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# UNIT 13 INTERNET AND ITS SERVICES

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## 13.0 OBJECTIVES

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In the previous Units of this Block, you have been introduced to computer based information storage and retrieval systems, networks, especially library and information networks with emphasis on resource sharing library networks. In this Unit, let us try to understand what Internet is and what type of services can be obtained from it.

- After reading this Unit, you will be able to:
- understand the basic nature of Internet;
- know its origin and development;
- be aware of the types of resources and services that are available over Internet;
- comprehend the issues associated with the location and evaluation of Internet resources;
- learn the tools and techniques associated with searching on the Internet;
- explain the uses of Internet access in libraries; and
- assess the opportunities that Intranets offer to libraries.

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## 13.1 INTRODUCTION

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You have probably been hearing a lot about 'Internet' lately. If you take a quick look through a big city newspaper you can find a reference to 'Internet' in every section. In the main section, for instance, you will find coverage of a political speech in which a political leader talks about the importance of 'Internet'. On the other hand, if you turn to the business section, you will come across an item where a media company announces a new way to take advantage of the Internet. On other pages, you may find a feature about a user who has found an innovative way to use Internet.

### But, what is Internet?

There are many ways to answer this question and how you choose to answer is really a matter of how you use it. To some people, it is a source of entertainment, to others it is a research



tool, yet to some others, it is a gold mine of money-making opportunities. The most general answer, however, describes Internet as a 'network of networks'. In case, you do not know what a network is then this description would not help you much though we intend to elaborate on it in the later sections in a formal manner. The Internet, in a sense is anything you want it to be. If you use the Internet to get information about different systems of education or educational models in the world, that is what the Internet to you. Similarly, if you happen to be a legal expert researching all the decisions of the supreme Court of India, then, Internet is the services and resources available via Internet, the search engines and browsers, which support the users in finding their way around the Internet, and the resources like BUBL (the Bulletin Board for Libraries) and also other aspects relevant to Library and Information professionals. The contents of this unit are (tailored) keeping in view the requirements of the candidates undergoing the Bachelor's degree programme of IGNOU. It is believed that this effort would enable them to understand the nature of Internet so that they may be in a position to exploit this resource as and when required in their professional work.

## **13.2 ORIGIN AND DEVELOPMENT OF INTERNET**

The Internet has its origins in a network called the 'ARPA net, developed in the early 1970s by the Advanced Research Projects Agency (ARPA) in the US. It was first used for the transfer of intelligence within the US Department of Defence, but, later on it was adopted by the academic community to build an academic network for information exchange. By late 1980s; access to the Net was open to the general public, as network technology introduced client server architecture and ethernet local area networks, supporting end-user access to networks.

By mid 1990s, the Internet was made up of over 60,000 networks. Basic descriptions of the Internet generally start by identifying it as a network of networks, run cooperatively with a minimum of supervision, where the participating networks agree on the common protocols and rules. Nobody, therefore, is officially incharge or controls the Internet.

### **13.2.1 What is Internet?**

A great majority of people are now aware of the existence of Internet But, many of them have perhaps a some what misguided view of what the Internet really is. In this connection, it may be mentioned that a concise and complete description of the Internet may be had from one of the papers published by Library Association. Superhighway, London (1995) p.547, the Internet consists of a large number of linked computer networks forming a global network. This is largely open and free, allowing users to communicate with each other for work and recreational purposes, and for corporate and personal reasons. Because the Internet is so vast and is without regulation or hierarchy, the network is a treasure-trove of information from many sources. Resources are available in all subjects; mailing is possible for all the participants; documents can be forwarded and delivered across the world and directories and journals abound. Developments such as The World Wide Web (WWW) combine friendliness of user interface with enormously powerful information retrieval capability. Electronic mail is one of the most important services offered through the Internet, with each person having a personal mail address, enabling them to link up to another user anywhere in the world and communicate within seconds' (p. 547). In other words, it is easier to view the Internet in two related but distinct parts: they are the communications network, which is the immense web of interconnected local and wide area networks, telephone lines, cables, fibre-optics and satellite links which provide the medium for the transfer of information around the Internet, and the computers and computing sites which actually hold and process the data which is available to be transmitted across the network. It may be mentioned that whilst the communications network part of things are well integrated and for the most part operates transparently to the user, the same cannot be said about the data end of the business.

