

# COMPUTER NETWORKS

# 1

## THE CONCEPT OF NETWORKING

The idea of networking is probably as old as telecommunications itself. Nowadays, we have computer talking to each other over vast assemblages of wires, fiber optics, microwaves etc. in this lesson we would be dealing with the means and ways by which the process of communication is accomplished through computers.

We can define network as a collection of computers that are able to communicate with each other, often by relying on the services of a number of dedicated hosts that transmit data between the participants. Hosts are very often computers but one can also think of intelligent printers as hosts. Small agglomerations of hosts are also called sites.

## EVOLUTION OF COMPUTER NETWORKS

Apart from the centralized computing paradigm dominated by monolith mainframes until late 1970s, the initial use of modern networks was for file and print services in academic environments. With these services users could access files remotely from a file server and send print requests to a remote printer controlled by a dedicated machine called print server.

Gradually the utility of these network services started getting appreciated in commercial environments and small offices and later large offices started setting up networks for file and print services. Soon networks were also being used for application services so that applications could be loaded on the user machine from a dedicated machine called application server.

With the falling prices of small computers and PCs, system designers started using these small machines to build large low-cost networks based on what is called client-server architecture. In this, the user machines are called clients and they are served by dedicated machines called servers.

## ADVANTAGES OF NETWORKING

There are many advantages offered by networking. some of them are as follows:

- **Resource Sharing**

The main advantage of the networking is that it enables resource sharing which is of a great advantage to the organizations in particular. The primary goal of networking is to make all programs, equipment, and especially data available to anyone on the network without regard to the physical location of the resource and the user. In other words, the mere fact that a user happens to be 1000 km away from his data should not prevent him from using the data.

- **High Reliability**

High reliability is provided by networking by having alternate sources of supply. For example, all files could be replicated on two or three floppies or machines in the sense that if one copy has some problem the other can be used accordingly. For military, banking, air traffic control, and many other applications, the ability to continue operating in the face of hardware problems is another hard disk can rescue the people in such areas from unnecessary trouble.

- **Saving Money**

Today most of the networks consist mainly of smaller computers rather than the large mainframes, which used to be the concept in earlier days. This is so because small computers have a much better price/performance ratio than large ones. The mainframes are roughly a factor of ten faster than Personal Computers (PCs), but they cost a thousand times more. This imbalance has caused many system designers to build systems consisting of personal computers giving rise to the concept of one computer per user, with data kept on one or more shared file server machines. The whole arrangement is based on the client-server model.

- **Scalability**

Another advantage offered by networking is scalability. This can be defined as the ability of the network to increase system performance gradually as the workload grows just by adding more processors.

This scalability becomes much easier in case of the smaller computers. This is so because in case of centralized mainframes, when the system becomes full, it is replaced by a larger one, usually at great expenses and even causing disruption to the users. With the new client-server networking model, new clients

can be added as needed as and whenever needed without causing much disruption and inconvenience to the users.

- **Communication Medium**

A computer network acts as a powerful communication medium among widely separated people. Today a network has the ability to connect two or more people placed remotely apart from each other.

In the future, the advantage of network to enhance human-to-human communication will probably prove more important than technical goals such as improved reliability. Today the popularity of the internet shows how important is networking in the communication between the remotely placed people.

- **Access To Remote Information**

Starting in the 1990s, computer networks began to start delivering services to private individual at homes thus enabling people to access remote information. Today access to remote information is coming in many forms. One area in which it is already happening is the access to financial institutions. Many people pay their bills, manage their bank accounts, and handle their accounts electronically. Today our own MTNL has also launched the facility of payment of the bills over the internet thus saving the people from the pain of standing in the long queues. Today with the advent of e-commerce, which is business over the network, home shopping is also becoming popular. This provides the facility to inspect the on-line catalogs of thousands of companies.

Another application called the World Wide Web provides easy access to the information systems like the arts, business, cooking, government health, history, hobbies, recreation, science, sports, travel, and other such million of topics.

- **Person-To-Person Communication**

Until now, we have now talked of applications that involve interactions between a person and a remote database. The second broad category of network use is person-to-person interactions and this has been made possible with our own Electronic mail or E-mail, as it is popularly known. Today the E-mail is widely used by millions of people. In the near future E-mail is going to provide the facility of exchanging audio and video material over the net besides the textual part. Real-time E-mail allows remote users to communicate with no delay,

possibly seeing and hearing each other as well. This technology makes it possible to have virtual meetings called videoconferences among far-flung people. Virtual meetings could be used for remote school, getting medical opinions from distant specialists, and numerous other applications. Worldwide newsgroups, which involve discussions on every conceivable topic, are already finding a commonplace among a select group of people, and this will grow to include the whole of the world population at large. In these discussions, one person posts a message and all the other subscribers of that particular newsgroup, can read it.

- **Interactive Entertainment**

The third category is entertainment, which is a huge and growing industry. The most sought after application here is video-on-demand. In the future, it may be possible to select any movie or television program ever made, in any country, and have it displayed.

On your screen instantly. New films may become interactive, where the user is occasionally prompted for the story direction with alternate scenarios for all cases. Live television may also become interactive, with the audience participating in quiz shows, choosing among contestants, and on one team trying to shoot down the players on the opposite team, and so on.

In short, the ability to merge information, communication, and entertainment will surely give rise to a massive industry based on computer networking.

## **USES OF COMPUTER NETWORKS**

There are numerous uses of computer networks, all of them are as follows:

- **PRIVATE NETWORK**

Many organizations have a substantial number of computers in operations, often located far apart. For example, a company with many factories may have compute at each location to keep track of inventories, monitor productivity, and do the local pay roll. The issue here is resource sharing and the goal is to make all program, equipment, and especially data available to any one on the network without regard to the physical location of the resource and the user. Network provides high reliability by having alternative sources of supply. For example, all files could be replicated on two or three machines; if one of them is unavailable the copies could be used.



Networks are helpful in saving money. Small computer have a much better price/performance ratio than large ones. Mainframes are roughly a factor 10 faster than personnel computer but they cost a thousand times more. In this model, the users are called clients and the whole arrangement is called client server model.

## • **COMMUNICATION**

Communication using computer has brought a revolution in the world of Information Technology, particularly in the field of personal computer. We have always heard of networking or the term network. A network is a way or means of transmitting or receiving (exchange) information from one or more sources.

In computing networks, the origin of the information request utilizes the services of a network to locate and return the information. This is done with addresses. In the two previous examples of the car salesman and the employment agent, a telephone number can be considered the address of their associate or client. Addresses in computer networking are used in the same manner. These addresses identify the network resource. There are two popular architectures for networking- hierarchical and peer.

Peer networking does not need pre-defined network addressing. Instead, each resource on the network is seen as a peer. Each network resource is peer to the other network resources. When a new network resource joins the network it introduces it and notifies its peer of any other network resources that it knows about-peer networks are open and share network information.

## • **NETWORK HARDWARE**

It is now time to turn our attention from the application and social aspect of the networking to the technical issues involved in network design. There is generally accepted taxonomy into which all computer networks fit, the tow dimension stands out as important: transmission technology and scale.

The network hardware components used are

- (a) Transmission channel
- (b) Network Interface Card (NIC)
- (c) Servers
- (d) Workstations

### (a) **Transmission Channel**

Generally following four types of channels are used for data communication in a LAN.

- Open Wire
- Twisted Pair
- Coaxial Cable
- Optical Fiber

**(b) Network Interface Card (NIC)**

Network interface units connect each device in the LAN network to shared transmission device. It contains the rules or logic to access the LAN. NIC is also used to implement LAN protocols and for device attachments. Its function depends on the type of topology used in LAN. In microcomputers, NIC may be installed as an add-on card.

**(c) Servers**

One of the major benefits of implementation of LAN is sharing expensive resources such as storage devices, printer etc. This is achieved through providing servers on the LAN. It is a dedicated computer, which controls one or more resources. This contains both hardware and software interface for LAN. Three major categories of servers used in LANs are:

- (i) File Server
- (ii) Printer Server
- (iii) Modem Server

**• NETWORK SOFTWARE**

Operating System is required to operate on the LAN system, manage the tremendous workload with a number of various types of server attached to it. It has basically two-aspect (i) Server software (ii) workstation software. As in case of other multi-user operating systems, LAN operating system also facilitates the sharing of expensive resources such as printer, storage space etc. among all LAN users provides security for data and permits connection to other networks. There are various types of LAN operating system for example Novel Netware, WINDOWS NT, etc.

The first computer networks were designed with the hardware as the main concern and the software as an afterthought. This strategy no longer works. Network

software is now highly structured. Most networks are organized as a series of layers or levels, each one built upon the one below it the number of layers, the name of each layer, the contents of each layer, and the function of each layer differ from network to network. However, in all networks, the purpose of each layer is to offer services to the higher layers, shielding those layers from the details of how the offered service are actually implemented. Layer N on one-machine carries on a conversation with layer on another machine. The rule and conventions used in this conversation are collectively known as the layer N protocol. A protocol is an agreement between the communicating parties on how communication is to proceed.



# DATA COMMUNICATION

2

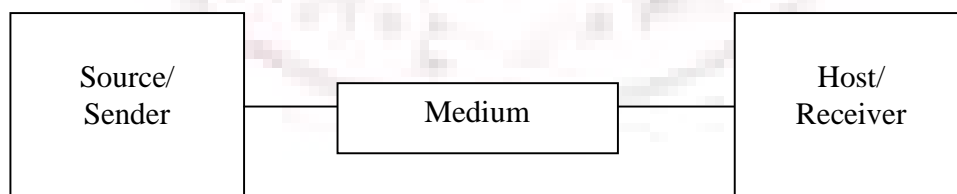
## INTRODUCTION

Data Communications is the transfer of data or information between a source and a receiver. The source transmits the data and the receiver receives it. The actual generation of the information is not part of data communications nor is the resulting action of the information at the receiver. Data Communication is interested in the transfer of data, the method of transfer and the preservation of the data during the transfer process.

In Local Area Networks, we are interested in “connectivity”: connecting computers together to share resources. Even though the computers can have different disk operating systems, languages, cabling and locations, they still can communicate to one another and share resources.

The purpose of data communications is to provide the rules and regulations that allow computers with different disk operating systems, languages, cabling and locations to share resources. The rules and regulations are called protocols and standards in the communications.

## BASIC COMPONENTS OF COMMUNICATION



Source: The transmitter of data. Examples are:

- Terminals

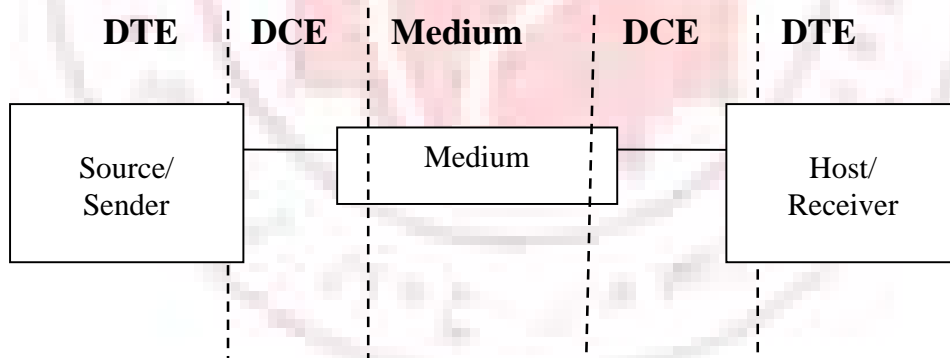
- Computers
- Mainframes

Medium: The communication stream through which the data is being transmitted. Examples are:

- Cabling
- Microwave
- fiber optics
- Radio Frequencies (RF)
- Infrared Wireless

Receiver: The receiver of the data transmitted. Examples are:

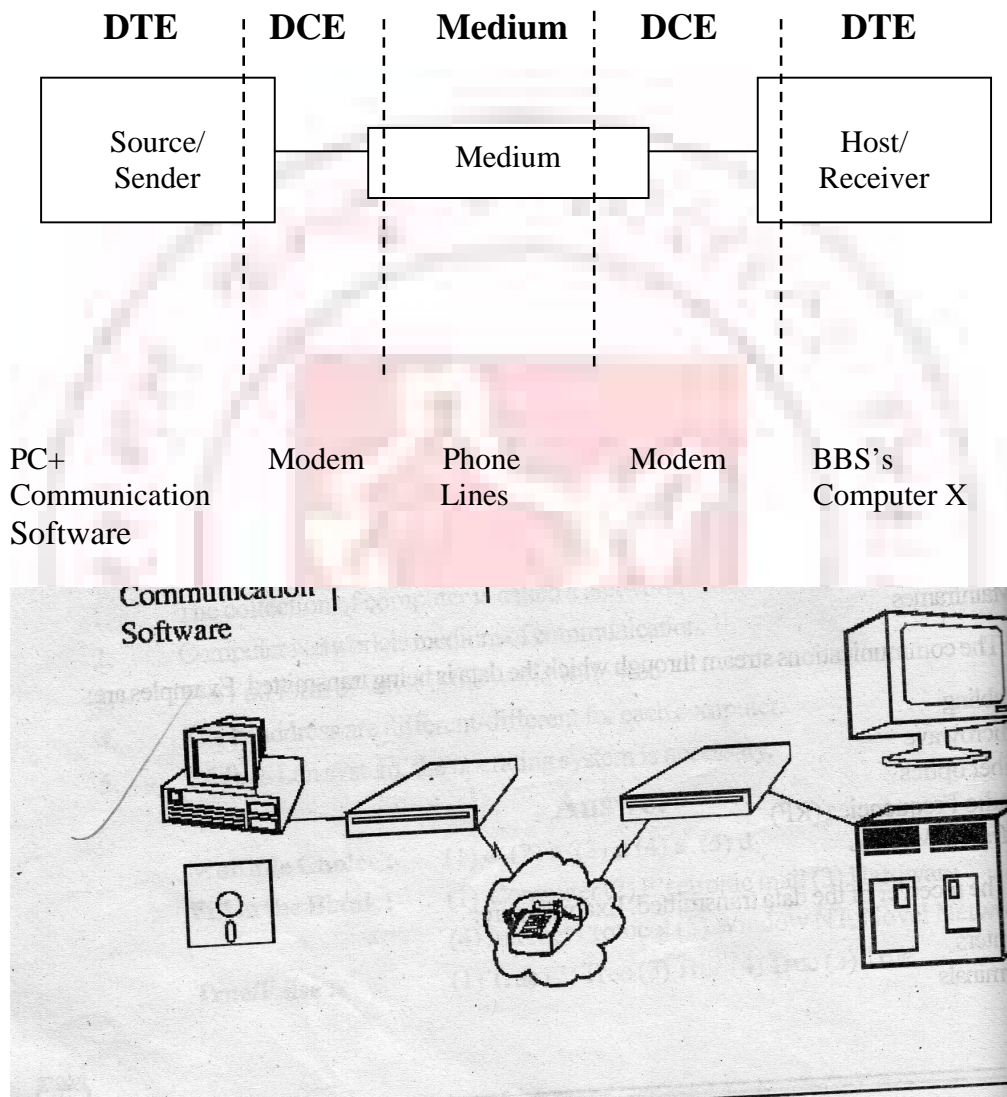
- Printers
- Terminals
- Mainframes
- Computers



DCE: The interface between the Source & the Medium, and the Medium & the Receiver is called the DCE (Data Communication Equipment) and is a physical piece of equipment.

DTE: Data Terminal Equipment is the telecommunications name given to the source and receiver's equipment.

An example of this would be your PC dialing into a BBS (Bulletin Board System):

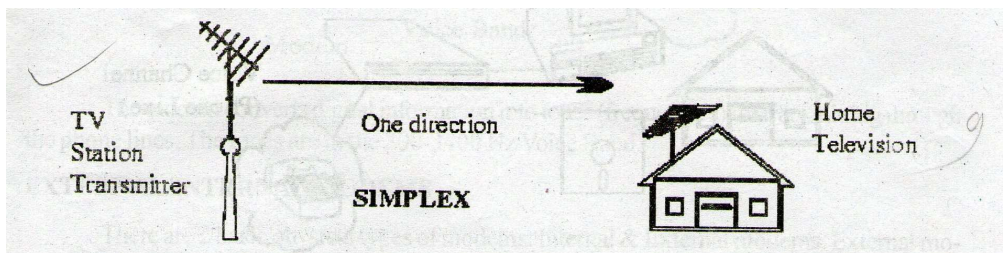


## DATA FLOW

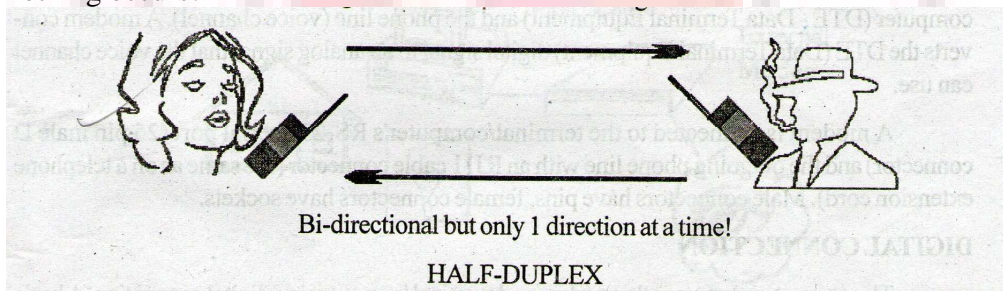
Data flow is the flow of data between two points. The direction of the data flow can be described as:



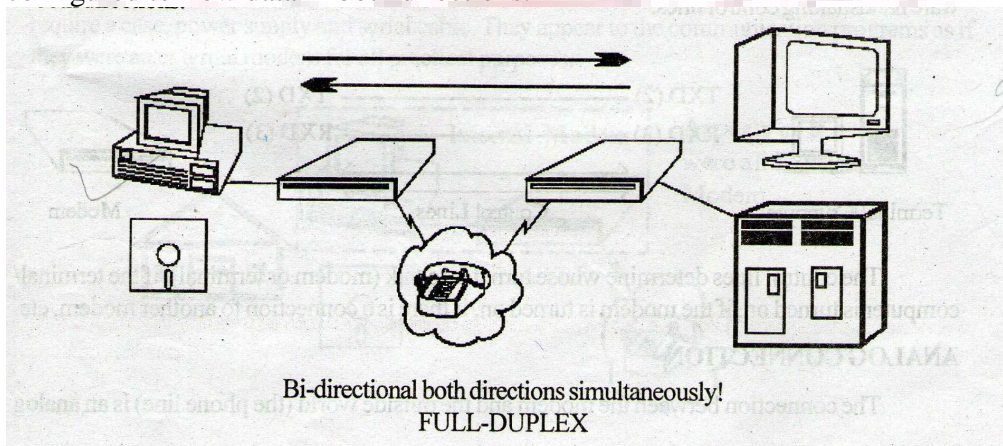
Simplex: data flows in only one direction on the data communication line (medium). Examples are radio and television broadcasts. They go from the TV station to your home television.



Half-Duplex: data flows in both directions but only one direction at a time on the data communication line. For example, a conversation on walkie-talkies is a half-duplex data flow. Each person takes turns talking. If both talk at once nothing occurs!

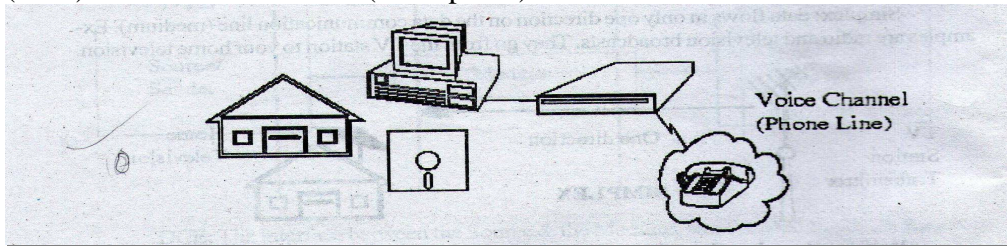


Full-Duplex: data flows in both directions simultaneously. Modems are configured to flow data in both directions.



## MODEMS

A modem (Modulator / Demodulator) connects a terminal/computer (DTE) to the Voice Channel (dial-up line).



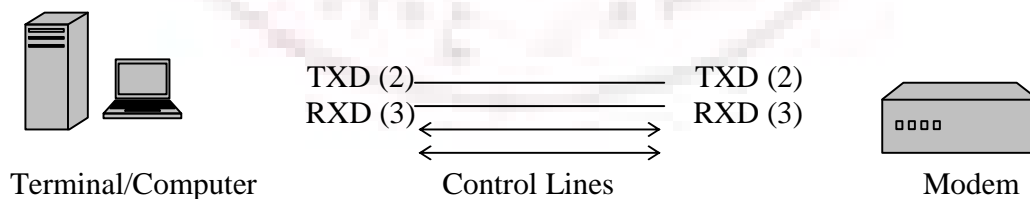
### Basic Definition

The modem (DCE-Data Communication Equipment) is connected between the terminal/computer (DTE-Data Terminal Equipment) and the phone line (voice channel). A modem converts the DTE (Data Terminal Equipment) digital signal to an analog signal that the voice channel can use.

A modem is connected to the terminal/computer's RS-232 serial port (25 pin male D connector) and the outgoing phone line with an RJ11 cable connector (the same as on a telephone extension cord). Male connectors have pins, female connectors have sockets.

### DIGITAL CONNECTION

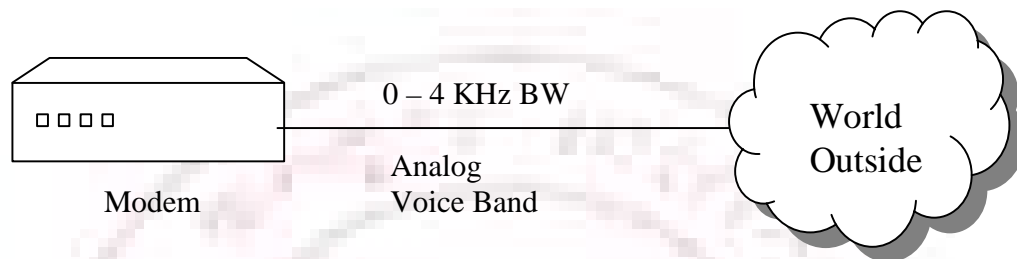
The connection between the modem and terminal/computer is a digital connection. A basic connection consists of a Transmit Data (TXD) line, a Receive Data (RXD) line and many hardware handshaking control lines.



The control lines determine whose turn it is to talk (modem or terminal), if the terminal/computer is turned on, if the modem is turned on, if there is connection to another modem, etc.

## ANALOG CONNECTION

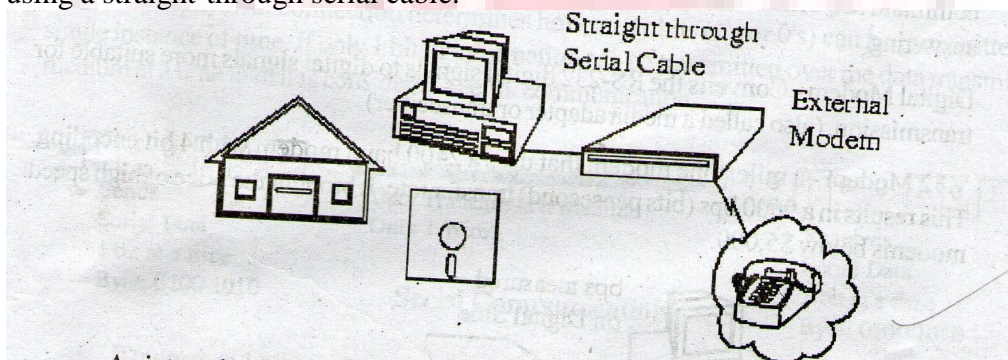
The connection between the modem and the outside world (the phone line) is an analog connection. The voice channel has bandwidth of 0-4 KHz but only 300-3400 Hz is usable for data communications.



The modem converts digital information into tones (frequencies) for transmitting through the phone lines. The tones are in the 300-3400 Hz Voice Band.

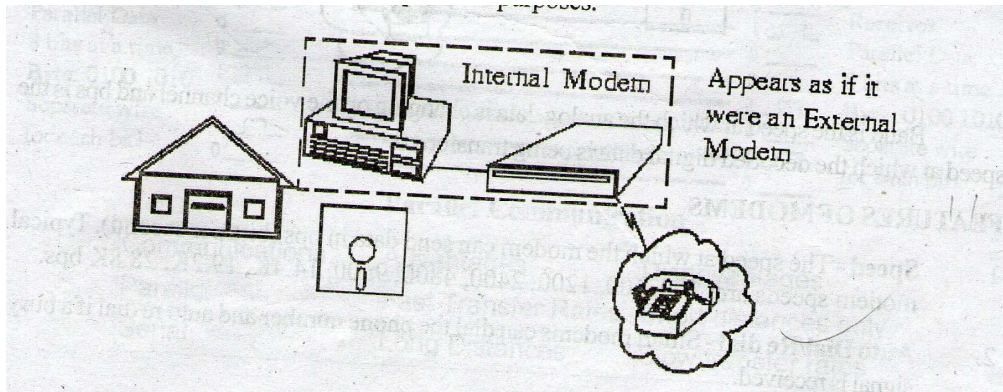
## EXTERNAL/INTERNAL MODEMS

There are 2 basic physical types of modems: Internal & External modems. External modems sit next to the computer and connect to the serial port using a straight-through serial cable.



An Internal modem is a plug-in circuit board that sits inside the computer. It incorporates the serial port on-board. They are less expensive than external modems because they do not require a case, power supply and serial cable. They appear to the communication programs as if they were an external modem for all practical purposes.

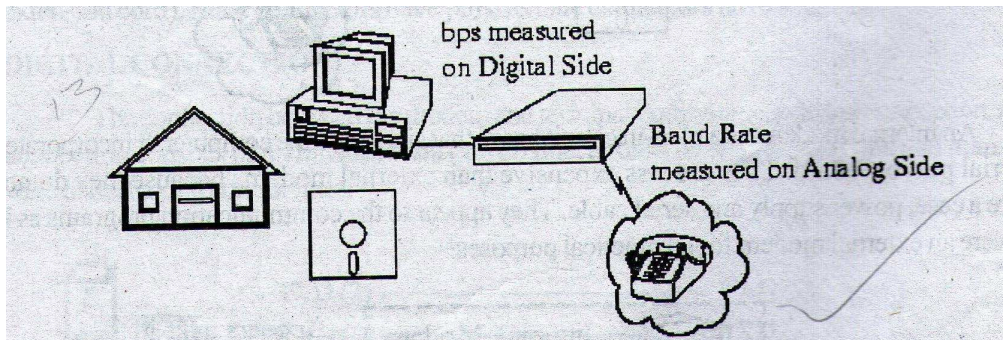




## MODEM TYPES

There are many types of modems, the most common of which are:

- i. Optical Modem- Uses optical fiber cable instead of wire. The modem converts the digital signal to pulses of light to be transmitted over optical lines (more commonly called a media adapter or transceiver).
- ii. Short Haul Modem- A modem used to transmit data over 20 miles or less. Modems we use at home or to connect computers together among different offices in the same building are short haul modems.
- iii. Acoustic Modem- A modem that couples to the telephone handset with what looks like suction cups that contain a speaker and microphone. Used by traveling salespeople to connect to hotel phones.
- iv. Smart Modem- A modem with a CPU (microprocessor) on board that uses the Hayes AT command set. This allows auto-answer & dial capability rather than manually dialing & answering.
- v. Digital Modem- Converts the RS-232 digital signals to digital signals more suitable for transmission. (also called a media adapter or transceiver)
- vi. V.32 Modem- A milestone modem that uses a 2400 baud modem with 4 bit encoding. This results in a 9600 bps (bits per second) transfer rate. It brought the price of high speed modems below \$5,000.



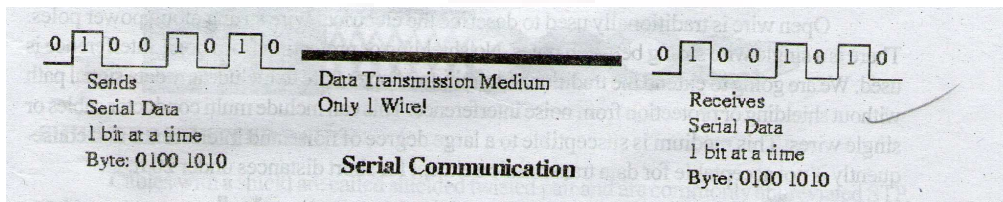
Baud is the speed at which the analog data is changing on the voice channel and bps is the speed at which the decoded digital data is being transferred.

## FEATURES OF MODEMS

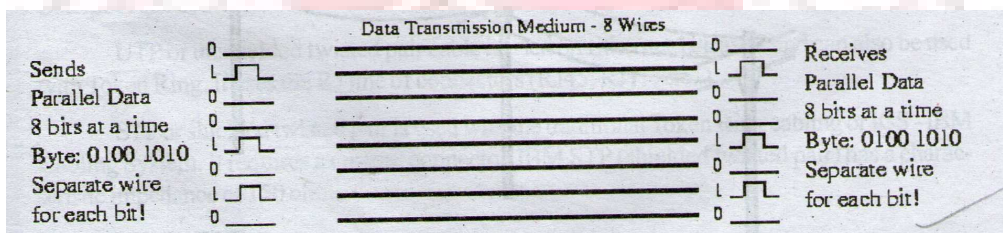
1. **Speed** – The speed at which the modem can send data in bps (bits per second). Typical modem speeds are: 300, 600, 1200, 2400, 4800, 9600, 14.4K, 19.2K, 28.8K bps.
2. **Auto Dial/Redial** – Smart modems can dial the phone number and auto re dial if a busy signal is received.
3. **Auto Answer** – Most modems have Ring Detect capability and can automatically answer the telephone when an incoming call comes in.
4. **Self Testing** – Newer modems have self-testing features. They can test the digital connection to the terminal/computer and the analog connection to a remote modem. They can also check the modem's internal electronics.
5. **Voice Over Data** – Voice Over Data modems allow a voice conversation to take place while data is being transmitted. This requires both the source and destination modems to have this feature.
6. **Synchronous or Asynchronous Transmission** – Newer modems allow a choice of synchronous or asynchronous transmission of data. Normally, modem transmission is asynchronous (we send individual characters with just start and stop bits). Synchronous transmission or packet transmission is used in specific applications.

## PHYSICAL CONNECTION

The physical connection determines how many bits (1's or 0's) can be transmitted in a single instance of time. If only 1 bit of information can be transmitted over the data transmission medium at a time it is considered a serial communication.



If more than 1 bit of information is transmitted over the data transmission medium at a time then it is considered a parallel communication.



### Parallel Communication

Communications	Advantages	Disadvantages
Parallel	Fast Transfer Rates	Short distances only
Serial	Long Distances	Slow transfer rates

## TRANSMISSION MEDIA – GUIDED

There are 2 basic categories of transmission media: guided and unguided.

Guided transmission media uses a cabling system that guides the data signals along a specific path. The data signals are bound by the cabling system. Guided media is also known as bound media. “Cabling” is meant in a generic sense, and is not meant to be interpreted as copper wire cabling only.



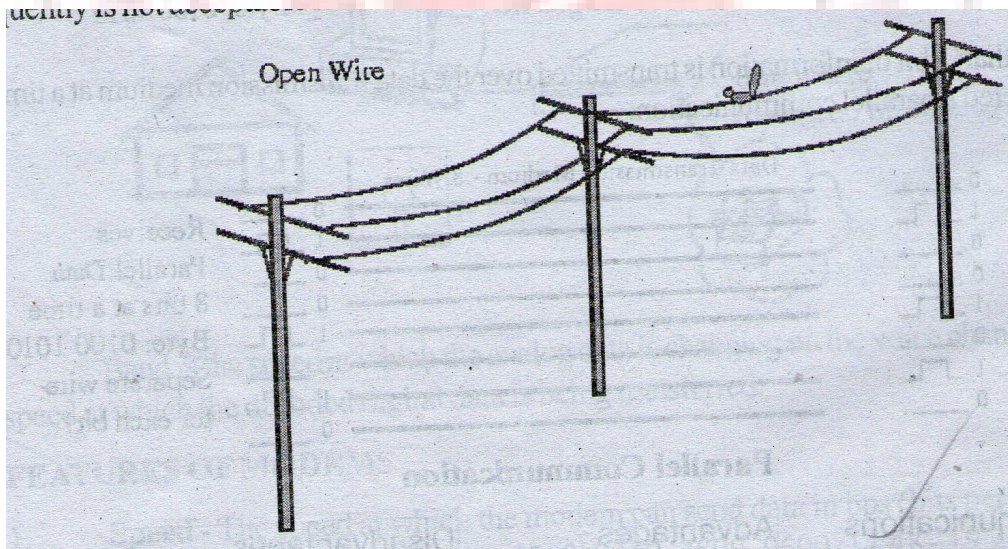
Unguided transmission media consists of a means for the data signals to travel but nothing to guide them along a specific path. The data signals are not bound to a cabling media and are therefore often called unbound media.

There 4 basic types of guided media:

- a. Open Wire
- b. Twisted Pair
- c. Coaxial Cable
- d. Optical Fiber

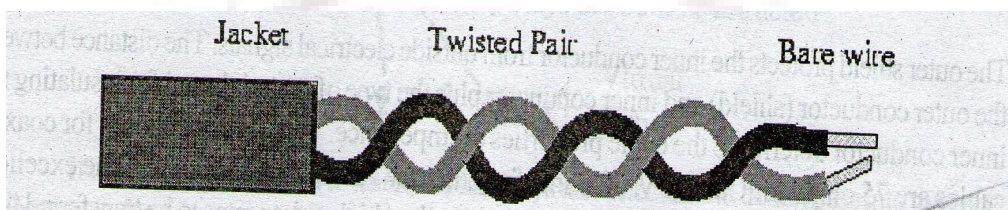
## **OPEN WIRE**

Open wire is traditionally used to describe the electrical wire strung along power poles. There is a single wire strung between poles. No shielding or protection from noise interference is used. We are going to extend the traditional definition of open wire to include any data signal path without shielding or protection from noise interference. This can include multi conductor cables or single wires. This medium is susceptible to a large degree of noise and interference and consequently is not acceptable for data transmission except for short distances under 20 ft.



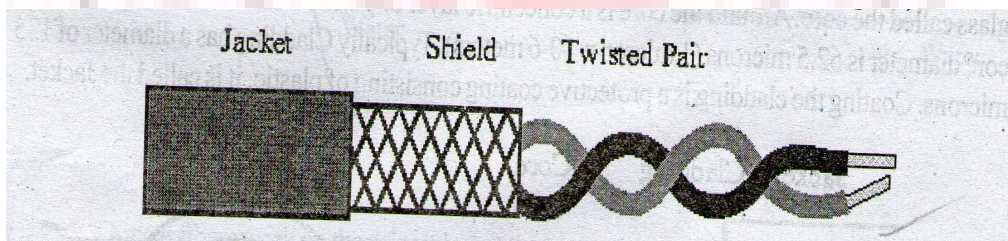
## **TWISTED PAIR**

The wires in twisted pair cabling are twisted together in pairs. Each pair consists of a wire used for the +ve data signal and a wire used for the -ve data signal. Any noise that appears on 1 wire of the pair will also occur on the other wire. Because the wires are opposite polarities, they are 180 degrees out of phase (180 degrees - phasor definition of opposite polarity). When the noise appears on both wires, it cancels or nulls itself out at the receiving end, Twisted pair cables are most effectively used in systems that use a balanced line method of transmission: polar line coding (Manchester Encoding) as opposed to unipolar line coding (TTL logic).



### **UNSHIEDED TWISTED PAIR**

The degree of reduction in noise interference is determined specifically by the number of turns per foot. Increasing the number of turns per foot reduces the noise interference. To further improve noise rejection, a foil or wire braid “shield” is woven around the twisted pairs. This shield can be woven around individual pairs or around a multi-pair conductor (several pairs).



### **SHIELDED TWISTED PAIR**

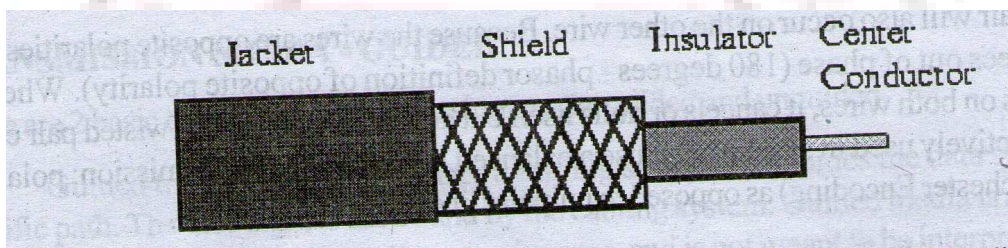
Cables with a shield are called shielded twisted pair and are commonly abbreviated STP. Cables without a shield are called unshielded twisted pair or UTP. Twisting the wires together results in a characteristic impedance for the cable. A typical impedance for UTP is 100 ohm for Ethernet 10BaseT Cable.

UTP or unshielded twisted pair cable is used on Ethernet 10BaseT and can also be used with Token Ring. It uses the RJ line of connectors (RJ45, RJ11, etc....)

STP or shielded twisted pair is used with the traditional Token Ring cabling or ICS-IBM Cabling System. It requires a custom connector. IBM STP (shielded twisted pair) has a characteristic impedance of 150 ohms.

## COAXIAL CABLE

Coaxial cable consists of two conductors. The inner conductor is held inside an insulator with the other conductor woven around it providing a shield. An insulating protective coating called a jacket covers the outer conductor.

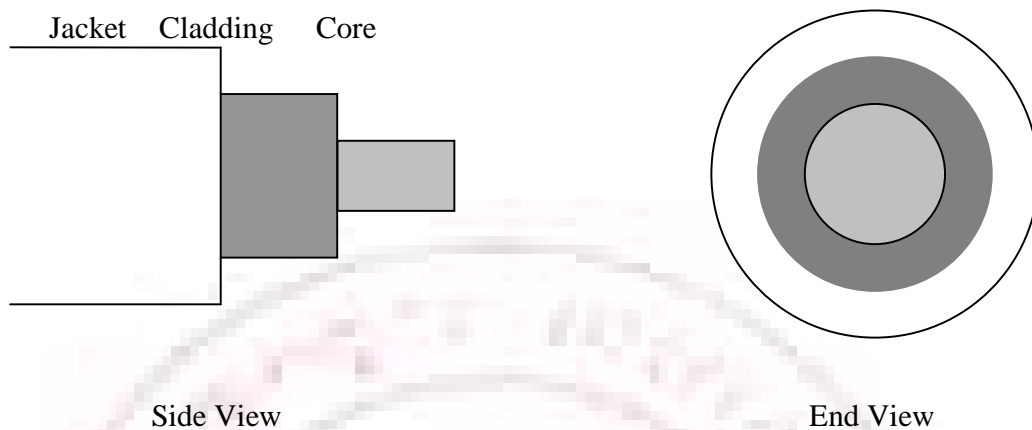


The outer shield protects the inner conductor from outside electrical signals. The distance between the outer conductor (shield) and inner conductor plus the type of material used for insulating the inner conductor determine the cable properties or impedance. Typical impedances for coaxial cables are 75 ohms for Cable TV, 50 ohms for Ethernet Thinnest and Thick net. The excellent control of the impedance characteristics of the cable allow higher data rates to be transferred than with twisted pair cable.

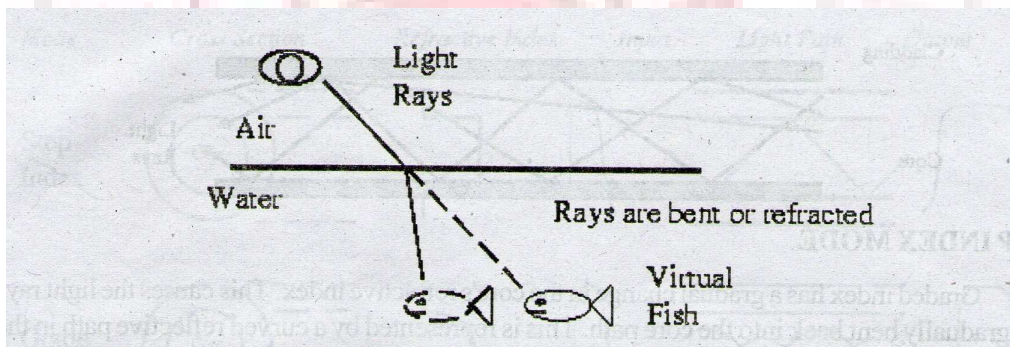
## OPTICAL FEBER

Optical fiber consists of thin glass fibers that can carry information at frequencies in the visible light spectrum and beyond. The typical optical fiber consists of a very narrow strand of glass called the core. Around the core is a concentric layer of glass called the cladding. A typical core diameter is 62.5 microns (1 micron = 10<sup>-6</sup>meters). Typically Cladding has a diameter of 125 microns. Coating the cladding is protective coating consisting of plastic, it is called the jacket.

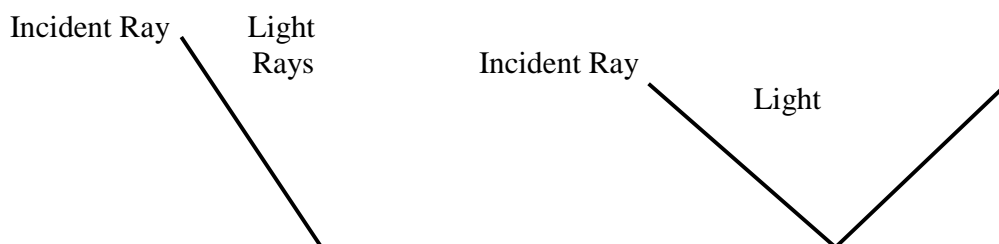


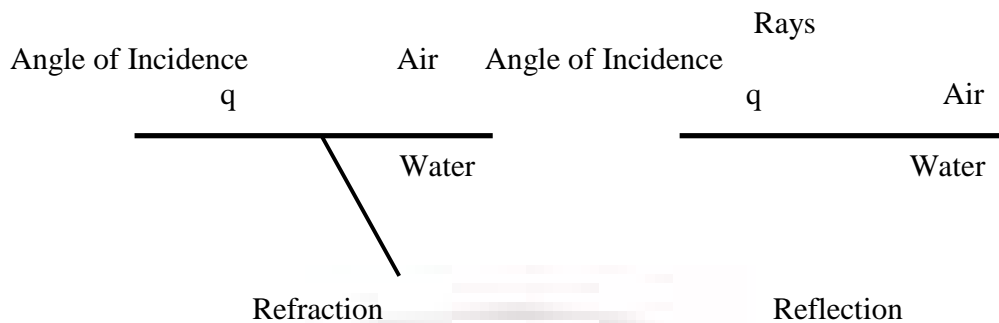


An important characteristic of fiber optics is refraction. Refraction is the characteristic of a material to either pass or reflect light. When light passes through a medium, it “bends” as it passes from one medium to the other. An example of this is when we look into a pond of water.



If the angle of incidence is small, the light rays are reflected and do not pass into the water. If the angle of incident is great, light passes through the media but is bent or refracted.





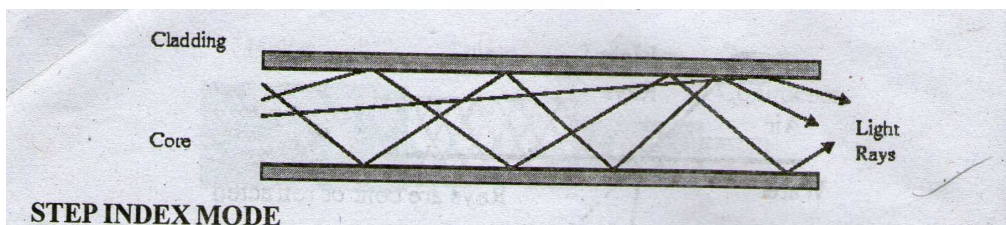
Optical fibers work on the principle that the core refracts the light and the cladding reflects the light. The core refracts the light and guides the light along its path. The cladding reflects any light back into the core and stops light from escaping through it – it bounds the medium!

## OPTICAL TRANSMISSION MODES

There are three primary types of transmission modes using optical fiber. They are

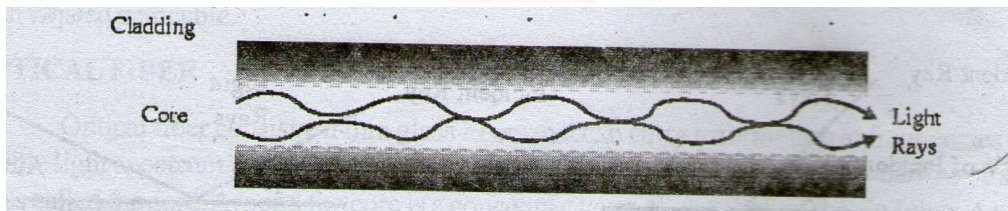
- a. Step Index
- b. Graded Index
- c. Single Mode

Step index has a large core, so the light rays tend to bounce around inside the core, reflecting off the cladding. This causes some rays to take a longer or shorter path through the core. Some take the direct path with hardly any reflections while others bounce back and forth taking a longer path. The result is that the light rays arrive at different times. The signal becomes longer than the original signal. LED light sources are used. Typical core: 62.5 microns.



## STEP INDEX MODE

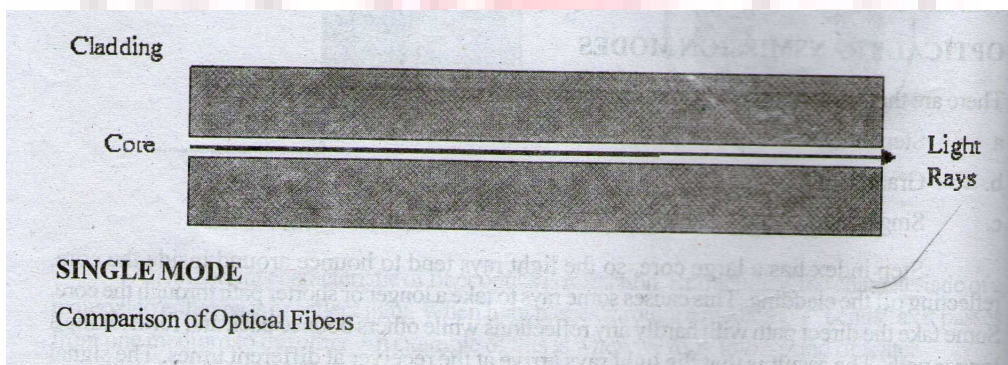
Graded index has a gradual change in the core's refractive index. This causes the light rays to be gradually bent back into the core path. This is represented by a curved reflective path in the attached drawing. The result is a better receive signal than with step index. LED light sources are used. Typical Core: 62.5 microns.



## GRADED INDEX MODE

Note: Both step index and graded index allow more than one light source to be used (different colors simultaneously), so multiple channels of data can be run at the same time!

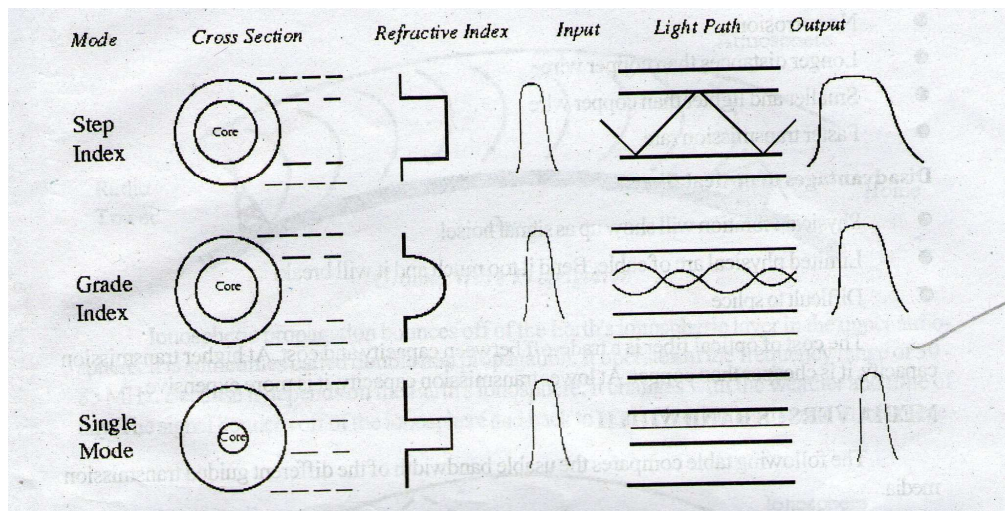
Single mode has separate distinct refractive indexes for the cladding and core. The light ray passes through the core with relatively few reflections off the cladding. Single mode is used for a single source of light (one color) operation. It requires a laser and the core is very small: 9 microns.



