



DIPLOMA IN WEB DESIGN

DWD-03

INTERNET AND WEB TECHNOLOGY

Block

1

INTERNET TECHNOLOGY

Unit -1	:	Internet Concepts
Unit -2	:	Internet Protocols
Unit -3	:	Internet Applications
Unit -4	:	Internet Security and Privacy

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DIPLOMA IN WEB DESIGNING

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UNIT - 1

INTERNET CONCEPTS

Learning objectives:-

At the end of this unit you will be able to:

- ✎ Understand the Internet
- ✎ Know various services provided by Internet
- ✎ Familiar with evolution of the Internet
- ✎ Understand the working of internetworks?
- ✎ Know the role of the Internet Service Providers
- ✎ Know the evolution of WWW
- ✎ Identify the function of Search Engine
- ✎ Understand Basic concept of Client & Server
- ✎ Explain the Tool Bar Menus of Internet Explorer

STRUCTURE

- 1.1 Introduction
- 1.2 Requirement for Internet
 - 1.2.1 Hardware Requirements
 - 1.2.2 Software Requirements
- 1.3 Evolution of Internet
- 1.4 Tasks performed by Internet
- 1.5 Working on Internet
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 - 1.6.1 Dial up connection
 - 1.6.2 Leased line connection
 - 1.6.3 DSL Connection
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- 1.7 Internet Service Provider (ISP)
- 1.8 WWW and its Evolution
- 1.9 Searching & Surfing
- 1.10 Search Engine
- 1.11 Web Browser
- 1.12 Client – Server Architecture
- 1.13 Summary
- 1.14 Check your Progress
- 1.15 References

Introduction

The Internet, sometimes called simply "the **Net**," is a worldwide system of computer networks. In other words the Internet is a network of networks in which users at any one computer can (if they have permission or connected) get information from any other computer (and sometimes talk directly to users at other computers). Today the use of internet has increased tremendously. It has revolutionized the whole world and made computers the most effective communication tool. Internet gives us access to information on almost every subject. In this chapter we will learn about what is Internet and how it came in to existence. Also we will discuss some of the services and tools which are



commonly used to access the Internet, and will learn about how to begin searching the Internet for information. A specific technology which is rapidly becoming one of the central mechanisms for providing information on the Internet, the World Wide Web, will also be explained in it. *The Internet is a communication system that connects computers and computer networks all over the world. Thus, we define the **Internet as a global network of computers/devices**. “Inter” comes from the word “International”, “Net” here refers to a computer network. The Internet is an arrangement of connected computers, which lets the computer users all over the globe to exchange data or information.*

1.2 Requirements for the Internet

The uses of Internet needs following things.

1.2.1 Hardware Requirements:

- A personal computer with at least a speed of 800 MHz or more
- RAM of about 128 MB
- Telephone line connection
- Modem to link Internet

1.2.2 Software Requirements

- Any operating system like Windows XP, Windows 7, Windows 8, Linux etc
- Internet Explorer, Netscape Navigator or any other web browser

1.3 Evolution of Internet

In 1969 when man walked on the moon; the U.S. defense department set an Advanced Research project Agency (ARPA) for further research. They designed a network of four computers to exchange and share their data. This network was called **ARPANET** (Advanced Research Project Agency Network). Later, many universities were allowed to join this network and share the information. This was the beginning of 'Networking of computers' which grew bigger day by day and gave birth to **INTERNET**- the technology which has changed our life. Earlier, Internet was used by engineers, scientists and computer experts for re-search purpose. Gradually, the network was made accessible to private agencies and general public. People started using it for sending messages and files between the computers. The most interesting thing about Internet is that no single agency controls or maintains the Internet.

In 1972, the ARPANET spread over the globe with **23 nodes** located at different countries and thus became known as **Internet**. Later, many universities were allowed to join this network and share the information. Internet is that no single agency controls it or maintains it. It cannot be **hijacked or monopolized**. Rather for its smooth functioning, some task forces have been established they are -

IETF- Internet Engineering Task Force.

I RTF-Internet Research Task Force.

IAB- Internet Architecture Board.

ISP - Internet Service Provider

In India, internet services started on 15th August 1995 through government owned VSNL. Now many private internet service providers like Airtel, Reliance, Sify, and Tata etc. have also been allowed to provide internet services.

1.4 Tasks Performed by Internet

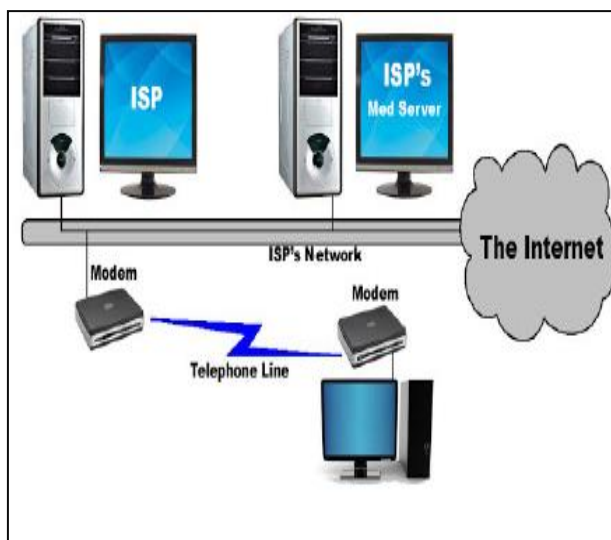
Network is a group of two or more computers linked together. If two or more networks are joined together then they form inter-network. Internet is a inter-network of whole world. Thousands of networks are joined with internet. We can perform many tasks with Internet as described below

- **NEWS AND INFORMATION:** Internet provides facility to read different newspapers online and get the information regarding various topics of our interest such as politics, sports, education etc. It also keeps us updated with current events.
- **ART AND ENTERTAINMENT:** Internet allows us to download and purchase various software for art and entertainment such as games, songs, movies, jokes, stories etc.
- **ON-LINE SHOPPING:** We can purchase various items like books, clothes, gift items etc. from different e-shops around the world without actually going there.

- **MAILING LETTERS:** Electronic mail is the most popular feature of the Internet. It allows us to send and receive messages. We can also attach pictures, videos, sounds to our email and send it to anyone.
- **HEALTH AND FITNESS:** we can have an all-time doctor at our service to provide health and fitness information. We can also search for remedies and precautions for different diseases.
- **TOURISM AND TRAVEL:** Internet provides facility for online booking of hotels, railway tickets, air tickets etc. all over the world and round the clock.
- **CHATTING:** Internet allows us to exchange text messages with an-other person anywhere in the world.
- **BANKING OPERATIONS:** Now all Banking operations can be done right from our home using Internet / e-banking services.
- **VIDEO CONFERENCING:** Through video conferencing, we can com-municate with the other person visually. To do video conferencing, both the persons need to have web cameras.

1.5 Working of the Internet

The internet is the network of networks around the world. It is a global network of computer. It consists of millions of private, public, academic, business, and government networks. The Internet connects millions of computers. These computers are called hosts. The communication protocol used for Internet is TCP/IP. The computers on Internet are linked through different communication media. The commonly used communication media are telephone lines, fiber optic cables, microwave and satellite.



A large number of books, newspapers, magazines, encyclopedia, and other types of materials are available in electronic form on the Internet. We can find information or news on about almost anything of the world. We can also access latest information or news on any topic. It means that Internet is an ocean of knowledge. In addition of finding information, we can communicate with other people around the world. Due to Internet our world has become a "global village".

Working of the Internet, there is no particular organization that controls the Internet. Different networks of private companies, government agencies,

research organizations, universities etc. are interconnected together. You can say that the Internet is a collection of millions of computers, all linked together. A personal computer can be linked to the Internet using a phone-line modem, DSL or cable modem. The modem is used to communicate with the server of an Internet Service Provider (ISP). ISP is a company that provides the Internet connections to the users. There are many ISP companies in each country of the world. The user has to get an Internet connection from any ISP company to connect to the Internet.

A computer in a business or university is usually connected with LAN using Network Interface Card (or LAN card). The LAN of university or business is connected to the server of ISP using a high-speed phone line such as T1 Line. A T1 Line can handle approximately 1.5 million bits per second. A normal phone line using a modem can handle 30,000 to 50,000 bits per second. The user's computer connects to ISP's server makes its connection to larger ISP. The largest ISPs maintain fiber-optic lines, undersea cables or satellite links. In this way, every computer on the Internet is connected to every other computer on the Internet.

1.6 Internet Connections

In today's age, there are numerous ways to connect laptops, desktops, mobile phones and tablets to the Internet. When determining which type of Internet connection is right for us, it's important to understand the distinction between each connection. Some of the most widely used Internet connections are listed below.

TYPES OF INTERNET CONNECTIONS

There are five types of internet connections which are as follows:

- (i) Dial up Connection
- (ii) Leased Connection
- (iii) DSL connection
- (iv) Cable Modem Connection
- (v) VSAT

1.6.1 Dialup Connection

Dial-up refers to an Internet connection that is established using a modem.

The modem connects the computer to standard phone lines, which serve as the data transfer medium. When a user initiates a dial-up connection, the modem dials a phone number of an Internet Service Provider (ISP) that is designated to receive dial-up calls. The ISP then establishes the connection, which usually

takes about ten seconds and is accompanied by several beeping and a buzzing sound.



After the dial-up connection has been established, it is active until the user disconnects from the ISP. Typically, this is done by selecting the “Disconnect” option using the ISP’s software or a modem utility program. However, if a dial-up connection is interrupted by an incoming phone call or someone picking up a phone in the house, the service may also be disconnected.

Advantages

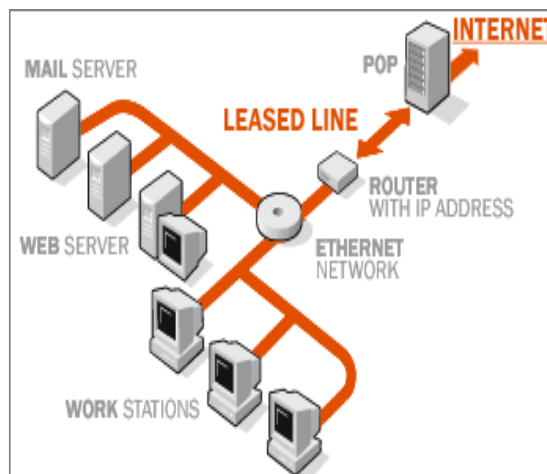
- Low Price
- Secure connection – your IP address continually changes
- Offered in rural areas – you need a phone line

Disadvantages

- Slow speed.
- Phone line is required.
- Busy signals for friends and family members.

1.6.2 Leased Connection

Leased connection is a permanent telephone connection between two points set up by a telecommunications common carrier. Typically, leased lines are used by businesses to connect geographically distant offices. Unlike normal dial-up connections, a leased line is always active. The fee for the connection is a fixed monthly rate. The primary factors affecting the monthly fee are distance between end points and the speed of the circuit. Because the connection doesn’t carry anybody else’s communications, the carrier can assure a given level of quality.



For example, a T-1 channel is a type of leased line that provides maximum transmission speed of 1.544 Mbps. You can divide the connection into different lines for data and voice communication or use the channel for one high speed data as primary circuit. Dividing the connection is called multiplexing. Increasingly, leased lines are being used by companies, and even individuals, for Internet access because they afford faster data transfer rates and are cost-effective if the Internet is used heavily.

Advantage

- Secure and private: dedicated exclusively to the customer
- Speed: symmetrical and direct

- Reliable: minimum down time
- Wide choice of speeds: bandwidth on demand, easily
- upgradeable
- Leased lines are suitable for in-house office web hosting

Disadvantages

- Leased lines can be expensive to install and rent.
- Not suitable for single or home workers
- Lead times can be as long as 65 working days
- Distance dependent to nearest POP
- Leased lines have traditionally been the more expensive
- It access option. A Service Level Agreement (SLA) confirms

1.6.3 DSL Connection

Digital Subscriber Line (DSL) is a family of technologies that provides digital data transmission over the wires of a local telephone network. DSL originally stood for *digital subscriber loop*. In

telecommunications marketing, the term DSL is widely understood to mean Asymmetric Digital Subscriber Line (ADSL), the most commonly installed DSL technology. DSL service is delivered simultaneously with wired telephone service on the



same telephone line. This is possible because DSL uses higher frequency bands for data separated by filtering. On the customer premises, a DSL filter on each outlet removes the high frequency interference, to enable simultaneous use of the telephone and data. The data bit rate of consumer DSL services typically ranges from **256 Kbit/s to 40 Mbit/s** in the direction to the customer(downstream), depending on DSL technology, line conditions, and service-level implementation. In ADSL, the data throughput in the upstream direction, (the direction to the service provider) is lower, hence the designation of *asymmetric* service. In Symmetric Digital Subscriber Line (SDSL) services, the downstream and upstream data rates are equal.

Advantages:

- **Security:** Unlike cable modems, each subscriber can be configured so that it will not be on the same network. In some cable modem networks, other computers on the cable modem network are left visibly vulnerable and are easily susceptible to break in as well as data destruction.
- **Integration:** DSL will easily interface with ATM and WAN technology.
- High bandwidth

- Cheap line charges from the phone company.
- Good for “bursty” traffic patterns

Disadvantages

- **No current standardization:** A person moving from one area to another might find that their DSL modem is just another paper weight. Customers may have to buy new equipment to simply change ISPs.
- **Expensive:** Most customers are not willing to spend more than rupees 200 to 250 per month for Internet access. Current installation costs, including the modem, can be high.
- **Distance Dependence:** The farther you live from the DSLAM (DSL Access Multiplexer), the lower the data rate. The longest run lengths are 18,000 feet, or a little over 3 miles.

1.6.4 Cable MODEM Connection

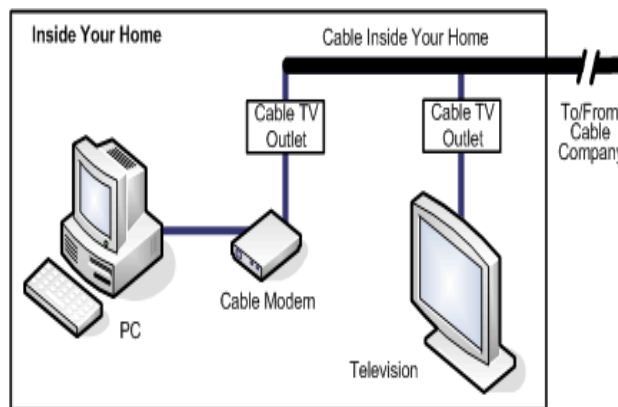
A **cable modem** is a type of Network Bridge and modem that provides bi-directional data communication via radio frequency infrastructure. Cable modems are primarily used to deliver broadband Internet access in the form of cable Internet, taking advantage of the high they are commonly deployed in Australia, Europe, Asia and America. In India the cable TV company runs a coaxial cable into the building to deliver their Internet services. Although fed from the same coax that provides cable TV service, most companies place a splitter outside of the building and run two cables in, rather than using a splitter at the set-top box. The coax terminates at the cable modem. The cable modem itself attaches to the SOHO computing equipment via its 10BASE-T port. In most circumstances, the cable modem attaches directly to a user’s computer. If a LAN is present on the premises (something many cable companies frown upon), some sort of router can be connected to the cable modem.

Advantages

- **Always Connected:** A cable modem connection is always connected to the Internet. This is advantageous because you do not have to wait for your computer to “log on” to the Internet; however, this also has the disadvantage of making your computer more vulnerable to hackers.
- **Broadband:** Cable modems transmit and receive data as digital packets, meaning they provide high-speed Internet access. This makes cable modem connections much faster than traditional dial-up connections.
- **Bandwidth:** Cable modems have the potential to receive data from their cable provider at speeds greater than 30 megabits per second; unfortunately, this speed is rarely ever realized. Cable lines are shared by all of the cable modem users in a given area; thus, the connection speed varies depending upon the number of other people

using the Internet and the amount of data they are receiving or transmitting.

- **File Transfer Capabilities:** Downloads may be faster, but uploads are typically slower. Since the same lines are used to transmit data to and from the modem, priority is often given to data traveling in one direction.
- **Signal Integrity:** Cable Internet can be transmitted long distances with little signal degradation. This means the quality of the Internet signal is not significantly decreased by the distance of the modem from the cable provider.
- **Routing:** Cable routers allow multiple computers to be hooked up to one cable modem, allowing several devices to be directly connected through a single modem. Wireless routers can also be attached to your cable modem.
- **Rely on Existing Connections:** Cable modems connect directly to preinstalled cable lines. This is advantageous because you do not need to have other services, such as telephone or Internet, in order to receive Internet through your cable modem. The disadvantage is that you cannot have cable internet in areas where there are no cable lines.

