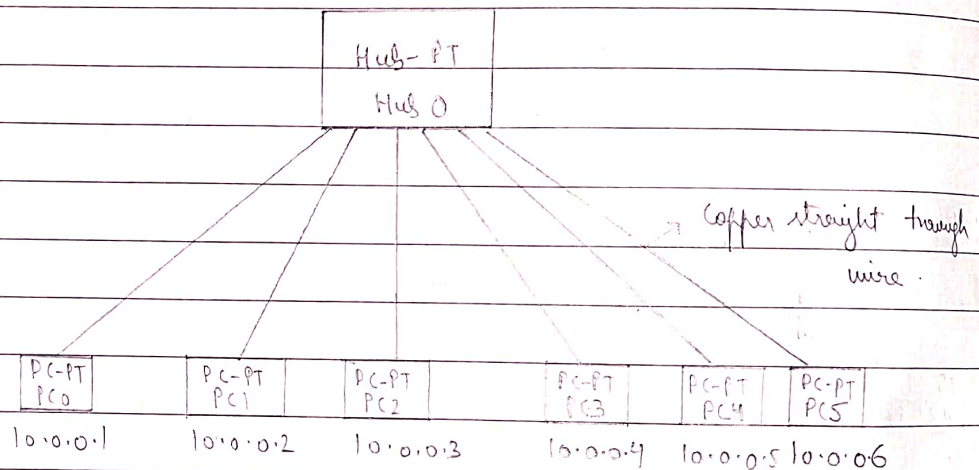


Lab: Week 1 (Hubs and Switches)

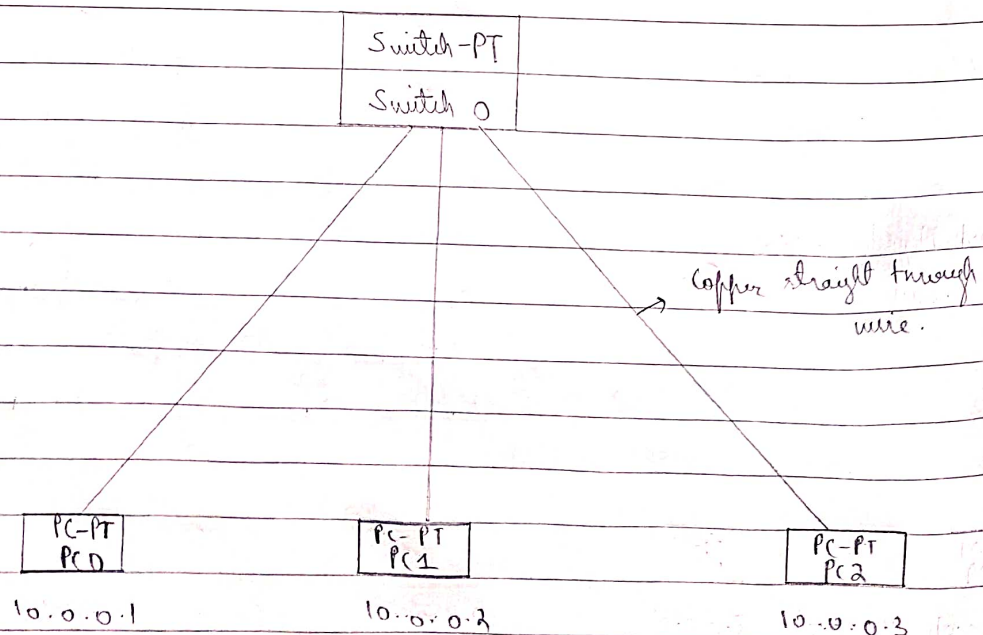
↳ Aim: Creating a topology and simulate sending a simple PDU from source to destination using simple hub and switch as connecting devices.

↳ Topology:

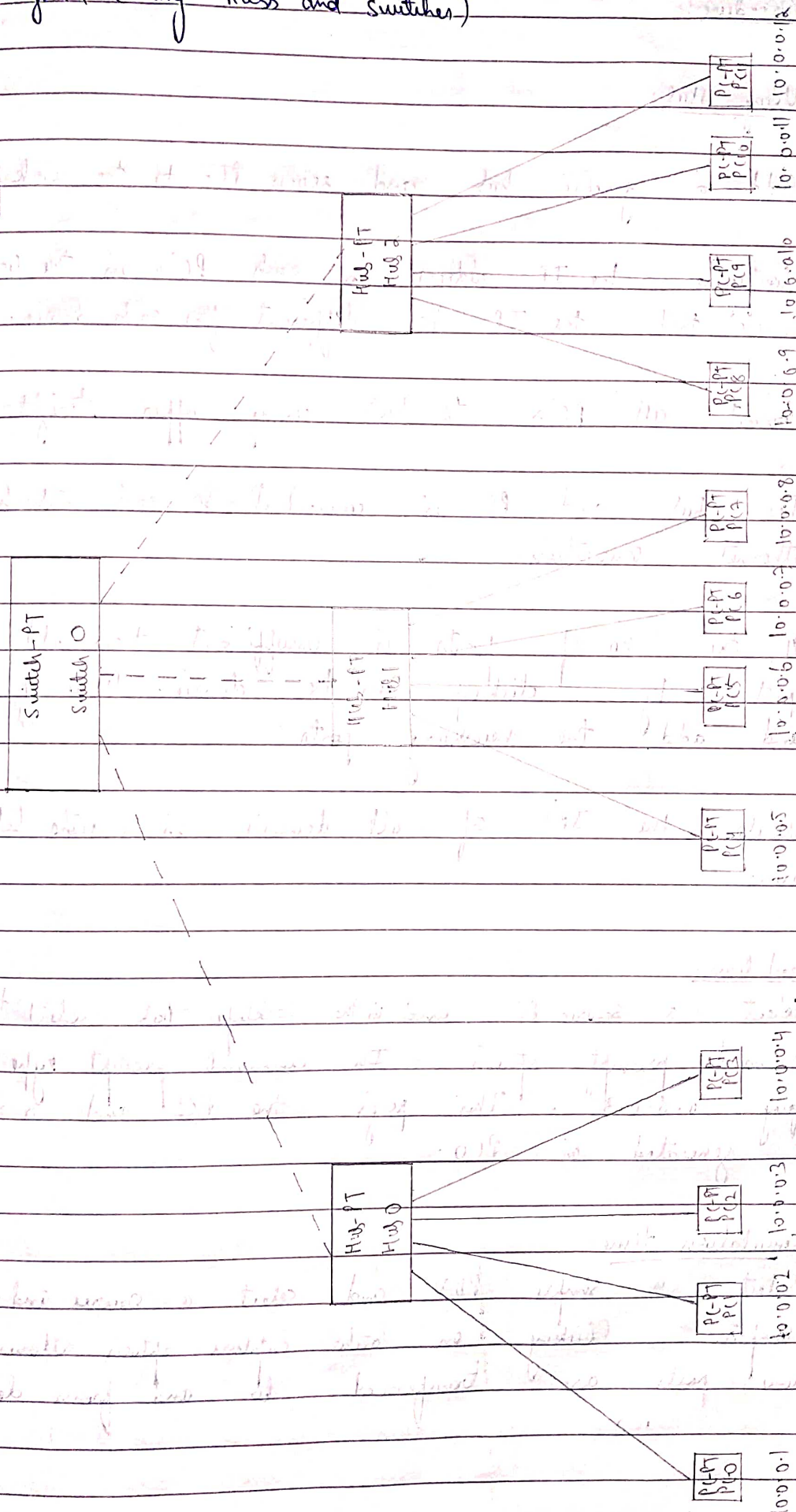
→ Using Hub.



→ Using Switch



→ Hybrid (Using Hubs and switches)



USN:1BM20CS059

PC1 10.0.0.1, PC2 10.0.0.2, PC3 10.0.0.3, PC4 10.0.0.4, PC5 10.0.0.5, PC6 10.0.0.6

USN:1BM20CS059

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128

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

Time: 01:47:48 Power Cycle Devices Fast Forward Time

| File | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | BB | Delete |
|------------|-------------|--------|-------------|------|-------|-----------|----------|-----|----|----------|
| Scenario 0 | Successful | PC1 | PC2 | ICMP | Blue | 0.000 | N | 0 | | (delete) |

Connections

Copper Network Through

Toggle PDU List Window

Realtime

12:05 10-11-2022



Click Power Tools Studies

File Edit Options View Tools Extensions Help

Logical [Blank] New Cluster Move Cluster Set Tiled Background Viewport

```
graph TD; Switch[Switch] --- PC0[PC0]; Switch --- PC1[PC1]; Switch --- PC2[PC2];
```

USN: 1BM20CS059

PC0

Physical Config Desktop Custom Interface

Command Prompt

```
Jacket Trace PC Command Line 1.0
Pinging 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 = 1ms, Maximum = 1ms, Average = 1ms

PC>
```

Time: 00:02:12 Power Cycle Devices Fast Forward Time

Connections

Scenario 0

New Delete

Toggle PDU List Window

| Fire | Last Status | Source | Destination | Type | Color | Time(jsec) | Periodic | Num | ESR | Delete |
|------|-------------|--------|-------------|------|-------|------------|----------|-----|--------|----------|
| | Successful | PC0 | PC2 | SCHP | | 0.000 | N | 0 | (edit) | (delete) |

