

Chapter-4

Internet Technology

4.1 Internet

Internet is a huge network of computers which connects all the small and large computers spread around the world. It is such network which connects computers around the world with telephone lines, cables or various wireless media. Internet is also called network of networks because all the computers of globe are connected each other through internet.

Internet is largest and popular network of world. With the help of internet we can access information regarding of any field like education, medical, science, sports, politics, music, commerce and space etc. in a moment. Internet has eliminated the distances. A person connected with internet can contact with a person living in any part of the world. Internet is based on multimedia technology. Therefore through this any kind of data like text, photograph, audio, video, graphics etc. can be sent or received from one computer to another computer.



Diagram 4.1 Internet

Internet has the capability of exchange of data and information around the world. The secret of its popularity is its simplicity. There is no owner of it, which runs it. All the information in it comes through internet server. This is an example of extremely large independent cooperation. Although no any person, company, institute or government agency has its ownership and nor does it control, but some agencies become participant in its success by advising, setting the standards and providing information on other issues. The team who decides the standards and guidelines for various aspects of internet and research on internet is called World Wide Web Consortium (W3C). Certain rules are framed to run it, which are known as Protocol. There are two standard internet protocols. (1) Transmission Control Protocol - TCP and (2) Internet Protocol - IP

History of Internet

The internet was begun in decade of 1960 when the defense department of America developed it basically for scientific experiments and research. In 1969 American defense department started internet by connecting California University and Stanford Research Institute with it through network. This network was named "ARPANET". Initially it was used for only defense related requirements but later on various institutes and universities were also connected with this network.

After that in 1979 British Post office initiated a new technology by launching first international computer network. In 1986 the National Science Foundation (NSF) of America developed a new network named "NSFNET". Later on it was also connected with ARPANET. NSF works as backbone network in internet even today.

In 1989 British scientist Tim Berners Lee invented the World Wide Web (WWW) to simplify the communication on internet. This was a revolutionary invention in the history of internet. On 20 December, 1990 he launched first website of the world. This site was viewed on 6 August, 1991 around the world.

After this, several new technologies were developed, several new networks came into existence and joined with internet. In this way internet has reached in its current stage. Its evolution is still continues. People have longed to see it more advanced. It is the reason, the use of internet is increasing continuously not only in computers, but in mobile phones too.

Working of Internet

To connect with internet we have to take help from Internet Service Provider (ISP). An internet service provider is a company who provides access of internet and other services to you. These provides various ways to connect with internet in which dial up connection, cable, fiber optics and Wi-Fi are included. These different connec-

tions determine speed of your internet access. Initially there was only one Videsh Sanchar Nigam Limited (VSNL) internet service provider company in India, but now there exists several internet service provider companies, including two government, Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL).

Usually two types of connections are available for accessing internet services.
1. Dial up connection and 2. Direct connection.

In dial up connection subscriber has to dial a special number of his ISP from computer. A user is connected with internet as he connects with ISP. Dial up is a temporary connection because dialing has to be done to establish connection. User can terminate this connection whenever he/she wants.

In direct connection user is connected directly to ISP through a cable or a dedicated phone line. Lease line is being used for more fast speed internet. ISP can make available lease line of any band width according to need of user. Several types of internet plans are also made available by different internet service providers to users for mobile devices like laptop, tablet, smart phone etc. Currently nearly all internet service providers are providing high speed 3 G (Third Generation) internet services, while some service providers have started very high speed 4 G (Fourth Generation) internet services.

Now Wi-Fi services are available in most of the educational institutes, offices, air ports, hotels etc. These are called hotspots of Wi-Fi. In these places a person can connect with whole of the world through his Wi-Fi enabled phone or laptop. In Digital Bharat program there is plan to connect all the villages with broad band internet services and to make Wi-Fi enabled areas to all educational institutes and railway stations.

