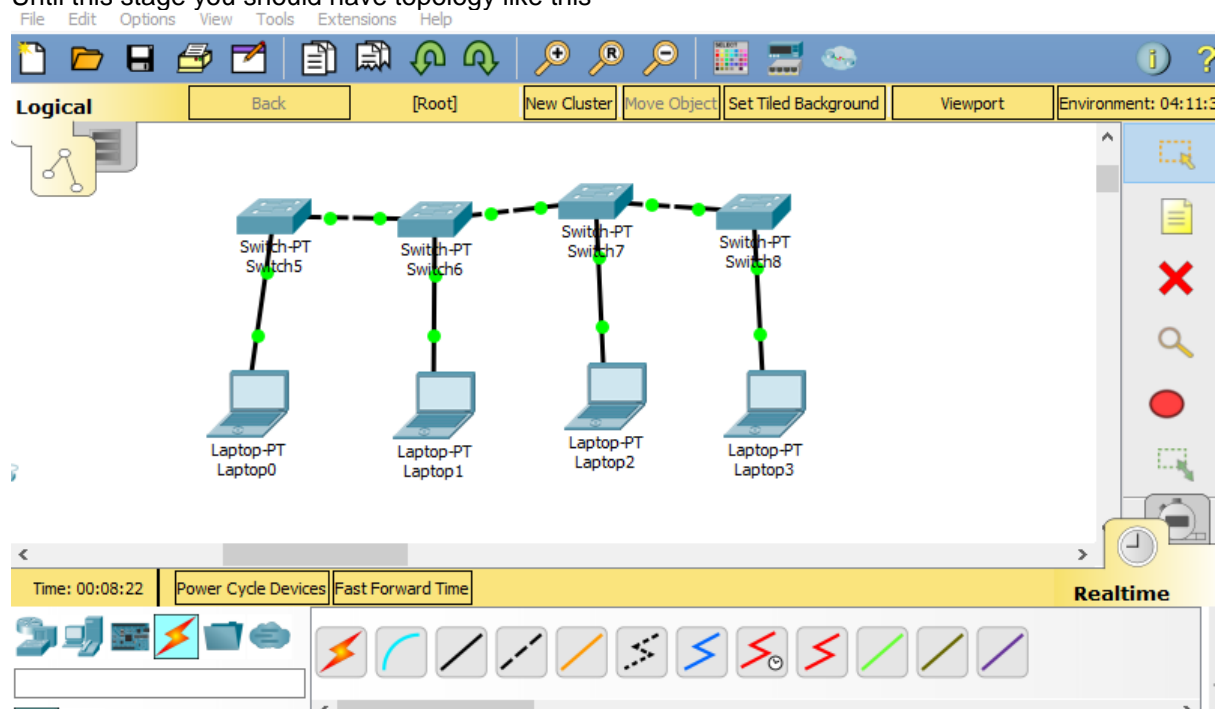


Figure 6: showing bus topology in cisco packet tracer

- 6- Now after this, click on laptop and go in desktop tab, which will look like:

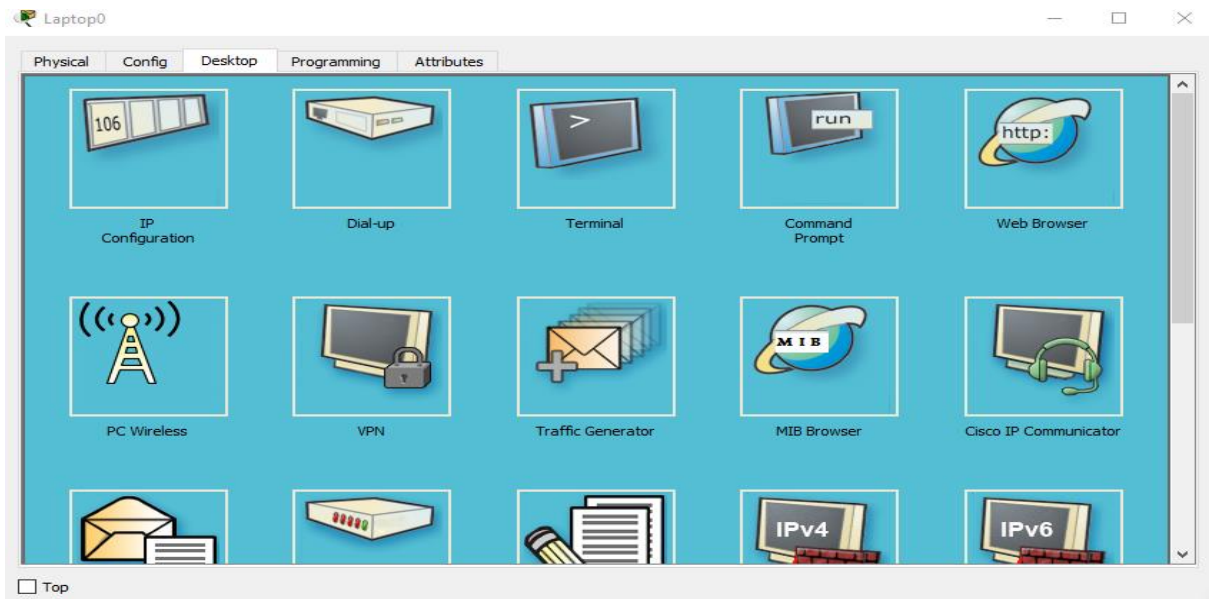


Figure 7: Figure showing Desktop of the laptop

- 7- Click on IP configuration application on left corner of the terminal to configure IP address and subnet masks of the laptops, that will look like:

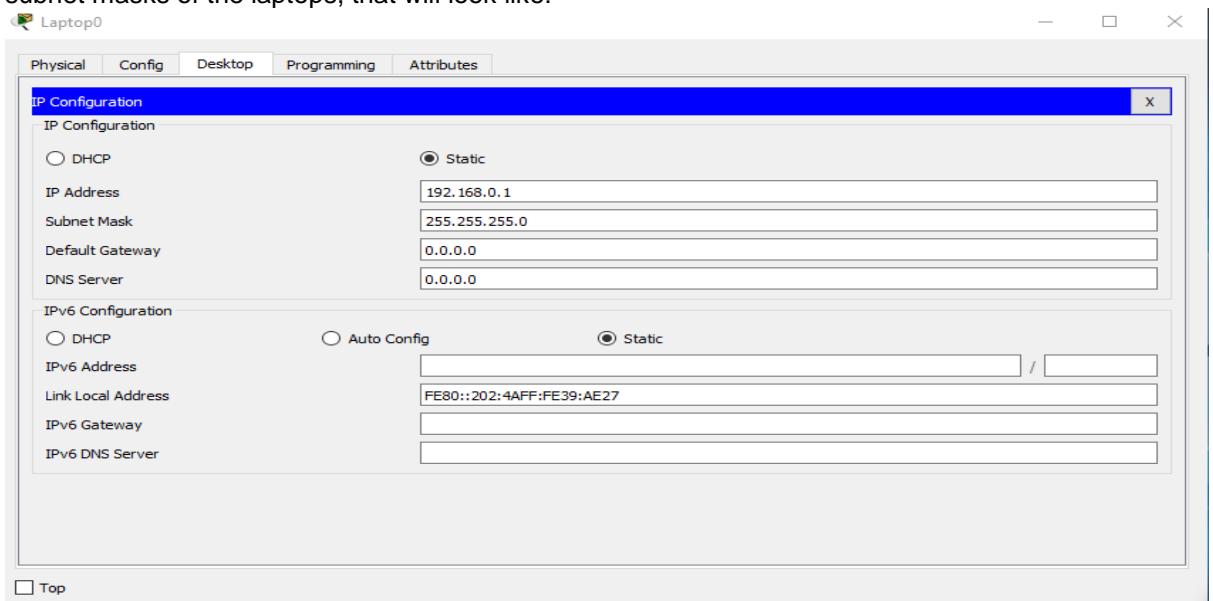


Figure 8: Showing Ip address configurations

- 8- Give IP address in IP address column which is 192.168.0.1.
- 9- Give subnet mask in IP address column which is 255.255.255.0.
- 10- Repeat the same for all laptop by incrementing each IP address to one like in second laptop you have to give IP address, which is 192.168.0.2 and subnet mask will remain the same.
- 11- Here all the configuration has been done now, you have to check whether a PDU from one laptop can be sent to another laptop or not.
- 12- Make sure that you will be in real mode.

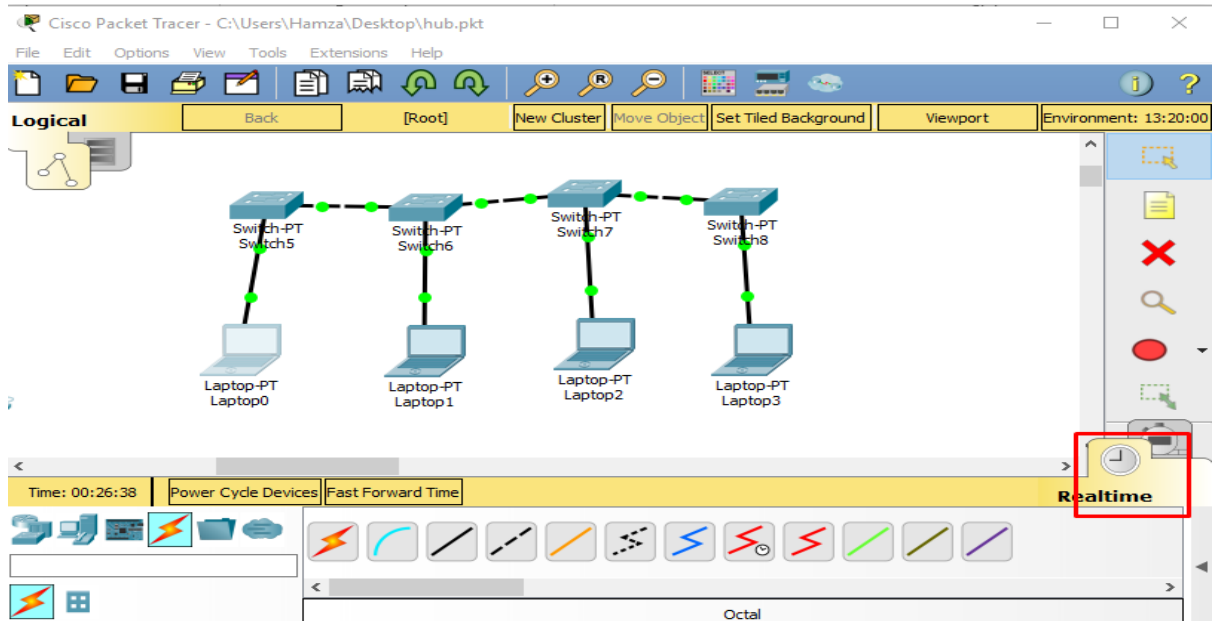


Figure 9: showing cisco packet tracer in real mode

13- Now click on the PDU and add PDU from laptop0 to laptop3.

