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COMMUNICATIONS ON INTERNET

In the previous lesson you have learnt about data communication and networking concept. Communication means transfer of data. Undoubtedly Internet is the fastest means of communication today and that is why it is called the “Information Superhighway”. It has revolutionized almost every facet of our lives. Whether we have to exchange messages, share pictures and videos, find information on any topic, debate in a group, or view live lectures, Internet is there to provide all these services to you at the click of the button. It has grown and evolved over the years and changed the way we communicate across the globe today. Internet has shrunk the world into a global village. Desktop computers, mainframes, cell phones, security alarms, video game consoles, GPS units, etc., are all connected to the net.

In this lesson, you will learn about internet, its related terminologies and also about some common ways of communication on Internet like email, instant messaging, newsgroup, blogging, social networking etc.



OBJECTIVES

After reading this lesson, you will be able to :

- define Internet;
- describe Internet related terminologies;
- list Internet protocols (TCP/IP, FTP, HTTP);
- use Internet;
- assess various Internet services like;
 - email;

- Instant Messaging and Chat Rooms;
- Blogs;
- Newsgroups;
- Video Conferencing;
- Social Networking;
- explain Cookies and Cloud Computing;

6.1 INTERNET

Internet (Inter-Network) or simply 'Net' is a vast communication network which connects thousands and millions of computers across the globe. It is also called network of networks because it is made up of thousands of smaller networks that can exchange information with each other. The users connected to Internet can share resources and communicate with each other. Internet offers many methods of connecting with people like emailing, chatting, blogging, social networking etc. Internet is an information hub. We can find information on almost any topic in the world. Any user can create content, offer services and sell products on the internet without requiring permission from any central authority. That is why we have wide range of applications and services to avail on the net.

Although no single person or organization actually runs the internet, yet tens of thousands of interconnected networks run by service providers, individual companies, universities, government etc. together run the Internet. Hence we say that 'No one but still everyone runs the Internet'. In fact, today, the net has grown into a spectacular combination of private sector, government sector and entrepreneurial broadcasters.

To connect to Internet, we need the following:

- (i) A web browser installed on our computer
- (ii) A modem
- (iii) A telephone connection
- (iv) A connection from an Internet Service Provider(ISP) like Airtel, MTNL etc.

Internet uses certain rules called **protocols** which allow sharing of resources among various users on the network. You will learn about these protocols later in this lesson.

6.1.1 History of Internet

The Department of Defence in USA created a small network called **ARPANET** (**A**dvanced **R**esearch **P**rojects **A**gency **N**etwork) to protect government





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communication systems in the event of a military strike. Using standard protocols, this network connected only contractors, military personals and university researchers who were involved in the project, so that they could communicate and share data with each other. The popularity of ARPANET spread among researchers and soon **National Science Foundation** launched **NSFNet** that linked several high speed computers. This later came out to be known as **Internet**. By late 1980s, thousands of cooperating networks were part of Internet. Present day Internet is now a platform for all types of resources. In fact, it continues to grow as an informational and communication resource with each passing day. It provides personal, economic, educational, and political resources to each connected user across the globe. It has truly become a communication highway for millions of users.

6.2 INTERNET TERMINOLOGIES

You will come across various terminologies associated with communications on Internet during the course of this lesson. Let us first understand these terminologies.

Webpage

The document that can be viewed in the web browser is known as the web page.

Website

The collection of web pages interlinked with each other through hyperlinks is known as website. The first page of a website is known as the **home page**.

World Wide Web (WWW)

The World Wide Web(WWW) or simply the ‘web’ is a system of Internet servers that support documents formatted using HTML. These documents or web pages may contain links to other documents (hyperlinks), text, graphics, audio or video files. So a user can search for the desired data or information by navigating from one web page to another.

Web Browser

A web browser is a free software application that is used to view web pages, graphics and almost any other online content. It is specifically designed to convert HTML and XML into readable document. A web browser helps us to navigate through the World Wide Web. Some of the common web browsers are Internet Explorer, Firefox, Google Chrome, Netscape Navigator and Safari.

Web Server

It is the server on the World Wide Web that responds to the request made by the web browsers.

