Computer Networks: Lab Record

Week: 1

Experiment 1: Hubs and Switches

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

Observation:

Bafna Gold
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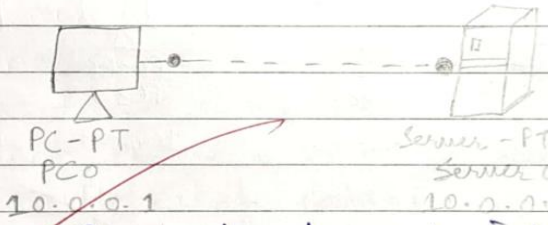
9. Device - specific selection Box : This box is where you choose specifically which devices you want to put in your network & which connections to make.

10. User Created Packet Window : This window manages the packets you put in the network during simulation scenarios.

Experiment - 1

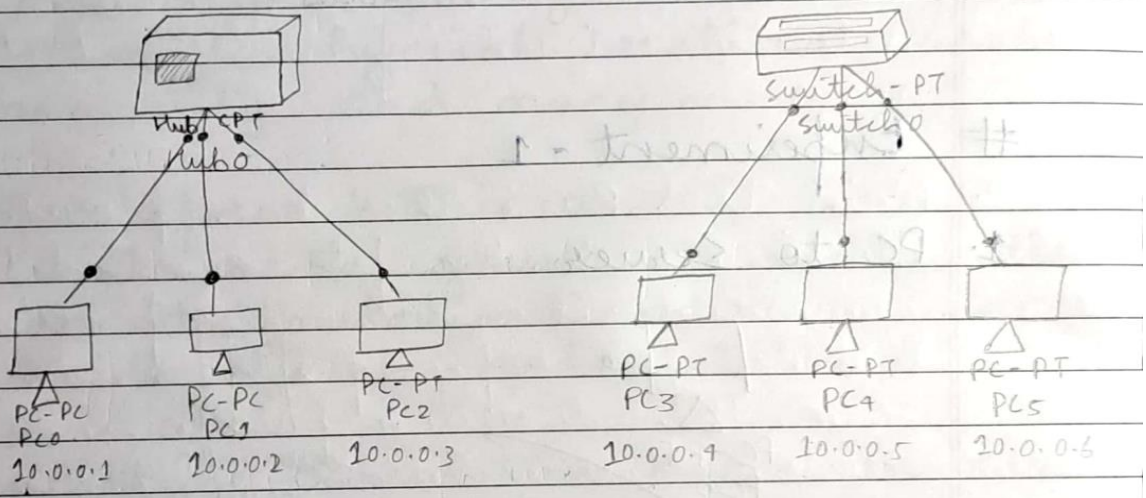
1. PC to Server.



- 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 cross-over 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 server responses to client ~~app~~ queries.

2. Hub & Switch.



- Aim :- To create a simple network that consists of three PCs connected to a central hub and another network with three PCs connected to a switch. This configuration will help observe the behaviour of data transmission using hub and switch devices.

- Topology :

i) Hub Network :- Three PCs (PC0, PC1, PC2) are connected to a hub (Hub0) using ~~straight~~ through Ethernet cables.

IP Addresses :
PC0 = 10.0.0.1, PC1 = 10.0.0.2, PC2 = 10.0.0.2

ii) Switch Network :- Three PCs (PC3, PC4, PC5) are connected to a switch (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, PC2 to hub0. Similarly connect PC3, PC4, PC5 to switch 0 using same type of cables.

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

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

5. In the hub network, observe how the hub broadcasts packets to all the devices, causing potential traffic overload.

In the switch network, observe how the switch forwards packets only to the intended recipient, reducing unnecessary traffic.

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

Observation:

