17

FUNDAMENTALS OF INTERNET

17.1 INTRODUCTION

The latest buzzword in computer world is 'Internet'. It has taken the entire world by surprise with its cutting edge technology to connect people and computers throughout the world. Using Internet, organizations all over the world can exchange data, people can communicate with each other in a faster and effective way, and researchers can gather information in their respective areas of research. With the help of video conferencing over Internet, it has become possible that people can even see each other while communicating. Even one can do all his shopping sitting back at home. He does not bother to go to the crowded market place. Slowly shopkeepers are also opting for electronic commerce, which provides them greater reach and fastest way to do business over Internet. Don't get surprised, if you come to know that the Paanwalla in your locality has started selling his paan over Internet.

17.2 OBJECTIVES

After going through this lesson you would be able to

● define Internet

● explain various terminology used in Internet

- use various services provided by Internet

- search for information over Internet

- enjoy Internet surfing

- send E-mail and do FTP

17.3 INTERNET – THE HISTORY

In 1969, the U.S. Defence Department funded a project to develop a network, which can withstand the bombing. Basically the idea was to develop a very secure network which can work even after a nuclear attack. This project was known as ARPANET. The proposed network was not supposed to have a central control – which would be an obvious target. Ten years of research brought Local Area Ethernet Networks (LANs) and workstations were developed to get connected to LAN. These workstations and LANs were then connected to the ARPANET. For next decade the ARPANET grew and its decentralized features helped its rapid expansion. Computers connected to ARPANET used to standard or rule to communicate with each other. This standard used by ARPANET is known as NCP (National Control Protocol). Protocol is a network term used to indicate the standard used by a network for communication. But the passing time and rapid change in information technology suppressed NCP and brought TCP/IP (Transmission Control Protocol/Internet Protocol) in to the world of networking. TCP converts messages into streams of packets at the source, and they are reassembled back into messages at the destination. IP handles the dispatch of these packets. It handles the addressing, and makes sure that a packet reaches its destination through multiple nodes and even across multiple networks with multiple standards. This flexibility of TCP/IP to handle multiple networks with multiple protocols encourages other networks to get connected to ARPANET. Slowly the ARPANET became a massive network of networks and now it is known as 'Internet'.

Why do people want to get connected to Internet? May be because of freedom it provides. The Internet is a rare example of a large democracy with no state of head, no official censors, no bosses, no board of directors. Nobody controls the Internet and in principle, any computer can speak to any other computer, as long as it obeys the technical rules of the TCP/IP protocol. This freedom of Internet helped it to move out of its original base in military and research institutions, into elementary and high schools, colleges, public libraries, commercial sectors even into the shop of a vegetable ven-

dor.

17.4 SERVICES OF INTERNET –E-mail, FTP, Telnet, WWW

But what does one do with the Internet? May be four things, basically: mail, discussion groups, long-distance computing, and file transfers. Internet mail is (e-mail or electronic mail), much faster as compared to normal postal mail. One can also send software and certain forms of compressed digital image as an attachment. News groups or discussion groups facilitate Internet user to join for various kinds of debate, discussion and news sharing. Long-distance computing was an original inspiration for development of ARPANET and does still provide a very useful service on Internet. Programmers can maintain accounts on distant, powerful computers, execute programs. File transfer service allows Internet users to access remote machines and retrieve programs, data or text.

(a)   E-Mail (Electronic Mail)

E-mail or Electronic mail is a paperless method of sending messages, notes or letters from one person to another or even many people at the same time via Internet. E-mail is very fast compared to the normal post. E-mail messages usually take only few seconds to arrive at their destination. One can send messages anytime of the day or night and it will get delivered immediately. You need not to wait for the post office to open and you don't have to get worried about holidays. It works 24 hours a day and seven days a week. What's more, the copy of the message you have sent will be available whenever you want to look at it even in the middle of the night. You have the privilege of sending something extra such as a file, graphics, images etc. along with your e-mail. The biggest advantage of using e-mail is that it is cheap, especially when sending messages to other states or countries and at the same time it can be delivered to a number of people around the world.

Although e-mail is faster and cheaper, it has many of the components of regular mail. It allows you to compose note, get the address of the recipient and send it. Once the mail is received and read, it can be forwarded, replied. One can even store it for later use, or delete. In a-mail even the sender can request for delivery receipt and read receipt from the recipient.

(i)   Features of E-mail:

- One-to-one or one-to-many communications

- Instant communications

- Physical presence of recipient is not required

- Most inexpensive mail services, 24-hours a day and seven days a week

- Encourages informal communications

(ii)   Components of an E-mail Address

As in the case of normal mail system, e-mail is also based upon the concept of a recipient address. The email address provides all of the information required to get a message to the recipient from any-where in the world. Consider the e-mail ID

john@hotmail.com

In the example above, "john" is the local part, which is the name of a mailbox on the destination computer, where finally the mail will be delivered. Hotmail is the mail server where the mailbox "john" exist, .com is the type of organization on net, which is hosting the mail server.