URL

Every web page or file has a unique address assigned to it. This special format of the address is known as **Uniform Resource Locator** or URL. Hence a URL specifies the unique address assigned to each web resource (viz., web page, video, image, song etc.). The general format of URL is given below:

type:// address/path

In the above format

- type – specifies the type of server or protocol
- address – specifies the name / address of the server on the Internet
- path – specifies the location of file on the server

For example, consider the following URL

www.airindia.in/travel-info.htm

In the above example http identifies both protocol and server followed by a colon (:) and two forward slashes (/). www.airindia.in is the name of the server and travel-info.htm is the name of the HTML file on the server. This type of character based naming system is known as **Domain Name System(DNS)**.

Here, it should be mentioned that names of the servers commonly begin with ‘www’ for World Wide Web. Types of domain names are given in the table below:

Domain Name	Purpose
.com	For commercial firms/companies/organizations
.edu	For educational organizations
.gov	For government organizations
.mil	For military bodies/ regiments etc.
.net	For network bodies/organizations
.org	For non- profit organizations
.biz	For business firms/bodies/organizations



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In addition to the above table, sometimes, a two letter abbreviation indicating the country name is also used. For example, in the domain name www.yahoo.co.in, ‘in’ indicates the country India.

A URL and the IP addresses help us to name, find and bookmark specific pages and files for our web browsers.

IP Address

As mentioned before, every web page has a specific address. Similarly every computer on the network also has a unique address. This is called the IP address where **IP** stands for **Internet Protocol**. Any computer’s IP address is a four-part or eight- part electronic serial number with each part separated by dots (.) or colons(:). For example ‘212.30.0.220’ is an IP address. Any device, may it be laptop, computer or smartphone that accesses the net, is assigned at least one IP address for tracking purposes.

HTML

HTML stands for **Hyper Text Markup Language**. Here, ‘hypertext’ refers to the hyperlinks that an HTML page may contain and the ‘markup language’ refers to the way tags are used to define the page layout and the elements within the page and also to make the document interactive through hyperlinks. Hence it defines how web pages are formatted and displayed in the web browser. In simple terms, HTML specifies how to display text, pictures, images, videos or even hyperlinks in the browser. Please note that HTML is neither a word processing application nor a **Desk Top Publishing (DTP)** software nor a programming language. It is just a markup language that specifies the web page layout and hyperlinks through special layout commands called **tags**. So we have separate tags for headings, titles, fonts, images, tables, hyperlinks etc.

The general structure of an HTML document is given below:

```
<HTML>
  <HEAD>
  .....
  </HEAD>
  <BODY>
  ....
  </BODY>
</HTML>
```

You will learn HTML in detail in the web designing lesson.

XML

XML (**Extensible Markup Language**) is the language that is used to display the content of a web page in a structured manner. It defines a set of rules for encoding documents in a format which is both human-readable and machine-readable and hence can be read by any XML compatible application. XML is basically a mechanism for defining tags and structural relationships between these tags. It focusses on cataloguing and databasing the text content of the web page. This flexible language is used to describe data, to create information formats and to electronically share structured data using Internet.

XML files contain tags and text similar to HTML. But unlike HTML, XML is not a markup language. Instead it is a ‘meta-language’ which can be used to create markup languages for specific applications. It allows us to create a database of information without having an actual database. HTML defines how elements are displayed and printed while XML assigns meaning to the elements. Also, HTML uses predefined tags but XML requires the developer of the content to define most of the tags. However, XML can be used with HTML pages also.

For example, in a web page, XML may describe the items that have to be accessed when the web page loads and HTML defines the layout of the items to be displayed. Just like database records, any data item such as ‘roll no’, ‘name’, ‘date of birth’ can be specified. Because of this provision of common method of identifying the data and separating the data from presentation, XML has become the standard format for electronic interchange and web services.

ISP

ISP or Internet Service Provider is either a private company or a government agency that offers varying services like viewing web pages, emailing, hosting and publishing web pages, blogging etc. Some of the examples of ISPs are MTNL, Airtel, TataDocomo etc. Generally these ISPs offer their services at various speed connections for a monthly fee.

Now-a-days we are also able to get wireless services from various **Wireless Internet Service Providers** (WISPs) that cater to laptop and smartphone users who travel on a regular basis.