## SINGLE MODE

Comparison of Optical Fibers





We don't use frequency to talk about speed any more, we use wavelengths instead. The wavelength of light sources is measured in nanometers or 1 billionth of a meter.

#### Indoor cable specifications:

- LED (Light Emitting Diode) light source
- 3.5 db/km Attenuation (loses 3.5 dB of signal per kilometer)
- 850 nM – wavelength of light source
- Typically 62.5/125 (core dia/cladding dia)
- Multimode – can run many light sources.

#### Outdoor cable specification:

- Laser Light Source
- 1dB/Km Attenuation (loses 1dB of signal per kilometer)
- 1170 nM - wavelength of light source
- Monomode (single mode)

#### Advantages of Optical Fiber:

- Noise immunity: RFI and EMI immune (RFI – Radio Frequency Interference, EMI – Electro Magnetic Interference)
- Security: cannot tap into cable.
- Large Capacity due to BW (bandwidth)

- No corrosion
- Longer distances than copper wire
- Smaller and lighter than copper wire
- Faster transmission rate

#### **Disadvantages of optical fiber:**

- Physical vibration will show up as signal noise!
- Limited physical are of cable. Bend it too much and it will break!
- Difficult to splice

The cost of optical fiber is a trade – off between capacity and cost. At higher transmission capacity, it is cheaper than copper. at lower transmission capacity, it is more expensive.

#### **MEDIA VERSUS BANDWIDTH**

The following table compares the usable bandwidth of the different guided transmission media.

Cable Type	Bandwidth
Open Cable	0 -5 MHz
Twisted Pair	0 -100 MHz
Coaxial Cable	0 – 600 MHz
Optical fiber	0 -1 GHz

#### **TRANSMISSION MEDIA – UNGUIDED**

Unguided transmission media is data signals that flow through the air. They are not guided or bond to a channel to follow. They are classified by the type of wave propagation.

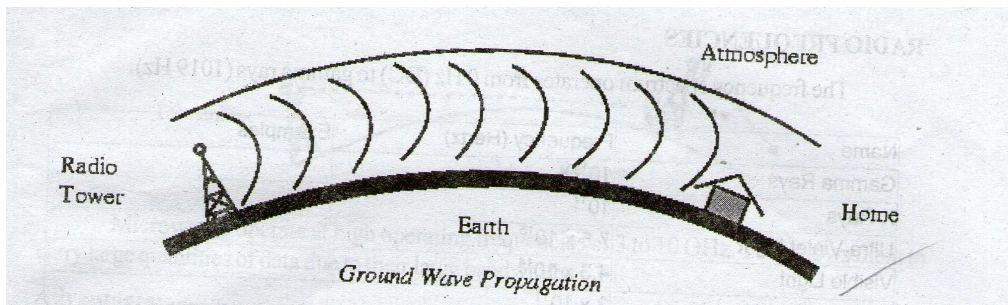
##### **RF Propagation**

There are three types of RF (radio frequency) propagation:

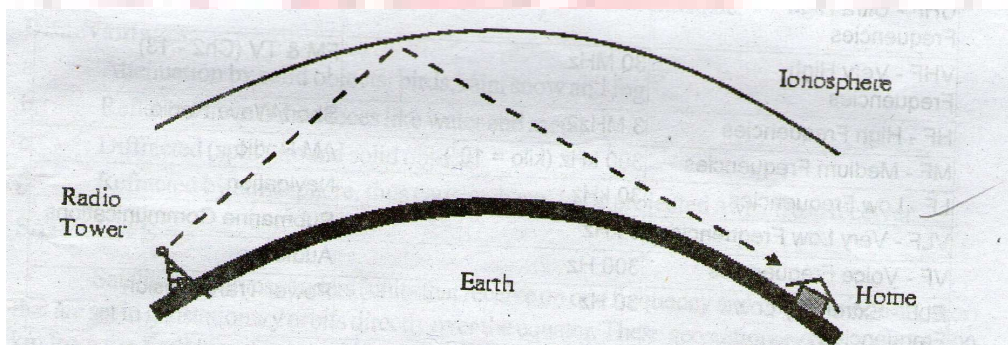
- Ground Wave
- Ionospheric

- Line of Sight (LOS)

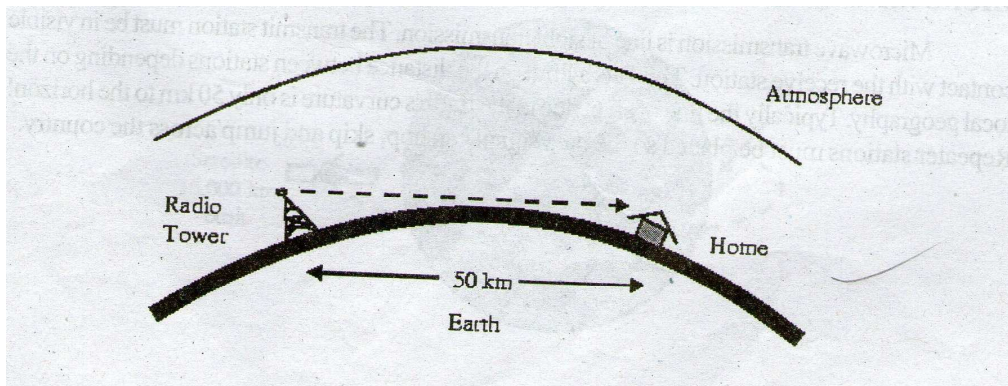
Ground wave propagation follows the curvature of the Earth. Ground waves have carrier frequencies up to 2 MHz. AM radio is an example of ground wave propagation.



Ionospheric propagation bounces off of the Earth's ionospheric layer in the upper atmosphere. It is sometimes called double hop propagation. It operates in the frequency range of 30-85 MHz. Because it depends on the Earth's ionosphere, it changes with the weather and time of day. The signal bounces off of the ionosphere and back to earth. Ham radios operate in this range.



Line of sight propagation transmits exactly in the line of sight. The receive station must be in the view of the transmit station. It is sometimes called space waves or tropospheric propagation. It is limited by the curvature of the Earth for ground – based stations (100 km, from horizon to horizon). Reflected waves can cause problems. Examples of line of sight propagation are: FM radio, microwave and satellite.



## RADIO FREQUENCIES

The frequency spectrum operates from 0 Hz (DC) to gamma rays (10<sup>19</sup> Hz)

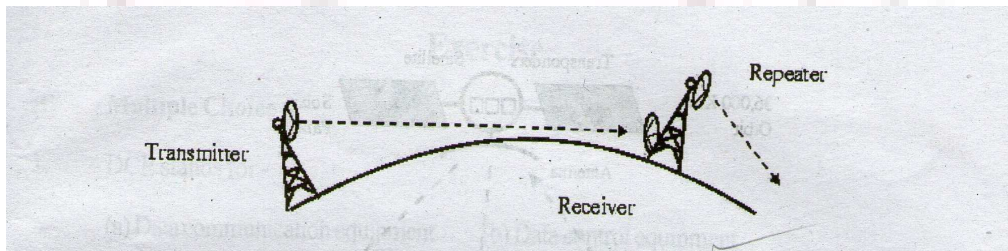
Name	Frequency (Hertz)	Examples
Gamma Rays	10 <sup>19</sup> +	
X-Rays	10 <sup>17</sup>	
Ultra -Violet Light	7.5 x 10 <sup>15</sup>	
Visible Light	4.3 x 10 <sup>14</sup>	
Infrared Light	3 x 10 <sup>11</sup>	
EHF – Extremely High Frequencies	30 GHz (Giga = 10 <sup>9</sup> )	Radar
SHF – Super High Frequencies	3 GHz	Satellite & Microwaves
UHF – Ultra High Frequencies	300 MHz (Mega = 10 <sup>6</sup> )	UHF TV (Ch. 14-83)
VHF – Very High Frequencies	30 MHz	FM & TV (Ch2 – 13)
HF - High Frequencies	3 MHz	Short Wave Radio
MF - Medium Frequencies	300 kHz (kilo = 10 <sup>3</sup> )	AM Radio
LF – Low Frequencies	30 kHz	Navigation
VLF - Very Low Frequencies	3 k Hz	Submarine Communications
VF – Voice Frequencies	300 Hz	Audio
ELF – Extremely Low Frequencies	30 Hz	Power Transmission



Radio frequencies are in the range of 300 kHz to 10 GHz. We are seeing an emerging technology called wireless LANs. Some use radio frequencies to connect the workstations together, some use infrared technology.

## MICROWAVE

Microwave transmission is line of sight transmission. The transmit station must be in visible contact with the receive station. This sets a limit on the distance between stations depending on the local geography. Typically the line of sight due to the Earth's curvature is only 50 Km to the horizon! Repeater stations must be placed so the data signal can hop, skip and jump across the country.



Microwaves operate at high operating frequencies of 3 to 10 GHz. This allows them to carry large quantities of data due to their large bandwidth.

### Advantages:

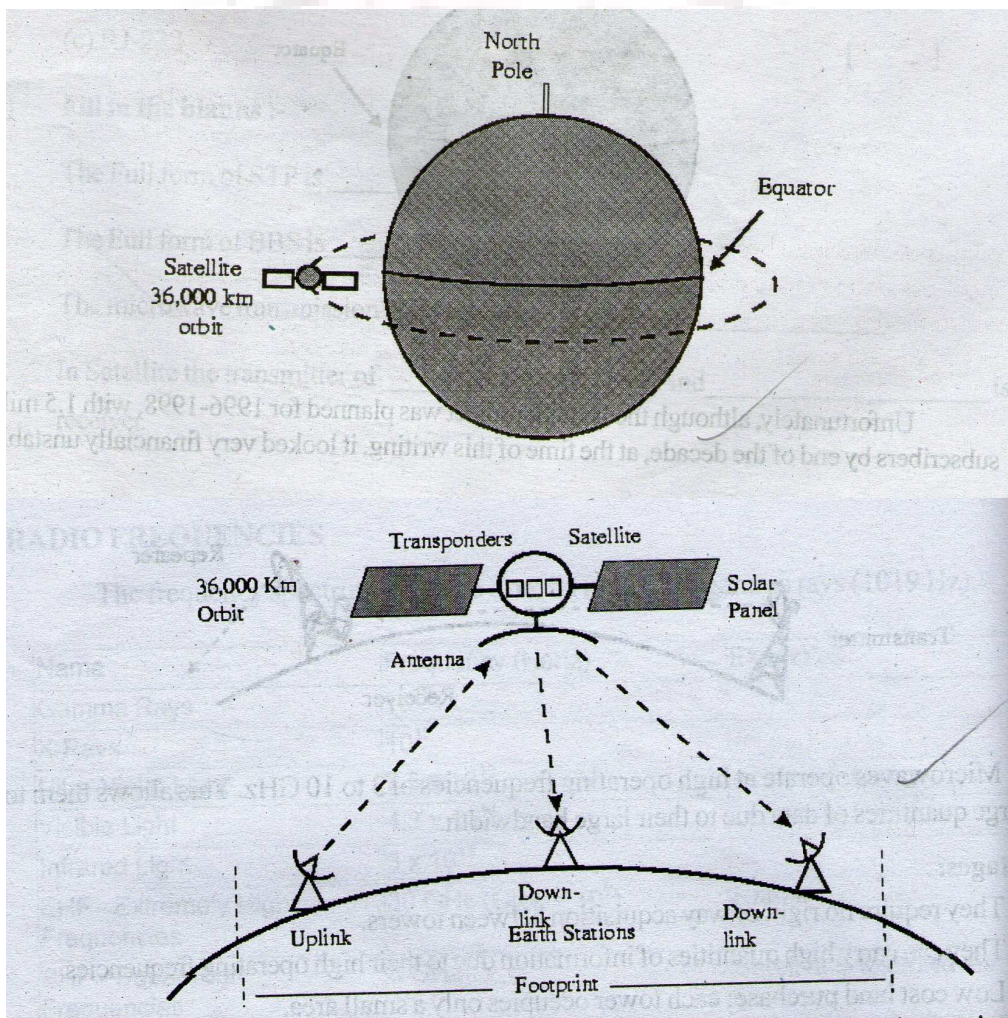
- They require no right of way acquisition between towers.
- They can carry high quantities of information due to their high operating frequencies.
- Low cost land purchase: each tower occupies only a small area.
- High frequency/short wavelength signals require small antennae.

### Disadvantages:

- Attenuation by solid objects: birds, rain, snow and fog.
- Reflected from flat surfaces like water and metal.
- Diffacted (split) around solid objects.
- Refracted by atmosphere, thus causing beam to be projected away from receiver.

## SATELLITE

Satellites are transponders (units that receive on one frequency and retransmit on another) that are set in geostationary orbits directly over the equator. These geostationary orbits are 36,000 Km from the Earth's surface. At this point, the gravitational pull of the Earth and the centrifugal force of Earth's rotation are balanced and cancel each other out. Centrifugal force is the rotational force placed on the satellite that wants to fling it out into space.



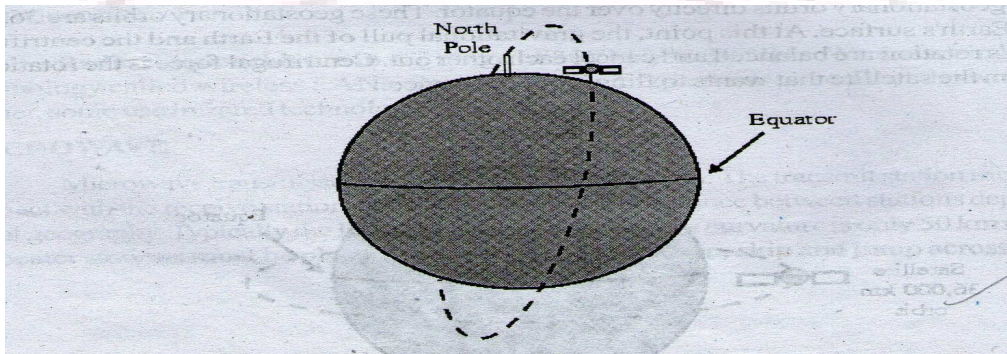
The uplink is the transmitter of data to the satellite. The downlink is the receiver of data. Uplinks and downlinks are also called Earth stations because



they are located on the Earth. The footprint is the “shadow” that the satellite can transmit to, the shadow being the area that can receive the satellite’s transmitted signal.

## **IRIDIUM TELECOM SYSTEM**

The Iridium Telecom System is a new satellite system that will be the largest private aerospace project. It is a mobile telecom system intended to compete with cellular phones. It relies on satellites in lower Earth orbit (LEO). The satellites will orbit at an altitude of 900 – 10,000 Km in a polar, non-stationary orbit. Sixty-six satellites are planned. The user’s handset will require less power and will be cheaper than cellular phones. There will be 100% coverage of the Earth.



Unfortunately, although the Iridium project was planned for 1996-1998, with 1.5 million subscribers by end of the decade, at the time of this writing, it looked very financially unstable.



## **INTRODUCTION TO INTERNET**

**3**

### **WHAT IS INTERNET?**

The Internet is a computer network made up of thousands of networks worldwide. No one knows exactly how many computers are connected to the Internet, however, that these number in the millions.

No one is in charge of the Internet. There are organizations which develop technical aspects of this network and set standards for creating applications on it, but no governing body is in control. The Internet backbone, through which Internet traffic flows, is owned by private companies.

All computers on the Internet communicate with one another using the Transmission Control Protocol/Internet Protocol suite, abbreviated to TCP/IP. Computers on the Internet use a client/server architecture. This means that the remote server machine provides files and services to the user's local client machine. Software can be installed on a client computer to take advantage of the latest access technology.

An Internet user has access to a wide variety of services: electronic mail, file transfer, vast information resources, interest group membership, interactive collaboration, multimedia displays, real-time broadcasting, shopping opportunities, breaking news, and much more.

The Internet consists primarily of a variety of access protocols. Many of these protocols feature programs that allow users to search for and retrieve material made available by the protocol.

It's a collection of networks- a network of networks-computers sharing information via a common set of networking and software protocols.

## **HISTORY AND OVERVIEW OF THE INTERNET**

### **1969 – Birth of a Network**

The Internet as we know it today, in the mid – 1990s, traces its origins back to a Defence Department project in 1969. The subject of the project was wartime digital communications. At that time the telephone system was about the only theater – scale communications system in use. A major problem had been identified in its design – its dependence on switching stations that could be targeted during an attack. Would it be possible to design a network that could quickly reroute digital traffic around failed nodes? A possible solution had been identified in theory. That was to build a “web” of datagram network, called a “catenet”, and use dynamic routing protocols to constantly adjust the flow of traffic through the catenet. The Defence Advanced Research Projects Agency (SARPA) launched the DARPA Internet Program.

### **1970 - Infancy**

DARPA Internet, largely the plaything of academic and military researchers, spent more than a decade in relative obscurity. As Vietnam, Watergate, the Oil Crisis, and the Iranian Hostage Crisis rolled over the nation,

several Internet research teams preceded through a gradual evolution of protocols. In 1975, DARPA declared the project a success and handed its management over to the Defense Communications Agency. Several of today's key protocols (including IP and TCP) were stable by 1980, and adopted throughout ARPANET by 1983.

### **Mid 1980 – The Research Net**

Let's outline key features, circa- 1983, of what was then called ARPANET. A small computer was a PDP-11/45, and a PDP-11/45 does not fit on your desk. Some sites had a hundred computers attached to the Internet. Most had a dozen or so, probably with something like a VAX doing most of the work – mail, news, EGP routing. Users did their work using DEC VT- 100 terminals. FORTRAN was the word of the day. Few companies had Internet access, relying instead on SNA and IBM mainframes. Rather, the Internet community was dominated by universities and military research sites. It's most popular service was the rapid email it made possible with distant colleagues. In August 1983, there were 562 registered ARIANET hosts (RFC 1296).

UNIX deserves at least an honorable mention, since almost all the initial Internet protocols were developed first for UNIX, largely due to the availability of kernel source (for a price) and the relative ease of implementation (relative to things like VMS or MVS). The University of California at Berkeley (UCB) deserves special mention, because their Computer Science Research Group (CSRG) developed the BSD variants of AT&T's UNIX operating system. BSD UNIX and its derivatives would become the most common Internet programming platform.

Many key features of the Internet were already in place, including the IP and TCP protocols; ARPANET was fundamentally unreliable in nature, as the Internet is still today. This principle of unreliable delivery means that the Internet only makes a best-effort attempt to deliver packets. The network can drop a packet without any notification to sender or receiver. Remember, the Internet was designed for military survivability. The software running on either end must be prepared to recognize data loss, retransmitting data as often as necessary to achieve its ultimate delivery.

### **Late 1980 – The PC Revolution**

Driven largely by the development of the PC and LAN technology, subnetting was standardized in 1985 when RFC 950 was released. LAN



technology made the idea of a “catenet” feasible – an internet work of networks. Subnetting opened the possibilities of interconnecting LANs with WANs.

The National Science Foundation (NSF) started the Supercomputer Centers program in 1986. Until then, supercomputers such as Cray’s were largely the playthings of large, well-funded universities and military research centers. NSF’s idea was to make supercomputer resources available to those of more modest means by constructing five supercomputer centers around the country and building a network linking them with potential users. NSF decided to base their network on the Internet protocols, and NSFNET was born . For the next decade, NSFNET would be the core of the U.S. Internet, until its privatization and ultimate retirement in 1995.

Domain naming was stable by 1987 when RFC 1034 was released. Until then, hostnames were mapped to IP address using static tables, but the Internet’s exponential growth had made this practice infeasible.

In the late 1980s, important advances related poor network performance with poor TCP performance, and a string of papers by the likes of Nagle and Van Jacobson (RFC 896, RFC 1072, RFC 1144, RFC 1323) present key insights into TCP performance. The 1987 Internet Worm was the largest security failure in the history of the Internet. More information can be found in RFC 1135. All things considered, it could happen again.

### **Early 1990 – Address Exhaustion and the Web**

In the early 90s, the first address exhaustion crisis hit the Internet technical community. The present solution, CIDR, will sustain the Internet for a few more years by making more efficient use of IP’s existing 32-bit address space. For a more lasting solution, IETF is looking at IPv6 and its 128-bit address space, but CIDR is here to stay.

Crisis aside, the World Wide Web (WWW) has been one of Internet’s most exciting recent developments. The idea of hypertext has been around for more than a decade, but in 1989 a team at the European Center for Particle Research (CERN) in Switzerland developed a set of protocols for transferring hypertext via the Internet. In the early 1990s it was enhanced by a team at the National center for Supercomputing Applications (NCSA) at the University of Illinois – one of NSF’s supercomputer centers. The result was NCSA Mosaic, a graphical, point-and-click hypertext browser that made Internet

easy. The resulting explosion in “Web sites” drove the Internet into the public eye.

### **Mid 1990s – The New Internet**

Of at least as much interest as Internet’s technical progress in the 1990s has been its sociological progress. It has already become part of the national vocabulary, and seems headed for even greater prominence. It has been accepted by the business community, with a resulting explosion of service providers, consultants, books, and TV coverage. It has given birth to the Free Software Movement.

The Free Software Movement owes much to bulletin board systems, but really came into its own on the Internet, due to a combination of forces. The public nature of the Internet’s early funding ensured that much of its networking software was non – proprietary. The emergence of anonymous FTP sites provided a distribution mechanism that almost anyone could use. Network newsgroups and mailing lists offered an open communication medium. Last but not least were individualists like Richard Stallman, who wrote EMACS, launched the GNU Project and founded the Free Software Foundation. In the 1990s, Linus Torvalds wrote Linux, the popular (and free) UNIX clone operating system.

The explosion of capitalist conservatism, combined with a growing awareness of Internet’s business value, has led to major changes in the Internet community. Many of them have not been for the good.

First, there seems to be a growing departure from Internet’s history of open protocols, published as RFCs. Many new protocols are being developed in an increasingly proprietary manner. IGRP, a trademark of Cisco Systems, has the dubious distinction as the most successful proprietary Internet routing protocol, capable only of operation between Cisco routers. Other protocols, such as BGP, are published as RFCs, but with important operational details omitted. The notoriously mis-named Open Software Foundation have introduced a whole suite of “open” protocols whose specifications are available – for a price – and not on the net. I am forced to wonder: 1) why do we need a new RPC? and 2) why won’t OSF tell us how it works?

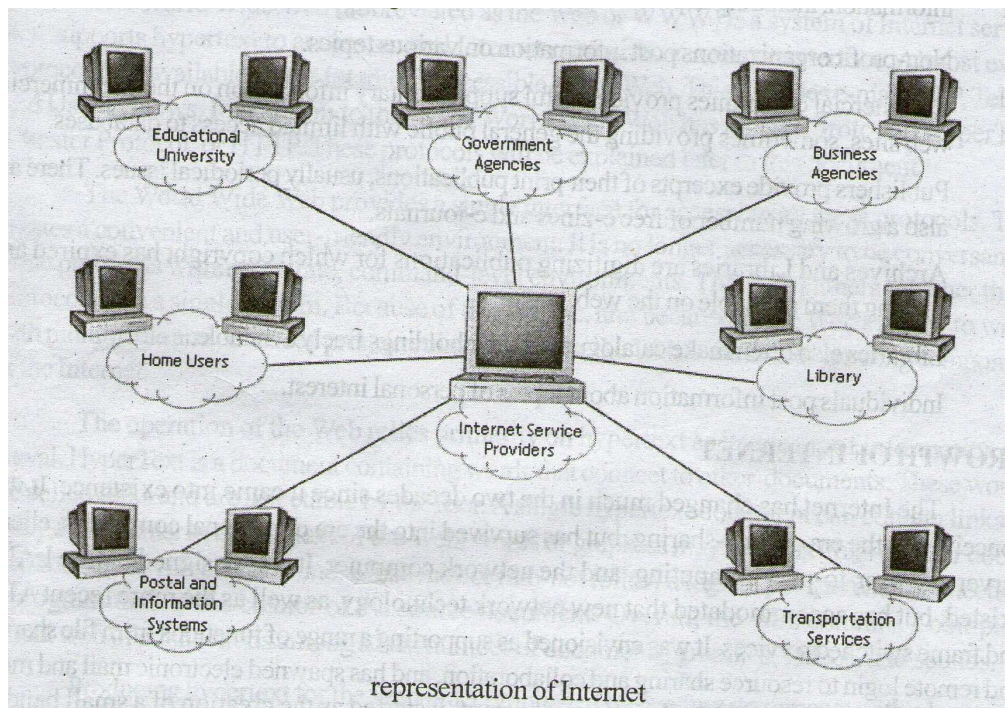
People forget that businesses have tried to run digital communications networks in the past. IBM and DEC both developed proprietary networking schemes that only ran on their hardware. Several information

providers did very well for themselves in the 80s, including LEXIS/NEXIS, Dialog, and Dow Jones. Public data networks were constructed by companies like Tymnet and run into every major US city. CompuServe and others built large bulletin board – like systems. Many of these services still offer a quality and depth of coverage unparalleled on the Internet (examine Dialog if you are skeptical of this claim). But none of them offered nudie GIFs that anyone could download. None of them let you read through the RFCs and then write a Perl script to tweak the one little thing you needed to adjust. None of them gave birth to a Free Software Movement. None of them caught people's imagination.

The very existence of the Free Software Movement is part of the Internet saga, because free software would not exist without the net. "Movements" tend to arise when progress offers us new freedoms and we find new ways to explore and, sometimes, to exploit them. The Free Software Movement has offered what would be unimaginable when the Internet was formed – games, editors, windowing systems, compilers, networking software, and even entire operating systems available for anyone who wants them, without licensing fees, with complete source code, and all you need is Internet access. It also offers challenges, forcing us to ask what changes are needed in our society to support these new freedoms that have touched so many people. And it offers chances at exploitation, from the businesses using free software development platforms for commercial code, to the Internet Worm and security risks of open systems.

People wonder whether progress is better served through government funding or private industry. The Internet defies the popular wisdom of "business is better". Both business and government tried to build large data communication networks in the 1980s. Business depended on good market decisions; the government researchers based their system on openness, imagination and freedom. Business failed; Internet succeeded. Our reward has been its commercialization.

For the next few years, the Internet will almost certainly be content – driven. Although new protocols are always under development, we have barely begun to explore the potential of just the existing ones. Chief among these is the World Wide Web, with its potential for simple on – line access to almost any information imaginable. Yet even as the Internet intrudes into society, remember that over the last two decades "The Net" has developed a culture of its own, one that may collide with society's. Already business is making its pitch to dominate the Internet. Already Congress has deemed it necessary to regulate the Web.



## **WHO OWNS THE INTERNET?**

No one actually owns the internet, and no single person or organisation controls the internet in its entirety. More of a concept than an actual tangible entity, the internet relies on a physical infrastructure that connects networks to other networks. There are many organisations, corporations, governments, schools, private citizens and service providers that own pieces of infrastructure, but there is no one body that owns it all. There are however, organisations that oversee and standardise what happens on internet and assigns IP addresses and domain names, such as the national science foundation, the internet engineering task force, icann, internic and internet architecture board.

## **WHO PUTS INFORMATION THE INTERNET?**

Individuals and organizations make information available through the internet for a variety of reasons. Some of this information is freely available to the general public, while some of it is restricted to a particular user community. The following are some of the people who put information on the internet, and the types of information they make freely available.



1. Governments often have a mandate to make information freely available to their citizens, and are publishing a wealth of statistical and other information on the web.
2. University researchers, educators and students make available various types of academic information, including unpublished articles.
3. Non- profit organizations post information on various topics.
4. Commercial companies provide useful supplementary information on their commercial web sites, sometimes providing the general public with limited access to databases.
5. Publishers provide excerpts of their print publications, usually periodical issues. There are also a growing number of free e-zines and e-journals.
6. Archives and Libraries are digitizing publications for which copyright has expired and making them available on the web.
7. Libraries also often make catalogues of their holdings freely available.
8. Individuals post information about topics of personal interest.

## **GROWTH OF INTERNET**

The Internet has changed much in the two decades since it came into existence. It was conceived in the era of time-sharing, but has survived into the era of personal computers, client server and peer-to-peer computing, and the network computer. It was designed before LAN's existed, but has accommodated that new network technology, as well as the more recent ATM and frame switched services. It was envisioned as supporting a range of functions from file sharing and remote login to resource sharing and collaboration, and has spawned electronic mail and more recently the World Wide Web. But most important, it started as the creation of a small band of dedicated researchers, and has grown to be a commercial success with billions of dollars of annual investment.

One should not conclude that the Internet has now finished changing. The Internet, although a network in name and geography, is a creature of the computer, not the traditional network of the telephone or television industry. It will, indeed it must, continue to change and evolve at the speed of

the computer industry if it is to remain relevant. It is now changing to provide such new services as real time transport, in order to support, for example, audio and video streams. The availability of pervasive networking (i.e., the Internet) along with powerful affordable computing and communications in portable form (i.e., laptop computers, two-way pagers, PDA's, cellular phones), is making possible a new paradigm of nomadic computing and communications.

This evolution will bring us new applications – Internet telephone and, slightly further out, Internet television. It is evolving to permit more sophisticated forms of pricing and cost recovery, a perhaps painful requirement in this commercial world. It is changing to accommodate yet another generation of underlying network technologies with different characteristics and requirements, from broadband residential access to satellites. New modes of access and new forms of service will spawn new applications, which in turn will drive further evolution of the net itself.

## **COMPONENTS OF THE INTERNET**

### **WORLD WIDE WEB**

The World Wide Web (abbreviated as the Web or WWW) is a system of Internet servers that supports hypertext to access several Internet protocols on a single interface. Almost every protocol type available on the Internet is accessible on the Web. This includes e-mail, FTP, Telnet, and Usenet News. In addition to these, the World Wide Web has its own protocol: Hyper Text Transfer Protocol, or HTTP. These protocols will be explained later in this document.

The World Wide Web provides a single interface for accessing all these protocols. This creates a convenient and user – friendly environment. It is no longer necessary to be conversant in these protocols within separate, command – level environments. The Web gathers together these protocols into a single system. Because of this feature, and because of the Web's ability to work with multimedia and advanced programming language, the Web is the fastest-growing component of the Internet.

The operation of the Web relies primarily on hypertext as its means of information retrieval. Hyper Text is a document containing words that connect to other documents. These words are called links and are selectable by the user. A single hypertext document can contain links to many documents. In the context of the Web, words or graphics may serve as links to other

documents, images, video, and sound. Links may or may not follow a logical path, as each connection is programmed by the creator of the source document. Overall, the Web contains a complex virtual web of connections among a vast number of documents, graphics, videos, and sounds.

Producing hypertext for the Web is accomplished by creating documents with a language called Hyper Text Markup Language, or HTML. With HTML, tags are placed within the text to accomplish document formatting, visual features such as font size, italics and bold, and the creation of hypertext links. Graphics and multimedia may also be incorporated into an HTML document. HTML is an evolving language, with new tags being added as each upgrade of the language is developed and released. The World Wide Web Consortium (W3C), led by Web founder Tim Berners-Lee, coordinates the efforts of standardizing HTML. The W3C now calls the language XHTML and considers it to be an application of the XML language standard.

The World Wide Web consists of files, called pages or home pages, containing links to documents and resources throughout the Internet.

The Web provides a vast array of experiences including multimedia presentations, real-time collaboration, interactive pages, radio and television broadcasts, and the automatic “push” of information to a client computer. Programming languages such as Java, JavaScript, Visual Basic, Cold Fusion and XML are extending the capabilities of the Web. A growing amount of information on the Web is served dynamically from content stored in databases. The Web is therefore not a fixed entity, but one that is in a constant state of development and flux.

## **E-MAIL**

Electronic mail, or e-mail, allows computer users locally and worldwide to exchange messages. Each user of e-mail has a mailbox address to which messages are sent. Messages sent through e-mail can arrive within a matter of seconds.

A powerful aspect of e-mail is the option to send electronic files to a person's e-mail address. Non – ASCII files, known as binary files, may be attached to e-mail messages. These files are referred to as MIME attachments. MIME stands for Multimedia Internet Mail Extension, and was developed to help e-mail software handle a variety of file types. For example, a document

created in Microsoft Outlook, offer the ability to read files written in HTML, which is itself a MIME type.

## **TELNET**

Telnet is a program that allows you to log into computers on the Internet and use online databases, library catalogs, chat services, and more. There are no graphics in Telnet sessions, just text. To Telnet to a computer, you must know its address. This can consist of words (locis.loc.gov) or numbers (140.147.254.3). Some services require you to connect to a specific port on the remote computer. In this case, type the port number after the Internet address. Example: telnet nri.reston.va. Us 185.

Telnet is available on the World Wide Web. Probably the most common Web-based resources available through Telnet have been library catalogs, though most catalogs have since migrated to the Web. A link to a Telnet program must be installed on your local computer and configured to your Web browser in order to work.

With the increasing popularity of the Web, Telnet has become less frequently used as a means of access to information on the Internet.

## **FTP**

FTP stands for File Transfer Protocol. This is both a program and the method used to transfer files between computers. Anonymous FTP is an option that allows users to transfer files from thousands of host computers on the Internet to their personal computer account. FTP sites contain books, articles, software, games, images, sounds, multimedia, course work, data sets, and more.

If your computer is directly connected to the Internet via an Ethernet cable, you can use one of several PC software programs, such as WS\_FTP for Windows, to conduct a file transfer.

FTP transfers can be performed on the World Wide Web without the need for special software. In this case, the Web browser will suffice. Whenever you download software from a Web site to your local machine, you are using FTP. You can also retrieve FTP files via search engines such as FtpFind, located at <http://WWW.ftpfind.com/THis> option is easiest because you do not need to know FTP program commands.



## **E-MAIL DISCUSSION GROUPS**

One of the benefits of the Internet is the opportunity it offers to people worldwide to communicate via e-mail. The Internet is home to a large community of individuals who carry out active discussion organized around topic-oriented forums distributed by e-mail. These are administered by software programs. Probably the most common program is the listserv.

A great variety of topics are covered by listservs, many of them academic in nature. When you subscribe to a listserv, messages from other subscribers are automatically sent to your electronic mailbox. You subscribe to a listserv by sending an e-mail message to a computer program called a list server. List servers are located on computer networks throughout the world. This program handles subscription information and distributes messages to and from subscribers. You must have a e-mail account to participate in a listserv discussion group. Visit Tile.net at <http://tile.net/> to see an example of a site that offers a searchable collection of e-mail discussion groups.

Majordomo and Listproc are two other programs that administer e-mail discussion groups. The commands for subscribing to and managing your list memberships are similar to those of listserv.

## **USENET NEWS**

Usenet News is a global electronic bulletin board system in which millions of computer users exchange information on a vast range of topics. The major difference between Usenet News and e-mail discussion groups is the fact that Usenet messages are stored on central computers, and users must connect to these computers to read or download the messages posted to these groups. This is distinct from e-mail distribution, in which messages arrive in the electronic mail-boxes of each list member.

Usenet itself is a set of machines that exchanges messages, or articles, from Usenet discussion forums, called newsgroups. Usenet administrators control their own sites, and decide which (if any) newsgroups to sponsor and which remote newsgroups to allow into the system.

There are thousands of Usenet newsgroups in existence. While many are academic in nature, numerous newsgroups are organized around recreational topics. Much serious computer related work takes place in Usenet

discussions. A small number of e-mail discussion groups also exist as Usenet newsgroups.

The Usenet news feed can be read by a variety of newsreader software programs. For example, the Netscape suite comes with a newsreader program called Messenger. Newsreaders are also available as standalone products.

## **FAQ, RFC, FYI**

**FAQ** stands for Frequently Asked Questions. These are periodic postings to Usenet newsgroups that contain a wealth of information related to the topic of the newsgroup. Many FAQs are quite extensive. FAQs are available by subscribing to individual Usenet newsgroups. A Web-based collection of FAQ resources has been collected by The Internet FAQ Consortium and is available at <http://www.faqs.org/>

**RFC** stands for Request for Comments. These are documents created by and distributed to the Internet community to help define the nuts and bolts of the Internet. They contain both technical specifications and general information.

**FYI** stands for For Your Information. These notes are a subset of RFCs and contain information of interest to new Internet users.

Links to indexes of all three of these information resources are available on the University Libraries Web site at <http://library.albany.edu/internet/reference/faqs.html>

## **CHAT & INSTANT MESSAGING**

Chat programs allow users on the Internet to communicate with each other by typing in real time. They are sometimes included as a feature of a Web site, where users can log into the “chat room” to exchange comments and information about the topics addressed on the site. Chat may take other, more wide-ranging forms. For example, America Online is well known for sponsoring a number of topical chat rooms.

Internet Relay Chat (IRC) is a service through which participants can communicate to each other on hundreds of channels. These channels are usually based on specific topics. While many topics are frivolous, substantive

conversations are also taking place. To access IRC, you must use an IRC software program.

A variation of chat is the phenomenon of instant messaging. With instant messaging, a user on the Web can contact another user currently logged in and type a conversation. Most famous is America Online's Instant Messenger. ICQ, MSN and Yahoo also offer chat programs.

Other types of real-time communication are addressed in the tutorial Understanding the World Wide Web.

## COMMON WEB TERMINOLOGY

**bps (bits per second):** A measurement of the speed at which data travels from one place to another. A 57,600 bps modem can theoretically transmit about 57,600 bits of data per second.

**client:** A program that requests services from other programs or computers that are functioning as servers or hosts.

**DNS (Domain Name Service):** DNS servers translate symbolic machine names (such as doeace.org) into numerical addresses (128.223.142.14).

**Email (electronic mail):** Messages sent and received via a computer network.

**FAQ (frequently asked questions):** A document that answers common questions about a particular subject.

**Flame:** A "flame" usually refers to any message or article that contains strong criticism, usually irrational or highly emotional

**ftp (file transfer protocol):** A way to transfer files from one computer to another via the Internet. Many sites on the Internet have repositories of software and files that you can download using an ftp client like Fetch or WS\_FTP.

**home page:** The main or leading web page of an organization's or individual's web site.

**host:** A computer that provides services to other client computers on a network. On the Internet a single computer often provides multiple host functions, such as processing email, serving web pages, and running applications

**HTML (Hyper Text Markup Language) :** The language of the World Wide Web...a set of codes that tells a computer how to display the text, graphics, and other objects that comprise a web page. The central functional element of HTML is the Hyper Text link, which is a word or picture you can click on to retrieve another web page and display it on your computer screen.

**IMAP (Internet Message Access Protocol):** A popular method used by programs like Outlook, Eudora, and Netscape to retrieve email from an email server.

**IP address:** A computer's unique Internet address, which usually looks like this: 128.223.142.14. Most computers also have a domain name assigned to them, which represents cryptic IP addresses with words that are easier to remember (e.g., gladstone.uoregon.edu). mailing list. An email-based forum for discussing a particular topic. Mailing lists are administrated by a central program that distributes messages to all participants.

**MIME (Multipurpose Internet Mail Extensions):** A system for encoding binary data so it can be included with text messages sent across the Internet. Email programs often use MIME to encode attachments.

**network:** Two or more computing devices connected together by wiring, fiber optic cable, wireless circuits, or other means. The Internet is a network that connects thousands of computer networks.

**POP (Post Office Protocol):** An older method used by programs like Eudora or Netscape to retrieve email from a mail server.

**protocol:** A precise definition of how computers interact with one another on a network. In order for the Internet to work reliably, participants agree to set up their systems in accordance with a specific set of protocols, ensuring compatibility between systems.

**server:** A computer, or application that provides files, data, or some other central body of information to multiple client computers by means of a network.

**ssh:** Secure Shell software that encrypts communications over the Internet.

**TCP/IP (Transmission Control Protocol/Internet Protocol):** These are two of the main protocols of the Internet. In order for a computer to connect to the



Internet, it must have some kind of TCP/IP communication software installed on it.

**Telnet:** A way for users to create an unencrypted terminal session with a remote system.

**USENET:** A worldwide collection of discussion groups that use the Internet to transfer tens of thousands of messages among a network of servers set up at sites around the world.

**URL (Uniform Resource Locator):** A fancy term for the address of a World Wide Web page or other resource.

**World Wide Web:** A system of linked servers that distribute text, graphics, and multimedia information to users all over the world.

## **GUIDELINES FOR INTERNET COMMUNICATION**

### **Write concise messages:**

There is a large amount of messages that are transmitted on the internet everyday. To help reduce the amount of traffic on the Internet and ease the load of correspondence on the recipients, you must keep the length of your messages to a minimum.

### **Compose relevant responses:**

When replying to message, only include the sections of the previous message that are relevant to your response. You can use some of the conventions or abbreviations of email communication such as FYI (for your information), BTW (by the way), and :- ) (a smiley face) for conveying tone and feeling in messages.

### **Include Return Address Information:**

Configure your email client to include the return email address. When signing a message, include alternate modes of communication, such as your telephone number or street address. Most email programs include the capability to create a signature file that automatically inserts your name and other pertinent information at the end of a message.

**Make Subject Lines Descriptive:**

A message with a generic subject like Information, or lack of a subject line, will often be overlooked over by a recipient who gets a large number of email messages. Use a short descriptive phrase that summarizes your message

**When Replying, Reference to the Original Message:**

When you are replying to a message, first delete the unnecessary parts of the original mail and retain specific points to which you need to respond. Then insert your response after each related point.

**Acknowledge when you receive an Email:**

Ensure that you notify the sender that you have received their message.

**Check Your Email on a Regular Basis:**

Senders of email expect a prompt response. Check your email account every few days to ensure that all of your mails are attended to.

**Reply in a Timely Manner:**

Process mail and respond to messages immediately. If you fail to check your emails regularly, the large numbers of email will be unmanageable. If you regularly receive a large load of email, you can manage the email by using an add-on utility.

**Don't Send Personal Messages Via Newsgroup or Mailing Lists:**

If a message is meant for one individual only, do not send it to them via a newsgroup or list that goes to many recipients. Always look at the address line on the top of your message to make sure you are responding only to those person(s) you wish to receive the message.

**Learn to Properly Convey Irony, Sarcasm, and Humor:**

Often, a good-natured attempt to be witty can be misunderstood. Use a conversational tone in your messages only when the recipient is familiar with your personal style of communication.

### **Don't Publicly Criticize Other Users:**

Civil discourse is better than emotive or vulgar communication. In case an issue requires a harsh response, avoid using email. Instead communicate directly with the person.

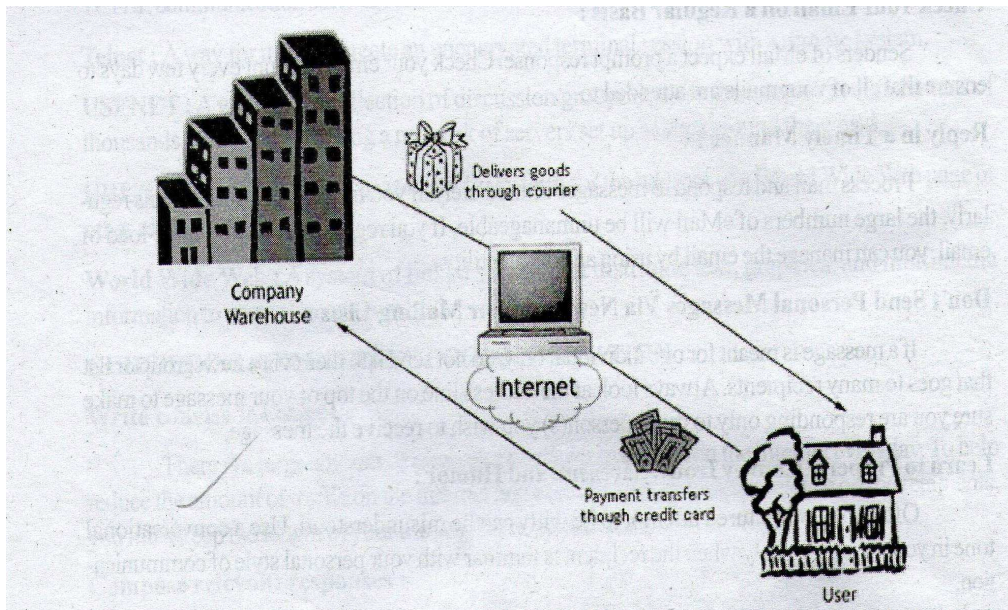
## **WHAT IS ECOMMERCE?**

### **The basic elements of electronic commerce.**

Business includes processes such as recruiting, hiring, and managing, besides buying and selling. The Internet and related technologies provide a medium for businesses to exchange information about processes. For example, the product range and specifications can be disseminated to retailers from a manufacturer.

ECommerce is the abbreviated form of electronic commerce. This term can be defined as business activities that are conducted by using electronic data transmission via the Internet and the World Wide Web.

In B2C transactions, an individual consumer selects and purchases a product or service over the Internet. For example, Amazon.com conducts B2C transactions over the Web. In a business-to-business or B2B transaction, two businesses conduct their transactions via the Internet. B2B transactions account for a much larger proportion of revenue generated directly by than B2C transactions. In addition, business processes that are not directly involved in selling and purchasing account for the majority of business activities on the Internet. For example, a subsidiary company can place purchase orders for its raw materials from a manufacturing company.



B2B transactions over networks pre-date the emergence of the World Wide Web. Since the 1960s, some businesses have electronic data interchange (EDI) to exchange data related to purchasing and billing between corporate information systems. However, traditional EDI was expensive, and the Internet coupled with the World Wide Web offer a cheaper and universal approach to B2B transactions.

## **DIFFERENCES BETWEEN ELECTRONIC COMMERCE AND TRADITIONAL COMMERCE**

Commerce is the exchange of goods and services and involves several interdependent business processes. A concept of a good or service must be designed or invented. The concept must be produced through manufacturing if it is a good, or implemented if it is a service. Buyers need to be informed about the existence and value of a seller's goods and service through marketing and promotions. The good or service must be shipped or otherwise transferred from the seller to the buyer. Accounting systems are needed to track expenses and payments.

Underlying each of these business processes is the creation and transmission of information. In traditional commerce, this information was generally exchanged through paper, verbally, or through first-hand experience. For example, if you were interested in buying a television, you would probably



visit a dealership and talk to a salesperson. In addition, you can test the features to gain first-hand experience or read a review in a magazine.

In electronic commerce, some or all of this information have been moved to the Internet. In the example of purchasing a new car, you could view information online that you would have to visit a dealership before to access. Because you would not have to spend time traveling to each dealership, you could more easily compare prices form several sources. You might also find reviews online from other people about the cars they own. This might not replace the need for a test drive, but it might assist you in narrowing your selection of what cares to test drive.

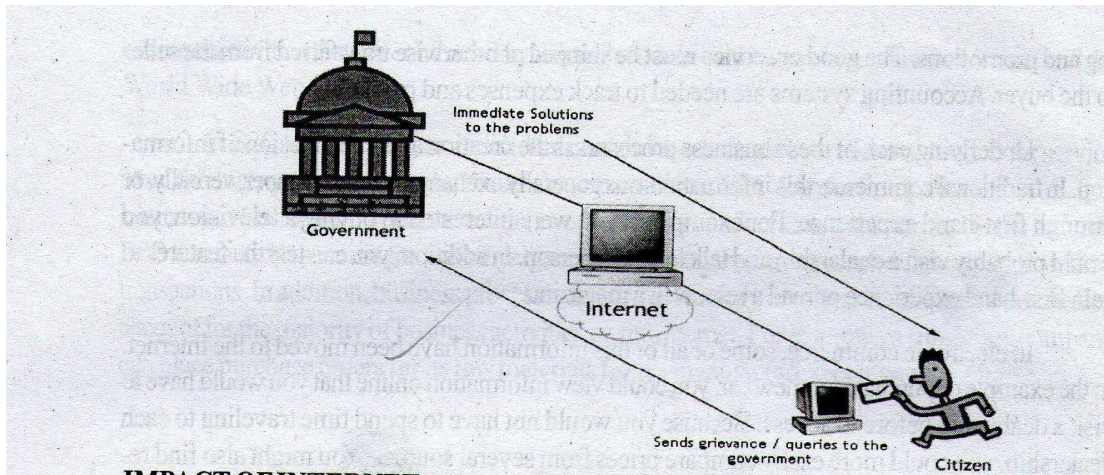
## **WHAT IS EGOVERNANCE**

**eGovernment is he use of Information and Communications Technologies (ICT's) to promote more efficient governance by allowing:**

1. Better delivery of public services
2. Improved access to information
3. Increased accountability of government to its citizens

**The five major goals of eGovernment are:**

1. Efficient citizen grievance redressal
2. Strengthening good governance
3. Broadening public participation
4. Improving productivity and efficiency of the bureaucracy
5. Promoting economic growth



## IMPACT OF INTERNET

The Internet an “enabling technology.” When its introduction is sensitive to local values and committed to local capacity – building, it offers important opportunities to:

Open dialogue. Facilitates knowledge sharing, awareness of alternative perspectives, and open exchange by enabling low cost networking. Improve governance. Raises efficiency, transparency, and participatory systems. Improve social and human rights conditions. Expands access to better quality education, healthcare, and disaster relief capacity.