World Wide Web

People have been watching dream for nearly 50 years for such a data base which keeps all the global knowledge and information and by this data base people of the whole world could be connected. Now this dream has come true and the necessary technology has been invented for this. The name of this technology is World Wide Web. It is known as www in brief. World Wide Web is a kind of database, which is spread all over the world.

World Wide Web is an internet service based on general group of protocol which sends the documents in a standard way to any specially configured server computer through internet. It provides such convenience to programs on various standard computer platforms like LINUX, WINDOWS, MAC etc. so that it could display the information coming from the computer server in a good format. This type of program is

called Web Browser. With the help of web browser World Wide Web has make it possible for a website that it could keep the information in several pages in which text, sound, pictures and even videos and links for connecting with other pages are available. On clicking of any link, page linked to that link is opened immediately in front of user. World Wide Web (WWW) and internet, both are not similar, but these are related to each other and also dependent on each other. Actually World Wide Web is the subset of internet, which can be called as graphical interface of internet. It gives us information about new ways of accessing information.



Diagram 4.2 World Wide Web

The main purpose of the hypertext information system is that the text could be read from one end to another end easily in spite of reading in a firm and linear structure like a book. By this a user will feel convenience to go forward or backward as well as to read or watch desired contents by navigating another page. World Wide Web provides infinite information, it too provides new ways of linking, so that user could browse as he or she wants.

Now World Wide Web has the capacity of showing graphics, sound and video with text. More new version of browsers are capable of showing applications having multimedia. And the most important thing is that all these tasks are very easy - only click on and this will take you from one link to another, one site to another site and server in few moments.

Web is completely a cross platform. Cross platform means you can access web on hardware of any company with any operating system and with any kind of display. Web is infinite store of information. Information on web is spread out in hundreds and millions of websites. So it can be said that web is split. Web can be updated at any time, so it is dynamic too.

Web is interactive. The intent from interactive is its capability of interaction with its webserver. We have to select only the links for navigation or to open another page.

There can be interactive forms on pages, which can be filled out. Forms can have text boxes, where something can be typed; there can be radio buttons, in which one or more options can be chosen from several options or there can be menu items from which one or more items can be chosen. When form is submitted, all the information goes to sever, where that page has been created. Web is such a media, by help of which one can reach to people and can make conversation with people around the world.

Web Browser

As like, you go to any library for searching or 'browsing' books, in the same way you can search or explore the pages on internet using browser. Browser is a kind of software on your computer, which allows you to access internet. Browser is also known as web client or internet navigation tools. Browser works as window showing different websites, which have information. You have to only write down the web address in your browser and you immediately reach on that website.

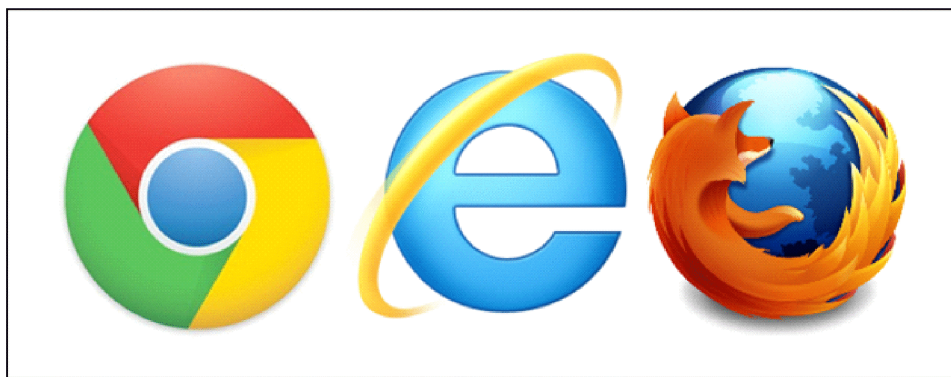


Diagram 4.3 Different Web Browser

The document located on web is called web page. The first page of any site, which contains a full series of web pages, is known as home page of that website. It is the function of browser to show these pages. So browser is that program, which is used for interface between web and user. It displays web pages and facilitates the navigation of different web pages. It does several functions like reading, saving, downloading or uploading, copying or printing of web contents; sending or receiving mail, recording the history of visited sites and book marking of any web address. A vast range of web browser is available for every type of computer system. Currently some most popular browsers are Internet Explorer, Mozilla Fire Fox, Google Chrome, Netscape Navigator, Safari etc.