6.3 INTERNET PROTOCOLS

You have learnt that, protocol is the set of rules that are followed while communicating on any network. No activity, may it be sending messages or sharing files, can be done on any network without using protocols. Some of



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the common protocols used while communicating on Internet are: TCP/IP, FTP, HTTP etc.

Let us discuss these in details.

6.3.1 TCP/IP (Transmission Control Protocol/Internet Protocol)

TCP/IP protocol is the basic protocol of the Internet. It is not a single protocol but a suite of protocols that define the set of commands that specify the sender, receiver and the data that is being transmitted. For any communication, we need two things- the message to be transmitted and means to transmit it. The TCP part of the protocol handles the message to be transmitted. It breaks the message into small units called packets and then transmits them over network. The packets when received are again reassembled back by TCP of the receiver. It also retransmits any part of data that was not received by the destination computer. The IP part of the protocol is concerned with the transmission of data to the right destination. It assigns a unique IP address to each and every recipient of the network. By this, it makes sure that the data is transmitted at the correct destination.

TCP/IP can also be used as a communication protocol over a private network. When our computer is connected to the Internet, it is provided with a copy of the TCP/IP program in order to allow communication with other computers on the network. Nearly all computers today support TCP/IP. Since TCP/IP has become the foundation of Internet, so this software is built into all major operating systems viz. Windows, Unix and Mac OS.

6.3.2 FTP (File Transfer Protocol)

FTP defines the set of rules to transfer any type of file on a TCP/IP based network. It is most commonly used to download a file from a server or to upload a file to a server using Internet. FTP divides the file into multiple segments and assigns a reference number to each segment. These segments are then transmitted and reassembled at the destination computer so that the exact copy of the original file is received. FTP also performs automatic error detection and correction during the file transfers. There are hundreds and thousands of FTP files over the Internet. Files stored on an FTP server can be accessed using FTP client such as web browser, FTP software program or using command line interface.

6.3.3 HTTP (Hyper Text Transfer Protocol)

HTTP is the set of rules that are used to transfer hypertext on World Wide Web. Hypertext can be in the form of text, graphic, sound or video. HTTP is the

language of web pages and consists of two forms- (i) the set of requests from browsers to servers and (ii) the set of responses from server to the browsers at the user end. It has various built in request methods which allow the users to read, store or remove a web page, to connect two or more web pages or even remove the existing connection between two web pages.

HTTP defines how messages are formatted and transmitted. It also defines the actions taken by the web servers and browsers in response to various commands.

For example, when we enter the URL of a website in the address bar of the browser, an HTTP command is sent to the web server directing it to find and transmit the requested web page in the browser window. As soon as the user opens any of the browser applications, HTTP protocol is automatically put to action.

https stands for Hyper Text Transfer Protocol Secured'. In this protocol, a special layer of encryption is added to hide user's personal information and passwords. This is specifically used by ecommerce sites to secure online transactions.



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6.4 WORKING OF INTERNET

Each of the computers connected on the network is called host. These computers are connected to each other using various communication media like telephone lines, fibre optic cables, microwaves and satellites. Internet allows many computers to connect and communicate with each other using standard set of rules called protocols. The most important protocol governing the Internet is TCP/IP.

As mentioned before, there is no particular organization that controls the Internet. A personal computer can be linked to the Internet using a modem. The modem communicates with the server of an Internet Service Provider(ISP). As mentioned before, ISP is the company that provides internet connections to the users and each user has to get a connection from any of the ISPs. In case of LANs that are operational in small organizations or universities etc., the server of each of these LANs are connected to the server of ISP using high speed telephone lines. The computer when connected to the ISP server, makes its connection to the larger ISP (Regional ISP) which are further connected to other larger ISPs (World ISP) using fibre optics or satellites. This is how each computer gets connected to Internet. Figure 6.1 below depicts the working of Internet.



