Computer Communication & Internet

**What is Communication?**

Communication (Taken from Latin word commūnicāre, meaning "to share") is the activity of exchanging or imparting (sending or receiving) information using some medium like peoples, Computers and others devices.

Computers in organizations have been used to extract and correlate information. Resource sharing, high reliability and communication can be achieved by connecting computers.

**What is Network?**

A *network* consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow electronic communications. The computers on a *network* may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

**What is Internet?**

The Internet, sometimes called simply "the Net," is a worldwide system of computer networks – a network of networks in which users at any one computer can, if they have permission, get information from any other computer. It was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANet.

Today, the Internet is a public, cooperative and self-sustaining facility accessible to hundreds of millions of people worldwide.

**Local Area Network (LAN)**
LAN is a computer network that spans over a small area. It connects computers and workstations to share data and resources such as printers or faxes. LAN is use to small area such as home, office or college.



**Size:**
As mentioned above, LANs are restricted in size and usually spread across a range of 1 km.

**Transmission Technology:** It refers to the technology by which data from source is transmitted to the destination. These days varies from 10 Mbps to 1000 Mbps (1 Giga Bits per second) or even more.

WLAN (Wireless Local Area Networks)

Wireless Local Area Networks are much like LAN networks, except they do not require network cables to connect each other.

### Metropolitan Area Networks (MAN)

Metropolitan Area Network is a network system that covers area of a single city. MAN connects more than one LANs in a city or town and covers a smaller geographical area than a WAN.
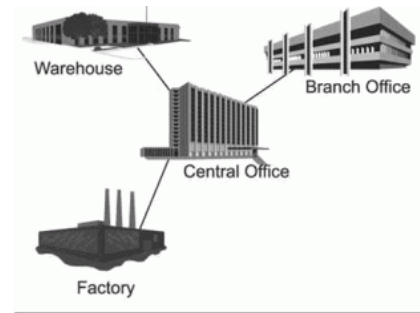


### Wide Area Networks (WAN)

WAN covers a wide geographical area which includes multiple computers or LANs. It connects computers through public networks, like telephone system, satellite link or leased line.
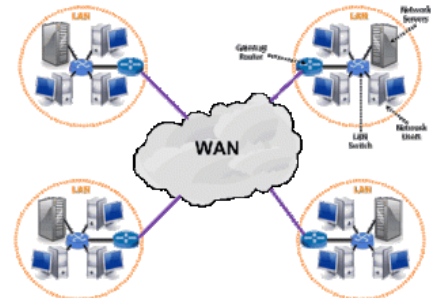


The **Internet** is an example of a **global WAN**. In fact it is the world's largest WAN.

### Internet

Internet is the world's largest computer network and is described as a network of networks. One of the greatest things about the Internet is that nobody really owns it. It is a global collection of networks, both big and small. These networks connect together in many different ways to form the single entity that we know as the Internet. The term "The Internet" was first used in 1982 and Network uses TCP/IP protocols.

The *Internet* is an example of a network that connects many WANs, MANs, and LANs into the world's largest global network.

### Concept of Internet

ARPANET (Advanced Research Project Agency Networks), the originator of Internet emerged in 1957 from the U.S. Department of Defence. Although nobody owns the Internet, but it is monitored and maintained indifferent ways.

The Internet is a **global collection** of computer networks that are linked together by devices called routers and use a common set of protocols for data transmission known as **TCP/IP** (transmission control protocol / Internet protocol). The primary purpose of the Internet is to facilitate the sharing of information.

### Basic of Internet Architecture

The internet architecture can be broadly classified into three layers. The very first layer consists of Internet Backbones and very high-speed network lines. The National Science Foundation (NSF) created the first high-speed backbone in 1987 called NSFNET, it was a T1 line that connected 170 smaller networks together and operated at 1.544 Mbps (million bits per second). IBM, MCI and Merit worked with NSF to create the backbone and developed a T3 (45Mbps) backbone the following year. Backbones are typically fiber optic trunk lines. The trunk line has multiple fiber optic cables combined together to increase the capacity. Fiber optic cables are designated OC-48 can transmit 2,488 Mbps (2.488 Gbps). The nodes are known as Network Access Point (NAPs). The

second layer is usually known as Internet Service Provider (ISP). The ISPs are connected to the Backbones at NAP's with high-speed lines.

The end users which are part of third layer are connected to ISPs by dial up or leased lines and modems. The speed of communication is usually 1400 bps to 2048 kbps.

