# Department of Commerce (CA)

## INTRODUCTION TO INFORMATION TECHNOLOGY

**SEMESTER:I** **SUB CODE:18BCA14C**

**I B.COM(CA)**

**UNIT 3:Internet terminology-history of the internet-architecture and components-computer networks-LAN-application of LAN-WAN-internet-internet applications.**

## REFERENCE BOOK:

*INTRODUCTION TO INFORMATION TECHNOLOGY BY ALX LEON AND MATHEW LEON

*INTRODUCTION TO INFORMATION TECHNOLOGY BY PARAMESHWARAN

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ASST. PROFESSOR.

# What is the "internet"?

- The Internet is a global information network that connects millions of computers It is growing exponentially and provides a unique information resource that is global, diverse and current.

# What do we use the internet for?

- Browsing information
- Social media and creating awareness
- For entertainment (music, videos, movies)
- Communicating with people all over the world.
- Sharing information
- E-commerce and banking

# Internet in the 1960's

- In 1962, a scientist from M.I.T. and DARPA named J.C.R. Licklider proposed : a "galactic network" of computers that could talk to one another. Such a network would enable government leaders to communicate even if the Soviets destroyed the telephone system.
- In 1965, another M.I.T. scientist developed a way of sending information from one computer to another that he called "packet switching." Packet switching breaks data down into blocks, or packets, before sending it to its destination.

# Contd.

- Without packet switching, the government's computer network—now known as the ARPANET—would have been just as vulnerable to enemy attacks as the phone system.
- In 1969, ARPANET delivered its first message: a "node-to-node" communication from one computer to another but it crashed the full network. The internet was yet to be born

# Contd.

- By the end of the 1970s, a computer scientist named Vinton Cerf had begun to solve this problem by developing a way for all of the computers on all of the world's mini-networks to communicate with one another.
- He called his invention "Transmission Control Protocol," or TCP. (Later, he added an additional protocol, known as "Internet Protocol." The acronym we use to refer to these today is TCP/IP.)

# Contd.

- TCP/IP was described to be the "handshake" between computers all over the world. It enabled each computer to have its own identity.

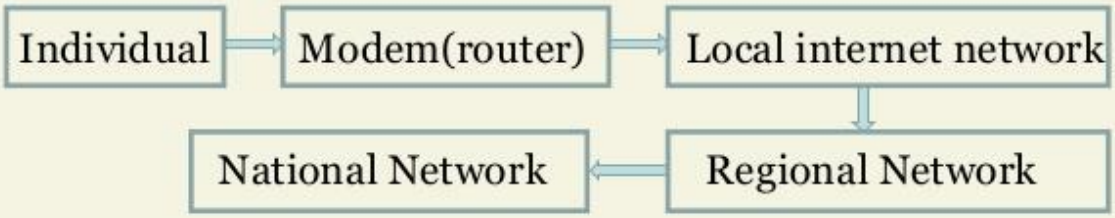
# What is the Internet architecture?

It is by definition a meta-network, a constantly changing collection of thousands of individual networks intercommunicating with a common protocol.

A short form of the compound word "inter-networking". This architecture is based in the very specification of the standard TCP/IP protocol, designed to connect any two networks which may be very different in internal hardware, software, and technical design.

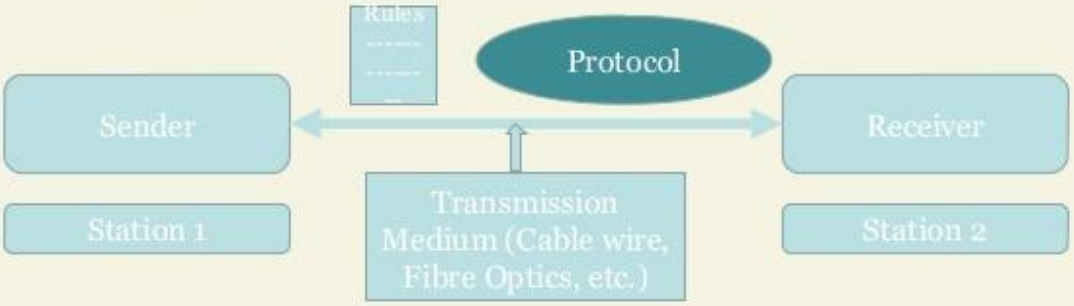
# Internet Path

An individual's access to the Internet is often from home over a modem to a local Internet service provider who connects to a regional network connected to a national network.