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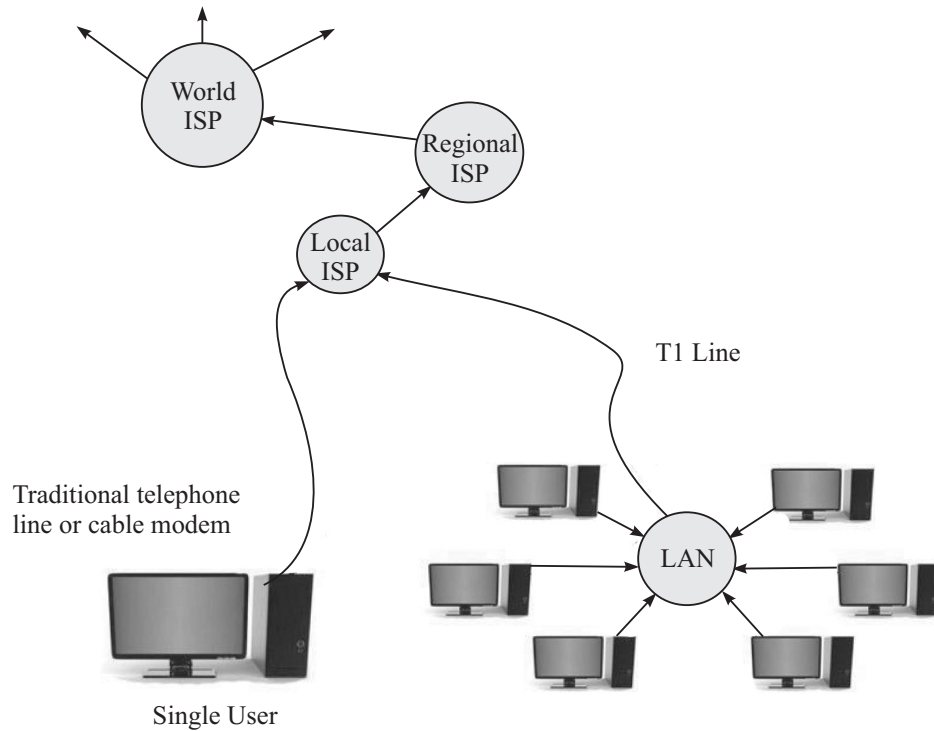


Fig. 6.1: Working of Internet

Let us now have a look at the sequence of events that leads to transmission of data from one computer to another on Internet.

- (i) Each computer on the network has a unique IP address assigned to it. The source computer breaks the data to be transmitted into small packets. Each packet has a serial number and an IP address of the receiving computer on it.
- (ii) All these packets are then sent to the address of the destination computer. The packets pass through various computers on the network until they reach their destination computer.
- (iii) Since the destination computer receives the packets in random order, the TCP protocol reassembles the packets according to their serial number. If any packet is lost or garbled during transmission, it is demanded again. The process continues till the original data is obtained.



INTEXT QUESTIONS 6.1

Fill in the blanks:

- 1. Internet is

2. To connect to the internet you need,,,
3. ARPANET stands for
4. The rules to communicate on Internet are called
5. The first page of a website is known as
6. helps us to navigate through the world wide web.



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6.5 INTERNET SERVICES

With the advancement of technology, the range and quality of services available on net has also increased. These wide range of services help us to communicate and share data. Let us discuss some of the commonly used services available on the net.

6.5.1 Email

Email or Electronic mail refers to the messages sent electronically via Internet. These messages travel through multiple channels till they reach their destination with definite address. In today’s technological era, Emails have become an indispensable part of communication. You will learn Email in detail in the next lesson.

6.5.2 Instant Messaging and Chat Rooms

Instant Messaging (IM) is another Internet service that allows us to communicate with the people instantaneously. This communication is generally through text based messaging but now a days voice chat is also increasingly becoming popular.

To avail this service, download the messenger program on the browser. Some of the messenger services available on the net are Skype, Yahoo Messenger, Hike Messenger, Google Talk etc. In most cases the sender and the receiver communicating through IM are known to each other. As the messenger opens, a list of people who have their accounts in that messenger service is displayed. The IM system alerts us when somebody on our private chat list is online or has sent us a message. We may respond to the message and hence start the chat by typing messages in the **Chat window** that appears on the screens of both sender and receiver (Fig. 6.2). With the advancements in technology, most of the instant messaging service providers allow us to send and share links, videos, images, audio files and many more.

