Computer Networks.

→ Overview of the Interface

Cisco packet Tracer is used as a network simulation tool that allows us to create and simulate network topologies.

→ Menu Bar.

It has file menu similar to standard options.

Open samples → Involve / include different devices.

options → Interface → customize device Models.

Miscellenous → Autofile back-up (always off) [off ▽]

→ under Main menu.

1) Main Toolbar : [select / delete]

[↶ undo] [⊕ zoom-in] [start / stop simulation]

2) Device - Type Toolbar: categories of networking.

3) Workspace :

- Logical Workspace → How devices are connected & how data will flow in the network (specific Menu bars)
- Physical Workspace → This view allows user to arrange devices geographically in a virtual environment, simulating real world deployment- [Laid down connected]

[Logical] [Physical]

4) Device selection: [blue bar] dark 

1) power cycle all devices

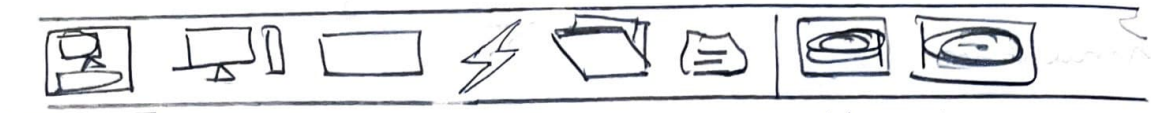
2) Fastforward → quickly converge the network protocols and wait for all to finish processes

4) Simulation mode.

Realtime | Simulation

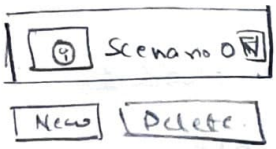
Real time on the Network

Simulation → allows to control time as well as add packets and watch them trav



Routers | PC's | connect | cables. to connect

Scenarios → create packets



5. Device specific Interfaces.

- Physical Tab → displays physical properties of the device.
  Insert / Delete Network cards.
- Config Tab → Allows users to configure settings like IP address.

6. Network component Palette

It displays End Devices, Networking Devices and WAN Emulation components.

7. Network Diagram Symbols.

rectangle for routers.
squares for PCs.
circles for hubs or switches.

Status bar :

located at bottom, the status bar provides quick information about the simulation status.

25-09-24

Experiment - 1

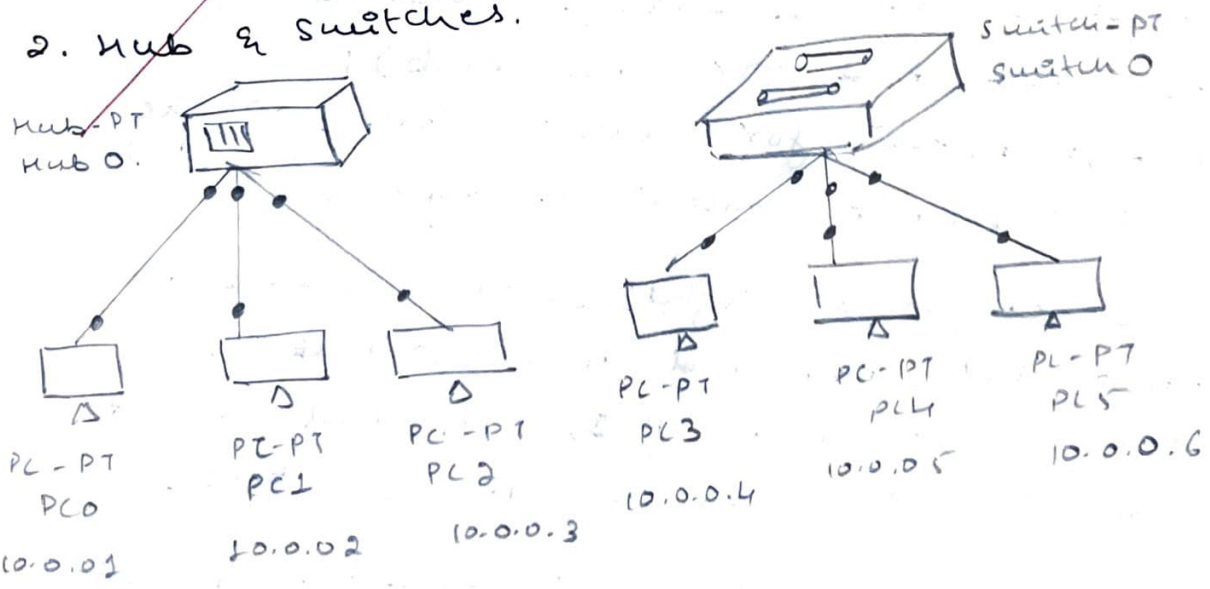
1. PC to server

Aim: To set up a point-to-point network between a PC & a server, facilitating direct communication to observe data exchange.

Topology: A PC (PC0) is connected to a server (server 0) using a crossover ethernet cable. IP address of PC0 : 10.0.0.1
IP address of server 0 : 10.0.0.2

observation: The direct connection allows PC0 to communicate with server 0, which is typical in small networks for tasks such as file sharing, service requests or testing servers responses to client queries.

2. Hub & Switches.



Q1) Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demostrate
* ping message

Aim: To create a simple network consisting of three PC's connected to a central Hub and another network with three PC's connected to a switch. This configuration will help observe the behaviour of data transmission using Hub & switch devices.

Topology: 1. Hub Network: Three PCs (PC0, PC1, PC2) are connected to a (Hub 0) using straight-through Ethernet cables.

IP addresses: PC0 = 10.0.0.1
PC1 = 10.0.0.2
PC2 = 10.0.0.3

2. Switch Network: Three PCs (PC3, PC4, PC5) are connected to a (Switch 0) using straight-through ethernet cables.

IP addresses: PC3 = 10.0.0.4
PC4 = 10.0.0.5
PC5 = 10.0.0.6

Procedure:

1. Add 1 hub, 1 switch and 6 PCs (PC0, PC1, PC2 for the hub); PC3, PC4, PC5 for the switch) to the cisco packet tracer workspace.

2. Use copper straight through cables to connect PC0, PC1 and PC2 to Hub 0. Parallelly connect PC3, PC4 and PC5 to Switch 0 using same type of cables.

3. Assign IP addresses to each PC & obtain subnet mask

4. Switch to simulation to observe data traffic behaviour when packets are sent between the devices.

5. In the Hub network, notice how the hub broadcasts packets to all devices, causing potential traffic overload. In the Switch network, observe how the switch forward packets only to the intended reccpient, reducing unnecessary traffic.

6. The Hub broadcasts data to all connected devices leading to more network congestion, while the switch efficiently sends data only to the correct device, optimizing performance

Observation:

1. The hub broadcasts packets to all devices, which may cause unnecessary traffic.

2. The switch forwards packets only to the appropriate device by learning MAC addresses, making it more efficient by reducing traffic.

Difference between Hubs & Switches.

Hubs	Switches.
1. Hub broadcast data to all devices	1. Switches send it only to the destination
2. Hubs create more traffic	2. Switches reduces traffic by directing data
3. Hubs work at physical layer	3. Switches operate at the data link layer.
4. Hubs are slower due to shared bandwidth	4. Switches are faster with dedicated bandwidth.
5. Hubs are cheaper	5. Switches are more expensive but more efficient.