# Data Communication

- Data Communication means the exchange of between two or more devices via some transmission medium.
- Main components of data communication




# OSI layer Model

7 Layers

7. Application Layer - Cables
6. Presentation Layer - Ethernet
5. Session Layer - IP
4. Transport Layer – TCP/UDP
3. Network Layer
2. Data Link Layer
1. Physical Layer

All
People
Seem
To
Need
Data
Processing

# TCIP/IP Model

4 Layers

4. Application Layer

FTTP, HTTP,....

3. Transport Layer

TCP, VDP, SCTP

2. Internet Layer

ARP, RARP, ICMP, IGMP

1. Network Interface layer

# Internet Layer

- Packaging
- Addressing
- Routing

# IP Address

- 4 bytes
  - e.g. 163.1.125.98
  - Each device normally gets one (or more)
  - In theory there are about 4 billion available

An IP address serves two principal functions: host or network interface identification and location addressing.

# Routing

- How does a device know where to send a packet?
  - All devices need to know what IP addresses are on directly attached networks
  - If the destination is on a local network, send it directly there
- If the destination address isn't local
  - Most non-router devices just send everything to a single local router

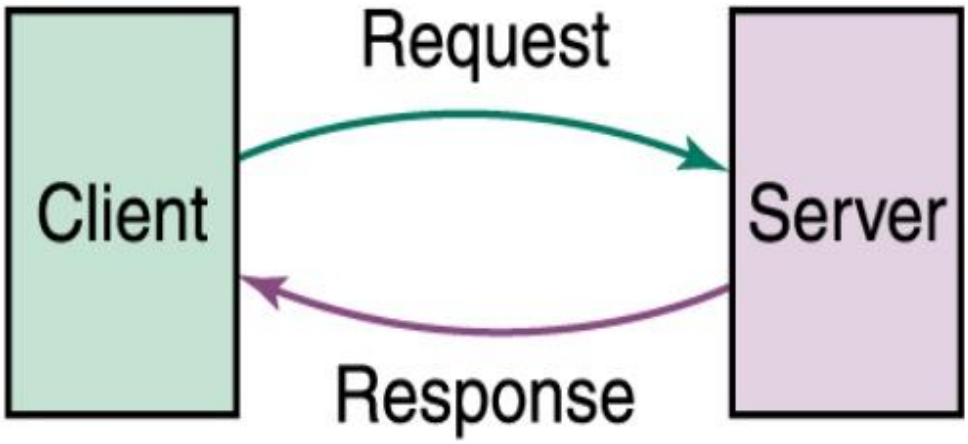
A router receives chunk of information from one of its incoming communication link and forwards it to one of its outgoing communication link.

# Firewall

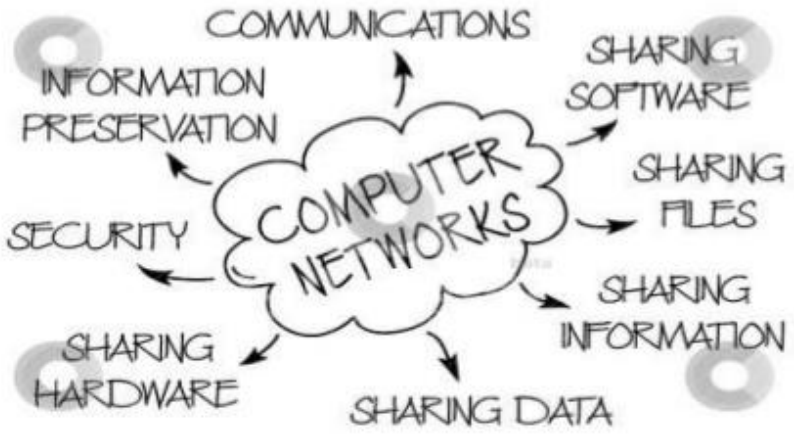
- A **choke point** of control and monitoring
- Interconnects networks with differing trust
- Imposes restrictions on network services
  - only authorized traffic is allowed
- Auditing and controlling access
  - can implement alarms for abnormal behavior
- Itself immune to penetration
- Provides **perimeter defence**

- A computer network is an interconnection of two or more computers that are able to exchange information.
- The computer may be connected via any data communication link, like copper wires, radio links, etc.
- They may be personal computers or large main frames.