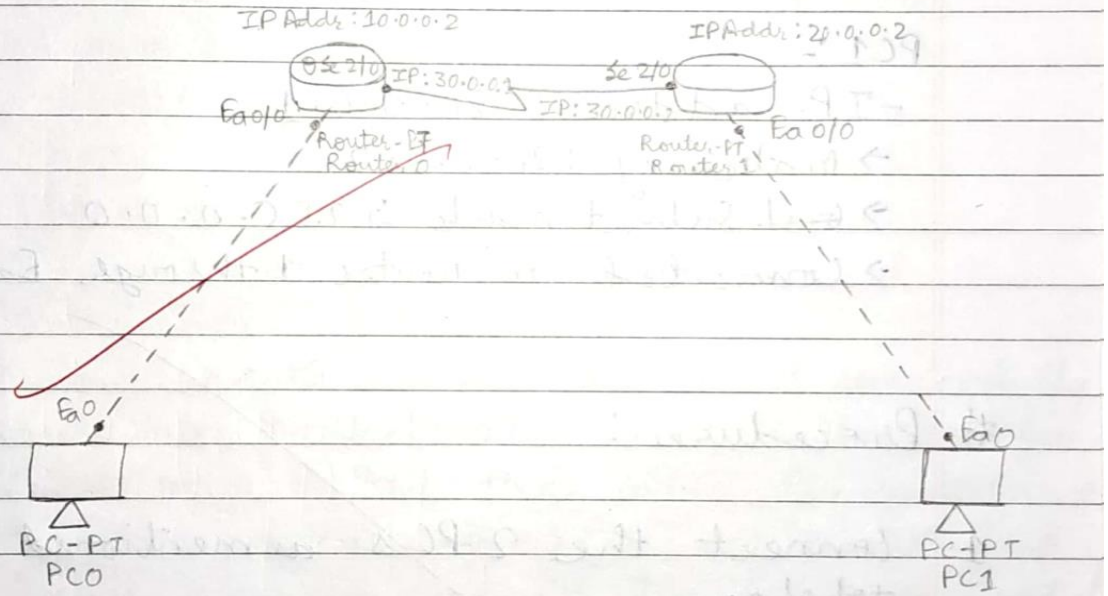
1. The hub broadcasts packets to all devices, which may cause unnecessary traffic.

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

Lab: 32(a)

Aim: Configure IP Address to routers in Cisco Packet Tracer.
Explore the following messages:
(i) ping responses. (ii) Destination unreachable
(iii) request timed out & reply.