Reduce poverty. Opens new opportunities for bypassed groups such as women, the poor, rural populations, and children. Introduce economic opportunities. Develops E-commerce and Information and Communications Technologies (ICT) sector. Improve environmental management. Supports GIS and food security early warning systems. Support indigenous knowledge. Documents knowledge within communities.

## GROWTH RATE OF INTERNET IN INDIA.

During the first three years of VSNL monopoly, the Internet subscriber base increased slowly. By the end of March 1998, there were almost 1, 40,000 subscribers. At the end of VSNL’s monopoly things changed dramatically. Among other factors, the entry of private players, unlimited and open competition, and the lowering of tariffs, led to the phenomenal surge in the

subscriber base growth. Between March '99 and March'01, the subscriber base grew by more than 200 percent per year, from 2, 80,000 to 30, 00,000.

However, from April 2001; the growth rate started declining on all over India. The current Internet subscriber base in India is 3.3 million and the user base is 16.5 million. The planned projection is 230 million by the end of the year 2007.

## **WHAT IS INTERNET FRAUD?**

The term "Internet fraud" refers to any type of fraudulent scheme that uses a component of the Internet to conduct fraudulent transactions, or to transmit the proceeds of fraud to financial institutions or to others connected with the scheme. The Internet components include chat rooms, email, message boards, or Web sites.

People can access the Internet at all times. This availability of the Internet increases the time in which people can browse the Internet for business decisions, information-searching, and personal interactions. Unfortunately, people who engage in fraud can also access the Internet 24 hours of the day. They can use the capabilities of the Internet such as sending e-mail messages worldwide in seconds or posting Web site information to carry out fraudulent schemes.

## **WHAT ARE THE MAJOR TYPES OF INTERNET FRAUD?**

The fraud schemes of the non-Internet era have been tuned to suit the Internet era and continue to confound consumers and investors. With the explosive growth of the Internet, and ecommerce in particular, online criminals try to present fraudulent schemes in ways that look, as much as possible, like the goods and services that the vast majority of legitimate e-commerce merchants offer. In the process, they not only cause harm to consumers and investors, but also undermine consumer confidence in legitimate e-commerce and the Internet. Here are some of the major types of Internet fraud that law enforcement and regulatory authorities and consumer organizations are seeing:

**Auction and Retail Schemes Online.** According to the Federal Trade Commission and Internet Fraud Watch, fraudulent schemes appearing on online auction sites are the most frequently reported form of Internet fraud. These schemes, and similar schemes for online retail goods, typically claim to offer high-value items that range from Carter watches to computers to collectibles

such as Beanie Babies®, that are likely to attract many consumers. These schemes induce their victims to send money for the promised items, but then deliver nothing or only an item far less valuable than what was promised.

**Business Opportunity/"Work-at-Home" Schemes Online.** Fraudulent schemes often use the Internet to advertise business opportunities that will allow individuals to earn thousands of dollars a month in "work-at-home" ventures. These schemes typically require the individuals to pay anywhere from \$35 to several hundred dollars or more, but fail to deliver the materials or information that would be needed to make the work-at-home opportunity a potentially viable business.

**Identity Theft and Fraud.** Some Internet fraud schemes also involve identity theft. Identity theft is the wrongful obtaining and using of someone else's personal data in some way that involves fraud or deception. In one federal prosecution, the defendants allegedly obtained the names and Social Security numbers of U.S. military officers from a Web site, and then used more than 100 of those names and numbers to apply via the Internet for credit cards with a Delaware bank. In another federal prosecution, the defendant allegedly obtained personal data from a federal agency's Web site, and then used the personal data to submit 14 car loan applications online to a Florida bank.

## **Internet Technology And Protocols**

# **4**

### **WHAT ARE PROTOCOLS?**

A protocol is a standard format for transmitting data between two devices.

The protocol determines the following:

1. The type of error checking to be used
2. Data compression method, if any



3. The method by which the sending device will indicate that the transmission is complete

A protocol describes the format that a message must take and the way in which computers must exchange a message within the context of a particular activity. The activities include sending messages across networks, exchanging e-mail, establishing remote connections, and transferring files. Two networking models support open systems interconnection. The first model, TCP/IP, is based on a suite of protocols in which each protocol solves a particular network communications problem. The second model, OSI, is based on international standards.

## **WHAT IS TCP/IP?**

The name TCP/IP refers to a suite of data communication protocols. The name is misleading because TCP and IP are only two of the several protocols that compose the suite. The name TCP/IP comes from two of the more important protocols in the suit: the Transmission Control Protocol (TCP) and the Internet Protocol (IP).

TCP/IP originated out of the investigative research into networking protocols that the Department of Defense (DOD) initiated in 1969. In 1968, the DOD Advanced Research Projects Agency (ARPA) began researching the network technology that is now called packet switching. The original focus of this research was to facilitate communication among the DOD community. The network that was initially constructed as a result of this research, and then called ARPANET, gradually became known as the Internet. The TCP/IP protocols played an important role in the development of the Internet. In the early 1980s, the TCP/IP protocols were developed. In 1983, they became standard protocols for the ARPANET. Owing to the history of the TCP/IP protocol suite, it is often referred to as the Internet protocol suite.

## **HOW TCP/IP WORKS?**

The design of TCP/IP hides the function of this layer from users and is concerned with getting data across a specific type of physical network such as Ethernet and Token Ring. The TCP/IP design reduces the need to rewrite higher levels of a TCP/IP stack when new physical network technologies, such as ATM and Frame Relay, are introduced.

The functions performed at the TCP/IP level include encapsulating the IP data grams into frames that are transmitted by the network. TCP/IP also

maps the IP addresses to the physical addresses used by the network. One of the strengths of TCP/IP is its addressing scheme, which uniquely identifies every computer on the network. This IP address must be converted into an address that is appropriate for the physical network over which the data gram is transmitted. Data to be transmitted is received from the inter network layer. The network access layer is responsible for routing and must add its routing information to the data. The network access layer information is added in the form of a header, which is appended to the beginning of the data. In Windows NT, the protocols in this layer appear as NDIS drivers and related programs. The modules that are identified with network device names usually encapsulate and deliver the data to the network, while separate programs perform related functions such as address mapping.

The first model, TCP/IP, is based on a suit of protocols in which each protocol solves a particular network communications problem. This model contains

1. Application Layer
2. Transport Layer
3. Internet Layer
4. Network Interface Layer
5. Physical Layer

## **APPLICATION LAYER**

A user invokes an application program the accesses a service available across a TCP/IP internet. The application passes data to and receives data from the transport layer.

## **TRANSPORT LAYER**

This layer provides services that permit an application program on one host to communicate with an application program on a remote host. The transport layer divides the stream of data into packets, adds a destination address, and passes the packets to the next layer. The transport uses two protocols, TCP and UDP,

## **INTERNET LAYER**

This layer ensures that data is routed to the correct destination. The internet layer encapsulates the packet received form the transport layer into a datagram, adds a header, and determines the routing requirement. For incoming datagram, it determines which transport protocol should handle the packet.

## **NETWORK INTERFACELAYER**

This layer controls access to network transmission mechanisms. The network interface is responsible for accepting IP datagram and transmitting them over a specific network. The interface can be a device driver (connected to a LAN) or a subsystem with its own data link protocol.

## **PHYSICALLAYER**

The hardware connection provides the physical interconnection between the host and the network

## **INTERNET PROTOCOL**

IP is a connectionless protocol, which means that IP does not exchange control information, called a handshake, to establish an end-to-end connection before transmitting data. In contrast, a connection – oriented protocol exchanges control information with the remote computer to verify that it is ready to receive data before sending it. When the handshake is successful, the computers are said to have established a connection. IP relies on protocols in other layers to establish the connection if connection-oriented services are required. IP also relies on protocols in another layer to provide error detection and error recovery. IP is sometimes called an unreliable protocol because it contains no error detection or recovery code.

## **IP ADDRESSING**

As with any other network-layer protocol, the IP addressing scheme is integral to the process of routing IP datagrams through an internetwork. Each IP address has specific components and follows a basic format. These IP addresses can be subdivided and used to create addresses for subnetworks, as discussed in more detail later in this chapter.

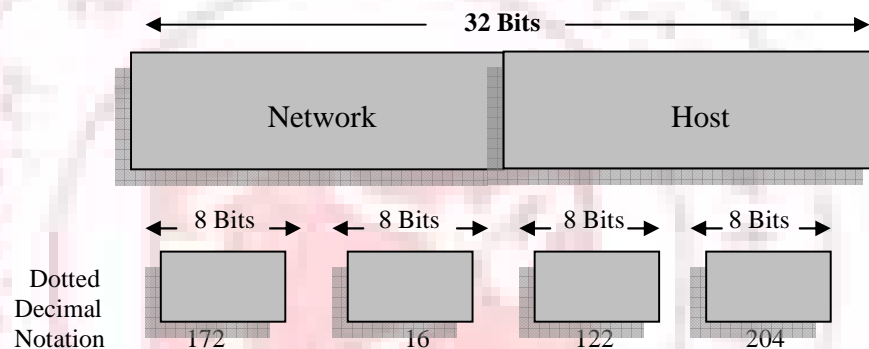
Each host on a TCP/IP network is assigned a unique 32-bit logical address that is divided into two main parts: the network number and the host number. The network number identifies a network and must be assigned by the Internet Network Information Center (InterNIC) if the network is to be part of the Internet. An Internet Service Provider (ISP) can obtain blocks of network addresses from the InterNIC and can itself assign address space as necessary. The

host number identifies a host on a network and is assigned by the local network administrator.

## IP ADDRESS FORMAT

The 32-bit IP address is grouped eight bits at a time, separated by dots, and represented in decimal format (known as dotted decimal notation). Each bit in the octet has a binary weight (128, 64, 32, 16, 8, 4, 2, 1). The minimum value for an octet is 0, and the maximum value for an octet is 255. Figure 30-3 illustrates the basic format of an IP address.

### IP FORMAT



## IP ADDRESS CLASSES

IP addressing supports five different address classes: A, B, C, D, and E. Only classes A, B and C are available for commercial use.

IP Address Class	Purpose	Address Range	Max. Hosts
A	Few large organizations	1.0.0.0 to 126.0.0.0	$16,777,214^2 (2^{24}-2)$
B	Medium-size organizations	128.1.0.0 to 191.254.0.0	$65,543 (2^{16}-2)$
C	Relatively small organizations	192.0.1.0 to 223.255.254.0	$245 (2^8-2)$
D	Multicast groups (RFC 1112)	224.0.0.0 to 239.255.255.255	N/A
E	Experimental	240.0.0.0 to	N/A



		254.255.255.255	
--	--	-----------------	--

## **SERIAL LINE IP (SLIP) AND COMPRESSED SERIAL LINE IP (CSLIP)**

SLIP is a minimal protocol used to send to send datagrams for transmission across a serial line such as a telephone circuit. (SLIP is not an Internet standard.) SLIP is used only when both hosts know each other's address and only when IP datagrams are being transmitted. When a host makes a connection, the SLIP server behaves like a router for TCP/IP traffic. Once connected, the SLIP host sends all network traffic over the serial interface.

Because network traffic is exchanged over the telephone link, performance is an issue for applications that handle numerous graphics, file sharing, or hypermedia. Compressed SLIP (CSLIP) improves SLIP performance by compressing the TCP/IP headers.

## **POINT-TO-POINT PROTOCOL (PPP)**

PPP was developed as an Internet standard to address the weaknesses of SLIP. Often used for dialup remote LAN access, PPP allows the remote host to connect to the network and use IP network protocols. PPP is defined as a three-layered protocol as follows:

1. Data Link Layer, a modified version of the High-Level Data Link Control (HDLC) that guarantees reliable delivery over any type of serial line.
2. Link Control, used to establish the connection, negotiate configuration parameters (including compression), check link quality, and close the connection.
3. Network Control Protocols, individual protocols that provide configuration and control information for the Network Layer protocols.

## **THE PORTS**

Many TCP/IP programs can be initiated over the Internet. Most of these are client/server oriented. As each connection request is received, inetd starts a server program, which then communicates with the requesting client machine.

To facilitate this process, each application (FTP or Telnet, for example) is assigned a unique address. This address is called a port. The application in question is bound to that particular port and, when any connection request is made to that port, the corresponding application is launched (inetd is the program that launches it).

There are thousands of ports on the average Internet server. For purposes of convenience and efficiency, a standard framework has been developed for port assignment. (In other words, although a system administrator can bind services to the port of his or her choice, services are generally bound to recognized ports. These are commonly referred to as well-known ports.)

## **COMMON PORTS AND THEIR CORRESPONDING SERVICES OR APPLICATIONS.**

### **Service or Application Port**

File Transfer Protocol (FTP): 21  
Telnet: 23  
Simple Mail Transfer Protocol (SMTP): 25  
Gopher: 70  
Finger: 79  
Hypertext Transfer Protocol (HTTP): 80  
Network News Transfer Protocol (NNTP): 119

## **OPEN SYSTEMS INTERCONNECTION (OSI)**

### **Introduction to the ISO – OSI Model**

The ISO (International Standards Organization) has created a layered model, called the OSI (Open Systems Interconnect) mode, to describe defined layers in a network operating system. The purpose of the layers is to provide clearly defined functions that can improve Internetwork connectivity between “computer” manufacturing companies. Each layer has a standard defined input and a standard defined output.

### **OSI Model Explained**

This is a top-down explanation of the OSI Model. It starts with the user's PC and it follows what happens to the user's file as it passes through the different OSI Model layers. The top-down approach was selected specifically (vs. starting at the Physical Layer and working up to the Application Layer) for ease of understanding. It is used here to show how the user's files are transformed (through the layers) into a bit stream for transmission on the network.

**These are the 7 Layers of the OSI model:**

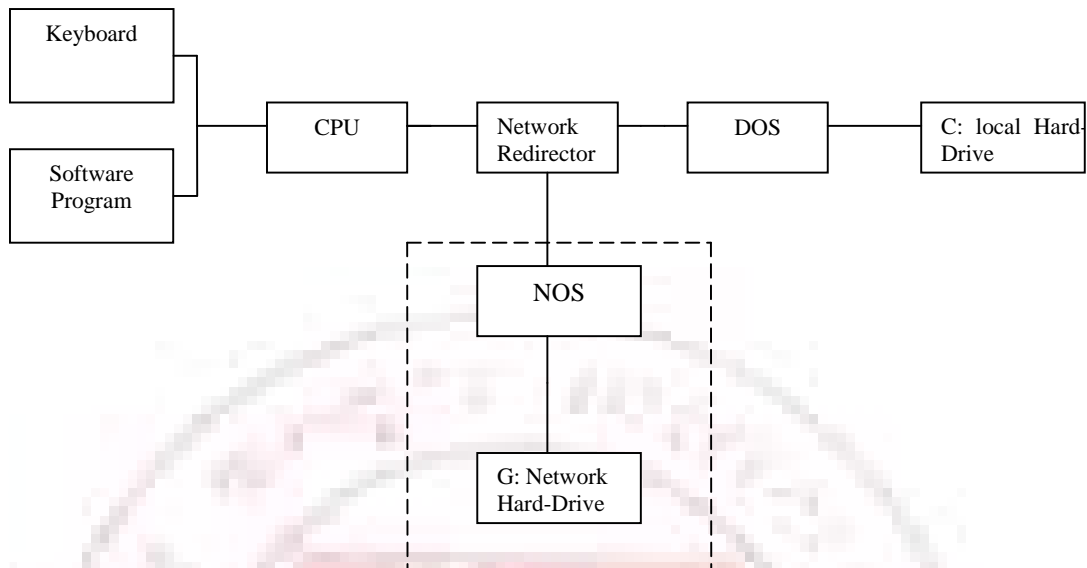
- 7. Application Layer (Top Layer)
- 6. Presentation Layer
- 5. Session Layer
- 4. Transport Layer
- 3. Network Layer
- 2. Data Link Layer
- 1. Physical Layer (Bottom Layer)

**Layer 7 – Application Layer**



*Basic PC Logical Flowchart*

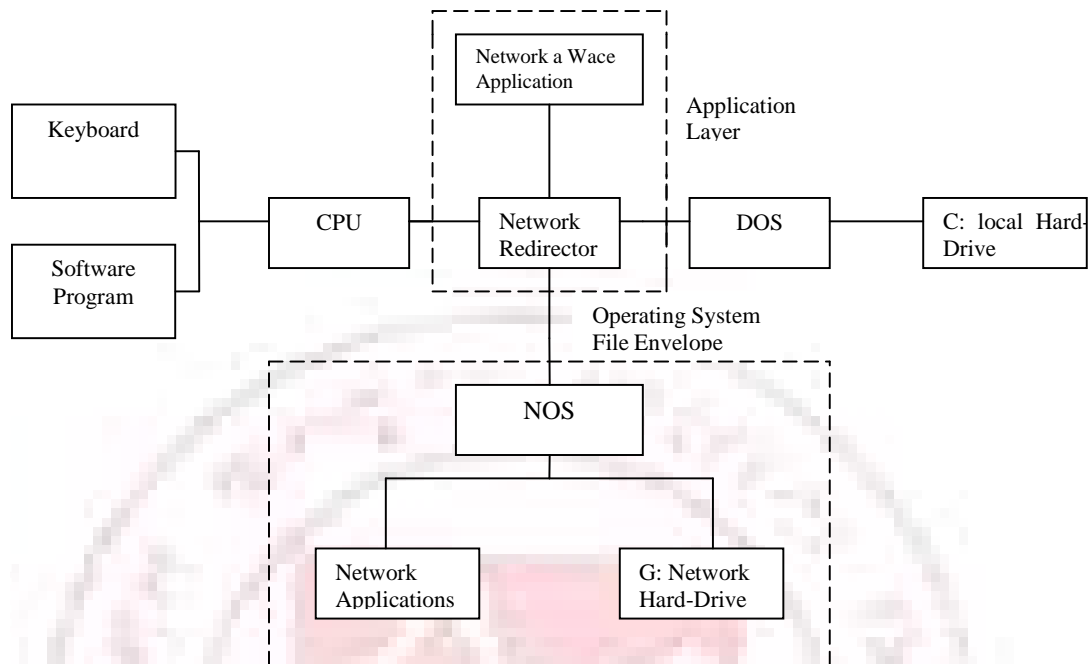
A basic PC logic flowchart is shown in Fig. The Keyboard & Application are shown as inputs to the CPU (requesting access to the hard disk). The Keyboard requests accesses through user inquiries (such as “DIR” commands) and the Application seeks access through “File Openings” and “Saves”. The CPU, through the Disk Operating System, sends and receives data from the local hard disk (“C:” in this example).



### *Simple Network Redirection*

A PC setup as a network workstation has a software “Network Redirector” (the actual name depends on the network – we will use a generic term here) placed between the CPU and DOS (as shown in Fig 2.). The Network Redirector is a TSR (Terminate and Stay Resident) program: it presents the network hard disk as another local hard disk (“G:” in this example) to the CPU. All CPU requests are intercepted by the “Network Redirector”. The Network Redirector checks to see if either a local or a network drive is requested; the request is passed on to DOS. However, if a network drive is requested, the request is then passed on to the network operating system (NOS).

Electronic mail (E-Mail), client-server databases, games played over the network, print and file servers, remote logons, and network management programs (or any “network aware” applications) are all aware of the network redirector. They have the ability to communicate directly with other “network applications” on the network. The “Network Aware Applications” and the “Network Redirector” make up Layer 7 (the Application layer of the OSI Model, as shown in Fig).



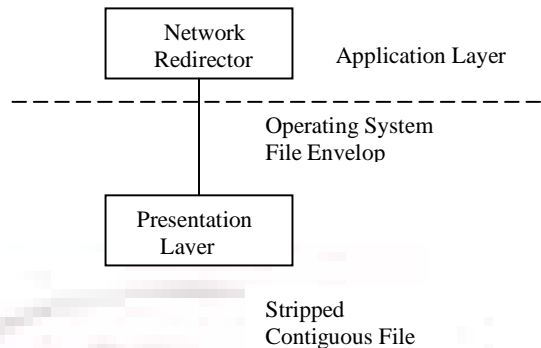
*PC Workstation with Network Aware Software*

## Layer 6 – Presentation Layer

The Network Redirector sends CPU operating system native code to the network operating system: the coding and format of the data is not recognizable by the network operating system. The data consists of file transfers and network calls by network aware programs.

For example, when a dumb terminal is used as a workstation (in a mainframe or minicomputer network), the network data is translated into (and from) the format that the terminal can use. The Presentation layer presents data to and from the terminal using special control characters to control the screen display (LF-line feed, CR-carriage return, cursor movement, etc...). The presentation of data on the screen would depend on the type of terminal that's used: VT100, VT52, VT420, etc.



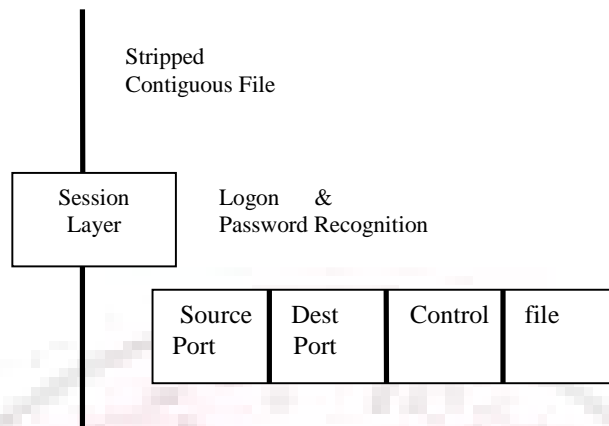


Similarly, The Presentation layer strips the pertinent file from the workstation operating system's file envelope. The control characters, screen formatting, and workstation operating system envelope are all stripped or added to the file (if the workstation is receiving or transmitting data to the network). This could also include translating ASCII file characters from a PC world to EBCDIC in an IBM Mainframe world.

The Presentation Layer also controls security at the file level: this provides both file locking and user security. The DOS Share program is often used for file locking. When a file is in use, it is locked from other users to prevent 2 copies of the same file from being generated. If 2 users both modified the same file, and User A saved it, then User B saved it, then User A's changes would be erased! At this point, the data is contiguous and complete (i.e. one large data file). See Fig.

### **Layer 5 – Session Layer**

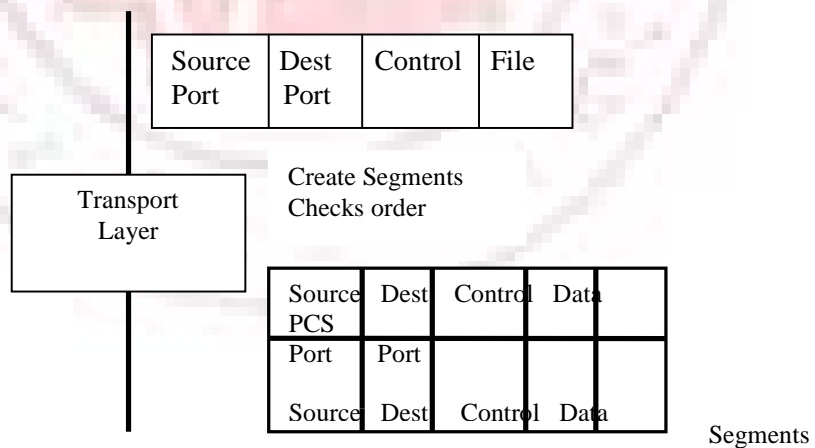
The Session layer manages the communications between the workstation and the network. The Session layer directs the information to the correct destination, and identifies the source to the destination. The Session layer identifies the type of information as data or control. The Session layer manages the initial start-up of a session, and the orderly closing of a session. The Session layer also manages Log on procedures and Password recognition



*Session Layer*

#### Layer 4 – Transport Layer

In order for the data to be sent across the network, the file must be broken up into usable small data segments (typically 512 – 18k bytes). The Transport layer breaks up the file into segments for transport to the network, and combines incoming segments into a contiguous file. The Transport layer does this logically, not physically, and it is done in software as opposed to hardware.

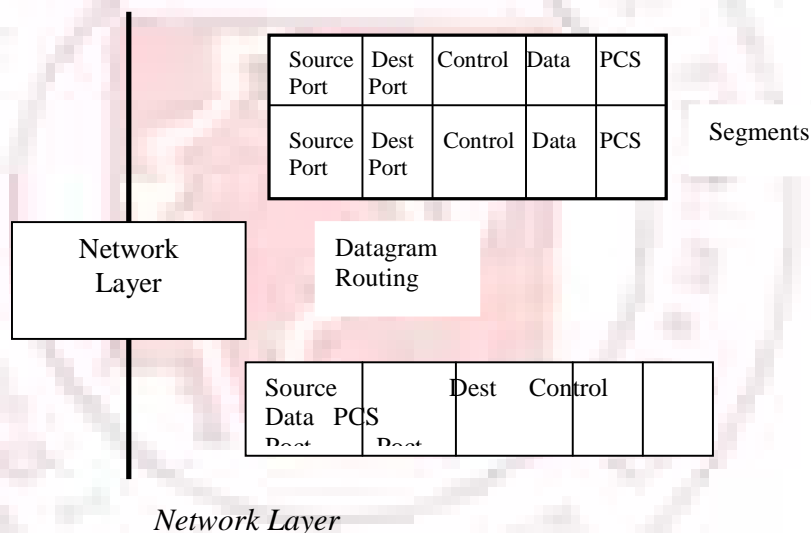


The Transport layer provides error checking at the segment level (frame control sequence). This makes sure that the data grams are in the correct

order: the Transport layer will correct out of order datagrams. The Transport layer guarantees an error-free host to host connection. It is not concerned with the path between machines.

### Layer 3 – Network Layer

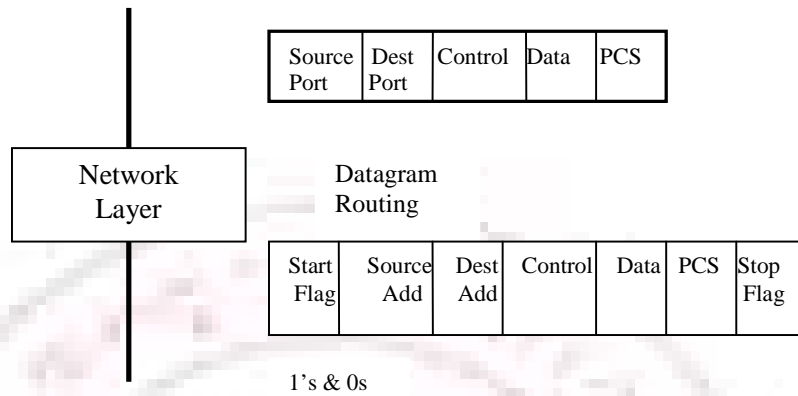
The Network layer is concerned with the path through the network. It is responsible for routing, switching, and controlling the flow of information between hosts. The Network layer converts the segments into smaller datagrams than the network can handle: network hardware source and destination addresses are also added. The Network layer does not guarantee that the datagram will reach its destination.



### Layer 2 – Data Link Layer

The Data Link layer is a firmware layer of the network interface card. The Data Link layer puts the datagrams into packets (frames of bits: 1s & 0s) for transmission, and assembles received packets into datagrams. The Data Link layer works at the bit level, and adds start / stop flags and bit error checking (CRC or parity) to the packet frame. Error checking is at the bit level only:

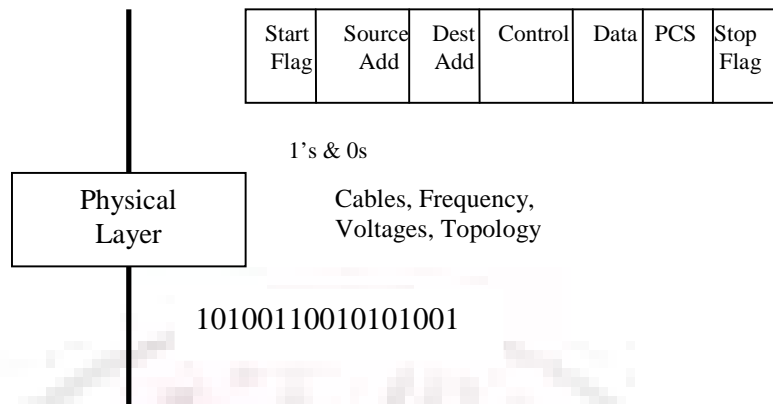
packets with errors are discarded and a request for re-transmission is sent out. The Data Link layer is primarily concerned with bit sequence.



*Data Link Layer*

### Layer 1 – Physical Layer

The Physical layer concerns itself with the transmission of bits. It also manages the network card's hardware interface to the network. The hardware interface involves the type of cabling (coax, twisted pair, etc.), frequency of operation (1 Mbps, 10Mbps, etc.), voltage levels, cable terminations, topography (star, bus, ring, etc.), etc. Examples of Physical layer protocols are as follows: 10Base5 – Thicknet, 10Base2 – Thinnet, 10BaseT – twisted pair, ArcNet, FDDI, etc. (see Fig. 9).

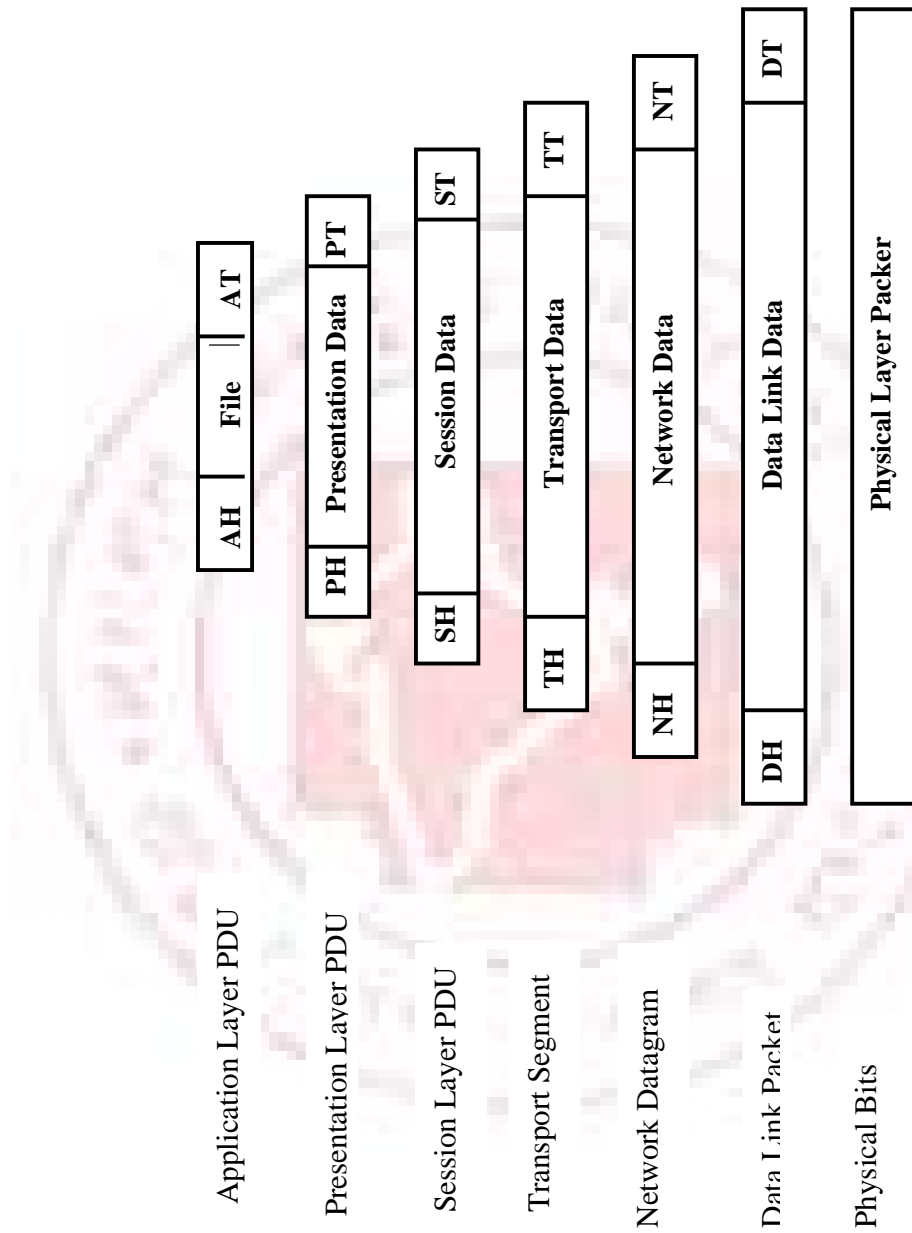


*Physical Layer*

## LAYER-SPECIFIC COMMUNICATION

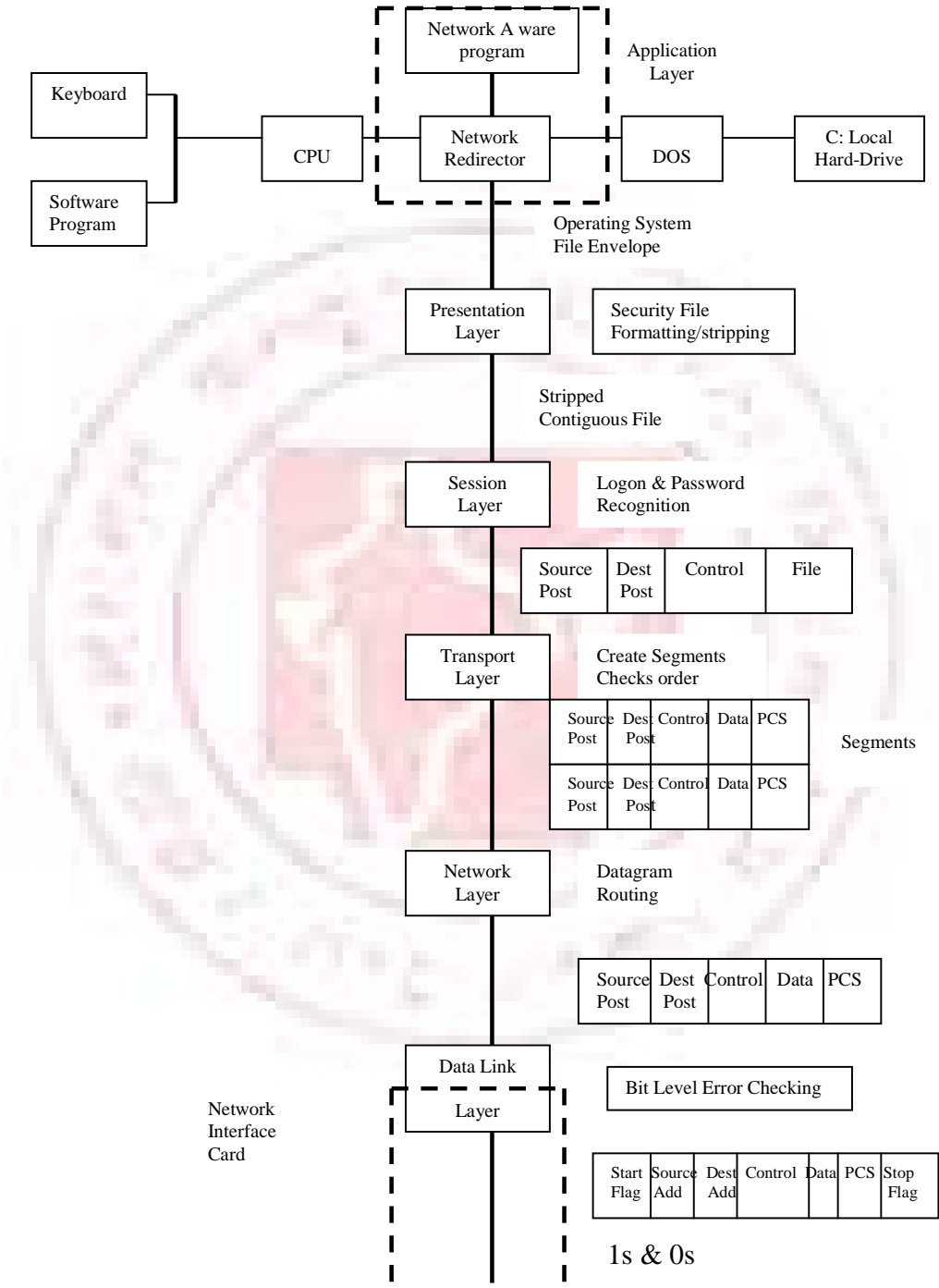
Each layer may add a Header and a Trailer to its Data (which consists of the next higher layer's Header, Trailer and Data as it moves through the layers). The Headers contain information that specifically addresses layer-to-layer communication. For example, the Transport Header (TH) contains information that only the Transport layer sees. All other layers below the Transport layer pass the Transport Header as part of their Data.

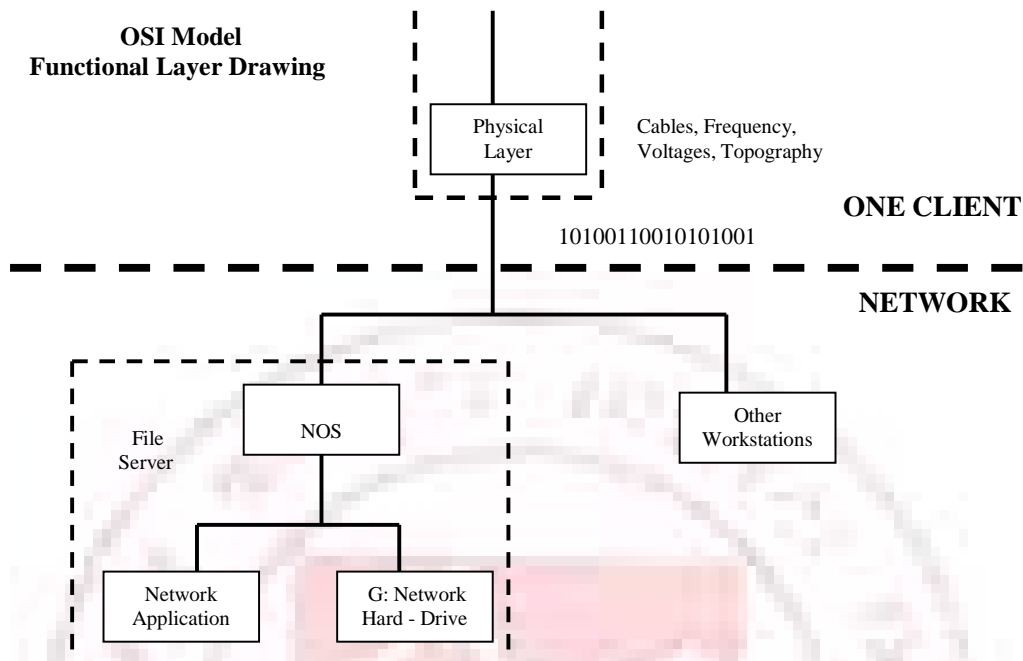




PDU – Protocol Data Unit (a fancy name for Layer Frame)

OSI Model Function Drawing





## WHAT IS FDDI?

Fiber Distributed Data Interface (FDDI) is a multi-vendor local area network standard developed by the American National Standards Institute (ANSI). It offers an industry-standard solution for organizations that need a high-speed LAN with high capacity and performance.

FDDI is based on dual counter-rotating token passing rings that are connected by optical fibers that transmit data at the rate of 100 Mbps. At this speed, the ring can support up to 500 nodes with a spacing of 2km between adjacent nodes. The basic operation of FDDI is similar to that of token ring. Since it is very difficult to tap into a fiber, a ring was the logical solution. FDDI groups stations, including workstations, bridges, and routers, into a ring. Each station has an input fiber from the previous station and an output to the

Due to the historical higher costs of its adapters and fiber optics, FDDI has been used primarily in backbone networks and for high-speed

communications between host processors. The higher bandwidths offered by ATM, Fast Ethernet, and FDDI technologies complement each other, and are expected to coexist in virtually all organizations for many years to come.

FDDI was primarily designed to carry computer data. Beyond FDDI, FDDI-II is being developed to cater for a mix of voice, data and video traffic.

## **TECHNOLOGY OVERVIEW**

Token Ring and Ethernet are the two dominant LAN standards that are being widely utilized to connect users in a workgroup to each other and to common resources. The rapid increase in the speed and performance of personal computers and workstations has initiated a demand for a corresponding increase in LAN bandwidth. To meet this demand the ANSI (American National Standards Institute) committee had developed the FDDI standard that is being widely used.

### **Why use FDDI?**

With growing demands on network systems, the search for a “high – bandwidth LAN” has gained importance in many organizations. The increased demands are coming from two areas: First, the number of network users has increased in recent years, creating congestion in system traffic. Second, the increasing use of peer-to-peer network architecture means that more information gets passed between users, instead of passing through a central server.

The need for networks to handle more data, more quickly than ever, is becoming urgent. As a result, several contenders are vying for throne of high-speed networking. While ATM and Fast Ethernet have gained the most attention, FDDI is the popular choice. FDDI is a full-fledged technology compared to the emerging high-speed networking technologies, such as ATM and Fast Ethernet. In addition, FDDI has established standard interoperability, and product availability.

## **WHAT IS ASYNCHRONOUS TRANSFER MODE (ATM)?**

Asynchronous Transfer Mode (ATM) is a technology that arises from international standards. The standards relate to the transmission of data, voice, and video simultaneously over a network at speeds that are greater than the transmission rate without the standards. ATM can transport electronic

communications from sources that range from phone calls through movies to targets such as email and files. The targets are contained on a gopher or a World Wide Web server.

ATM can transport electronic communication at a rate of hundreds of megabits per second. This transfer rate is faster than the ethernet technology that is available on local area networks. The rate of transfer by using the ATM technology allows the integration of speech, motion, and data into multimedia presentations in offices and schools. Although, ATM is still in its infancy, the technology is being deployed across the country. ATM and future enhancements will lead to a global information system over the next decade and will become a central feature of the Information Superhighway that is being developed across the world. The use of the ATM technology in public schools is being investigated. OWL ink will be among the first projects that implements the capabilities of the ATM.

## **ETHERNET**

Ethernet is one of the standard's of local area network (LAN) technology that transmits information between computers at speed of 10 & 100 million bits per second (mbps). Currently the most widely used version of ethernet technology is the 10 Mbps twisted pair variety. It includes the original thick coaxial system, as well as thin coaxial, twisted pair, and fiber optic systems. The most recent ethernet standard defines the new 100 mbps as the fast ethernet system which operates over twisted pair and fiber optic media.

## **HISTORY**

Ethernet was invented at the Xerox Palo alto research centre in the 1970s by Dr. Robert M Metcalfe. It was designed to support research on the office of the future, which included one of the world first personal workstations, the Xerox alto. The first ethernet system ran at approximately 3Mbps and was known as "experimental ethernet." There are several Lan technologies in use today, but ethernet is by far the most popular. Industry estimates indicates that as of 1994, over 40 million ethernet nodes had been installed worldwide. The widespread popularity of the ethernet ensures that there is a large market for ethernet equipment, which also helps to keep the technology competitively priced.

## **Elements of the ethernet system**



The ethernet system consists of there basic elements

1. The physical medium used to carry ethernet signals between computers
2. A set of medium access control rules embedded in each ethernet interface that allows multiple computers to fairly arbitrate access to the shared ethernet channel
3. An ethernet frame that consists of a standardized set of bits used to carry data over the system

## **OPERATION OF ETHERNET**

Each ethernet equipped computer, also known as a station operates independently of all stations on the network: there is no central controller. All stations attached to an ethernet are connected to a shared signaling system, also called the medium. Ethernet signals are transmitted serially, one bit at a time, over the shared signal channel is idle, the station transmits its data in the form of an ethernet frame or packet.

## **NETWORKS**

It makes sense, most often for financial reasons but also for others, to network groups of computers where they share a common workload. All the computers in an administrative office, all the computers to do with a certain ward or discipline. Networking computers means that the people using them can share files easily, send each other messages and share each other's printers. This idea has developed into Local Area Networks (LANs.) Nowadays most organizations have a local area network. LAN's can be as small as just one shared office or as large as a whole city.

### **Wide Area Networks**

In some cases an organization is spread over a large area, and you do not have the easy concentration of computing to provide a LAN for. In this instance computers may be connected by a Wide Area Network (WAN). The difference between a WAN and a LAN is partly one of scale (although this is relative) but also relates to the technology. With a LAN you will typically get a

fast network that can network PC file servers. With a WAN the network will often be much slower and will usually involve some mainframe computer as the server rather than a PC.

### **Combined Networks**

LAN's and WAN's are not mutually exclusive. In fact they combine very well together. Many organizations now have both, where a WAN has been created by connecting up a series of LAN's. A good example of this is the Academic Community. Every University has it's own LAN providing email, printing, file sharing and other facilities. Then every University is connected to the joint Academic Network (JANET) which is a WAN running the length of the country.

### **LAN TOPOLOGIES**

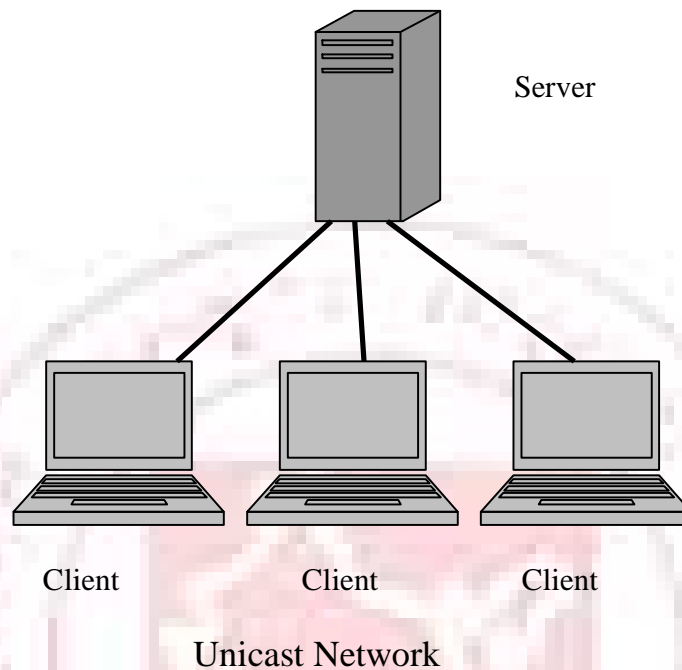
The application in use, such as multimedia, database updates, e-mail, or file and print sharing, generally determines the type of data transmission.