- The computer network may be located in a room, building, city, country, or anywhere in the world.
- Computer networks have opened up an entire frontier in the world of computing called the **client/server model.**

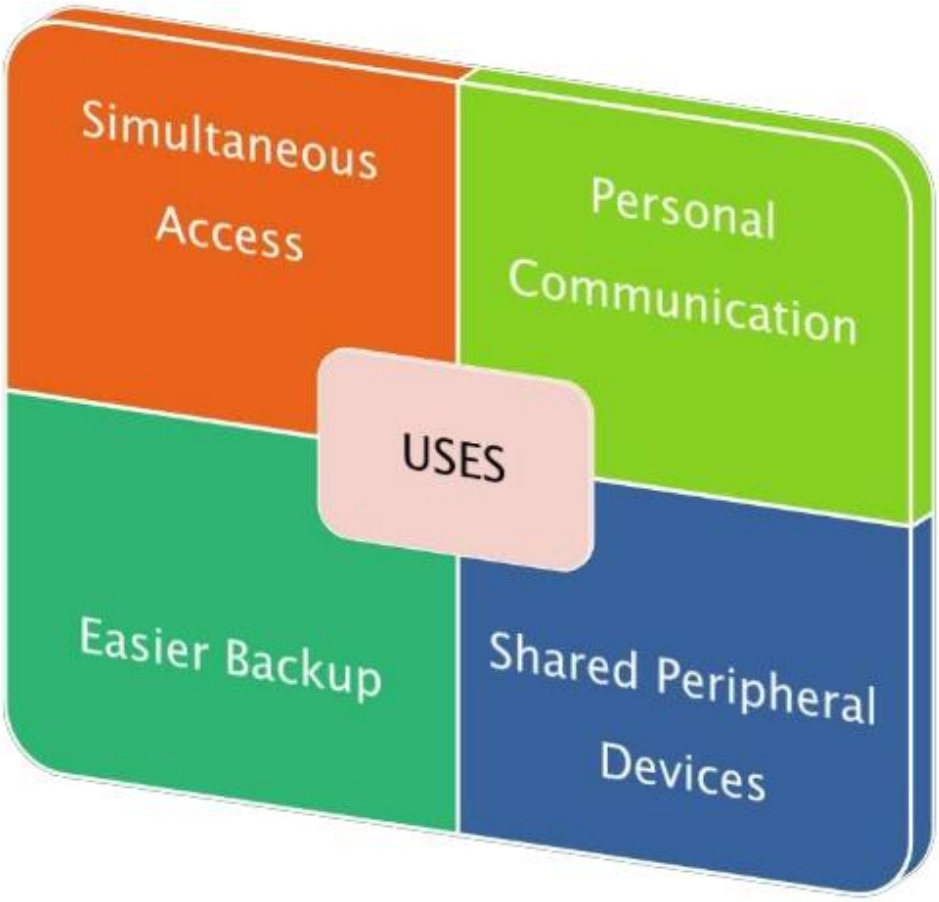

Request
Client
Server
Response

# ADVANTAGES OF COMPUTER NETWORK



- **FILE SHARING** – Networks offer a quick and easy way to share files directly.
- **RESOURCE SHARING** – All computers in the network can share resources such as printers, fax machines, scanners, and modems.
- **COMMUNICATION** –Those on the network can communicate with each other via e-mail, instant messages, etc.

