



**COMPUTER COMMUNICATION  
AND INTERNET**

CHAPTER - 5

# Topic

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2.Objectives

- Basic of Computer Network
  - a.Local Area Network(LAN)
  - b.Wide Area Network (WAN)

3. Internet

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4. Services on Internet

- a.Wide Web and Websites
- b.Communication on Internet
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5. Preparing Computer for Internet Access

- a. ISPs and examples (Broadband/Dialup/Wi-Fi)
- b. Internet Access Techniques

# INTRODUCTION

Data communications refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to **exchange data**. ... The best-known computer network is the Internet.

## Communication through the Internet



# Basic Concepts of a Computer Network

## Objectives

- Understand why a computer network is needed
- Understand what types of services are available on a network
- Understand how computers can be connected locally to form a Local Area Network (LAN) and over long distances to form a Wide Area Network (WAN)
- Be aware of how and why computers are connected to form a network at home, in school and in workplace
- Be able to use and describe the common services available in a networked environment



## BASICS OF COMPUTER NETWORK

### Open system:

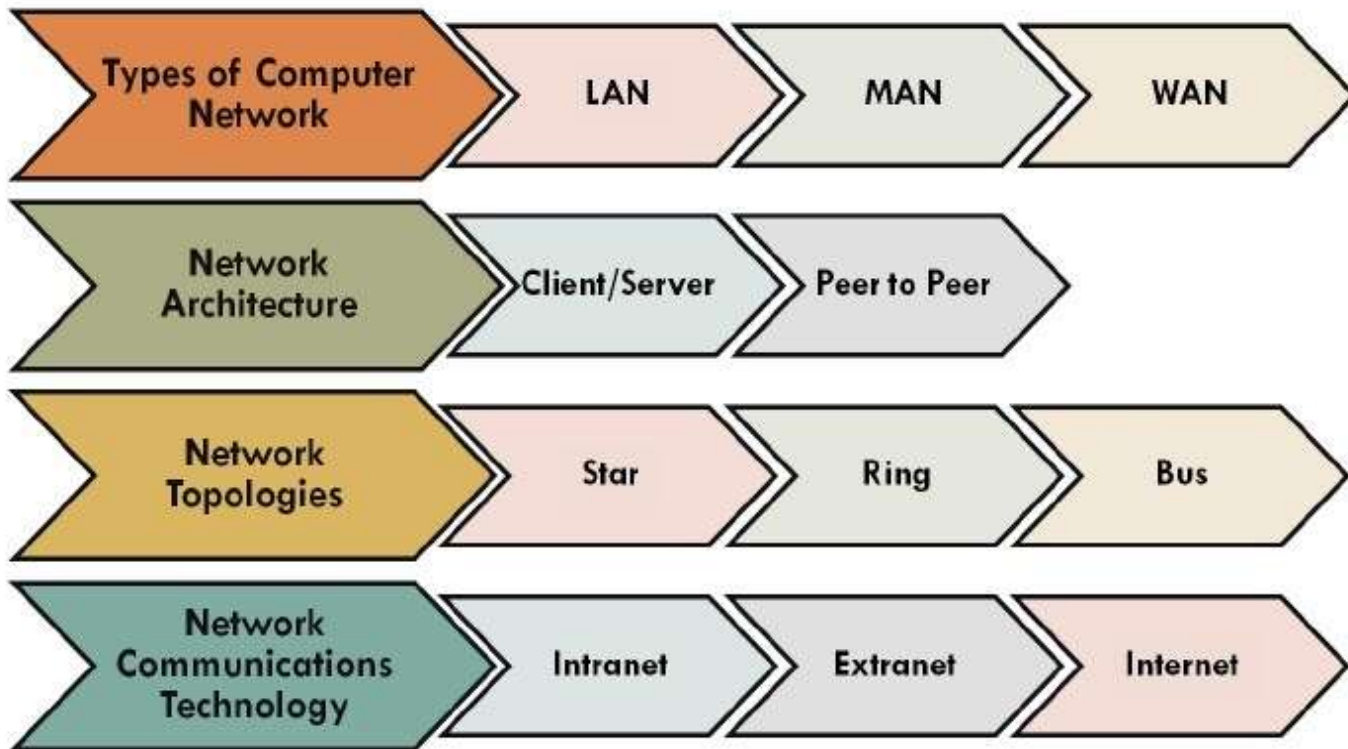
A system which is connected to the network and is ready for communication.