Web Server

The computer which keeps web pages in form of directories and files and allows files to read, is called Server. It behaves like information provider and provides information according to need. Server computer runs a software, which is known as Web Server.

Web server plays an important role in make available web pages and websites to browser. Web Server is such a computer and program, which is responsible for answering the requests from web browser around the world. Some large companies have their own web server, but most companies hire the server. Web server has to be accessed for watching HTML page on web. This is the function of web server that it receives the connection of web browser coming through internet and take the appropriate HTML page to client on request. This is done through the HTTP protocol. Web server is always connected with internet because we can use internet at any time. The speed of internet connection on the computer serving as server should be relatively more. At the same time this computer must be able to tackle all the requests coming together to it.

A web server mainly works the following -

1. Web site management
2. To receive requests for providing information
3. Provides information according to request of client and showing requisite page.

Some popular servers running on web server are Internet Information Server (IIS), Apache Web Server, Netscape Server and Microsoft Personal Web Server.

Web Protocol

Protocol is a rule or a set of certain rules, which provide an environment of communication between different parts. For example human communication is not possible without a definite language and grammar. Protocol provides following facilities -

1. Is transmission Media in organized way or not?
2. Are network components connected with each other or not?
3. When and how much data is transferring?

The protocols which are used for exchange of information on web, are called

web protocols. Through these protocols different web pages are sent from web server to browser. Therefore web protocols play important role in establishing connection between server and browser. Some web protocols, which are used for exchange of information on web are TCP/IP, PPP, HTTP, FTP, Simple Mail Transfer Protocol (SMTP) etc.

HTTP (Hyper Text Transfer Protocol)

It is the set of rules, which transfers hypertext between two or more than two computers. HTTP is a technique, which opens related document on selecting of any hypertext link, wherever it is. Web documents are marked in HTML for formatting and linking. Web server uses HTTP for showing HTML pages. HTTP is a stateless protocol, where web browser connects with web server, downloads the needed files and after that disconnects the connection.

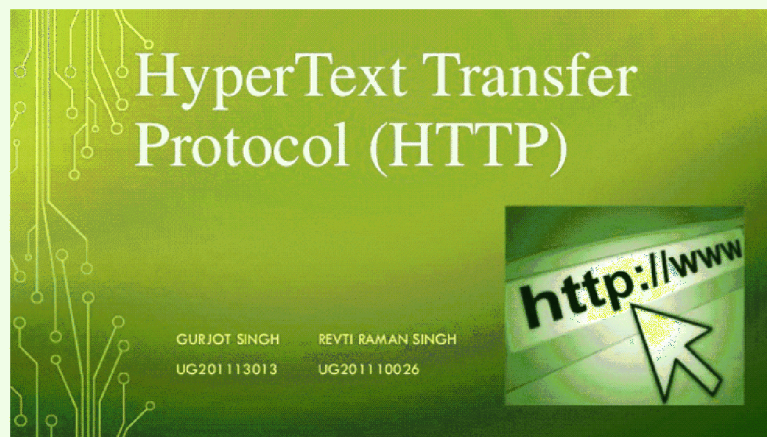


Diagram 4.4 Hypertext Transfer Protocol

It is a Non-proprietary Independent and open platform based on ISO. This works equally on single computer or on LAN, WAN and internet.

URL and IP address

URL (Universal Recourse Locator) is a web address, which is write down on browser to reach up to any website. Each website has a URL. For example the URL <http://rajeduboard.rajasthan.gov.in> takes the user to the web site of Board of Secondary Education, Rajasthan. URL keeps the full information about the resource. It connects any document or page on World Wide Web through web browser. You do not know the physical location of resource by it.