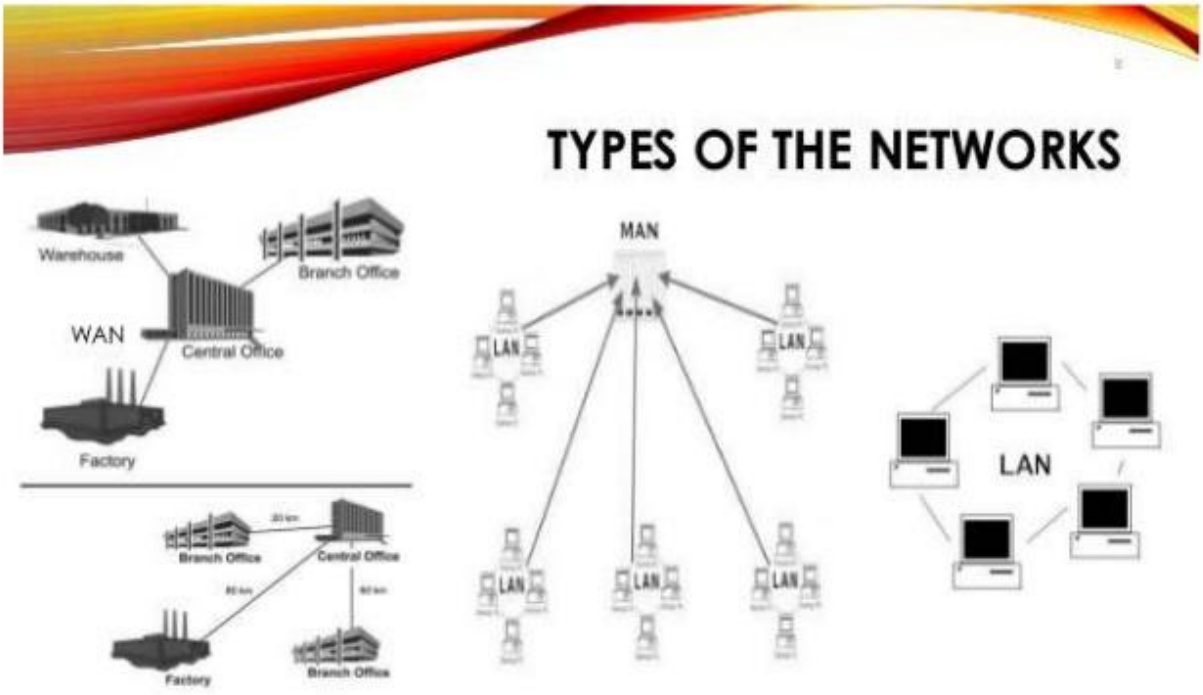
- **Flexible Access** – Networks allow their users to access files from computers throughout the network.
- **Sharing of Information** – Computer networks enable us to share data and information with the computers that are located geographically large distance apart.

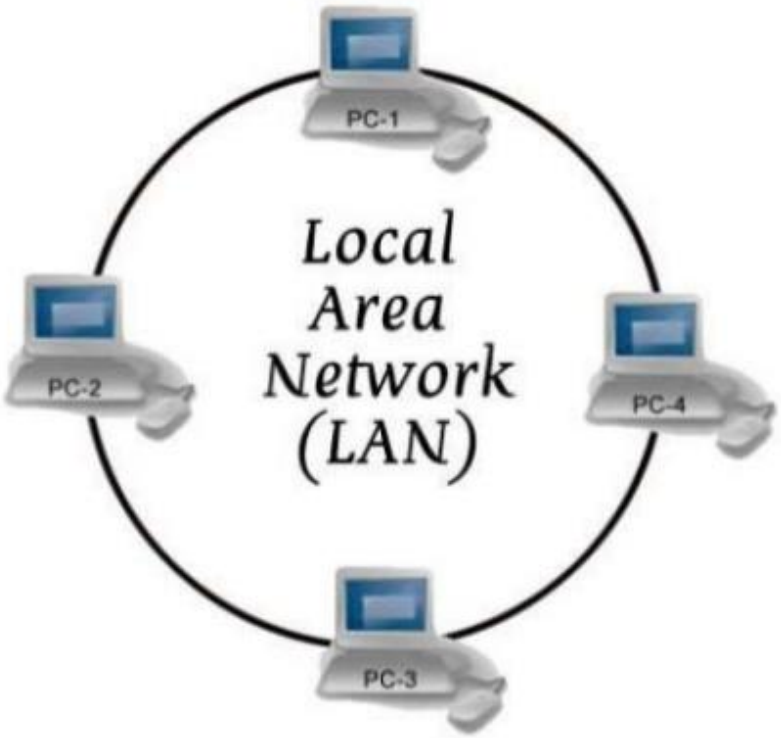

Simultaneous Access
Personal Communication
USES
Easier Backup
Shared Peripheral Devices

The different types of network are based on following:

- **Size of the network** – Refers to the area over which the network is spread.
- **Connection** – Refers to the transmission media and protocols used for connecting.
- **Network topology** – Arrangement of computers on the network.