It may further be stated that the communications network is basically a physical network of connections, which provide the means of passing signals from one place to another. The adoption of a common set of protocols, or standard 'ways of talking' makes it easy to use. In other words, these protocols enable data to be passed coherently and easily from one place on the network to another TCP/IP (Transmission Control Protocol / Internet Protocol) is at the heart of Internet Communications. The TCP/IP must be thought of as a common language and rules for the behaviour in the communications environment which all parts of the Internet share and understand. All the computer systems connected to the Internet must be in a position to



communicate in TCP/IP language or have some arrangement to interpret and translate TCP/IP instructions. The end users need not know anything about how TCP/IP works. Users can communicate or talk through their local operating systems such as Windows, DOS, UNIX, etc., and programmes will take care of translating user's requirements into a form which complies with the protocol. However, the users must remember that the TCP/IP common language is concerned with one thing only, that is communication. All it does is to make it easy for one machine to contact another to be able to pass data from one place to another. It has nothing to do with controlling, specifying or standardising the content of the data which may be transmitted. Therefore, as an answer to the question, 'what is Internet?' We may state that Internet is a collection of interlinked computer networks, or a network of networks. Currently, Internet connects over one million different computers and the rate of increase in use and new subscribers is growing everyday. The Internet provides global connectivity via a mesh of networks based on the TCP/IP and Open Systems Interconnection (OSI) protocols. Historically, the Internet was essentially an academic network, but business use is growing, so that the Internet is no longer merely an elite network for communication between eminent research centres, but is also accessible to colleges, businesses and libraries throughout the world. In other words, the Internet offers a gateway to a myriad of online databases, library catalogues and collections, and software and document archives in addition to e-mail.

Technically speaking "the Internet is a massive, searchable, dynamic, widely available, distributed multi-platform information system which possesses a number of general capabilities". In looking at the Internet objectively, most librarians feel that it has opened up wide vistas of sources (including graphic sound and text materials) on a global basis that previously were unavailable to the average library or individual searcher. Of course, it assumes that the searcher has the proper equipment, software and Internet connection before anything happens, and even then, retrieving materials might be slow, or impossible to achieve in certain cases because there is so much traffic on the system. In other cases the searcher may quickly discover great quantities of materials of interest or perhaps a single item that is very valuable to retrieve. Therefore, the Internet can be a very useful system for enlarging sources of data of a library. But this situation may not automatically solve their problems nor satisfy every client's needs.

### 13.2.2 How Does Internet Work?

In this section, let us try to know, some of the technicalities relating to the working of Internet.

It may be stated that the procedure of Internet's working is associated with a new type of switching methodology known as 'packet switching'. Packet switching techniques take a structured approach in that they divide an individual message or information into separate 'packages', each of which is transmitted independently through the network. In other words, the Internet works by breaking down all the information which needs to be transmitted into 'packets', which contain not only the data to be transmitted, but also information indicating where it has to reach, where it came from and to what other 'packets' of data it is related to. Because these packets are in a standard form, and a standard method of addressing is used for them, they can be passed from any 'Internet-aware' point on the network to the next until they reach their intended destination. The advantage of this technique is that since the network has to deal with smaller standard *size* packets in a pre-determined way, a faster transmission rate can be achieved. Also the network is able to *make* its own decisions on routing, and can change these dynamically as traffic conditions change, with no apparent disadvantage to the end user. By breaking transmission into standard data packets, transmission across the Internet is made efficient and robust.