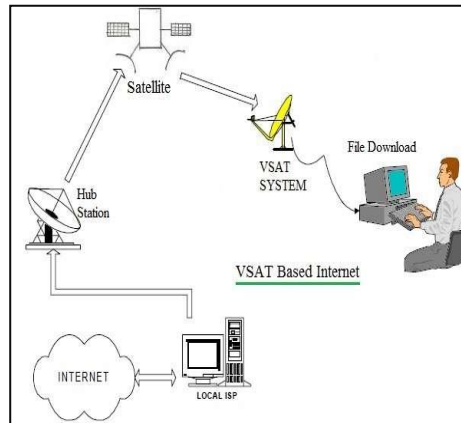


Disadvantages

- Cable internet technology excels at maintaining signal strength over distance. Once it is delivered to a region, however, such as a neighborhood, it is split among that region's subscribers. While increased capacity has diminished the effect somewhat, it is still possible that users will see significantly lower speeds at peak times when more people are using the shared connection.
- Bandwidth equals money, so cable's advantage in throughput comes with a price. Even in plans of similar speeds compared with DSL, customers spend more per Mb with cable than they do with DSL.
- It's hard to imagine, but there are still pockets of the United States without adequate cable television service. There are far fewer such pockets without residential land-line service meaning cable internet is on balance less accessible in remote areas.

1.6.5 VSAT

It stands for very small aperture terminal, an earthbound station used in satellite communications of data, voice and video signals, excluding broadcast television. A VSAT consists of two parts, a transceiver that is placed outdoors in direct line of sight to the satellite and a device that is placed indoors to interface the transceiver with the end user's communications device, such as a PC. The transceiver receives or sends a signal to a satellite transponder in the sky. The satellite sends and receives signals from a ground station computer that acts as a hub for the system. Each end user is interconnected with the hub station via the satellite, forming a star topology. The hub controls the entire operation of the network. For one end user to communicate with another, each transmission has to first go to the hub station that then retransmits it via the satellite to the other end user's VSAT.



Advantages

Satellite communication systems have some advantages that can be exploited for the provision of connectivity. These are:

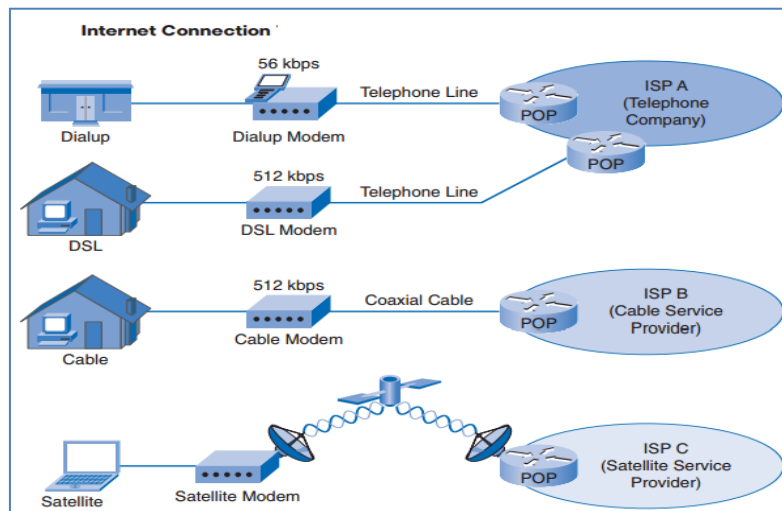
- Costs Insensitive to Distance
- Single Platform service delivery (one-stop-shop)
- Flexibility
- Upgradeable
- Low incremental costs per unit

Disadvantages

- High start-up costs (hubs and basic elements must be in place before the services can be provided)
- Higher than normal risk profiles
- Severe regulatory restrictions imposed by countries that prevent VSAT networks and solutions from reaching critical mass and therefore profitability
- Some service quality limitations such the high signal delays (latency)

Satellite: A satellite connection uses broadband but does not require cable or phone lines; it connects to the Internet through satellites orbiting the Earth. As a result, it can be used almost anywhere in the world, but the connection may be affected by weather patterns. Satellite connections are also usually slower than DSL or cable.

- ❖ **3G and 4G:** 3G and 4G service is most commonly used with mobile phones, and it connects wirelessly through your ISP's network. However, these types of connections aren't always as fast as DSL or cable. They will also limit the amount of



data you can use each month, which isn't the case with most broadband plans.

1.7 Internet Service Provider [ISP]

Internet Service Provider (ISP), it refers to a company that provides Internet services. For a monthly rent, the service provider usually provides a software package, username, and password and access phone number for e.g. Airtel, Vodafone, and BSNL. For broadband access you typically receive the broadband modem hardware or pay a monthly rent for this equipment that is added to your ISP account billing. Equipped with a modem, you can then log on to the Internet and browse the World Wide Web and send and receive e-mails.

In addition to serving individuals, ISPs also serve large companies, providing a direct connection from the company's networks to the Internet. ISPs themselves are connected to one another through Network Access Points (NAPs). ISPs may also be called IAPs (Internet Access Providers).



1.8 WWW& its Evolution

The World Wide Web, abbreviated as WWW or W3 and commonly known as the Web, is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them via hyperlinks.

The World-Wide Web was developed to be a pool of human knowledge, and human culture, which would allow collaborators in remote sites to share their ideas and all aspects of a common project.

Evolution of WWW

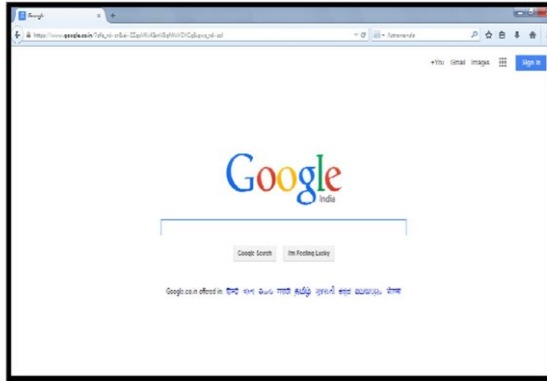
- In March 1989, Tim Berners-Lee wrote a proposal that referenced ENQUIRE, a database and software project he had built in 1980, and described a more elaborate information management system.
- On November 12, 1990, with help from Robert Cailliau, Tim Berners-Lee published a more formal proposal to build a "Hypertext project" called "Worldwide Web" (one word, also "W3") as a "web" of "hypertext documents" to be viewed by "browsers" using client-server architecture.
- This proposal estimated that a read-only web would be developed within three months and that it would take six months to achieve "the creation of new links and new material by readers, to achieve universal authorship" as well as "the automatic notification of a reader when new material of interest to him/her has become available."
- A NeXT Computer was used by Berners-Lee as the world's first web server and also to write the first web browser, Worldwide Web, in 1990.
- Tools needed were a working Web the first web browser (which was a web editor as well); the first web server; and the first web pages, which described the project itself.
- On August 6, 1991, Tim Berners-Lee posted a short summary of the World Wide Web project on the .hypertext newsgroup.
- This date also marked the debut of the Web as a publicly available service on the Internet. The first photo on the web was uploaded by Berners-Lee in 1992, an image of the CERN house band Les Horribles Cernettes.
- The first server outside Europe was set up at SLAC to host the SPIRES-HEP database in 91 – 92.
- The concept of hypertext originated with older projects from the 1960s, such as the Hypertext Editing System (HES) at Brown University by Ted Nelson and Douglas Engelbart.
- Tim Berners Lee introduced the concept of the Universal Document Identifier (UDI), later known as Uniform Resource Locator (URL) and Uniform Resource Identifier (URI); the publishing language Hypertext Markup Language (HTML); and the Hypertext Transfer Protocol (HTTP).
- In 1993, a graphical browser was developed by a team at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign (NCSA-UIUC), led by Marc Andreessen. This was the first web browser ever.

1.9 Searching & Web surfing

Search means: “Try to find out” Web search is the act of looking for WebPages. The system that collects similar WebPages together at one place is called a web search engine. When we ask a web search engine such as Google or Bing find WebPages related to a topic, we will get back a list of hyperlinks to related WebPages. This list may have a hundred or more links. They are often divided up into a number of search engine results pages (SERPs). From a SERP, we decide which link we should try and see if it's referenced page had what we're looking for.

Web surfing means to move from place to place (one website to another website) on the Internet, searching for topics of interest. The term also has another meaning -- spending time on the Internet.

Web surfing has become a favorite pastime for many Internet users. Just as in "TV channel surfing," where one clicks the remote to go from channel to channel, the hyperlinks on Web pages make it easy to go from one page to another.



1.10 Search Engine

A web search engine is designed to search for information on the World Wide Web and FTP servers. The search results are generally presented in a list of results and are often called hits. The information may consist of web pages, images, information and other types of files. Some search engines also mine data available in databases or open directories.



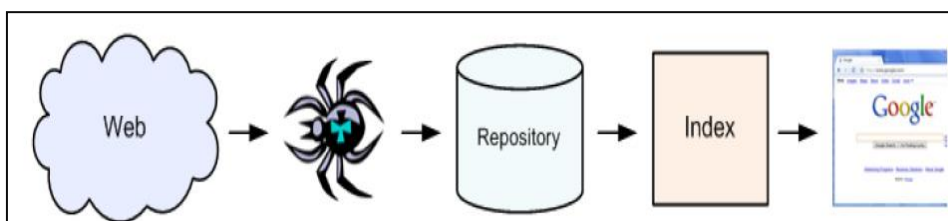
- The very first tool used for searching on the Internet was Archie.
- The first web robot, the Perl-based World Wide Web Wanderer was built and used by it to generate an index called 'Wandex'. The purpose of the Wanderer was to measure the size of the World Wide Web.
- Around 2000, Google's search engine rose to prominence. The company achieved better results for many searches with an innovation called Page Rank. This iterative algorithm ranks web pages based on the number and Page Rank of other web sites and pages that link there, on the premise that good or desirable pages are linked to more than others.

- Web search engines work by storing information about many web pages, which they retrieve from the html itself. These pages are retrieved by a Web crawler (sometimes also known as a spider) — an automated Web browser which follows every link on the site.
- This information is then analyzed and indexed. The contents of each page are then analyzed to determine how it should be indexed. The purpose of an index is to allow information to be found as quickly as possible.

On basis of your search criteria, search engines automatically search for websites from www and display the results. Then you can choose from and open the website that you are looking for. Google is one of the most popular search engines. Other search engines are Bing, Ask, MSN and Yahoo. The web addresses for these search engines are -

Google - www.google.com
 Bing -www.bing.com
 ASK -www.ask.com
 Yahoo -www.yahoo.com

A search engine works in the following order:



1. **Web crawling:** Web search engines work by storing information about many web pages. These pages are retrieved by the program known as Web crawler - which follows every link on the site. Web crawler may also be called a Web spider.
2. **Indexing:** Indexing also known as web indexing, it stores data to facilitate fast and accurate information retrieval.
3. **Searching:** A web search query fetches the result from the web search engine entered by the user to meet his information needs.

1.11 Web Browser

A browser is a software that lets you view web pages, graphics and the online content. Browser software is specifically designed to convert HTML and XML into readable documents. The most popular web browsers are: Google Chrome, Firefox, Internet Explorer, Safari, Opera and UC Browser.

A web browser is a software application which enables a user to



display and interact with text, images, videos, music, and other information that could be on a website. Text and images on a web page can contain hyperlinks to other web pages at the same or different website. Web browsers allow a user to quickly and easily access information provided on many web pages at many websites by traversing these links. Web browsers format HTML information for display so the appearance of a web pages many differs between browsers.

Purpose:

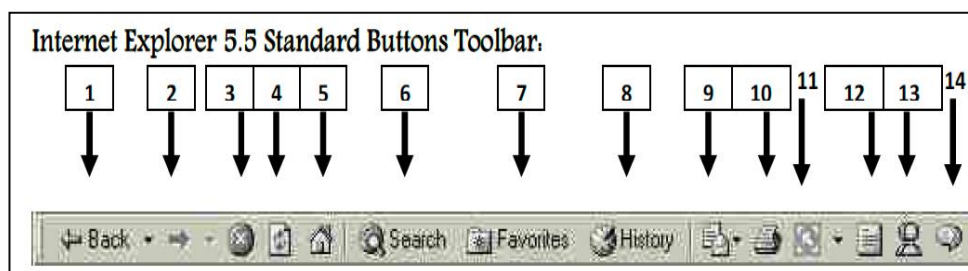
Web browser is used to run the software application that allows retrieving, presenting and traversing the information from one place to another.

- Web browser provides the resources using the WWW (World Wide Web) this can be identified by URI (Uniform Resource Identifier).
- Web browser fetches the data like web page, image, video or other piece of content from the server and displays it accordingly.
- Web browser uses hyperlinks to display the resources and allow the users to navigate their browsers according to the resources.
- Web browser defines the application software that is designed for the user to access and retrieve the documents using the Internet.

Internet Explorer (IE - created by Microsoft) is a very prominent web browser for the Windows OS. IE is the most popular web browser. It comes pre-installed on all Windows computers. The latest version of IE is IE7 with IE8 in beta. IE was designed to view a broad range of web pages and to provide certain features within the OS.

TOOLBARS

The Microsoft Internet Explorer toolbar consists of buttons that are shortcuts for menu commands. They make browsing faster and easier.



1. **Back.** Let's you return to pages you've viewed, beginning with the most recent. Right click the Back button and select from a list of recently visited sites.
2. **Forward.** Let's you move forward through pages you've viewed using the Back button. Right click the Forward button and select from a list of recently visited sites.
3. **Stop.** Halts the process of downloading a Web page. Click this if you want to stop downloading a page for any reason for example, if you're having trouble downloading it or if you don't want to wait for it to download. Then try downloading it again or browse elsewhere.

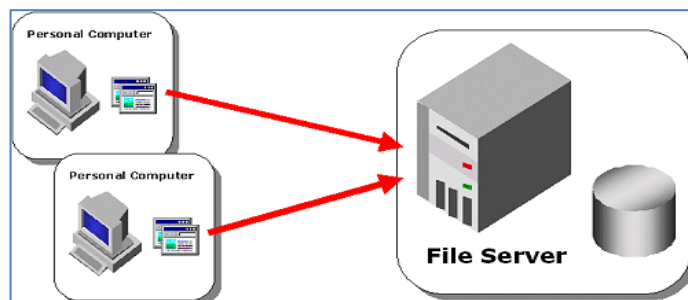
4. **Refresh.** Updates any Web page stored in your disk cache with the latest content. When you return to a page that you've visited, your browser displays the file stored in your disk cache, rather than the current page on the World Wide Web. If a web page doesn't come up the whole way or is taking abnormally long to load, try the Refresh or Reload button _ sometimes this will load the page better.
5. **Home.** Returns you to your home page. You can designate any Web page as your home page.
6. **Search.** Displays a choice of popular Internet search engines in the left pane. Your search results appear in the left pane, too. When you click a link, the page appears in the right pane, so you don't lose sight of your search results.
7. **Favorites.** Displays a list of the sites you have marked. Click any item in the list to jump to it.
8. **History.** Shows a list of Web sites you've visited.
9. **Mail.** Connects you to the Microsoft Outlook Express messaging and collaboration client so you can read email and newsgroup messages.
10. **Print.** Prints the page you're viewing. This is one way to save information from the Internet so that you don't have to reconnect to view it again. You can even print the URL associated with each hyperlink, making it easy to navigate to the site later.
11. **Edit.** Opens a file in the Microsoft word processor that contains the HTML code for the page you're viewing so you can see and even edit it.
12. **Discussion.** Access a discussion server.
13. **Messenger.** Opens Windows Messenger.
14. **Media.** Displays a list of audio and video media options using Real Player or the Windows Media Player.

1.12 Client Server Architecture

Clients: A clients is a program running on a local machine requesting service from a server. A client program is finite which means a client program is run by the user or any other application when it is needed and terminates when the service is complete. Services needed frequently and by many users have specific client server application programs.

Server: A server is an application program running on the remote machine providing services to the client. A server program is an infinite program.

When it starts, it runs infinitely unless a problem arises. It waits for incoming requests from client .When a request comes it responds and



provides services to the request.

A client – server relationship is many – to –one. Many clients can use the services of one server.

1.13 Summary

- ✍ “**Inter**” comes from the word “International” ,.
- ✍ “**Net**” refers to a computer network.
- ✍ The **Internet** is a communication system that connects computers and computer networks all over the world.
- ✍ **The Internet** is a massive network of networks. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet.
- ✍ **IETF**- Internet Engineering Task Force.
- ✍ **I RTF**-Internet Research Task Force.
- ✍ **IAB**- Internet Architecture Board.
- ✍ **ISP** - Internet Service Provider
- ✍ The **World Wide Web**, abbreviated as WWW or W3 and commonly known as the Web, is a system of interlinked hypertext documents accessed via the Internet.
- ✍ **Leased line** provides maximum transmission speed of 1.544 Mbps.
- ✍ The most popular **web browsers** are: Google Chrome, Firefox, Internet Explorer, Safari, Opera and UC Browser.
- ✍ **Search engine** – a computer program that searches for specific words or phrases on the web
- ✍ **Internet service provider (ISP)** - a company that provides customers access to the internet
- ✍ **A search engine** works in the following order: Web crawling, Indexing, and Searching.
- ✍ A **web server** commonly known as HTTP server or application server is a program that serves content using the HTTP protocol.
- ✍ A **browser** is a software that lets you view web pages, graphics and the online content.
- ✍ **TCP/IP** - TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet
- ✍ **Download**-To copy data from a remote computer to a local computer.
- ✍ **Upload**-To sends data from a local computer to a remote computer.

1.14 Check Your Progress

1. Fill in the blanks:

- a) International Networks of Computer is known as _____
- b) www stands for_____.
- c) A _____ is a program running on a local machine.