In an Instant Messaging service, two people are sending and receiving messages through a Chat window. On the contrary, a chat room, is an online web service in which two or more users can send messages to each other in real time. Although a chat room generally consists of people with common interest, but



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the participants might be either known to each other or might be anonymous. The participants can engage in text based, voice based or video based live discussions with one another. Text from all users is instantly displayed in the chat room’s conversation log or **chat window**. This service also gives the option of chatting privately with a particular user but generally these individual chat sessions are for customer service, where each individual customer’s query is answered privately. Chat rooms are also utilized by employees of various organizations to communicate with each other from multiple locations. Some of the popular chat room service providers are Openchat, Teenchat, Paltalk etc. Even the Instant messaging services can also be used for chatting through chat rooms. Also almost all the IM and chat service providers give us the options for voice chat and video chat. So we have the option to exchange voice messages and live images as well.

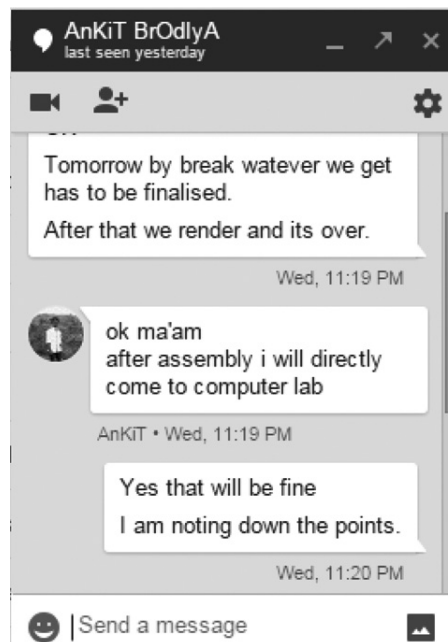


Fig. 6.2: Chat Window

6.5.3 Newsgroups

A newsgroup is just like a public forum where multiple users are continuously exchanging information about a particular topic. The messages are posted on a bulletin board of the newsgroup and any member can read and respond to them. To view and post messages in the news group, firstly, we need a news reader application that runs on our computer and connects us to a news server on the internet. Unlike chat rooms, the communication in a newsgroup is not instant. People may read and respond to the messages that are posted on bulletin boards as per their convenience.

In a single newsgroup several active discussions may be in progress between hundreds and thousands of people. One can join a newsgroup at any time to become part of this huge conversation. The newsgroups are organized into various categories as shown in the table below.

Category	Subjects
Alt	Varied
news	Usenet technical issues
Soc	Social issues
comp	Computers and technology
misc	Miscellaneous
Rec	Recreation (sports, adventure etc.)
talk	Controversial and sensitive topics
alt.binaries	Images and videos
Biz	Business and advertising

The newsgroups are read from right to left. For example rec.trek.himalyas means ‘Trekking in Himalyas’ is the topic in the ‘recreation’ category. Some of the websites offering newsgroup services are giganews.com, supernews.com etc.

6.5.4 Blogs

The word blog was coined by Peter Merholz in 1999 and it comes from the word “Web Log.” The literal meaning of a blog is a website that contains an online personal journal with his/her comments, reflections and also hyperlinks provided by the author. So, using this internet service, the users are able to post journal entries on a web page and thus share their thoughts and ideas. This process of authoring or editing a blog is called **blogging**. Each individual article that is posted is known as a **blog post**. The blogs which are created and edited by multiple users are known as **Multi Author Blogs(MABs)**.

A typical blog is the combination of text, images, audio, video and even links to other blogs. Anybody who knows how to create and publish a webpage can easily publish their own blog by typing the text and clicking “Publish” button. We can say that a blog is like a website on which personal feelings and experiences can be shared with thousands of people around the world. It is sort of an online writer’s column. That is the reason now-a-days blogging is also seen as a form of social networking service. Amateurs and professional writers



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publish their blogs on various topics viz. their hobbies, opinions on political matters, their views on celebrities, technical tips on using various applications etc. Blogs can even be used for advertising and promotions of a product, individual or a company.

The type of blogging in which only short messages are posted is known as **microblogging**. The commonly used website for microblogging is Twitter created in 2006 by Jack Dorsey. Using Twitter, the user can send and receive maximum of 140 characters in a text message. That is why Twitter is also known as ‘**SMS of the Internet**’. These messages on Twitter are known as **tweets**. Registered users can read and post the tweets while unregistered users can only read the tweets posted by others.