### Computer Network:

An interconnection of multiple devices, also known as hosts, that are connected using multiple paths for the purpose of sending/receiving data or media.

Computer networks can also include multiple devices/mediums which help in the communication between two different devices; these are known as **Network devices** and include things such as routers, switches, hubs, and bridges.



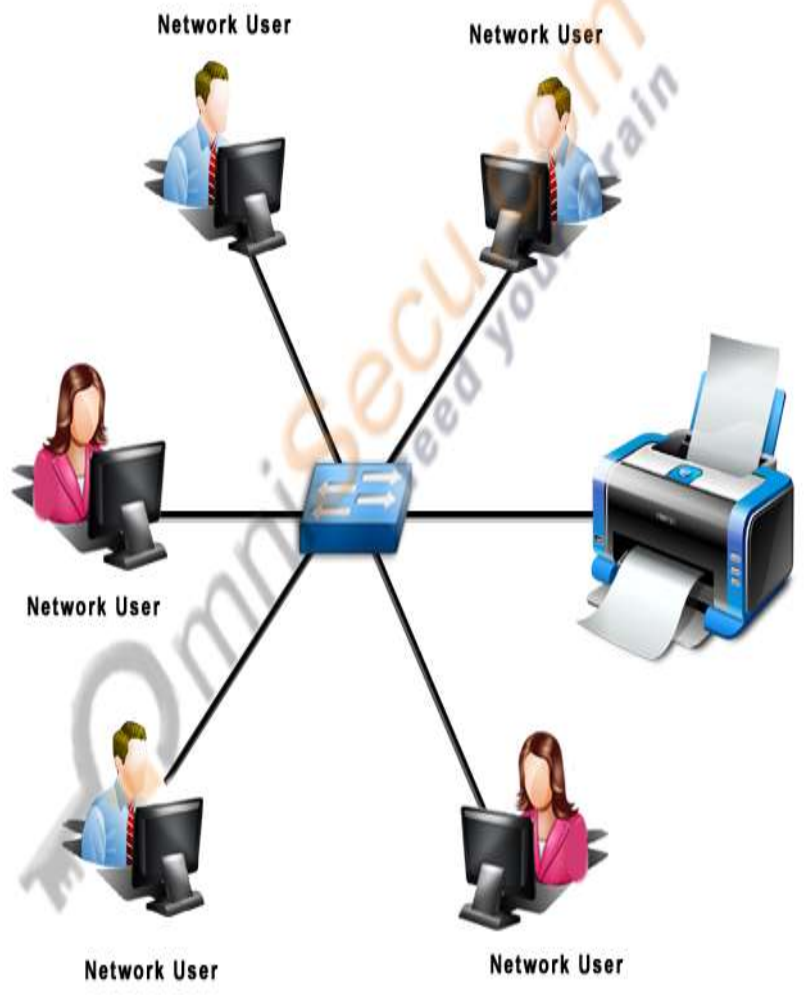


## LOCAL AREA NETWORK (LAN)

A local area network is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building. By contrast, a wide area network not only covers a larger geographic distance, but also generally involves leased telecommunication circuits.