- d) A _____ is an application program running on the remote machine providing services to the client.
- e) URL Stands for _____.
- f) ISP stands for _____.
- g) ARANET stands for _____.
- h) IETF stands for _____.
- i) IRTF stands for _____.
- j) IAB stands for _____.

2. Answer the following Questions:

- a) What is Internet?

- b) Define www?

- c) What is a Search Engine?

- d) Define ISP?

- e) What are Client & server?

- f) Write different types of internet connection.

- g) What is satellite internet connection?

h) What is 3G & 4G?

i) What is web Browser? Mention list of web browser.

j) Define list of menus commands in Internet explorer.

1.15 References

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UNIT-2

INTERNET PROTOCOLS

Learning objectives:-

At the end of this unit the students will be able to:

- ✎ Define a Protocol.
- ✎ Know the list of Protocols.
- ✎ Understands the Internet Addresses.
- ✎ Know the IP address of the System.
- ✎ Understand the Domain Name System.
- ✎ Understand the URL.
- ✎ Know the working of VoIP.
- ✎ Know the IPV₄& IPV₆ Addresses.

STRUCTURE

- 2.1 Introduction
- 2.2 Types of Internet protocol
 - 2.2.1 TCP / IP
 - 2.2.2 FTP
 - 2.2.3 HTTP
 - 2.2.4 PPP
 - 2.2.5 TELNET
 - 2.2.6 UDP
 - 2.2.7 NNTP
- 2.3 E-Mail Protocols
 - 2.3.1 SMTP
 - 2.3.2 POP3
- 2.4 IP Address
- 2.5 Domain Name System
- 2.6 URL
- 2.7 IPV₄/IPV₆
- 2.8 Voice over internet Protocol (VoIP)
- 2.9 Summary
- 2.10 Check your Progress
- 2.11 References

2.1 Introduction

When we have to communicate with anyone, then we need to follow the same language, so that communication can be done in an effective manner. In the same way, whenever there is need to exchange data or information among different or same type of networks on internet, they need to follow same set of rules.

The Internet is based on many layers of information, where each layer is dedicated to a different kind of documentation. These different layers are called Protocols. A protocol is a set of rules that governs the communication between computers on a network. They exist at several levels in a telecommunication connection.

The most popular protocols used on internet are the World Wide Web, FTP, Telnet, Gopher space, instant messaging, and email.

2.2 Types of Protocol

2.2.1 TCP/IP

TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic point-to-point meaning each communication is from one point (or host computer) in the network to another point or host computer communication protocol on the Internet. It is used as a communication protocol in all types of networks. When you are connected to the Internet, your computer provides you a copy of the TCP/IP program when you need to send messages to or get information from the other computer. TCP/IP is a two layer protocol. The top layer, TCP(Transmission Control Protocol) manages the assembling of a message or file divided into smaller packets that are transmitted over the Internet and received by a TCP that reassembles the packets into the original message on the destination computer. The lower layer, Internet Layer, handles the address part of each packet so that it gets to the right destination. Each gateway computer on the network checks for the address to forward the message. Some packets from the same message are routed differently than others, but they are reassembled at the destination.

2.2.2 HTTP:

It stands for Hypertext Transfer Protocol, is a set of standards that allows users of the World Wide Web to exchange information found on web pages on internet. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands. Today's modern browsers no longer require HTTP in front of the URL since it is the default method of communication. But, it is still used in browsers because of the need to access other protocols such as FTP through the browser. The HTTP provides a standard for Web browsers and servers to communicate.

2.2.3 File Transfer Protocol (FTP)

It is a standard protocol used on network to transfer the files from one host computer to another host computer using a TCP based network, such as the Internet. FTP uses separate control and data connections between the client and the server. To use FTP server, users need to authenticate themselves using a sign-in protocol, using a username and password, but can connect anonymously if the server is configured to allow it. For secured transmission the data encrypts (hides) the username and password, and even encrypts the content, using SSL.

To transfer files with FTP, use a program often called the client. An FTP client program initiates a connection to a remote computer running FTP server software. After the connection is established, the client can choose to send and/or receive files. To connect to an FTP server, a client requires a username and password as set on the server. Many FTP servers use a username as “anonymous”. Using FTP, you can also update (delete, rename, move, and copy) files at a server. You need to logon to an FTP server. However, publicly available files are easily accessed using anonymous FTP.

FTP using TCP/IP, works in the same way as HTTP used for transferring Web pages from a server to a user’s browser. FTP sites are heavily used and require several attempts before connecting.

To use your web browser to connect to an FTP site, where you normally enter a URL as: *ftp://username@ftp.site name/*

2.2.4 Point to Point Protocol (PPP)

PPP (Point-to-Point Protocol) is used for communication between two computers using a serial interface, mostly a personal computer connected by phone line to a server. For example, an Internet Service Provider (ISP) may provide you with a PPP connection so that the ISP server can respond to your requests, pass them on to the Internet, and forward your requested Internet responses back to you. It was basically designed to help communication between two systems through telephone lines as it supports transmission of network packets over a serial point to point link.

PPP is sometimes considered a member of the TCP/IP suite of protocols. Essentially, it encapsulates and packages your computer’s TCP/IP packets into PPP frames and then forwards them to the server over serial transmission lines such as telephone lines, ISDN etc. PPP defines the format of frame to be exchanged between devices on one or multiple links and also defines the authenticity of the two devices. It supports various authentication schemes such as Password Authentication Protocol (PAP) and Challenge Handshake Authentication protocol (CHAP).

2.2.5 TELNET

Telnet is the main internet protocol for creating a connection with a remote machine. It allows you to connect to remote computers (called remote hosts) over a TCP/IP network (such as the Internet). Once your telnet client establishes a connection to the remote host, your client becomes a virtual terminal, allowing you to communicate with the remote host from your computer with whatever privileges you may have been granted to the specific application and data on that host computer.

Telnet clients are available for all major operating systems viz. Mac OS X, Windows, UNIX, and Linux. To use these clients, go to their respective command lines and then enter: telnet host where host is the name of the remote computer to which you wish to connect. In most cases, you'll need to have an account on that system but canals log in as guest or public without having an account.

Telnet is most likely to be used by program developers and anyone who has a need to use specific applications or data located at a particular host computer. It gives the user the opportunity to be on one computer system and do work on another, which may be anywhere across the globe. Telnet provides an error free connection which is always faster than the latest conventional modems.

2.2.6 UDP

User Data Protocol is a communication protocol. It is normally used as an alternative for TCP/IP. However there are a number of differences between them. UDP does not divide data into packets. Also, UDP does not send data packets in sequence. Hence, the application program must ensure the sequencing. UDP uses port numbers to distinguish user requests. It also has a checksum capability to verify the data.

2.2.7 NNTP

Network News Transfer Protocol is used to manage the notes posted on unset newsgroup (a collection of posted notes on a subject posted by different users). NNTP servers are responsible for managing Usenet newsgroup collected globally. A NNTP client is a part of the web browser also called as a news reader. It uses a reserve port no 119.

2.3 E-Mail Protocols

2.3.1 SMTP

SMTP stands for Simple Mail Transfer Protocol that allows transmission of email over the Internet. Most email software is designed to use SMTP for communication purposes when sending email. It only works for outgoing messages. So when an email has to be sent, the address of their Internet Service Provider's SMTP server has to be given. The actual mail transfer is done through Message Transfer Agents (MTA). So the client computer must have a client MTA and the server must have a server MTA. SMTP actually defines the MTA client and the server on the internet.

SMTP is a reliable and easy to set up protocol. Messages either get to a recipient, or there is an error message that explains why that wasn't possible. One of the purposes of an SMTP is that it simplifies the communication of email messages between servers. It allows the server to break up different parts of a message into categories the other server can understand. Any email message has a sender, a recipient or sometimes multiple recipients - a message body, and usually a title heading. Once a message goes out on the internet, everything is turned into strings of text. This text is separated by code words or numbers that identify the purpose of each section of an email. SMTP provides those codes, and email server software is designed to interpret these codes.

The other purpose of SMTP is to set up communication rules between servers. Every server has its own way to identify itself, define the mode of communication that they will follow, check for errors and handle them. In a typical SMTP transaction, a server will identify itself, and announce the kind of operation it is trying to perform. The other server will authorize the operation, and the message will be sent. If the recipient address is wrong, or if there is some other problem, the receiving server may reply with some error message.

SMTP has a major disadvantage that it is relatively easy to send a message with a fake sender address. This results in spread of many email-based viruses. Someone may receive a message that they think is coming from a friend, when someone else is actually sending it. Although attempts are being made to overcome this disadvantage but it still causes some problems.

Most servers these days actually use a slightly updated version of the SMTP protocol called ESMTP (Extended Simple Mail Transfer Protocol). This was created to allow transmission of multimedia through email. When someone sends a picture or music file through their email program, ESMTP communication codes are used to identify the kind of data being transferred.

Multipurpose Internet Mail Extension (MIME) is a supplementary protocol that allows non ASCII data to be sent through SMTP. Please note that MIME is not a protocol and cannot replace SMTP.

2.3.2 POP3

Post Office Protocol 3 or POP3 is the third version of a widespread method of receiving email which receives and holds email for an individual until they pick it up. SMTP has a disadvantage that if the destination computer is not online, mails cannot be received. So the SMTP server receives the mail on behalf of every host and the respective host then interacts with the SMTP server to retrieve messages by using a client server protocol called POP3.

POP3 makes it easy for anyone to check their email if their email program is configured properly to work with the protocol. It is extremely common among most mail servers because of its simplicity and high success rate and minimum errors. Also it can work with virtually any email program, as long as the email program is configured to host the protocol. Many popular email programs, including Microsoft Outlook, are automatically designed to work with POP3. Each POP3 mail server has a different address, which is usually provided to an individual by their web hosting company. This address must be entered into the email program so that the program can connect effectively with the protocol. The individuals receiving POP3 email will have to input their username and password in order to successfully receive email.

2.4 IP Addresses

All networks follow some agreed upon set of rules for communication. For example, when you speak to one another, you follow one rule which is "when one person is speaking, the other would listen". Similarly, computers on a network also follow some set of rules for communicating with one another. These set of rules are called protocols. There are many networking protocols. One of the most common networking protocols TCP/IP protocol. Today's most commonly known network, the Internet, also follows this protocol. A network that follows TCP/IP protocol can also be termed as TCP/IP network.

Each network device (a computer or any other network device) on a TCP/IP network needs to have a unique address on the network. This unique address on a TCP/IP network is the IP Address. IP address are needed to that different networks can communicate with each other.

IP addresses can be thought of as a series of numbers, uniquely identifying a computer on a network. Thus, you can say that just like, telephones are uniquely identified through their telephone-numbers; computers on a TCP/IP network (such as Internet) are uniquely identified through their unique address –IP Address.

Each IP Address is actually a series containing four numbers separated by dots or periods e.g. 192.168.1.1 is an IP Address. Similarly 10.217.1.1 is also an IP address and so on.

Every machine on a TCP / IP network has a unique Identifying number called an IP Address.

IP address are normally written in ***dotted decimal form*** are listed above, but computers internally convert them in to binary form. For instance,

An IP address in dotted **decimal form**: 216. 27. 61. 137

Same IP address in **binary form**: 11011000. 00011011.00111101.10001001

HOW A COMPUTER GETS ITS IP ADDRESS

Whenever a computer becomes part of network, it is assigned its IP address. In other words, when you get connected to your ISP (internet Service Provider) e.g. Reliance, Airtel, MTNL, BSNL etc., your computer gets its IP Address. If you want to know about the IP address assigned to your computer, you can follow the instructions given below.

1. Connect to your ISP.
2. Click on **Start** and then at **Run**.
3. In the **Run** dialog, type **cmd** and Press Enter.
4. In the cmd window, type **ipconfig** and press Enter.

2.5 Domain Name System (DNS)

So, now you know that every computer connected to the Internet. Therefore, different websites on internet also have their unique IP address. Now I am going to ask you a question – do you need to know a website's IP Address before you can access it. If you know the URL (uniform Resource Locator) (Such as www.gmail.com) of a website you can access it. The URL is actually the domain name of the website. So, the domain name is unique name of the website.

The Domain Name is a unique name assigned to a website. A domain generally contains following parts:

1. www
2. name describing the website purpose
3. TLD (Top level domain) such as .com, .net, .org, .edu, .in, .ca etc.

Example:

1. www.google.com
2. www.cbse.nic.in
3. www.dce.edu
4. www.yahoo.co.in

Domains are classified as non-geographic and geographic figure 3 lists various common domain names. The domain names in India come under a larger domain "in".

Non-Geographic domains	
Code	Applicable for
.com	commercials organizations
.net	network organizations
.gov	parts of governments
.edu	organizations of higher education
.mil	non-classified military networks
.org	organizations that do not fit the commercial or educational designation
Few Geographic Domains	
Country	Domain Name
Australia	.au
China	.cu
Germany	.de
India	.in
Japan	.jp
United kingdom	.uk
United states	.us

The Internet address socis@del2.vsnl.net.in indicates that the host computer whose name is del2 is one of the host computer in the sub-domain named Videsh Sanchar Nigam Limited (VSNL) which is a network organization (net) and is situated in country India (.in). The socis is one the user group in this server/host (del2).

2.6 URL

Every server on the Internet has an IP number, a unique number consisting of 4 parts separated by dots. The IP number is the server's address.

165.113.245.2

128.143.22.55

However, it is harder for people to remember numbers than to remember word combinations. So, addresses are given "word-based" addresses called URLs. The URL and the IP number are one and the same.

The standard way to give the address of any resource on the Internet that is part of the World Wide Web (WWW). A URL looks like this:

http://www.matisse.net/seminars.html

telnet://well.sf.ca.us

gopher://gopher.ed.gov/

The URL is divided into sections: transfer/transport protocol: // server (or domain). Generic top level domain/path/filename.

The first part of a URL defines the transport protocol.

http:// (Hypertext Transport Protocol) moves graphical, hypertext files

ftp:// (File Transfer Protocol) moves a file between 2 computers


gopher:// (Gopher client) moves text based files

News: (News group reader) accesses a discussion group

telnet:// (Telnet client) allows remote login to another computer

Here's an example:

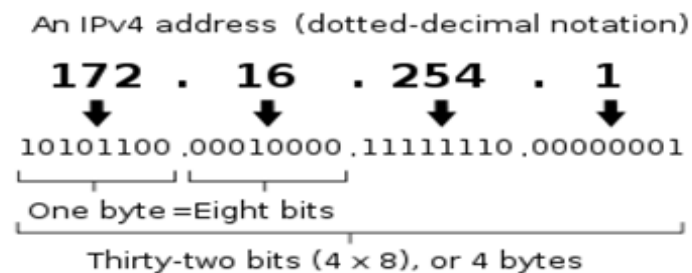
http://www.vrml.k12.la.us/tltc/mainmenu.htm

- **http** is the protocol
 - **www.vrml.k12.la.us** is the server
 - **tltc/** is the path
 - **mainmenu.htm** is the filename of the page on the site
1. You do not have to enter **http://**, most browsers will add that information when you press **Enter** or  click the button at the end of the Address Bar.
 2. To view recently visited Web sites, click the down arrow at the end of the address field.
 3. When you start typing a frequently used Web address in the Address bar, a list of similar addresses appears that you can choose from. And if a Webpage address is wrong, Internet Explorer can search for similar addresses to try to find a match.
 4. The URL must be typed correctly. If you get a “Server Does Not Have A DNS Entry” message, this message tells you that your browser can't locate the server (i.e. the computer that hosts the Web page). It could mean that the network is busy or that the server has been removed or taken down for maintenance. Check your spelling and try again later.

2.7 IPV₄ and IPV₆

IPv4 Addresses

In IPv4 an address consists of 32 bits which limits the address space to 4294967296 (2³²) possible unique addresses. IPv4 reserves some addresses for special purposes such as private networks (~18 million addresses) or multicast addresses (~270 million addresses). IPv4 addresses are canonically represented in dot-decimal notation, which consists of four decimal numbers, each ranging from 0 to 255, separated by dots, e.g., 172.16.254.1. Each part represents a group of 8 bits (octet) of the address. In some cases of technical writing, IPv4 addresses may be presented in various hexadecimal, octal, or binary representations.



IPv4 provides hierarchical addressing scheme which enables it to divide the network into sub-networks, each with well-defined number of hosts. IP addresses are divided into many categories:

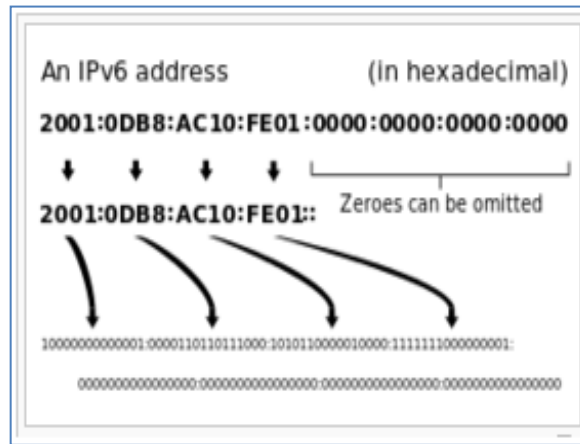
- Class A: It uses first octet for network addresses and last three octets for host addressing.
- Class B: It uses first two octets for network addresses and last two for host addressing.
- Class C: It uses first three octets for network addresses and last one for host addressing.
- Class D: It provides flat IP addressing scheme in contrast to hierarchical structure for above three.
- Class E: It is used as experimental.