6.5.5 Video Conferencing

Video Conferencing (VC) is the technology that allows communication between two or more people at different locations by simultaneous two-way audio and video or even text transmissions. It is also known as **video conference** or **video tele-conference** or simply **tele conference**. We can compare this with a video telephone with each participant having a video camera, microphone and speakers mounted on their respective computers/laptops/smartphones etc. As the two participants speak, their voice is carried over the network and the images appear on the monitor of the other participant.

Video Conferencing has become an important tool for communication in the field of business, education, medicine and media. We can now attend lectures being held at some distant location. Also, in the field of medicine, the live demonstrations/ surgeries and procedures are shown worldwide using this technology. Video Conferencing is becoming more and more popular with the advancements in telecommunication technology and reduction in the hardware cost required for it. There are three main types of video conferencing technologies – Point to Point, Multipoint and Streaming.

Point To Point Video Conferencing

In this type of VC, a direct connection is established between two locations that need to communicate with each other. In simple words, it is just like a telephone call with video facility.

Multipoint Video Conferencing

In case of multipoint video conferencing, two or more participants sit in a virtual conference room and communicate as if they were sitting right next to each other.

Streaming Video Conferencing

In this type of video conferencing, the participants may choose to view the meeting on a remote computer or a mobile device using certain VC software/applications. We can even access the video conference via the web browser.

Video Conferencing is the hybrid of networking, video, audio and much more. Initially video conferencing was a costly affair, so it could be afforded only by a few business organizations but now, with the introduction of relatively low cost hardware, high capacity broadband telecommunication services and video compression techniques, video conferencing has become quite popular in almost all fields.

6.5.6 Social Networking

Social networking is another Internet service that allows people to build social relations on the net. The websites that provide such services are known as **social networking websites**. Facebook is one of the most commonly visited social networking websites. The people connected on social networking websites share common interests or have real life connections to form an online community of internet users.

The journey of social networking websites started around 1978 with the invention of Bulletin Board System (BBS) in Chicago. This BBS was used to make announcements, inform friends about an event or even share information by posting messages. By 1997, certain other websites like six degrees became popular as it allowed the users to create profiles and list friends. A profile consists of user's personal information, social links etc.

Various other social networking websites like Friendster, Myspace, Orkut, LinkedIn etc. were launched but Facebook is the most commonly used social networking site today with over one billion active users. It was founded by Mark Zuckerberg on 4th February, 2004. Initially it was restricted to only Harvard University students but now it allows anyone who is more than 13 years old to become a registered user of this social networking site.

The users first need to register with the Facebook website and then create his/her profile, add other users as friends, exchange messages and notifications. Registered users may also join common-interest groups. The institutions, companies or organizations may form Facebook pages and accounts to promote their products on the social platform.

Most social networking sites such as Twitter, Facebook etc. have dedicated apps for smartphones and other such hand-held devices.



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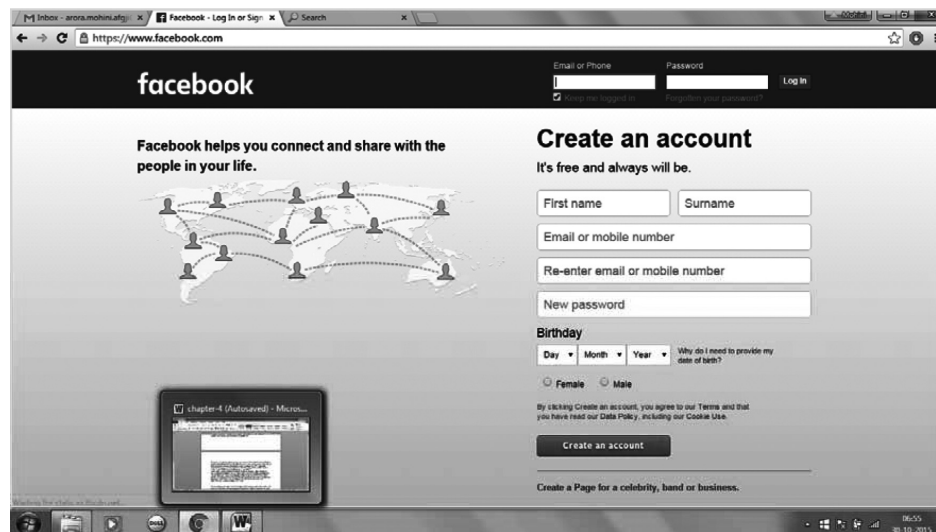