ON THE BASIS OF SIZE




PC-1
Local
Area
Network
(LAN)
PC-2
PC-4
PC-3

# LAN

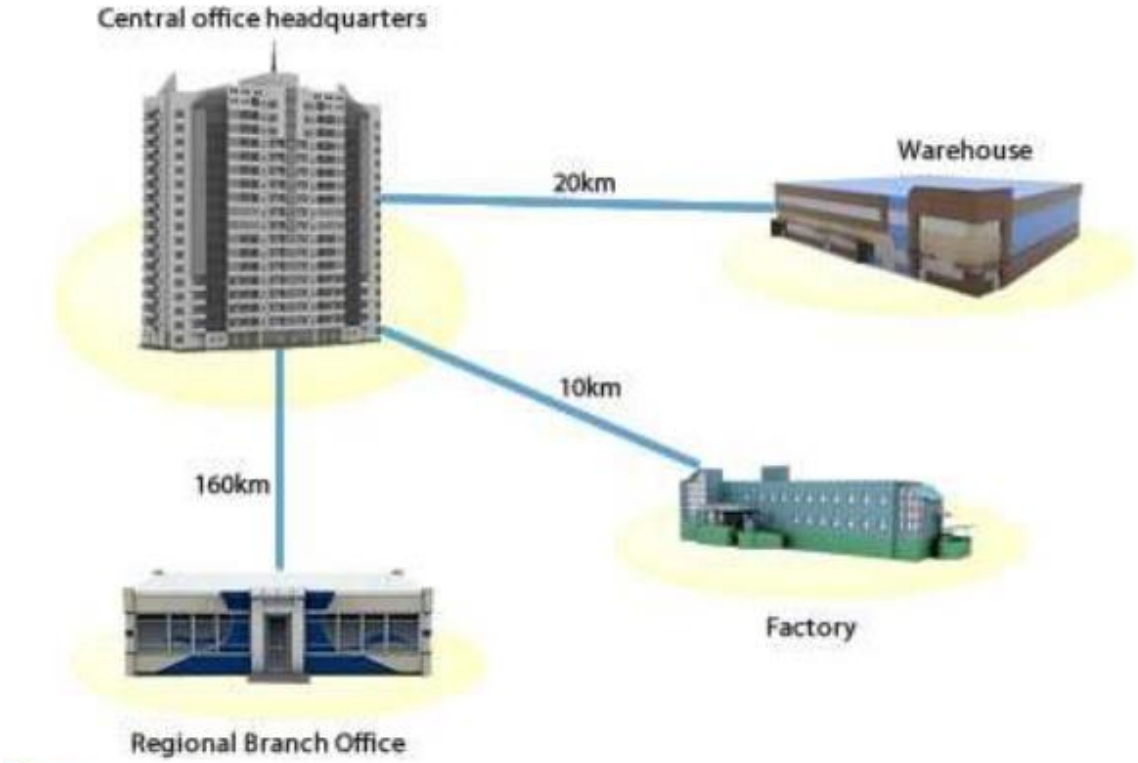
- LAN is a computer network widely used for local communication.
- LAN connects computers in a small area like a room, building, office, or a campus spread up to a few kilometers.
- They are privately owned networks, to exchange information.

- Star, Bus, and Ring are some of the common LAN networking topologies.
- LAN runs at a speed of 10 mbps to 100 mbps and has low delays.
- A LAN based on wifi wireless network technology is called wireless local area network(WLAN).


LOCAL AREA NETWORK (LAN)

# MAN

- MAN is a computer network spread over a city. The computers in a MAN are connected using cables.
- MAN connects several LAN spread over a city.
- It covers the distance upto 30-50 km.
- Example- Cable television network.


Central office headquarters
Warehouse
20km
10km
160km
Factory
Regional Branch Office

# WAN

- WAN is a network that connects computers over long distances like cities, countries, continents or world wide.
- WAN uses public, leased, or private communication links to spread over long distances.
- WAN uses telephone lines, satellite link and radio link to connect.

- The need to be able to connect any number of computers at any number of sites, results in WAN technology to be different from the LAN technology.
- It is slower and less reliable than a LAN.
- INTERNET is a common example of WAN.


Seattle
New York
Wide
Area
Network
Los Angeles
Miami

# PROTOCOL CONCEPT

- A network protocol defines rules and conventions for communication between network devices.
- Protocols specify interactions between the communicating entities.