IPv4 also has well-defined address spaces to be used as private addresses (not routable on internet), and public addresses (provided by ISPs and are routable on internet).

IPv6 Addresses

The rapid exhaustion of IPv4 address space prompted the Internet Engineering Task Force (IETF) to explore new technologies to expand the addressing capability in the Internet. The permanent solution was deemed to be a redesign of the Internet Protocol itself. This new generation of the Internet Protocol was eventually named Internet Protocol Version 6 (IPv6) in 1995. The address size was increased from 32 to 128 bits (16 octets), thus providing up to 2¹²⁸ (approximately 3.403×10³⁸) addresses. This is deemed sufficient for the foreseeable future.

The intent of the new design was not to provide just a sufficient quantity of addresses, but also redesign routing in the Internet by more efficient aggregation of sub network routing prefixes. This resulted in slower growth of routing tables in routers. The smallest possible



individual allocation is a subnet for 264 hosts, which is the square of the size of the entire IPv4 Internet. At these levels, actual address utilization rates will be small on any IPv6 network segment. The new design also provides the opportunity to separate the addressing infrastructure of a network segment, i.e. the local administration of the segment's available space, from the addressing prefix used to route traffic to and from external networks. IPv6 has facilities that automatically change the routing prefix of entire networks, should the global connectivity or the routing policy change, without requiring internal redesign or manual renumbering. The large number of IPv6 addresses allows large blocks to be assigned for specific purposes and, where appropriate, to be aggregated for efficient routing. With a large address space, there is no need to have complex address conservation methods as used in CIDR.

All modern desktop and enterprise server operating systems include native support for the IPv6 protocol, but it is not yet widely deployed in other devices, such as residential networking routers, voice over IP (VoIP) and multimedia equipment, and network peripherals.

IPv6 is still in transition phase and is expected to replace IPv4 completely in coming years. At present, there are few networks which are running on IPv6. There are some transition mechanisms available for IPv6-enabled networks to speak and roam around different networks easily on IPv4. These are:

- Dual stack implementation
- Tunneling
- NAT-PT

2.8 VoIP

VOIP stands for voice over internet protocol. It enables the transfer of voice using packet switched network rather than using public switched telephone network. By using VOIP software, phone calls can be done using standard internet connection. This method of making phone calls is much cheaper than convectional way because the service of Telecommunication Company is not used. There are three different methods of VoIP service in common use today:

1. **ATA** - ATA stands for analog-to-digital converted. It is used to connect the telephone device to the computer. It takes the analog signals from the phone and converts them to digital signals. These digital signals can now be transmitted over the internet. Some providers also are bundling ATAs free with their service.
2. **IP phones** - IP phones appear much like an ordinary telephone or cordless phone. They are directly connected to the router or the LAN. They have all the hardware and software necessary right onboard to handle the IP call. IP Phones are sometimes called VoIP telephones, SIP phones or Soft phones.
3. **Computer-to-computer** - It is the most easy and simplest way to use VoIP. The basic hardware requirements are as follows:
 - Computer
 - Internet
 - Speakers
 - Microphone

The only cost involved with computer - to- computer VoIP is the monthly ISP fee.

2.9 Summary

- **Protocol:** A special set of rules that two or more machines on a network follow to communicate with each other.
- **Transmission Control Protocol (TCP):** It breaks the data into packets that the network can handle efficiently.
- **Internet protocol (IP):** It gives distinct address (called IP address) to each data packet.
- **File Transfer Protocol (FTP):** It is used for transferring files from one system to another on the internet.
- **Hypertext Transfer Protocol (HTTP):** It is the protocol that is used for transferring hyper text files on the World Wide Web.
- **Point-to-Point Protocol (PPP):** It is used for communication between two computers using a serial interface.
- **Simple Mail Transfer Protocol (SMTP):** It allows transmission of email over the Internet.
- **Post Office Protocol 3(POP3):** It receives and holds email for an individual until they pick it up.
- **Telnet:** A protocol for creating a connection with a remote machine.
- **VOIP:** VOIP stands for voice over internet protocol. It enables the transfer of voice using packet switched network rather than using public switched telephone network.

2.10 Check Your Progress

1. Expand the following abbreviations:

FTP : _____
TCP : _____
SMTP : _____

VoIP : _____
HTTP : _____
POP : _____

2. Write short notes on:

a) TCP/IP

b) HTTP

c) SMTP

d) FTP

e) TELNET

3. What is VOIP?

4. What is IP V₄& IPV₆?

5. What is URL?

6. What is IPV₄?

7. What is Protocol?

8. What is NNTP?

2.11 References

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2. HTML for the World Wide Web with XHTML and CSS: Visual QuickStart Guide, Fifth Edition
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UNIT-3

INTERNET APPLICATIONS

Learning objectives:-

At the end of this unit the students will be able to:

- ✎ Know e-mail features
- ✎ Differentiate a Webpage & a Website
- ✎ Understand Online chat & IRC
- ✎ Know Video conferencing
- ✎ Know different types of Social Networks

STRUCTURE

- 3.1 Introduction
- 3.2 Webpage
- 3.3 website
 - 3.3.1 How website is different form portal?
 - 3.3.2 Components of website
 - 3.3.3 Elements of website
 - 3.3.4 Construction of website
 - 3.3.5 Website Development & publishing
 - 3.3.6 Website Designing
 - 3.3.7 Website Development Language
 - 3.3.8 Website Publishing
 - 3.3.9 Website URL Registration
 - 3.3.10 Website hosting
- 3.4 Electronic Mail
 - 3.4.1 E-mail Features
 - 3.4.2 E-mail structure
 - 3.4.3 Components of e-mail
 - 3.4.4 Field Associated with an e-mail message
 - 3.4.5 How e-mail serviced used?
- 3.5 Chat & IRC
- 3.6 Videoconferencing
- 3.7 Online Banking
- 3.8 Online shopping
- 3.9 E-learning
- 3.10 E-Reservation
- 3.11 Mobile Technology
- 3.12 Social Network
- 3.13 Summary
- 3.14 Check your Progress
- 3.15 References

3.1 Introduction

Everyone is using internet irrespective of their background & interest. The types of services available on net are as diverse as the interest of the people. Internet application or Web Services mean the services provided by World Wide Web. The World Wide Web provides services like chatting, emailing, video conferencing, e-learning, e-shopping, e-reservation, e-groups and social networking. These services may mean different things to different people but in simple words, they are the ways to communicate and here the communication takes place between two electronic devices.

When two persons are talking to each other, we say they are chatting. Likewise when two computers (or two electronic devices) exchange data and information, we say two computers are e-chatting. They communicate with each other with the help of technology and programming standards used on Internet. Let us discuss the services provided by World Wide Web in detail in the following sections.

3.2 Webpage

A Web page also known as Electronic Page is a part of the World Wide Web. It is just like a page in a book. The basic unit of every Web site or document on the Web is a Web page containing the information. A Web page can contain an article, or a single paragraph, photographs, and it is usually a combination of text and graphics.

Static and Dynamic webpage

A **static web page** often called a flat page or stationary page, is a web page that is delivered to the user exactly as stored. A static web page displays the same information for all users, such versions are available and the server is configured to do so. Such web pages are suitable for the contents that never or rarely need to be updated. A **dynamic web page** is a web page which needs to be refreshed every time whenever it opens in any of the web browsers to display the updated content of the site.

What makes a web page works?

- The server receives the request for a page sent by your browser.
- The browser connects to the server through an IP Address; the IP address is obtained by translating the domain name.
- In return, the server sends back the requested page

Difference between Webpage and Website

A web page is one single page of information, while a website is made up of a number of different web pages connected by links known as Hyperlinks.

3.3 Website

The collection of web pages on the World Wide Web that is accessed by its own Internet address is called a Web site. Thus, a Web site is a collection of related Web pages. Each Web site contains a home page and contains other additional pages. Each Web site is owned and updated by an individual, company, or an organization. Web is a dynamically moving and changing entity; today web sites generally change on a daily or even hourly basis.

3.3.1 How website is different from Portal?

Web portal is a medium by which users access the resources, while a website is a destination in itself. Portals and websites are distinct entities which are linked together, but they should not replace each other. A website is also a portal, if it broadcast information from different independent resources whereas Web Portal refers to a website or services that provide varied resources and services such as email, forums, search engines and online shopping malls. Some of the web portals are AOL, iGoogle, Yahoo and even more.

A website refers to a location or a domain name hosted on a server which is accessible via internet. It is a collection of web pages, images, videos which are addressed relative to a Uniform Resource Locator (URL). Websites provide content from independent resources to specific audience. The content of the website is generally focused & contains the material needed to be accessed.

3.3.2 Components of Website

1. **Contents of a Web Page:** A webpage of a website must contain the basic elements such as Page title, URL, file name, header, footer, navigation, web page content are all parts to the composition of a web page.
2. **Website Graphics:** Always use web graphics which have been optimized for optimum download speed, as the web hosting space affects the performance of the website.
3. **Heading of the site:** Headings in a website play a crucial role as they not only present a clear structure of the web page to the audience and help the search engines to retrieve the required information.
4. **Effective Color Contrast:** As the websites are used to retrieve the information related to specific purpose or topic. It is very important to take care of the presentation of the contents of the sites. So that, website visitors must not have any difficulty in reading a web page. As some times when we pick a color scheme for our website we forget that there are people with poor vision and color deficiencies.

3.3.3 Elements of Website

1. **Good Visual Design:** A site must be appealing and if required, must be professional. Your site reflects your company, your products and your services.
2. **Screen Resolution:** As we know that websites are displayed on the screen of electronic devices and every device has different resolution. Today, the average web surfer uses a resolution of 1024 x 768 pixels. However, you need to make sure that your website looks good at this setting and must work nicely for other resolutions too.
3. **Color Scheme & Text Formatting:** To make the website presentable appropriate color scheme must be used. Always use 2 or 3 primary colors that reflect the purpose of your site. Add contrast colors in your site, which helps the user to easily read the text. Use fonts that are easy to read and available on most of today's computer systems. Keep the standard font size for paragraph text i.e. between 10 and 12 pts.
4. **Insert Meaningful Graphics:** Graphics are important, as they provide the site a legible and interactive appearance. However, don't use too many images and that too with a high resolution. First, whenever user will try to download the website it will take too long to download and secondly, too many images with less text, lose the interest of the customer.
5. **Simplicity:** Keep your site simple and allow for adequate white space. Don't overload your site with complex design, animation, or other effects to impress your viewers.
6. **Relevant Content:** Include relevant information along with style, to help the visitors to make a decision.
7. **Navigation:** Keep your site simple and well organized. Don't use fancy Navigation Bar in your website. Place all the menu items at the top of your site, or above the fold on either side. Include Site Maps in your site to reduce the number of top level navigation items. Every component of your site should work quickly and correctly. Broken or poorly constructed components will frustrate the visitors. All the hyperlinks, contact forms, should be placed appropriately.
8. **Minimal Scroll:** While surfing the sites for information users do not like scrolling the page instead they need to see all the information on one screen. Even the Search Engines will reward you for this behaviour.
9. **Consistent Layout:** Always use a consistent layout in the whole website which will help you to retain the theme of the site.
10. **Cross-platform/browser Compatibility:** Today many open source browsers are being used by the users. Create a website which should be platform independent.

3.3.4 Construction of Website

STEPS TO BUILD A WEBSITE

Step 1: Hosting

The first step in constructing a website is to decide about the web hosting provider for your site. There are several types of Web hosting options you can choose from such as:

Free Web hosts: Most people want to go for free Web hosting. On one hand it is free but on the other hand, you don't always get much space, due to low bandwidth.

Search a Web Hosting Provider: These are the links to other sites for finding a good host for your site.

Step 2: Domain Name

You can plan your website in two ways: using a domain name and without using a domain name. You can put up a site on free hosting or even paid hosting plans. A domain name provides extra branding for your site and makes it easier for people to remember the URL.

Step 3: Plan Your Website

After deciding the domain and your URL, you can start planning your site. You need to decide the audience aimed at. Select the type of site: Most websites are news/information, product, or reference sites. Each has a different focus. A site must have formal language; where as a personal site can use slang and an informal tone.

Step 4: Build Your Website Page by Page

For building a website you need to work on one page at a time. To build your site you should be familiar with the key elements of the site as discussed above.

Step 5: Publish Your Website

After the completion of the design now it is the time to publish your website on web. You can do this either with the tools using your hosting service or with FTP clients. Knowing which you can use depends upon your hosting provider.

Step 6: Promote Your Website

There are many ways to promote a website such as web search engine, word of mouth, email, and advertising. You build your Web content so that it ranks well in commonly used search engines. This can be difficult, but it is inexpensive and can result in good results if you work at it.

Step 7: Maintain Your Website

Maintenance is the last step of constructing a site which helps in keeping your site updated with the latest trends of market. In order to keep your site going well and looking good, you need to test your site frequently. And you should also work on content development on a regular basis.

3.3.5 Website Development & Publishing

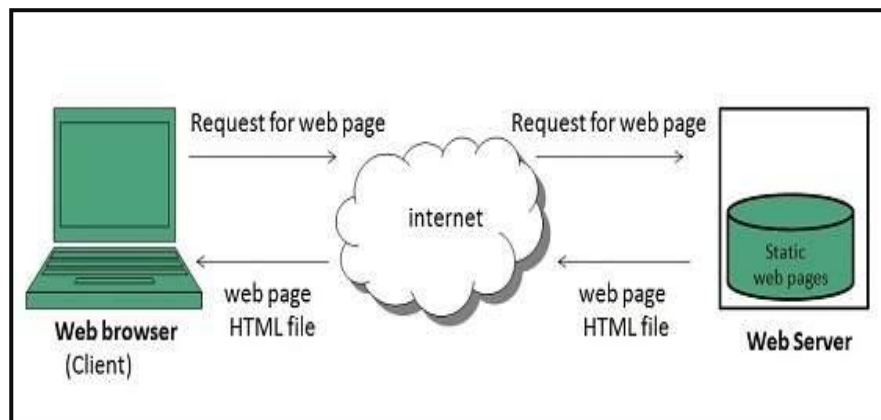
Website is a location on web and is hosted on a web server. It is a set of related web pages. It is accessed using Internet address known as Uniform Resource Locator

WEBSITE TYPES: There are two type of web site:

1. Static Websites

Static websites are also known as flat or stationary websites. They are loaded on the client's browser as exactly they are stored on the web server. Such websites contain only static information. User can only read the information but can't do any modification or interact with the information.

Static websites are created using only HTML. Static websites are only used when the information is no more required to be modified.



2. Dynamic Websites

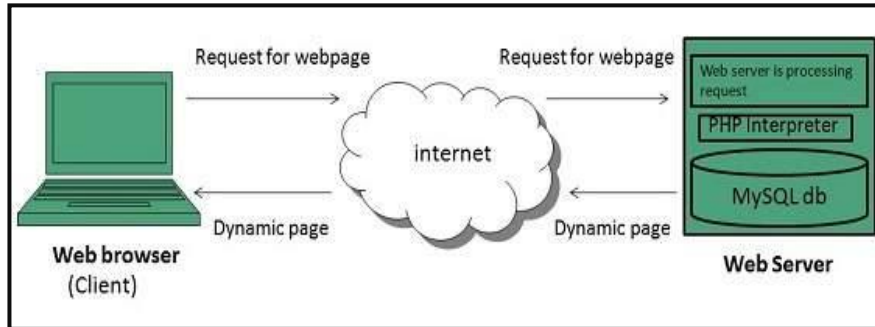
Dynamic websites shows different information at different point of time. It is possible to change a portion of a web page without loading the entire web page. It has been made possible using **Ajax** technology.

Server-side dynamic web page

It is created by using server-side scripting. There are server-side scripting parameters that determine how to assemble a new web page which also includes setting up of more client-side processing.

Client-side dynamic web page

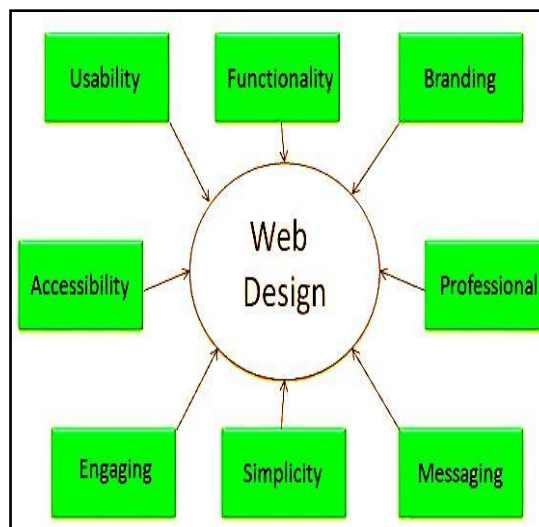
It is processed using client side scripting such as JavaScript. And then passed in to **Document Object Model (DOM)**.



3.3.6 Website Designing

Web designing has direct link to visual aspect of a web site. Effective web design is necessary to communicate ideas effectively. Web designing is subset of web development. However these terms are used interchangeably. Web Design Plan should include the following:

- Details about information architecture.
- Planned structure of site.
- A site map of pages.