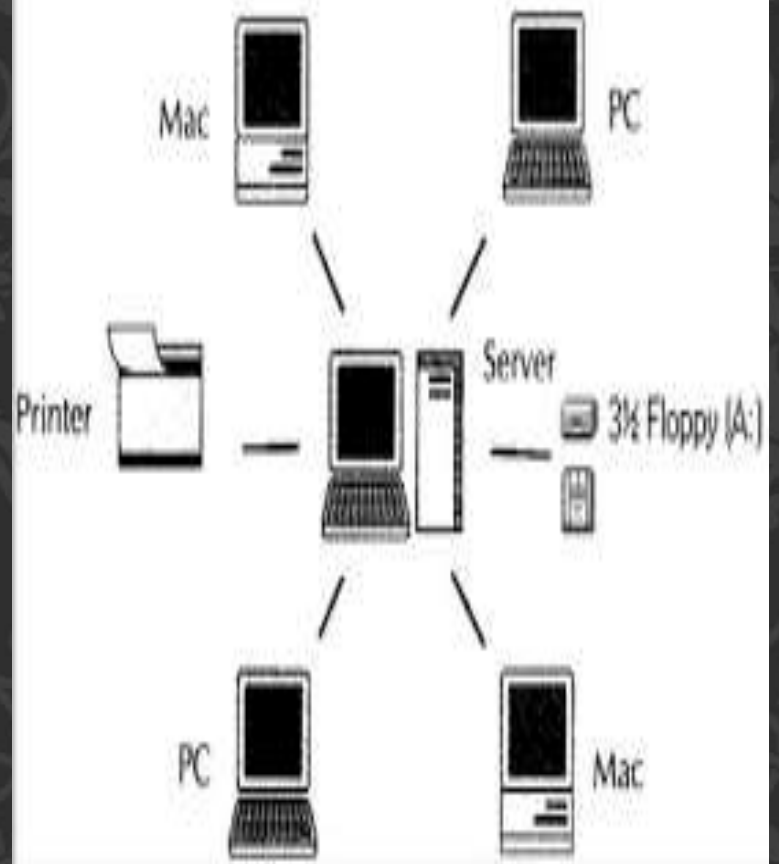






**LOCAL AREA NETWORK (LAN)**

## Local Area Network (LAN)







## Difference b/w LAN MAN WAN

LAN LOCAL AREA NETWORK	MAN METROPOLITAN AREA NETWORK	WAN WIDE AREA NETWORK
<b>Use</b> Building Office School , house	Multiple building , or in a city	Multiple city , country
<b>Network Range</b> 10m – 1000m	5km – 50km	1000000km
<b>Example</b> Ethernet , Wifi	Cable tv network	Internet

LAN:	MAN:	WAN:
local area network	matropolitan area network	wide area network
>connects small network areas	>cover larger than a LAN but a smaller than a WAN	>cover larger area geographically, such as state and country
>for data transfer there is high bandwidth	>For data transfer, there is moderate bandwidth	>there is low bandwidth
>it is typically owned by an individual or an org.	>it can be owned publically, privately	>distributed ownership model
>n/w is limited between 100-1000 m. coverage	>usually stretch up to an area of 100km	>ranges up to 100,000 km
>low cost of setup	>It has a moderate cost	>costs more to set-up a WAN than LAN or MAN

## Internet ...?

- *Definition:*

**The Internet is millions of computers around the world connected to each other.**

- *Explanation:*

**When you're on the Internet, your computer is connected to others by networks of telephone wire, cable and satellite. The Web, e-mail, chat, and newsgroups are things you can do on the Internet.**



# CONCEPT OF INTERNET

**The Internet is most often used for three main purposes:**

- Communication.
- Buying and selling (e-commerce)
- Searching for information. ...
- A connection method.
- An Internet Service Provider (ISP)
- A web browser.
- Enter the URL of a website you want to visit.
- Use a Search Engine.



Internet-Based Services Some of the basic services available to Internet users are

**Email** – A fast, easy, and inexpensive way to communicate with other Internet users around the world.

**Telnet** – Allows a user to log into a remote computer as though it were a local system.

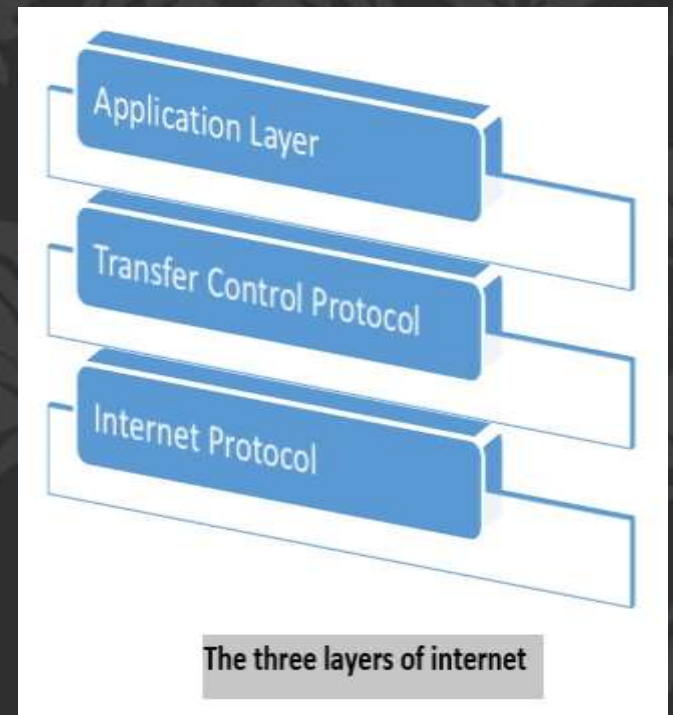
**FTP** – Allows a user to transfer virtually every kind of file that can be stored on a computer from one Internet-connected computer to another.