The first part of the URL, that is before colon (:), tells the method of accessing.

Usually it is http but it may be ftp or gopher. Its second part, which is after the colon (:), tells the resource. The text after double slashes (//) in it, tells the name of server and the text after single slash (/) tells file or directory to which user is connected. A URL is always case sensitive, therefore special attention to be taken for lower case, upper case and symbols at the time of typing the URL.

Each URL has an IP (Internet Protocol) address. IP address is a series of numbers, which tells to your computer the where about of the Information searching by you. IP address is like a telephone number but in form of a large and complicated phone number. Because the IP addresses were complicated and difficult to remember, therefore the URL were created. To access Google website, in spite of writing its IP address (45.732.34.353), only its URL www.google.com is to be insert. Usually IP addresses have the following characteristics -

1. No any two computers have the same IP addresses.
2. IP addresses are internationally and model.
3. All those computers, which are connected to internet, works under a similar plan.



Diagram 4.5 URL (Uniform Resource Locator)

Hypertext Markup Language (HTML)

The language, which is used in developing web pages, is known as Hypertext Markup Language (HTML). HTML is the language, which is understood by the browser. Web pages are also known as HTML document. HTML language for internet was also invented by Tim Berners Lee, the inventor of World Wide Web. This is a set of special codes, which is used for controlling decoration and to link the other information to script. Actually it has the same role, which has the steel and other parts in making a

Each word of a Hypertext Markup Language has a special meaning. The word Hyper indicates that the text in HTML is not in a linear way as like in a book. That is to say, when you are working on internet, and want to access a document of your choice, you can directly reach there. This work is done by Hyper Link. This is what it means, to watch a document on internet there is no any definite order or sequence. The word Hyper is just opposite to Linear. We can see any page on World Wide Web. Here the word Text indicates that only text can be written on the files on which we are working.

The screenshot shows a text editor window titled "Editeur - [Html syntax text editor.htm]". The menu bar includes File, Edit, Search, Macro, Tools, Window, and Help. The toolbar contains various icons for file operations and editing. The editor displays the following code:

```
<HTML>
<HEAD>
<TITLE>Editeur web site</TITLE>
<LINK REL=stylesheet TYPE="text/css" HREF="Styles.css">
<META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=iso-8859-1">
<META NAME="GENERATOR" CONTENT="Mozilla/4.03 [en] (Win95; I) [Netscape]">
<META NAME="DESCRIPTION" CONTENT="Editeur web site">
<META NAME="KEYWORDS" CONTENT="java, perl, html, php, python">
<SCRIPT language="JavaScript">
<!--
function animateAnchor() {
    var el=event.srcElement;
    if ("A"==el.tagName) { // Initialize effect if none specified
        if (null==el.effect) el.effect = "highlight"
        // Swap effect with the class name.
        temp = el.effect;
        el.effect = el.className;
        el.className = temp;
    }
    // Initialize event handlers
    document.onmouseover = animateAnchor;
    document.onmouseout = animateAnchor;
}
```

The status bar at the bottom indicates "For Help, press F1", the time "10:9", the mode "Insert", and the file status "Unmodified". The bottom right corner shows "88 lines, 3342 characters".

Here Language indicates that we are using a language with its all formats. Here it is important to say that HTML is not a programming language. It is a scripting language, in which documents are controlled with marking.

Website can be called a collection related to World Wide Web. Generally website

is a media, which is structured by user in his choicest format. Website is mainly a one way communication. It means that the published and stored contents in a website can only be readable or watchable. It is not possible by a user to rectify or edit it and to make any comments and reaction. In this way website can be considered as a safe house, which is absolutely self-alternative for website maker. But due to continuous evolution of the World Wide Web, in now a days the state of one way communication of the website has been changed and efforts for the continuity of communication in it, have begun.

