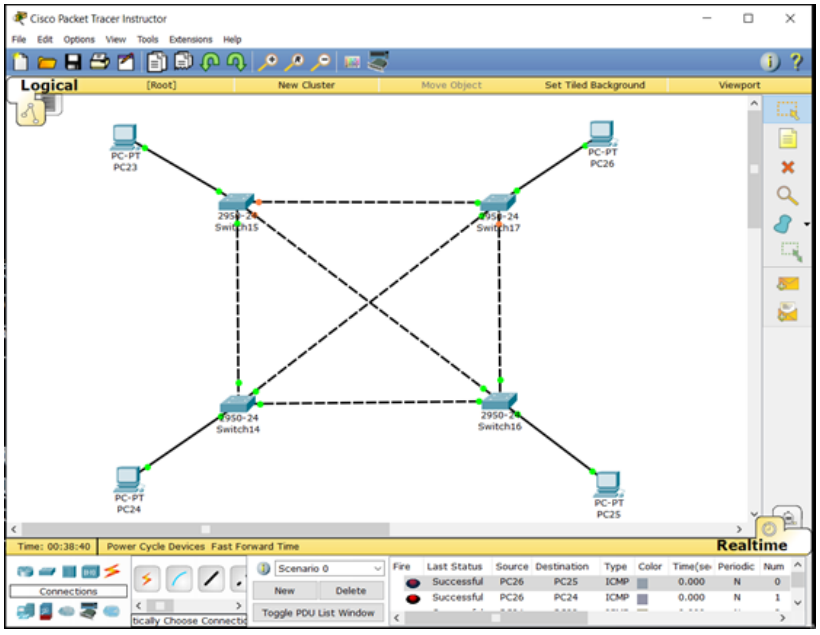
Lab 6: STUDY OF DIFFERENT NETWORK TOPOLOGIES USING CISCO PACKET TRACER

A network is two or more devices connected through links. A link is a communications pathway that transfers data from one device to another. Two or more devices connect to a link; two or more links form a topology. The topology of a network is the geometric representation of the relationship of all the links and linking devices (usually called nodes) to one another. There are four basic topologies possible:

1. Mesh
2. Star
3. Bus and
4. Ring

Mesh Topology

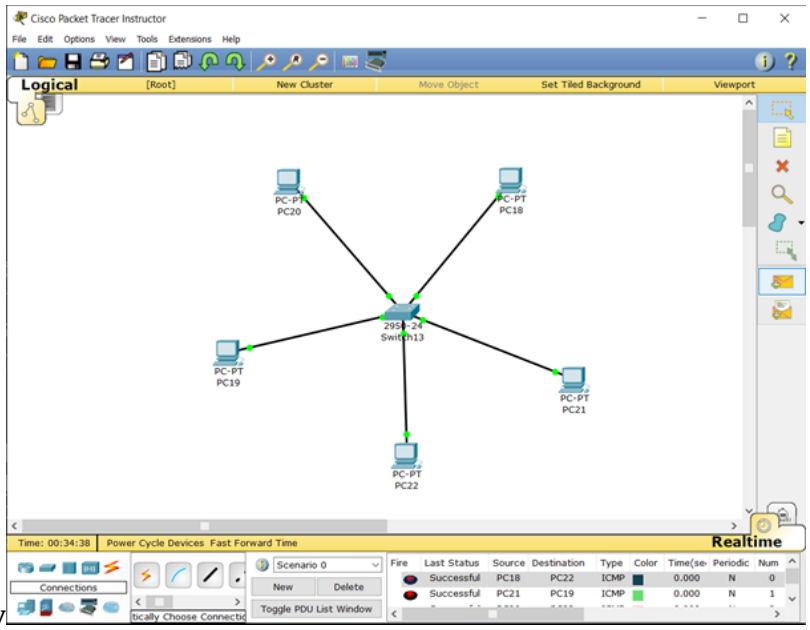
In a mesh topology, every device has a dedicated point-to-point link to every other device. The term *dedicated* means that the link carries traffic only between the two devices it connects. To find the number of physical links in a fully connected mesh network with every node, we first consider that each node must be connected to every other node.