Wire frame

Wireframe refers to a visual guide to appearance of web pages. It helps to define structure of web site, linking between web pages and layout of visual elements.

Following things are included in a wireframe:

- ★ Boxes of primary graphical elements
- ★ Placement of headlines and sub headings
- ★ Simple layout structure
- ★ Calls to action
- ★ Text blocks

Wireframe can be created using program like Visio but you can also use a pen and paper.

Web Designing Tools

Here is the list of tools that can be used to make effective web designs:

S.N.	Tool Description
------	------------------

1.	Photoshop CC This is a great web designing tool provided by Adobe. The latest Photoshop CC 2014 supports many new features such as smart objects, layer comps, smart guides, Type kit integration, font search, and workflow enhancements.
2.	Illustrator CC Illustrator CC is also a web designing tool comes with powerful features like AutoCAD libraries, white overprint, fill and stroke proxy swap for text, automatic corner generation, unnamed images and touch type tools etc.
3.	Sublime Text Sublime Text is a source code editor with Python application programming interface. It's functionality can be extended using plug-in.
4.	Image optim It is basically used for optimizing images on a website in order to load them faster by finding best compression parameters and by removing unnecessary comments.
5.	Sketch 3 Sketch 3 is a web designing tool developed specifically for designing interfaces, websites, icons etc.
6.	Heroku It is also a great web development tool which supports Ruby, Node.js, Python, java and PHP.
7.	Axure It supports prototyping, documentation, and wire framing tools for making interactive website design.
8.	Hype 2 The Hype 2 offers: Easiest way to Animate & add interactivity, Hardness the power of HTML5, Mobile responsiveness, and WYSIWYG features.
9.	Image Alpha This tool helps to reduce file sizes of 24-bit PNG files. It does so by applying lossy compression and convert it to PNG8+alpha format which more efficient.
10.	Hammer This tool is suitable for non-programmers and good only for small projects.
11.	JPEGmini Lite It is an image optimizing tool and supports photos in any resolution up to 28 Megapixels.
12.	BugHerd This tool helps to see how the projects is going and what everyone is working on. It also helps to identify issues in development.

Web Page Anatomy:

A web site includes the following components:

1. Containing Block

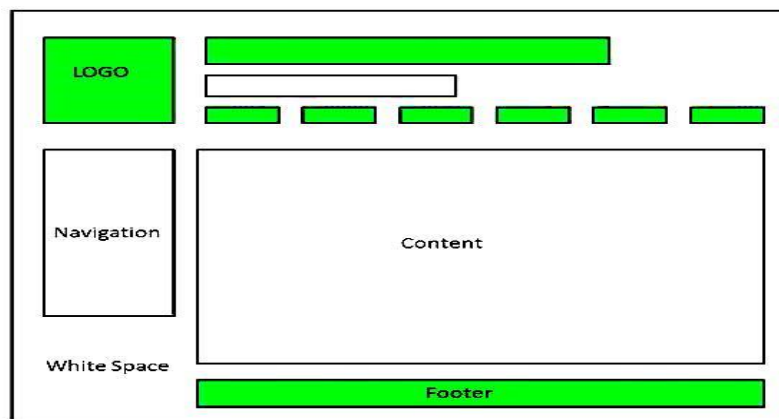
Container can be in the form of page's body tag, an all containing div tag. Without container there would be no place to put the contents of a web page.

2. Logo

Logo refers to the identity of a website and is used across a company's various forms of marketing such as business cards, letterhead, brochures and so on.

3. Navigation

The site's **navigation system** should be easy to find and use. Often the navigation is placed right at the top of the page.



4. Content

The content on a web site should be relevant to the purpose of the web site.

5. Footer

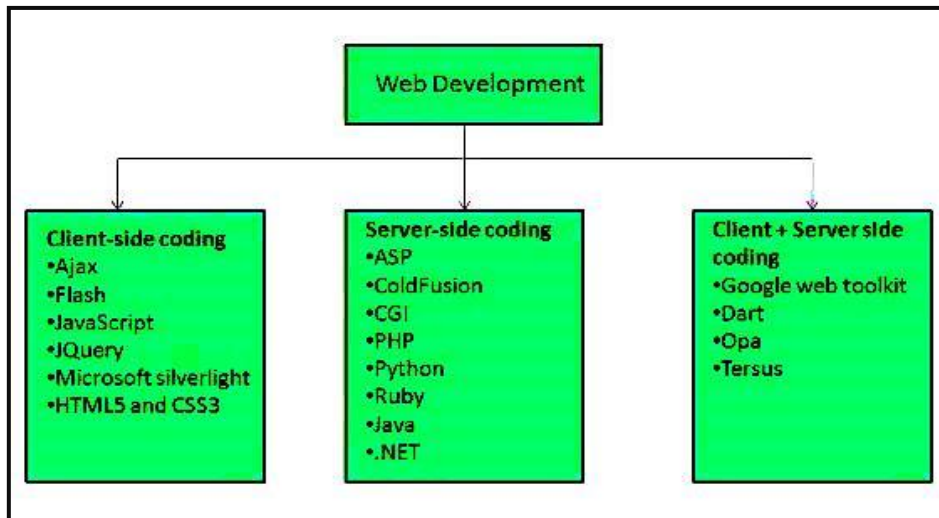
Footer is located at the bottom of the page. It usually contains copyright, contract and legal information as well as few links to the main sections of the site.

6. Whitespace

It is also called as **negative space** and refers to any area of page that is not covered by type or illustrations.

3.3.7 Website Development Language

Web development refers to building website and deploying on the web. Web development requires use of scripting languages both at the server end



as well as at client end.

The list of software used for create website are

- CoffeeCup Free HTML Editor
- Notepad++
- PageBreeze
- Firebug
- Bluefish Editor
- Brackets
- KompoZer
- OpenBEXI
- GIMP

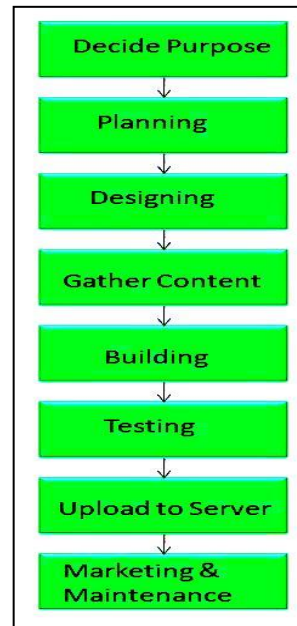
Before developing a web site once should keep several aspects in mind like:

- What to put on the web site?
- Who will host it?
- How to make it interactive?
- How to code it?
- How to create search engine friendly web site?
- How to secure the source code frequently?
- Will the web site design display well in different browsers?
- Will the navigation menus be easy to use?
- Will the web site loads quickly?
- How easily will the site pages print?
- How easily will visitors find important details specific to the web site?

- How effectively the style sheets be used on your web sites?

Web Development Process

Web development process includes all the steps that are good to take to build an attractive, effective and responsive website. These steps are shown in the following diagram:



Web development tools

A web development tool helps the developer to test and debug the web sites. Now a day the web development tool comes with the web browsers as add-ons. All web browsers have built in tools for this purpose.

These tools allow the web developer to use HTML, CSS and JavaScript etc.. These are accessed by hovering over an item on a web page and selecting the “Inspect Element” from the context menu.

Features

Following are the common features that every web development tool exhibits:

1. **HTML AND THE DOM**

HTML and DOM viewer allows you to see the DOM as it was rendered. It also allows making changes to HTML and DOM and seeing the changes reflected in the page after the change is made.

2. **WEB PAGE ASSESTS, RESOURCES, AND NETWORK INFORMATION**

Web development tools also help to inspect the resources that are loaded and available on the web page.

3. **PROFIING AND AUDITING**

Profiling refers to get information about the performance of a web page or web application and **Auditing** provides developers

suggestions, after analyzing a page, for optimizations to decrease page load time and increase responsiveness.

Skill Required

For being a successful web developer, one should possess the following skills:

- Understanding of client and server side scripting.
- Creating, editing and modifying templates for a CMS or web development framework.
- Testing cross browser inconsistencies.
- Conducting observational user testing.
- Testing for compliance to specified standards such as accessibility standards in the client region.
- Programming interaction with JavaScript, PHP, and JQuery etc.

3.3.8 Website Publishing

Website publishing is the process of uploading content on the internet. It includes:

- uploading files
- updating web pages
- posting blogs

Website is published by uploading files on the remote server which is provided by the hosting company.

Prerequisites for Website Publishing

In order to publish your site, you need the following things:

- Web development software
- Internet Connection
- Web Server

1. Web development software

It is used for building web pages for your web site. Dreamweaver and WordPress are example of web development software.

2. Internet Connection

Internet connection is required to connect to a remotely located web server.

3. Web Server

Web server is the actual location where your website resides on. A web server may host single or multiple sites depending on what hosting service you have paid for.

3.3.9 Website URL Registration

A domain name is the part of your Internet address that comes after "www". For example, in **www.google.com** the domain name is **google.com**. A domain name becomes your Business Address so care

should be taken to select a domain name. Your domain name should be easy to remember and easy to type.

Domain Extensions

The final letter at end of internet address is known as top level domain names. They are called top level because they are read from right to left, and the part after the dot is the highest in a hierarchy.

The table shows the **Generic Top-Level** Domain names:

Domain	Meaning
.com	Commercial Business
.edu	Education
.gov	U.S. government agency
.int	International Entity
.mil	U.S. military
.net	Networking organization
.org	Non-profit organization

Registering Domain Name

S.N.	Domain Name Registrar
1	Address Creation, LLC
2	Address on the web, LLC
3	101domains, INC
4	Atomicdomainnames, LLC
5	BigRock Solutions Ltd
6	Black Ice Domain, Inc
7	Block Host LLC
8	Domain Monkeys, LLC
9	Domain Mantra, Inc.
10	DomainName, Inc.
11	Dot Holding Inc.
12	DotMedia Ltd
13	Extend Names, Inc.
14	Extremely Wild
15	Fast Domain Inc.
16	Google Inc

Registering a Domain Name is very simple. You can take following step to get your desired domain name registered:

- Think of a name that justifies your business need. To find out the available names you can enter a name at commercial domain name registrar such as GoDaddy.
- If the domain name entered by you is available, then select that particular domain name.

- Now it will ask you for other additional services such as Email inbox, hosting etc. that host also provides. You may choose what's best for you.
- Now they will ask you for your personal information which is stored in WHOIS database.
- It will then ask for payment information. Pay for the purchase you have made. Make sure you enter the correct payment information.
- Once you are done with all above steps, you are ready to use their tools to upload your stuff to your site.

Domain Name Registrar

There are a number of domain name registrars available in the market. The above table contains some of popular domain name registrars:

3.3.10 Website Hosting

Web hosting is a service of providing online space for storage of web pages. These web pages are made available via **World Wide Web**. The companies which offer website hosting are known as **Web hosts**. The servers on which web site is hosted remain switched on 24 x7. These servers are run by web hosting companies. Each server has its own IP address. Since IP addresses are difficult to remember therefore, webmaster points their domain name to the IP address of the server their website is stored on.

It is not possible to host your website on your local computer, to do so you would have to leave your computer on 24 hours a day. This is not practical and cheaper as well. This is where web hosting companies comes in.

Types of Hosting

The following table describes different types of hosting that can be availed as per the need:

S.N.	Hosting Description
1	Shared Hosting In shared hosting, the hosting company puts thousands of website on the same physical server. Each customer has their own allocation of physical web space and a set of bandwidth limit. As all websites share same physical memory, MYSQL server and Apache server, one website on the server experiencing high traffic load will affect performance of all websites on the server.
2	Virtual Private Server VPS It is also known as Virtual Dedicated Server. It is a server which is partitioned into smaller servers. In this customer is given their own partition, which is installed with its own operating system. Unlike shared hosting, VPS doesn't share memory or processor

	time rather it allocates certain amount of memory and CPU to use which means that any problem on a VPS partition on the same drive will not affect other VPS customers.
3	Dedicated Server In this kind of hosting, single dedicated server is setup for just one customer. It is commonly used by the businesses that need the power, control and security that a dedicated server offers.
4	Reseller Hosting A reseller acts as a middle man and sells hosting space of someone else's server
5	Grid Hosting Instead of utilizing one server, Grid Hosting spreads resources over a large number of servers. It is quite stable and flexible. The servers can be added or taken away from the grid without crashing the system.

WEB HOSTING COMPANIES

Following are the several companies offering web hosting service

S.N.	Hosting Company
1	Blue Host
2	Go Daddy
3	Host Gator
4	just Host
5	Laughing Squid
6	Hivelocity
7	liquid Web
8	Media TempleServInt
9	Wired Tree
10	Wild West Domains
11	Wix
12	WIPL
13	Big Rock

3.4 E-Mail

E-mail or Email is simply the short form of “electronic mail”. It is a system of receiving, sending, and storing electronic messages. An electronic message is text or a file prepared using software in computer and that travels through telephone lines from one computer to another. E-mail has become a popular method of communication. Now, an e-mail is preferred for personal or business communication as compared to letter sent by traditional post. Electronic mail has gained universal popularity because a person from any age group and from any background can use it and the delivery of



the message is instant. The speed is much higher than the speed of the traditional postal or the courier service.

Email uses multiple protocols within the TCP/IP (Transmission Control Protocol / Internet Protocol) suite. For example, SMTP (simple mail transmission protocol) is used to send messages, while the POP or IMAP (Internet Message Access Protocol) protocols are used to retrieve messages from a mail server. When we configure an email account, we must define our email address, password, and the mail servers used to send and receive messages. Fortunately, most webmail services configure our account automatically, so we only need to enter our email address and password. Some of the **free e-mail services are Gmail (Google Mail), Yahoo mail, Rediff mail, Hotmail** etc.

3.4.1 E-Mail Features

E-mail provides the following features:

1. **Cost effective** –The message sent through e-mail cost very low. It is very cheaper than courier or fax or telegram.
2. **High Speed**- Email can be sent very fast and almost instantaneously.
3. **Easy to use**- It is very easy to use e-mail to send a message through internet.
4. **Time saving**- we can sent the same message to a number of person at a time. So, we can save a lot of time.
5. **Message storing**: we can store the send and received message in our mail box.
6. **Address book**: we can store a number of e-mail address and contact details in address book.
7. **Wait for you**: The mail is lies in mail box, until the user login mail ID.so the e-mail waits for you.
8. **Security**: Your email is delivered to your own personal and private account with a password required to access and view emails.
9. **Accessible anywhere at any time**: You don't have to be at home to get your mail. You can access it from any computer or mobile device that has an Internet connection.

3.4.2 E-Mail Structure

Sending and receiving emails require an e-mail address. An email address is divide into two parts namely, the user name & name of the mail server. The two parts are separated by the symbol “@”. The structure of an Emil address is given here

username@mailservername.com

e.g. dcp3380@gmail.com

Here

dcp3380 → username

gmail	→	the name of the mail server
.com	→	a commercial website or domain name
@	→	It is a keyword which separate the user name and

server domain.

3.4.3 Component of E-Mail

The components of e-mail are:

1. **LOG-IN:** To send or receive e-mail, we have to first log onto our e-mail account by visiting its web site and typing the user name and password.
2. **LOG-OUT / SIGNOUT:** Click this option, once you have finished reading or sending the e-mails. This option brings you out from your e-mail account.
3. **IN-BOX:** It displays information about all the mails that we receive in our e-mail account. To read any mail click on it. The mail will be displayed in the new window.
4. **COMPOSE / WRITE MAIL:** To write mail to any one, we have to click on this option (or any other similar option). It will open a new window wherein we type the e-mail address of the person, subject of the mail and the text in the mail.
5. **SEND AN E-MAIL:** After composing an e-mail, click the Send button. We can send the same mail to many persons by typing their e-mail address separated by commas (,).
6. **REPLY:** This option is displayed when we open any mail. It is used to send replay to the received e-mail. We can simply type in our reply and click on the send button.

3.4.4 Field Associated with an E mail Message

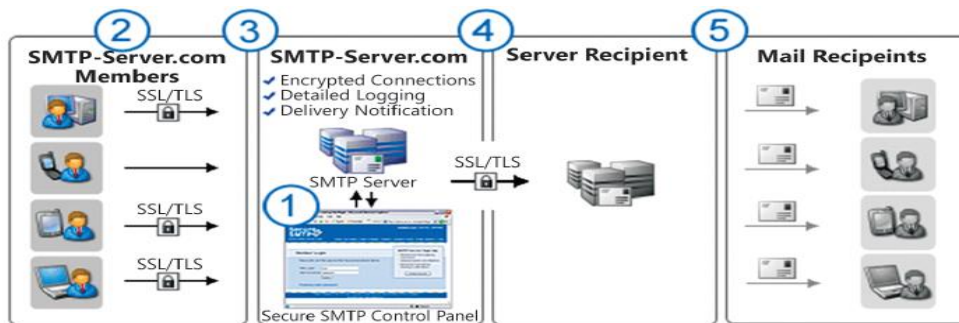
An email client can be Outlook Express, Hotmail or Gmail. The email client may typically consist of four important fields. They are To:, Cc:, Bcc: and Subject:

- | | |
|-------------|--|
| To: | This field is used to write the email address of the person to whom the message is to be sent. |
| Cc: | This field is optional and is used to send a message to multiple additional addresses. |
| Bcc: | This field is also optional and is used to send a message to multiple additional addresses. The difference between Cc and Bcc: field is decided in terms of visibility. The address in Bcc: field is termed as blind carbon copy, the addresses mentioned in this field are not visible to the recipients of the “To:” and the “Cc:” fields. |

Subject: This field is used to mention short title for what is included in the body of the message.