Fig. 6.3: Home Page of Facebook

6.6 COOKIES

The name cookie is taken from ‘magic cookies’ in UNIX. These are tokens that are attached to the program or user and change according to the responses by the program or the user.

A cookie is the message given to the web browser by a web server. The message received by the browser is stored in a text file and is sent back to the server each time the browser requests a page from the server. In this manner, cookies help the web server to keep track of the user’s activity on a specific website. When you open a website containing a cookie, we may be asked to enter our personal information through a form. This personal information like name, address, hobbies etc. is packaged into a cookie and sent to the web browser which stores it for later use. The next time when we open the same website, the browser will send the cookie to the web server which can use this information to present you customised web pages. Hence a cookie contains information that is freely provided to the web site by you.

These are neither plug-ins nor any of the malicious programs. Further, as they cannot access the hard drive of our computer, so they are not capable to spread viruses.

6.7 CLOUD COMPUTING

Cloud computing is the latest technology that has revolutionized the manner in which data and applications are stored, used and shared using Internet. This technology relies on sharing the resources (such as data and application programs) rather than storing them on local servers or personal devices.

In Cloud computing, the word ‘cloud’ signifies Internet. Hence Cloud computing means Internet based computing. Various services, called cloud services are delivered to users through Internet at any time and at any place. The Cloud services include use of software and storage space over the net. Since the data storage and processing is centralized, there is no need of installing different applications on our machine. This makes cloud computing extremely cost effective. The only thing required for cloud computing is the web browser and an internet connection. You will learn cloud computing in detail in the cloud computing lesson.



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INTEXT QUESTIONS 6.2

Fill in the blanks.

1. Email refers to
2. The process of authoring or editing a blog is called as
3. The three types of video conferencing techniques are,,
4. Cloud computing relies on resources rather than storing them on local servers or personal devices.
5. The blogs which are created and edited by multiple users are known as
6. is also known as “SMS of the Internet”.



WHAT YOU HAVE LEARNT

- Internet is a network of networks because it is made up of thousands of smaller networks that can exchange information with each other.
- The collection of web pages interlinked with each other through hyperlinks is known as website.
- WWW is a system of Internet servers that support documents formatted using HTML.
- Web browser is a free software application that is used to view web pages, graphics etc.



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- HTML is a markup language that specifies the web page layout and hyperlinks through special layout command called tags.
- XML defines set of rules for encoding documents in a format which is both human and machine readable and hence can be read by any XML compatible application.
- The process of authoring or editing a blog is called as blogging.
- Cookie is the message given to the web browser by a web server.



TERMINAL EXERCISE

1. Give two examples for each of the following:
 - (a) ISP
 - (b) Web browsers
 - (c) Social Networking Websites
 - (d) Instant Messaging Services
2. Explain URL and its parts with the help of an example.
3. What is the need of IP addresses on a network?
4. How data is transmitted from one computer to another on Internet?
5. Explain the working of Internet.
6. Differentiate between
 - (a) Instant Messaging and Chat rooms.
 - (b) FTP and HTTP
7. Why Twitter is known as ‘SMS of the Internet’?
8. Define blog, blogging and blog post.
9. Explain Video-Conferencing and types of video conferencing techniques.
10. What is XML?



ANSWERS TO INTEXT QUESTIONS

6.1

1. Network of networks
2. A web browser installed on your computer, a modem, a telephone connection and a connection from an Internet Service Provider (ISP).
3. Advanced Research Projects Agency Network
4. Protocol
5. Homepage
6. Web browser

6.2

1. The messages sent electronically via Internet.
2. blogging
3. Point –to–point, Multipoint and Streaming.
4. Sharing
5. Multi Author Blogs (MABs)
6. Twitter



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