Star Topology

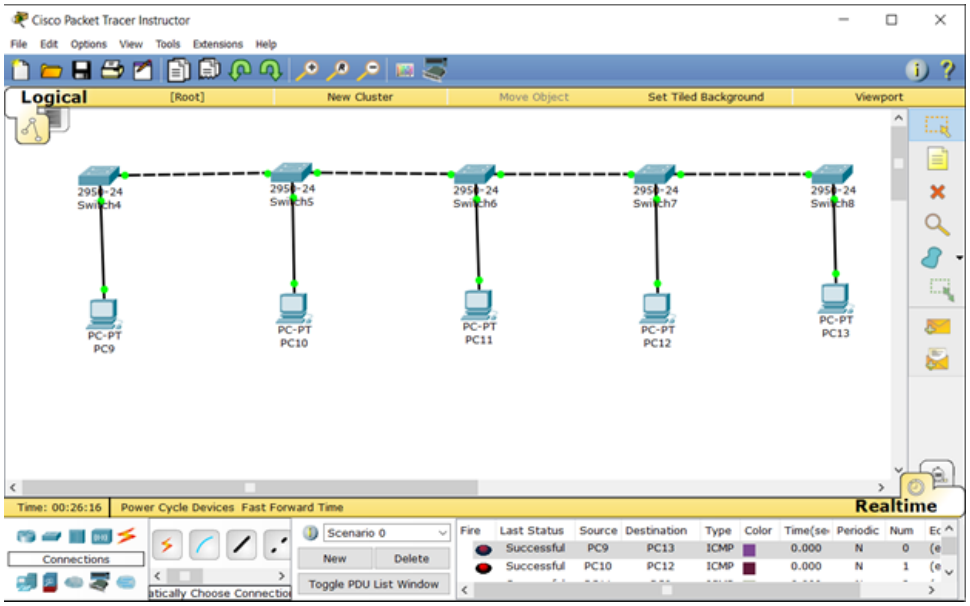
In a star topology, each device has a dedicated point-to-point link only to a central controller, usually called a hub. The devices are not directly linked to one another. Unlike a mesh topology, a star topology does not allow direct traffic between devices. The controller acts as an exchange: If

one device wants to send data to another, it sends the data to the controller, which then relays the data to the other connected device.