3.4.5 How email Service used?

Messages sent by electronic mail normally reach a recipient's account



Schematic diagram How E mail is transferred

within seconds. The message can include text, images and numerous types of formatted documents. These days, it is no longer necessary to be sitting in front of a PC to send or receive an email. A variety of mobile devices, such as tablet computers and smart phones make it possible to send the message via E-mail. The following diagram displays how an e-mail moves from the sender to the receiver.

3.5 CHAT and IRC

The word chat as it literally means in English is communication between two or more people. The electronic chat is the communication between two or more individuals using their computers. Chat is only feasible when both the users are on Internet at the same time. The communication occurs through typed text messages. Usually, this “talking” is the exchange of typed-in messages requiring one site as the repository for the messages (or “chat site”) and a group of users who take part from anywhere on the Internet.



The group chats can be ongoing or scheduled for a particular time and duration. Most chats are focused on a particular topic of interest and some involve guest experts or famous people who “talk” to anyone joining the chat. Alternatively two users can chat when they are using the Internet and the platform at the same time.

Several browser interfaces provide the chat facility these days such as Instant messaging, Windows, Skype and ICQ. With the invent of 3G technology not only text data but video data can also be streamlined at the same time

CHATTING

A real time informal communication over the Internet is chatting. A chat program is software which is required for chatting over the internet. AOL Instant Messenger, Campfire, Internet Messenger, MSN Messenger are some commonly used chat programs. In order to chat, the user should have an account on a chatting program. A phone call is a voice based chat while online chat is textual conversation.

INTERNET RELAY CHAT (IRC)

IRC protocol is used for chatting. It provides chatting between groups or between two individuals. It was developed by Jarkko Oikarinen in Finland in the late 1980s. It is based on client/server model. The IRC client sends and receives messages to and from an IRC server. The IRC server transports the message from one client to another. The IRC server is linked to many other servers to form an IRC network. IRC server identifies every user through a unique nickname. Each user is assigned a unique channel in case multiple discussions are taking place.

3.6 Videoconferencing

The video conferencing is a conference between two or more people sitting at various remote locations around the world. They can talk to each other when they are connected to each other using Internet. Thus, they are able to transmit both the video and audio data.

In video conferencing, several computer networks relay the information through the Internet. Each of the end user has a camera known as Webcam as well microphone to capture the video data and the voice data in real time and this is

transmitted over Internet. The participants can view each other over their monitors as well as hear the voice data over speakers of



their laptop or desktop computers. These days equipment such as smart phones and tablets has the capability of capturing the video data as well voice data. Therefore, it is possible to conduct video conferencing from any part of the world not necessarily connected to Internet through wires.

Multipoint videoconferencing allows three or more participants to sit in virtual conference room and communicate, as though they are all sitting together. With the rapidly changing cost of the hardware and accessibility of Internet across the world, video conferencing is changing the way people

conduct meetings. The business class all around the world consider video conferencing as a rapid tool to reduce the need for personal meetings and hence the need for all participants to get together at one location. The high speed of Internet connectivity not only allows the video and audio data but participants can open, review, share and discuss the documents.

On the television, we see a number of times that the program host is conducting the interview among several participants sitting in different cities or countries. This is done with the technology used in video conferencing. The participants are not only able to hear each other but can see and talk to each other live. The entire proceedings of the interview such as the data transmission between or among participants across the world can be seen clearly by the viewers of the television.

Advantages of Video Conferencing

1. **Reduced traveling cost:** In the global world where businesses are being conducted across continents, the travelling cost and the time that is wasted during travel is reduced to a greater extent. The video conferencing lowers the distance by showing the receiver on the monitor and it takes least amount of time to conduct talks between the two users.
2. **Increased productivity:** The people meet in the virtual world where the discussions takes place instantly without meeting each other and the decisions about a problem are thus made faster. This leads to increased productivity.
3. **Going Green:** Since conferencing between people is possible even without travelling from one place to another through video conferencing, a lot of petrol or fuel is saved. One can therefore say, that it is an eco-friendly initiative.

Disadvantages of Video Conferencing

1. **Technical issues-** Since the video conferencing depends heavily on the availability of a high speed internet connection, the technical issues of such types can delay the discussions among the participants sitting in different locations.
2. **Lack of personal contact-** All types of discussions cannot be handled through video conferencing. Discussion between an employer and prospective employee or the assessment of a candidate is possible most of the time through the personal interview. i.e. face to face interaction. It is difficult to judge a person through the video or a virtual interview.

3. 7 Net Banking

A system of banking in which customers can view their account details, pay bills, and transfer money by means of the Internet is known as net banking. Internet banking, sometimes called online banking. Internet banking uses the Internet to conduct banking activity, for example, transferring funds,

paying bills, viewing checking and savings account balances etc. Internet banks are also known as virtual, cyber, net, interactive, or web banks. Following figure shows the login for SBI Account Holder.

3.8 Online shopping

Online shopping or online retailing is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the Internet using a web browser.

We can search for and purchase products from almost anywhere if the vendor makes his products available through the Internet. We



We can pay the bill of our purchases by using a credit card. Some vendors may allow us to make our payment by electronically transferring the money from our bank.

The good thing is that purchasing things online is very easy. The advantage for online shopping is we can start at home and the item comes to. Do we have plenty of time to go to the store and look up and down for the item like? Most people say NO, time is precious. So on line shopping is considered as a time saving activity.

3.9 E-Learning

The E-Learning is a method of providing guidance and/or delivering information to students of university or the employees of companies. Several universities and companies design the courses that can be reviewed using laptop, desktops or other smart devices. These programs are developed in such a way that the individuals don't need to come to a classroom but can review all the data from any place convenient to them. It can be their home or their office.



The following are the advantages of online or computer-based learning:

1. Class work can be scheduled around work and family
2. Reduces travel time and travel costs for off-campus students
3. Students may have the option to select learning materials that meets their level of knowledge and interest
4. Students can study anywhere; they only need access to a computer and Internet connection
5. Self-paced learning modules allow students to work at their own speed
6. Flexibility to join discussions in the bulletin board threaded discussion areas at any hour, or visit with classmates and instructors remotely in chat rooms
7. E-Learning can accommodate different learning styles and facilitate learning through a variety of activities
8. Develops knowledge of the Internet and computer skills that will help learners in their career

3. 10 E-Reservation

E-Reservation System is an online reservation system that enables hotels, resorts, property owners, operators, theater operators and transport companies to maximize revenues without having to put human booking agents.

This system works with the Web and the Internet helps provide an access to a user/ customer to book a ticket, room etc. without ever having to go to the booking office. Since such systems are internally integrated with the database of the companies, the booking system helps to monitor access to the client as long as there is availability of the seats/ rooms etc. The diagram below shows the process of e-reservation in case of a hotel room booking.

Advantages:

1. Increases direct sales as immediate confirmation is provided.

2. Reduces administrative costs as less human agents are required.
3. Helps manage inventory better as more visibility to the customer.
4. Provides global access to the customers without the capital expenditure to set up local offices.

3.11 Mobile Technology

Mobile technology is exactly what the name implies - technology that is portable. Mobile technology is rapidly changing the face of communication in the most remote areas of the world. Today, out of the seven billion people in the world, approximately six billion are cell phone subscribers. In response, companies, governments, and NGOs alike have realized the potential of this tool in addressing today's most pressing global challenges. Here are some important uses of Mobile Technology.



1. Education
2. Surveys and Polling
3. Banking
4. Data Analysis

3.12 Social Network

Social Networking is a platform that helps people to connect with others and build a social relation. The last 15 years has seen a splurge of social networking sites where people can search / choose to make friends, post pictures and photos, comment on each other's activities. Social networking has opened the doors where people can connect and share their lives and the activities by them without being close geographically. People can connect from anywhere in the world with the internet connection. They can become the member of one or other available social networking site.

Social networking site allows a user to share ideas, activities, events, and interests among the people. The individuals can also have the control of the content they share and the person with whom they are or want to communicate with.



An individual can share text information, photos, data files or even videos. Many people now a day use social networking sites to market their business and thus reach the potential customer. Using an account of these sites they can showcase their product and services that the people interested can follow and review.

3.13 Summary

- ✍ **Web site** is a collection of one or more web pages grouped under the same domain name.
- ✍ **E-mail** or Email is simply the short form of “electronic mail”. It is a system of receiving, sending, and storing electronic messages.
- ✍ **E-mail** allows us to send and receive messages to and from anyone with an email address, anywhere in the world.
- ✍ **Net banking**: A system of banking in which customers can view their account de-tails, pay bills, and transfer money by means of the Internet is known as net banking.
- ✍ The word **chat** as it literally means in English is communication between two or more people. The electronic chat is the communication between two or more individuals using their computers
- ✍ **Video conferencing**, several computer networks relay the information through the Internet. Each of the end user has a camera known as Webcam as well microphone to capture the video data and the voice data in real time.

- ✍ The **E-Learning** is a method of providing guidance and/or delivering information to students of university or the employees of companies
- ✍ **E-Reservation** System is an online reservation system that enables hotels, resorts, property owners, operators, theater operators and transport companies to maximize revenues without having to put human booking agents.
- ✍ **Social Networking** is a platform that helps people to connect with others and build a social relation.
- ✍ **Social networking** site allows a user to share ideas, activities, events, and interests among the people.

3.14 Check Your Progress

1. What is Web site?

2. Write the difference between Webpage and Website.

3. Write the components of website.

4. Write the steps to build a website.

5. Write the steps of web development process

6. What is e-mail?

7. Write the components of e-mail?

8. Write the features of e-mail?

9. What is the meaning of Mobile Technology?

10. What is on-line shopping?

11. What is Net Banking?

12. What is social networking?

3.15 Reference

1. Computer Networks and Internets with Internet Applications (Third Edition)
2. www.google.com
3. www.wpdfd.com
4. www.wdvl.com
5. www.w3.org
6. www.webstandards.org/

UNIT- 4 INTERNET SECURITY AND PRIVACY

Learning objectives:-

At the end of this unit the students will be able to learn:

- ✎ Internet security
- ✎ E-mail security
- ✎ How to safe your password
- ✎ How to secure personal data
- ✎ How to secure one's Smartphone.

STRUCTURE

- 4.1 Introduction
- 4.2 Understanding basic internet security
- 4.3 Secure your computer
- 4.4 Keeping passwords safe
- 4.5 Encrypting passwords with a password manager
- 4.6 Protecting your internet passwords
- 4.7 Introduction to e-mail safety
- 4.8 Introduction to securing personal data
- 4.9 Introduction to mobile phone security
- 4.10 Summary
- 4.11 Check your Progress
- 4.12 References

4.1 Introduction

Cyberspace (internet, work environment, intranet) is becoming a dangerous place for all organizations and individuals to protect their sensitive data or reputation. This is because of the numerous people and machines accessing it. It is important to mention that the recent studies have shown a big danger is coming from internal threats or from disappointed employees like the Edward Snowden case, another internal threat is that information material can be easy accessible over the intranet.

One important indicator is the IT skills of a person that wants to hack or to breach your security has decreased but the success rate of it has increased, this is because of three main factors –

- Hacking tools that can be found very easily by everyone and they are endless.
- Technology with the end-users has increased rapidly within these years, like internet bandwidth and computer processing speeds.
- Access to hacking information manuals

Now let's go directly to the point of what all to secure in a computer environment –

- First of all, is to check the physical security by setting control systems like motion alarms, door accessing systems, humidity sensors, and temperature sensors. All these components decrease the possibility of a computer to be stolen or damaged by humans and environment itself.
- People having access to computer systems should have their own user id with password protection.
- Monitors should be screen saver protected to hide the information from being displayed when the user is away or inactive.
- Secure your network especially wireless, passwords should be used.
- Internet equipment as routers to be protected with password.
- Data that you use to store information which can be financial, or non-financial by encryption.
- Information should be protected in all types of its representation in transmission by encrypting it.

4.2 Understanding Basic Internet Security

To understand basic internet security we should have a basic understanding of how the Internet is organized and which path our information travels. With this knowledge we can easily assess which measures we can take to protect ourselves.

If you want to communicate with a friend you can send her/his a letter and post it to the nearest mailbox; it then travels through an extensive network to (hopefully) reach the person the information is intended for. Internet is just like that, however, the message is sent in an open envelope and every postman on the way can read the message, alter its content and/or the destination without you knowing.



To counter this, people have long used secret languages to communicate safely. In this section we will explain two methods of encryption. The first method explains an end-to-end encryption, encrypting the whole way from sender to receiver. The second method partly encrypts the route.

1. END-TO-END ENCRYPTION

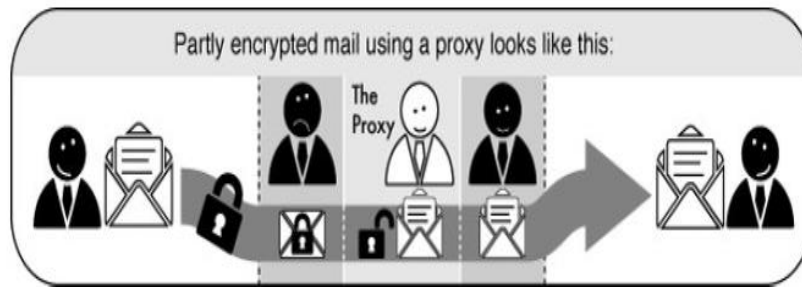
If you encrypt your message and only the recipient can read it, it will be meaningless to all the postmen in between, and if they alter it you will notice it directly. In order to make such an encryption work, you still have to be sure to trust the recipient and be sure that you are really exchanging information with her and not with someone pretending to be her. This method is called end-to-end encryption and is the safest way of communication. You also have to be sure that no one is watching over your shoulder while you write your message. Some of the end-to-end encryption methods that we cover in this book are HTTPS for browsing and PGP for e-mailing.



Unfortunately for end-to-end encryption to work, both you and your friend (source, co-worker) need to have the tools to use it and have to agree on the secret language used. On the internet this means the website you are visiting or the people you are e-mailing. This not always the case, still, we can considerably increase our online safety by encrypting a part of the route.

2. PARTLY ENCRYPTED MAIL THROUGH A PROXY

To get back to the mail analogy you might be on a field trip in a repressive country and want to send a message to your friend at home. You don't trust the post offices and the postmen in this country. So before you left, you asked your local post office to act as an intermediary (the proxy) and agreed to use a secret language. Now you can just write a message to your friend in the secret language of your post office. You will send this to your post office and they will take care of the delivery of the message to your friend.



In this scenario you have to trust your local post office, all the postmen after that and of course your friend.

4.3 How to Secure Your Computer

There are steps that everyone with a computer should take to keep it secure. This may involve protecting information about your network of activists, your credit card number or your human-biology collection; but some of the tools you need are the same. Your computer holds valuable information and this need to be protected.

Beware of programs or people that promise perfect security: online safety is a combination of good software and human behavior. Knowing what should be kept offline, who to trust, and other security questions cannot be answered by technology alone. Look for programs that list risks on their Web sites or have been peer reviewed.

1. KEEP YOUR OS UPDATED

Keep your operating system up-to-date: the developers of operating systems provide updates that you should install from time to time. These may be automatic or you may have to request them by entering a command or adjusting your system settings. Some of these updates make your computer more efficient and easier to use, and others fix security holes. Attackers learn about these security holes rapidly, sometimes even before they're fixed, so fixing them promptly is crucial. Luckily most operating systems do a quite good job in keeping the system updated and safe, if at least you allow them to do so.

Installing new updates on a new computer is very important. A new computer you buy in the shop can be there for some months already. This means the computer is often behind with the security updates. So when buying a new computer, please take some time to update your Operating System.

2. USER ACCOUNT AND PASSWORD

Every computer needs an account to login. This account is needed to access your data and use the functions of your computer. Please be sure to setup a password for every account.

Use good passwords: no password selection system can guard against being threatened with violence, but you can improve your security by making it harder to guess. Use combinations of letters, punctuation, and numbers. Combine lower and upper case letters. Do not use birth dates, telephone numbers, or words that can be guessed by going through public information about you. More information about this can be found in the chapter on passwords.

Modern operating systems separate normal tasks from administrative tasks like installing software. This division is very important, as administrative tasks need extra privileges and have total access to your hardware and software. Be sure to create a normal user account for day to day usage and never use the administrative account for this.

Last but not least: Never store your password on a post-it on your computer or underneath your keyboard.

3. PHYSICAL PROTECTION

A lot of people do not realize the information on your computer can be very valuable for others. If you are working in an unknown/uncontrolled environment or area, always keep a good look on your belongings and never leave them unattended. Take some time to think over what the risks are if the data on your computers fall in the wrong hands. Ask yourself, "which information is actually stored on my computer and what can other people do with this information?". Please realize, a password on your computer will maybe protect against quick access, but it doesn't protect your data once the whole system is lost. With physical access to a computer it's very simple to access the data on your hard disk (with the use of another computer) without knowing even the first character of your password. If the information on your laptop is very valuable, have special attention to the section about securing personal data. The above is also true when you lend your equipment to someone else. Although you might completely trust the person you lend to, you don't have control on how secure they may handle your equipment.