**UseNet news** – A distributed bulletin board that offers a combination news and discussion service on thousands of topics.

**World Wide Web (WWW)** – A hypertext interface to Internet

## BASICS OF INTERNET ARCHITECTURE

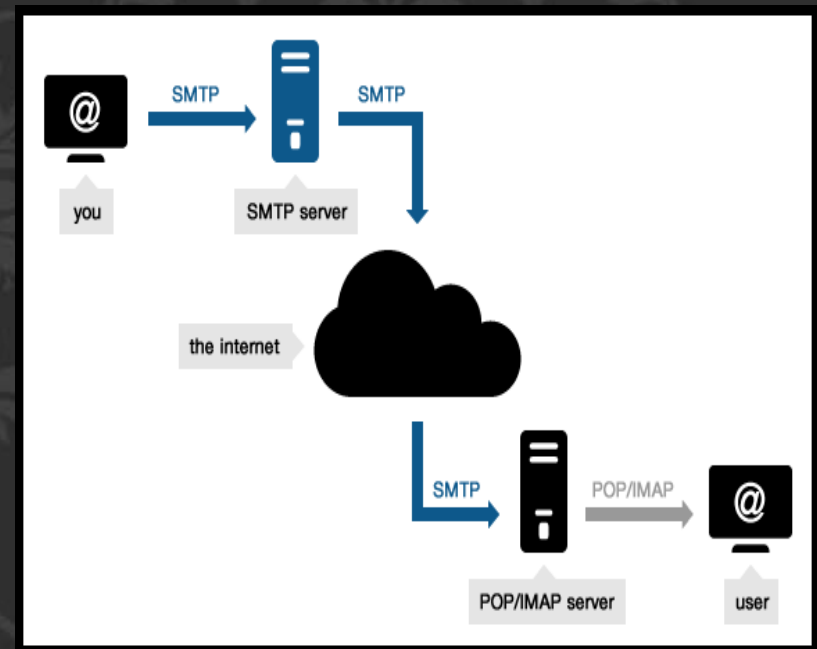
Internet architecture is a **meta-network**, which refers to a congregation of thousands of distinct networks interacting with a common protocol. In simple terms, it is referred as an internetwork that is connected using protocols. ... This protocol connects any two networks that differ in hardware, software and design.



## Application Protocol

Third layer in internet architecture is the application layer which has different protocols on which the internet services are built. Some of the examples of internet services include email (SMTP facilitates email feature), file transfer (FTP facilitates file transfer feature), etc.

SMTP (**Simple Mail Transfer Protocol**) is the basic standard that mail servers use to send email to one another across the internet. SMTP is also used by applications such as Apple Mail or Outlook to upload emails to mail servers that then relay them to other mail servers



# INTERNET PROTOCOL ADDRESS

IP address stands for **internet protocol address**; it is an identifying number that is associated with a specific computer or computer network. When connected to the internet, the IP address allows the computers to send and receive information.

## Internet Protocol

### IP Address

- **IP address is for the INTERFACE of a host. Multiple interfaces mean multiple IP addresses, i.e., routers.**
- **32 bit IP address in dotted-decimal notation for ease of reading, i.e., 193.140.195.66**
- **Address 0.0.0.0, 127.0.0.1 and 255.255.255.255 carries special meaning.**
- **IP address is divided into a network number and a host number.**
- **Also bits in Network or Host Address cannot be all 0 or 1.**