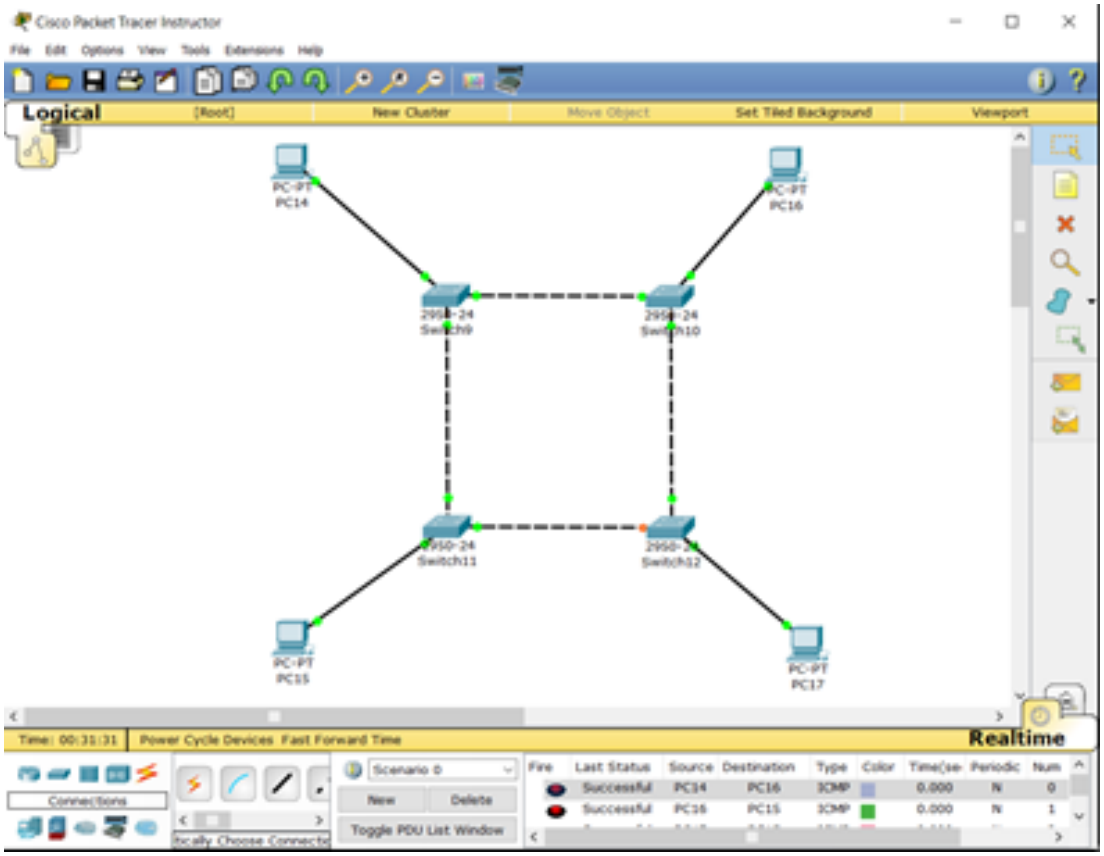
Bus Topology

A bus topology, on the other hand, is multipoint. One long cable acts as a backbone to link all the devices in a network. Nodes are connected to the bus cable by drop lines and taps. A drop line is a connection running between the device and the main cable.



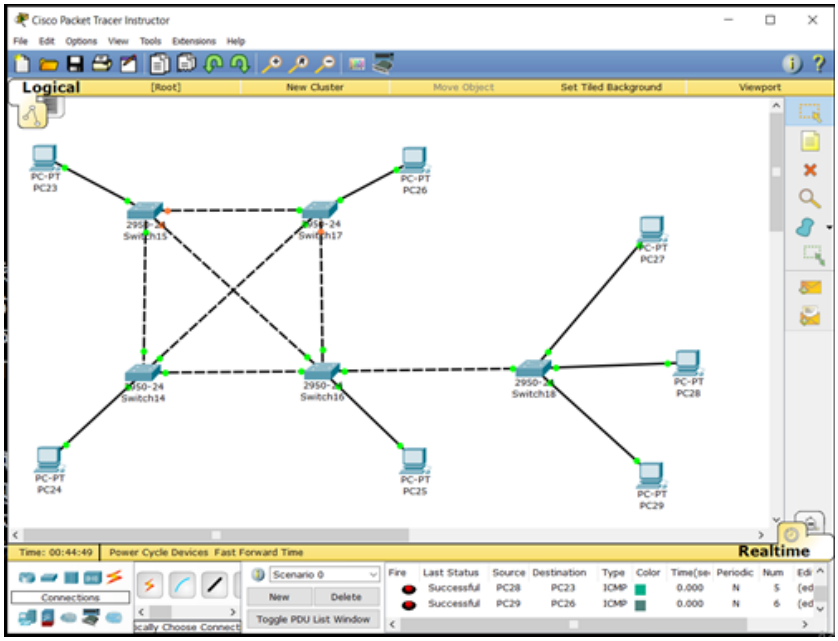
Ring Topology

In a ring topology, each device has a dedicated point-to-point connection with only the two devices on either side of it. A signal is passed along the ring in one direction, from device to device, until it reaches its destination. Each device in the ring incorporates a repeater. When a device receives a signal intended for another device, its repeater regenerates the bits and passes them along. A ring is relatively easy to install and reconfigure. Each device is linked to only its immediate neighbors (either physically or logically). To add or delete a device requires changing only two connections.



Hybrid Topology

A network can be a hybrid. For example, you can have a main star topology with each branch connecting several stations in a bus topology.