Realtime

ENG INTL 12:43 10-11-2022

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Reset] New Cluster Move Object Set Tiled Background Viewport

USN: 1BM20CS059

Simulation Panel

Event List

| Time | Last Device | At Device | Type | Info |
|-------|-------------|-----------|------|------|
| 0.000 | --- | PC2 | ICMP | |
| 0.001 | PC2 | Switch0 | ICMP | |
| 0.002 | Switch0 | PC1 | ICMP | |
| 0.002 | Switch0 | PC2 | ICMP | |
| 0.003 | PC2 | Switch0 | ICMP | |
| 0.004 | Switch0 | PC2 | ICMP | |

Reset Simulation ☒ Constant Delay Captured to: 0.004 s

Play Controls Back Auto Capture / Play Capture / Forward

Event List Filters - Valid Events
ACL Filter, ARP, CDP, DHCPv4, DNS, EIGRPv4, FTP, H.323, HTTPv4, HTTPS, ICMP, ICMPv4, IPsec, IS-IS, LACP, LLDP, MIB, NTP, OSPFv4, PAgg, POP3, RADIUS, RARP, RTSP, SCOR, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All Events

Time: 00:01:46.795 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Run 0.00 (add) (delete)

Simulation

ENG INTS 1234 10-11-2022

Cross Platform Tools Studio

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

```
graph TD; Root[Root] --- N1[ ]; Root --- N2[ ]; Root --- N3[ ]; N1 --- PCPT1[PC-PT PC0]; N1 --- PCPT2[PC-PT PC1]; N1 --- PCPT3[PC-PT PC2]; N1 --- PCPT4[PC-PT PC3]; N2 --- PCPT5[PC-PT PC4]; N2 --- PCPT6[PC-PT PC5]; N2 --- PCPT7[PC-PT PC6]; N2 --- PCPT8[PC-PT PC7]; N3 --- PCPT9[PC-PT PC8]; N3 --- PCPT10[PC-PT PC9]; N3 --- PCPT11[PC-PT PC10]; N3 --- PCPT12[PC-PT PC11];
```

USN: 1BM20CS059

PC0

Physical Config Desktop Custom Interface

Command Prompt

```
Socket Tester PC Command Line 1.0
PC#PING 10.0.0.12

Pinging 10.0.0.12 with 32 bytes of data:

Reply from 10.0.0.12: bytes=32 time=0ms TTL=128
Reply from 10.0.0.12: bytes=32 time=0ms TTL=128
Reply from 10.0.0.12: bytes=32 time=0ms TTL=128
Reply from 10.0.0.12: bytes=32 time=0ms TTL=128

Ping statistics for 10.0.0.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC#
```

Time: 00:00:43 Power Cycle Devices Fast Forward Time

Connections

Copper Straight-Through

Scenario 0

New Delete

Toggle PDU List Window

| File | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Run | Set | Delete |
|------|-------------|--------|-------------|------|-------|-----------|----------|-----|--------|----------|
| | Successful | PC0 | PC11 | ICMP | | 0.000 | N | 0 | [edit] | [delete] |

Realtime

ENG #11 10-11-2022

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical (Root) New Cluster Move Object Set Tiled Background Viewport

USN: 1BM20CS059

Simulation Panel

Event List

| Time(sec) | Last Device | At Device | Type | Info |
|-----------|-------------|-----------|------|------|
| 0.006 | Hub2 | Switch0 | ICMP | |
| 0.006 | Hub2 | PC8 | ICMP | |
| 0.006 | Hub2 | PC9 | ICMP | |
| 0.006 | Hub2 | PC10 | ICMP | |
| 0.007 | Switch0 | Hub0 | ICMP | |
| 0.008 | Hub0 | PC1 | ICMP | |
| 0.008 | Hub0 | PC2 | ICMP | |
| 0.008 | Hub0 | PC3 | ICMP | |

Reset Simulation Constant Delay Captured for 0.008 s

File Controls Back Auto Capture / Play Capture / Forward

Event List Filters - Hide Events

ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTLS, EIGRP, EIGRPv6, FTP, H.323, IGMP, IGMPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NTP, NETFLOW, NTP, OSPF, OSPFv6, RADIUS, RDP, RDPv6, RTSP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All Filters

Time: 00:07:33.587 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Scenario 0