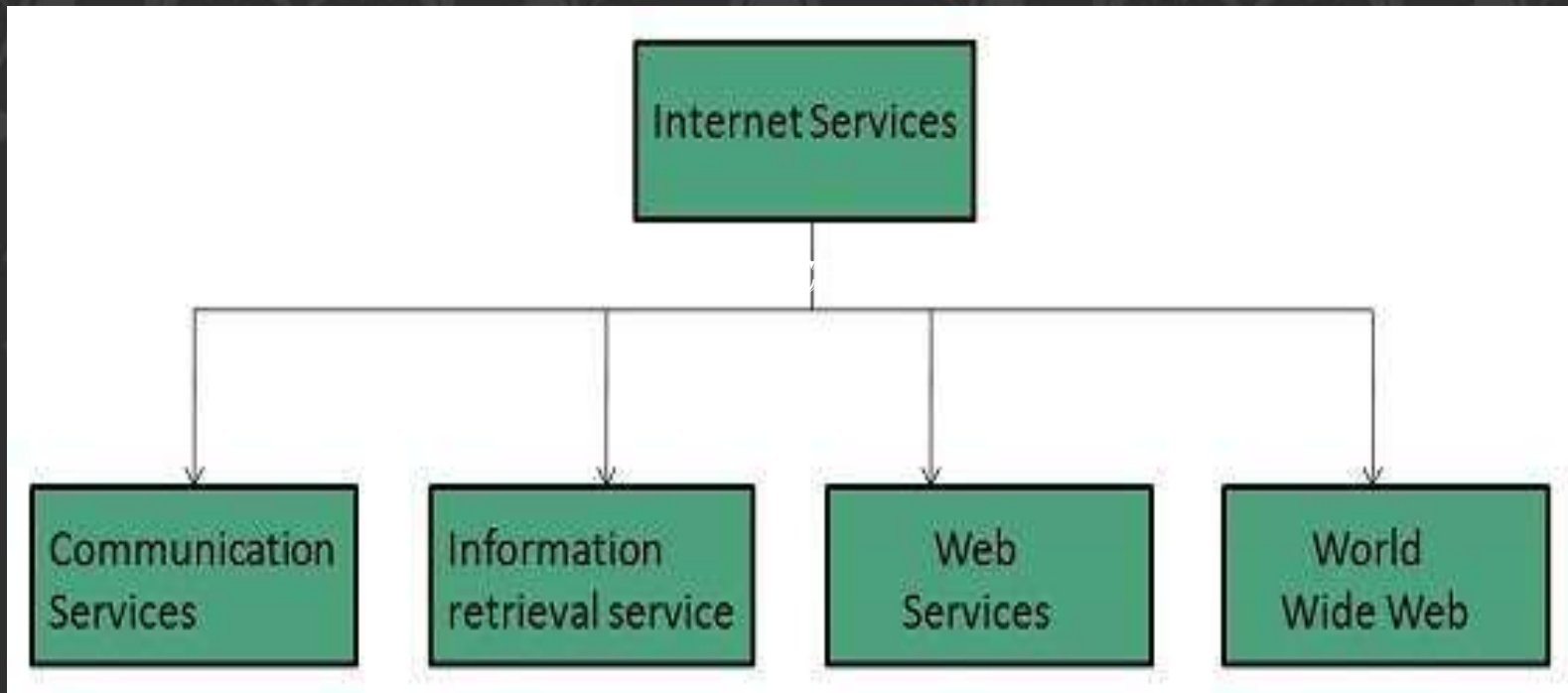
IP Address:  
192.168.0.50

IP Address:  
192.168.0.150



Request:  
Destination IP Address: 192.16.0.150

# INTERNET SERVICES





## What is the World Wide Web?

- The content of the worldwide web is held on individual web pages gathered together to form websites of associated information.
- Websites are held on a computer called a “Web Server”. A webserver is connected to the internet and allows people access to view the pages.
- In simple terms this means the World Wide Web is a collection of webpages which are stored on web servers connected to the internet.

# WEBSITES

A set of related web pages located under a single domain name, typically produced by a single person or organization.

## WebSite Definition



### What is Website?

A **website**, also written as Web site, web site, or simply **site**, is a set of related **web pages** containing content (media), including text, video, music, audio, images, etc. A website is **hosted** on at least one **web server**, accessible via a **network** such as the **Internet** or a private **local area network** through an **Internet address** known as a **Uniform Resource Locator(URL)**. All publicly accessible websites collectively constitute the **World Wide Web(WWW)**.



# The World Wide Web

What is the **World Wide Web (WWW)**?