LAN transmissions fit into one of three categories:

- Unicast
- Multicast
- Broadcast

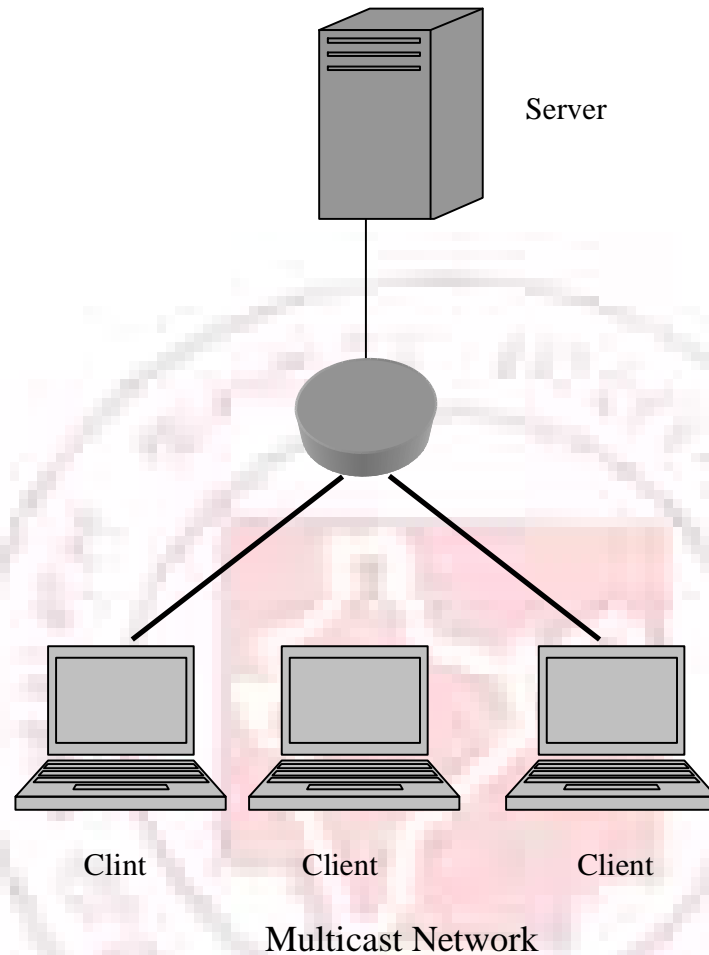
### **UNICAST**

With unicast transmissions, a single packet is sent from the source to a destination on a network. The source-node addresses the packet by using the network address of the destination node. The packet is then forwarded to the destination network and the network passes the packet to its final destination. Figure 2-1 is an example of a unicast network.



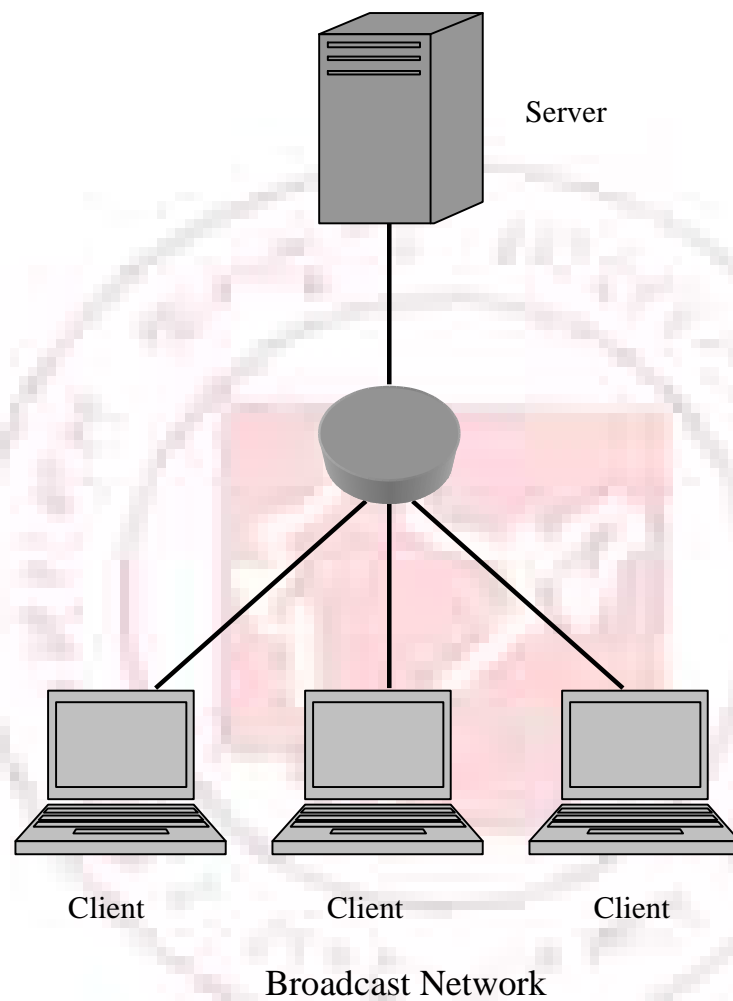
## MULTICAST

With a multicast transmission, a single data packet is copied and forwarded to a specific subset of nodes on the network. The source node addresses the packet by using a multicast address. For example, the TCP/IP suite uses 224.0.0.0 to 239.255.255.255. The packet is then sent to the network, which makes copies of the packet and sends a copy to each segment with a node that is part of the multicast address. Figure 2-2 is an example of a multicast network.



## **BROADCAST**

Broadcasts are found in LAN environments. Broadcasts do not traverse a WAN unless the Layer 3 edge-routing device is configured with a helper address (or the like) to direct these broadcasts to a specified network address. This Layer 3 routing device acts as an interface between the local-area network (LAN) and the wide-area network (WAN).



Multimedia broadcast traffic is a much more bandwidth-intensive broadcast traffic type. Multimedia broadcasts, unlike data broadcasts, typically are several megabits in size; therefore, they can quickly consume network and bandwidth resources. Broadcast-based protocols are not preferred because every network device on the network must expend CPU cycles to process each data



frame and packet to determine if that device is the intended recipient. Data broadcasts are necessary in a LAN environment, but they have minimal impact because the data broadcast frames that are traversing the network are typically small. Broadcast storms can cripple a network in no time because the broadcasting device uses whatever available bandwidth is on the network.

An example of a data broadcast on a LAN could be a host searching for server resources, such as Novell's IPX GNS (Get Nearest Server) or Apple Talk's Chooser application. Unlike data broadcasts, which are usually made up of small frames, multimedia broadcasts are typically several megabits in size. As a result, multimedia broadcasts can quickly consume all available bandwidth on a network, bringing a network and its attached devices to a crawl, if not render them inoperable.

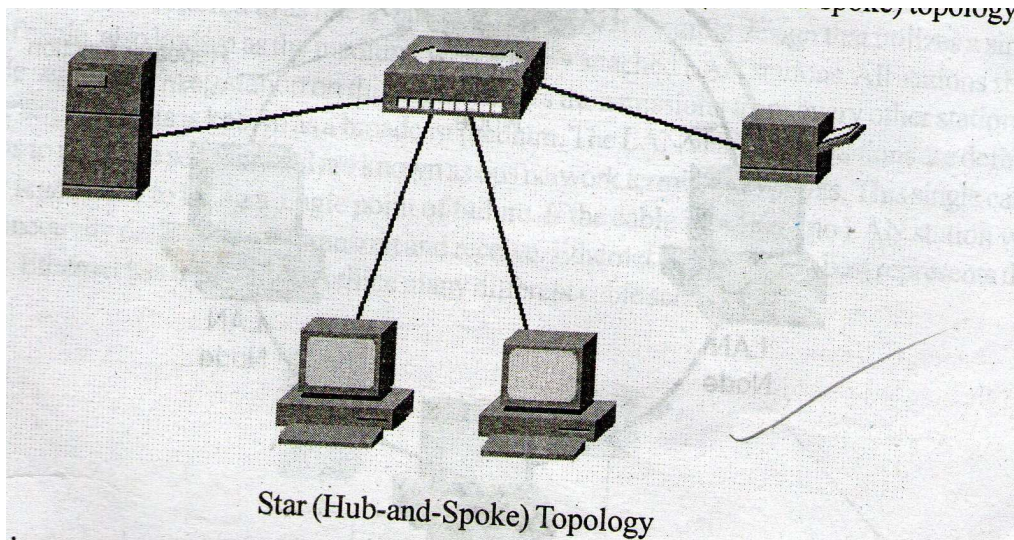
#### **Four LAN topologies exist:**

- Star (Hub-and-Spoke)
- Ring
- Bus
- Tree

#### **STAR (HUB-AND-SPOKE) TOPOLOGY**

All stations are attached by cable to a central point, usually a wiring hub or other device operating in a similar function. Several different cable types can be used for this point-to-point link, such as shielded twisted-pair (STP), unshielded twisted-pair (UTP), and fiber-optic cabling. Wireless media can also be used for communications links.

The advantage of the star topology is that no cable segment is a single point of failure impacting the entire network. This allows for better management of the LAN. If one of the cables develops a problem, only that LAN-attached station is affected; all other stations remain operational. The disadvantage of a star (hub-and-spoke) topology is the central hub device. This central hub is a single point-of-failure in that if it fails, every attached station is out of service. These central hubs, or concentrators, have changed over the years. Today, it is common to deploy hubs with built-in redundancy. Such redundancy is designed to isolate a faulty or failed component, such as the backplane or power supply. Figure 2-4 is an example of a star (hub-and-spoke) topology.

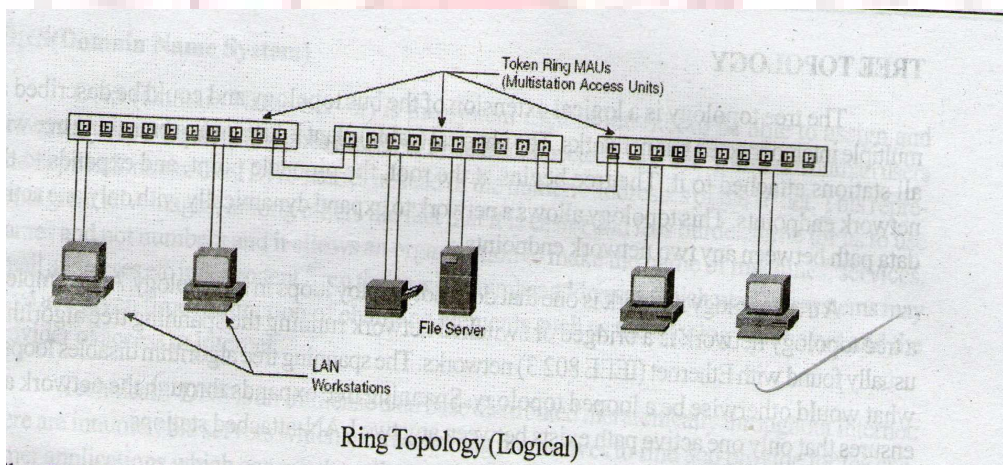
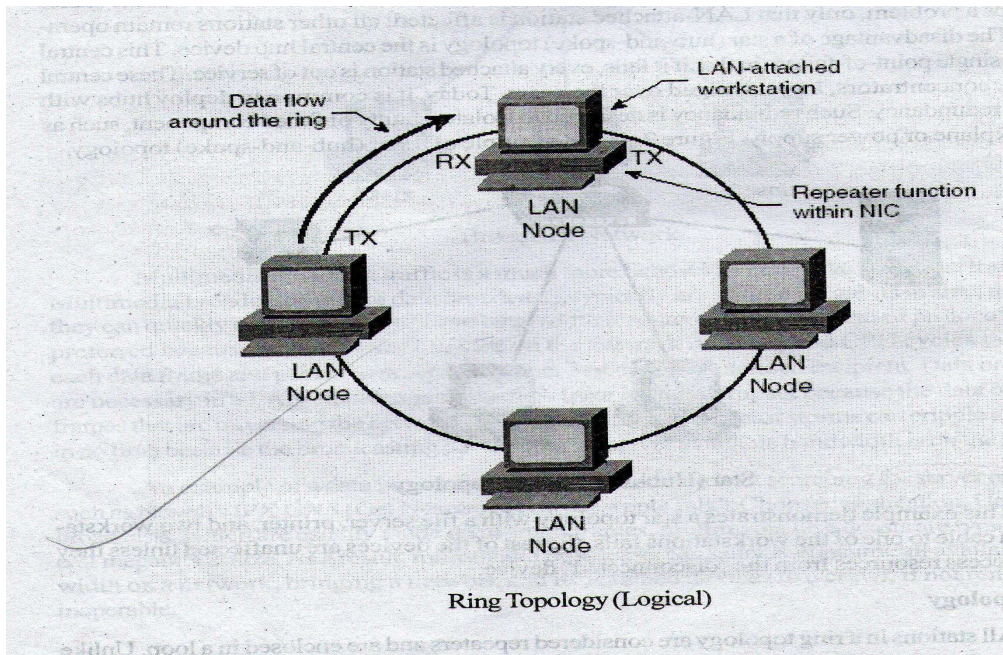


This example demonstrates a star topology with a file server, printer, and two workstations. If a cable to one of the workstation fails, the rest of the devices are unaffected unless they need to access resources from the “disconnected” device.

### Ring Topology

All stations in a ring topology are considered repeaters and are enclosed in a loop. Unlike the star (hub-and-spoke) topology has no end points. The repeater in this case is a function of the LAN-attached station’s network interface card (NIC). Because each NIC in a LAN-attached station is a repeater, each LAN station will repeat any signal that is on the network, regardless of whether it is destined for that particular station. If a LAN-attached station’s NIC fails to perform this repeater function, the entire network could come down. The NIC controller is capable of recognizing and handling the defective repeater and can pull itself off the ring, allowing the ring to stabilize and continue operating. Token Ring (IEEE 802.5) best represents a ring topology. Although the physical cabling is considered to be a star topology, Token Ring is a ring in logical topology, as demonstrated by the following figures. Although physical topology is a physical layer attribute, the media access method used at the data link layer determines the logical topology. Token Ring defines a logical ring and contention, as Ethernet defines a logical bus. Even when attached to a hub, when one Ethernet device transmits, everyone hears the transmission, just as though on a bus.



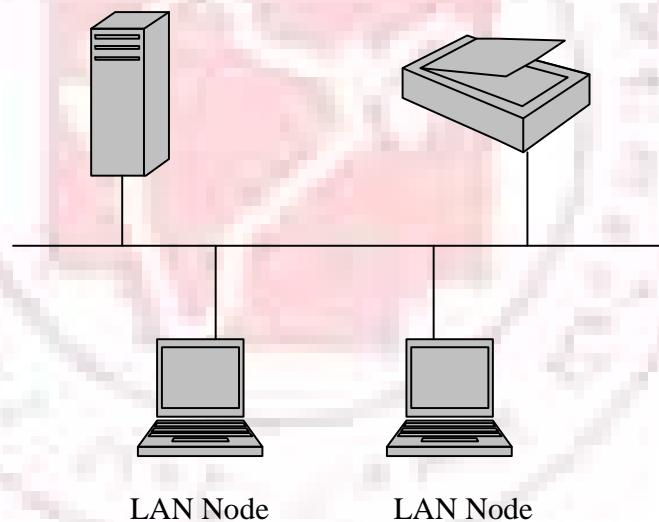


Fiber Data Distributed Interface (FDDI) is another example of a ring topology implementation. Like Token Ring, FDDI rings are physically cabled in a star topology. FDDI stations can be configured either as a single attachment station (SAS) or as a dual attachment station (DAS). SASs are connected to one of the two FDDI rings, whereas DASs are connected to both rings via an A and B port on the FDDI stations and concentrator. Token Ring and FDDI LANs will be

discussed in greater detail in Chapters 6, “Token Ring/IEEE 802.5,” and 7, “FDDI.”

## **Bus Topology**

Sometimes referred to as linear-bus topology, Bus is a simple design that utilizes a single length of cable, also known as the medium, with directly attached LAN stations. All stations share this cable segment. Every station on this segment sees transmissions from every other station on the cable segment; this is known as a broadcast medium. The LAN attachment stations are definite endpoints to the cable segment and are known as bus network termination points. This single cable segment lends itself to being a single point of failure. If the cable is broken, no LAN station will have connectivity or the ability to transmit and receive. Ethernet (IEEE 802.3) best represents this topology. Ethernet has the ability to utilize many different cable schemes.



Bus Topology

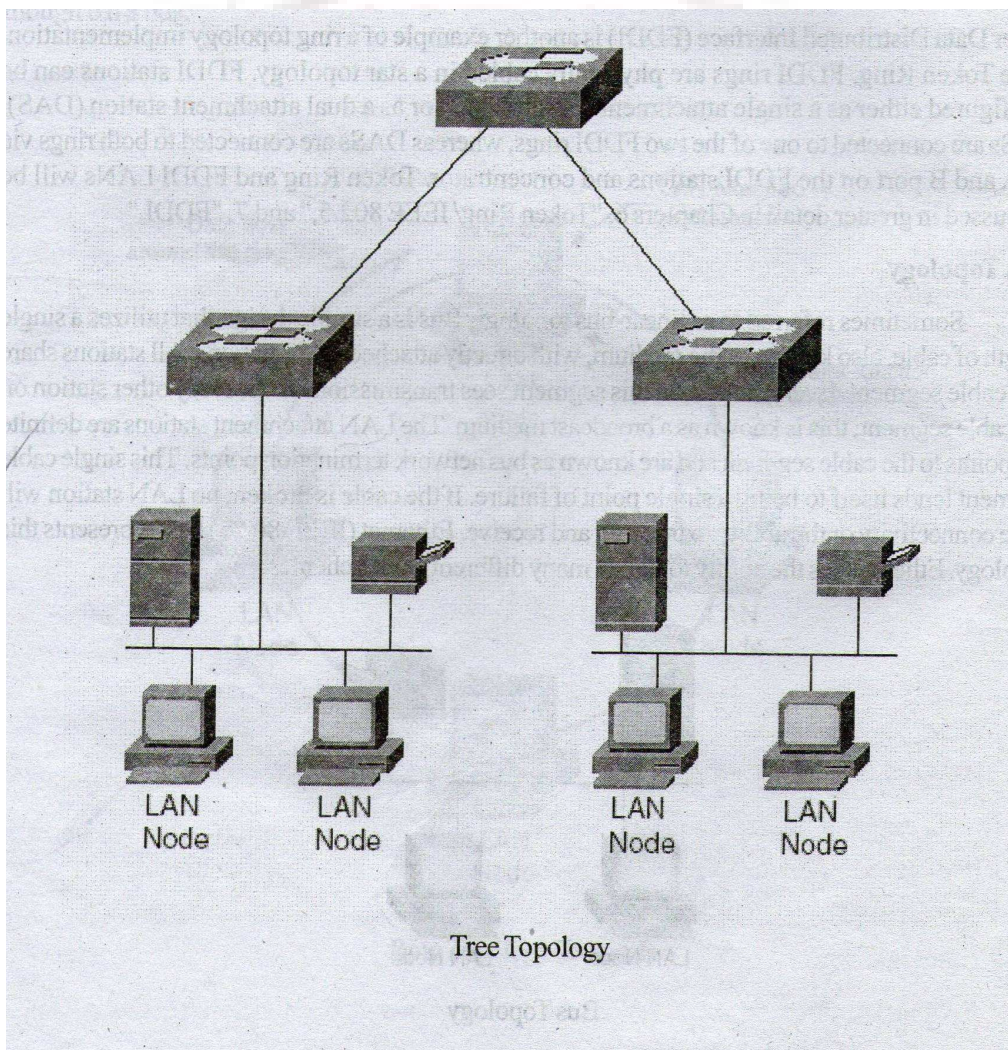
## **TREE TOPOLOGY**

The tree topology is a logical extension of the bus topology and could be described as multiple interconnected bus networks. The physical (cable) plant is known as a branching tree with all stations attached to it. The tree begins at the root, the pinnacle point, and expands to the network endpoints. This



topology allows a network to expand dynamically with only one active data path between any two network endpoints.

A tree topology network is one that does not employ loops in its topology. An example of a tree topology network is a bridged or switched network running the spanning tree algorithm, usually found with Ethernet (IEEE 802.3) networks. The spanning tree algorithm disables loops in what would otherwise be a looped topology. Spanning tree expands though the network and ensures that only one active path exists between any two LAN-attached stations.





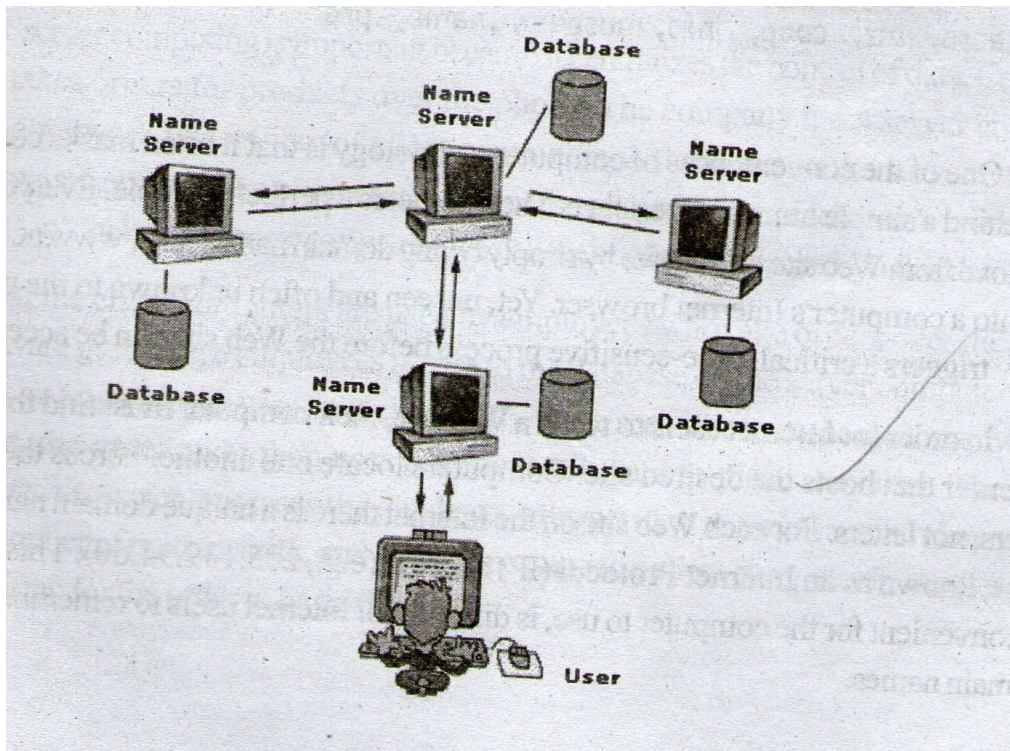
## **DNS (Domain Name System)**

DNS (Domain Name Server) is the system used in Internet to be able to assign and universally use unequivocal names to refer to systems connected to the net. Thus both human users and applications can use DNS names instead of the numeric addresses of the IP net. This represents great advantages, among others the fact that it is easier and less burdensome for us to use names and not numbers and it allows an organization to make the name of machines, services, email addresses etc independent from the specific number addresses which working systems may have at a given time in function of changing elements such as the topology of the net and the provider of access to Internet.

Technically DNS is an immense data base distributed hierarchically throughout Internet: there are innumerable servers which interact among themselves to find and provide for the customer applications which consult them the translation of a name to its associated IP address, to which the desired connection may be made. Each part of the data base has a replica in at least two servers and this ensures the proper redundancy factor. The reason which motivated the development and implementation of DNS in Internet was the great growth in the number of machines connected. Previously, the link between numbers and IP addresses was made via lists kept centrally in a single file (Host.txt) which had to be constantly updated with each new system connected and to be present in all the computers connected to Internet.

### **Name Servers:**

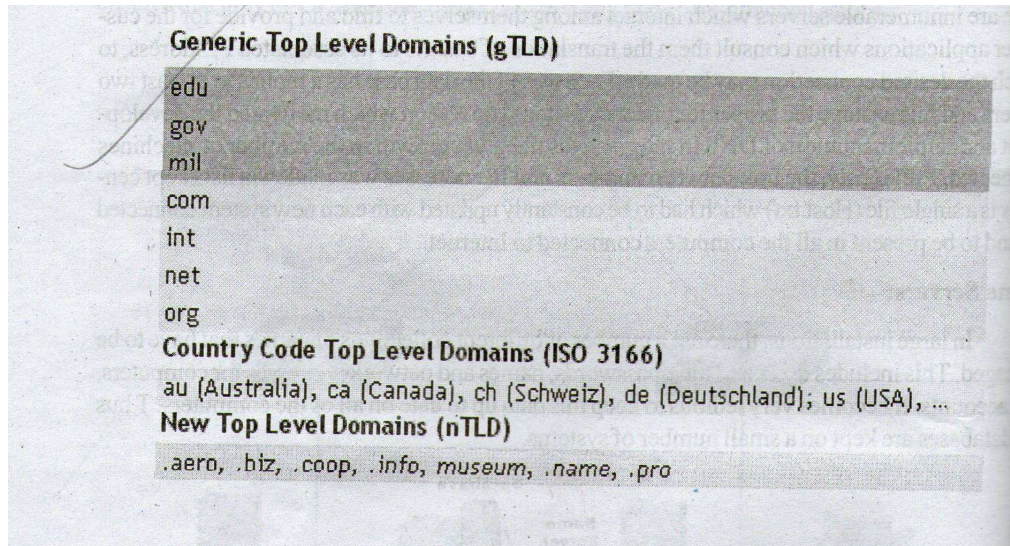
In large installations, there are a number of different collections of names that have to be managed. This includes users and their passwords, names and network addresses for computers, and accounts. It becomes very tedious to keep this data up to date on all of the computers. Thus the databases are kept on a small number of systems.



The objective of DNS is to allow the scaling down, from both the administrative and technical points of view, of the system of Internet names by means of a hierarchical distribution of delegated domains. The domains are administrative entities the object of which is to divide up the management load of central administrative entities the object of which is to divide up the management load of a central administrator and share it out among the sub administrators. The latter in their turn may repeat the process if the volume of the domain to be administered makes this advisable.

At the first hierarchical level are the “Top Level Domains” or TLD’s which are one per country (two letter domains which correspond to the ISO-3166 code for each territory) plus the special 3 letter domains: “edu”, “com”, “gov”, “mil”, “org”, “int” and “net”.

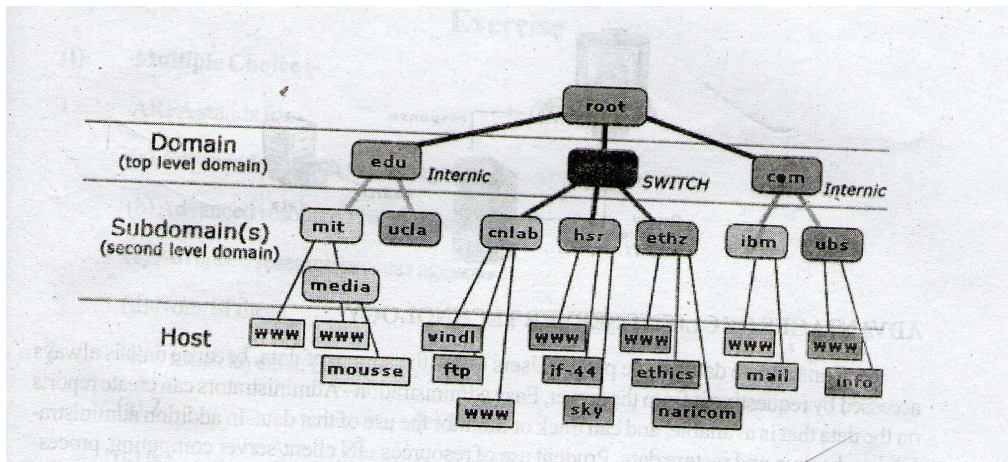
### **Generic Top Level Domains (g TLD)**



One of the conveniences of computer technology is that it often masks complex interactions behind a simple human experience. The Internet is a perfect example. Everyday, millions of users move from Web site to Web site by simply typing domain names (e.g., [www.networksolutions.com](http://www.networksolutions.com)) into a computer's Internet browser. Yet, unseen and often unknown to the user, each entry actually triggers a critical, time-sensitive process before the Web site can be accessed.

In order for Internet users to reach a Web site, their computer must find the address of the Web server that hosts the desired site. Computers locate one another across the Internet using numbers, not letters. For each Web site on the Internet there is a unique domain name and numeric address, known as an Internet Protocol (IP) address (e.g., 205.139.94.60). This number, while quite convenient for the computer to use, is difficult for Internet users to remember; thus the need for domain names.





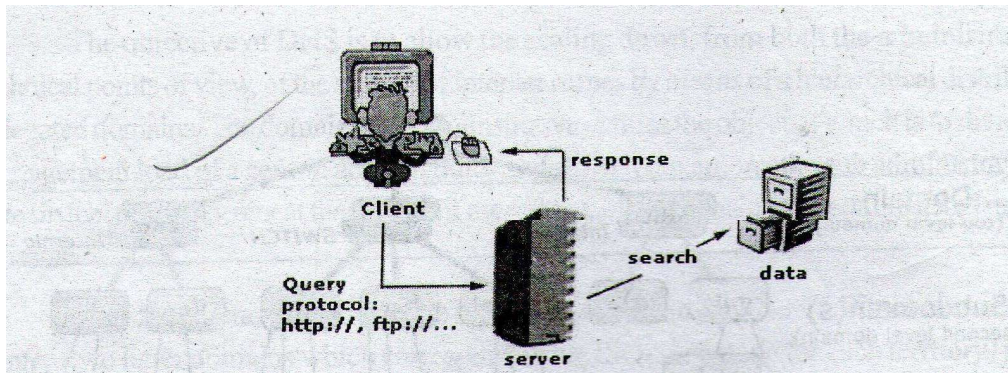
## WHAT IS CLIENT/SERVER TECHNOLOGY

A client/server system consists of two different types of computers, client computers and server computers that are connected by a network. Users work at the client computers and pass requests to the server computers. Server computer controls the information, files, or programs that the client computers require. Both these types of computers have software that meet the specific role they play in the client/server environment. Although it is common to refer to a server computer as the server, in reality the server refers to the software application that servers files, not the computer on which it runs. Similarly a client is a computer that has client software.

Client/server computing is important because it centralizes the control of data. Consider a business that takes orders for products over the phone. The company has a server computer, connected by a network to a variety of client computers. A database on the server computer contains information about all the products the company sells, including each item's price and the number of units in stock. The server software gives client applications access to this database.

Some of the client computers are used by employees who take orders over the phone. The client software gives these employees access to the database on the server computer. When an order comes in, an employee uses their client software to see if the item the customer wants is in stock. If it is, the order taker then uses the client software to place the order. The server software receives the order, accesses the database, subtracts the appropriate number of

units from the total number of units in stock, and sends a message to a client computer in another part of the company asking for the order to be fulfilled.



## **ADVANTAGES OF CLINET/SERVER TECHNOLOGY**

Consolidate data in one place-Users know the source of data, because data is always accessed by requesting it from the server, Easy administration-Administrators can create reports on the data that is available, and can track or monitor the use of that data. In addition administrators can backup and restore data. Prudent use of resources – IN client/server computing, processor-intensive tasks is concentrated on a powerful server computer, freeing up the processors of slower client computers. Easy connectivity- The network on which a client/server system resides does not have to be a standard LAN (local area network). You can use a dial-up modem connection to access a server computer from a client computer on the other side of the planet.

## **WHAT DO I NEED TO GET ON THE INTERNET?**

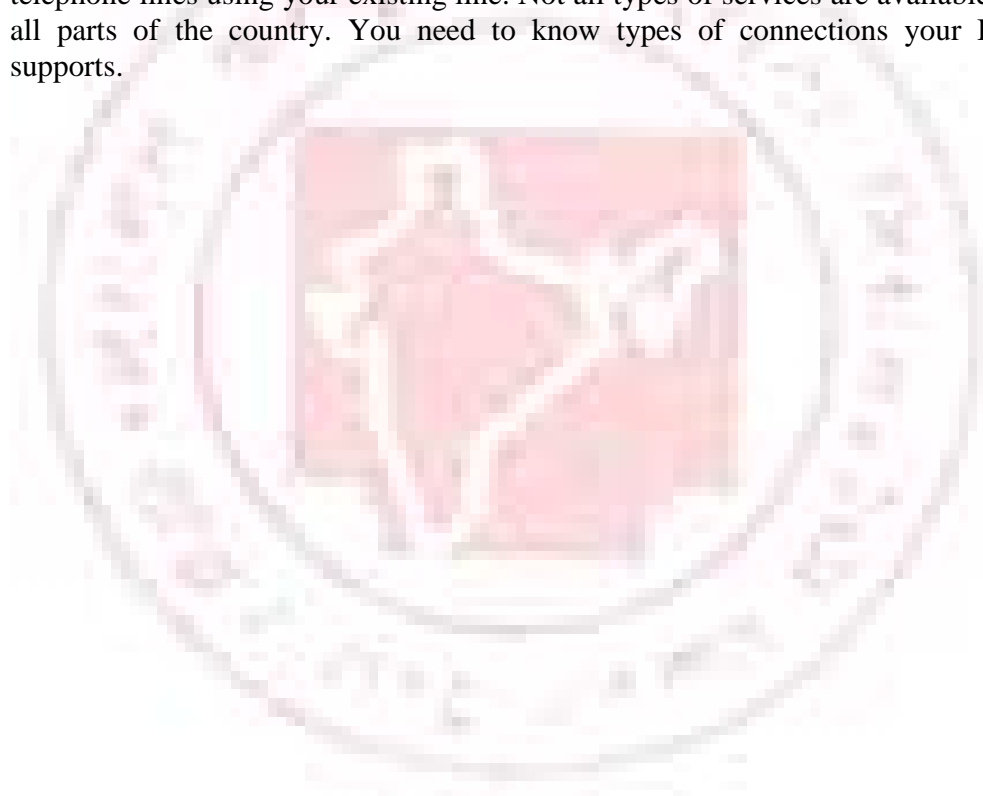
To get connected to the Internet you need a computer, a modem or other access device, an Internet service provider (ISP) and software.

Modem: Modems are devices which use phone lines to connect your computer to your Internet service provider's (ISP) host computer (also called a server) which is connected to the Internet. The speed of a modem determines how fast information is transmitted to and from your computer and is measured in bits per second (bps)(it takes about 10 bits to transmit a single character such as the letter A). There are faster ways of connecting to the Internet using ISDN lines, cable modems and Digital Subscriber Lines (DSL). An ISDN line transfers information at a rate of between 57,600 bps and 128,000 bps. ISDN adapter instead of a modem, and some specialized equipment that the phone company



must install. A T-1 line is very fast connection used by web servers or other computers than need to be connected to the Internet all the time. You can get internet access through some cable TV networks. Speeds can be as great as 36 Mbps. Cable access requires a special cable modem. Because it works with your TV cable, it doesn't tie up a telephone line. Cable modems are always on, so there is no need to connect.

DSL (Digital Subscriber Line) is another high-speed technology that is becoming increasingly popular, DSL lines are always connected to the Internet, so you don't need to dial-up. Information can be transferred at rates up to 1.54 Mbps (around 30 times faster than a 56-kbps modem) over ordinary telephone lines using your existing line. Not all types of services are available in all parts of the country. You need to know types of connections your ISP supports.



# World Wide Web

# 5

## **WHAT IS GOPHER?**

Gopher is a communications method or protocol for retrieving text and file-based information from the Internet. Designed at the University of Minnesota, gopher quickly became an Internet standard. When gopher was first developed, the programs that used this method for accessing Internet information were also called Gopher. Today, programs that use this method of retrieval are referred to as Gopher Clients. The program called Gopher is also considered a Gopher client. The Gopher protocol is designed to allow easy access to text and file-based information that is distributed across different machines on the Internet. Gopher allows you to connect to remote computers known as Gopher Servers and browse the information that has been made available on them. Typically, you use Gopher by starting at a local machine, and following connections from that machine out to other source of data. At each new machine, there are often connections to other computers. This interconnection of data and machines was the precursor to what has come to be called the World Wide Web.

## **THE WEB IS BORN**

In March 1989, Tim Berners-Lee of Geneva's European Particle Physics Laboratory (CERN- Conseil European pour la Recherche Nucleaire) proposed to develop a hypertext system to enable easy information sharing among the High Energy Physics community regardless of the country they were in.

### **The three components of the hypertext system were:**

A consistent user interface. The ability to incorporate a wide range of technologies and document types. Universal readership. (Universal readership enables anyone on the network using a wide variety of computers, to read the same documents easily.)

In October of 1990 the World Wide Web began to take shape when the CERN labs began working on the first graphical hypertext delivery system also known as a Web browser. In November 1992 the CERN list of “reasonably reliable servers” comprised 26 servers at sites around the world. In January 1993, 50 web servers were in existence and the Viola browser was made available for X Windows systems. In February 1993, Mosaic was developed by Marc Andreessen at NCSA (National Center for Supercomputing Applications) in the United States at the University of Illinois. In 1994, Andreessen and some of the Mosaic team left NCSA to form Netscape with Jim Clark where they developed and released a commercial Web browser called Navigator for free on the net. In the same year the work of having secure Web access started. Security was required if people were to provide credit card information on the Web. To develop the Web further, CERN turned over the Web project to the W3 Organization in July 1994. The W3 organization was a joint effort between CERN and MIT.

## **WORLD WIDE WEB**

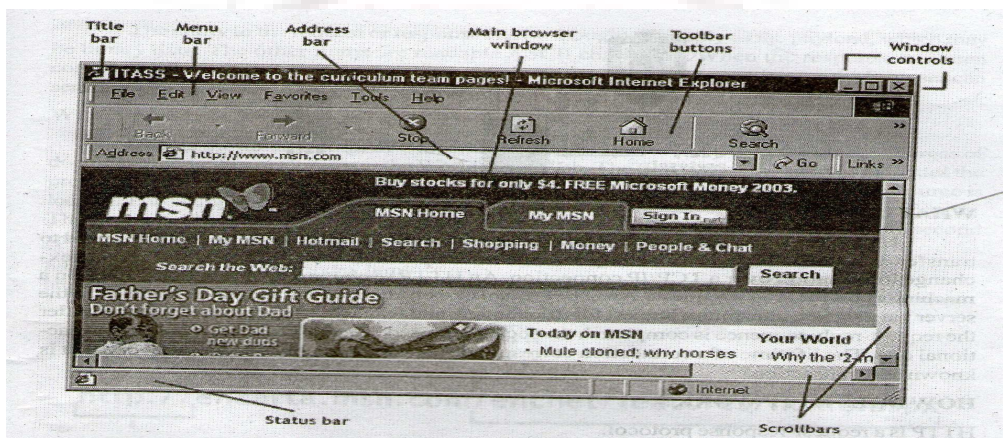
The World Wide Web (also known as the Web, WWW, and sometimes W3) is the area of the Internet that has received tremendous focus in the last few years. Many people new to the Internet, think that the Web \*is\* the Internet. However, the Web is just part of the Internet, albeit a very major part. The Web is made up of “sites”-a site being where someone has placed files that can be accessed by those connected to the Internet. The files are of all different types – text, graphic, video, sound, etc. – and they are on computers around the world. They constitute a vast amount of information on several subjects.

The files are accessed by using IP addressing and a specific protocol called http, which stands for Hypertext Transfer Protocol. The Web works on the client/server model. You use a client program which passes your request for information to a server. The server obtains the information and passes it back to your client. The client software that you use to access the Web is called a browser. Popular browsers are Netscape Navigator and Microsoft Internet Explorer. With all of these browsers, you can see graphic files on the Web. There are some text-only browsers, such as Lynx.

## **WWW BROWSER**

A Web browser is a program that you can use to view files on the Internet, including images, text, sound and video. A graphical Web browser is a browser that enables you to view Multimedia content such as images, audio, and

video, on the Internet. The first graphical Web browser was “Mosaic” that was developed in 1993 by the National Center for Supercomputing Application at the University of Illinois. Marc Andreessen and six fellow students developed the program for creating the Mosaic browser while working on a university-sponsored computer project. This program has contributed immensely to developing and propagating the World Wide Web to the forefront of Internet tools. Mosaic converted the text only WWW into an environment that is similar to Microsoft Windows. With the introduction of Mosaic, the total amount of data transported through the Web increased by a factor of 10,000 within six months.



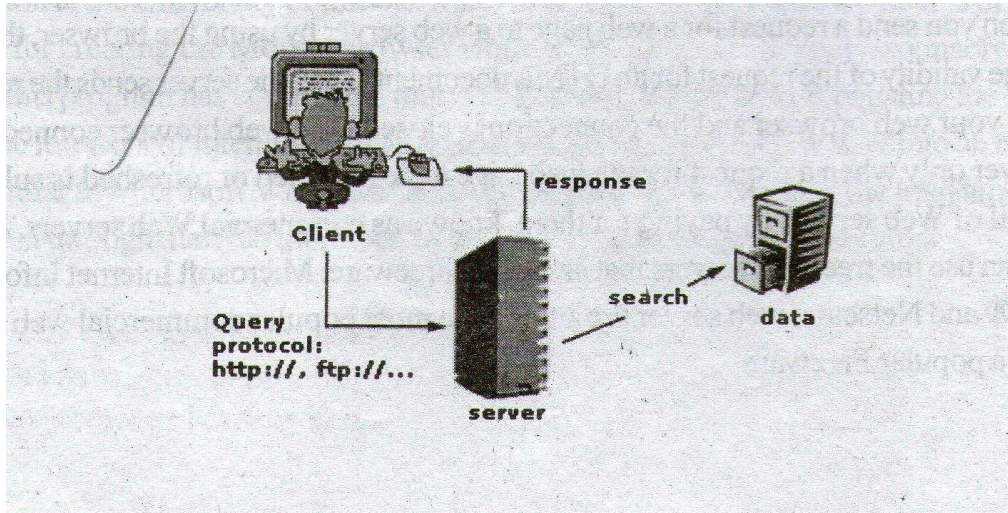
## WEB SERVER

A web server is the computer that stores web pages or an application that resides on the server. The computer and the server refer to the hardware components while the application is the software component. The server transmits graphics, audio, and video to web browsers. Web servers are also called HTTP servers because they use the Hyper Text Transfer Protocol (HTTP) to serve web pages to web browsers.

A connection between the web browser and the web server is called 'stateless'. This is because when you send a request for a web page to a web server by using the browser, the server checks for the validity of the request for an HTML document. Then the server sends the requested web page to your web browser and the connection is closed. The web browser connects to the web server only when a request for the web page to be reloaded or refreshed is submitted. You can avail of Web servers by paying for them, known as commercial Web servers. Alternatively, you can use the free Web servers that are called Freeware, Microsoft Internet Information Server (IIS) ® and Netscape



web server are among the most popular commercial web servers. Apache® is a popular Freeware.



## WHAT IS HTTP?

HTTP, the Hypertext Transfer Protocol, is the application-level protocol that is used to transfer data on the Web; HTTP comprises the rules by which Web browsers and servers exchange information over a TCP/IP connection. An HTTP server is a program that listens on a machine's port for HTTP requests. An HTTP client or web client opens a TCP/IP connection to the server via a socket, transmits a request for a document, and waits for a reply from the server. After the request-reply sequence is completed, the socket is closed. So the HTTP protocol is a transactional one. The lifetime of a connection corresponds to a single request-reply sequence that is known as a transaction.

## HOW DOES HTTP WORK?

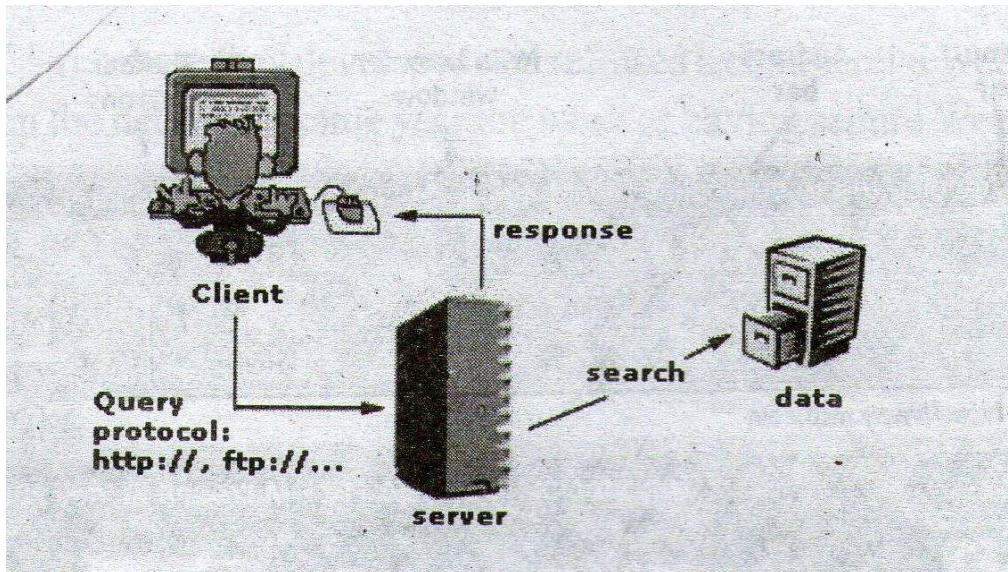
HTTP Is a request-response protocol.

The request comprises

- a request line
- a set of request headers
- an entity

The server sends a response that comprises

- a status line,
- a set of response headers, and
- an entity.



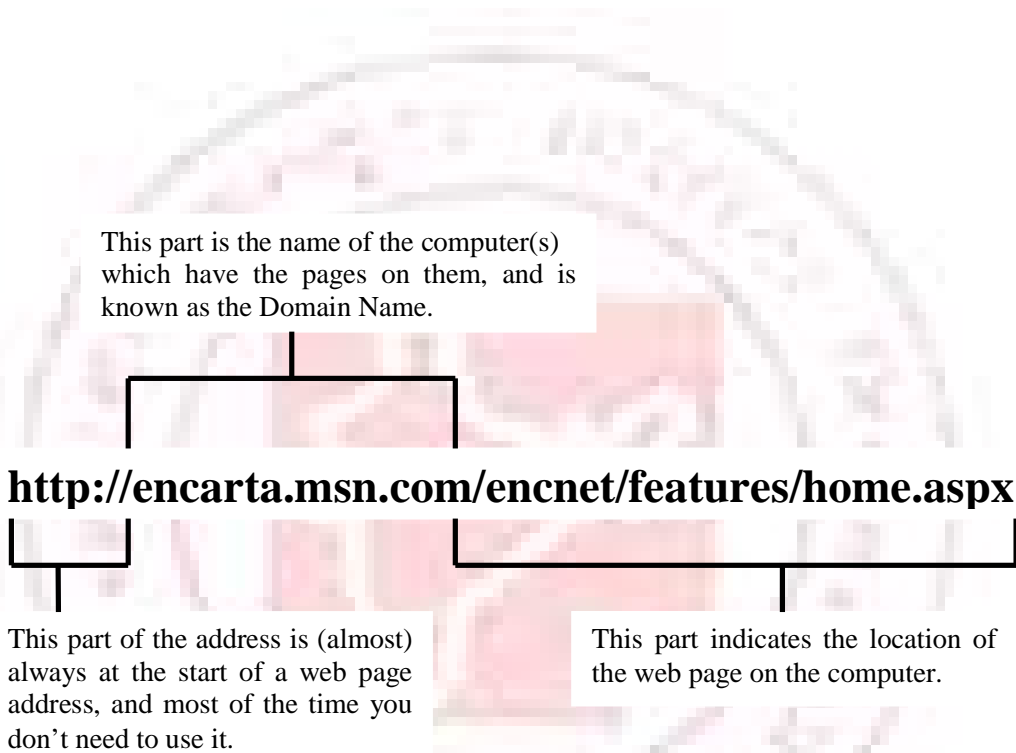
The entity in the request or response can be thought of simply as the payload, which may be binary data. The other items are readable ASCII characters. When the response has been completed, the browser or the server may terminate the TCP/IP connection, or the browser can send another request.

## WHAT IS A URL?

URL is the abbreviation of Uniform Resource Locator. AURL is the global address of documents and other resources on the World Wide Web. The first part of the address indicates the protocol and the second part specifies the IP address or the domain name where the resource is located. For example, the two URL's below point to two different files at the domain [www.nyise.org](http://www.nyise.org). The first specifies a file located in the subdirectory "fanny" of the NYISE web site; the second specifies a Web page that should be fetched using the HTTP protocol:

<http://www.nyise.org/fanny/index.html>  
<http://www.nyise.org/index.html>





This part is the name of the computer(s) which have the pages on them, and is known as the Domain Name.

The diagram shows a URL with brackets and lines pointing to specific parts. A bracket above 'encarta.msn.com' points to a callout box. A bracket below 'http://' points to a callout box. A bracket below 'encnet/features/home.aspx' points to a callout box.

**http://encarta.msn.com/encnet/features/home.aspx**

This part of the address is (almost) always at the start of a web page address, and most of the time you don't need to use it.

