



AN OVERVIEW OF THE INTERNET

The Internet is a collection of individual networks, connected by intermediate networking devices, which function as one large network. The first form of the Internet is called ARPANET. It was a research project conducted by Advanced Research Project Agency (ARPA) of the USA connecting computers in a number of research organisations. This was a US defence project, which started in early 1960s. The purpose of this project was to build a communication network that the Soviet Russia could not easily destroy. Unlike in telephone networks, where the switching is centralised, data in this network could travel between nodes in more than one route. So they were successful in restricting any possible damage to one or some routes only.

Computers around the world use different types of operating systems (UNIX, Windows, Solaris, etc.) and are in different types of networks (Token Ring, FDDI, Ethernet, etc.). In order to be able to communicate between these computers there has to be a common language, or a common protocol. For this purpose several protocols were developed. A set of protocols called TCP/IP (Transmission Control Protocol / Internet Protocol) was developed by the Defence Advanced Research Project Agency of the USA (DARPA) -- ARPA changed its name to DARPA in 1971 and in 1993 it changed back to ARPA and back again to DARPA in 1996 -- and it became the most widely used protocol in the world. The reason for this is its open and efficient inter-networking design. The aim of DARPA was to inter-connect a number of universities and research establishments. The resultant network is known as the Internet. This name was first used in 1983.

IP part of the TCP/IP determines the routing of data around the Internet and addressing structure of each node connected to the Internet. Each node connected to the Internet has a unique address called the IP address. The IP address consists of 32 bits and is written in the form of W.X.Y.Z, where each letter stands for a numerical value between 0 and 255, e.g., "205.156.23.2" can be used as an IP address. As these IP addresses are difficult to remember, symbolic names are assigned to them with the help of servers called DNS (Domain Name System) servers. For example 'www.pdn.ac.lk' is the address assigned to the university of Peradeniya. DNS is a world-wide system of servers, which map symbolic names like the above to the correct IP address for routing purposes. TCP part focuses on providing reliable transmission of byte stream (data) between two nodes in the Internet. TCP depend on IP to move data around the Internet. As IP is unreliable, TCP has to protect data losses, corruption, duplication, etc. by adding sequence numbers and checksums on the sending side and by sending acknowledgements for received data on the receiving side.

Some of the main uses of the Internet are

World Wide Web	Electronic mail
TELNET	FTP
Newsgroups	Chat & instant messaging
Internet Telephony	Online TV & Radio
E commerce	E learning

World Wide Web (WWW)

The World Wide Web or in short web is an integration of text, graphics and multimedia in a user-friendly manner with the aim of distributing them over a wide area. It allows using a number of protocols (email, ftp, telnet, etc.) in a single easy-to-use interface. The protocol for WWW is called HTTP (Hyper Text Transfer Protocol).



The Web is a development by Tim Berners-Lee and Robert Cailliau of CERN, the European Particle Physics Laboratory in Geneva that was established in the 1980s. In 1985 the National Centre for Supercomputing Applications (NCSA) was established. Marc Anderson of NCSA developed a collection of user-friendly interfaces known as Mosaic for browsing the web in 1993.

Marc Anderson after having founded his own company, Mosaic Communication Corp. (changed its name to Netscape Corp. the same year) and developed a browser called Netscape 1.0 in 1994. The Microsoft Company built a web browser called Internet Explorer 1.0 in 1995. Still, Netscape Navigator and Internet Explorer are the most widely used browsers, although there are many other browsers available now.

Operation of the web primarily depends on Hypertext for information retrieval. In the 1960s Ted Nelson proposed the concept of hypertext and Douglas C Engelbart developed the 1st working system. Hypertext documents contain words called "links" that are connected to other documents. Producing hypertext to the web is accomplished by creating documents with a language called HyperText Mark up Language or HTML.

The World Wide Web Consortium (W3C) established by Tim Berners-Lee keeps on standardising the HTML. Now W3C calls the language as XHTML and it is considered to be an application of the XML standard. Programming languages like Java Script, Java, Visual Basic, XML extend the capabilities of the web.

The web addresses called URLs (Universal Resource Locator) have the form of www.microsoft.com

Search engines

In order to find web pages that contain material relevant to a user, Internet search engines are used.

Before the web gained its popularity, programs called "gopher", "Archie", etc were used as search engines to find the information in the Internet. Now the web is the major source of information and several tools were built for searching the web. Some of the most widely used tools to search the web are Google, AltaVista, Yahoo, and Metacrawler.

When searching, a user types a few key words that specify the area of his search. Then the search engines look through millions of web pages in the Internet for these keywords. The way this is done can vary from search engine to search engine. So the listings for the same keywords for different search engines are not the same.