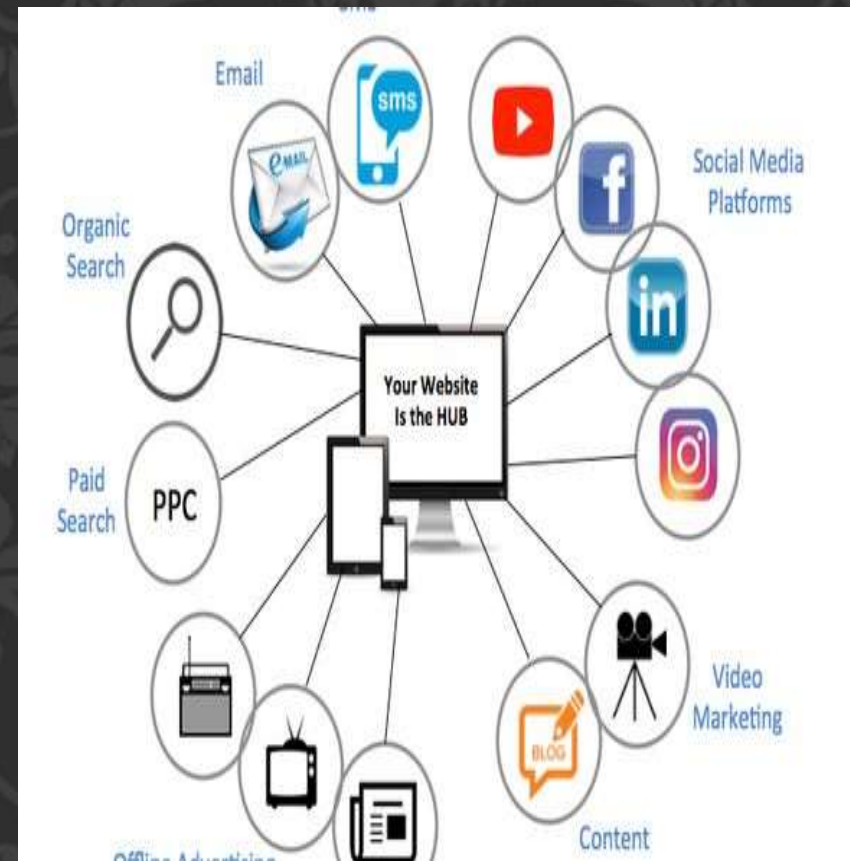
Also called  
the **Web**

A worldwide collection of electronic documents

Each electronic document is called a **Web page**

Can contain text, graphics, sound, video, and built-in connections

A **Web site** is a collection of related Web pages











## INTERNET SERVICES

1. World Wide Web (WWW)

2. e-mail

3. Instant Messaging

4. Voice over Internet Protocol (VoIP)

5. Message Board

6. File Transfer Protocol

Electronic Mail

E-Commerce

Education

FTP File Transfer

Online Banking

Collaboration

Search Engines

Cashless Transactions

Social Networking

## PREPARING COMPUTER FOR INTERNET ACCESS

There are many ways to obtain access to the internet. The method varies according to the type of devices (computer, laptop, mobile) being used and type of connections offered.

### ISPs and Examples (Broadband/Dialup/Wi-Fi)

Internet Service Provider (ISP) is the gateway to access internet. It is an organization that gives access to the internet. ISPs provide services for home, large industries, government sectors, etc. There are two types of connections –

**Instant** – Starts when user dials-up for connection and ends after the session is over.

**Full-time** – The connection prevails 24/7 even if the session ends.

## Broadband

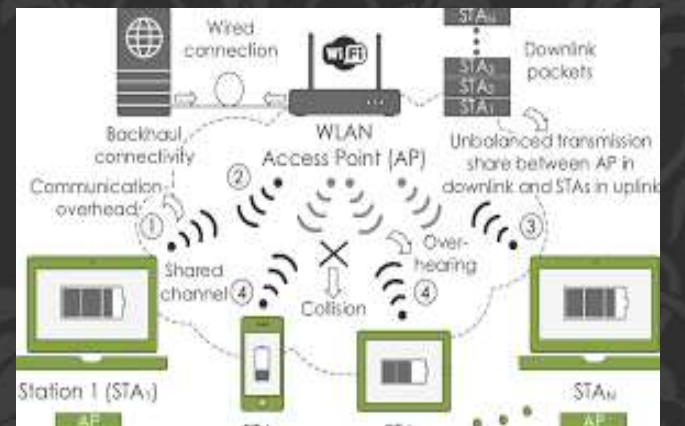
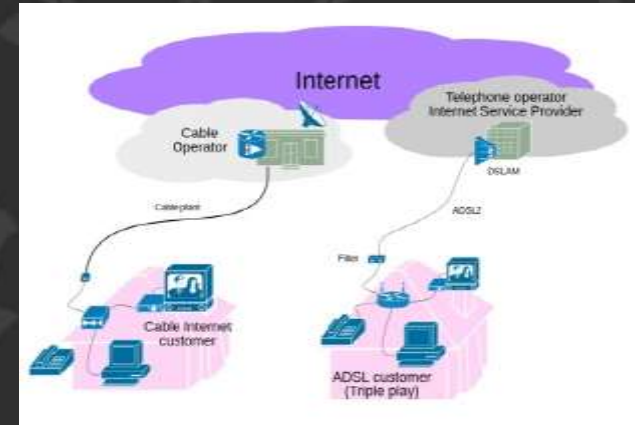
Broadband connections are considered as high speed connections, as they use modes that can handle several signals at once, such as fibre optics, twisted pair cables, coaxial cables and other technologies.