Procedure

- You can't connect end devices directly with each other. For this, you will need a **communication device** like *hub* or *switch*. For the sake of simplicity, use *switch* for connecting end devices. You can find *communication devices* from tools menu that can be found in bottom left corner. Simply go to the toolbox and select *switches*. You will find different models of switches. You can use any of them. The number of switches must be equal to the number of end devices.

- Here comes the connection setup. For this purpose, go to the toolbox (as used earlier) and select the connections menu item. There are different sort of connecting media in there. Select *copper-straight through cable* for connecting each pair of switch and end device together. Connect each of the end device with corresponding switch turn by turn.

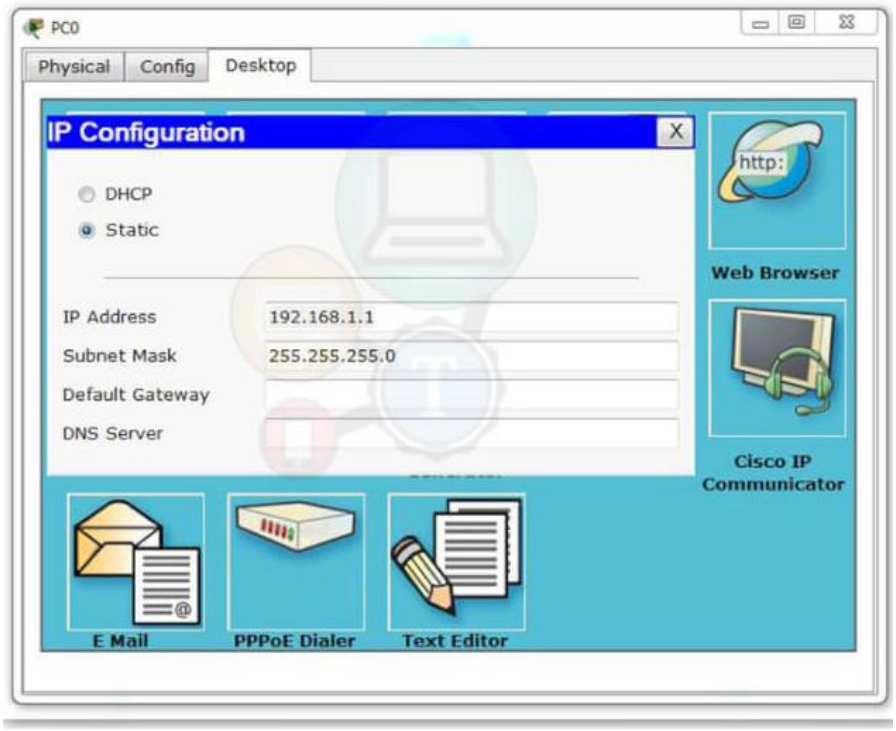
- For configuring IP address, you will need to open end device configuration. This can be done easily by clicking on the end device. Nevertheless, you will see the following configuration screen.

You will need to look for 'IP Configuration' option. This option is present under the 'Desktop' tab. So, go ahead and click on that to open *desktop* for enhanced configuration settings.

This is the main step. In the coming step, you are going to learn about assigning IP address to end device. However, before that you will need to open IP configuration settings. For this, please go ahead and click on the 'IP Configuration' option. This will open up a dialog box, which is shown in the following picture.

Enter the following configuration data. But please do remember, that for each device you will have to use different IP address. You can use the following list of IP addresses:

Switch	**IP Address**
Switch 0	192.168.1.1
Switch 1	192.168.1.2
Switch 2	192.168.1.3
Switch 3	192.168.1.4
Switch 4	192.168.1.5
Switch 5	192.168.1.6



- Build the topologies and perform the following operations.
- You have to check network is established properly or not by ping command in command prompt.
- You have sent two PDU packets one targeted from PC0 to PC2 and another targeted from PC3 to PC1.
- Go to simulation (Bottom left) → Show filters → Select ICMP → Add simple PDU → Auto capture/play
- Take proper screenshot of simulation output and network setup.