Topology:-

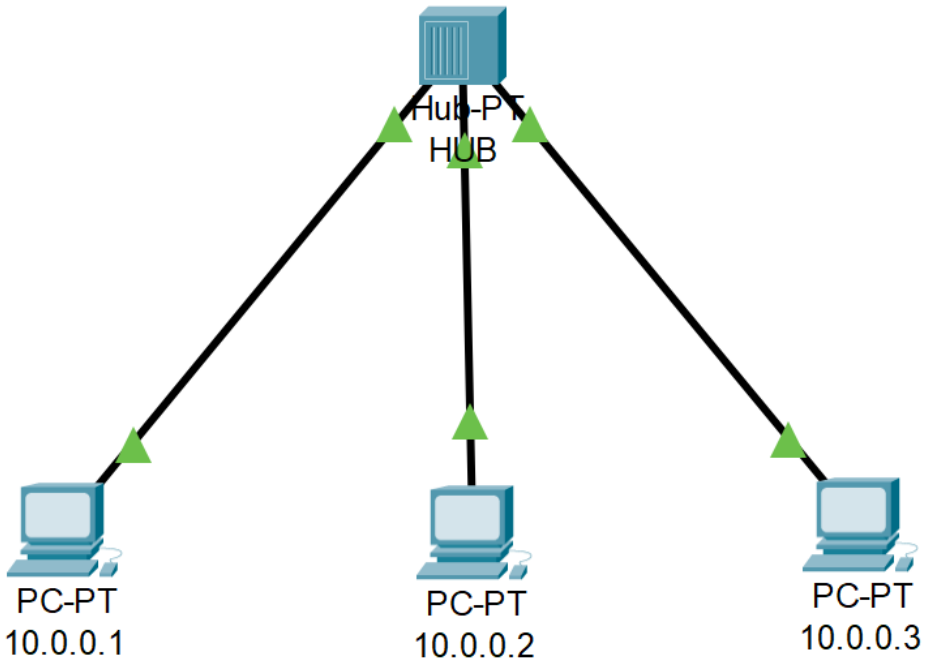


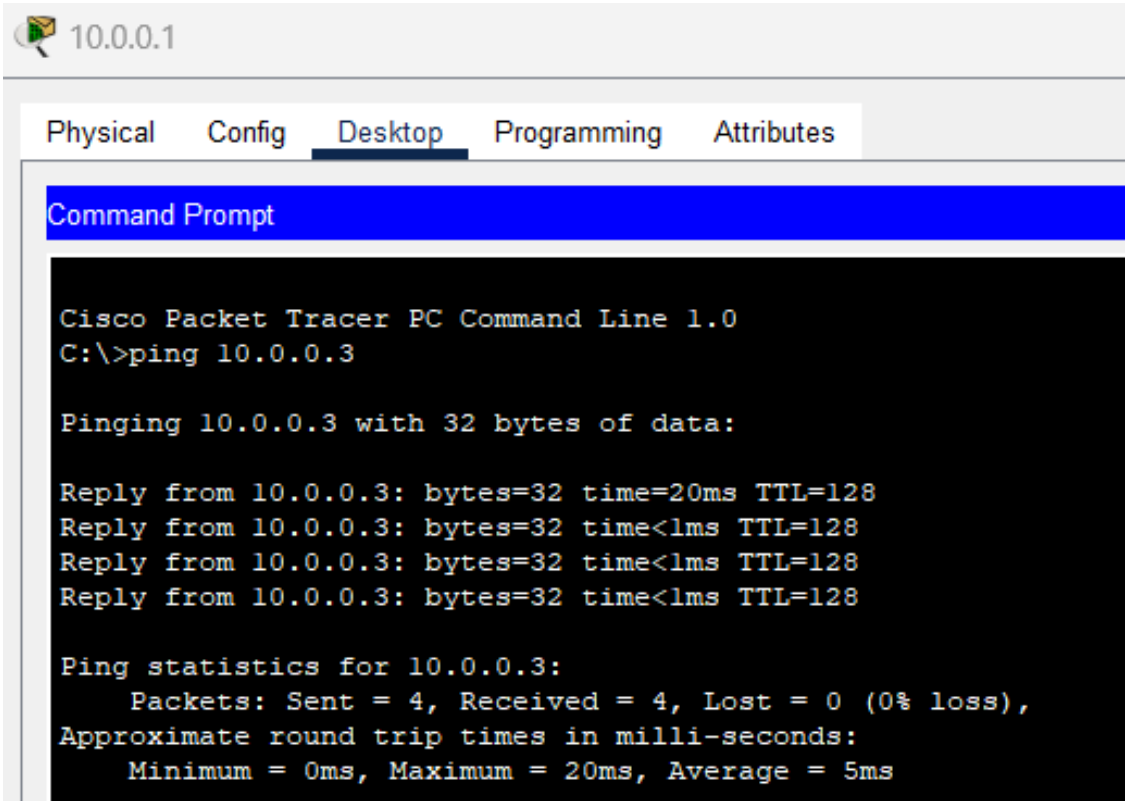
IP Addr: 10.0.0.1
Subnet mask: 255.0.0.0
Gateway: 10.0.0.2

IP Addr: 20.0.0.1
Subnet Mask: 255.0.0.0
Gateway: 20.0.0.2

Routers:
Router 0: Interface Fa 2/0 connected to PC 0 : 10.0.0.2
Interface se 2/0 connected to Router 1: 30.0.0.1
connected to Router 1 & PC0.

Screenshots:



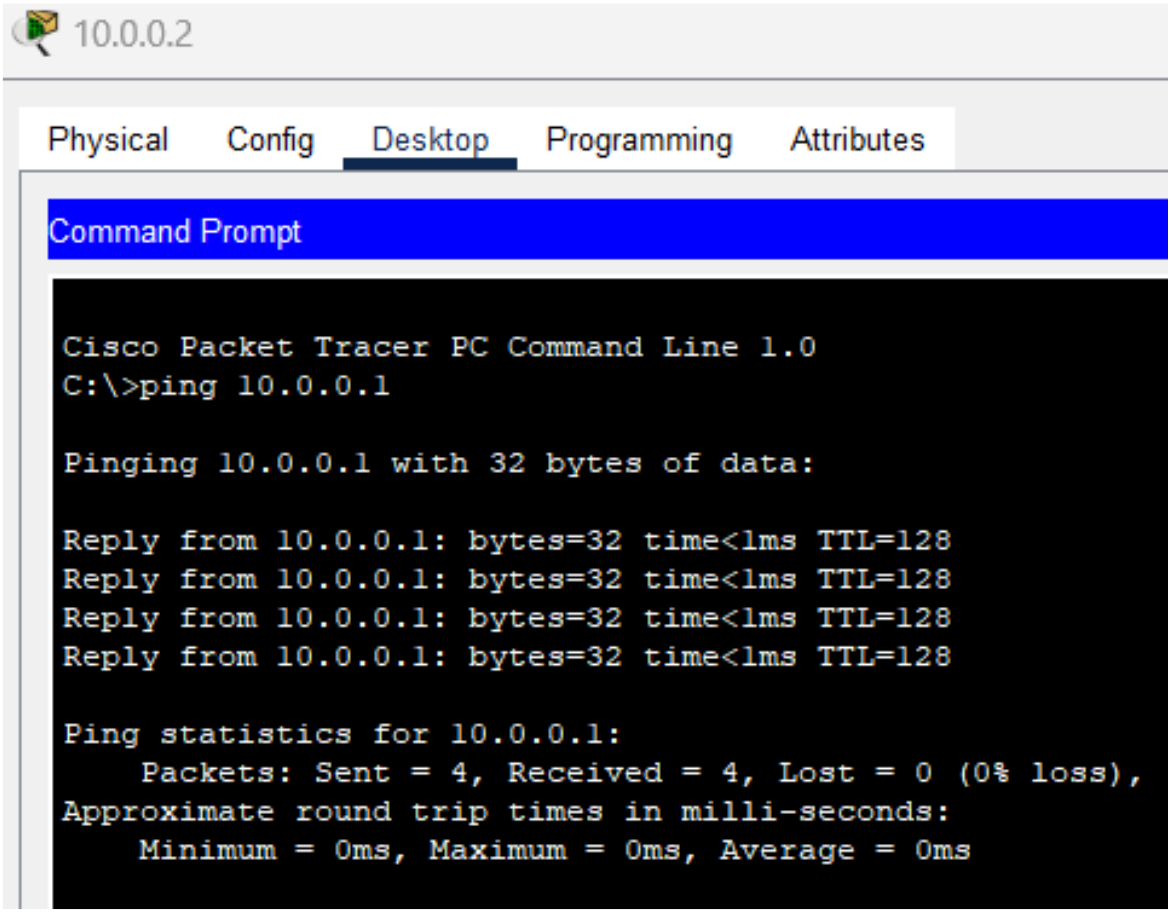


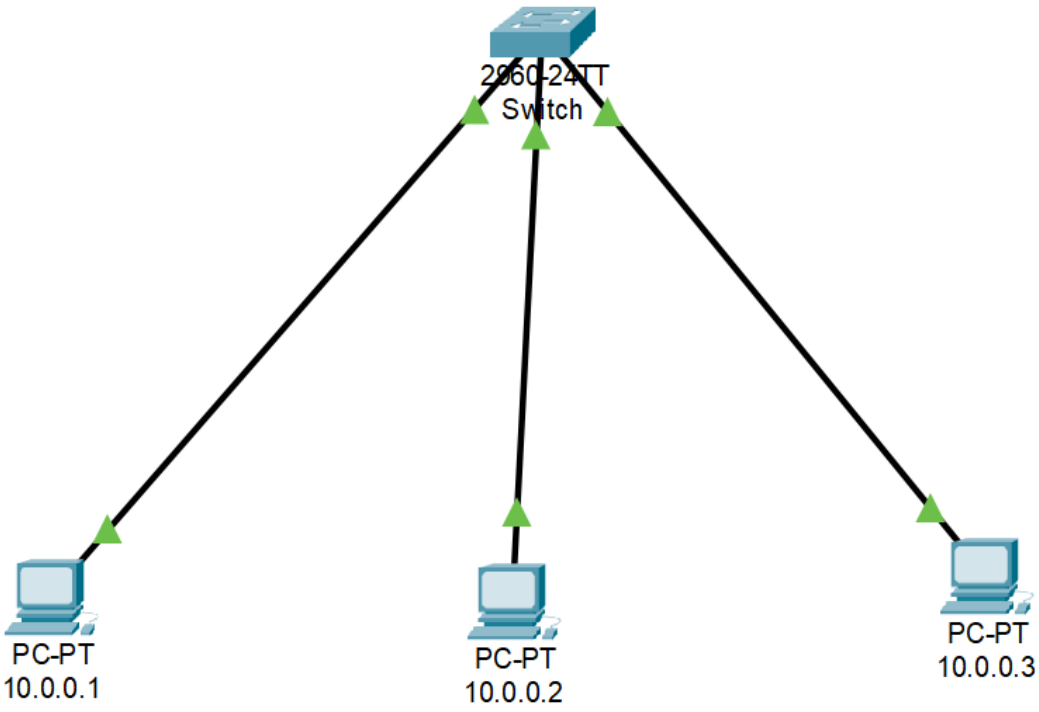
```
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```





10.0.0.1

Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Cisco 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
```

```
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```