Today every kind of contents related to education, medical, entertainment, sports, politics, science, music, commerce etc. all the subjects and topics are available on World Wide Web. Today every enterprises, organizations, institutes, establishments have their own websites. And now people have started making their own private websites. There are so many web hosting service providers, which provide free space on their server for web hosting. Currently the total number of the websites on World Wide Web is nearly one billion.



Diagram 4.7 Home Page of Website of BSER

Webpage

Webpage is a subset of any website. The way in which all the pages of a book make together a book, in the same way different web pages together make a website. The way in which any page of a book can access by its page number, in the same way Any page of a website can access by its URL.

Webpages are written by the use of any language amongst HTML, DHTML, XML, Java Script, VB Script, C++ etc. A website can be made from few pages to hundreds or thousands of pages.

Domain Name



Diagram 4.8 Different Types of Domain Name

The domain system was developed for naming a computer on internet, so that it can easily be remembered and also easy to be found. It is such a way by which computers working on internet are recognized and found. There cannot two domain names of an institute.

Any domain name has two or more than two parts, which are isolated with the use of dots. For example: `rajeduboard.rajasthan.gov.in`, `google.com` etc. The last part of the domain name is a High Level Domain Name and it provides information about the institute, to which you want to connect. The main categories of the High Level Domain Names are following.

- `.com` - Commercial organization
- `.edu` - Educational institute
- `.net` - Institutes operating internet
- `.org.` - Organizations which cannot be categorized
- `.gov` - Government or government organization

Country Codes - These provide information about the country. These are expressed with two letters. For example: `.in` for India, `.uk` for United Kingdome, `.fr` for France.

DNS (Domain Name System)

As there are several websites and IP addresses in internet, so browser cannot found these itself. It to be found each and every one. The role of DNS (Domain Name System) starts from here. DNS essentially, a phone book for web. DNS transforms

any URL into IP address in spite of transforming it into phone number, so that user reach on the website, to which he is searching.

Actually DNS (Domain Name System) does the work of mixing the domain names and IP addresses. It stores the data. This system provides the facility of using an easy domain to internet users, so that they do not have to remember various types of IP numbers.

Search Engine



Diagram 4.9 Different Search Engines

Such computer programs are called Search Engine, which search out the desired information from stored on any computer system. The most popular form of search engine is web search engine, which is used for searching of information on World Wide Web. These engines present the obtained result generally in an index, so that we can know the nature and location of desired information. Search engines help us to reach up to any information relatively in very short time. They also prevent us from information overload.

Search engines obtain these results by crawling and indexing all the information available online. The world information is doubling every year and to connect the people with its search is becoming more challenging. Especially for those 16 % searches, which are new every day. The engineers will have to do hard work for continuous improvement, so that businessman and customers can found each other continuously.

Currently Google, Yahoo, Bing etc. several search engines are available, on which millions and billions searches are made daily. Bing of Microsoft is such a search

engine, which make available the advertisement free searches to schools.

Electronic Mail

Electronic Mail is called E-mail in brief. It is the more popular name of its. E-mail works the exchange of messages, information and documents between users and computers. It is most used thing in internet.



Diagram 4.10 E-mail Logo

Sending an E-mail is similar to posting an electronic version of any letter. When you send any E-mail, it reaches in few seconds to destination. As like address of house, everyone has its unique E-mail address. To get E-mail facility, an E-mail account has to be created, so that mail can be sent and received. Currently Gmail, Yahoo Mail, Hotmail, and Rediffmail etc. several E-mail services are available.

Important Points

1. Internet is a huge network of computers which connects all the small and large computers spread around the world.
2. Internet is also called network of networks because all the computers of globe are connected each other through internet.
3. Internet is largest and popular network of world.
4. Internet has the capability of exchange of data and information around the world. The secret of its popularity is its simplicity. There is no owner of it, which runs it. All the information in it come through internet server.
5. Certain rules are framed to run it, which are known as Protocol.
6. There are two standard internet protocol. (1) Transmission Control Protocol - TCP and (2) Internet Protocol - IP
7. In 1969 American defense department started internet by connecting California University and Stanford Research Institute with it through network. This network was named "ARPANET".