This part indicates the location of the web page on the computer.

## **WHAT IS A SEARCH ENGINE?**

A Search Engine is used to find information on the Internet when you don't know where to start. Search engines allow users to enter keywords to find Internet sites. Search Engines use "robots" or "crawlers" to find and index words that appear on web sites. The Search Engine then matches the keywords in the search to the words in its index. The different search engines that are available are [www.google.com](http://www.google.com), [www.altavista.com](http://www.altavista.com), [www.hotbot.com](http://www.hotbot.com), [www.yahoo.com](http://www.yahoo.com), [www.askjeeves.com](http://www.askjeeves.com) etc.

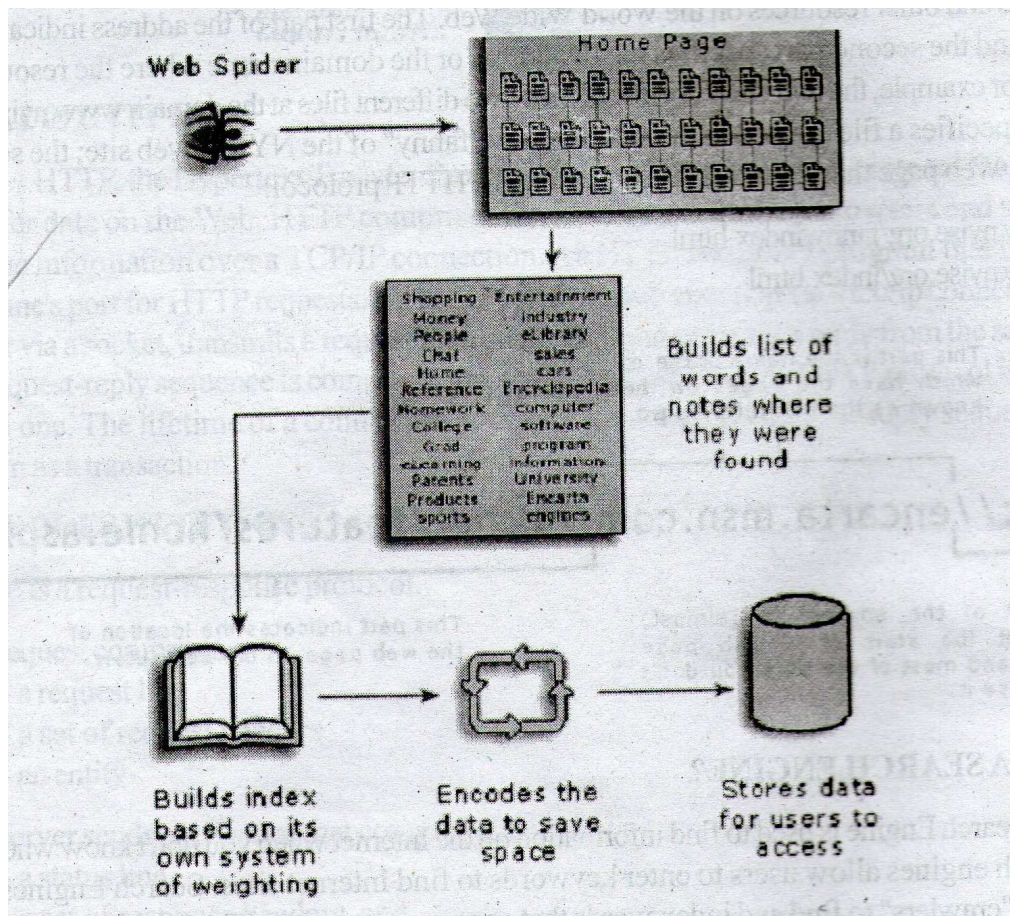
## **METASEARCHERS OR CRAWLERS**

Metasearchers or crawlers offer the possibility to do a search without having to consult every search robot separately. They function as an intermediary, by passing on the query to the search robots and afterwards order the results.

### **THIS HAPPENS IN TWO WAYS:**

The first type presents the various search robots together on one page, each with their own text box. The user subsequently chooses a particular search robot. The advantage of such a page is that you can immediately go the Metasearch page and choose another search robot.

The second type offers the possibility to type in a query once and then indicates in which database of which robot(s), the search is to be carried out. The query is then simultaneously submitted to the chosen search robots. The results are presented either in a long list sorted according to relevance or as a list per search robot that is then sorted according to relevance.



## SEARCHING CRITERION

### Quotes

Placing words within quotation marks (“”) creates a phrase. The search engine returns a match only when the engine finds the exact word sequence. Example: “minnesota trade office”

### Asterisk

An asterisk (\*) is also known as a wild card; it must be placed on the right-hand side of a word or embedded within a word. Normally sites require at least three characters to the left. You can use an asterisk to find various

spellings or related words. Example: export\* would return matches of export, exports, exporter, and exporting.

### **AND operator**

Search results must contain all words joined by the AND statement.  
Example: commercial AND service.

### **AND NOT operator**

Search result cannot contain the word that follows the AND NOT statement.

Example: software AND NOT integrator will find sites about software itself but eliminate sites about software integrator

### **OR operator**

Search results must contain at least one of the words joined by the OR statement. Example: distributor OR agent lists sites that contain either word.

### **Plus**

Adding a plus sign (+) directly in front of a word requires that the word be included in all search results. Place the plus sign between two words in a multiple word search.

Example: export+assistance

### **Minus**

Adding a minus sign (-) directly in front of a word indicates that the word should not be found in search results, Example: commerce-chamber

### **Parentheses**

Use parentheses to build complex search queries that incorporate other special words and characters. Example: NAFATAAND (Canada OR Mexico) lists sites about either country pertaining to NAFTA.

# Web Browser

# 6

## WHAT IS A WEB BROWSER?

A web browser is a program that you can use to view files on the Internet, including images, text, sound and video

## HISTORY

The first graphical Web browser, a program that lets Internet users page through the Web, was “Mosaic”. This program was developed in 1993 by the National Center for Supercomputing Application at the University of Illinois. Marc Andreessen and six fellow students developed the program while working on a university-sponsored computer project. This program has provided much of the forward push that has brought the World Wide Web to the forefront of Internet tools. Mosaic turned the then text only WWW into a point-and-click environment much like Microsoft Windows by using only a mouse. With the introduction of Mosaic, the total amount of data transported through the Web increased by a factor of 10,000 within six months.

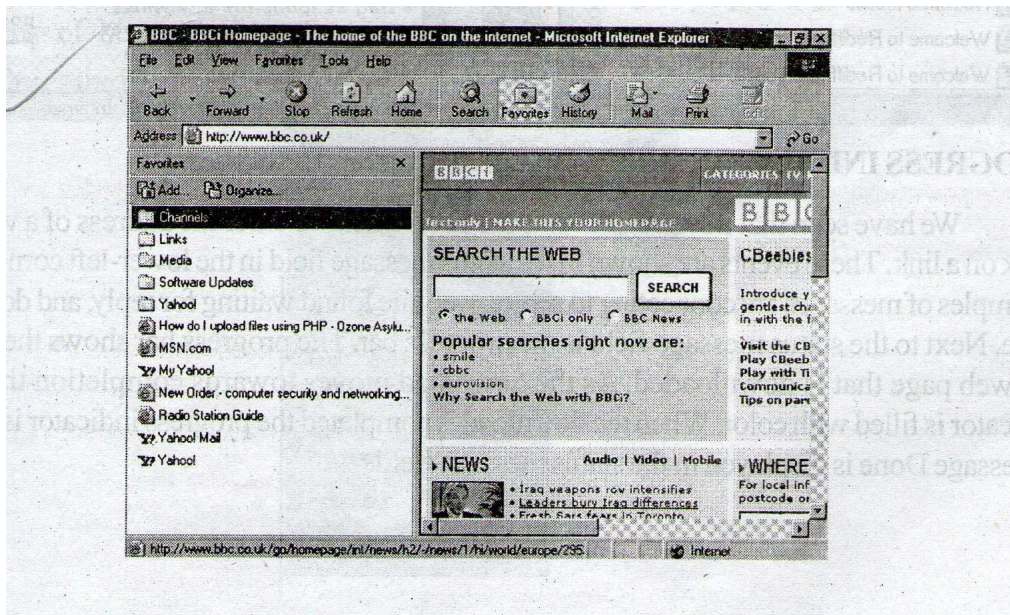
## WHAT ARE BOOKMARKS?

You can use bookmarks to save the locations of Web sites that you can revisit. Bookmarks are stored as a list on your computer. The browser can access this list when you want to revisit the Web site.

## HOW DO I USE BOOKMARKS?

To view a Web site from the list of bookmarks, select the item that represents the Web site from the list. The browser will display the page. Please note: The bookmark feature is referred to as favorites in Internet Explorer and bookmark in Netscape Navigator



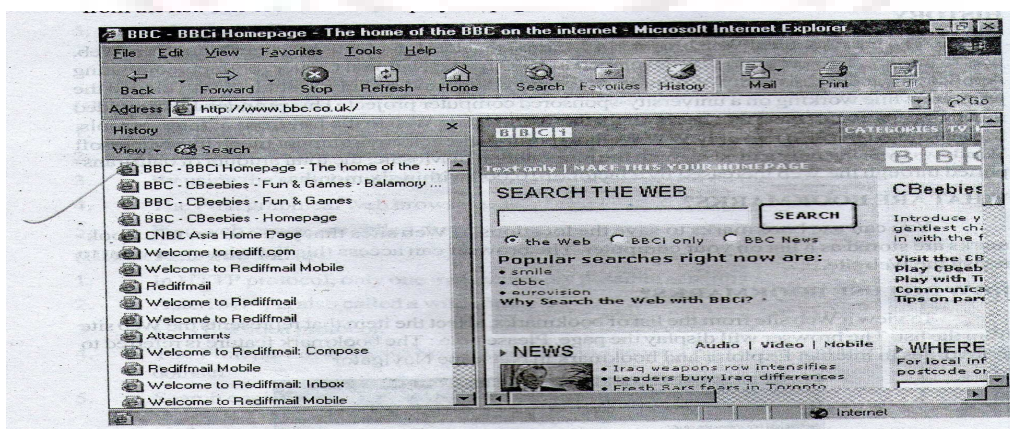


## WHAT IS BROWSER HISTORY?

A built in feature of the browser which keeps a record of the pages visited by the user with help of the browser.

## HOW DO I USE HISTORY?

To view a Web site from the list of History, select the item that represents the Web site from the list. The browser will display the page.





## **PROGRESS INDICATOR**

We have seen that a series of events are fired when we enter the address of a web page or click on a link. These events are shown in the status message field in the lower-left corner of the IE. Examples of messages are connecting to server, web site found waiting for reply, and downloading page. Next to the status message field is the progress bar. The progress bar shows the amount of the web page that is downloaded. As the download moves towards completion the progress indicator is filled with color. When the download is completed the progress indicator is empty and a message done is displayed in the status message field.

## **USING THE BROWSER TOOLBAR**

The browser toolbar provides quick access to the commonly-used functions of the browser.

The Back button and the Forward Button are quick navigation aids you “surf” between different web pages on the internet. Web pages contain Hyperlinks that link different pages (and different sites) to each other. As you navigate between the different pages and web sites, your browsing history is stored and can be accessed quickly using these buttons. The Stop Button will stop a page from loading in the browser. Use this when you have clicked on a link by mistake or when the page is having trouble loading. The Refresh Button re-loads the web page in the browser. This can be used when a page is having trouble loading. The Home Button will take you to your home page (for information on how to set this up, see setting your home page below). The Search Button will give you quick access to the search facility in the browser. This is usually set to the Microsoft search site, which will appear in a pane on the right-hand side of the screen. The Favorites Button opens your favorites in a pane on the right-hand side of the screen

## **FILE MENU**

**Using this menu one can**

- |              |   |
|--------------|---|
| <b>New:</b>  | Opens a new browser window (New>window).          |
| <b>Open:</b> | Open a specific Internet address or a local file. |
| <b>Edit:</b> | Edit the current page.                            |
| <b>Save:</b> | Save the current page                             |

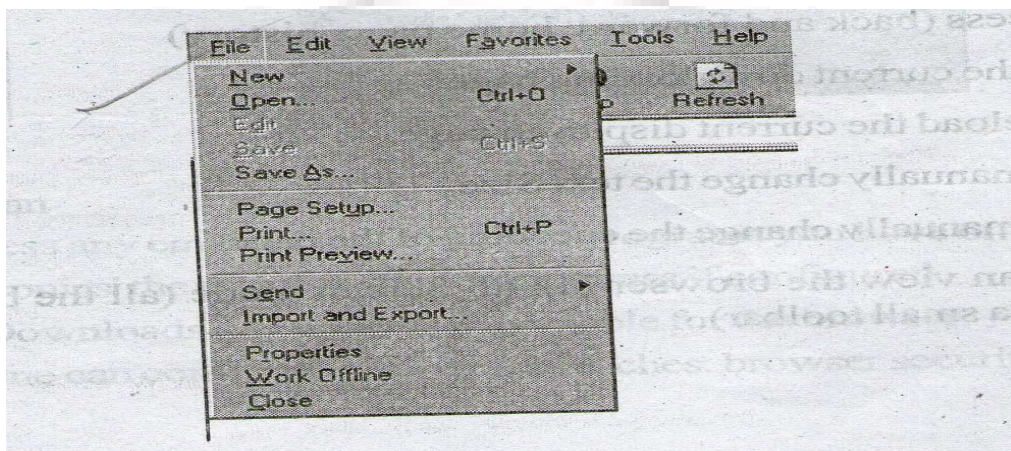
**Print:** Prints the current page (use Page Setup to change printing settings).

**Send:** Send the page to someone via email.

**Import and Export:** Allows to import and export browser settings such as favorites.

**Properties:** List the properties of the current displayed page, like page size, data created, address of the page

**Close:** Closes the browser window.



## EDIT MENU

Using this menu one can

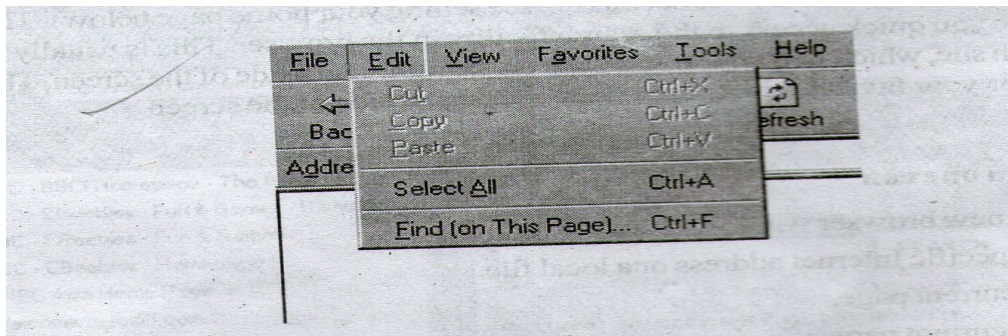
**Cut :** One can cut content of the displayed page so they can be copied to another program.

**Copy :** One can copy content of the displayed page so they can be copied to another program.

**Paste :** One can paste content.

**Select All :** One can select all content of the displayed page.

**Find :** Find specific words on the current web page.



## VIEW MENU

Using this menu one can

**Toolbar :** One can view the toolbars that are available in Internet Explorer.

**Status bar :** One can view the status of the web page being accessed.

**Explorer bar :** One can change the icons on the Explorer bar.

**Go To :** One can access (back and forward, home page, history)

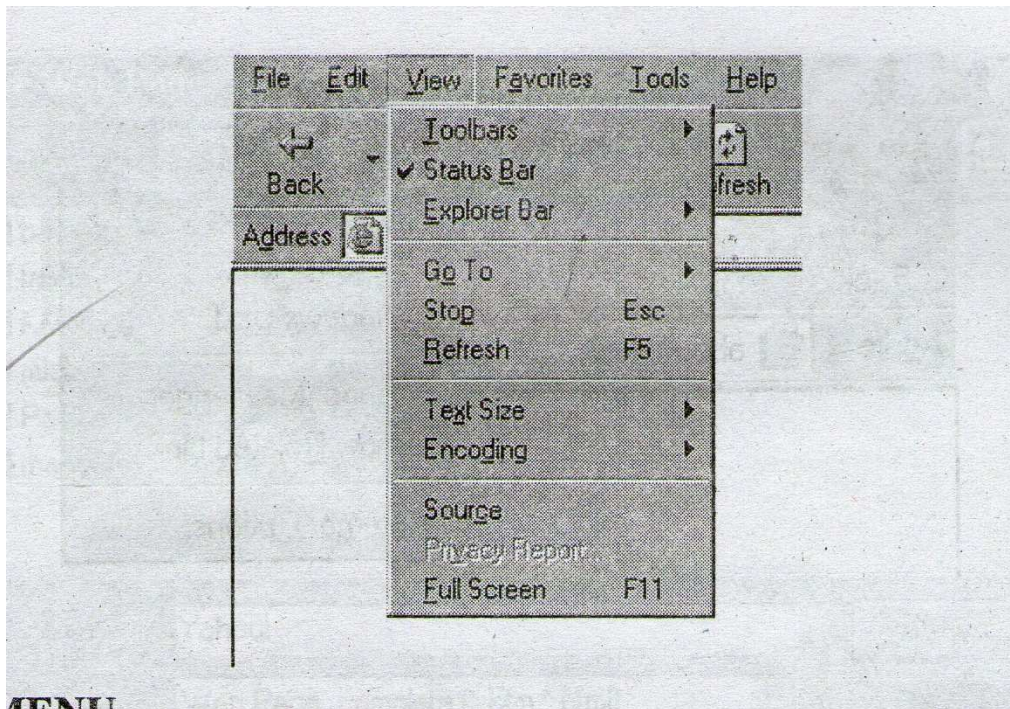
**Stop :** One can stop the current downloading page.

**Refresh :** One can reload the current displayed page.

**Text Size :** One can manually change the text Size.

**Encoding :** One can manually change the encoding of the page.

**Full Screen :** One can view the browser in Full Screen mode (all the browser controls will disappear apart from a small toolbar).



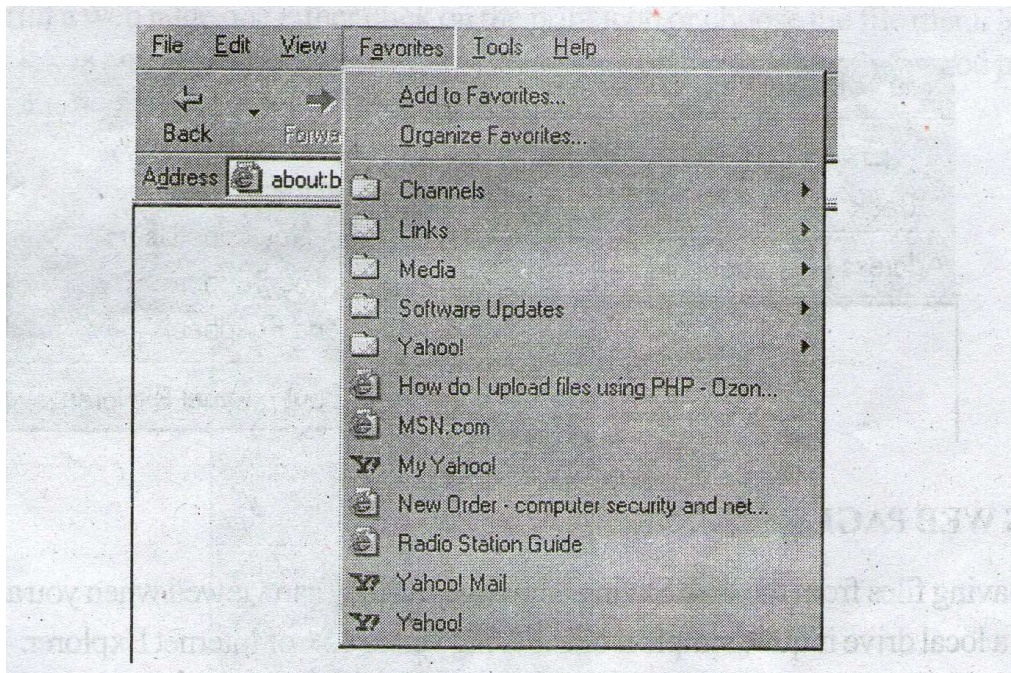
## FAVORITES MENU

Using this menu one can

**Add :** Add sites to your favorites list.

**Organise :** Organise your list of favorites by placing them in folders etc.





## TOOLS MENU

Using this menu one can

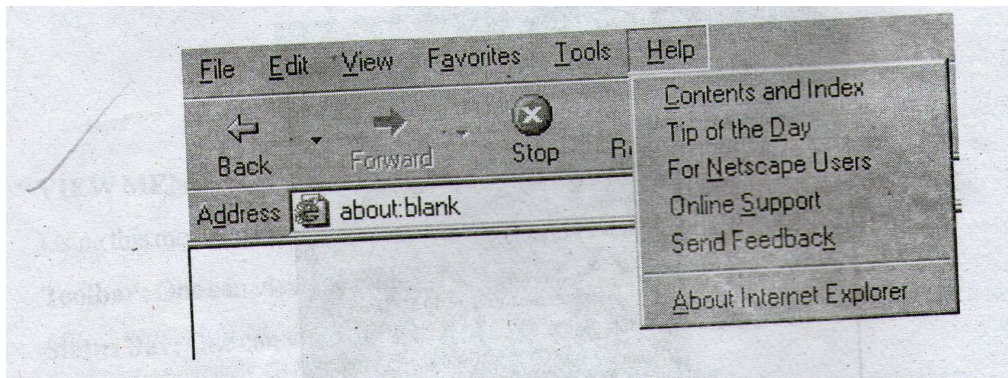
**Mail and news :** Access any email or news reading programs you have on your computer.

**Synchronies :** Synchronies' the emails to outlook express if configured.

**Windows Update :** Downloads any updates if available for the browser.

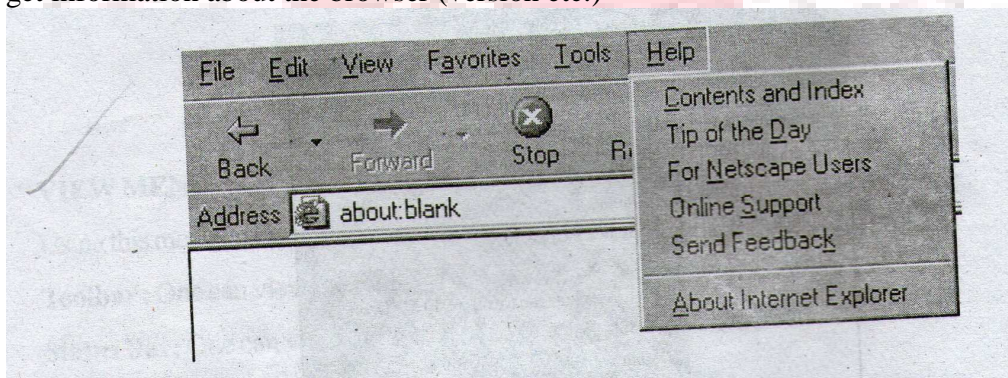
**Internet Options :** One can configure proxy, clear caches, browser security options.





## HELP MENU

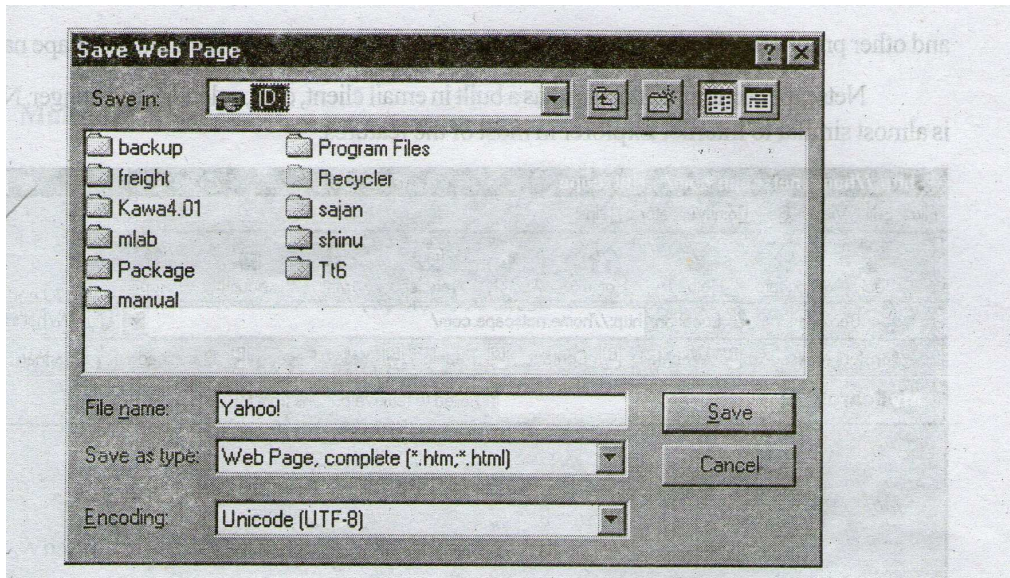
Using this menu one can access the Help for the program.  
access online tours of the Internet and support site for Microsoft products  
get information about the browser (version etc.)



## SAVING WEB PAGES

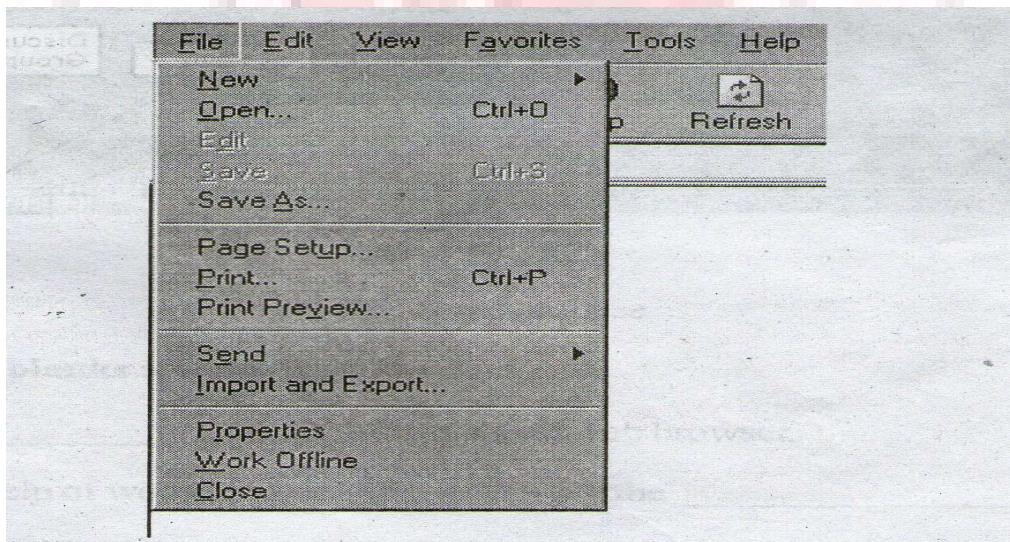
Saving files from the web Saving web pages so they can be viewed when you are “offline” or stored on a local drive is quite simple if one is using version 5+ of Internet Explorer. Web pages are usually made up of a lot of different elements such as text, images, sound, and video. Internet Explorer 5 saves all the files needed to reproduce the web page as it appears online in a folder so things like images will still be present in your local copy of the file. Internet Explorer 4, on the other hand, will only save the HTML file that brings all these elements together and formats them on the web page. This means that if one is using version 4, one will find that any images, sound, video, and even some of the functionality and formatting of a saved page is lost.





## PRINTING WEB PAGES

To print a web page one either click on the print icon or choose the file menu and choose print. On click this option the current page will be printed on the default configured printer (To change print setting one needs to Page Setup).

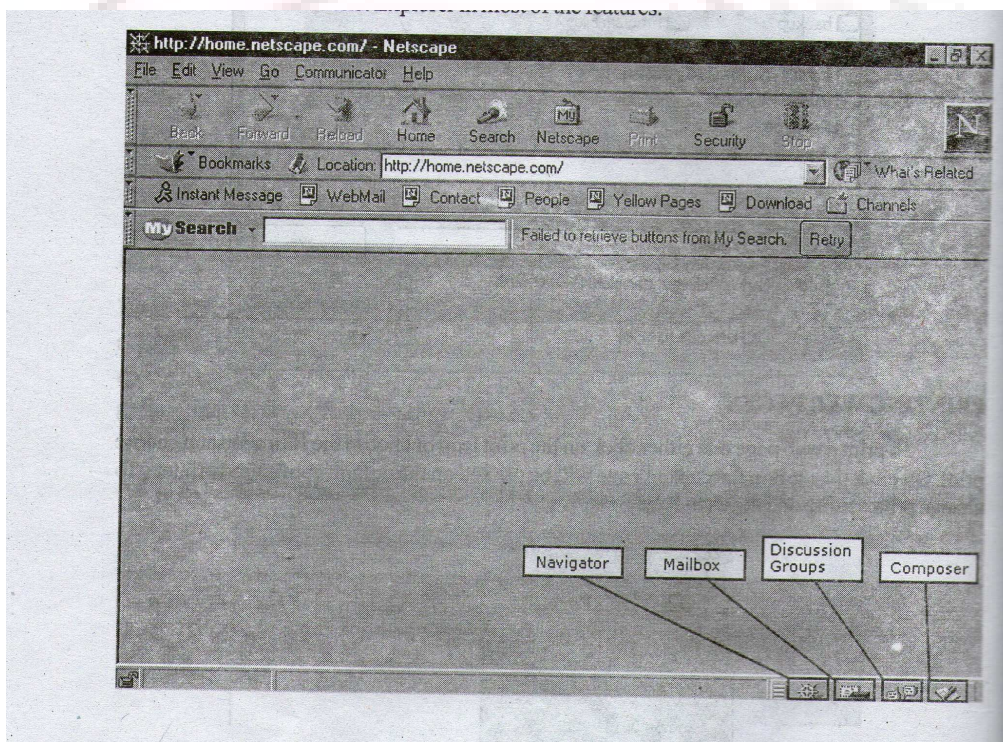


## NETSCAPE COMMUNICATOR



Netscape's Communicator, often referred to simply as "Netscape" is one the most popular Web browsers. This is graphical browsers, which means that can display graphics as well as text, and can used to view interact with multimedia formats, including sound, video, and other programs. The browser part of Netscape's Communicator is called Netscape navigator.

Netscape communicator also has a built in email client, chat, calendar, messenger. Netscape is almost similar to Internet Explorer in most of the features.



# Electronic Mail

7

## INTERODUCTION TO E-MAIL

Electronic-mail or E-mail is the process of sending messages anywhere electronically using the computer and a modem. Email can be sent and received according to the convenience of the user. Any number of Emails can be sent at a time to any number of designated locations. E-mail is delivered almost instantaneously. E-mail is cheap and easy to use especially for international messages. The cost of an E-mail is only the price of the telephone connection to the Internet Service Provider.

## WHY USE E-MAIL?

1. It is much cheaper to send an E-mail than a letter.
2. It is much cheaper than a long distance phone call.
3. It saves paper and raises productivity within the office environment.
4. Replies can be formulated at leisure and are easily sent (no searching for addresses).

## WHAT IS AN EMAIL ADDRESS?

An email address is composed of two parts the user name and the domain in the format username@domain. Each email address uniquely identifies an Internet user.

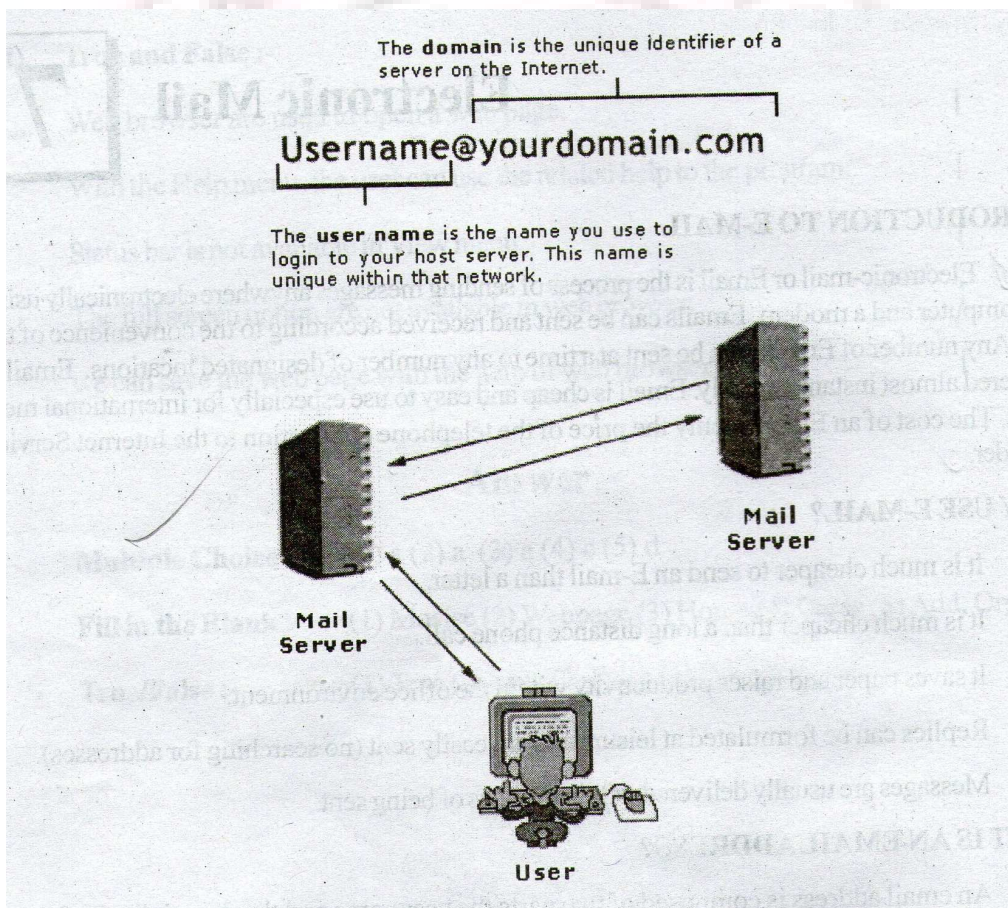
The user name is the name you use to login to your host server. This name is unique within the network. The domain is the unique identifier of a server on the Internet user.

## EMAIL NETWORKS:

Email Networks are nothing but a group of users who share common information with the help of emails. One can become a part of network by signing on to the network. After which one will receive or post queries or information to the user group or the email network.

## WHAT IS A MAIL SERVER?

Mail server is software residing on the server that acts as a collection point for incoming and outgoing E-mail for the users that it services. While the mail server will route outgoing E-mail upon receiving it from the user, it will store incoming E-mail till the user's mail client requests it to be downloaded and then deleted.





## **WHAT IS SMTP?**

SMTP stands for Simple Mail Transfer Protocol. This protocol is a server-to-server protocol that usually operates in the background, and is the standard way in which mail is transported over TCP on port 25. SMTP simply routes the messages from one mail server to another.

## **WHAT IS POP3?**

POP3 is Post Office Protocol, version 3. It is an email protocol that all allows a user to read and delete mail from the server. It differs from IMAP in which it does not allow email to be manipulated on the server, but requires mail to be downloaded onto the client computer.

POP3 is better suited for the average user using a single computer. POP3 matches the method used by most users to use email: download, read, delete. In contrast, IMAP, reads, sorts, and makes email available for download. IMAP allows the user to easily download messages from his account by eliminating the need to manage the account size.

## **WHAT IS MIME?**

MIME stands for “Multipurpose Internet Mail Extensions”. It is the standard for how to send multi-part, multimedia, and binary data using the world-wide Internet email system. Typical uses of MIME include sending images, audio, word processing documents, programs, or even plain text files.

## **WHAT IS IMAP4?**

IMAP4 is a protocol for reading mail messages from a mail server over a network.

### **How does it work?**

IMAP4 was designed to make it easy for users to manage reading their e-mail from more than one location or over a slow Internet connection. Unlike POP3, which generally downloads all mail messages in a user’s mailbox at once, IMAP4 only downloads message headers from the mail server. The main body of the mail messages and the attachments reside on the mail server until requested. Once requested, the entire message is copied from the mail

server and sent to the user. All mail is stored on the mail server until the user deletes and purges it. IMAP4 provides only header information so that the user's computer does not download all mail at once. By giving the user the option to request only the messages they want to read, IMAP4 helps mobile users save time in downloading and reading mail over slow links.

Users can also create multiple mail folders on the IMAP4 mail server and move messages between the folders. By keeping all messages on the mail server, users can log into the IMAP4 server from different locations and have access to both new and old messages in their mail folders.

#### **Benefits of IMAP4:**

- Mail is centrally stored and managed on the mail server and can be backed up.
- Users can access mail from any IMAP compliant computer.
- Users can choose the messages to download.
- Users can retrieve messages from the server if they have accidentally deleted the mails. This is possible only if the user has not deleted and purged the mails.

#### **EMAIL HEADERS.**

Emails have headers that provide information on the origin of a message and enable you to track and stop junk e-mail. Most e-mail clients only show the To: and From: headers, which can be easily forged. The complete message headers will look something like this:

Return-Path: [fake@address.com]

Received: from some.host.com (hostname [xx.xx.xx.xx])

by mydomain.com (8.9.3/8.9.3) with ESMTP id NAA 123456;

Thu, 11 May 2002 10:15:30 + 0530 (EDT)

Date: 11 May 2002 10:15:30 + 0530

From: Spammer [junk@mydomain.com]

To: user@mydomain.com

Subject: My junk message!!

Netscape Mail (ver 4)

Click View from the pull-down menu bar. Then click Headers and Select all.

Outlook Express

Open the message. Then click File from the pull-down menu bar and selected Properties. Another window with two tabs is displayed. To view the details, click the Details tab. Cut and paste the headers into the message that you want to forward.

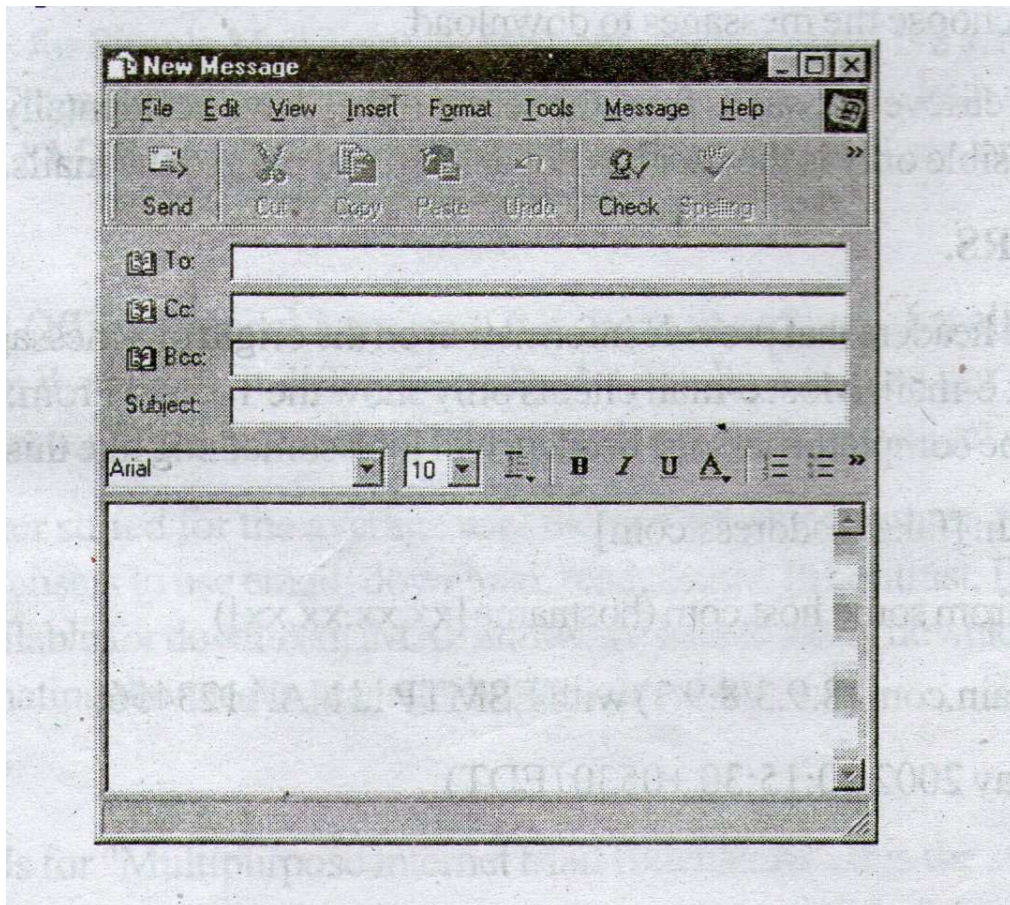
## **EMAIL STRUCTURE**

**To:** In this field you can type an address (or several addresses separating names with a comma or semicolon) to whom one would like to send a email to.

**CC (carbon Copy):** This will send a copy of the message to the address placed in this field and other recipients can see that the copy was sent.

**BCC (Blind carbon Copy):** This will send a copy of the message to the address placed in the field but other recipients do NOT see that the copy was sent.

**SUBJECT line:** The subject should be should be short but descriptive. Some people filter their mail by subject so the subject line should be reflective of the contents of the message or the message may not be read by the recipient

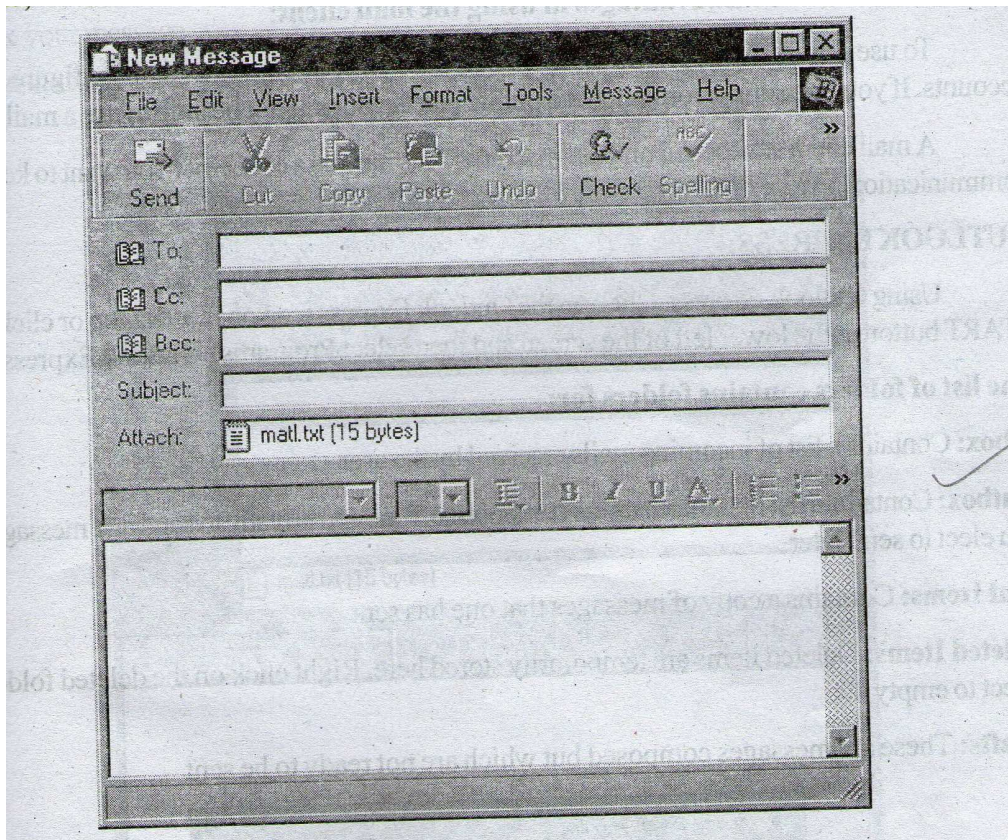


## EMAIL STRUCTURE

**(Body):** You can type your message in the message field, copy text from another program and paste in the message field or embed a document in the message field. Notice that the font options (color, size, style) become active at this point. REMEMBER the recipients of your message using a different email program may not see text the same way you wrote it.

**Attachment:** This a feature allowed in a email to attach other files and documents such as text, audio, video sound.





## **WHAT IS A MAIL CLIENT?**

A mail client is a specialized program that is designed for checking and composing email. There are several freely available mail clients including the open source Netscape mail and the Microsoft Outlook Express.

### **Advantages of mail client.**

When using a mail client, you do not have to be connected to the Internet. You can connect, download all your email, disconnect, and read the emails when you want. This is a very nice ability you use a modem at home and have one phone line. Also, you can compose email anytime, save it, and send it later when you are connected to the internet.

Mail clients provide more features than web mail; such as integrated spell checking which identifies misspelled words, powerful address books, and mail filters. Mail clients are faster than web mail. When you access



mail by using web mail, you have to wait for the web server to generate the next web page and send the page over the internet every time you click a link or button. In contrast, mail clients are applications on your computer, so the interface responds quickly to your commands. Some mail clients allow you to check and send email from multiple accounts from one place.

**There are also some disadvantages in using the mail client:**

To use a mail client, you must install software on your computer and configure specific accounts. If you are using a computer at a public place, you will not be able to use a mail client.

A mail client stores mail on your machine. This may be a concern if you want to keep your communication private. Mail clients are often more difficult to learn how to use.

**OUTLOOK EXPRESS:**

Using Outlook Express: Click on the Outlook Express icon on the desktop or click on the START button at the lower left of the screen and then select Programs/Outlook Express.

**The list of folders contains folders for:**

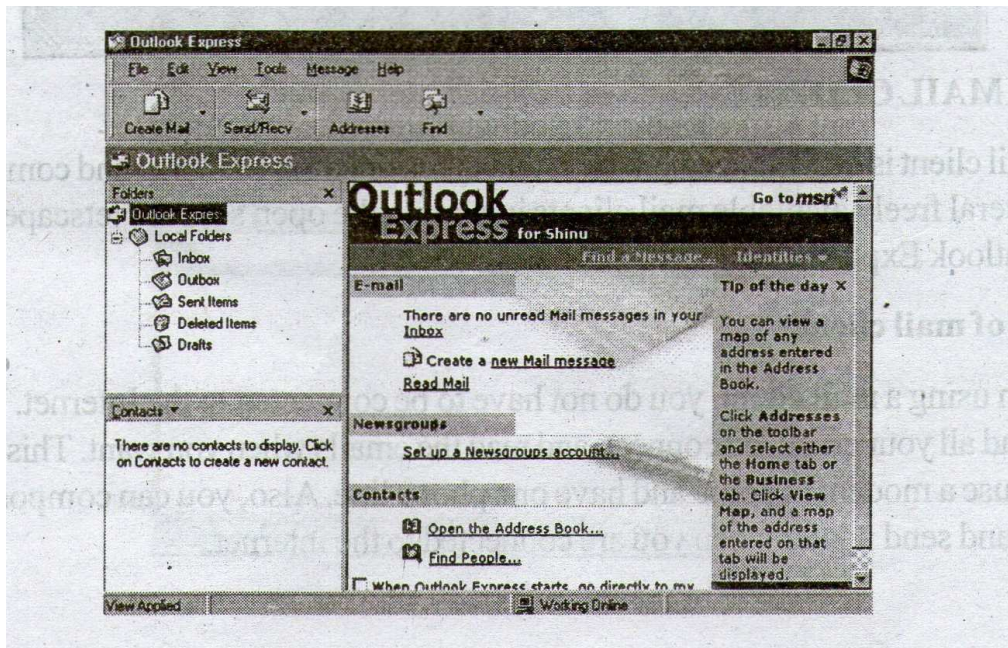
**Inbox:** Contains a list of incoming mails received by the user

**Outbox:** Contains a list of mails that was composed offline and is ready to send and messages that you elect to send later

**Sent Items:** Contains a copy of messages that one has sent

**Deleted Items:** Deleted items are temporarily stored here. Right click on the deleted folder and select to empty it.

**Drafts:** These are messages composed but which are not ready to be sent



## **SENDING MESSAGES:**

Click on the send button to send this message.