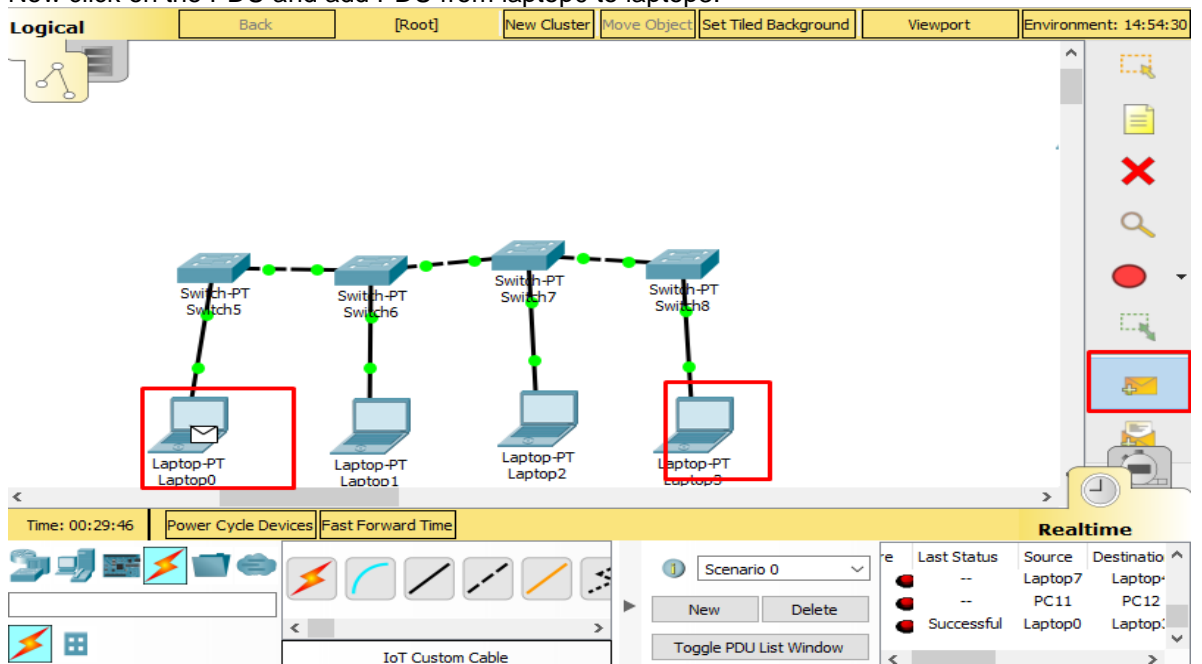


Figure 10: Sending PDU from laptop0 to laptop3

14- After sending PDU from laptop0 to laptop3, you can see the status of your PDU that rather its successful or not, which is depicting at the right lower corner of the terminal.

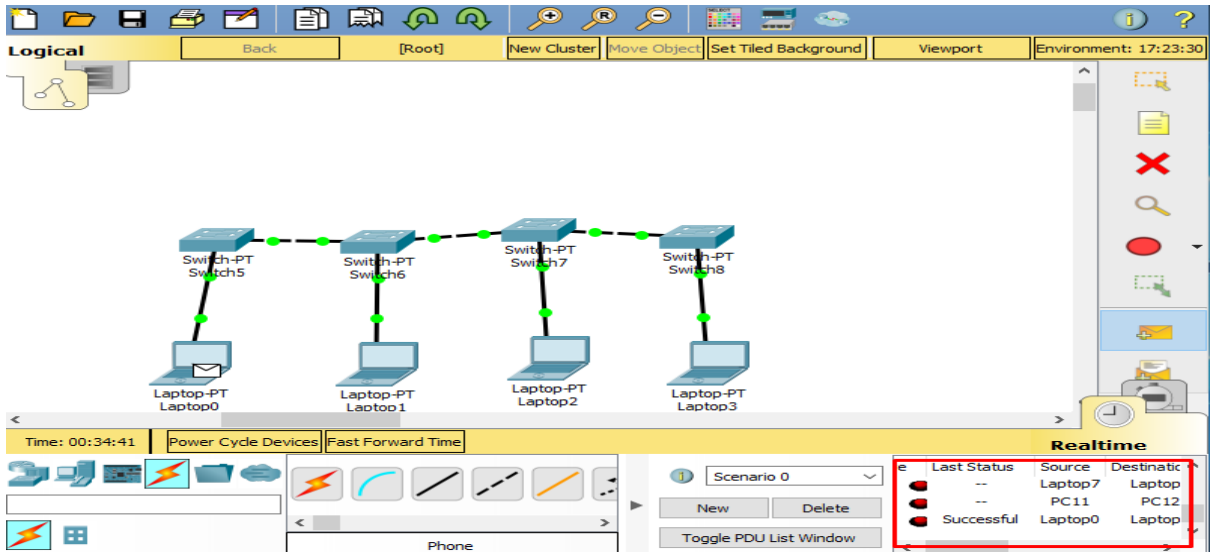


Figure 11: showing the status of the PDU.