There are few search tips or methods that can narrow down a search:

a) AND, +

"AND" and "+" stand for the same, and words joined either by "AND" or "+" must be found in the web pages listed, e.g., Ernest + Hemingway. In this case lists of web pages including both terms "Ernest" and "Hemingway" appear.

b) NOT, —

"NOT" and "—" stand for the same, and in the application of this search tip web pages appear without the word that follows "NOT" or "—", e.g., in the application of the search "music—jazz" lists of web pages appear with the term "music" but not with "jazz."

c) OR

In the application of "OR" web pages having one of the terms joined by OR must appear, e.g., electronic bookstore OR bookshop, in this case, list of web pages having either "bookstore" or "bookshop" appear.



d) “.....”

Words inside the quotation marks are treated as a phrase and in its application web pages with the complete phrase are listed.

i.e. “the wonderful wizard of oz”

e) It is also possible to search for the required web site within a list of results, e.g., after searching for “universities” it is possible to search within these results for “universities in the USA” with the suggestion “USA”.

Above are some of the ways to narrow a search. All the search engines may not have these features. Also the search can be restricted to a domain, date, language, and the order of occurrence of search items depending on the search engine used.

E-mail (Electronic Mail)

Shortly after the ARPANET was created, a quick way of communicating called e-mail was incorporated into it by Ray Tomlinson in 1972. It was one of the earliest Internet protocols, which allowed people at different computers using different operating systems to communicate with one another. E-mail can be sent to one or many persons making one-to-one and one-to-many communication possible.

Several protocols are used for transmitting and receiving e-mails. Some of them are:

SMTP (Simple Mail Transfer Protocol) most widely used to send messages independent of any specific transmission subsystem.

POP (Post Office Protocol) widely used to retrieve email messages through the Internet.

MIME (Multipurpose Internet Mail Extension) allows transmission and receiving of various kinds of data in the form of sound, graphic, etc.

S/MIME (Secure MIME) allows encryption and digital signature for e-mail.

There are many e-mail programs like Outlook Express, Eudora, Pegasus Mail, Netscape Mail, and Yahoo mail. A lot of e-mail services are virtually free. Hotmail, Yahoo mail, Eudora mail are some of the online e-mail service providers.

Telnet

Telnet is a program, which enables one to get connected to a remote computer via the Internet. According to the access granted by the remote computer, the user can use the data and programs in the remote computer as if they are in his own computer. In the past telnet was a greatly used protocol, but as the web-gained popularity and as Telnet is a text based application, it is rarely used today.

FTP (File Transfer Protocol)

FTP stands for both the program and the method used for transferring files between computers. FTP sites contain a lot of books in the electronic form, sounds, computer games, and articles to be downloaded. Anonymous ftp is an option, which allows any user to transfer files between computers without a special password.

Chat and instant messaging

These facilities allow real-time communication by using the keyboard. A chat room is basically a place where a group of people can communicate and every one can see what the others type. To a specific user it is possible to have a one-to-one chat between two users or/and



conference chatting between users in a group, which is basically called instant messaging. There are a number of chat rooms and software available. MSN Messenger, Yahoo Messenger, ICQ and IRC are the most commonly used messenger software. There is a numerous number of chat rooms available on specific subjects in the Internet.

Internet Telephony

Internet telephony refers to voice messaging services including facsimile. Unlike in the case of Public Switched Telephone Networks (PSTN) the voice messages are transmitted through the Internet. Here analog voice signals are digitised and compressed at the transmitting end before transmission. This process is reversed at the receiving end.

Talking on the net began in 1995 when a company called Vocal Tec Inc. introduced its Internet Phone (IPhone) product. The protocol used is called VoIP (Voice over IP) as routing through the Internet is done using the Internet Protocol. Internet Telephony can handle messages from PC to PC, PC to telephone, or telephone to telephone.

Internet telephony is substantially cheaper when making long distance calls. Even if the PSTN is used to connect to the Internet, the charging will be for the Internet connection and for the service rendered by some company that facilitate the call at the other end.

Newsgroups

This is both a communication and an information resource. People in a news group discuss a particular topic (such as health). Anyone who joins the news group can become a part of it. These messages are stored in hundreds of servers around the world. This way it may not be possible to get an answer quickly. But it is possible to communicate with a large number of people who are interested in the topic. Thus, it is possible to get a good understanding about a selected topic, by joining a news group of the subject.

Normally the Internet Service Provider gives a list of newsgroups to which the subscriber can join. In case if this is not available there are free news services available in the Internet.

Newsgroup began in 1979 between few students to share information. With the help of this students developed the first newsgroup called USENET.

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