## **Start a new message:**

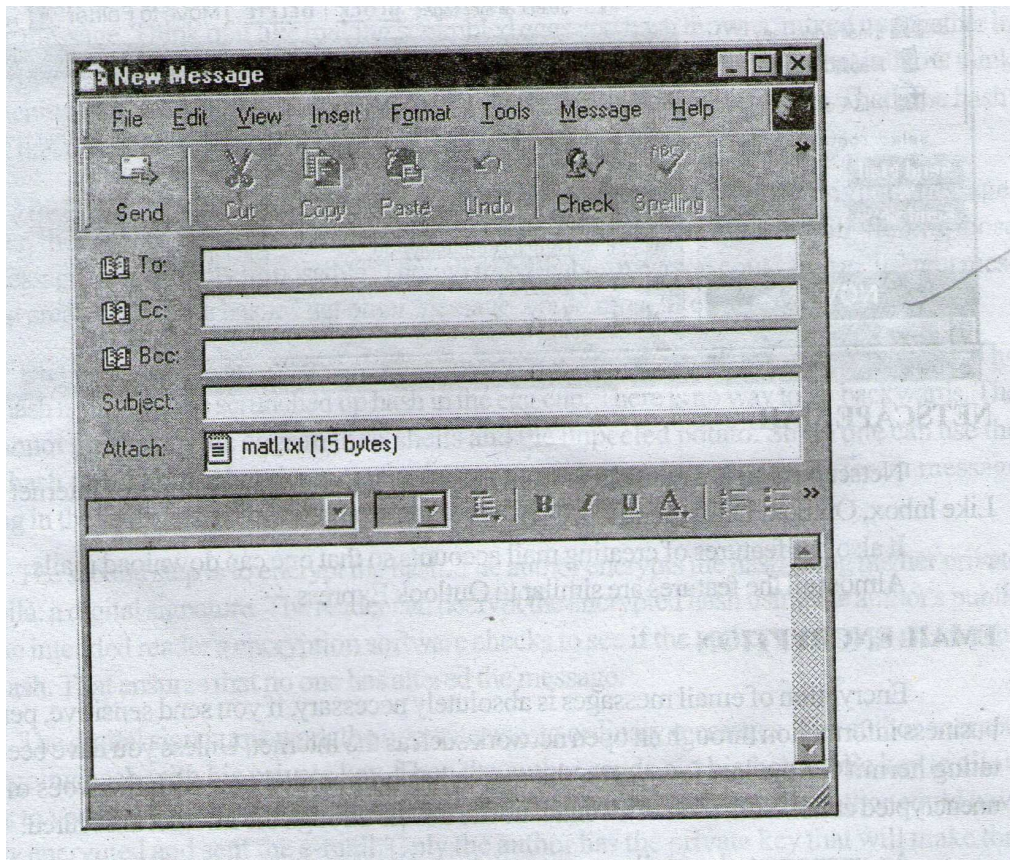
On the toolbar, click the New Mail button. Select the address of person to send to.

Type the subject

Attachment: To attach a file click on the attach icon and then attach the file.

Type the your message.

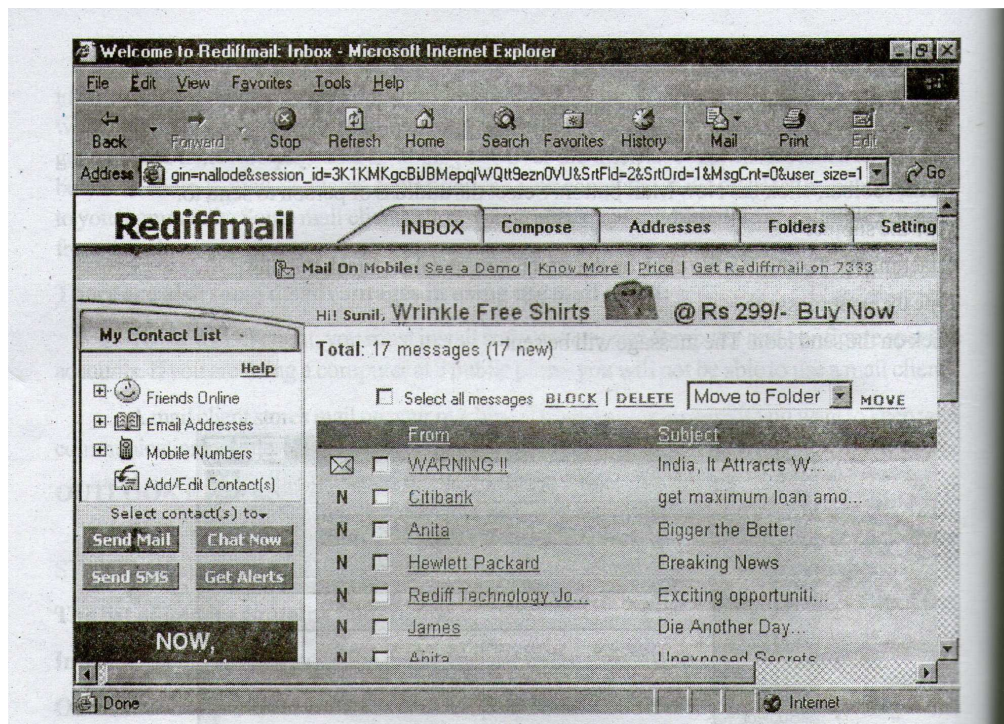
Click on the send icon. The message will be sent.



## WEB MAIL

Allows you to send and check your e-mail by logging in to a user-friendly web-based interface, similar to that operated by Hotmail. This can be particularly useful when away from your home or office. This feature allows you to access your mail from anywhere you can access the web. All you need is a computer connected to the Internet and a web browser





## NETSCAPE MAIL

Netscape mail is a mail client from Netscape. It has similar features of Internet Explorer. Like Inbox, Outbox, Draft, SentItems.

It also has features of creating mail accounts so that one can download mails.

Almost all the features are similar to Outlook Express

## EMAIL ENCRYPTION

Encryption of email messages is absolutely necessary, if you send sensitive, personal, or business information through an open network such as the Internet. Unless you have been a meditating hermit for the last few years, the media has bombarded you with the woes of sending unencrypted email. Still, 99% of all email traffic travels though the Internet unsecured.

An unencrypted e-mail can go anywhere for that matter. It all depends on the state of Internet "traffic" that day. An e-mail message can pass through numerous different computer systems en route to its final destination. Meanwhile, on some computers though which those e-mail is relayed, there may



be 'sniffers' or other malicious software tools. They are waiting to copy, alter or tamper with that e-mail in some way. Some are looking for key words or manes. Other sniffers are watching for credit card numbers or login passwords.

Email Encryption is the conversion of information (data) into code, to ensure confidentiality. Email encryption, then, is encoding email messages so that only the intended recipient(s) can read them.

## **DIGITAL SIGNATURES**

Most e-mail encryption tools have another element. On top of encryption algorithms, they add a digital signature. The digital signature assures the e-mail's reader that no one tampered with the message and that it did in fact come from the author.

To do this, a digital signature combines two pieces of information: a hash and the author's private key. First, let's talk about the 'hash.' The software creates the 'hash' which is a sequence of numbers (ones and zeros) unique to the author's message. The software does this by first scrambling the message. Think of it like making scrambled eggs and hash browns, mixed up together in the frying pan. Then the software crunches the scrambled mess down, digitally that is now think of crunching the scrambled eggs and hash brown potatoes into a small egg cup. That's the hash: the stuff that made it into the small egg cup.

The encryption software can only create one possible hash from an original message. However, there could be other messages that end up creating the same hash. Still, finding those other messages are virtually impossible. Though improbable, a person could find a different message that creates the same hash. that other message would most likely be gibberish.

This hash cannot be reverse engineered (that is why they call it a one-way hash). The digital hash is just like the scrunched up hash in the egg cup. There is no way to go backwards. The hash cannot go back to the eggs in their shells and the unpeeled potato. So no one can use the digital hash to find out what the message is, nor can it be used to create a different message resulting in the same hash. The common length of the hash is 128 bits.

The second step is to encrypt the hash. The author encrypts the hash using his/her private key. Voila: a digital signature. The reader can decrypt the encrypted hash using the author's public key. The intended reader's

encryption software checks to see if the author's message creates the same hash. That ensures that no one has altered the message.

The digital signatures work the opposite way to ordinary messages. The author encrypts the outgoing hash with his private key. Then the author sends out his/her public key to allow readers to verify the hash is right. The reader would also know that only the author could have initially encrypted and sent the e-mail. Only the author has the private key that will make that system work. The weak link is in the complexity of the keys that a user creates. A safe bet is to have keys with a minimum of 230 digits.



# File Transfer Protocol

## 8

### WHAT IS FTP

File Transfer Protocol is the expanded form of FTP. It is the simplest way to upload and download files over the network, When downloading a file you are transferring the file to your computer from another computer over the Internet. You can use FTP to exchange files between computer accounts, to transfer files between an account and a desktop computer, or to access software archives on the Internet. An FTP address is similar to an HTTP or Web site address except that it uses the prefix [ftp://instead](#) of http://.

Usually, a computer with an FTP address is dedicated to receive an FTP connection. A computer that is setup to host Web pages is referred to as a Web server or Web site. A computer that is dedicated to receiving an FTP connection is referred to as an FTP server or FTP site.

### HISTORY OF FTP

#### 1971 – First proposed file transfer mechanism,

1973, Feb – First “official” FTP document which was a protocol for file transfer between HOSTs on the ARPANET. In this document, the primary function of FTP is defined as transferring files efficiently and reliably among hosts and allowing the convenient use of remote file storage capabilities.

June, 1980 – Specification of FTP

1985 – Standard FTP

### WHAT IS A FTP SERVER?

A FTP server is a way off sharing files with other people on the internet. You setup a FTP server and other people can download files you have on your hard disk. This provides you with an easy way off sharing files. A FTP

Server allows Uploading which means a user is sending files to your FTP Server and Downloading which means a user is transferring files from your FTP Server.

**Servers offer features that are different from each other:**

- 1) File Resume – Allows the client to start downloading a file from a specific byte offset. This is important because it is the way that many download acceleration engines work. Instead of relying on one connection for a single stream of data for the file, it opens up four connections. Each file stream downloads a specific quarter of the file from a specific byte offset to another specific byte offset. To another specific byte offset. Other common uses for this feature on FTP servers are to resume a broken transfer. If for some reason a download crashes or breads off at some point during the download, the client software is able to make use of this feature on the server in order to be able to resume the file download and complete the file.
- 2) OS Integration – Some of the newer and more comprehensive servers out there offer Operating System integration, that is the ability to restrict access rights on the FTP server and its directories based on domain or local permission. That way, an administrator can set up an account and the FTP server will use COM+ events to learn of the account creation and hence set up the user and its access rights in the FTP server's user access.
- 3) User Accounts – Other servers allow the administrator to set up his or her own permissioning system with users that do not have access to your computer or domain. The administrator then can go in the shared directory structure and assign rights to that user within the shared files, on what he or she can and cant see, whether or not things can be read if seen, written to if read, and executed if read. This feature set gives the administrator a greater degree of control over the server that he or she administrates.
- 4) IP Address Control – These are two parts to this feature set and many servers may claim this functionality that do not have both feature sets. On the one hand, this could indicate that the server software in question has the ability to define and enforce blocked IP addresses. By assigning blocked IP addresses, the administrator can restrict problematic clients or hackers from accessing the FTP site.



IF they make a request, they will be summarily denied, often not even getting a response. The other feature set this refers to is the ability to set the server to only pay attention to requests coming on a specific IP. By implementing this feature set, administrators can set up several small FTP servers on the same computer and have them each look at requests from a different nic card. In this way, a single physical server is used even though it is hosting several different FTP servers.

- 5) Upload/Download ratios – Much of the time, the administrator setting up an FTP server will not want to allow too much bandwidth for any one particular task. If the server is a full duplex file server (that is, a server which people both upload and download to), then the strain on bandwidth can be considerable if too many people are trying to do too much of one thing. For that reason, administrators can set up a bandwidth ratio to specify a specific amount of bandwidth that each direction is allowed to use. They could separate a 1.5MBps connection so that no more than .5MBps is used to upload which leaves 1 full MBps to be used for downloading files from the server.
- 6) Real-time User monitor – Most FTP servers use a logging system that logs the commands that a user executed but does not actually display the commands and actions that are being executed in real time. With some more advanced servers, the administrator has the ability to call up a display that shows the current downloads and uploads that are going on NOW. This allows an extra step of accessibility and control to ensure that the FTP server that the administrator is running has been properly controlled and is not running of its own accord outside specified boundaries.
- 7) Disk Quota Limitations – Many servers that have user support also support the ability to set exactly how much space a user can upload data to or download from. In this way you can restrict users from using up too much of the available resource pool so that no specific user has too much in the way of resources over any other.

All in all there are a wide range of FTP server applications out there from a variety of manufacturers. Whether you are using Serv-U, Coffeecup FTP, or any one of a host of other servers, the administrator needs to make sure that it offers the features an ability that are right for you. Once you transition to an FTP

server, it is rather difficult to move to a new one so be careful in which server you select for your needs.

## **DOS FTP**

Create a dos-prompt Window (Stat button/ programs/ select Dos Prompt).

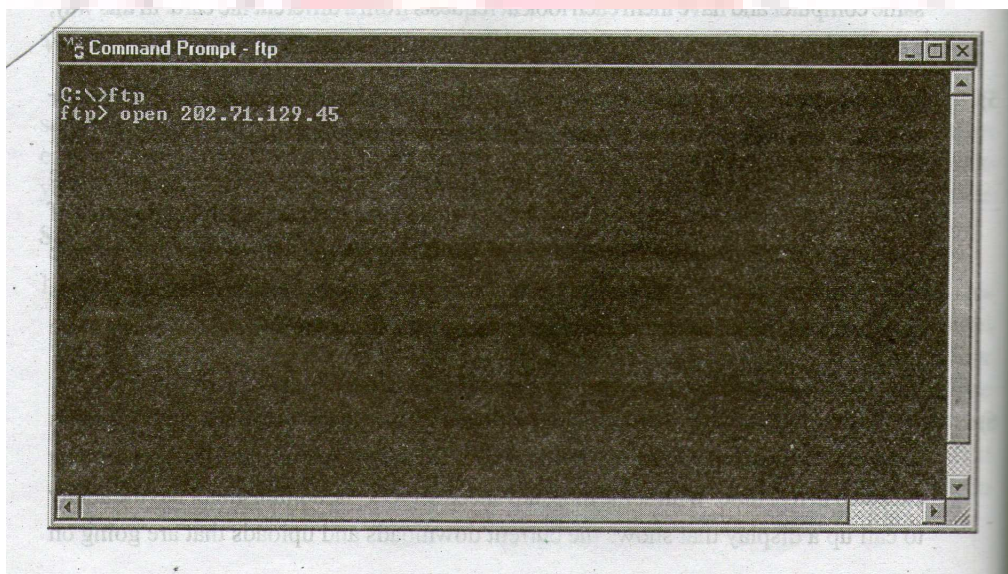
Change your PC's directory to the directory that contains the file you wish to upload (ie"cd c :\"")

Type "ftp" at the dos prompt and press enter

Type "open yourdomain.com" or the ip address of the server and press enter

Type in your username (do not include the "@dot-com" extension) and press enter

Enter your password and press enter



## **DOS FTP COMMANDS**

### **COMMAND FUNCTION**

**help**            **Displays DOS FTP help.**

**ascii**           **Sets transfer mode to ASCII (for text files and HTML pages).**

<b>binary</b>	<b>Sets transfer mode to BINARY (for graphics and sound files).</b>
<b>cd</b>	<b>Changes working directory on the remote computer.</b>
<b>delete</b>	<b>Deletes files on the remote computer.</b>
<b>disconnect</b>	<b>Breaks the ftp connection but keeps FTP client open.</b>
<b>get</b>	<b>Copies a remote file to the local computer using the current file transfer type (the local dir is the one your launched FTP in or changed to with the ics command).</b>
<b>icd</b>	<b>Changes the working directory on the local computer.</b>
<b>ls</b>	<b>Displays list of remote directory's files and sub-directories.</b>
<b>mdelete</b>	<b>Multiple delete of files.</b>
<b>mget</b>	<b>Copies a remote directory.</b>
<b>mkdir</b>	<b>Creates a remote directory.</b>
<b>mput</b>	<b>Copies multiple remote files to local computer.</b>
<b>put</b>	<b>Copies a local file to the remote computer.</b>
<b>rename</b>	<b>Renames remote files</b>

## **CUTE FTP**

Choose Site Manager from the File menu. Choose which folder you would like the Site Profile to be in (possibly in the General FTP Sites folder) and click on the Next fill in the following fields:

Label: Whatever you want to name the site profile

FTP Host Address: yourdomainname.com

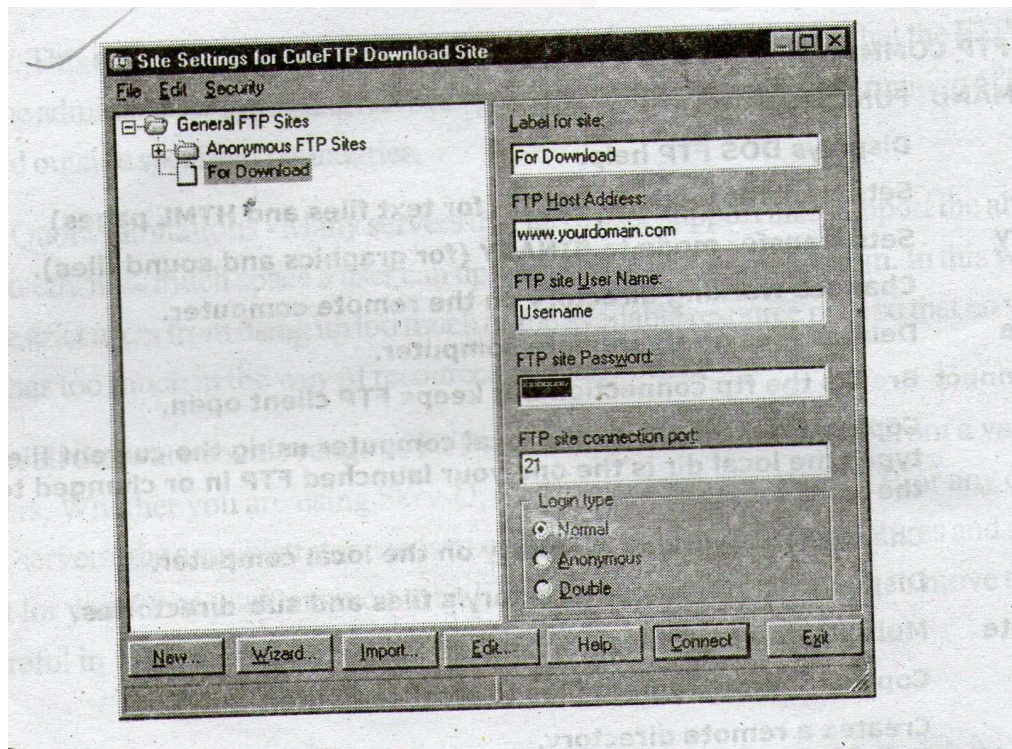
FTP site User Name: Your username

FTP site Password: Your password

FTP site Port Connection: 21

Set the Login Type to Normal

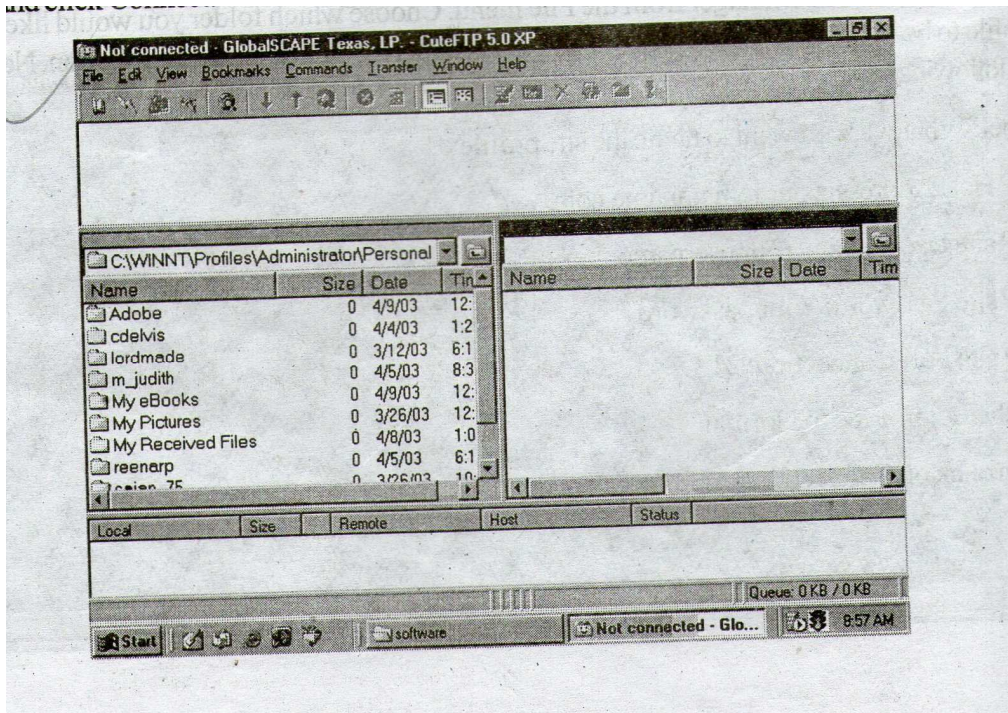
Then click on Connect



## CUTE FTP

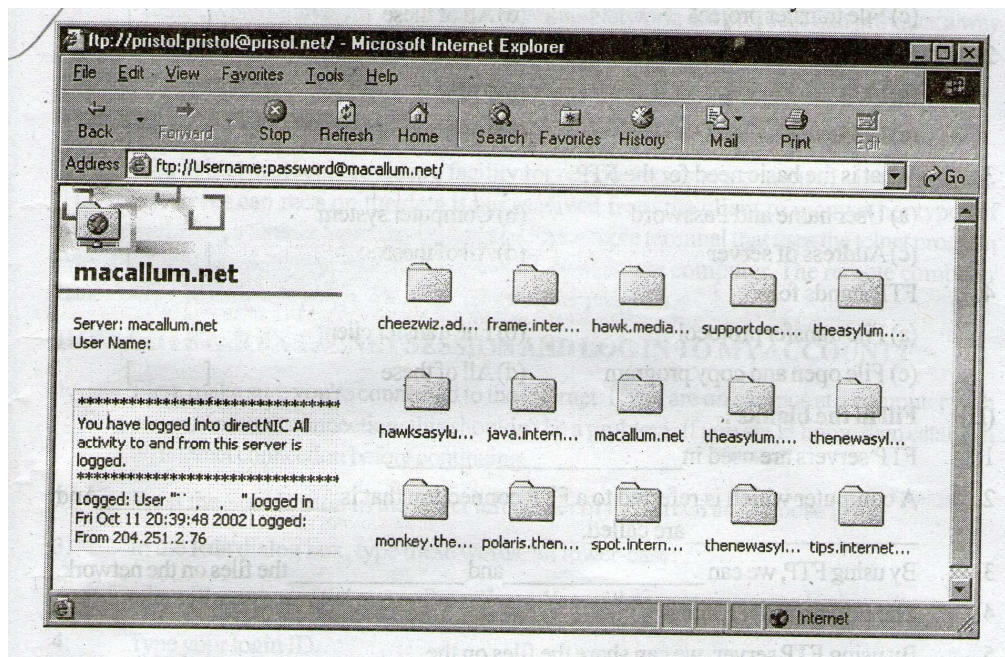
Once you are logged in, the left window is the Local Window and the right window is the Remote Window. In the Remote Window, you will be logged into the Home Directory; open up the Domain Directory to which you want to upload your site. Then, choose the files in the Local Window you want to upload and click and drag them to the Remote Window. The next time you need to upload to the site, simply choose Site Manager from the File menu and click on the Site Profile and click Connect.





## BROWSER BASED FTP

Using Internet Explorer to upload is easy. In the address bar type ftp:// username: [Password@yourdomainname.com](#) This will log you into the Home Directory. From here open the folder for the Domain Directory to which you want to upload. Once in the Domain Directory, simply click and drag the files from your computer into the Domain Directory.



# Telnet

## 9

### WHAT IS TELNET?

Telnet, which stands for Telecommunications Network, is a protocol that provides a way for clients to connect to servers on the Internet. Users can use Telnet to communicate with a remote login service.

### THE TELNET PROTOCOL

The Telnet protocol provides a facility for remote logins to a computer via the Internet. The telnet server can pass on the data it has received from the client to many other types of process including a remote login server. A user with a simple terminal that uses the telnet program which is the client program, runs a login session on a remote computer. The remote computer handles the communications needs of the telnet server program.

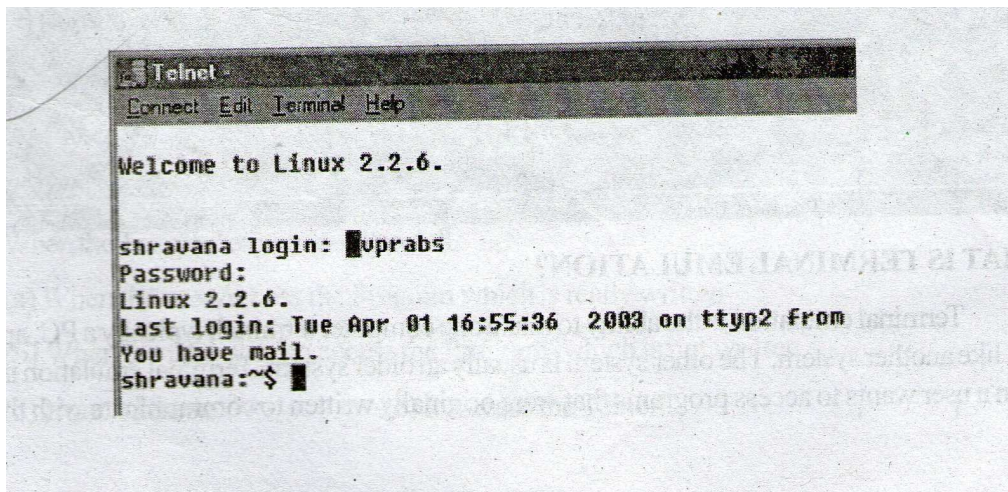
### HOW DO I START A TELNET SESSION AND LOG IN TO MY ACCOUNT?

1. First, make sure you're connected to the internet. If you are on campus at a computer with a direct internet connection, this shouldn't be a problem. If you are at home then establish an internet connection before continuing.
2. Press the Start Button in the lower left corner of the screen and choose Run.
3. In the Run dialog box, type these words, all lower-case:

telnet IP number of the server Press Enter. You will see a login screen login:



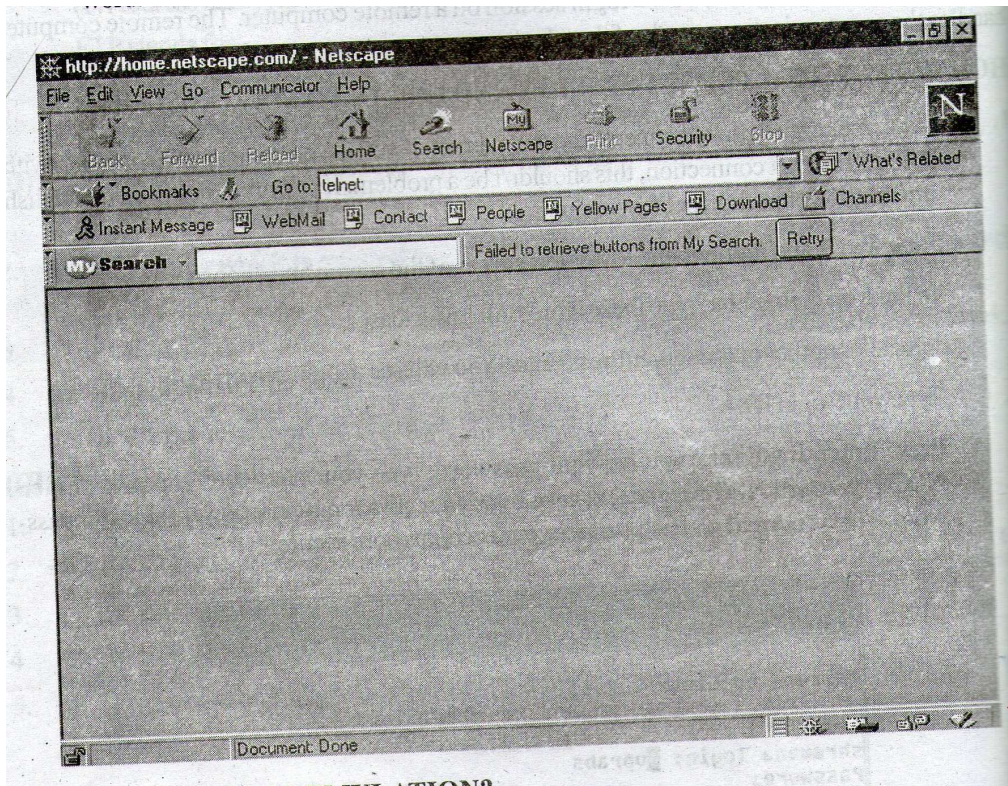
4. Type your login ID.
5. Press Enter. It will ask you for your password; type your password and press Enter. NOTE: you will NOT see the text appear, or your cursor move, when typing your password. This is normal and helps make your account more secure.



## HOW DO I START A TELNET SESSION WITH NETSCAPE

1. First, make sure you're connected to the internet. If you are on campus at a computer with a direct internet connection, this shouldn't be a problem. If you are at home then establish an internet connection before continuing.
2. In the Go to: type telnet IP number of the server  
  
Press Enter. You will see a login screen  
login:
3. Type your login ID.
4. Press Enter. It will ask you for your password; type password and press Enter. NOTE: you will not see the text appear, or your cursor move, when typing your password. This is normal and helps make your account more secure





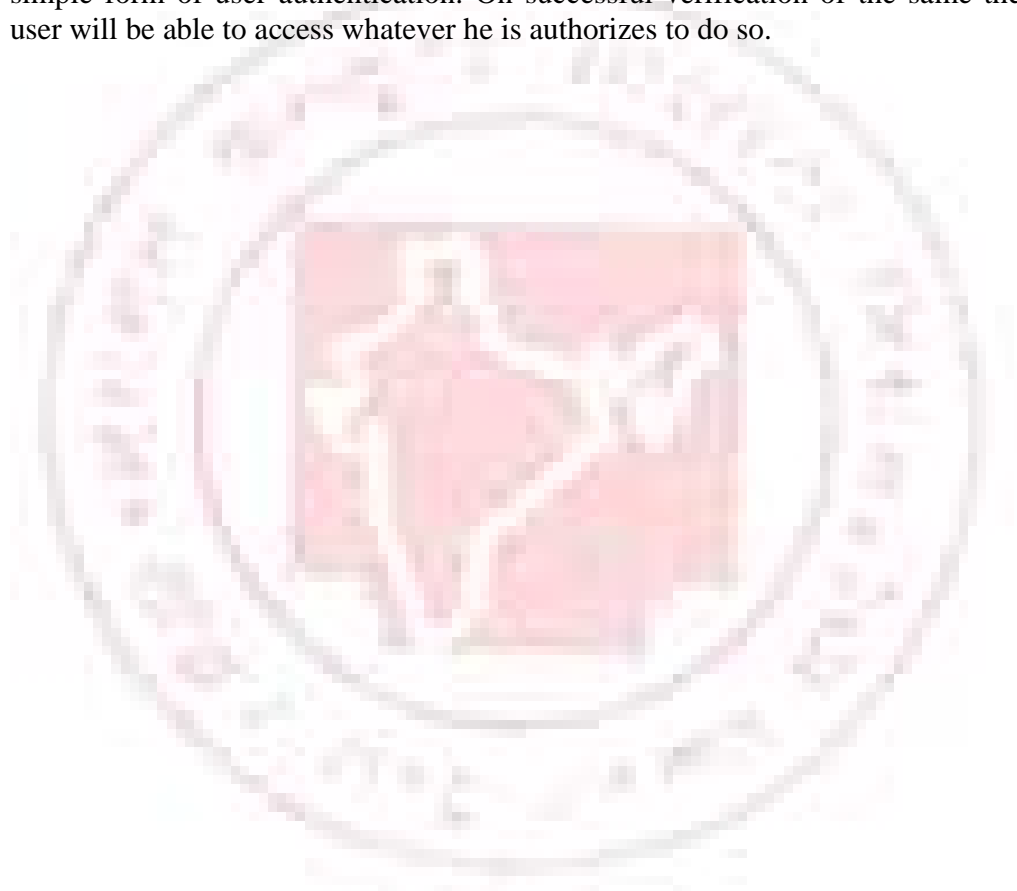
## WHAT IS TERMINAL EMULATION?

Terminal emulation is the ability to make one computer terminal, typically a PC, appear to look like another system. The other system is usually an older system. Terminal emulation is useful when a user wants to access programs that were originally written to communicate with the older system. Terminal emulation is also used to give PC users the ability to log on and get direct access to legacy programs in a mainframe operating system. Terminal emulation requires installing a special program in the PC or on a local area network (LAN) server to which it is connected. Typically, an enterprise with mainframe computers installs a terminal emulation program in all its workstations or LAN servers. Workers can work locally with Windows, other PC or workstation applications and simultaneously open a window and work directly with mainframe applications. The terminal emulation program runs like any other workstation application as a separate program task providing its own window to the user. Unlike the graphical user interface (GUI) of other applications the terminal emulation window presents a text-only interface to some particular mainframe operating system or application. Different terminal

emulation is required for specific types of terminals – for example, the IBM 3270 display terminal, the AS/400 5250 display terminal, or DEC's VT100 terminal.

## **WHAT IS USER AUTHENTICATION?**

User verification in any system for determining, and verifying, the identity of a remote user is called authentication. User name and password is a simple form of user authentication. On successful verification of the same the user will be able to access whatever he is authorized to do so.



# User and Internet Relay Chat

10

## WHAT IS USENET?

A Usenet is an enormous bulletin board type of messaging system. People can exchange messages that are available to anyone who wants to read them on the Usenet. The messages are divided into groups according to subject. The groups are most often called newsgroups, discussion groups, or forums. The messages on the Usenet may be about any subject. The message may ask a question, open a discussion, or it may be a reply to another message. There may be a group of messages that started with one question. The group referred to as a thread, consists of replies to the question, then replies to the replies, and so on. The Usenet is organized into sections and subsections that help in keeping related messages together.

## ORGANIZATION OF NEWSGROUPS

Newsgroups are arranged into hierarchies and a naming convention is used for the hierarchies. In this method of organization; each newsgroup has a two-or-more-part name. The first part of the name, often called the top-level, gives the main area of interest and each subsequent part of the name narrows the focus of the subject. For example a newsgroup with the name rec.music.reggae would tell you that that the group has to do with recreation. The second part would tell you that it has to do with music, and the third part would narrow the focus to reggae. There are “main” hierarchies, called mainstream hierarchies and “non-mainstream” newsgroups.

### Top-level names of the mainstream newsgroups:

- comp – computers (hardware, software, networks, databases, languages, etc.)
- humanities – literature, fine arts, etc.
- misc – those groups that don’t fit anywhere else, but still belong in the mainstream groups
- news – having to do with Usenet news itself

(administrative issues, FAQs, announcements, general information, questions and answers)  
rec – recreation (sports, hobbies, arts, entertainment, etc.)  
sci – science (science, research, engineering, medicine etc.)  
soc – social (issues, politics, culture, culture, socializing – but not chit-chat!)  
talk – debates and discussions (politics, religion, environment, etc.)

## **ORGANIZATION OF NEWSGROUPS**

Top – level names of non-mainstream newsgroups.  
alt – those that clearly don't belong in the main groups;  
no restrictions on what these can be  
bionet – biology  
biz – business product information  
be – German language and culture  
va – Virginia  
umich – University of Michigan

In addition there are some fee-based newsgroups. The fee is paid by your ISP to maintain the groups at its site. Your provider may or may not pass a fee along to you for accessing the groups.

### **Two such top-level hierarchies are:**

clari – Clarinet subscription service; UPI feeds, columnists, stock reports scores  
msen – subscription service; Reuters articles

## **NEWS SERVER**

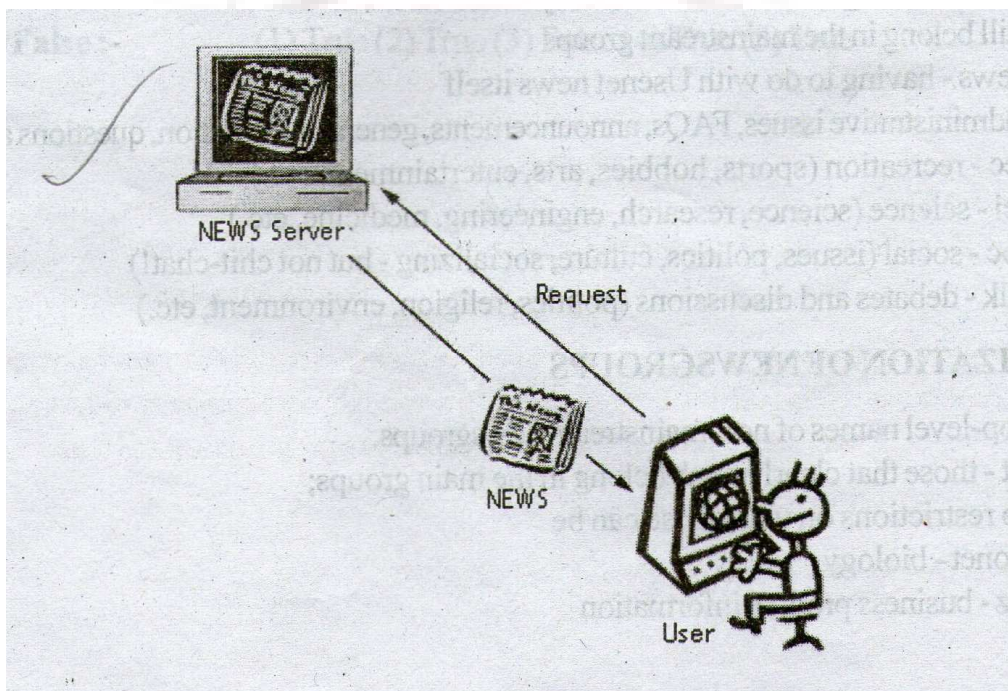
A news server is a computer with software which receives news articles of Usenet's newsgroups from other news servers, propagates them to yet other news servers, stores them locally for a certain period of time, and provides them to news readers that connect to it. It also allows news readers to post new articles which it stores and propagates as well.

The propagation of news articles is configured at the feeding or sending news server. This means that each news server has a list of other news servers to which it propagates news articles. The propagation is not done to those



news servers that already have the name of the feeding news server in their Path: header. This in turn means that to operate a news server you'll need to find an operator of an already working news server who is willing to feed you or include your news servers is feeding.

The news server software that is installed on the news server must provide an effective means to store and deal with articles. It also has to take care that old articles are deleted regularly or expired so that there is enough space on the hard disks to store new ones.



## WHAT IS ONLINE CHAT?

Online chat is a method by which two or more computer users connected to the internet communicate with each other in real time. When you chat on the Internet, you “talk” to others using your keyboard to type text messages. Although there are different types of Internet chat, they all follow the same basic principles. Typically the users will connect to a chat server using a chat client and meet in a chat room. A “chat room” is a virtual environment where chatters gather. Once the users are in the same chat room, they can converse with one another by typing messages into a window where all of the

other users in the chat room can see the message. Conversations are then carried on by reading the messages entered by the other users in the chat room and responding to them.

## **WHAT IS A CHAT SERVER?**

A chat server is a specially equipped computer connected to the internet that allows users with chat clients to converse with one another through typed messages in real time. There are a great number of chat servers which let users connect for free. Some of the more popular chat servers are dal.net, under.net, etc.

## **INTERNET RELAY CHAT SOME BACKGROUND ON IRC**

In 1988, Jarkko Oikarinen of Finland developed the multi-user text chat program known as IRC. IRC was not the beginning of text chat but it was the beginning of a global network, known as EFNet. EFNET allowed physically dissimilar computers to link together for the purpose of text chat. Today, there are more than 50 known ERC networks. That number has matured as IRC's popularity soars and new, user-friendly software brings the creativity of sound, video, animation, and real-time file transfers to us.

## **IRC CLIENTS AND SERVERS**

Accessing IRC is an example of using specialized software, called a client that allows your computer to access another computer, called a server. The server is a program that processes your IRC client's requests for information and allows you to utilize the server's resources. You can chat with other IRC users, as well as exchange files with them.

There are numerous IRC clients available, in versions for Windows and Macs. These software packages are freely distributed at many sites on the Internet that offer shareware and freeware programs. Modern chat clients take the work out of IRC, which used to require the knowledge of basic and advanced commands to access resources on remote computers. Windows and Mac IRC client commands have been transformed into menu selections, mouse clicks, and information windows. To use IRC you need to know only the name and port of the server that you want to connect to. Your IRC client will use this information to access the resources of the specified remote server. This connection will bring you together with other computer users who have contacted the same server and port. Ports are access points to a server. You can use a port to talk to anyone on

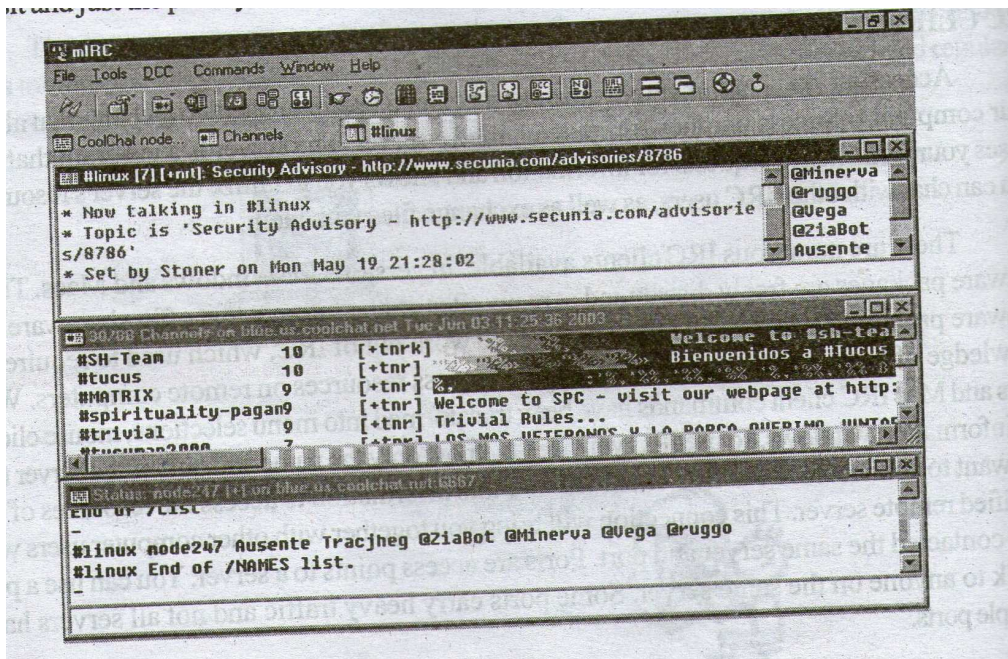
the same server. Some ports carry heavy traffic and not all servers have multiple ports.

## **IRC NETWORKS**

EFNet the largest IRC network, accommodates upto 22,000 clients at a time. EFNet has approximately 84 servers linked together. The second and third largest existing networks are the UnderNet and DalNet. The EFNet located in New York, UnderNet in Los Angeles, and DalNet in Dallas comprise the 'Big 3' in the IRC world. If something smaller appeals to you, then most IRC networks will suit you better than the Big 3. The number of people who can access small IRC networks ranges from 2 to a few hundred people. You can even find networks that suited to your interests, for example, family-oriented, technical, hobbies, adventure, and role-playing games

## **USING IRC**

To use IRC, you need to install client software on your computer. Next you need to use your Internet connection to connect to an IRC network. After you are connected to an IRC network, you can select a channels to join. A channel is like a room, where you can talk in groups or in private conversations to any number of people. You can also leave at any time and join another channel. While IRC is anonymous, it is not designed to hide you form other people. Also, when you are talking to people you do not know and you have no way of knowing if what they are saying is true or not. So use some caution when using IRC. Remember that IRC as a whole is un moderated, although each channel is controlled by a channel operator, who can force people off the channel. People can and will say things that will shock and offend you. Some channels will be calm and others will be chaotic. If you don't like what's being said in one place, you can move on to another. You are bound to find people with whom you can enjoy pleasant conversation. As soon as the last person leaves a channel, it no longer exists. So a channel can be uninteresting to you on one visit and just the place you want to be on another visit, because it's an entirely new channel.



**IRC commands start with a slash. Here are a few examples:**

/nick – sets your nickname

/list – gives you a list of channels on the server

/names – gives you a list of nicknames being used

/help – gives you help information

/join – joins a channel

/part – leaves a channel

/whois – gives you user information All channel names begin with a pound sign (#) or an ampersand (&), for example, #hottub.

## SMILIE

Smilie	Description	Smilie	Description	Smilie	Description
:-)	smile	:->	sarcastic	:-	angry
;-)	wink	:-)))	laughing or	:-(-	weeping



			double chin		
:-)	laughing tears	;-)=)	grin	}-)	evil
:-D	laughing	:-}	wry smile	:-@	angry
:-P	tongue	:-(	sad, angry	:-()	talking
:-<	Sad	:-I	indifferent/sad	:-X	mute
:-O	surprised/shocked	=:-)	shocked	O:-)	halo
:-3	has eaten a lemon	:-/	sceptical	:-Z	sleeping
?-(	sorry, I don't know what went wrong	:-x	kissing	:-*	sorry, I didn't want to say that
:*)	drunk (red nose)	%-)	stared too long at	#-)	monitor dead
.-)	one-eyed	X-)	unconscious	:-Q	smoking
(:-)	bald	-:-)	punk	<:-)	stupid question (donkey's hat)
:-)-8	big girl	<\-)	chinese	@:-)	arab
8:-)	little girl	::-)	wearing glasses	[:]	robot
.^)	side view	8-)	wearing glasses / wide-eyed grin	B-)	horn-rimmed glasses
B:-)	sunglasses on head	_O-)	aquanaut	:<)	moustache
(:-	left-handed	{:-)	wig	:-E	vampire
:-[	vampire	:)	happy	:O)	boxer's nose
: }	(what should we call these?)	[:]	robot	:]	gleep, friendly
=)	variations on a theme	:>	(what?)	:@	(what?)
:D	laughter	:I	hmmm...	:(	sad.

## WHAT IS WEB PUBLISHING?

At its most basic level, web publishing consists of making various computer files available to Internet users through the World Wide Web. These files may be of several types:

- Plain text (.txt)
- Hypertext (.html)
- Multimedia
  - Graphics (.gif or .jpg)
  - Audio (.wav .au .mid)
  - Video (.mpg or .mov)
- Scripts, Java applets or other Web program files (.cgi .class .js .asp)
- Files in proprietary formats (.pdf .doc)
- Downloadable files (.exe .zip)

## WHY PUBLISH ON THE WEB?

In recent years, the World Wide Web has become the primary system for distributing information on the Internet. Its growth in popularity has been the result of its ability to incorporate graphics and other multimedia effects, the development of robust software tools such as Netscape Navigator and Microsoft Internet Explorer to access a variety of file formats, and its flexibility in incorporating new technologies. Publishing on the web can be an effective way to disseminate almost any kind of information.

## WHAT IS WEB SITE HOSTING?

Web site hosting is an Internet-computer that holds your Web site, and sends copies of it to whomever makes a request to see it. Your Web site is an interconnected group of computer files that contain text or images. In many ways, the files composing a web site are similar to your word-processing documents, and exist on the designer's hard disk. For the world to view these web pages, copies of these files are placed on the hard disk of a server that is operated by a Web hosting company or service. This server is a computer that is connected to the Internet 24 hours a day, 7 days a week. The connection is of

very high-speeds. This high speed is required to allow hundreds of people to simultaneously view web pages on that computer. In addition, the web host computer must run special software. This software connects a specific domain name such as [www.myinn.com](http://www.myinn.com) to the appropriate group of web pages.