4. SMOKING A CIGARETTE

It is very well possible you are working in a cafe or other (semi) public place on your laptop. Maybe you have opened some password protected websites (webmail) and maybe even have opened some encrypted files or emails. Once you go out for a quick break and a cigarette, please be sure at least your screen is locked. All mainstream operating systems can be used to lock your screen automatically if you close your lid or after a few minutes of inactivity. Be sure to enable these options, failing to do so will certainly at least sometimes result in good opportunity for attackers to access your private data. Unfortunately this habit is still not very common with users but very important.

5. USE ANTI-VIRUS SOFTWARE

If you're still using Microsoft Windows, use anti-virus software and keep it updated. Malware is software written in order to steal information or to use your computer for other purposes. Viruses and



malware can gain access to your system, make changes and hide themselves. They could be sent to you in an e-mail, be on a Web page you visit, or be part of a file that does not appear to be suspicious. Anti-virus software providers constantly research emerging threats and add them to lists of things that your computer will block. In order to allow the software to recognize new threats, you must install updates as they are released. Be aware of scareware. Scareware is software which advertises itself as anti-virus software, but is in fact a virus or spyware itself. If you install (free or commercial) anti-virus software, please be sure it's not scareware. A quick search of the name of the vendor/product in combination of the term "scareware" on Google will be enough to find out if you've just downloaded scareware. Scareware can be often found in "advertisements" on dodgy websites with warnings about "found viruses"

6. EXTERNAL DATA (USB-STICKS, E-MAIL ATTACHMENTS)

Transferring viruses with USB-sticks or with E-mail attachments is very easy and often done by the virus itself rather than the owner/sender, especially under Microsoft Windows. Be careful when inserting USB-

sticks or lent out your stick to others. It's just recently Microsoft changed its policy regarding automatically opening USB-sticks. This should make Windows a little safer, but still watch out suspicious programs on USB-sticks. Never open any file you do not trust, regardless to if it was distributed via E-mail, USB or other methods.

7. ONLY USE TRUSTED AND OPEN SOURCE SOFTWARE

Be sure you can trust the vendor of the applications you use. A lot of companies are offering applications on the internet. Between these companies there are several with other intentions than they will tell you.

Use Free and Open Source Software (FOSS). Open source software is made available both as a working product and as a work in progress to users and software engineers. This offers several security advantages over closed source, for-profit software that may only be available in your country through illegal channels due to export restrictions or expense. You may not be able to download official updates for pirated software and often pirated versions already include viruses. With Open Source software there is no need to search through several suspicious sites for a copy free of spyware and security glitches. Any legitimate copy will be free and is available from the creators. If security flaws emerge, they can be spotted by volunteers or interested users. A community of software engineers will then work on a solution, often very quickly.

Another problem that has occurred in some countries with regards to illegally installed closed source software is that equipment of NGOs or journalists were confiscated by the government based on copyright regulations as a measure to gain access to the information that was on the devices.

8. BE UPDATED

Keep yourself updated on the latest security threats: the effort put into harming you may change. Methods to protect yourself that works today may stop working or even become a threat themselves tomorrow. Even if you don't need it now, know where to find information and use different sources of information.

4.4 Keeping Passwords Safe

Passwords are for the computer world basically what keys are in the physical world. If you lose a password you will not be able to get in, and if others copy or steal it they can use it to enter. As a minimum measure a good password should not be easy to guess by people and not easy to crack by computers, while still easy enough for you to remember.

PASSWORD LENGTH AND COMPLEXITY

To protect your passwords from being guessed, length and complexity are the key factors. Passwords like the name of your pet or a birth date are very unsafe; also any word that appears in a dictionary is easily guessed by a computer. You should also never use a password containing only numbers. You should use a password containing a combination of lower case letters, capitals, numbers and special characters and it should have a minimum length of 8 characters for basic security.

MINIMIZING DAMAGE

If your password is leaked or guessed, it is very important to minimize the damage as much as possible. To this end there are two measures you can take. Firstly, be sure to keep different passwords for different sites, otherwise if your password for one site is compromised it is very easy for the attacker to gain access to your other accounts. You can for example do this by choosing a few basic passwords to which you add a unique suffix per site. Secondly, change your password from time to time, at least for things you consider to be sensitive. In that way, if an attacker has got access to your account without you noticing, you effectively block him out.

PHYSICAL PROTECTION

Especially if you are traveling and using internet cafes, or other un-trusted computers, you have to be aware that there are other ways for people to obtain your passwords. Firstly there is "over the shoulder" surveillance, where someone, or a camera, watches your actions and might see the password you are typing (or where you are browsing). A second typical threat is the presence of key loggers. Key loggers are software or hardware devices that record key-strokes, they can be hidden inside a computer or keyboard and hence totally invisible to you. Be very careful what you do in those places and which sites you visit there. If you really have to use such a place be sure to change your passwords as soon as possible. For more tips on Internet Cafes read the chapter on them.

EASY-TO-REMEMBER AND SECURE PASSWORDS

One way to create strong and easy-to-remember passwords are to start with a sentence you can easily remember, like: "this book really helps for securing my digital life!"

Take for instance the first letter of every word: "tbrhfsmdl" and now add some more substitutions, the "f" can be the 4 (for "for") and we can add some capitals and special characters. The end result might be something like "TbRh4\$mdL!" This is secure and easy to remember. Just try to think of a system that works for you to remember the passwords. Alternatively you might want to use one strong password that is easy to remember and keep all your other secure (less easy to remember) passwords by using a tool that keeps them securely on your computer or phone.

USING AN APPLICATION TO KEEP YOUR PASSWORDS

Even easy-to-remember passwords might be difficult to manage. One solution is to use a dedicated application to manage most of your passwords. The application we will discuss is KeePass which is a free and open password manager that is considered to be secure (given that you chose a safe and secure "master password" for the keepass application).

For website passwords a more convenient solution that is probably safe enough for most of your passwords is to use the built-in password manager of the Firefox browser. Be sure to set a master password as is explained in the chapter on safe browsing, otherwise this is very insecure! Other browsers might also come with built-in password managers, but remember that if you don't have to unlock them with a master password they are mostly unsafe and easily retrievable by attackers having access to your computer.

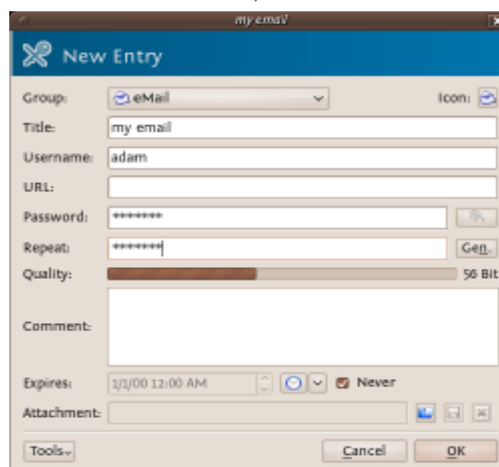
PROTECT YOUR WEBSITE PASSWORDS

Browsers offer to save the login information and passwords for websites you use. If you choose to save the passwords, you should make sure that the passwords are stored in a safe way. See the chapter about Keeping your internet passwords safe in Firefox.

4.5 Encrypting passwords with a password manager

To encrypt password we use KeePass on Windows and KeePassX Ubuntu, and Keychain on OSX. The basic principle is the same; you have a file on your computer which is encrypted with one single very secure password. This is sometimes referred to as a 'Master Password', 'Admin-Password', 'Root-Password' etc. but they are all the ultimate key to all your other keys and secure data. For this reason you can't and shouldn't think to light about creating this password.

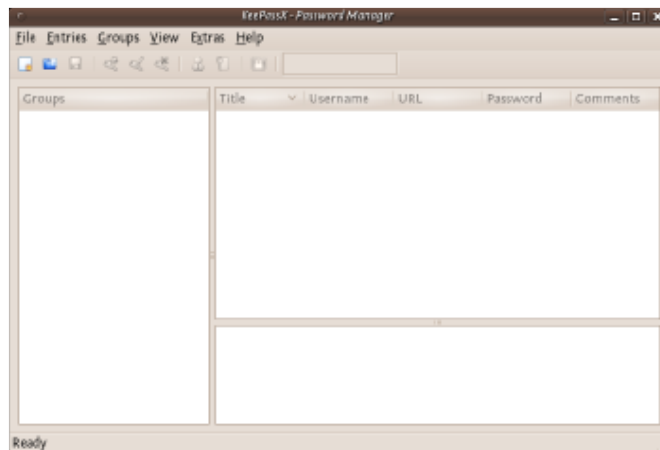
If a password manager is part of your OS (like it is with OSX) it unlocks automatically for you after you login to your account and so opening secure information like passwords. For this, and other, reasons you should disable 'Automatically Login'. When you start-up your computer you should always have to login and, even better, set your computer to automatically logout or lock the screen after a set amount of time.



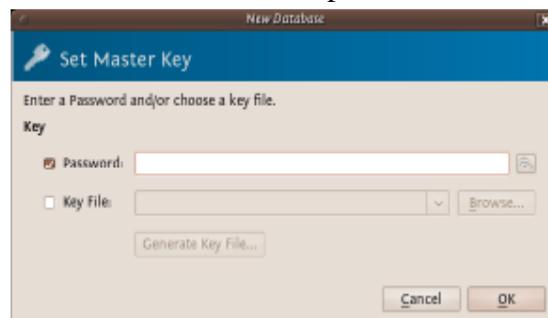
ENCRYPTING PASSWORDS WITH KEEPASSX ON UBUNTU

First open KeePassX from the Applications→Accessories →KeePassX menu.

The first time you use KeePassX you need to set up a new database to store your passwords. Click on File->New Database. You will be asked to set a master key (password)



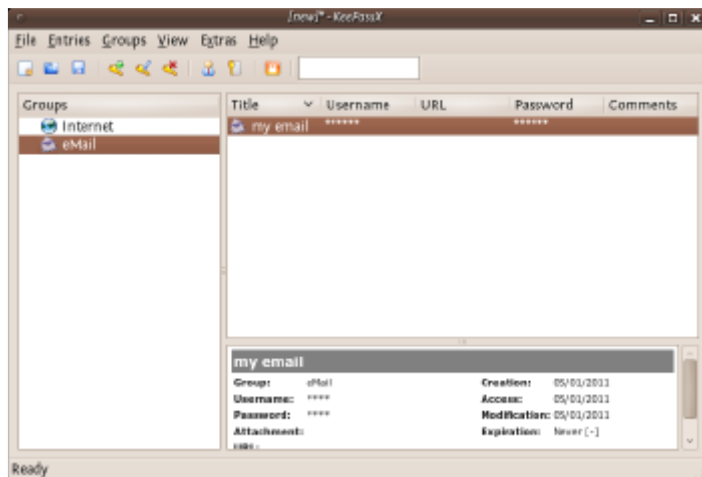
Choose a strong password for this field - refer to the chapter about passwords if you would like some tips on how to do this. Enter the password and press 'OK'. You then are asked to enter the password again. Do so and press 'OK'. If the passwords are the same you will see a new KeePassX 'database' ready for you to use.



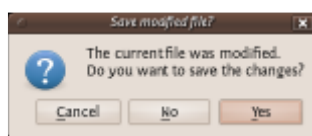
Now you have a place to store all your passwords and protect them by the 'master' password you just set. You will see two default categories 'Internet' and 'Email' - you can store passwords just under these two categories, you can delete categories, add sub-groups, or create new categories. For now we just want to stay with these two and add a password for our email to the email group. Right click on the email category and choose 'Add New Entry...':

KeePassX gives some indication if the passwords you are using are 'strong' or 'weak'...you should try and make passwords stronger and for advice on this read the chapter about creating good passwords. Press 'OK' when you are done and you will see something like this:

To recover the passwords (see them) you must double click on the enter and you will see the same window you used for recording the information. If you click on the 'eye' icon to the right of the passwords they will be converted from stars (***) to the plain text so you can read it.



Now you can use KeePassX to store your passwords. However, before getting too excited, you must do one last thing. When you close KeePassX (choose File->Quit) it asks you if you would like to save the changes you have made.



Press 'Yes'. If it is the first time you used KeePassX (or you have just created a new database) you must choose a place to store your passwords. Otherwise, it will save the updated information in the file you have previously created.

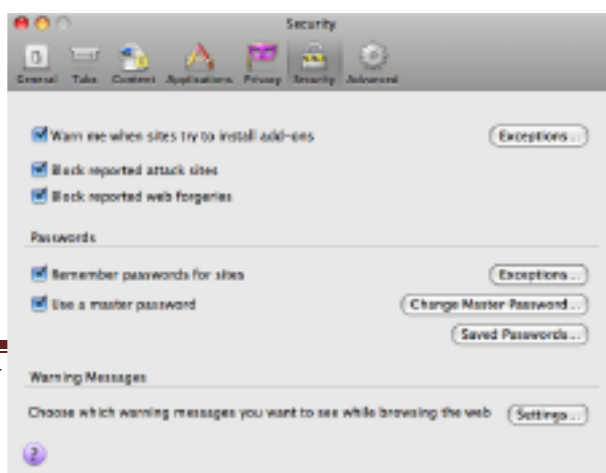
When you want to access the passwords, you must then open KeePassX and you will be asked for the master key. After typing this in, you can add all your passwords to the database and see all your entries. It is not a good idea to open KeePassX and have it open permanently, as then anyone could see your passwords if they can access your computer. Instead, get into the practice of just opening it when you need it and then closing it again.

4.6 Protecting your internet passwords

Firefox can remember your internet passwords. This can be a very convenient option to use with all those different sites requiring passwords nowadays. However, if you use this function, you have to set a master password; otherwise, this feature is a real security threat.

To enable a master password, open your Firefox preferences and select the security icon. Check the "use a master password" box.

After launching Firefox, it will ask you once for the master password; after that, the internet password keyring will be unlocked. If the internet password keyring is unlocked, you



can inspect all saved passwords in the Preferences -> Security -> "Saved Passwords ..." dialog. If you browse to a known website with a login form, the password is entered automatically.

Please note that at the time of this writing the implementation of Firefox' internet password key ring is not complete, as it is not locked automatically after a certain time of inactivity or before closing your laptop lid. If you want Firefox to lock your internet password key ring automatically after a certain time of you not using your computer, you might install the "Master Password Timeout" Plugin.

4.7 Introduction to Email Safety

E-mail is one of the oldest forms of communication on the Internet. We often use it to communicate very personal or otherwise sensitive information. It is very important to understand why e-mail in its default configuration is not secure. In the following chapters we will describe the different methods necessary to secure your e-mail against known threats. We will also provide you with basic knowledge to assess the risks involved in sending and receiving e-mail. This section will start by describing the security considerations when using e-mail.

NO SENDER VERIFICATION: YOU CANNOT TRUST THE 'FROM' ADDRESS

Most people do not realize how trivial it is for any person on the Internet to forge an e-mail by simply changing the identity profile of their own e-mail program. This makes it possible for anyone to send you an e-mail from some known e-mail address, pretending to be someone else. This can be compared with normal mail; you can write anything on the envelope as the return address, and it will still get delivered to the recipient (given that the destination address is correct). We will describe a method for signing e-mail messages, which prevents the possibility of forgery. Signing e-mail messages will be explained in the chapter about PGP (Pretty Good Privacy).

E-MAIL COMMUNICATIONS CAN BE TAPPED, JUST LIKE TELEPHONES

An e-mail message travels across many Internet servers before it reaches its final recipient. Every one of these servers can look into the content of messages, including subject, text and attachments. Even if these servers are run by trusted infrastructure providers, they may have been compromised by hackers or by a rogue employee, or a government agency may seize equipment and retrieve your personal communication.



There are two levels of security that protect against such e-mail interception. The first one is making sure the connection to your e-mail server is secured by an encryption mechanism. The second is by encrypting the message itself, to prevent anyone other than the recipient from understanding the content. Connection security is covered extensively in this section and in the sections about VPN. E-mail encryption is also covered in detail in the chapters about using PGP.

MAIL HOAXES, VIRUSES AND SPAM

More than 80% of all the traffic coming through a typical e-mail server on the Internet contains spam messages, viruses or attachments that intend to harm your computer. Protection against such hostile e-mails requires keeping your software up-to-date and having an attitude of distrust toward any e-mail that cannot be properly authenticated. In the final chapter of this section, we will describe some ways to protect against hostile e-mail.

4.8 Introduction to securing personal data

You may find it necessary or perhaps re-assuring to encrypt some data on your computer. Hard drives are not very well protected by the Operating Systems password mechanism - it is pretty easy to remove a hard disk from a laptop and access it from another computer, similar to how you would access any hard disk you use for back-up or storage. So if you want to avoid this possibility you should encrypt the data on your hard disk or, better still, encrypt your entire hard disk.