New Delete

Toggle PDU List Window

File Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

| | | | | | | | | | |
|------------|-----|------|------|--|-------|---|---|--------|----------|
| Successful | PC9 | PC11 | ICMP | | 0.000 | N | 0 | [edit] | (delete) |
|------------|-----|------|------|--|-------|---|---|--------|----------|

Copper Straight-Through

Simulation

ENG 12:58 10-11-2022

↳ Procedure:

→ Using Hub:

- i) Add a generic hub and seven PCs to the workspace.
- ii) Configure the IP address of each PC's in the configuration table. Ensure that the IP is different for each device.
- iii) Connect all PC's to hub using copper straight wire.
- iv) The hub and PC is connected to each other's fast ethernet connection.
- v) If the no. of ports is insufficient then add extra port by clicking on the device. Turn off the device and add the necessary ports.
- vi) Write the IP's of all devices in a note below the device.

Real time:

Select a source PC and in the desktop tab select the command prompt option. In command prompt type "ping 10.0.0.3". This pings the PC2 and a response is generated on PC0.

Simulation time:

Select a simple PDV and select a source and destination computer. Clicking on packet capture option allows us to see how packets are transferred to and from device.

→ Using Switch:

- i) Add a generic switch and three PCs to the workspace.
- ii) Configure the IP addresses of each PC's in the configuration tab. Ensure that IP is different for each device.
- iii) Connect all PC's to the switch using copper straight through.
- iv) If no. of ports are insufficient then add extra ports by clicking on device. Turn off the device and add the necessary ports.
- v) Write the IP's of all devices in a note below the device.

Real time:

Select a source PC and in the desktop tab select command prompt option. In command prompt option, ping the destination PC by specifying its IP.

Simulation time:

Select a simple PDV and select a source and destination computer. Clicking on auto capture option allow us to see how packets are transferred.

→ Hybrid Mode:

- i) Add a switch, 3 hubs and 12 PC's to workspace.
- ii) Connect the three hubs to the switch and 4 PC's to each of the hubs using copper cross over and copper straight through wires respectively.

- iii) Configure the IP of each of the PC in configure and add a note below each PC containing IP addresses.

Real time mode:

Select the PC you want to send the packet from and open its command prompt. Specify the destination PC by specifying its IP address. A response is sent by the destination PC to source PC.

Simulation mode:

Add a simple PDU by selecting the pair of PC and click on auto capture from right panel.

4. Observation:

→ Hub:

Learning outcome:

- i) When a source sends a packet in the network the hub receives the packet and sends broadcast over the network, i.e., it sends data to all the end devices in the network and the node where it matches with the specified address accepts the packet and acknowledges it. Remaining nodes discard/ignore the message.
- ii) The communication between hub and end device is established through copper straight through wire as they belong to different layers.
- iii) The number of ports can be added if needed by clicking on the device and adding the necessary ports.

Result:

PC > ping 10.0.0.3

pinging 10.0.0.3 with 32 bytes of data

Reply from 10.0.0.3 : byte = 32 time = 0ms

Reply from 10.0.0.3 : byte = 32 time = 0ms

Reply from 10.0.0.3 : byte = 32 time = 0ms

Reply from 10.0.0.3 : byte = 32 time = 0ms

Ping statistics for 10.0.0.3 :

Packets sent = 4, received = 4, lost = 0.

→ Switch :

Learning outcome :

i) When a source device sends a message to the switch, once a connection is established. Which takes some time called as learning time, the switch receives the packet. It initially broadcasts the packet to all connected devices to locate the destination. Once the destination is located, the message is sent only to that device.

ii) The connection between the switch and end device is established using copper straight through as they belong to different network layers.

iii) The number of ports can be added if needed by clicking on the device and adding the necessary ports.

Result:

PC > ping 10.0.0.2

pinging 10.0.0.2 with 32 bytes of data

Reply from 10.0.0.2 : bytes = 32 time = 0ms

Reply from 10.0.0.2 : bytes = 32 time = 0ms

Reply from 10.0.0.2 : bytes = 32 time = 0ms

Reply from 10.0.0.3 : bytes = 32 time = 0 ms

Ping statistics for 10.0.0.3:

Packets : Sent = 4, Received = 4, Lost = 0.

→ Hybrid Mode
Learning Outcome :

i) The switch and hub are connected through copper cros over as they belong to the same network layer but PC and hubs are connected through copper straight through as they belong to different network layers.

ii) The message from the source PC to destination is sent through the hub which then sends to all its connected PC's and the switch. The switch then sends the message to the respective hub and the hub sends the message to all its connected PC. The destination PC acknowledges that it has received the message by sending a acknowledged back to the source PC.

iii) The number of ports can be added if needed by clicking on the device and adding the necessary ports.