## **COMPONENTS OF WEB PUBLISHING**

1. Web server. It is compulsory that at an individual or enterprise subscribes to an information system service providing access to the internet. Organization which have substantial computing resources can set up their own HTTP server and connect to the internet.
2. HTML authoring tool. To compose the Web pages an authoring tool is needed. Web pages are made of HTML which is an ASCII text file consisting of HTML tags. Common text editors can be used for this task. To create commercial or more complicated HTML, such as multimedia Web pages, a higher functionality tool such as Perl.
3. Web browser. Web browsers are client software which can be used to navigate and access the large volume of Web pages stored in different Web servers on the internet. The browsers are text and graphics-based, however the later is more preferred because they can display graphics and icons which are more users friendly. The most commonly used Web browsers are Netscape Communicator (Netscape Communications 1998) and Microsoft Internet Explorer (Microsoft Corporation 1998).

## **DESIGNING WWW DOCUMENTS**

The World Wide Web provides a easy way to make information available to a wide audience. When you decide to be an 'information provider' using the Web, there are many design issues to consider before you actually start entering the information into a document and adding the codes to make the information readable by a Web browser.

**Some of these issues are:**

**Structure**

Typically, your information will be presented in segments, called pages. The structure of your information system is the way these pages are connected. Some common structures are a sequence where the information is meant to be read from the beginning to the end, a grid where connections between pages does not make a regular pattern, and a hierarchy where a parent page provides access to a number of different sequences. Each of these structures has advantages, and will be appropriate for different projects.

## **Audience**

You can provide information that caters to specific needs of the audience, such as a novice level and an expert level. The information can be structured to provide alternate views of the information.

## **Ergonomics**

This means making your information easy and pleasant to read from a computer monitor. Studies have shown that people do not like to do sustained reading from a screen. It is usually true that people will be happier to see the information they want immediately rather than having to hunt for it. Therefore, you will want to structure your information so that the person retrieving it will see the pertinent information on the screen, without scrolling for it. Information designed for paper publishing may have to be rewritten so that it is suitable for on-screen presentation. The World Wide Web provides an easy way to make information available to a wide audience. When you decide to be an 'information provider' using the Web, there are many design issues to consider before you actually start entering the information into a document and adding the codes to make the information readable by a Web browser.

## **Long Term Considerations**

Besides the initial effort of preparing the documents to be published, a Web site requires a long term commitment for maintaining the documents. This maintenance is required because of information changes, structure changes, revisits by users.

## **Information Changes**

Information is useful only when it is current. Outdated information leaves a very poor impression on those who visit your site. So, keeping a web



site current will require constant attention to making sure the information contained in it is correct and up-to-data.

### **Structural Changes**

Once you have set up many files, linked to each other, it becomes more difficult to make changes without leaving parts of your site “stranded”. This can be particularly problematic when the original designer of a site leaves the organization and someone new must take over. Planning for this eventuality may save considerable effort later.

### **Revisits by Users**

Users who have visited your site may have book marked it for future reference. If you remove your web site then the next time that the bookmarks are referenced the user will be met with the response that your site does not exist. This is not good advertising. So, make sure that you are fully committed to ongoing maintenance of a web page before hosting your Web site.

### **HOW TO SUBMIT A SITE TO A SEARCH ENGINE?**

Everyone with a site should at least start by individually submitting their home page and/or other main pages to a dozen or so of the main Search Engines.

#### **The technique one would use is.**

1. Go to the home page of the Search Engine and look for a link called “Add URL” or “Submit a Site.”
2. Click on this link then look for a link to a Help page. The difficulty here is that each Search Engine seems to have it’s own rules. They might be confusing but not unfathomable.

#### **Here are some basic questions to find answers to before submitting to a search Engine:**

1. Does it require just one submission of the home page or will it allow submission of other main pages or even all the pages in the site?

2. Does it index content or meta tags? Before submitting to any Search Engine that uses Meta Tags, spend some time developing good ones for your pages.
3. Do you have frames in your site and does the Search Engine index sites with frames? (A few do, most don't)
4. Is it directory-type Search Engine (like Yahoo) that requires the person doing the listing to find the correct categories

## **WEB PUBLISHING TOOLS**

### **Macromedia Dreamweaver**

<http://www.macromedia.com/software/dreamweaver/>

Macromedia Dream weaver is both a “visual HTML” (WYSIWYG) and HTML source code editor. Dreamweaver supports table and frame creation through a drag-and-drop environment, Cascading style sheet (CSS) standards, CSS-P (CSS positioning), Netscape Layers, and Java Script including image rollover effects, and animations. Dynamic HTML can be saved for 3.0 and 4.0 browsers. Dreamweaver also includes some site management capabilities. Two of the most noteworthy features are link checking or editing and a library for commonly used content. Dreamweaver is provided by Macromedia Inc. and is available for Macintosh and Windows 95/NT.

### **Net Objects Fusion**

<http://www.netobjects.com/>

Net Object Fusion is unique in that it offers a “site-oriented approach” rather than a simple WYSIWYG page editor. In other words, it allows users to visually map out the site structure, make global changes, automatically update links, and construct and organize individual pages without using HTML or Dynamic HTML coding. Database publishing is also supported, although support varies according to platform. Once the site is designed, the entire site structure, including the HTML pages, is generated from a Net Objects database. Net Objects Fusion is provided by Net Objects, Inc. and is available for both Macintosh and Windows 95/NT.

## **DOCUMENT MANAGEMENT**

Every firm must have and manage evidence – the proof of their actions, such as dealing with clients, customers, other firms, other firms, etc., as well as the other way around. In short, every firm should be able to prove all their actions were done efficiently and effectively, That's why in many companies, thousands and even millions of documents have been accumulated and more documents are added daily.

As the time is passing, more and more the proof is moving from traditional paper documents to electronic media, so electronic documents management is a significant part of any agency's business operations. But, it also means that no single medium now holds all the documents relating to an agency's business activities. If electronic document management is not done to the full extent and/or not all traditional records management disciplines for paper documents are applied to electronic documents, it can result in:

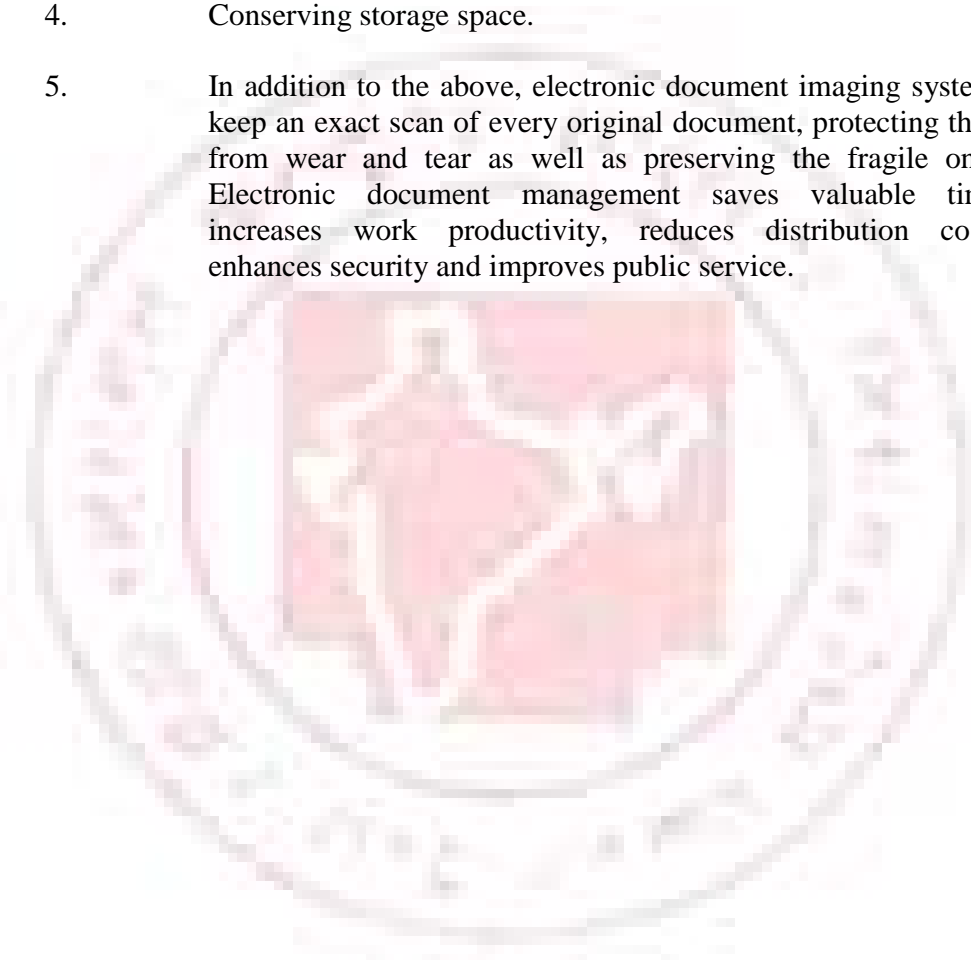
1. confusion between different versions of a document
2. loss or destruction of documents that should be kept
3. questionable authenticity, because of possible manipulation of text in electronic documents
4. loss of context of documents due to lack of linking of related documents
5. document inaccessibility because of technological change in record management software or records storage media

Which is naturally a consequence of inadequate document management model an business record retention policy, and not due to creating and keeping documents in electronic form

## **DOCUMENT MANAGEMENT**

Modern digital technology has created a situation where documents are easily copied and transferred from one medium to another. Electronic document imaging is the conversion of paper documents into electronic images on a computer. Electronic document archival and retrieval provide conditions for:

1. Improved, instantaneous and more efficient, access to documents, records and evidence than ever before
2. Preventing misfiling and loss of documents
3. Reducing indexing time
4. Conserving storage space.
5. In addition to the above, electronic document imaging systems keep an exact scan of every original document, protecting them from wear and tear as well as preserving the fragile ones. Electronic document management saves valuable time, increases work productivity, reduces distribution costs, enhances security and improves public service.





The Web depends on Web page authors and vendors sharing the same conventions for HTML. This has motivated joint work on specifications for HTML. HTML was originally developed by Tim Berners-Lee while at CERN, and popularized by the Mosaic browser developed at NCSA. HTML 2.0 was developed under the aegis of the Internet Engineering Task Force (IETF) to codify common practice in late 1994. HTML+ (1993) and HTML 3.0 (1995) proposed much richer versions of HTML. Despite never having received consensus in standards discussions, these drafts led to the adoption of a range of new features. The efforts of the World Wide Web Consortium's HTML Working Group to codify common practice in 1996 resulted in HTML 3.2 (January 1997). Most people agree that HTML documents should work well across different browsers and platforms. Achieving interoperability lowers costs to content providers since they must develop only one version of a document. If the effort to standardize is not made, there is much greater risk that the Web will devolve into a proprietary world of incompatible formats, ultimately reducing the Web's commercial potential for all participants.

Each version of HTML has attempted to reflect greater consensus among industry players. This attempt ensures that the investment made by content providers will not be wasted and that their documents will not become unreadable in a short period of time. HTML has been developed with the vision that all types of devices should be able to use information on the Web: PCs with graphic displays of varying resolution and color depths, cellular telephones, hand held devices, devices for speech for output and input, computers with high or low bandwidth, and so on.

## **ACCESSIBILITY**

As the Web community grows and its members diversify in their abilities and skills, it is crucial that the underlying technologies be appropriate to their specific needs. HTML has been designed to make Web pages more accessible to those with physical limitations. HTML 4 developments inspired by concerns for accessibility include:

Better distinction between document structure and presentation, thus encouraging the use of style sheets instead of HTML presentation elements

and attributes. Better forms, including the addition of access keys, the ability to group form controls semantically, the ability to group SELECT options semantically, and active labels. The ability to markup a text description of an included project. A new client-side image map mechanism that allows authors to integrate image and text links.

The requirement that alternate text accompany images and image maps. Support for the title and language attributes on all elements. Support for the abbreviations and acronyms. A wider range of target media, such as True type Font, Braille, for use with style sheets. Better tables, including captions, column groups, and mechanisms to facilitate non-visual rendering. Long descriptions of tables, images, frames, etc. Authors who design pages with accessible issues in mind will enable the accessibility community to use the pages. In addition, the accessible pages will benefit from well-designed HTML documents that distinguish structure and the presentation of information will adapt more easily to new technologies.

HTML is a very simple SGML-based markup language that is complex enough to support basic online formatting and presentation of hypermedia documents. HTML documents use tags to indicate formatting or structural information. A tag is a left angle bracket (<) followed by a directive and zero or more parameters followed by a right angle bracket (>).

## **DOCUMENT LAYOUT**

**An HTML 4 document is composed of three parts:**

1. A line containing HTML version information
2. A declarative header section that is delimited by the HEAD element
3. A body section which contains the document's actual content. The body may be implemented by the BODY element or the FRAMESET element.

White space that includes spaces, new lines, tabs, and comments may appear before or after each section. The head and body sections should be delimited by the HTML element.

**Here's an example of a simple HTML document:**

```
<HTML>
<HEAD>
<TITLE>MY FIRST HTML DOCUMENT </TITLE>
</HEAD>
<BODY>
<P>HELLO WORLD! </P>
</BODY>
</HTML>
```

Output : on screen  
Hello world

## **TITLE**

Every HTML document should have a title that preferably consists of about half a dozen words that declare the document's purpose. Titles are not displayed as part of the document text, but are rather displayed separately from the document by most browsers at the top of the window. The title of the HTML document is also used for identification in certain other contexts. The title generally goes on the first line of the document.

### **For example:**

```
<title>This is my document. </TITLE>
```

The directive for the title tag is title which is self explanatory. There are both starting and ending title tags. The ending tag is similar to the starting tag except for a slash (/) that precedes the directive, for example:</TITLE>. HTML is not case sensitive. This means that both <title> and <TITLE> are the same.

## **HEADER**

A heading element briefly describes the section that it introduces. Heading information may be user agents, for example, to construct a table of contents for a document automatically. There are six levels of headings in HTML with H 1 to indicate the most important and H6 as the least. Visual browsers usually render more important headings in larger fonts than less important ones. Authors should not choose a heading level based on the font size

commonly used by visual browsers. The heading level should be chosen based on the importance of the heading and the placement in the document.

Headers are displayed within the document, generally using larger or bolder fonts than normal document text. H1 through H3 are the commonly used headers.

Here is an example level 1 header:

Here is an example level 1 header:

```
<H1>This is a level 1 header. </H1>
```

Here is an example level 2 header:

```
<h2>This is a level 2 header. </h2>
```

Output : on the screen

This is a level 1 header.

This is a level 2 header.

## **BLOCK ORIENTED AND INLINE ELEMENTS**

HTML elements that appear within the BODY section are of two types: “block-level” and “inline.” Inline elements are also known as “text level” elements. Block-level elements typically contain inline elements and other block-level elements. Inline elements may contain only data and other inline elements. Compared to inline elements, block-level elements, create “larger” structures and are formatted differently than inline elements. When displayed in a HTML page, the block-level elements begin on new lines.

## **LISTS**

Formatted lists can also be created using HTML tags. The three main types of list that can be used are ordered lists and unordered lists and definition list. An ordered is numbered list, whereas an unordered list is bulleted:

(a) OL –Ordered list

(b) UL – Unordered list

(c) DL – Definition List

output : on the screen



### **Example for Ordered list:**

1. Ordered list

### **Example for Unordered list:**

- Unordered list

### **Example for Definition list:**

- Definition List

## **ORDERED LISTS**

`<OL>` - Designates the start of an ordered list

`<LI>` - Designates and item in the list.

`</OL>` - Designates the end of an ordered list.

**The ordered list starts with a value 1 if not specified.**

Example

```
<ol>
```

```
<li>This is how it looks
```

```
<li>This is how it works
```

```
<li>This is how we all learn
```

```
</ol>
```

### **Output : on the screen**

1. This is how it looks
2. This is how it works
3. This is how we all learn

## UNORDERED LISTS

<UL> - Designates the start of an unordered list

<LI> - Designates an item in the list.

</UL> - Designates the end of an ordered list.

**Unordered lists provide bullets for each of the items by default.**

Example

```
<ul>
```

```
<li>First Item
```

```
<li>Second Item
```

```
<li>Third Item
```

```
</ul>
```

**Output : on the screen**

- First Item
- Second Item
- Third Item

## DEFINITION LISTS

<DL> - Designates the start of a definition list.

<DT> - Designates a definition term.

<DD> - Designates a definition to go with the definition term.

</DL>- Designates the end of a definition list.

## This works only on some browsers

Example

```
<dl><lh>Team  
  
<dt><b>Project Manager</b>  
  
<dd>Rahul Kumar  
  
<dt><B>Team Leader</b>  
  
<dd>Shashank Gupta  
  
<dt><B>Programmer</b>  
  
<dd>Anil Sharma  
  
<dt><B>Programmer</b>  
  
<dd>Anil Kumar  
  
</dl>
```

Output : on the screen

**Team**

**Project Manager**

Rahul Kumar

**Team Leader**

Shashank Gupta

**Programmer**

Anil Sharma

**Programmer**

Anil Kumar

## **BLOCK-LEVEL ELEMENTS**

### **ADDRESS**

The ADDRESS element provides contact information for a document or part to a document. The information provided by the ADDRESS element may include the names of the document's maintainers, links to the maintainers' Web pages, e-mail addresses for feedback, postal addresses, phone numbers, and so on.

Example:

```
<ADDRESS>Maintained by Vijay
```

```
<A HREF="mailto:vijay@abcd.com">
```

```
vijay@abcd.com </A></ADDRESS>
```

**Output : on the screen**

Maintained by Vijay

### **BLOCKQUOTE**

The BLOCKQUOTE element defines a block quotation. Unlike inline quotations, block quotations may contain block-level elements such as P and TABLE.

Example:

```
<p>This is a test document for the HTML page you can key in the  
same content and check the page in the  
browser</P><BLOCKQUOTE>and </BLOCKQUOTE>
```

```
<P>You can continue to work with HTML because it is  
interesting.</P>
```

**Output : on the screen**

This is a test document for the HTML page you can key in the same content and check the page in the browser

and

You can continue to work with HTML because it is interesting.

## **DIV – DIVISION**

The DIV element defines a generic block-level container, allowing authors to provide style or language information to blocks of content.

Example:

```
<DIV ALIGN=center>Hello! This has to center the text in the  
table</DIV>
```

## **SPAN**

The SPAN element is a generic inline container. SPAN carries no structural meaning itself, but it can be used to provide extra structure through its LANG, DIR, CLASS, and ID attributes.

SPAN should only be used where no other HTML inline element provides a suitable meaning. If a presentation such as bold or italic text would be suitable on browsers, programmers may prefer to use an appropriate font style element.

Example:

```
<P><SPAN>India's Independence</SPAN> In the year 1947</P>
```

## **Output : on the screen**

Example for DIV – Division:

Hello! This has to center the text in the table



Example for DIV – Division:

India's Independence In the year 1947

## **CENTER**

The CENTER element defines a block whose contents are centered horizontally on visual browsers. <CENTER> is a shorter version for <DIV ALIGN=center>, although CENTER is slightly better supported among browsers. The CENTER element is useful for centering tables.

Example:

```
<CENTER>
<TABLE>
<TR ALIGN=center>
<TD>Name</TD>
<TD>Office</TD>
<TD>City</TD>
</TR>
<TR ALIGN=center>
<TD>Vijay</TD>
<TD>PS</TD>
<TD>Bangalore</TD>
</TR>
</TABLE>
</CENTER>
```

## Output on the screen

Name	Office	City
Vijay	PS	Bangalore

## INLINE ELEMENTS

### H1

The H1 element defines a level-one heading. A document generally should have exactly one H1 element to mark the most important heading. Visual browsers typically render H1 in a large, bold font.

Example:

```
<H1>This Is The Title Of The Document</H1>
```

### HR – Horizontal Rule

The HR element defines a horizontal rule for visual browsers. While this element is inherently presentational, it can be used structurally as a section divider.

Example:

```
<HR>
```

```
<P> Hi this is a test document to test the use of the Horizontal Rule</P>
```

```
</HR>
```

## Output on the screen

This is a level 1 header.

---

Hi this is a test document to test the use of the Horizontal Rule

---

## **P – PARAGRAPH**

This P element defines a paragraph. The closing tag for P is optional, but its use prevents common browser bugs. HTML does not specify a presentation for the P element. Browsers commonly use block paragraphs with no first-line indent and separated by a blank line, but some browsers allow the user to specify a different presentation.

Example:

```
<P> Hi this is a test document to test the use of the Paragraph tag  
</P>
```

### **Output on the screen**

Hi this is a test document to test the use of the Paragraph tag

## **TABLE**

The TABLE element defines a table for data that can be arranged in rows and columns. TABLE is commonly used as a layout device, but programmers should avoid this practices as much as possible. Tables can cause problems are often accentuated when tables are used solely for layout purposes. Browsers will not display anything until the complete table has been downloaded, which can have very noticeable effects when an entire document is laid out within a TABLE.

Example:

```
<TABLE>  
  
<TR>  
  
<TH>First Name:</TH>  
  
<TH>Vijay</TH>  
  
</TR>
```

<TR>

<TD>Last Name</TD>

<TD>R</TD>

</TR>

</TABLE>

The TABLE element also takes a number of optional attributes to provide presentational hints in browsers.

Output on the screen

<b>First Name :</b>	<b>Vijay</b>
Last Name	R

The BORDER attribute specifies the width of the border in pixels around a table. The FRAME attribute, specifies which sides of the table's outer border are visible. This attribute is poorly supported by browsers. The RULES attribute, also poorly supported by browsers, specifies the borders between table cells. Possible values are:

NONE for no inner borders

GROUPS for borders between row groups and column groups only

ROWS for borders between columns only

COLS for borders between columns only

ALL for borders between all cells.

NONE is the default value if BORDER = 0 is used or if no BORDER attribute is given. ALL is the default value for any other use of BORDER.

The CELSPACING attribute defines the amount of space between table cells, and the CELLPADDING attribute defines the amount of space within table cells. CELLPADDING refers to the space between the border and the cell contents. The value for these attributes may be given as a number of pixels or as a percentage. However, most browsers do not support percentages and treat CELLPADDING = "20%" as CELLPADDING = "20." A percentage value is relative to the vertical space available for vertical padding or spacing, and the amount is split evenly between the top and bottom. Horizontal padding and spacing behave similarly. The padding or spacing is always applied to all four sides.

**Note:** The WIDTH attribute specifies the width of the table as a number of pixels or as a percentage of the available horizontal space. Widths in pixels should be avoided, especially width above 500 pixels, since this causes unnecessary horizontal scrolling for some users.

## **A – ANCHOR**

The A element denotes an anchor which is a hypertext link or the destination of a link. The HREF attribute specifies a hypertext link to another resource, such as an HTML document or a JPEG image.

Example:

```
<AHREF="first.html">My first page</A>
```

The value of the HREF attribute is the URL of the link. The TYPE attribute can be used to specify the Internet media type of the link, allowing browsers to avoid fetching a resource that they cannot handle.

## **ABBR = ABBREVIATION**

The ABBR element is used to markup abbreviations. The TITLE attribute in conjunction with ABBR gives the expanded form of the abbreviation, allowing visual browsers to provide the expanded form as a "tool tip". If the short form is a pronounceable word, the ACRONYM element should be used instead of ABBR

Example:

```
<ABBR TITLE="Los Angeles">L.A.</ABBR>
```



Example for A – Anchor:

My first page

Example for ABBR – Abbreviation:

L.A.

## ACRONYM

The ACRONYM element is used to markup acronyms. The TITLE attribute is useful in conjunction with ACRONYM to give the expanded form of the acronym, allowing visual browsers to provide the long form as a “tool tip”.

Example;

<ACRONYM TITLE=”Central Bureau Investigation”>CBI</ACRONYM>

## UNIFORM RESOURCE LOCATORS (URL’S)

These specify the location of a resource for a hypertext link:

http:	Internet server
gopher:	hostname or IP
ftp:	Username: Password@hostname
telnet:	hostname or IP
mailto:	Email address.
news:	Newsgroup name.
file	address or file name

### Output : on the screen

Example for ACRONYM

CBI

## **B – BOLD**

The B element suggests that text be rendered as bold text. In most cases, use of a phrase element such as STRONG is more appropriate since such elements express the meaning of the text more clearly.

Example:

```
<B>Show Clearly</B>
```

## **BIG**

The BIG element suggests that text be rendered in a larger font. In most cases, use of a structural element such as STRONG or a heading (e.g., H3) is more appropriate since these elements express the meaning of the text more clearly.

## **BR - BREAK**

The BR element forces a break in the current line of text. It is often misused to break lines of text in a paragraph or table cell to present the text nicely. This usually results in an awkward presentation when viewed with a font size other than used by the programmer.

Example:

```
<br>
```

## **Output on the screen**

Example for B – Bold

Show Clearly

Example for BIG

See Clearly

## **Example for BR – Break**

firstline

secondline

thirdline

## FONT

The FONT element, allows authors to suggest basic font changes. Use of the FONT element brings numerous usability and accessibility problems. A user has a sophisticated workstation with a large monitor has carefully configured his browser to use black text on a yellow background, and has specified that his color scheme should override document colors. Along comes a web page with white text on a black background. Our user is overriding body colors, so he still sees black on yellow. But this page also contains a sentence here, a phrase there, emphasized with `<FONT COLOR="yellow">`--this worked fine on the author's black background but is completely invisible against the user's yellow background. He may wonder what all those empty spaces mean, but unless he views the HTML source, he will never know that he is missing an important part of the author's message. While Netscape allows the user to override text and body colors, it does not allow the user to override font colors.

The SIZE attribute suggests relative changes in font size, for example: `<FONT SIZE="+1">` or `<FONT SIZE="-1">`. These tags increment or decrement the font size relative to the size specified in the BASEFONT element, or relative to a base size of 3 if no BASEFONT element is used.

The COLOR attribute suggests a text color. While most browsers allow users to override author color changes, the widely used Netscape Navigator 2.x, 3.x, and 4.x do not override colors specified with FONT. This makes the COLOR attribute very difficult to handle from an accessibility point of view.

## I – ITALIC

The I element suggests that text be rendered as italic text.

Example:

`<I> We prefer to view this in italics</I>`

## SUB

The SUB element is used for subscripts. Since SUB is inherently presentational, it should not be relied upon to express a given meaning. However, it can be useful for chemical formulas and mathematical indices, where the subscript presentation is helpful but not required.

Example:

Chemical formulas include H<SUB>2</sub>O (water)

## SUP

The SUP element is used for superscripts. Since SUP is inherently presentational, it should not be relied upon to express a given meaning. However, it can be useful for mathematical exponents where the context implies the meaning of the exponent, as well as other cases where superscript presentation is helpful but not required.

Example:

2<SUP>3</SUP>equals 8

## Output on the screen

Example for I-Italic:

We prefer to view this in italics

Example for SUB:

Chemical formulas include H<sub>2</sub>O (water)

Example for SUP:

2<sup>3</sup> equals

## U – UNDERLINE

The U element, suggests that text be rendered as underlined text.

Example

<H3><U>My heading</U></H3>

## **BLOCK LEVEL AND INLINE ELEMENTS**

The following elements may be use as either block-level elements or inline elements. If used as inline elements (e.g., within another inline element or a P), these elements should not contain any block-level elements.

APPKET – Java applet

BUTTON – Button

OBJECT – Object

SCRIPT – Client-side script

### **Output : on the screen**

Example for I – Italic:

My heading

## **APPLET**

The APPLET elements is used to embed Java applets. APPLET is currently a more reliable method of embedding Java applets as compared to the OBJECT method. APPLET's CODE attribute specifies the name of the contains the compiled Applet subclass. The value is relative to the URL specified in the CODEBASE attribute, or to the HTML document's base URI if the CODEBASE attribute is not given.

The ALT attribute can be used to give alternate text for browsers that recognize the APPLET element but do not support Java or do not have Java enabled. Authors can also give alternate content between the start and end tags of the APPLET element – a better method than using the ALT attribute since it allows authors to include HTML markup in the alternate content and also works with pre-HTML 3.2 browsers that do not support APPLET.

Example:



```
<APPLET archive="ansnow.jar" code="amsnow.c;ass" width=320
height=208>
```

```
<param name=backimage value="ansnow1.jpg">
```

```
<IMG SRC="animation.gif" ALT="" WIDTH=320
HEIGHT=208>Sorry, your browser doesn't support Java.
```

```
</APPLET>
```

## **BUTTON**

The **BUTTON** element defines a submit button, reset button, or push button. Programmers can also use **INPUT** to specify these buttons, but the **BUTTON** element allows richer labels, including images and emphasis. However, **BUTTON** is new in HTML 4.0 and poorly supported among current browsers, so **INPUT** is a more reliable choice at this time.

The **TYPE** attribute of **BUTTON** specifies the kind of button and takes the value submit (the default), reset, or button. The **NAME** and **VALUE** attributes determine the name/value pair sent to the server when a submit button is pushed. These attributes allow authors to provide multiple submit buttons and have the form handler take a different action depending on the submit button used.

Example:

```
<BUTTON NAME=submit VALUE=modify>Modify</BUTTON>
```

```
<BUTTON NAME=submit
VALUE=continue>Continue</BUTTON>
```

## **OBJECT**

The **OBJECT** element is used to include object such as images, videos, Java applets, and VRML worlds. **OBJECT** is intended to replace the more specific **IMG** and **APPLET** elements, as well as the proprietary **EMBED** and **BGSOUND** elements a better choice for the time being.

**OBJECT**'s **DATA** attribute specifies the URI of the embedded object. Relative URL's are interpreted with respect to the **CODEBASE** attribute

if it is given. The CLASSID may be used to specify an implementation for the object. Java applets, Python applets, and Active X controls all provide implementations for the embedded object, and so are specified with the CLASSID attribute.

### Example:

```
<object          classid="clsid:D27CDB6E-AE6D-11cf-96B8-
444553540000"  codebase=http://macromedia.com/.../swflash.cab
width="440"      height="330"><param          name="movie"
value="images/03a01001.swf">

<embed          src="images/03a01000.swf"          quality="high"
pluginspage="http://www.macromedia.com/go/          getflashplayer"
type="application/x-shockwave-flash"              width="440"
height="330"></embed></object>
```

## SCRIPT

The SCRIPT element includes a client-side script in the document. Client-side scripts allow greater interactivity in a document by responding to user events. For example, a script could be used to check the user's form input prior to submission to provide immediate notice of any errors by the user.

### Example:

```
<script language="Javascript">
function alertme() {

alert("you are alerted");

} </script>
```

Note that not all browsers support client-side scripting, and supporting browsers allow the user to disable scripting, so authors should avoid dependence on client-side scripting wherever possible. The required TYPE attribute of SCRIPT specifies the media type of the scripting language, e.g., text/javascript. Examples of supported LANGUAGE values include JavaScript, JavaScript1.1, and VBScript. The values are not case sensitive.

## FORMS

Having looked at the structure of the standard HTML document and some of the basic HTML elements, let us now look at various form elements.

Forms are an effective means of making Web pages user-friendly. Forms are used in HTML for getting inputs from the user. Before the introduction of forms can typically be used by commercial organization for accepting orders from customers or taking feedback. One could also conduct tests over the Internet by using forms.

### **How Does a Form Work?**

In a form, the user is typically presented with a number of input mechanisms that help the user to enter data. These could be text fields, radio buttons, check boxes or list boxes. When data entry is complete, the user *submits* the form. Submitting the form will send the input by the user to the server for processing. This is done by selecting the Submit button on the page. This communicates to the browser that the user has completed data entry. The browser sends the data and the URL of the CGI script to the server. The Common Gateway Interface (CGI) is a standard for interfacing external applications with information servers, such as HTTP or Web servers. The server passes the data to the CGI script that processes it. The CGI script may store the data in a file or a database. It also sends a response in the HTML format to the server. The server then sends this response to the browser, which formats and displays the response.

### **Form Elements**

These are container elements. All elements required to define the contents of a form are the parameters of the elements and are called its attributes. We will discuss the attributes of the form elements and then proceed with the elements to define the contents of a form. Given below are the attributes of the form elements:

- 1. ACTION** – is a URL, specifying the location to which the contents of the form are submitted to elicit a response. Typically this form will be handling the CGI scripts. If this attribute is missing, then the URL, of the document itself is assumed.

**2. ENCTYPE** – specifies the format of the submitted data in case the protocol does impose a format itself.

**3. METHOD** – selects variations in the protocol. It specifies the format in which data is to be sent to the script. It can take one of the two values:

- GET
- POST

The difference between these two is the manner in which the data in the form is sent to the CGI script.

When the ACTION attribute is set to an HTTP URL, the METHOD attribute must be set to an HTTP METHOD as defined by the HTTP standard. The default METHOD is GET look at the elements used to define the input mechanism in a form.

```
<form method="..." action="url">...</form>
```

The URL should be a script or may use mailto.

The method is GET or POST, depending on how you want the data returned. Within a form, input fields are defined with: for multi line text input (surrounds prompting text):

```
<textarea name="..." rows="n" cols="n">...<type="...">
```

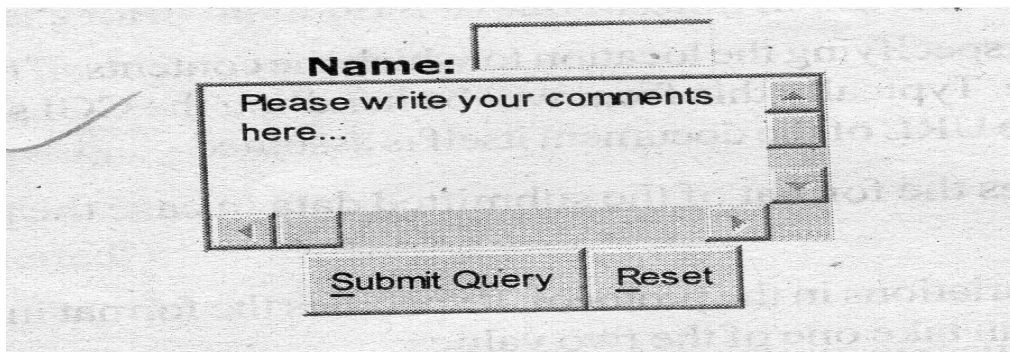
The type can be one of text, checkbox, radio, hidden, password, reset, or submit. Other attributes are align, checked, size, max length, src, and value. All <input> fields of a radio or checkbox group must have the same name.

Example:

```
<form method="GET" action="http/www.foo.bar/cgi-bin/script">
```

```
<p>Name: <input name="name" type="text" size="20"><br>
```

```
<textarea name="comments" rows="4" columns="40">Please  
write your comments here...</textarea><br><input  
type="submit"><input type="reset"></p></form>
```



## IMG – IMAGE

The IMG element specifies an inline image. The required SRC or source attribute specifies the location of the image. The image can be any format, though browsers generally support only GIF and JPEG images. Support for the other formats like PNG is increasing.

Example:

```
<IMG SRC="logo.gif"ALT="Welcome to XYZ Company"  
Width="128" Height ="93">
```

The ALT attribute provides alternate text for those users who do not load images. Effective ALT text should generally give the function of the image rather than a description of the image. For example, ALT="Welcome to XYZ Corp." would be more appropriate than ALT="XYZ Corp LOGO" for a company's logo on its welcome page. Good ALT text is crucial to the accessibility of a document for the significant portion of users who do not load images.

The WIDTH and HEIGHT attributes are most useful when they specify the exact dimensions of the image in pixels. This allows image-loading browsers to reserve the proper amount of space for the image and continue to render the rest of the document.

## SELECT



The SELECT element defines a form control for the selection of options. Internet Explorer displays the SELECT element without a FORM element. However, Netscape Navigator will not display any SELECT element outside of a FORM.

Example:

<P>Select one or more sections to search:

<SELECT NAME=sections>

<OPTION><OPTION>

<OPTION>Web Authoring Reference</OPTION>

<OPTION>FAQ Archives </OPTION>

<OPTION>Design Elements</OPTION>

<OPTION>Tools</OPTION>

<OPTION>Feature Article</OPTION>

</SELECT>

</P>

The SIZE attribute of SELECT, hints that visual browsers should display the element as a list box with specified number of options visible at any time. A scroll bar would allow access to any non-visible options. The SIZE attribute is especially useful in SELECT elements with numerous OPTIONS and multiple selections are allowed. In such a situation, some visual browsers will render the entire list in one large box without scrolling. A suitable SIZE attribute helps such browsers give a more appropriate presentation.

**Select one or more sections to search:**

Web Authoring Reference	▼
-------------------------	---

## **SPECIAL CHARAVTERS**

Three characters out of the entire ASCII (or ISO 8859) character set are special and cannot be used “asis” within an HTML document. These character are left angle bracket (<), right angle bracket (>), and ampersand (&).

The angle brackets are used to specify HTML tags, while ampersand is used as the escape mechanism for these and other characters:

1&lt; is the escape sequence for <  
1&gt; is the escape sequence for >  
1&amp; is the escape sequence for &

**Note:**

1. The “escape sequence” only means that the given sequence of characters represents the single character in an HTML document. The conversion to single character itself takes place when the document is formatted for display by reader.
2. There are additional escape sequences that are possible; notably, there are a whole set of such sequences to support 8-bit characters sets (namely, ISO 8859-1);

# Introduction to Interactivity Tools

13

## WHAT IS ASP?

Active Server Page or ASP, as it is more commonly known, is a technology that enables you to make dynamic and interactive Web pages. ASP uses server-side scripting to dynamically produce web pages that are not affected by the type of browser the web site visitor is using.

The default scripting language used for writing ASP is VBScript; although you can use other scripting languages like JScript which is Microsoft's version of Java Script. ASP pages have the extension .asp instead of .htm. When a page with the extension .asp is requested by a browser the web server interprets any ASP contained within the web page before sending the HTML produced to the browser. In this way all the ASP is run on the web server and no ASP will ever be passed to the web browser.

Any web pages containing ASP cannot be run by just simply opening the page in web browser. Web pages that contain ASP must be requested through a web server that supports ASP. If there is no Web server, then ASP pages cannot be displayed. ASP was first introduced by Microsoft on its web server Internet Information Server (IIS) that runs on Windows 2000/XP Pro/NT4/95. ASP pages run best on this Web server. The micro version of this server is called Personal Web Server (PWS). Both IIS and PWS are available free of cost with Windows.

## You can locate these Web servers in the following places:

Windows 2000/XP Pro-IIS can be found in 'add/Remove Programs' in the 'Control Panel'. Windows 98 – PWS can be found under 'add-ons' on the Windows 98 CD. Windows NT4/95-you can get hold of IIS by downloading the NT4 Option Pack from Microsoft (don't be fooled by the name

as it also runs on Windows XP Home Edition – IIS and PWS are not supported on this operating system.

## **WHAT IS VB SCRIPT?**

Like Java Script, VB Script you to embed commands into an HTML document. When a user of compatible Web browser downloads your page, your VB Script commands are loaded by the Web browser along with the rest of the document. The commands are run in response to a series of events. VB Script is an interpreted language. The browser interprets the VB Script commands when they are loaded and run. They do not need to be compiled into an executable form by the Web author who uses them.

VB Script is a fast flexible subset of Microsoft's Visual Basic and Visual Basic for Applications Languages. VB Script is designed to be easy to program in and quick in adding active content to HTML documents. The language elements are mainly ones that will be familiar to anyone who has programmed in just about any language, such as If...Then...Else blocks and Do, While, and For...Next loops, and atypical assortment of operators and built-in functions.

### **What Can VB Script Do?**

VB Script provides a fairly complete set of built-in functions and commands. These function and commands allow you to perform math calculations, manipulate strings, play sounds, open up new windows and new windows and new windows and new URLs, and access and verify user input to your Web forms. The code to perform these actions can be embedded in a page and executed when the page is loaded. You can also write functions that contain code that is triggered by events you specify. For example, you can write a VB Script method that is called when the user clicks the Submit button of a form, or one that is activated when the user clicks a hyperlink on the active page.

VB Script can also set the attributes or properties of ActiveX Controls, Java applets, and other objects present in the browser. This way, you can change the behavior of plug-ins or other objects without having to rewrite them. For example, your VB Script code could automatically set the text of an ActiveX label control based on what time the page is viewed.

## **WHAT IS JAVASCRIPT?**

JavaScript is a script is a script language from Netscape that is supported in Netscape Navigator as of Version 2.0. It is easier to use than Java, but not as powerful. JavaScript uses the HTML page as its user interface, whereas Java can generate a completely custom interface. On the client, JavaScript applets are maintained in source code. On the server, they are compiled into byte code, similar to Java programs. A JavaScript applet can be used to display a data entry form and validate the input, while a java program processes the information. JavaScript is also used to tie Java applets together.

JavaScript evolved from Netscape's Live Script language and was made more compatible with Java. Although it shares many of the features and structures of the full Java language, it was developed independently. JavaScript is endorsed by a number of software companies and is an open language that anyone can use without purchasing a license. It is supported by recent browsers from Netscape and Microsoft, though Internet Explorer only a subset, which Microsoft calls Jscript.

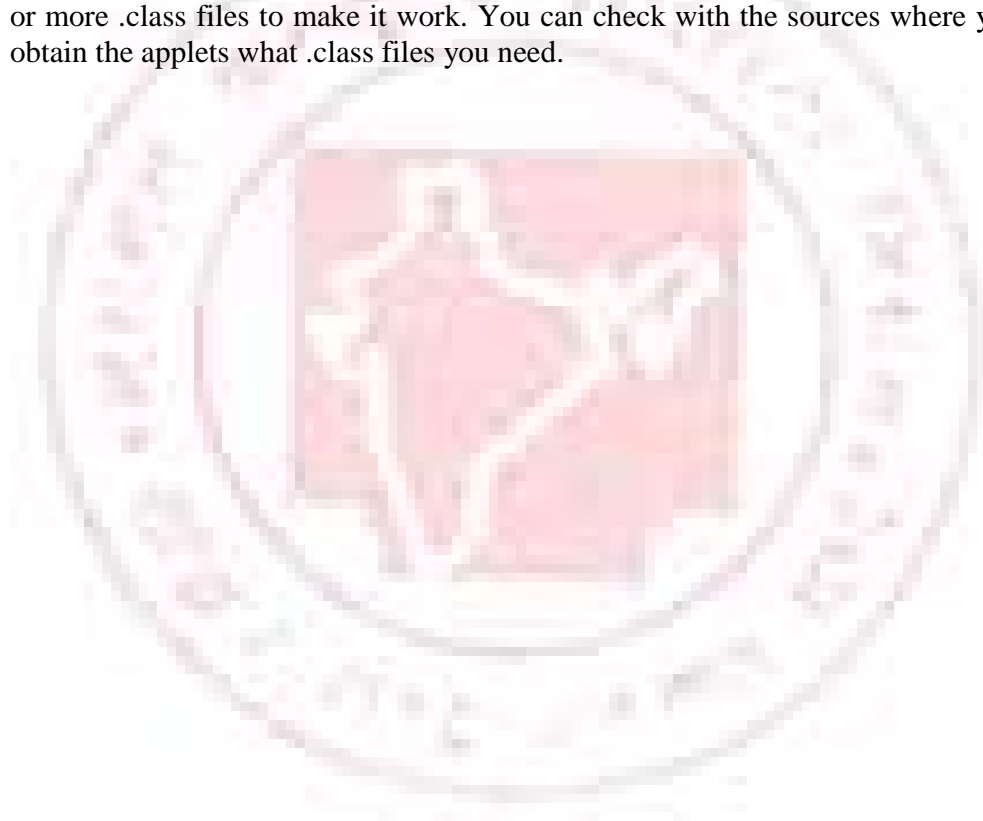
## **WHAT IS JAVA**

Java is language developed by Sun Microsystems which allows World Wide Web pages to contain code that is executed on the browser. Because Java is based on a single "virtual machine" that all implementations of java emulate, it is possible for Java programs to run on any system which has a version of java. It is also possible for Java programs to run on any system which has a version of Java. It is also possible for the "virtual machine" emulator to make sure that Java programs downloaded through the web do not attempt to do unauthorized things. Java is a full-blown object-oriented programming language developed by Sum Microsystems Inc. Java is an interpreted language. This means that in order for a java program to run on a computer, a run-time system (interpreter) will need to have been installed on the computer.

The dynamism and interactivity is achieved by including links within an HTML page to Java programs called applets. When the link is clicked on, the Java applet is transferred to your computer and executed locally by the browser. Java will therefore eliminate the need for a client computer on the Internet to depend on the host computer for the execution of dynamic content. Not only is Java poised to make the end user's life more interesting, but it also provides a powerful programming environment for the software developer and Internet content provider.



The Internet is a highly heterogeneous networked environment encompassing dozens of operating systems (Windows, Unix, Macintosh, OS/2, etc., etc.) running on a wide variety of microprocessors. A Java program once developed is capable of running on EVERY platform which has the Java interpreter. The implication of this portability is quite profound to the Internet programmer. The programmer no longer has to worry about developing different versions of an application to cater for the different computer platforms in use across the Internet. By programming in Java, only one application will need to be developed; it will then run on ALL platforms to which the Java interpreter is ported. In order to use Java applets, you need to have associated files, which are compiled applet programs usually ending with class. One applet may need one or more .class files to make it work. You can check with the sources where you obtain the applets what .class files you need.



## MULTIMEDIA

Multimedia is the ability to communicate in more than one way. For example the computer you are using to view this material is capable of flashing text and beeping when there is a problem. If your computer is equipped with multimedia capabilities then it can handle sound, video, and graphics in a better manner.

Originally the term multimedia was used by institutions who run distance learning courses in which they deliver content via a combination of text, TV, telephone, audio cassette and the radio. The advent of high resolution screens and sound and video playback facilities for computers has resulted in the increased use of multimedia applications for education.

A typical multimedia application is characterized by the following features:

The different media it possesses and makes use of the use of digital technology  
The interaction it demands of the user  
The integration of sound, images, text and data into seamless applications

## VRML

VRML is an acronym for Virtual Reality Modeling Language. Very early on in its history, when VRML was just an idea without an implementation, the M stood for “Markup”, paralleling HTML which is Hyper Text Markup Language.

A VRML file resides on a Web site just like an HTML file. Currently, a VRML file is a plain text file or a compressed text file, and its name generally ends in “.wrl”, “.wrl.gz”, or “.wrz”. The contents of a VRML file including the files that it may load through the Inline nodes are called a “world”.

This does not mean that the builder of a VRML world needs to model the whole planet. Many VRML worlds are single objects. VRML is a scene description language, which describes 3D environments over the Internet. When you access a URL containing a VRML world, a file is downloaded into your Web browser.

VRML is a file format that defines the layout and content of a 3D world with links to more information. VRML worlds are spacious and inherently interactive with objects that react to the user and to each other. VRML is scalable across platforms ranging from PCs to high-end workstations, and soon, the Mac. VRML is also band width efficient. Intricate, interactive 3D worlds can be described in worlds that are similar in size to HTML pages. Most of the time when VRML files are large it is because of motion capture data, animation, sound, or video, all of which will be reduced as “streaming media” becomes a reality. Straight VRML files are actually very small, especially if special optimization steps are taken. The Web Authoring Tools are the most widely used HTML editors and site management tools.

## **STREAMING**

Streaming is the term given to a continuous supply of data. Streaming Media is audio and video data that is supplied continuously to the end user from the web site that they are viewing. Streaming media files over the internet has the distinct advantage that users can start viewing them almost instantly without having to download the full file. In contrast, with more traditional files the whole file needs to be downloaded before anything can be viewed. The player software on the user’s computer decodes the compressed stream as it arrives through the user’s modem or network. So you can be viewing one part of the file while the rest is still being downloaded. Leading players include Real Player, Windows Media Player and Quick Time.

## **GRAPHIC WEB EDITORS**

### **GIF Animator**

GIF Animator can be used to create an animation by linking images together, similar to creating a “flip book”. Just insert each separate image into the animator, and then set the frame rate to determine the speed. Once you have inserted all the images, you can save the file as either a gif image, an .avi movie, or even a flash movie. Then the animator will generate the html code necessary to display your creation on your web page.

## **Adobe Photoshop**

Adobe® Photoshop® 7.0 software, the professional image-editing standard, helps you work more efficiently, explore new creative options, and produce the highest quality images for print, the Web, and anywhere else. Create exceptional imagery with easier access to file data: streamlined Web design: faster, professional-quality photo retouching: and more.