## Dial-up

In dial-up connection, the computer uses its modem to dial a telephone number given to user by an Internet Service Provider. This launches a connection between personal computer and ISP server. The dial-up connections are temporary, as the connection ends once the session gets completed.

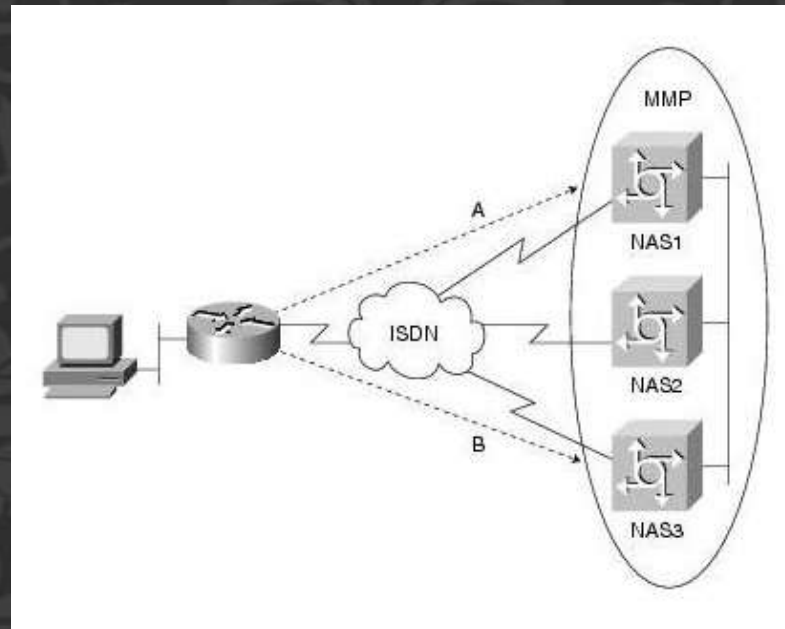
## Wi-Fi

Wireless LAN has become popular for use these days which is based on the technology called Wi-Fi (Wireless Fidelity). This uses radio waves to transmit signals and provides access to the internet within a short distance.



## Integrated Services Digital Network (ISDN) Service

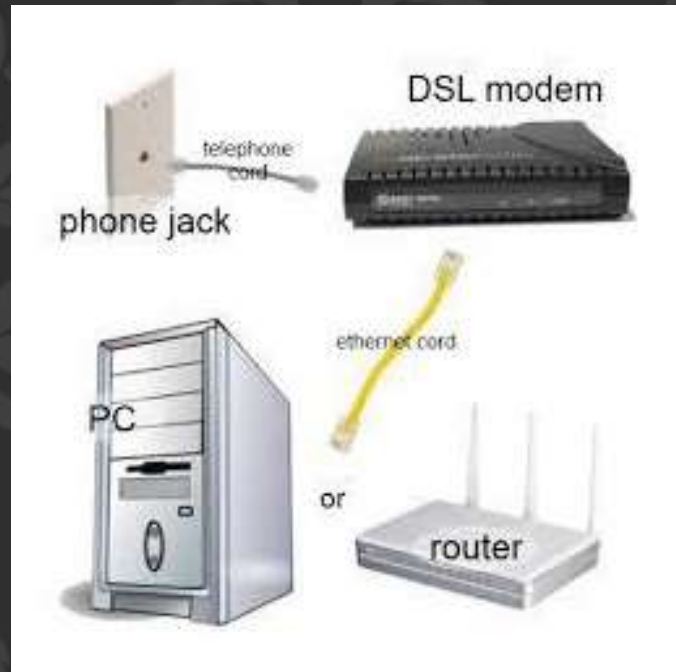
Integrated Services Digital Network (ISDN) is a digital service that simultaneously transmits voice & data, and controls signals over a single telephone line. ISDN service operates on a standard telephone line, but requires a special modem and phone service, which adds to the cost. An ISDN data connection can transfer data up to 128,000 bits per second (128 Kbps). It helps to connect a PC, telephone and fax to a single ISDN line and use them simultaneously.