**Service on Internet**
- **WWW (World Wide Web)**
- **Electronic Mail (E-mail)**
- **News Groups**
- **FTP (File Transfer Protocol)**
- **IRC (Internet Relay Chat)**
- **Voice / Video Communication – Skype**
- **Social networks**
- **Search Engines**
- **Web-Hosting (DATA CENTER)**
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**World Wide Web (WWW)**

The World Wide Web (WWW) is combination of all resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP). It is the most user-friendly service. It allows connecting to any computer having information. It offers the capability to links with sites. Web Servers is software that run on the Internet servers and provide information to the Web users and other servers. Internet servers store information on the Internet. There are Web servers, e-mail servers, FTP servers etc. serving the needs of Internet users all over the world.

The World Wide Web was invented by English scientist Tim Berners-Lee in 1989.

**Communication on Internet**
Communication is the most popular use of the Internet. All computer devices (including PCs, laptops and smartphones) that are connected to the **internet**. More than one computer connected to the **internet**, all able to **communicate** with each other. Other technologies, including video and audio conferencing and Internet telephony, are also available on the Internet.
Most of the technologies that are unique to the Internet require communication to be done in text—letters with some symbols and punctuation.

**Way of communication**

**Internet Services**
Types of Internet Services
- World Wide Web:

WWW is a graphical hypertext way of using the Internet using the HTTP protocol for transmitting Web pages and other information over the Internet. Web pages are written in HTML (Hypertext Markup Language) language, and recognizes them for this purpose designed browser (Internet Explorer, Google Crome and Mozilla Firefox, etc).
- Telnet

The Telnet 'Terminal Emulation' software support, which to communicate with a computer connected via a TCP / IP stack.

- Electronic Mail

E-mail is use to deliver, text, image, audio or video recording from one computer to another.

- FTP – File Transfer Protocol

Before the World Wide Web and FTP was the only way to transfer large files between computers of Internet users.

- Chat

This service allows the Internet to one or more of Internet users who are hooked to the same channel at the same time see the text that you type on your computer, and the texts of other active users typing on his computer.

- Social networks

A dedicated website or other application which enables users to communicate with each other by posting information, comments, messages, images, etc. that's called Social Networks.

**Preparing Computer for Internet Access**
Requirements to make your computer a part of the internet-

1. Internet connection
2. Modem
3. Telephone line
4. Program which controls the communication of data over the hardware component.

**ISPs and examples (Broadband/Dialup/WiFi)**
An **Internet service provider** (**ISP**) is an organization that provides services for accessing, using, or participating in the Internet. Internet service providers may be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned.

Internet services typically provided by ISPs include Internet access, Internet transit, domain name registration, web hosting etc.

**Some of the ISP's are:**
1. VSNL(Videsh Sanchar Nigam Limited)
2. MTNL(Mahanagar Telephone Nigam Limited)
3. Mantra Online
4. NetCracker
5. Satyam
6. Tata-indicom
7. Airtel

Choosing an Internet service
- **Dial-up:** Dial-up is generally the slowest type of Internet connection
- **DSL:** DSL service uses a **broadband connection**, which makes it much faster than dial-up. DSL connects to the Internet **via phone line** but does not require you to have a land line at home.

- **3G and 4G:** 3G and 4G service is most commonly used with mobile phones and tablet computers, and it connects**wirelessly** through your ISP's network. If you have a device that's 3G or 4G enabled, you'll be able to use it to access the Internet away from home, even when there is no Wi-Fi connection.

Wireless Network

A home network can be **wired** (using Ethernet cables) or **wireless** (using Wi-Fi). It may also be a **mixture** of the two, with some devices connecting with Ethernet and others connect using Wireless network.

**Internet Access Techniques**

**Internet Connection and Access Methods**

There are several ways of connecting to the Internet.We can divide the methods into two main types- **Fixed** and **Mobile**.

Home Internet

Fixed access is usually much faster and reliable than mobile and is used for connecting homes/offices. The main Access mechanisms are:

- ADSL over traditional Phone Lines (most common).
- Cable (limited to cable TV areas)
- Fibre broadband – Currently being Rolled out

**Mobile Internet**

When traveling away from the fixed location mobile access is used. The main access mechanisms are:

- Mobile broadband over 3G Network (common but slow)/4G/5G
- Public/ Private Wi-Fi (common)