# TYPES OF PROTOCOL

## Protocol has Five types-

- TCP (Transmission Control Protocol)
- IP (Internet Protocol)
- HTTP (Hyper Text Transfer Protocol)
- FTP (File Transfer Protocol)
- HTTPS (Hyper Text Transfer Protocol Secure)

## TCP (Transmission Control Protocol)

- It provides reliable transport service i.e. it ensures that messages sent from sender to receiver are properly routed and arrive at the destination.

- TCP converts messages into a set of packages at the source which are then reassemble back into messages at the destination. For this, TCP operates with the packet switching techniques.

## Packet Switching Techniques –

- The message is divided into small packets.
- Each packet contains address and information.
- The address is used to route the packet to its destination.

## IP(Internet Protocol)

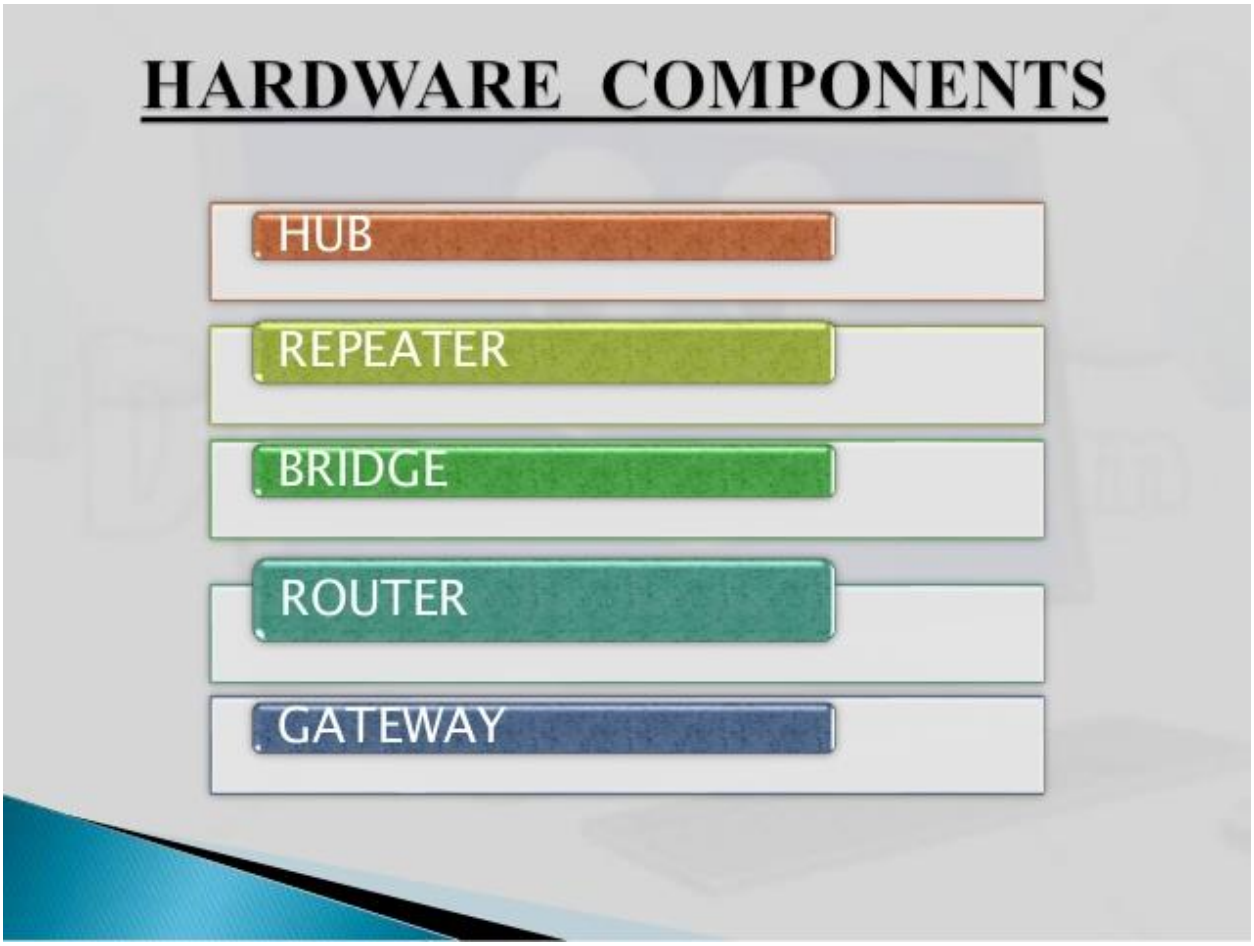
- IP allows different computers to communicate.
- IP handles the dispatch of packets over the network.
- It handles the addressing of packets, and ensures that a packet reaches its destination travelling through multiple networks.