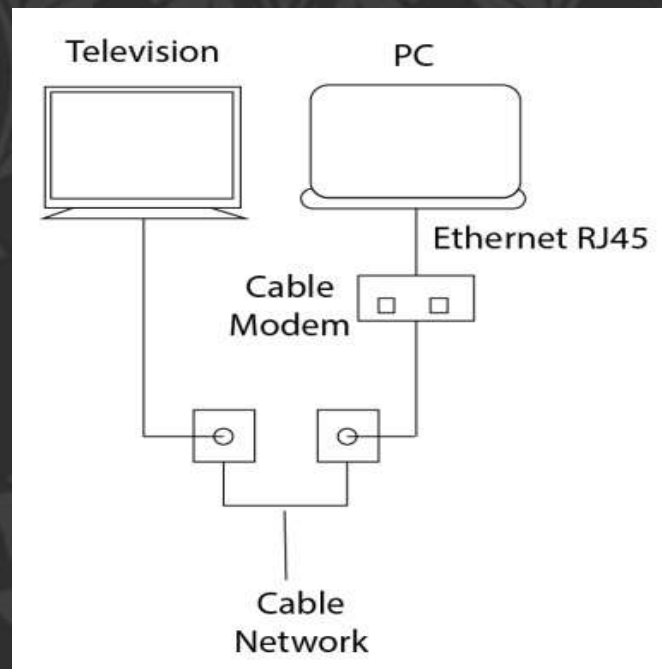
## Digital Subscriber Line (DSL)

Digital Subscriber Line is similar to that of ISDN in using telephone network, but it uses more advanced digital signal processing and algorithms to squeeze maximum number of signals through telephone lines. DSL also requires changes in components of telephone network before it can be offered in any area. Like ISDN, DSL provides simultaneous data, voice and fax transmission on the same line. Several versions of DSL services are available for home and business use; each version provides 24/7 full-time connection at different levels of service, speed, bandwidth and distance.



## Cable Modem Service

Now-a-days many cable television companies use some percentage of their network's bandwidth to provide internet access through prevailing cable television connections. Since this connection uses a special cable modem, it is called "Cable Modem Service". Cable television systems transmit data via coaxial cable, which can transmit data as much as 100 times faster than common telephone lines. Coaxial cable allows transmission via several channels simultaneously, i.e., the internet data can be transmitted on one channel, while audio, video and control signals are transmitted separately. The user can access internet and watch television concurrently, with two non-interfering data streams.



## Wireless LAN (WLAN) Connections

Wireless LAN connections are very common these days, which are based on the technology that is often cited as Wi-Fi (Wireless Fidelity). The distance covered by WLAN is usually measured in meters rather than miles. Therefore, this is not a technology that connects directly to an ISP but can be used to connect to another LAN or device through which internet access is achieved.

### Process

- To connect to internet, the wireless access point is connected to a wired LAN like any other devices, and then computers with wireless NICs can access the wired LAN.
- "Wireless access point" is a device that acts as a hub or switch.
- "NIC" refers to a Network Interface Card which helps to identify a computer on a network.

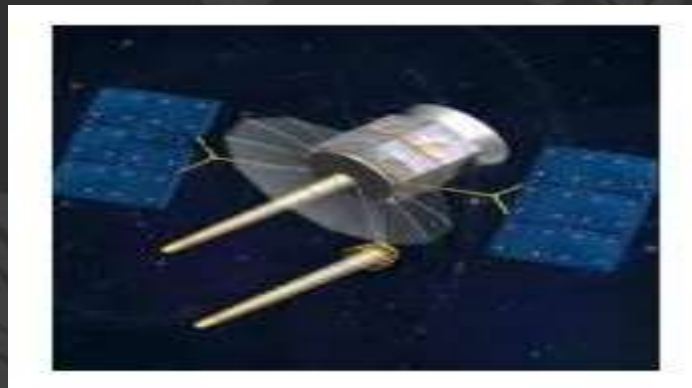


## Satellite Services

Satellite services provide a mutual (two-way) communication between user and the internet. This provides a full-time connection which is used in armed forces, business, etc. It includes two parts –

**Transceiver** – A satellite dish that is placed outdoors in direct line of sight to one of the several satellites in geostationary orbit.

**Modem-like device** – It is connected to a dish, placed indoors and connected to a LAN or computer.





## EXAMPLES OF ISPs

