

Experiment No: 1

Experiment Name: Basic Concept of Switching.

- 1. Objective:** Objective of this experiment is to get familiar with the basic concepts of computer network. In this experiment we'll be using some basic computer networking devices such as End Devices (i.e PC), Switching Devices, Hubs, connecting cables etc. Using the Cisco Packet Tracer we'll simulate the packet transferring from one PC to another and will check the efficiency of different working principles of different networking devices. We'll use "ping" and "trace route" to know how does it works and what type of output it gives.
- 2. Design Procedure:** Since we're going to perform some very basic operations of networking we'll design a simple network diagram using CISCO Packet Tracer.

First we'll test a simple packet transfer from one PC. The circuit contains one or more Hub(s) and some PCs. We'll connect two end point PC-to-PC or PC-toHub/Switch using a copper wire, it is usually a twisted pair cable with connectors (RJ-45) attached to the end points of the cable.

3. Transferring some Packet from one PC to another:

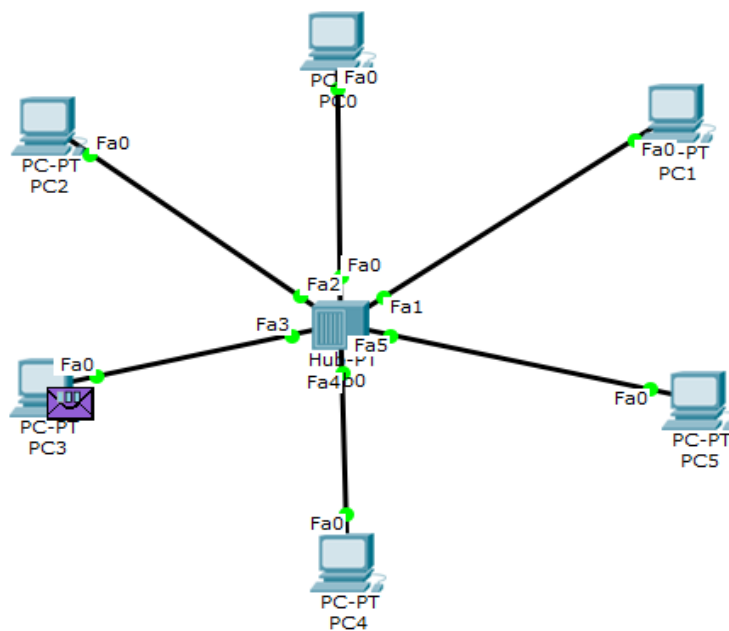


Figure 1: Several PC connected via a Hub in the center

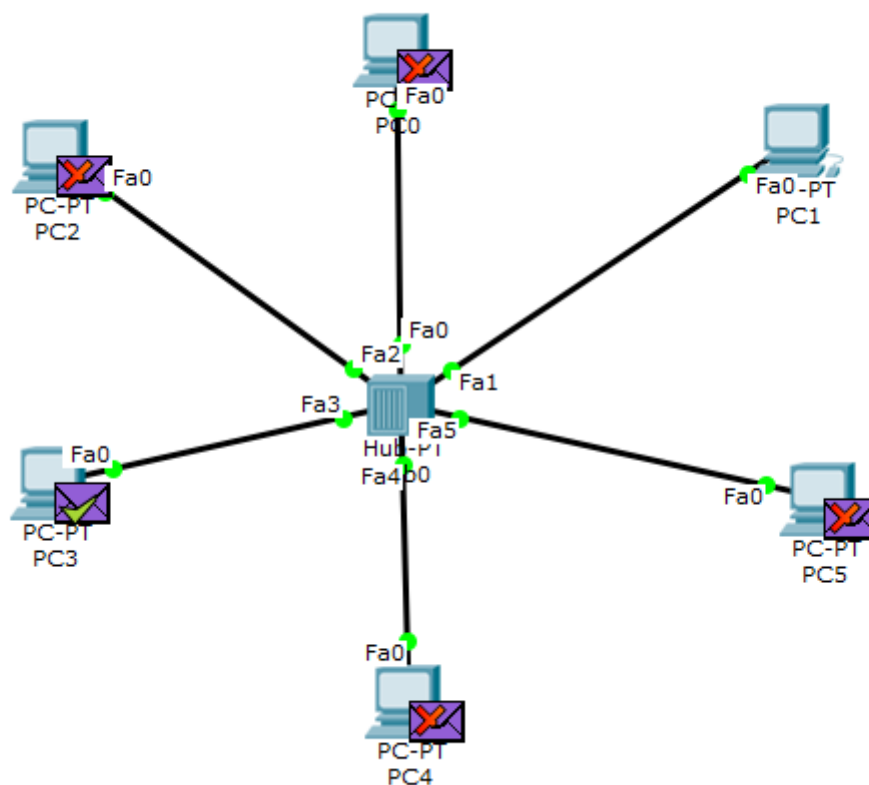


Figure 2: Packet transferring from Hub to all Other PCs

To test packet transfer from one PC to another via a Hub, we first connect the PCs to the hub as shown in figure above. The circuit is implemented using Packet Tracer software from CISCO. After connecting the PCs we assign IP addresses to all connected PCs. After assigning the IP address, we put some packet (ICMP) on one PC and set the destination PC. When in simulation mode in Packet Tracer software, we can easily see how a packet is transferred from on PC to another via a network Hub. After completing the packet transfer, we then replace the hub with a switch. Using a switch rather than a hub causes easy transfer of packet from one PC to another.

