COMPUTER NETWORKS

Week 2 25/09/24

Switches and Hubs

Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping message.

Computer Network - LAB 1 25/9/24

Protocols: LAN, WAN, Switches, routers others.

Logical workspace: It contains network topology creation. It includes devices like generic, real and modules. Routers, switches, hosts, hubs, bridges, wireless access points, wireless routers, cable modems. Multiuser remote network.

Physical workspace: Network topology creation. It includes structure cabeling like Bend Points & Group points on cables. Ethernet cable length display.

Modes: Realtime mode which includes realtime protocol updates.

Simulation mode to view packet animation.

Load authoring and sharing.

Connections / links:

* Console: Console connections can be made between PCs and routers or switches.
* copper straight-through cable: this is a standard ethernet media for connecting b/w devices that operate at d/f OSI layers.
* Copper Cross-over cable: is ethernet media for connecting b/w devices that operate at same OSI layer,

* Fiber : Fiber media is used to make connections between fiber ports.

* Phone : Phole line connections can only be made between devices with modem ports.

* Coaxial : Coaxial media is used to make connections between coaxial ports.

* Serial DCE and DTE : used for WAN links, must be connected between serial ports.

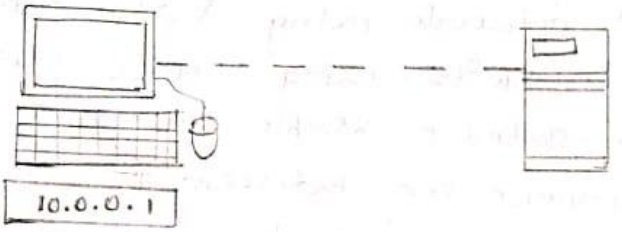
* Octal : The 8-port synchronous cable provides the high-density connector on one end and eight RJ-45 plugs on the other.

LAB1 :-

Q] Create a topology and stimulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping message.

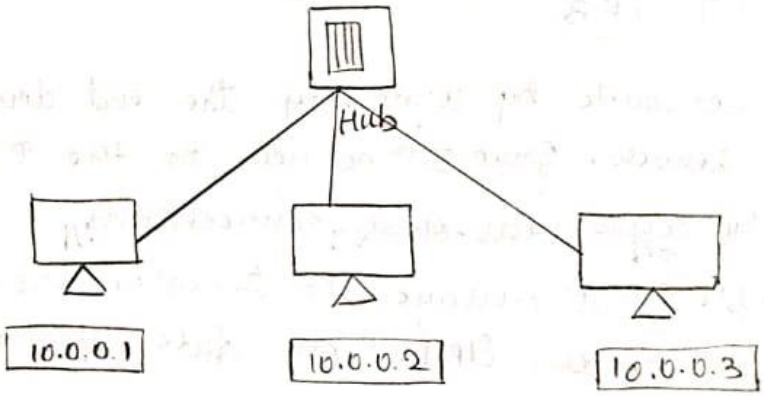
★ My First PT LAB

Created a network by connecting the end devices PC and a server. Gave IP address to the PC. Connected by copper cross-over connections.
Added simple PDU message to transfer message from PC to server. Clicked on Auto capture / Play and observed the operations.
Status showed successfully.



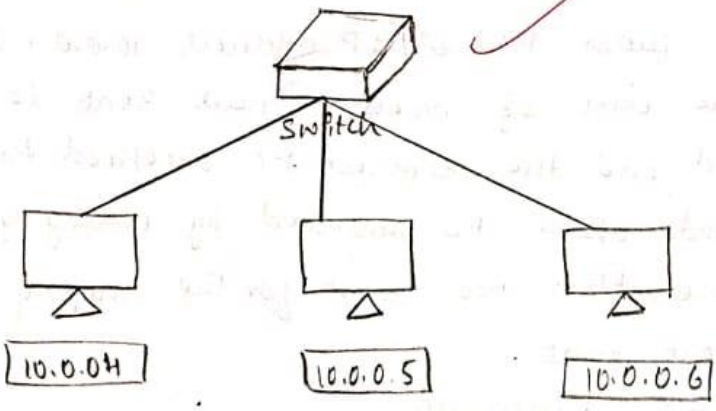
★ Hub - PCs.

Created a local area network using HUB and end devices PCs. Connected PC to hub using Copper Straight-through cable. Gave IP address for the PCs. connected. Added a simple PDU to communicate from PC of IP address 10.0.0.1 to 10.0.0.3. The copy of message was sent to all PC connected and the correct PC accepted the message, and other PC rejected by wrong symbol.
Similar observation was done for the message or acknowledgment sent.
Status shown successfully.



★ Switch - PC :-

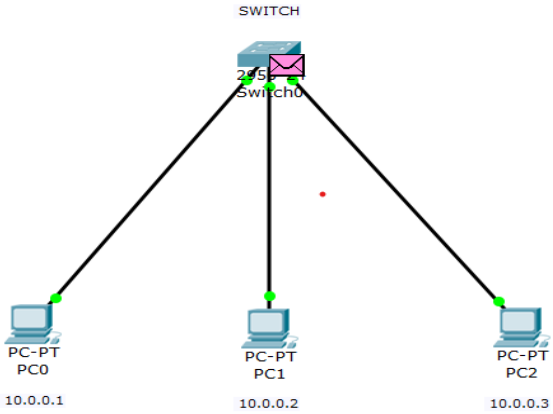
Comm created a network using Switch and PC. Connected PC to switch using Copper Straight - Through cable. Added a simple PDU to observe & message communication between two PCs. Clicked autoPlay to observe the working. Initially a copy of message was sent to all devices connected to switch. Only the right device accepted the message. Now when the acknowledgment was sent back the switch transfers that message to the correct PC. Since switch has memory. Status shown successfully.



→ Difference b/w Hub and Switch

Hub	Switch.
Hub operates on physical layer of OSI model.	Switch operates on data layer of OSI model.
Hub connects multiple PCs to single network	Switch connects multiple devices on single network.
Hub is broadcast type transmission	Switch is unicast, multicast and broadcast type transmission.

SWITCH :




```
Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

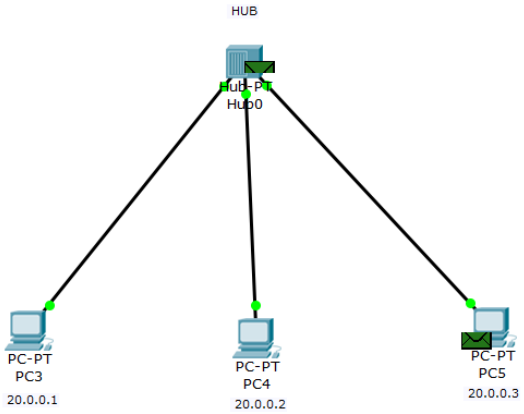
```
Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time<1ms TTL=128
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

HUB :




```
Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time<1ms TTL=128
Reply from 20.0.0.1: bytes=32 time=1ms TTL=128
Reply from 20.0.0.1: bytes=32 time<1ms TTL=128
Reply from 20.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Reply from 20.0.0.3: bytes=32 time=1ms TTL=128
Reply from 20.0.0.3: bytes=32 time<1ms TTL=128
Reply from 20.0.0.3: bytes=32 time=1ms TTL=128
Reply from 20.0.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```