15- Moreover, when you are in simulation mode of the cisco packet tracer you can see how a PDU is going and to where its going and what is its contents and futher information about the PDU by clicking on PDU.

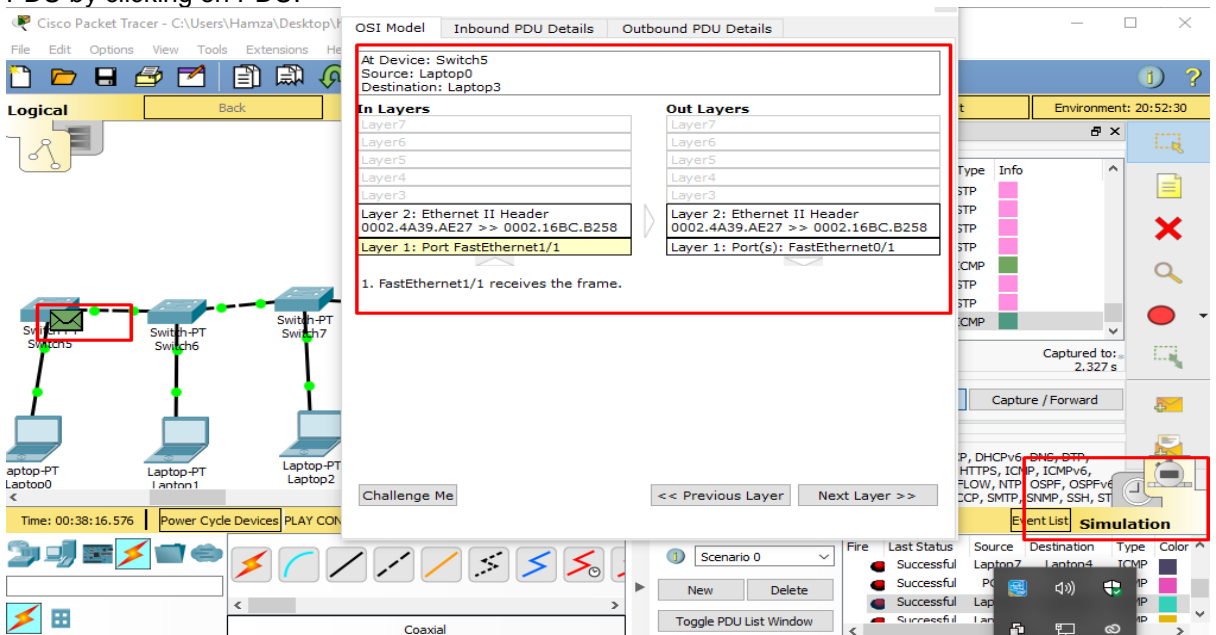


Figure 12: showing contents and information about the PDU

5. Evaluation tasks:

5.1 Task 1:

Construct a Mesh network topology which have four switches connected with 4 computers and assign them proper IP addresses, subnet mask and default gateways, also show the status of the PDU, by sending PDU from one PC to Another.

5.2 Task 2:

Construct a star network topology which have one Hub connected with 4 computers and assign them proper IP addresses, subnet mask and default gateways, also show the status of the PDU, by sending PDU from one PC to Another.

5.3 Task 3:

Construct a ring network topology which have five switches connected with 5 computers and assign them proper IP addresses, subnet mask and default gateways, also show the status of the PDU, by sending PDU from one PC to Another.