8. In 1989 British scientist Tim Berners Lee invented the World Wide Web (WWW) to simplify the communication on internet.
9. To connect with internet we have to take help from Internet Service Provider (ISP). An internet service provider is a company who provides access of internet and other services to you.
10. Usually two types of connections are available for accessing internet services. 1. Dial up connection and 2. Direct connection.
11. World Wide Web is a kind of database, which is spread all over the world.
12. World Wide Web is such an internet service based on general group of protocol which sends the documents in a standard way to any specially configured server computer through internet.
13. Browser is a kind of software on your computer, which allows you to access internet.
14. Browser is also known as web client or internet navigation tools.
15. The computer which keeps web pages in form of directories and files and allows files to read, is called Server.
16. Web Protocol is a rule or a set of certain rules, which provide an environment of communication between different parts.
17. HTTP (Hyper Text Transfer Protocol) is the set of rules, which transfers hypertext between two or more than two computers.
18. The language, which is used in developing web pages, is known as Hypertext Markup Language (HTML).
19. Website can be called a collection related to World Wide Web.
20. Webpage is a subset of any website.
21. The domain system was developed for naming a computer on internet, so that it can easily be remembered and also easy to be found.
22. DNS essentially, a phone book for web.
23. Such computer programs are called Search Engine, which search out the desired information from stored on any computer system.

24. E-mail works the exchange of messages, information and documents between users and computers.

Exercies

Multiple Choice Questions

1. The network of networks is called.
(A) LAN (B) MAN (C) WAN (D) Internet
2. The set which determines the standards internet, is called.
(A) W3C (B) TCP (C) IP (D) HTTP
3. The name of first of all established internet network.
(A) NSFNET (B) ARPANET
(C) NICNET (D) None of the above
4. The places of Wi-Fi Hot spots.
(A) Educational Institutes (B) Hotels
(C) Airports (D) All of above
5. The name of the software which sends information from internet to computer.
(A) Operating Software (B) Driver
(C) Browser (D) None of the above
6. Which example is not of the browser?
(A) Netscape Navigator (B) Internet Explorer
(C) Facebook (D) MozillaFoirefox
7. .com does mean.
(A) Commercial organization (B) Internet operating institute
(C) Educational institute (D) Government institute
8. The Facebook of World Wide Web is -
(A) Domain Name (B) Domain Name System
(C) Web Page (D) Uniform Resource Locator
9. Name of the search engine, which provide facility of free and without advertise-ment service.

- (A) Google (B) Yahoo (C) Bing (D) MSN
10. The most used internet service is -
- (A) E-mail (B) Search Engine (C) Uploading (D) Downloading

Very Short Answer Type Questions

1. What is the name of first established internet network?
2. Who did invent www?
3. Write the name internet service provider companies.
4. Who does work the displaying of information coming from internet in good format?
5. Tell the full form of http.
6. Tell the name of any internet protocol.
7. What is called the subset of a website?
8. By which name does the computer known on internet?
9. What will be the domain name of a commercial institute?
10. What is the name of program, which search the desired information on internet?

Short Answer Type Questions

1. Why internet is called the network of networks?
2. What are Internet Protocols?
3. Differentiate the dial up and direct internet connections.
4. Write the definition of World Wide Web.
5. What is Hypertext?
6. What is the function of Web Browser?
7. Tell the uses of HTML?
8. What does mean by Domain Name?
9. Write the names of main search engines.

Essay Type Questions

1. What is World Wide Web? Write down its characteristics.
2. What does call Web Browser? Tell its functions.
3. What does mean by HTML? How does it useful in creating a web page?
4. Describe the importance of Domain and Domain Name Server in Internet.

5. Write down the short notes on followings -

1. Search Engine
2. E-mail
3. URL
4. IP Address
5. Web Protocols