You can also take this protection another level and encrypt the data and store it on another device like a USB stick or small hard disk. This means the data can also be very easily physically hidden and it's also very portable. If you want to be really sneaky you can also create hidden encrypted

volumes which means if someone accesses your hard disk they must know quite a bit about computers to know how to find it - of course if you have the software installed to do this kind of thing that might not look so friendly to someone prepared to go to these measures.

'Encrypting your data' like this means locking away your data in a very secure 'container'. If you do not know the passwords then that data will look like a mess of letters, numbers and other characters. If you know the password you can easily open and access the files.

We will look mainly at TrueCrypt - a free/open source solution to this issue. TrueCrypt is very nice software that can be used on MacOSX, Linux or Windows for establishing and maintaining an on-the-fly-encrypted container ('volume'). On-the-fly encryption means that your data is encrypted when you save it and then also decrypted when you open (access) it without you needing to do anything. You can continue to use your computer like you normally would - you can drag and drop files to an encrypting data etc. When you turn off the computer the data is encrypted automatically - the same thing happens if your computer's power supply is interrupted or if the disk is removed from your computer. The only way to access the data is to start your computer in the normal fashion and entering the necessary passwords. It's actually pretty easy to use and in a sensible world all data would be stored in this fashion. The only issue you really need to consider is that the data is not encrypted automatically if you put your machine 'to sleep'. If you want this type of security you need to get used to waiting a while and do a real shutdown of your computer and a real start-up each time you use it. This is not the way people are usually working with laptops but this little extra attention and pause for a few moments is a small price to pay for good data security

4.9 Introduction to Mobile Phone Security

Most people have mobile phones today. In the past these devices were primarily used to call and send text messages. In addition, all mobiles have at least an ability to keep an address book. There is a new generation of mobile devices that come with Internet access, built-in video cameras and the ability to install additional software. These smart phones can be very convenient and provide you with very powerful and useful tools. These phones contain a lot of private data and, unfortunately, a phone can be lost easily. The following chapter deals with some methods to use them more secure.

SECURITY ISSUES WITH MOBILE PHONES

Physical security - A phone can be confiscated or stolen. If you are a journalist, your address book might be of special interest: it can be used just to gain knowledge of your network or for further social engineering. As a

minimum safety measure you should always enable some kind of password protection on your phone (not just on your SIM card).

Voice - Although the voice on a GSM (mobile phone) channel is encrypted, this encryption was hacked some time ago and is not considered safe anymore. Furthermore, if you do not trust the network(s) you are using it has never been safe. Normal VoIP communications are very insecure as they are not encrypted. Some other VoIP services use some kind of encryption.

SMS - Text messages are sent in plain text over the network, so they are also not considered secure, additionally they are not securely stored at your device, so anyone with access to it will be able to read them. If you are using an Android based phone read the chapter on 'Secure Text Messaging'

Smartphone - Smartphone's are quite new and unfortunately most advanced (and even some basic) ways of securing that are available on normal computers are not available on smart phones. They pose additional risk since you are also using them for things like agendas, and personal note taking. Also not all applications in an appstore or market are safe to use, because there are a considerable number of malware apps on the market which are passing your personal data to other companies. You should always check if the app's you want to use can be trusted. Internet on your mobile device is subject to the same problems as all wireless communications. Read the chapter on VPN for mobile devices to improve this.

Prepaid SIM cards - In some countries you are still able to use prepaid locally bought SIM cards without identifying yourself. Beware that your phone also has a unique identifier (known as the IMEI number) so switching SIM cards will not guarantee to protect your privacy.

The following chapters will deal with different methods that are available today to secure your mobile communications. Note that mobile phone security in particular is developing very fast and users should check out the current status of premier open source efforts like the Guardian Project

1. SECURE TEXT MESSAGING
2. SECURE TEXT MESSAGING
3. EMAIL SECURITY ON ANDROID

4.10 Summary

E-MAIL

E-mail, short for electronic mail, is a method to send and receive messages over the Internet. It is possible to use a Web mail service or to send e-mails with the SMTP protocol and receive them with the POP3 protocol by using an e-mail client such as Outlook Express or Thunderbird. It is comparatively rare for a government to block e-mail, but e-mail surveillance is common. If

e-mail is not encrypted, it could be read easily by a network operator or government.

FILE SHARING

File sharing refers to any computer system where multiple people can use the same information, but often refers to making music, films or other materials available to others free of charge over the Internet.

FILE SPREADING ENGINE

A file spreading engine is a Web site a publisher can use to get around censorship. A user only has to upload a file to publish once and the file spreading engine uploads that file to some set of share hosting services (like Rapid share or Mega upload).

HTTP (HYPERTEXT TRANSFER PROTOCOL)

HTTP is the fundamental protocol of the World Wide Web, providing methods for requesting and serving Web pages, querying and generating answers to queries, and accessing a wide range of services.

HTTPS (SECURE HTTP)

Secure HTTP is a protocol for secure communication using encrypted HTTP messages. Messages between client and server are encrypted in both directions, using keys generated when the connection is requested and exchanged securely. Source and destination IP addresses are in the headers of every packet, so HTTPS cannot hide the fact of the communication, just the contents of the data transmitted and received.

INSTANT MESSAGING (IM)

Instant messaging is either certain proprietary forms of chat using proprietary protocols, or chat in general. Common instant messaging clients include MSN Messenger, ICQ, AIM or Yahoo! Messenger.

INTERNET

The Internet is a network of networks interconnected using TCP/IP and other communication protocols.

IP (INTERNET PROTOCOL) ADDRESS

An IP address is a number identifying a particular computer on the Internet. In the previous version 4 of the Internet Protocol an IP address consisted of four bytes (32 bits), often represented as four integers in the range 0-255 separated by dots, such as 74.54.30.85. In IPv6, which the Net is currently switching to, an IP address is four times longer, and consists of 16

bytes (128 bits). It can be written as 8 groups of 4 hex digits separated by colons, such as 2001:0db8:85a3:0000:0000:8a2e:0370:7334.

MALWARE

Malware is a general term for malicious software, including viruses that may be installed or executed without your knowledge. Malware may take control of your computer for purposes such as sending spam. (Malware is also sometimes called bad ware.)

PACKET

A packet is a data structure defined by a communication protocol to contain specific information in specific forms, together with arbitrary data to be communicated from one point to another. Messages are broken into pieces that will fit in a packet for transmission, and reassembled at the other end of the link.

PROTOCOL

A formal definition of a method of communication, and the form of data to be transmitted to accomplish it. Also, the purpose of such a method of communication. For example, Internet Protocol (IP) for transmitting data packets on the Internet, or Hypertext Transfer Protocol for interactions on the World Wide Web.

PROXY SERVER

A proxy server is a server, a computer system or an application program which acts as a gateway between a client and a Web server. A client connects to the proxy server to request a Web page from a different server. Then the proxy server accesses the resource by connecting to the specified server, and returns the information to the requesting site. Proxy servers can serve many different purposes, including restricting Web access or helping users' route around obstacles.

SCRIPT

A script is a program, usually written in an interpreted, non-compiled language such as JavaScript, Java, or a command interpreter language such as bash. Many Web pages include scripts to manage user interaction with a Web page, so that the server does not have to send a new page for each change.

SMARTPHONE

A Smartphone is a mobile phone that offers more advanced computing ability and connectivity than a contemporary feature phone, such as Web access, ability to run elaborated operating systems and run built-in applications.

SPAM

Spam is messages that overwhelm a communications channel used by people, most notably commercial advertising sent to large numbers of individuals or discussion groups. Most spam advertises products or services that are illegal in one or more ways, almost always including fraud. Content filtering of e-mail to block spam, with the permission of the recipient, is almost universally approved of.

SSH (SECURE SHELL)

SSH or Secure Shell is a network protocol that allows encrypted communication between computers. It was invented as a successor of the unencrypted Telnet protocol and is also used to access a shell on a remote server.

The standard SSH port is 22. It can be used to bypass Internet censorship with port forwarding or it can be used to tunnel other programs like VNC.

SSL (SECURE SOCKETS LAYER)

SSL (or Secure Sockets Layer), is one of several cryptographic standards used to make Internet transactions secure. It is used as the basis for the creation of the related Transport Layer Security (TLS). You can easily see if you are using SSL/TLS by looking at the URL in your Browser (like Firefox or Internet Explorer): If it starts with https instead of http, your connection is encrypted.

WORLD WIDE WEB (WWW)

The World Wide Web is the network of hyperlinked domains and content pages accessible using the Hypertext Transfer Protocol and its numerous extensions. The World Wide Web is the most famous part of the Internet.

WEBMAIL

Webmail is e-mail service through a Web site. The service sends and receives mail messages for users in the usual way, but provides a Web interface for reading and managing messages, as an alternative to running a mail client such as Outlook Express or Thunderbird on the user's computer.

4.11 Check your Progress

A. Answer the followings:

1. WWW stands for _____.
2. SSL Stands for _____.
3. IM stands for _____.
4. HTTP Stands for _____.
5. SMTP stands for _____.

B. Short answer the questions:

1. What is information security on Internet?

2. How to secure or protect your information?

3. What is Password?

4. What is e-mail security?

5. How to secure your personal data?

6. How to secure your Smartphone?

4.12 References

1. Basic internet Security Text Book
2. Internet & Network security Fundamental
3. Network security tutorial.
4. Cyber Security from tutorial points
5. www.google.com

Check Your Progress - Possible Answers (Unit-1)

1.

- a) Internet
- b) World wide web
- c) Client
- d) Server
- e) Uniform Resource Locator
- f) Internet Service Provider
- g) Advanced Research Project Agency Network
- h) Internet Engineering Task Force.
- i) Internet Research Task Force.
- j) Internet Architecture Board.

2.

- a) **Internet:** The Internet is a communication system that connects computers and computer networks all over the world. Thus, we define the **Internet as a global network of computers/devices**.
- b) **WWW (World Wide Web)** - A technical definition of the World Wide Web is: all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).
- c) **Search Engine** _ A web server that collects data from other web servers and puts it into a database (much like an index), it provides links to pages that contain the object of your search.
- d) **URL (Uniform Resource Locator)** _ The Internet address. The prefix of a URL indicates which area of the Internet will be accessed. URLs look differently depending on the Internet resource you are seeking.

Check Your Progress -Possible Answers (Unit-2)

1.

- | | | |
|--------|---|-------------------------------|
| FTP | : | File Transfer Protocol |
| TCP | : | Transmission Control Protocol |
| SMTP | : | Simple Mail Transfer Protocol |
| VoIP | : | Voice over Internet Protocol |
| HTTP | : | Hypertext Transfer Protocol |
| POP | : | Post Office Protocol |
| Telnet | : | Telecommunication Network |

2.

- (a). **TCP/IP (Transmission Control Protocol/Internet Protocol)** is the basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet). When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.
- (b). **HTTP** or Hyper Text Transfer Protocol provides a set of rules to transfer files, videos, images over the World Wide Web. When the web browser is opened, a HTTP request call is made. A web server contains a HTTP daemon. This daemon is used to wait for HTTP requests and handles them when they arrive. The web browser from where HTTP requests are made is called as a client. These requests are sent to the server. It uses a reserved port no 80.
- (c). **SMTP** or Simple Mail Transfer Protocol is used to send email messages between servers. The messages are retrieved using email clients. SMTP is more commonly used to send messages from a mail client to a mail server. And hence the email client like POP needs to be configured. Hence, SMTP is used to send emails while POP or IMAP are used to receive messages. It is usually operated on port 25 on the internet.
- (d). **File Transfer Protocol (FTP)**, a standard Internet protocol, is the simplest way to exchange files between computers on the Internet. Like the Hypertext Transfer Protocol (HTTP), which transfers displayable Web pages and related files, and the Simple Mail Transfer Protocol (SMTP), which transfers e-mail, FTP is an application protocol that uses the Internet's TCP/IP protocols. FTP is commonly used to transfer Web page files from their creator to the computer that acts as their server for everyone on the Internet. It's also commonly used to download programs and other files to your computer from other servers.
- (e). **Telnet** is the main Internet protocol for creating a connection to a remote server.

3. Refer Section 2.8
4. Refer Section 2.7
5. URL: The standard way to give the address of any resource on the Internet that is part of the World Wide Web (WWW).
A URL looks like this:
<http://www.matisse.net/seminars.html>
The URL is divided into sections: transfer/transport protocol: // server (or domain)
6. IPv4 provides hierarchical addressing scheme which enables it to divide the network into sub-networks, each with well-defined number of hosts. IP addresses are divided into many categories:
 - Class A: It uses first octet for network addresses and last three octets for host addressing.
 - Class B: It uses first two octets for network addresses and last two for host addressing.
 - Class C: It uses first three octets for network addresses and last one for host addressing.
 - Class D: It provides flat IP addressing scheme in contrast to hierarchical structure for above three.
 - Class E: It is used as experimental.

IPv4 also has well-defined address spaces to be used as private addresses (not routable on internet), and public addresses (provided by ISPs and are routable on internet).

7. When computers communicate each other, there needs to be a common set of rules and instructions that each computer follows. A specific set of communication rules is called a protocol. Some protocol: PPP, HTTP, SLIP, FTP, TCP/IP
8. NNTP or Network News Transfer Protocol is used to manage the notes posted on unset newsgroup (a collection of posted notes on a subject posted by different users). NNTP servers are responsible for managing Usenet newsgroup collected globally. A NNTP client is a part of the web browser also called as a news reader. It uses server port no 119.

Check Your Progress - Possible Answers (Unit-3)

1. **Web site** is a collection of one or more web pages grouped under the same domain name.
2. **A web page** is one single page of information, while a website is made up of a number of different web pages connected by links known as Hyperlinks.

3. The components of website are :
Contents of a Web Page, Website Graphics, Effective Color Contrast
4. See the index no 3.3.4
5. The process of web development are :
Decide Purpose, Planning, Designing, Gather content, Building, Testing, Upload to server, Marketing and maintenance.
6. E-mail or Email is simply the short form of “electronic mail”. It is a system of receiving, sending, and storing electronic messages or **E-mail** or Email is simply the short form of “electronic mail”. It is a system of receiving, sending, and storing electronic messages.
7. The components of e-mail are:
 - **LOG-IN:** To send or receive e-mail, we have to first log onto our e-mail account by visiting its web site and typing the user name and password.
 - **LOG-OUT / SIGNOUT:** Click this option, once you have finished reading or sending the e-mails. This option brings you out from your e-mail account.
 - **IN-BOX:** It displays information about all the mails that we receive in our e-mail account. To read any mail click on it. The mail will be displayed in the new window.
 - **COMPOSE / WRITE MAIL:** To write mail to any one, we have to click on this option (or any other similar option). It will open a new window wherein we type the e-mail address of the person, subject of the mail and the text in the mail.
 - **SEND AN E-MAIL:** After composing an e-mail, click the Send button. We can send the same mail to many persons by typing their e-mail address separated by commas (,).
 - **REPLY:** This option is displayed when we open any mail. It is used to send replay to the received e-mail. We can simply type in our reply and click on the send button.
8. E-mail provides the following features:
 - **Cost effective** –The message sent through e-mail cost very low. It is very cheaper than courier or fax or telegram.
 - **High Speed**- Email can be sent very fast and almost instantaneously.
 - **Easy to use**- It is very easy to use e-mail to send a message through internet.
 - **Time saving**- we can sent the same message to a number of person at a time. So, we can save a lot of time.
 - **Message storing:** we can store the send and received message in our mail box.
 - **Address book:** we can store a number of e-mail address and contact details in address book.
 - **Wait for you:** The mail is lies in mail box, until the user login mail ID. So the e-mail waits for you.

- **Security:** Your email is delivered to your own personal and private account with a password required to access and view emails.
 - **Accessible anywhere at any time:** You don't have to be at home to get your mail. You can access it from any computer or mobile device that has an Internet connection.
9. Refer Section 3.11
 10. Refer section 3.8
 11. A system of banking in which customers can view their account details, pay bills, and transfer money by means of the Internet is known as net banking. Internet banking, sometimes called online banking. Internet banking uses the Internet to conduct banking activity, for example, transferring funds, paying bills, viewing checking and savings account balances etc. Internet banks are also known as virtual, cyber, net, interactive, or web banks. Following figure shows the login for SBI Account Holder.
 12. **Social Networking** is a platform that helps people to connect with others and build a social relation.

Check your Progress Possible Answers (Unit-4)

A. Answer

1. **WWW** stands for World Wide Web.
2. **SSL** Stands for Secure Sockets Layer.
3. **IM** stands for Instant Message.
4. **HTTP** Stands for Hyper Text Transfer Protocol.
5. **SMTP** stands for Simple Mail Transfer Protocol.

B. Answer

1. Information security is the process of preventing and identifying unauthorized use of computer, when transforming information over internet or network.
2. There are different techniques have been used to protect transfer of data or information from unauthorized user. Such as-
 - Keep the operating system updated
 - Use a Firewall
 - Anti-virus software is crucial to preventing virus attacks, but this strategy only works if users update their software.

Know that the only way a virus spreads is either by launching an infected file or by booting an infected disk. You cannot get a virus by simply being online or by reading e-mail.
3. A password is a string of character used to verify the identity of user during the authentication process. Passwords are typically used in conjuncture with a user name.
4. E-mail security refers to the collective measures used to secure the access and the content of the e-mail account or service. It allows an individual or organization to protect the overall access to one or more e-mail address/ accounts.