# ftp(file transfer protocol)

- The File Transfer Protocol (FTP) is a standard network protocol used to transfer computer files from one host to another.
- FTP is built on client server architecture.

# HTTP (HYPER TEXT TRANSFER PROTOCOL)


- HTTP is the underlying protocol used by the World Wide Web.
- HTTP defines how messages are formatted and transmitted and what actions web servers and browsers should take in response to various commands.


HARDWARE COMPONENTS
HUB
REPEATER
BRIDGE
ROUTER
GATEWAY

# HUB

- A hub is a multiport connecting device that is used to interconnect LAN devices.

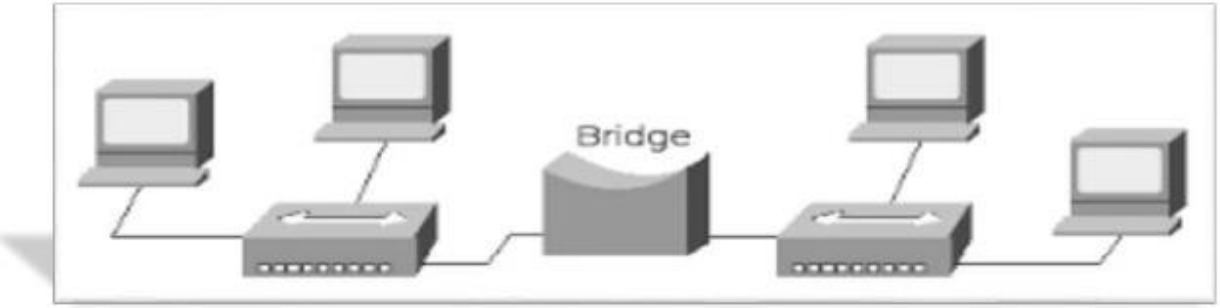

- A hub can be used to extend the physical length of a network.

# REPEATER

- Repeater boost or amplifies the signal before passing it through to the next section of cable.

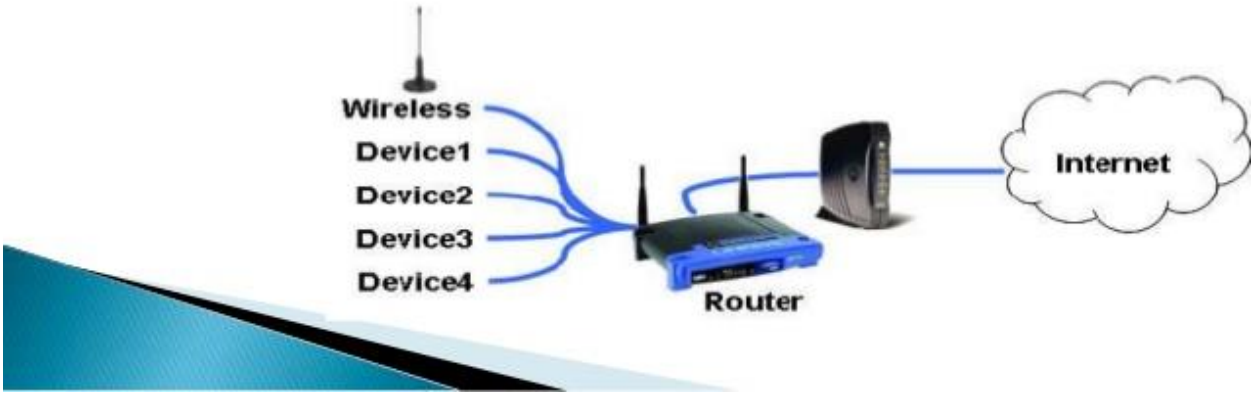
# BRIDGES

- It connects the network with same protocol and topology.
- The main task of a bridge computer is to receive and pass data from one LAN to another.



# ROUTER

- A router is a device that connects multiple networks using similar or different protocols.
- Routers are used when several networks are connected together.



# GATEWAYS

- Gateway is a device that connects two or more networks with different types of protocol.

- It receives data from one network and converts it according to the protocol of other network.