## **Macromedia Flash**

Macromedia Flash MX is the “must have” tool used by over one million professionals to deliver the best user experiences on the web, increasing both revenue and customer satisfaction while lowering costs. The approachable environment includes powerful video, multimedia, and application development features, which allow designers and developers to create rich user interfaces, online advertising, e-learning courses and enterprise application front ends.

# Internet Management Security Concepts, Information Privacy and Copyright Issue

15

## WHAT IS INTERNET SECURITY?

A list of the major challenges of Internet security and simple explanations of how they affect a network are explained below.

### **Protection from hackers and vandals on the internet.**

Hacker attacks can cause irreparable damage to sensitive and confidential information. Critical data resides on a company's private network and businesses must actively prevent the theft, destruction and corruption of this information. For some companies, the confidential information residing on the business network belongs to corporate clients, raising issues of legal liability as well as financial loss.

### **Protection from Dos (Denial of Service Attacks).**

The valuable rely more and more on networked resources, maintaining their availability is becoming more and more critical. A common type of attack referred to as a Denial of Service attack, is designed to deny access to networked resources by crashing servers or routers or by overwhelming the network with enough traffic to degrade service. These Dos attacks hinder normal network activity, making productivity nearly impossible.

### **Filter Inappropriate Materials.**

The valuable information so readily available online also includes material inappropriate for the workplace, classroom, and home. Companies can face losses in productivity due to the vast array of non-work related material



available at the click of a mouse. Objectionable content can create an uncomfortable work environment, creating a vulnerability to harassment lawsuits. Schools, libraries and home offices risk children accessing pornography or racially intolerant sites.

### **Protection Against Viruses.**

Viruses attacks are the greatest threat to Internet security today. The outbreak of viruses has increased in the past several years and statistics indicate that the number will continue to rise.

### **Protection from Active Content, such as ActiveX and Java.**

ActiveX is a programming language that is used to embed small programs in Web pages. It is generally considered an insecure protocol to allow into a network since it is possible for malicious programmers to write controls that can delete file, compromise security, or cause other damage. Java is also used to embed small programs known as applets, in Web pages. It is generally considered safer than ActiveX, but some administrators may want to filter out Java since there have been instances of bugs in these safety mechanisms.

### **WHAT IS A FIREWALL?**

A firewall protects a computer that are stand-alone's or a part of the local area network (LAN) against outside intrusion. Firewall's work as filters between the outside world and a private network. A firewall approves some types of traffic and blocks unauthorized users who attempt to access your network.

The term "firewall" is borrowed from architecture, but it doesn't actually refer to any one particular device. A firewall could be either a piece of hardware or software, and a network may use more that one type of firewall in order to provide extra security.

**There are two common types of firewall:**

A packet-filtering firewall applies predefined rules to filter the chunks of data, or packets, that pass through it. The filter accepts or rejects packets based upon the originating computer's network address or other characteristics. The packet filter may be a computer, or it may be part of a separate piece of hardware, such as a router.

A proxy server, also known as a gateway, acts as a middleman that relays data between the network and that outside world. The proxy prevents outsiders from gathering information about computers inside the network. The proxy can also screen packets based on their application type, such as Web access or email, or other identifying traits.

## **WHAT IS ANTI VIRUS**

Anti virus software protect your computer from a variety of malicious software programs which are referred as virus. The anti virus companies is always on a lookout for these viruses and provide an immediate cure for the same.

### **These can include:**

**Viruses** - - They are small programs that attach themselves to other programs or documents and replicate with the potential to cause damage.

**Worms** - - They are viruses that are specifically engineered to make extensive use of mail to spread themselves rapidly.

**Trojans** - - They are programs that appear harmless but have a damaging intent.

**Zombies** - - They are programs that install themselves on computers and remain dormant until some external event triggers them into action. The actions could include corrupting, truncating, or stealing your information and sending it to a predefined email account or opening up remote control access portals to your machines.

## **WHAT IS SSL (SECURE SOCKET LAYER)?**

Customers visiting web sites may want to maintain their privacy when they register for a service online and in particular want to be assured that their credit card details are kept well away from crooks and fraudsters. The most common means of achieving this privacy is through the use of SSL or Secure Socket Layer technology. When you connect to secure web space the data passing between your browser and the web site in question is encrypted which makes it virtually impossible for any third party to intercept the data that is being transferred. So whether your address or your credit card number that is being recorded it is strictly between you and the web site in question.

There are two symbols that assure the public that a web site has these security measures in place. Firstly a secure web server will be prefixed by `http's://` rather than the normal `http://`. Secondly your browser will display the “golden padlock” symbol that is your assurance that you are in a secure area. To gain certification for the security of your domain is a costly, complicated and time-consuming procedure.

This is where shared SSL is beneficial. It is seldom desirable to host the whole of your site on secure SSL servers as the extra complexity results in slower performance than you would get on “standard” hosting. So you can host the bulk of your site on normal shared hosting and use SSL secure hosting only for the sensitive function such as customer registration and online payment.

## **WHAT IS PROXY SERVER?**

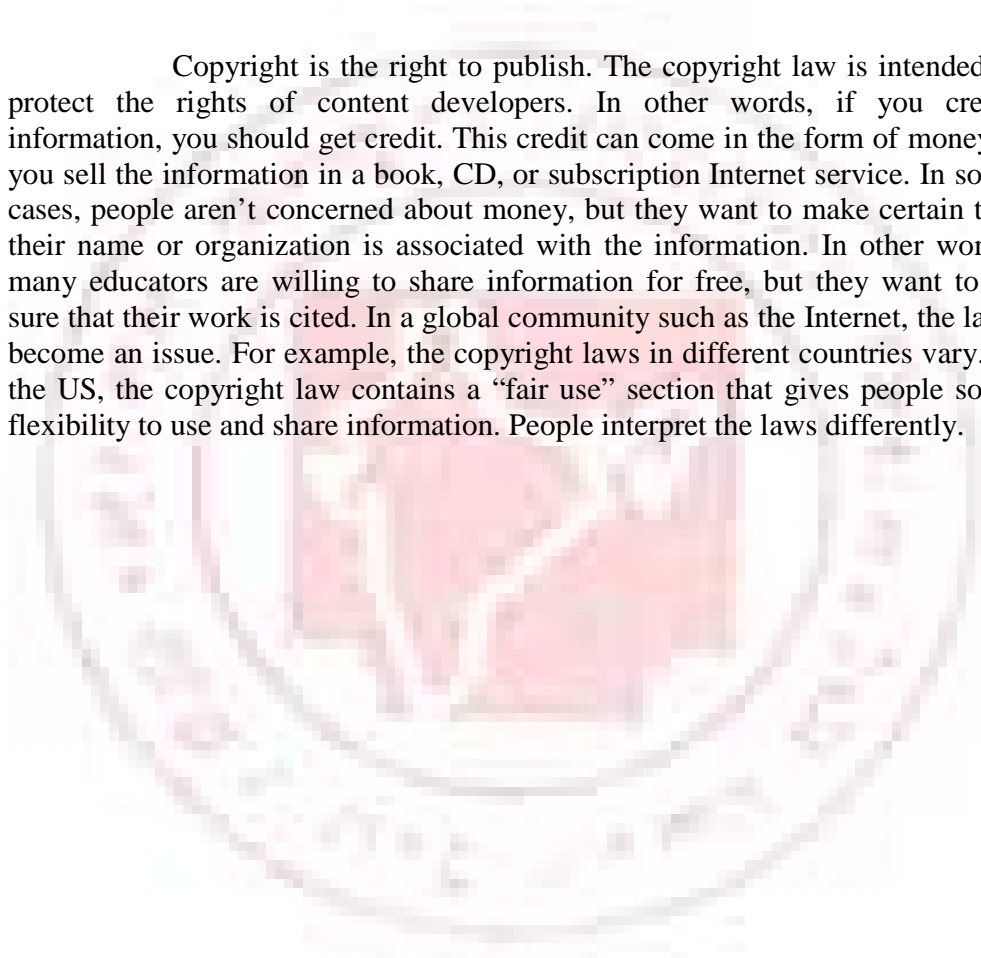
A proxy server is an interface between the browser and the destination server. The proxy server receives the page request and handles the connection of the browser to the destination. These proxy servers are also able to cache pages. If such a proxy is configured to cache then it will first check the cache to see if the requested page exists. If the page is not found then the proxy server searches other caching proxy servers or makes a direct request to the destination. This process depends on the configuration for the proxy. The advantage of using a common caching proxy server is given by the probability to find a page in the local cache. The probability is in general expressed by the hit rate. A cache with several GB size and a lot of users can reach a hit rate of 30 to 40 percent. Frequently requested pages such as the help pages of your browser may be in the cache every time. In case the page is not in the local cache there is no difference in the elapsed time of a direct request or a request handled by a proxy server.

## **INTELLECTUAL PROPERTY**

Intellectual property consists of written works, photographs, artwork, and music that people create from information and ideas. Many people enjoy sharing their intellectual property with others. However, they may want to get credit for their hard work.

## **COPYRIGHT ISSUES**

Copyright is the right to publish. The copyright law is intended to protect the rights of content developers. In other words, if you create information, you should get credit. This credit can come in the form of money if you sell the information in a book, CD, or subscription Internet service. In some cases, people aren't concerned about money, but they want to make certain that their name or organization is associated with the information. In other words, many educators are willing to share information for free, but they want to be sure that their work is cited. In a global community such as the Internet, the laws become an issue. For example, the copyright laws in different countries vary. In the US, the copyright law contains a "fair use" section that gives people some flexibility to use and share information. People interpret the laws differently.



## **AN INTRODUCTION**

Electronic commerce or 'eCommerce' is the use of the internet for a range of business purposes, including:

- marketing and publicity
- online sales via the web
- communication
- business to business transactions

## **MARKETING AND PUBLICITY**

The web is an ideal media for marketing and publicity because of its potential to reach a global audience and its capacity to support the use of images, animation, and audio/video. Many websites will carry advertisements for the web sites of sponsoring companies, which through the hyperlink system can be accessed simply by clicking on the advertisement.

## **ONLINE SALES VIA THE WEB**

Improvements in security are leading to an increasing number of web-based services now being available for the buying and selling of goods. Most major high-street brands now have a website with facilities for ordering goods online. In addition, a number of companies have been established to trade solely via the web.

## **COMMUNICATION**



Many companies now rely on the internet for communication, both within the company and with customer. While this is typically through email, other facilities such as chat, instant messaging, web telephony and audio/videoconferencing are also being used.

## **BUSINESS TO BUSINESS TRANSACTIONS**

Business to business (B2B) transactions involves the direct trade between two companies, rather than between a company and a customer, for example exchanging information or transactions with a supplier. This may be through the use of an “extranet” (area of a website restricted to authorized people who logon with a password) which allows access to ordering, product or accounting information specific to that company.

## **CONCEPTS**

Electronic commerce (e-commerce) is the use of telecommunications and data processing technology to improve the quality of transactions between business partners. It has existed in some form since the invention of the telegraph and early automated data processing equipment but its use has greatly increased. E-Commerce improves organizational efficiencies by leveraging data processing, database storage, and data communications technologies. Existing network facilities can be utilized to achieve great savings in labour costs and the reduction of paper storage and handling facilities. It has enabled firms to be more effective in improving the quality of standard goods and services and to offer a variety of new services of new services. The global marketplace has become larger and wider than ever because of the expansion of e-commerce activity.

The growth of electronic commerce has been fueled by the availability of world wide telecommunication networks along with enhanced information delivery techniques utilizing the various multimedia technologies Client-server architecture allows systems with different hardware and software platforms to interact in an open system computing environment.

## **TECHNOLOGY IN E-COMMERCE**

### **Introduction**

In any E-Commerce systems implementation, integration between business processes within companies is very important for a successful implementation. Within a company integration needs include interfacing with legacy systems, communicating with third party products, and integrating business processes across distributed E-Commerce systems. The two most commonly deployed technologies for this type of integration are ALE (Application Link and Enabling) and (Electronic Data Interchange) technologies, which make use of the popular Idoc (Intermediate Document) interface for exchanging data. EDI provides business process integration across companies by exchanging business documents such as purchase order, invoices, and shipment notices in electronic form using industry standard formats such as ANSI X12 (American National Standard's Institute) and EDIFACT (Electronic Data Interchange For Administration, Commerce, and Transport).

ALE, which is SAP's proprietary technology for integrating distributed business processes within a company, has been available in SAP since release 3.0. ALE was designed to link one SAP system to another SAP system, but the ALE architecture lent itself to being used in linking SAP system to non-SAP system without any modification. The flexibility of ALE technology has proliferated into several application areas, and today most third-party products use it to exchange data with SAP. ALE technology is also the basis for SAP's Business Framework architecture, introduced in release 4.0.

The underlying architecture of the ALE and EDI technologies are quite similar. Both make use of SAP's proprietary Idoc interface, which defines the format and structure of the data that is exchanged between two systems. Although ALE and EDI are the two biggest users of the Idoc interface, this interface can also be used by any two applications that need to exchange data. For example, it can be readily used to integrate SAP with Web applications. As cross-application technologies, ALE and EDI are used in various modules of SAP such as SD (Sales and Distribution), MM (Materials Management) and FI (Financials). The wide-ranging application of these technologies has created an ever-increasing need for ALE, EDI, and Idoc skills. Mastery of these skills is a necessity for anyone involved in the technical or functional side of an SAP implementation.

## **Internet & E-business**

Electronic commerce can be viewed from two business application perspectives. One perspective on e-commerce in business is to look at those businesses engaged in providing electronic commerce technology to help enable

other businesses. Internet Service Providers (ISP) and private Commercial Network Providers help the companies into wide area networks (WAN) for use in e-commerce activity. They may offer additional features such as protocol conversion and are they described as Value-Added Network (VAN). Other types of firms specialize in helping organization build electronic commercial sites. Software firms sell data encryption and other types of security-related technologies, user interface programs and other types of software used to implement e-commerce. Other firms specialize in consulting and designing e-commerce applications such as World Wide Web sites.

Another perspective on e-commerce is to examine the application uses to which a business uses such technologies. Linkages between business partners may be tightened through improvements in Just In Time (JIT) supply logistics overall improvement in supply chain management. Consumer marketing and sales techniques like shopping kiosks and home shopping techniques have removed barriers of distance and increased product awareness. Electronic publishing services, financial news and remote banking services are now available over networks. Commercial databases and library services provide general information resources. On line job placement services are numerous, and distance education and job training services can assist in career development. A wide variety of recreational and entertainment services are currently available and such services will expand dramatically in the near future.

### **Internet & E-business**

Electronic commerce can be viewed from two business application perspectives. One perspective on e-commerce in business is to look at those businesses engaged in providing electronic commerce technology to help enable other businesses. Internet Service Providers (ISP) and private Commercial Network Providers help the companies into wide area networks (WAN) for use in e-commerce activity. They may offer additional features such as protocol conversion and are they described as Value – Added Network (VAN). Other types of firms specialize in helping organization build electronic commercial sites. Software firms sell data encryption and other types of security-related technologies, user interface programs and other types of software used to implement e-commerce. Other interface programs and other types of software used to implement e-commerce. Other firms specialize in consulting and designing e-commerce applications such as World Wide web sites.

Another perspective on e-commerce is to examine the application uses to which a business uses such technologies. Linkages between business

partners may be tightened through improvements in Just In Time (JIT) supply logistics overall improvement in supply chain management. Consumer marketing and sales techniques like shopping kiosks and home shopping techniques have removed barriers of distance and increased product awareness. Electronic publishing services, financial news and remote banking services are now available over networks. Commercial databases and library services provide general information resources. On line job placement services are numerous, and distance education and job training services can assist in career development. A wide variety of recreational and entertainment services are currently available and such services will expand dramatically in the near future.

### **Advantages of E-Commerce**

The increased computerization of our society is triggering major changes in the organization of work. Paper driven processes are being reengineered to capture the benefits of doing business electronically. Businesses are implementing electronic commerce (EC or E-Commerce) to meet the imperatives of an increasingly competitive world.

Electronic Commerce is the business environment in which information for the buying selling, and transportation of goods and services moves electronically. Electronic Commerce (EC) includes any technology that enables a company to do business electronically. Some of the direct benefits of Electronic Commerce are:

- Improved Productivity
- Cost Savings
- Streamlined Business Processes
- Better Customer Service
- Opportunities for New businesses

#### **Improved Productivity:**

Using electronic commerce, the time required to create transfer and process a business transaction between trading partners is significantly reduced. Furthermore, human errors and other problems like duplications of records are largely eliminated with the reduction of data-entry and re-entry in the process. This improvement in speed and accuracy plus the easier access to document and information, will result in increase in productivity.

#### **Cost Savings:**

Based on the experience of a wide variety of early adopters of electronic commerce, Forrester Research has estimated that doing business on the Internet can result in cost savings of about 5% to 10% of sales. This cost savings stem from efficient communication quicker turnaround time and closer access to markets.

### **Streamlined Business Processes:**

Cost savings are amplified when businesses go a step further and adapt their internal processes and back-end legacy systems to take advantage of electronic commerce. Inventories can be shaved if businesses use the Internet to share such information as promotional plans, point – of – sale data, and sales forecasts. Business processes can also be made more efficient with automation.

### **Better Customer Service:**

With electronic commerce, there is better and more efficient communication with customers. In addition, customers can also enjoy the convenience of shopping at any hour, anywhere in the world.

### **Opportunities for New Businesses:**

Business over the Internet has a global customer reach. There are endless possibilities for businesses to exploit and expand their customer base.

## **APPLICATIONS, FEASIBILITY & VARIOUS CONSTRAINS:**

The latter half of the 1990's has seen an explosion in the use of the Internet/Intranet and its accessibility to individuals, corporations, and educational institutions. This revolution has dramatically changed the way organizations conduct business with its consumers and with each other. The geographic boundaries, that offer limited access to goods and services, are crumbling and companies of all sizes are busy building commerce solutions and adapting to new ways of doing business. The internet/Internet with inherent features like easy access, real-time information, and low cost, is a natural driver for commerce solutions. Further, companies enticed with the promise of the following competitive advantage as are undertaking electronic commerce projects.



- Broader market reach
- Increased efficiency and accuracy and accuracy through automated order-processing, inventory control billing, shipping, and so forth.
- Better customer service and support
- Instant communication with consumers and trading partners.
- Improved profit margins through automated supply chain management,
- Better forecasting of customer needs for goods and services
- Reduced labor costs
- Lower overall costs

Electronic commerce is often misunderstood to be limited to buying and selling of goods and services over the Internet. Actually, commerce solutions are a lot more than just the handling of business transactions and fund transfers over the Internet. It defines new forms of doing business. In addition to providing buying and selling services, commerce solutions can provide a complete system of services built into an organization's digital nervous system so it supports the sales processes and provides total account management.

# Internet Glossary

## **Address Mask**

The address mask is used to identify the parts of an IP address that correspond to the different sections (separated by dots). It's also known as the "subnet mask" since the network portion of an address can be determined by the encoding inherent in an IP address.

---

## **Advanced Research Projects Agency Network (ARPANET)**

A pioneering long-haul network funded by what's now-called DARPA (formerly known as ARPA). It was the foundation on which the Internet was built.

---

## **Agent**

The part of a system that performs information preparation and exchange on behalf of an application.

---

## **Alias**

A type of nickname (usually short and easy to remember) that refers to a type of network resource. Aliases are used so you won't have to remember the long and difficult names typical of network resources.

---

## **Anonymous FTP**

By using the word "anonymous" as your user ID and your email address as the password when you login to an FTP site, you can bypass local security checks and gain limited access to public files on the remote computer. This type of access is available on most FTP sites, but not all.

---

## **Application**

Sometimes known as a client or an “app,” it’s a program that performs a specific function. FTP, Mail, Gopher, Mosaic, and Telnet clients are the most common examples of Internet applications.

---

## **Archie**

You’ll usually hear this term referred to in the phrase “archie search.” Archie is a way of automatically gathering, indexing and sometimes even retrieving files on the Internet. Most good archie clients are able of FTP files once you’ve found the information you’re looking for.

---

## **Archive**

A collection of files stored on an Internet machine. FTP sites are known as archives.

---

## **Asynchronous Transfer Mode (ATM)**

A transfer method that dynamically allocates bandwidth using a fixed-size “packet,” or “cell.” Also known as “fast packet.”

---

## **AVI**

(Audio Video Interleaved) A Microsoft Corporation multimedia video format. It uses waveform audio and digital video frames (bitmaps) to compress animation.

---

## **Authentication**

Any process that ensures that users are who they say they are. When you type your name and password, you are authenticated and allowed access.

---

## **Bandwidth**

This refers to the difference (measured in Hz), between the highest and lowest frequencies of a transmission. Most people loosely refer to bandwidth as the amount of data that can be transferred over a network connection.

---

## **Berkeley Internet Name Domain (BIND)**

An early version of a DNS server developed by the University of California at Berkeley. Most Internet hosts run a version of BIND.

---

## **Bitmap**

A representation, consisting of rows and columns of dots, of a graphics image in computer memory. The value of each dot (whether it is filled in or not) is stored in one or more bits of data. For simple monochrome images, one bit is sufficient to represent each dot, but for colors and shades of gray, each dot requires more than one bit of data.

---

## **Bounce**

If you send email and it fails to arrive at its intended recipient for any reason (incorrect user name, network failure, etc.), the message “bounces” and returns to you. The subject line in a bounced message usually says something like: “Undeliverable Mail” or “Message Undeliverable.”

---

## **Browser**

A software program that allows users to access the Internet.

---

## **Non-graphical**

a user interface for computers which allows you to read plain text, not pictures, sound, or video, on the Internet. It is strictly text based, non-Windows, and does not place high memory demands on your computer. An example is lynx. (<http://lynx.browsee.org/>)

---

## **Graphical**

a user interface for computer which enables people to see color, graphics, and hear sound and see video, available on internet sites. These features are usually designated by underlined text, a change of color, or other distinguishing feature; sometimes the link is not obvious, for example, a picture with no designated characteristic. Examples are Netscape and Internet Explorer.

---

## **BTW**

Acronym meaning "By The Way." Seen mostly in IRC sessions.

---

## **Bulletin Board System (BBS)**

A computer which typically provides email services, file archives, and announcements of interest to the bulletin board system's operator (known as a sysop). BBS's started out as hobbies for computer enthusiasts, and were mostly accessible by modem. Recently, however, more and more BBS's are being connected to the internet.

---

## **Challenge-Handshake Authentication Protocol (CHAP)**

An authentication method that can be used when connecting to an Internet Service Provider. CHAP allows you login to your provider automatically, without the need for a terminal screen. It is more secure then the Password authentication Protocol (another widely used authentication method) since it does not send passwords in text format.

---

## **Chat**



Another term for IRC. Also, an acronym meaning “Conversational Hypertext Access Technology.”

---

## **Client**

In Internet terms, it’s an application that performs a specific function, such as Telnet or FTP. It’s the “front-end” to an Internet process. In more general terms, a client is computer system or process that requests a service of another computer system or process. The much talked about “client server architecture” refers to a workstation requesting the contents of a file from a server.

---

## **Comite Consultatif International de Telegraphique et Telephonique (CCITT)**

French for “International Telephone and Telegraph Advisory Council.” It’s an organization that plays a major role in the United National International Telecommunications Union (ITU). The CCITT is responsible for making technical recommendations about communications systems world – wide. Every four years, CCITT updates the standards, most recently in 1992.

---

## **Computer emergency Response Team (CERT)**

The CERT was formed by DARPA in November 1988 in response to the Internet worm incident. CERT exists to facilitate Internet-wide response to computer security events involving Internet hosts and to conduct research targeted at improving the security of existing systems. They maintain an archive of security-related issues on their FTP server at “cert.org.” Their email address is “[cert@cert.org](mailto:cert@cert.org)” and their 24-hour telephone Hotline for reporting Internet security issues is (412) 268-7090.

---

## **Coordinating Committee for Intercontinental Research Networks (CCIRN)**

A committee that provides a forum for North American and European network research organizations to cooperate and plan.

---

## **Corporation for Research and Educational Networking (CREN)**

An organization formed in October 1989, when Bitnet and CSNET were combined. CSNET is no longer around, but CREN still operates Bitnet.

---

## **Cracker**

Substantially different from “hackers,” crackers are users who try to gain illegal access to computers. They are usually malicious in their intentions.

---

## **Cyberspace**

The “world of computers and the society that society that gathers around them,” as referred to by William Gibson in his fantasy novel “Neuromancer.” It now loosely refers to the online world and even more loosely to the Internet.

---

## **Data Encryption Key (DEK)**

Much like an actual key used for locking and re-opening doors, DEKs are used for the encryption and decoding of message text, sometimes in the form of a digital signature.

---

## **Data Encryption Standard (DES)**

A standardized encryption method widely used on the Internet.

---

## **Datagram**

A block of data that is “smart” enough (actually, which carries enough information) to travel from one Internet site to another without having to rely on earlier exchanges between the source and destination computers (not to be confused with a Candygram).

---

## **Dedicated Line**

A communications line that is used solely for computer connections. If you buy an additional phone line for your modem, that's a dedicated line. There are other types of dedicated lines (such as T3s and T1s) that are used for larger network entities.

---

## **Dialup**

A widely-used method of accessing the Internet. A dialup connection uses regular phone lines to connect one computer to another via modem.

---

## **Distributed Computing Environment (DCE)**

An architecture based on standard programming interfaces, conventions, and server functionalities used for distributing applications transparently across networks. The DCE is controlled and promoted by the Open Software Foundation (OSF), a consortium of vendors including DEC, IBM and Hewlett Packard.

---

## **Domain**

A "logical" region of the Internet. People sometimes refer to them loosely as "sites." Generally, a domain corresponds to an IP address or an area on a host.

---

## **Domain Name System (DNS)**

The DNS is a static, hierarchical name service used with TCP/IP hosts, and is housed on a number of servers on the Internet. Basically, it maintains a database for figuring out and finding (or resolving) host names and IP addresses on the Internet. This allows users to specify remote computers by host names rather than numerical. IP addresses (if you've used UNIX, you may have heard the DNS referred to as the BSD UNIX BIND service). For example, go to a DOS, prompt in Windows 95, the % prompt in UNIX, or use a ping client for Windows 3.1 or Mac, and type "PING UTW.COM". This will check the DNS server you have configured, look up the numerical IP address for UTW.COM,

and then ping UTW's IP address. The advantage of the DNS is that you don't have to remember numerical IP addresses for all the internet sites you want to access.

---

### **Dot Address (or Dotted Decimal Notion)**

The common notation for IP addresses of the form 1.2.3.4; where each number represents one byte in the four-byte IP address.

---

### **Electronic Frontier Foundation (EFF)**

A foundation that addresses social and legal issues arising from the impact of computers on society.

---

### **Electronic Mail (Email)**

A method by which computer users can exchange messages with each other over a network. Email is probably the most widely-used communications tool on the Internet. There are many quirky conventions to Email, but most entail a "To:", "From:", and "Subject:" line. One of Email's advantages is its ability to be forwarded and replied to easily. If an email is badly received by a group or user, the sender is likely to get "flamed."

---

### **Email Address**

Your email address is made up of several parts. By convention, addresses use lowercase letters with no spaces. The first part of the address, the username, identifies a unique user on a server. The "@" (pronounced "at") separates the username from the host name. The host name uniquely identifies the server computer and is the last part of the Internet email address (for example, my email address is idraemel@nckn.com). Large servers, such as those used at universities or large companies sometimes contain multiple parts, called subdomains. Subdomains and the host name are separated by a "." (Pronounced "dot"). The three-letter suffix in the host name identifies the kind of organization operating the server (some locations use a two-letter geographical suffix). The most common suffixes are: .com (commercial) .edu (educational) .gov

(government) .mil (military) .net (networking) .org (non-commercial). Addresses outside of the U.S. sometimes use a two-letter suffix that identifies the country in which the server is located. Some examples are: .jp (Japan) .nl (The Netherlands) .uk (United Kingdom) .ca (Canada) .tw (Taiwan).

---

## **Encryption**

The basis of network security. Encryption encodes network packets to prevent anyone except the intended recipient from accessing the data.

---

## **Ethernet**

A standard and probably the most popular connection type for Local Area Networks (LANs). It was first developed by Xerox, and later refined by Digital, Intel and Xerox (see also “DIX”). In an Ethernet configuration, computers are connected by coaxial or twisted-pair cable where they contend for network access using a Carrier Sense Multiple Access with Collision Detection (CSMA/CD) paradigm. Ethernet can transfer information at up to 10 megabit-per-second (Mb/s).

---

## **FAQ**

Acronym for “Frequently Asked Questions.” FAQs are widely available on the Internet and usually take the form of large, instructional text files. They are written on a wide variety of topics, and are usually the most up-to-date source for specialized information.

---

## **File Transfer Protocol (FTP)**

The most widely-used way of downloading and uploading (getting and putting) files across an Internet connection. The File Transfer Protocol is a standardized way to connect computers so that files can be shared between them easily. There is a set of commands in FTP for making and changing directories, transferring, copying, moving, and deleting files. Formerly, all FTP connections were text based, but graphical applications are now available that make FTP commands as



easy as dragging and dropping, Numerous FTP clients exist for a number of platforms.

---

## **Firewall**

The name “firewall” derives from the term for a barrier that prevents fires from spreading. A computer “firewall” is a barrier between your computer and the outside world. Just like a fire is most likely to spread through open doors in a building, your computer is most vulnerable at its ports ( the doors). Without ports you could not go on the Internet or let Internet traffic enter your computer. An effective software firewall isolates your computer from the Internet using a code that sets up a blockade to inspect each packet of data, from or to your computer – to determine whether it should be allowed to pass or be blocked. Firewall software operates in various ways: Packet filters block traffic from IP addresses and/or port numbers, Proxy servers can break the connection between two networks. NATs (Network Address Translators) hides the IP addresses of client stations by presenting one IP address to the “outside” world. Stateful inspection verifies inbound and outbound traffic to be sure the destination and the source are correct. Firewall software can allow your computer to operate in stealth mode, so that its IP address is not visible.

---

## **Flame**

A negative response to an email message or newsgroup posting. If you post an article or send an email to an audience that deems your message inappropriate, expect to get “flamed.” The most common recipients of flames are users who post commercial messages in public forums, those who post adult material in non-adult areas of the Internet, and users who post or send make racial or gender-biased comments. The worst sort of flame is known as a “mail-bomb,” which occurs when the user being flamed opens his or her email and receives a flood of letters with unusually long file attachments that make his or her computer “crash.”

---

## **Follow-up**

A reply to an email or newsgroup posting that continues the conversation or idea, known as a “thread.”

---

## **Freenet**

A network system made up of community-based bulletin board systems with email, information services, interactive communications, and conferencing. They are usually funded and operated by individuals or organizations much like public television. Freenet providers are part of the National Public Telecomputing Network (NPTN), a Cleveland-based organization that works to make computer networking services as freely available as public libraries.

---

## **Gateway**

A kind of “go-between” device or program that passes information between networks that normally couldn’t communicate. What used to be called a gateway is now called a router. Not to be confused with a protocol converter.

---

## **Gopher**

An information search and retrieval tool used widely for research. Gopher information is stored hierarchically on computers across the Internet. It uses a simple protocol that allows a client to access information from a multitude of numerous Gopher servers at one time, creating what’s known as “gopher space.” The most common search tools in gopher are Veronica and Jughead. Gopher clients exist for most platforms.

---

## **Hacker**

A computer user who works to understand the “ins and outs” of computers, networks, and the Internet in general. Hackers are generally benign, and are not to be confused with crackers.

---

## **Host**

A computer that is attached to a network or the Internet. Hosts allow users on client machines to connect and share files or transfer information. Individual users communicate with hosts by using client application programs.

---

## **Hypermedia**

The combination of hypertext and multimedia in an online document.

---

## **Hypertext**

A type of text that allows embedded “links” to other documents. Clicking on or selecting a hypertext link displays document or section of a document. Most World Wide Web documents contain hypertext.

---

## **Hypertext Markup Language (HTML)**

The standard way to mark text documents for publishing on the World Wide Web. HTML is marked-up using “tags” surrounded by brackets. To see what tagged HTML text looks like, select the View Source feature from the menus in the program you are using to view this document now, and you’ll see a display of the HTML text used to create this page.

---

## **IMHO**

Acronym for “In My Humble Opinion.” Generally seen in IRC, email, or Usenet postings.

---

## **Integrated Services Digital Network (ISDN)**

A relatively new technology which combines voice and digital network services in a single medium. ISDN makes it possible for communications carriers to offer their customers digital data services as well as voice connections through a single line. CCITT defines the standards relating to ISDN.

---

## **International Organization for Standardization (ISO)**

An organization of 89 member countries (founded in 1946) responsible for setting world standards in many electronics areas. Members of the ISO are the national standards organizations of the member countries.

---

## **Internet**

A large, uncontrolled, unadministered, anarchic cyber-state that will soon take over the world! Basically, it's just everyone's computers hooked together. It's not a corporation, organization, or entity in itself. When you connect to the Internet, you actually become part of it. Always capitalized, the word Internet can also be referred to colloquially as the "Net."

---

## **Internet Assigned Numbers Authority (IANA)**

The central registry for various Internet protocol parameters, such as port, protocol and enterprise numbers, and options, codes and types, the currently assigned values are listed in the "Assigned Numbers" document. If you'd like more information or want to request a number assignment, you can email IANA at "[iana@isi.edu](mailto:iana@isi.edu)".

---

## **Internet Protocol (IP)**

An industry standard, connectionless, best-effort packet switching protocol used as the network layer in the TCP/IP Protocol Suite.

---

## **Internet Protocol Address (IP Address)**

The 32-bit address defined by the Internet Protocol. Every resource on the Internet has a unique numerical IP address, represented in dotted decimal notation. IP addresses are the closest thing the Internet has to phone numbers. When you "call" that number (using any number of connection methods such as FTP, HTTP, Gopher, etc.) you get connected to the computer that "owns" that IP address.

---

## **Internet Service Provider (ISP)**

An ISP is a company that maintains a network that is linked to the Internet via a dedicated communication line, usually a high-speed link known as a T1. An ISP offers use of its dedicated communication lines to companies or individuals (like me) who can't afford \$1,300 a month for a direct connection. Using a modem, you can dial up to a service provider whose computers will connect you to the Internet, typically for a fee.

---

## **Internet Society (ISOC)**

A non-profit, professional organization that supports the technical evolution of the Internet and stimulates that interest of members of the scientific and academic communities, industry, and the public regarding technology and the applications of the Internet. The ISOC also promotes the development of new applications for the Internet by publishing a quarterly newsletter, the Internet society News, and by holding an annual conference, called INET.

---

## **InterNIC**

Meaning "Internet information Center," InterNIC is the combined name for the providers of registration, information, and database services to the Internet. InterNIC is who you contact if you want to register a domain name on the Internet.

---

## **IRC**

The world-wide "party line" of the '90s. IRC allows multiple users to converse in real time on different "channels." Channels (which have a "#" sign preceding their name) vary in traffic and content. Channel operators (or Ops) moderate the conversation, and have the ability to "kick" people from channels, or even ban them if their actions warrant it. IRC clients are available for nearly all platforms.

---

## **LAN**



Acronym for “Local Area Network.” LANs are now commonplace in most businesses, allowing users to send email and share resources such as files, printers, modems, etc. Currently, most larger companies are connection their LANs to he Internet, allowing users to connect to resources within or outside the LAN

---

### **Leased Line**

A dedicated, full-time connection used to link a user or network to an Internet Service Provider or another network.

---

### **Listserv**

An automated mailing list distribution system. Listservs exist for a multitude of professional, educational, and special interest groups. Usually, you have to send and email to a Listserver with the subject “SUBSCRIBE listname” or something to that effect. You are then “subscribed” to that “mailing list” and (depending on the service) will receive regular mail from a single source or from all members who send email to the Listserver. Listserv was originally designed for the Bitnet/EARN network.

---

### **Mailing List**

A list of email addresses used to forward messages to groups of people. When you subscribe to a mailing list, you receive all mail sent to that list (see also Listserv).

---

---

### **Mirror Site**

Due to the popularity of some FTP and Web sites, mirror sites came into existence. They are areas on a computer that “mirror” or contain an exact replica of the directory structure of another computer. If you have trouble getting connected to an FTP site, for example, because of the high amount of traffic, you

can usually connect to a mirror site that contains the same information on a different computer. Mirror sites are usually updated once a day.

---

## **Moderator**

The person who manages moderated mailing lists, newsgroups, or online discussion forums for services such as AOL., CompuServe, or the Microsoft Network.

---

## **Mosaic**

A graphical browser for the World wide Web that supports hypermedia. The NCSA (National Super Computer Association) invented the Mosaic browser, which quickly became the industry standard. Recently, however, Netscape Communications has stormed the market with its freeware release of their Netscape Browser, which has radically redefined the Web. The term “Mosaic” is sometimes used incorrectly as a synonym for the World Wide Web.

---

## **Multipurpose Internet Mail Extensions Encoding (MIME Encoding)**

MIME is a standardized method for organizing divergent file formats. The method organizes file formats according to the file’s MIME type. When Internet (usually email) software retrieves a file from a server, the server provides the MIME type of the file, and the file is decoded correctly when transferred to your machine.

---

## **Netiquette**

The combination of the words “Net” and “etiquette,” this refers to the proper behavior on a network, and more generally the internet. The key element in Netiquette is remembering that actual people are on the other end of a computer connection, and offensive comments or actions are just as offensive even if you can’t see your recipient.

---

## **Network File System (NFS)**

A protocol developed by Sun Microsystems. NFS allows a computer to access and use files over a network as if they were local. This protocol has been incorporated into the products of more two-hundred companies, and is now a de facto internet standard.

---

### **Network News Transfer Protocol (NNTP)**

An industry standard protocol for the distribution, inquiry, retrieval, and posting of news articles.

---

### **Open Systems Interconnection (OSI)**

A suite of protocols, designed by ISO committees to be the international standard computer network architecture.

---

### **Packet**

The common term for the standard unit of data sent across a network.

---

### **Packet Internet Gopher (PING)**

The simplest way to test or time the response of an Internet connection. PING sends a request to an Internet host and waits for a reply (called a ... yep.. you guessed it: PONG). When you PING an address, you get a response telling you the number of seconds it took to make the connection. PING clients exist for a number of platforms, or you can use a UNIX or Windows 95 prompt to issue a PING command directly.

---

### **Password Authentication Protocol (PAP)**

One of the many authentication methods that can be used when connection go an ISP. PAP allows you to login automatically, without having to use a terminal

window to type in your username and password. One warning about PAP: passwords are sent over the connection in text format, which means there is no protection if someone is “listening-in” on your connection.

---

### **Point Of Presence (POP)**

An installation of telecommunications equipment, usually digital leased lines and multi-protocol routers.

---

### **Point-to-Point Protocol (PPP)**

A protocol that provides a method for transmitting packets over serial point-to-point links. PPP is one of the most popular methods for dialup connections to the Internet, since it allows you to use other standard protocols (such as IPX, TCP/IP, and Netbeui) over a standard telephone connection, but it can also be used for LAN connections.

---

### **Portal**

A Web site “gateway” that provides multiple services, which could include Web searching capability, news, free-email, discussion groups, online shopping, references and other services. A more recent trend is to use the same term for sites that offer services to customers of particular industries, such as a Web-based bank “portal,” on which customers can access their checking, savings and investment accounts.

---

### **Post Office Protocol (POP)**

A protocol designed to allow single users to read mail from a server. There are three versions: POP, POP2, and POP3. When email is sent to you, it is stored on the server until accessed by you. Once you are authenticated, the POP is used to transmit the stored mail from the server to your local mailbox on your client machine.

---

### **Posting**

The sending of an article to a Usenet newsgroup or the placing of a message on a BBS.

---

## **Protocol**

Simply, the “language” spoken between computers to help them exchange information. More technically, it’s a formal description of message formats and the rules that two computers must follow to exchange those messages. Protocols can describe low-level details of machine-to-machine interfaces (like the order in which bits and bytes are sent across a wire) or high-level exchanges between application programs (the way in which two programs transfer a file across the Internet).

---

## **Request For Comments (RFC)**

A document series, begun in 1969, which describes the Internet suite of protocols and related experiments. Not all (actually, very few) RFCs describe Internet standards, but all Internet standards are written up as RFCs.

---

## **Router**

A device that forwards traffic between networks. Forwarding decisions are made based on network layer information and routing tables, often constructed by routing protocols.

---

## **Search Engine**

Specialized software, such as Alta Vista and Yahoo, that lets WWW browser users search for information on the Web by using keywords, phrases, and Boolean logic. Different search engines have different ways of categorizing and indexing information. Search engines are accessed by typing in the URL of that engine or using a browser’s compilation of search engines in its Internet search function.

---



## **Serial Line Internet Protocol (SLIP)**

Similar to PPP, SLIP is another standard protocol used to run TCP/IP over serial lines, such as telephone circuits or RS-232 cables. Unlike PPP, however, SLIP does not work on a LAN connections. SLIP is probably the most popular way for dialup users to access the Internet.

---

## **Server**

Simply, a computer that provides resources, such as files or other information. Common Internet servers include file servers and name servers Domain Name Service.

---

## **SIG**

Acronym for “Special Interest Group.” SIGs sponsor a variety of Listservs, IRC channels, and Internet sites.

---

## **Signature**

An ASCII text file that can be automatically attached to the bottom of a piece of email or newsgroup posting that identifies the sender. Many signatures (or “sigs”) use symbols and characters to create images or words to make the sig more interesting.

---

## **Simple Mail Transfer Protocol (SMTP)**

A protocol used to transfer email. SMTP transfers mail from server to server, and the end user must use POP (see also Post Office Protocol) to transfer the messages to their machine.

---

## **Simple Network Management Protocol (SNMP)**

Developed to manage nodes on an IP network, SNMP is an Internet standard protocol. It can be used to manage wiring hubs, video toasters, CD ROM jukeboxes, and many other devices.

---

## **Smiley**

The use of punctuation marks and other symbols or characters to portray moods when typing, especially in email messages and IRC. Here's an example of a simple smiley :). If you don't see it, tilt your head to the left and look at it. The colon makes the eyes and the parenthesis makes the smiley mouth. The smile means happiness (like if someone says something funny) or it often denotes sarcasm. Other combinations of characters can express many other emotions. You may also hear them referred to as "emoticons".

---

## **TCP/IP Stack**

To properly use the TCP/IP protocol, PCs require a TCP/IP stack. This consists of TCP/IP software, sockets software (such as WINSOCK.DLL for Windows machines), and hardware driver software (known as packet drivers). Windows 95 comes with Microsoft's own built-in TCP/IP stack, including version 1.1 of Microsoft's WINSOCK.DLL and packet drivers.

---

## **Telnet**

The Internet standard protocol to connect to remote terminals. Telnet clients are available for most platforms. When you Telnet to a UNIX site, for example, you can issue commands at the prompt as if the machine were local.

---

## **Token Ring**

A type of LAN in which networked computers are wired into a "ring." Each computer (or node) is in constant with the next node in the ring. A control message, called a "token", is passed from one node to another, allowing the node with the token to send a message out to the network. If the ring is "broken" by one computer losing contact, the network can no longer communicate. The IEEE 802.5 token ring standard is the most common.

---

## **Topology**

The “layout” of all the computers on a network and the links that join them.

---

## **Transmission Control Protocol/Internet Protocol (TCP/IP)**

TCP/IP is the standard communications protocol required for Internet computers. To communicate using TCP/IP, PCs need a set of software components called a TCP/IP stack. Macintoshes typically use a proprietary software called Mac TCP. Most UNIX systems are built with TCP/IP capabilities.

---

## **UNIX-to-UNIX Copy (UUCP)**

Originally, UUCP was a program that allowed UNIX systems to transfer files over phone lines. Currently, the term is used to describe the protocol that passes news and email across the Internet.

---

## **Usenet**

Usenet groups are more commonly known as “newsgroups.” There are thousands of groups hosted on hundreds of servers around the world, dealing with various topics. Newsreader software is required to properly download and view “articles” in the groups, but you can usually “post” an article to a group simply by emailing to it.

---

## **Universal Resource Locator (URL)**

More commonly referred to as the URL, the Universal Resource Locator refers to the entire address that is recognized “universally” as the address for an Internet resource. Each resource on the Internet has a unique URL. URLs begin with letters that identify the resource type, such as http, ftp, gopher, etc. These types are followed by a colon and two slashes. Next, the computer’s name is listed, followed by the directory and filename of the remote resource. For

example, the URL for this glossary is <http://www.windows95.com/glossary.html/>

---

### **White Pages**

Databases containing email addresses, telephone numbers, and postal addresses of Internet users. You can search the Internet White Pages to find information about particular users.

---

### **WHOIS**

An Internet program (related to Finger and the White Pages) that lets you enter and Internet entity (such as domains, networks, and hosts) and display information such as a person's company name, address, phone number and email address.

---

### **Wide Area Information Service (WAIS)**

A distributed information service and search engine that allows natural language input and indexed searching. Many Web search utilities use a WAIS engine.

---

### **Winsocks**

Stands for "Windows Sockets." Winsocks is a set of specifications or standards for programmers creating TCP/IP applications for use with Windows.

---

### **World Wide Web (WWW or W3)**

The "Web" is a collection of online documents housed on Internet servers around the world. The concept of the Web was created by researchers at CERN in Switzerland. Web documents are written or "coded" in HTML. To access these documents, you have to use a Web browser, such as Netscape or Mosaic. When these browsers access (or hit) a page, the server uses the Hyper Text Transfer Protocol (HTTP) to send the document to your computer.

---

## **Worm**

A computer program that replicates itself and is self-propagating. While viruses are designed to cause problems on a local system and are passed through boot sectors of disks and through files, worms are designed to thrive in network environments. Network worms were first defined by Shoch & Hupp of Xerox in ACM Communications (March 1982). The most famous (or infamous) worm was the Internet Worm of November 1988. It successfully propagated itself on over 6,000 systems across the Internet.

---

## **Appendix -**

### **A**

#### **HOT SITES**

These sites take you to some of the major producers of computers, computer systems, and related hardware and software.

#### **COMPUTER SYSTEMS**

##### **IBM**

<http://www.ibm.com>

##### **Apple Computer**

<http://www.apple.com>

##### **Sun Microsystems, Inc.**

<http://www.sun.com>

##### **Digital Equipment Corporation (DEC)**

<http://www.dec.com>



### **Compaq**

<http://www.compaq.com>

### **Printers**

Hewlett-Packard

<http://www.hp.com>

### **Modems**

US Robotics

<http://www.usr.com>

### **Hayes**

<http://www.usr.com>

### **Practical Peripherals**

<http://www.practinet.com>

## **MAJOR SOFTWARE CORPORATIONS**

### **Microsoft**

<http://www.microsoft.com>

### **Adobe Systems Incorporated**

<http://www.adobe.com>

## **INTERNET SITES**

This section contains Internet-related World Wide Web sites.

### **Browsers and Plug-Ins**

#### **Netscape Communications**

<http://www.netscape.com>

#### **Microsoft Internet Explorer**

<http://www.microsoft.com/ie/>

### **Search Engines**

**Yahoo!**

<http://www.yahoo.com>

**Infoseek**

<http://www.infoseek.com/>

**Alta Vista**

<http://www.altavista.digital.com/>

**WebCrawler**

<http://www.webcrawler.com/>

**People Finders****InfoSpace**

<http://www.infospace.com>

**Who Where?**

<http://www.whowhere.com>

**America Directory Assistance**

<http://www.lookupusa.com/lookupusa.adp/peopsrch.htm>

**Broadcast Media**

This list of sites covers everything from network TV to cable to he movies.

**Network TV****ABC**

<http://www.abc.com>

**Fox**

<http://www.foxworld.com>

**Cable TV****Cinemax**

<http://www.cinemax.com>

**The Disney Channel**

<http://www.disney.com/DisneyChannel/>

**ESPN**

<http://www.espn.com>

**Movie Studios**

**MCA/Universal**

<http://www.mca.com>

**Sony Pictures**

<http://www.spe.sony.com/Pictures/SonyMovies/index.html>

**20<sup>th</sup> Century Fox**

<http://www.tcfhe.com>

**Walt Disney Studios**

<http://www.disney.com/DisneyPictures/>

**Warner Brothers**

<http://www.movies.warnerbros.com/>