There are six main categories;

com   Commercial institutions or organization

edu   Educational institutions

gov   Government site

mil   Military site

net   Gateways and administrative hosts

org   Private organizations

(b)   FTP (File Transfer Protocol)

File Transfer Protocol, is an Internet utility software used to upload and download files. It gives access to directories or folders on remote computers and allows software, data and text files to be transferred between different kinds of computers. FTP works on the basis of same principle as that of Client/Server. FTP "Client" is a program running on the your computer that enables you to talk to, and get

stuff from, remote computers. The FTP client takes FTP commands and send them as requests for information from the remote computer or known as FTP servers. To access remote FTP server it is required but not necessary to have an account in the FTP server. When the FTP client gets connected, FTP server asks for the identification in-terms of User Login name and password of the FTP client. If one does not have an account in the remote FTP server, still he can connect to the server using anonymous login.

Using anonymous login anyone can login in to a FTP server and can access public file archives, anywhere in the world, without having an account. One can easily Login to the FTP site with the username anonymous and e-mail address as password.

The basic objectives of FTP are

- to give flexibility and promote sharing of computer programs, files and data

- to transfer data reliably and more efficiently over network

- to encourage implicit or indirect use of remote computers using Internet

- to shield a user from variations in file storage systems among hosts.

Fig. 16.1

The basic steps in an FTP session are:

- Start up your FTP client, by typing ftp on your system's command line/'C>' prompt (or, if you are in a Windows, double-click on the FTP icon)

- Give the FTP client an address to connect to. This is the FTP server address to which the FTP client will get connected

- Identify yourself to the FTP remote site by giving the Login Name

- Give the remote site a password

- Remote site will verify the Login Name/Password to allow the FTP client to access its files

- Look directory for files in FTP server

- Change Directories if required

- Set the transfer mode (optional);

- Get the file(s) you want, and

- Quit.

(c)   Telnet (Remote Computing)

Telnet or remote computing is telecommunication utility software, which uses available telecommunication facility and allows you to become a user on a remote computer. Once you gain access to the remote computer, you can use it for the intended purpose. The TELNET works in a very step by step procedure. The commands typed on the client computer are sent to the local Internet Service Provider (ISP), and then from the ISP to the remote computer that you have gained access. Most of the ISP provides facility to TELENET into your own account from another city and check your e-mail while you are traveling or away on business.

The following steps are required for a TELNET session

- Start up the TELNET program,

- Give the TELNET program an address to connect to (some really nifty TELNET packages allow you to combine steps 1 and 2 into one simple step!),

- Make a note of what the "escape character" is;

- Log in to the remote computer,

- Set the "terminal emulation,"

- Play around on the remote computer, and

- Quit.

INTEXT QUESTIONS

1. Fill in the blanks.

    (a) .... is a network term used to indicate the standard used by a network for communication.

    (b) File Transfer Protocol, is a .... software used to up-load and download file.

    (c) Hotmail is the ....

    (d) The commands typed on the client computer are sent to the ....

    (e) The basic objective of FTP are to give flexibility and pro-mote sharing of files and ....

17.5 WORLD WIDE WEB (WWW)

WWW is the acronym for the World Wide Web. It is also commonly known as 'The Web'. The WWW is hypertext based information re-trieval tool. One can easily surf the Web by jumping from one docu-ment to another using the links in those documents. These docu-ments can be in many formats, such as text, graphics, animation, sound and latest is video. They may also be a combination of all these. All the information on Internet are presented to the user as a document or more popularly known as Web Page. All these Web Pages are link to each other or even to section within a Web Page. And these links are known as Hyper Links.

The tool used to view these Web Pages on Internet is known as Internet browser or simply browser. It is a software program specifi-cally developed to extract information on user request from the Internet and pesent them as a Web Page to the viewer. There are several browsers available in the market. However the most popular are Internet Explorer from Microsoft and Netscape from Netscape

Inc. The process of using browser to view information on Internet is known as Browsing or Surfing.

Fig. 17.2

(a)   Internet Address

Just like every house, every office, every location has an address, every page on the Internet has a unique address. This address is used to get the web page for user from Internet.

Just as the address of a house or office is known as its postal address, the address on the Internet is known as URL (Uniform Resource Locator). A typical Internet address or URL would look like;

http//www.nos.org/computers/internet/url.htm

The URL locates a particular web Page, among all the computers connected to the Internet. The URL contains the components that specify the protocol, server, and pathname of an item. Let us examine the URL given above (http://www.nos.org/computers/internet/url.htm).