4. Configuring a Switch: A switch is needed to be configured before using in a network circuit. In this experiment we'll try configuring a switch from a PC via Packet Tracer software. We first connect a PC to a switch's console using a RS-232 connector. The connection diagram is given below.

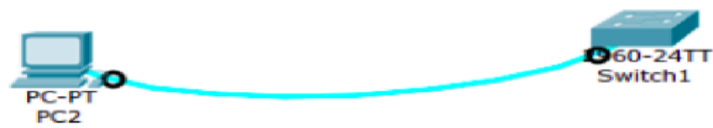


Figure 3 : Configuring a Switch from a PC

we'll be using the commands as bellow to initially configure a switch.

A screenshot of a PC2 terminal window. The window has tabs for Physical, Config, Desktop, Attributes, and Software/Services. The Terminal tab is active, showing a command-line interface for a Cisco switch. The output shows the switch's boot process and the configuration commands entered by the user.

```
* 1 28 WS-C2960-24TT 12.2 C2960-LANBASE-M
Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team

Press RETURN to get started!

Switch>en
Switch#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#enable secret csejul23
Switch(config)#line console 0
Switch(config-line)#login
% Login disabled on line 0, until 'password' is set
Switch(config-line)#password cse@JU
Switch(config-line)#login
Switch(config-line)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
exit
```

5. Ping & Traceroute:

Ping is a method to check if a host is alive or not. It sends some packets to a host defined by an IP address. It measures the round-trip time for messages sent from the originating host to a destination computer that are echoed back to the source. Basic command is: ping 'hostname' (host can be a IP address or web address)

```
protick@protick: ~
protick@protick:~$ ping www.google.com
PING www.google.com (172.217.26.196) 56(84) bytes of data.
64 bytes from maa03s23-in-f4.1e100.net (172.217.26.196): icmp_seq=1 ttl=62 time=
4.18 ms
64 bytes from maa03s23-in-f4.1e100.net (172.217.26.196): icmp_seq=2 ttl=62 time=
1.17 ms
64 bytes from maa03s23-in-f4.1e100.net (172.217.26.196): icmp_seq=3 ttl=62 time=
2.64 ms
64 bytes from maa03s23-in-f4.1e100.net (172.217.26.196): icmp_seq=4 ttl=62 time=
1.93 ms
^C
--- www.google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 1.176/2.484/4.181/1.109 ms
protick@protick:~$
```

the output results shows the statistics of 4 ICMP packets that was transferred within host and a client PC.

6. **tracert** (traceroute in unix like systems) is a computer network diagnostic tool for displaying the route (path) and measuring transit delays of packets across an Internet Protocol (IP) network.

Basic command: tracert 'hostname' (in windows system)

: traceroute 'hostname' (in unix like systems)

```
protick@protick: ~
protick@protick:~$ traceroute www.google.com
traceroute to www.google.com (172.217.26.196), 30 hops max, 60 byte packets
 1  10.196.0.1 (10.196.0.1)  0.993 ms  0.914 ms  1.426 ms
 2  angeldropsltd.com (103.242.217.37)  1.986 ms  1.947 ms  1.944 ms
 3  angeldropsltd.com (103.242.217.49)  1.939 ms  1.925 ms  1.882 ms
 4  103-4-64-217.aamranetworks.com (103.242.219.217)  1.904 ms  1.872 ms  1.864
ms
 5  172.16.207.2 (172.16.207.2)  1.852 ms  1.846 ms  1.813 ms
 6  172.16.0.1 (172.16.0.1)  1.808 ms  1.341 ms  1.307 ms
 7  172.16.1.1 (172.16.1.1)  1.687 ms  1.639 ms  1.655 ms
 8  103.229.83.41 (103.229.83.41)  2.197 ms  2.176 ms  2.169 ms
 9  xe-jig-100-cggc-00.pico.net.bd (103.7.251.137)  2.758 ms  2.743 ms  2.721 ms
10  163.47.159.38 (163.47.159.38)  2.698 ms  2.670 ms  163.47.159.34 (163.47.159
34)  2.648 ms
11  103.7.250.50 (103.7.250.50)  24.868 ms  24.855 ms  24.778 ms
12  72.14.235.69 (72.14.235.69)  24.750 ms  30.481 ms  24.244 ms
^C
protick@protick:~$
```

7. Discussion: In this experiment we've tested some packet transfer virtually and tested some packet transfer measurement tools such as PING and Traceroute. we've found that network latency is increased in real life because of surround noise and long distance of network cable.