Terna Engineering College

Computer Engineering Department

Program: Sem V

Course: Computer Network Lab

Faculty: Arathi Boyanapalli

LAB Manual

PART A

(PART A: TO BE REFERRED BY STUDENTS)

Experiment No.01

A.1 Objective:

Demonstration of different Network devices with their functionalities.

A.2 Prerequisite:

- Knowledge of Analog Communication
- Knowledge of Digital Communication
- Modulation, Media, Transmission types

A.3 Outcome:

After successful completion of this experiment students will be able to

- Identify various network cables and devices used in networking.
- To distinguish the network cables and devices based on speed, type and functionality.
- Propose the right cable and device for a particular network.

A.4 Theory:

- Refer any of the books mentioned in the book.
- https://drive.google.com/drive/u/1/folders/1HrRwwgdsVvAsori-24wgF0ft0Wv9i59J

PART B

(PART B : TO BE COMPLETED BY STUDENTS)

(Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case the there is no Black board access available)

Roll No. 50	Name: Amey Thakur
Class: TE-Comps B	Batch: B3
Date of Experiment: 16/07/2020	Date of Submission: 19/07/2020
Grade :	

B.1 Document created by the student:

(Write the answers to the questions given in section 5.1 during the 2 hours of practical in the lab here)

Refer B.5

B.3 Observations and learning:

(Students are expected to understand the selected topic. Have to list out the components & functionality. Prepare a flow of the algorithm defined in the paper. List the performance metrics that is used)

We learned about different Network devices with their functionalities

B.4 Conclusion:

(Students must write the conclusion as per the attainment of individual outcome listed above and learning/observation noted in section B.3)

1. We learned different networks devices with their functionalities.
2. We can now identify various network cables and devices used in networking, distinguish the network cables and devices based on speed, type and functionality.
3. We can also propose the right cable and device for a particular network.

Computer Networks Laboratory Experiment - 1

Amey Thakur
TE - Comps B - 50
B3

D.O.E. - 16.07.2020
D.O.S. - 19.07.2020

Q.1. State the roll of NIC in communication. Mention different types of NIC's available in the market.

Ans:

- Network Interface Card (NIC) is a hardware component which allows computers to connect over a network. Without it there is no connection possible. There are two different types of NIC cards ethernet and wireless.
- Ethernet NIC card requires plugging an ethernet cable into the card to transfer network data and connect to the internet. The other end of this cable is either plugged into the modem or a router.
- Wireless NIC cards come with a small antenna attached to the card. The antenna picks up the wireless signal from the router and turns this into a usable internet connection for the computer. Wireless NIC card requires additional setup on the computer as we need to connect to the network the computer by typing in the WiFi password for the wireless network. MAC address is a 12 digit hexa-decimal number (6 byte binary number) which is mostly represented by Colon-Hexadecimal notation.

Q.2. Distinguish between HW address and IP address. Can a single card have two HW addresses? Which number systems are used for HW address and IP address?

Ans:

Hardware / MAC Address	IP Address
- MAC Address stands for Media Access Control Address	- IP Address stands for Internet protocol Address.
- MAC Address is a six byte hexadecimal address	- IP Address is either four byte (IPV4) or six byte (IPV6) address
- A device attached with MAC address can retrieve by ARP protocol	- A device attached with IP address can retrieve by RARP protocol
- NIC card's manufacturer provides the MAC address	- Internet service Provider provides IP address
- MAC address is used to ensure the physical address of computer	- IP address is the logical address of the computer
- MAC address operates in the data link layer	- IP address operates in the network layer

- Single networks can have two MAC addresses as it can answer for multiple IP addresses with a single MAC address or with multiple MAC addresses

- Hardware / MAC addresses have 12 digit hexadecimal number while IP addresses. IPV4 uses 32 bit numbers and the latest installment of IPV6 uses 128 bit numbers.

Q.3. Distinguish the devices Hub, Switch, Router, Bridge and Gateways in terms of usage, functionality, speed, accommodation, cost and type

Ans:

- Hub

- A Hub is an electronic device that connects many network devices together so that devices can exchange data. Their function is to simply broadcast the incoming packet. It contains multiple ports. They are cheap and have a speed of 10 mbps.

Types of Hub

1. Active Hub -
   These are the hubs which have their own power supply and can clean, boost and relay the signal along with the network. It serves both as a repeater as well as a wiring center. These are used to extend the maximum distance between nodes.
2. Passive Hub -
   These are the hub which collect wiring from node and power supply from active hubs. These hubs relay signal onto the network without cleaning and boosting them and can't be used to extend the distance between nodes.

- Switch

- A switch is a computer networking devices that is used to connect multiple devices together on a computer network. A switch is considered more advanced than a hub because a switch will only send a message to a device that needs it.

- It's a point to point and expensive device with speed of 10/100 Mbps, 1 Gbps.
The switch can perform error checking before forwarding data, that makes it very efficient as it does not forward packets that have errors and forward good packets selectively to correct ports only

- Router
- A router is a device like a switch that routes data packets based on their IP addresses. Router is a device that connects the LAN to the internet.
The router is mainly used to connect the distinct networks or connect the internet to multiple computers. Routers will normally create, add or divide on the network layer as they are normally IP based devices. Routers have all sorts of speeds and their cost depends on the speed.

- Bridge
- A bridge operates at a data link layer. A bridge is a repeater with add on the functionalities of filtering content by reading the MAC addresses of source and destination. It is also used for interconnecting two LANs working on the same protocol.
It has a single input and single output port thus making it a two port device. They are used to divide larger networks into smaller sections.
They are very expensive.

Types of bridges.

1. Transparent bridges
- These are the bridge in which the stations are completely unaware of the bridge's existence. These bridges make use of two processes. i.e. bridge forwarding and bridge learning

2. Source Routing Bridges.
- In these bridges, routing operation is performed by source station and the frame specifies which route to follow. The host can discover frames by sending a special frame called discovery frame which spreads through the entire network using all possible paths to destination.

- Gateway
- A gateway is a passage to connect two networks together that may work upon different networking models. They basically work as the messenger agents that take data from one system, interpret it and transfer it to another system.
Gateways are also called protocol converters and can operate at any network layer.
Gateways are generally more complex than switch or router but they are slow as they need to perform intensive conversions

Q.4. Distinguish between Firewall and Intrusion Detection System (IDS)

Ans:

- Firewall is a system designed to prevent unauthorized access to or from a private network. It is possible to implement a firewall in either hardware / software form or a combination of both. Firewalls prevent unauthorized internet users from accessing private networks connected to the internet especially intranets.
- Intrusion Detection System (IDS) is a network security technology originally built for detecting vulnerability exploits against a target application / computer.

Q.5. Distinguish between Client and Server.

Ans:

- A client is a computer program that sends request to another program to perform its actions. Server is the receiving and responding program that processes the requests of the client program and enables the client to execute its actions.
- A server operates as a system that works in a computer network and responds to request send from another program, thereby providing a network servicing. A single central server can control and operate multiple clients at a time.

Q.6. Mention the different type connecting cables. Explain those in terms of specification, functionality and usage.

Ans:

Cable is a transmission media that transmits the communication signals. There are 3 types of cables

1. Twisted Pair Cable -

It is a high speed cable that transmits the data over 1 GBPS or more.

2. Coaxial cable -

Coaxial cable resembles a TV installation cable. It provides a high data transmission speed.

3. Fibre Optic Cable -

Fibre optic cable is a high speed cable that transmits the data using light beams. It provides high data transmission speed as compared to other cables.