The protocol is followed by a colon **(http:)**, the server is preceded by two slashes **(//www.nios.ac.cn.org)**, and each segment of the pathname is preceded by a single slash **(/computers/internet/url.htm)**. A protocol is set of rules that tells the computer know how to interpret the information at that address.

Fig. 17.3

The first component, the protocol, defines the manner for interpreting computer information. Many Internet pages use **HTTP** (HyperText

Transfer Protocol). Other common Internet protocols that one might come across are **FTP** (File Transfer Protocol), NEWS (Usenet news groups protocol), and **GOPHER** (an alternative transfer protocol). Gopher protocol is mostly out of date now. Some examples are:

● **http://**-Used to access HTML documents, or web pages.

● **gopher://**-Used to connect to a gopher menu of access gopher documents.

● **ftp://**-Used to connect to an FTP site or download a particular file via FTP.

● **telnet://**-Used to connect to a remote Internet site using Telnet.

The second component, the server **(www.nios.ac.cnedu)**, identifies the computer system that stores the information you seek and is always preceded by two slashes. A server is a computer that has information stored on it and sends it to the client, when a request is made. Each server on the Internet has a unique address name whose text refers to the organization maintaining the server.

The last component **(/computers/internet/)**, defines the path within the Server where the requested item (url.htm) will be found. Most of the Web page will have.htm or .html as their secondary or extension name.

(b)   How to get connected to Internet

There are various type of connectivity to get hook on to Internet. They all can be broadly classified into following category.

(i)   Gateway Access

Gateway Access is also known as Level-One connection. It is the access to the Internet from a network, which is not on the Internet. The gateway allows the two different types of networks to "talk" to each other. But the users of the Gateway Internet have limited access to the Internet. They might not be able to use all the tools available on Internet. The local Internet Service Provider (ISP) normally defines this limitation.

Good example of network with Level One connectivity within India is that of VSNL (Videsh Sanchar Nigam Limited). All access to Internet from India are through VSNL gateway.

Fig. 17.4

(ii)   Dial-up Connection

'Dial-up' connection is also known as Level Two connection. This provides connection to Internet through a dial-up terminal connection. The computer, which provides Internet access is known as 'Host' and the computer that receives the access, is 'Client' or 'Terminal'. The client computer uses modem to access a "host" and acts as if it is a terminal directly connected to that host. 56K modem access is now widely available and supported by most ISPs. It allows user to surf the Web at 56 Kbps with graphics. So this type of connection is also known as 'Remote Modem Access' connection. And the host to which the client gets connected is actually connected to the Internet by a full time connection (See Leased Connection).

Fig. 17.5

In dial-up connection to Internet, Host carries all the command that are typed on a client machine and forward them to Internet. It also receives the data or information from the Internet on behalf of the

'Client' and passes it to them. The client computer acts as a 'dumb' terminal connected to remote host.

This type of connection can further be divided into three categories.

- ### Shell Connection

In this type of Internet Connection, the user will get only textual matter of a Web Page. This connection does not support Graphics display. However the user will be able to surf the Internet, do FTP, receive mail. Shell Accounts were the only type of Internet access available for many years before the Internet entered in to the world of graphics and became more users friendly.

- ### TCP/IP Connection

Today's graphical World Wide Web browsers provide easier access with multimedia sound and pictures. The major difference between Shell and TCP/IP account is that, Shell account can only display text and does not support graphics display, whereas TCP/IP can display both. Hence it is more popular Internet connection. Shell accounts are slowly phasing out from the Internet scenario.

- ### ISDN

ISDN (Integrated Services Digital Network) offers Internet connectivity at speeds of up to 128 Kbps through the use of digital phone lines. ISDN is a dial-up service that has been provided by telephone companies for many years. This line combines two 64 Kbps channels to offer 128 Kbps band width broken into three bands: one band for the ringing signal of your phone, one band for your telephone conversation, and one band for data.

To use ISDN, you will need a serial communications port, an ISDN modem, and ISDN telephone line from telephone company operating in your areas.

To access any of these dial-up accounts you need the followings;

- Computer
- Modem
- Telephone Connection
- Shell or TCP/IP/ISDN account from the ISP
- Internet client software such as Internet browser

(iii)   Leased Connection

Leased connection is also known as direct Internet access or Level Three connection. It is the secure, dedicated and most expensive, level of Internet connection. With leased connection, your computer is dedicatedly and directly connected to the Internet using high-speed transmission lines. It is on-line twenty-four hours a day, seven days a week. Leased Internet connections are limited to large corpo-rations and universities who could afford the cost.

Fig. 17.6

(iv)   DSL

Digital Subscriber Line (DSL) is the newest technology being used for Internet access. DSL connects your home or office to the Internet through the same telephone wire that comes from the telephone pole on the street. Like ISDN, with DSL, user can make and receive telephone calls while connected simultaneously to the Internet. However, DSL service is limited in the distance that you can be from the provider's point of presence (POP).

To use DSL you will need a DSL modem (also called a router), a Network Interface Card (NIC), and a telephone line. DSL is also rela-tively new technology that is just being introduced in many places. Hardware developers are working with service providers to make the service cost affordable for consumers. As time goes by, the service should become more widely available at a reasonable price.

(v) Cable Modem Connection

The connection speed can be up to 10 times that of a dial-up and the cost is about twice that of an ISP's dial-up account, with no phone company charges. Many people who have cable TV can now get a high – speed connection to the internet from their cable provider.

Fig.17.7

Cable lines offer an extremely high bandwidth connection to the Internet. It divides the connection into lots of bands, and translates the data in the bands into signals that can be carried through cable lines. Cable modems change these signals into IP packets that your computer can understand.

To use cable modems you will need a cable splitter, a cable modem, and the service from a cable company. The installation process can be complex and is better left to a professional.

17.6 SEARCHING ON THE WEB

One of the most common problems all Internet users face is the fact that it can be quite difficult to find what you want on the Internet. There is no central "main menu" that users can access to navigate through the Internet. Although there might not be an official menu, there are several resources available – both on-line and off-line – that can make "surfing the net" easier. The Internet is a terrific resource. It contains hundreds of web sites dedicated to thousands of topics. There are some web sites, which are used to search information on the web. There are more than 2,500 search services presently on the Web.

Search services on the Internet come in two main flavours:

1) 'search engine' that index words or terms in Internet documents; and

2) 'directories' that classify Web documents or locations into an arbitrary subject classification scheme or taxonomy.

Most search engines take one or more words entered by the user, search the contents of every Web page stored in their databases and display the result. Search engines tend to "index" (record by word) all of the terms on a given Web document. Or they may index all of the terms within the first few sentences, the Web site title, or the document's metatags.

Internet directories are on-line Web sites that place Web page into one or more categories. Web pages are usually listed with a brief description and their URL. Depending on the Internet directory you are using, a search engine may also be available, as well as a Random URL link. Directories operate on a different principle. They require people to view the individual Web site and determine its placement into a subject classification scheme or taxonomy. Once done, certain keywords associated with those sites can be used for searching the directory's data banks to find Web sites of interest some popular search engineers are:-

● **Google-** http://www.google.com

● **Infoseek-** http://guide.infoseek.com

● **Alta Vista –** http://www.altavista.digital.com

● **Lycos –** http://www.lycos.com

● **Yahoo! –** http://www.yahoo.com

Your ability to find the information you seek on the Internet is a function of how precise your queries are and how effectively you use search services. Poor queries return poor results; good queries return great results.

INTEXT QUESTIONS

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2. **State whether the following statements are True or False.**

    (a) WWW is the acronym for the World Wide Web

    (b) In TCP/IP connection, the user will get only textual matter of a Web Page.

(c) Gateway Access is also known as Level-One connection.

(d) Good example of network with Level One connectivity within India is that of VSNL.

(e) E-mail is known as URL (Uniform Resource Locator)

(f) Leased connection is also known as direct Internet access or Level Three connection.

(g) With DSL, user can make and receive telephone calls while connected simultaneously to Internet.

(h) Cable connection has slower speed than dial up connection.

17.7 WHAT YOU HAVE LEARNT

In this lesson you learnt the history of Internet. Also you learnt the various types of services provided by Internet. In the process you could understand the concept of e-mail and file transfer protocol. By now you should be in a position to access Internet and put it to various uses.

17.8 TERMINAL QUESTIONS

1. Explain in brief the concept of e-mail.

2. What are the basic objectives of FTP?

3. What is the difference between Leased connection and Dialup connection?

4. Explain in brief

   (a) TCP/IP connection

   (b) Telnet

   (c) Gateway Access

   (d) Shell connection

5. Explain in brief the working principle of cable modem connection.

6. How does a search engine gets the required information from the web? Write the names of 2 popular search engines.

7. Explain the following terms.

a)   DSL   b)   ISDN

17.9 FEEDBACK TO INTEXT QUESTIONS

1.   (a)   protocol
     (b)   internet utility
     (c)   mailserver
     (d)   local internet service provider
     (e)   data

2.   (a) True   (b) False   (c) True   (d) True   (e) False (f) True

     (g) True   (h)   False.