#### Client-Server Concepts

It may be mentioned here that one of the most important rather significant concepts in Internet information provision is the idea of client/server architecture. Most of the net-based tools rely on this basic approach in order to be able to function efficiently. It is very important for us to understand as to how it works, as it can have a direct effect on how we search and the results we receive. The client/server model is a simple one. As its name implies, it is constituted of two parts, two programs, a client and a server, for each application. The client software runs on the local machine, the PC. The server software runs on another machine, perhaps a main frame, the host or the server of the information we want to retrieve. The application works by the combination of both the pieces of software working co-operatively together. A client without a server, or a server without clients, would be able to do nothing useful. Software tools



for client/server systems always work in pairs and share the computing workload. The server program is responsible for holding the data which is to be made available, and for finding and returning data requested by the clients. In other words, it is responsible for creating indexes, searching, and sometimes collecting and organising data. Most importantly, the server provides the means of allowing common access to data mounted on it. It waits for the client software to send it requests to do something, and returns the results of its efforts in response to such requests. In a way, the client programme is responsible for dealing with the user. It runs locally and provides interface between the user and the system, collecting information about what the user wants, transforming the requests into the agreed language of communication between the client and the server, packaging them up and sending them off to the relevant server computer. When the server responds with some data, the client 'unpacks' the coded materials and converts it for appropriate display and/or filing on the user's machine.

One of the greatest advantages of client/server architecture is that communications between the client and server do not need to be continuous. They can be intermittent. There is no need to maintain a connection between the client and the server. Using client/server architecture, it is easy to communicate across different systems. In other words, for each application, the client/ server will speak the same language for communication of what they want each other to do, as well as using Internet protocols for transmitting the requests and responses back and forth.

### 13.2.3 Internet Connections

It is important to know that there are different kinds of connection to the Internet which determine the way in which we will be able to work on it. In other words, connection to the Internet substantially affects its usefulness to the customer.

Local area networks can be attached to the Internet by installing TCP/IP networking software on the LAN server and obtaining connection between the LAN and the Internet. A wide range of different types of machines that are connected to the LAN can access the Internet, including DOS and windows-based personal computers (PCs) and UNIX workstations.

Basically, there are two fundamental methods of connection. They are full connection or terminal connection. In the case of full connection, there will be a permanent telecommunication link and the computer has a registered Internet name and address. The second type of connection is known as dial-up connection, via a temporary telecommunications link to a host machine that has full access. The third type of connection is known as gateway connection, where a connection is made through another network or service supplier" like 'Compu Serve'.

It is established either by direct connection such as used by universities or corporate bodies, where the machine or network of machines is permanently linked by dedicated line to the net, and has its own address; or remotely by using Serial Line Internet Protocol (SLIP) or Point to Point Protocol (PPP) connection to a directly connected machine. The advantage of having full connection is that, you can install any client software of your requirement on your machine and use all the facilities of the Internet.

On the other hand, if your local computer is connected to a host, which has a full connection, your machine acts only as a terminal to the host machine. You simply log on to the host and then access the Internet from the host. In this situation, you can avail only limited facilities depending upon the type of communication between your self and the host. It is the norm today for commercial hosts to provide SLIP/PPP connection, But this is not the case in those areas where telecommunications facilities are poor and the Internet is still developing.

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## 13.3 RESOURCES AND SERVICES THROUGH INTERNET

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It may be stated that the Internet is a massive, searchable, dynamic widely available, distributed, multi-platform information system having a great potential of resources. The resources available on Internet are changing constantly, Therefore, any list is liable to be out of date. However, a brief review of the types of databases and services is furnished in this section to enable you to have an idle a of Internet resources and services. There are a number of different types of use of the Internet. Some of them are listed below:

- *E-mail*: allowing users to send messages or files to each other;
- *News*: to inform users of available information



- *Remote log in*: allowing users to log in to remote sites;
- *FTP (file transfer protocol)*: which allows users to access and retrieve files at remote sites.

The information services available at remote sites include:

- 1) Listservs and discussion groups on a variety of topics. Participants have the opportunity to exchange current information and conduct dialogue, of these some listservs are of particular interest to information professionals;
- 2) Subject databases, specially from academic institutions in different subject specialties;
- 3) Community information. Different communities are providing access often through their public libraries, to information such as the library catalogues, demographic, and tourist information, etc.,
- 4) *Government resources*: All governments both national and local are providing information through their own Websites;
- 5) *Library Catalogues*: a large number of libraries are making their catalogues available through Internet;
- 6) *Commercial resources*: Commercial information databases;
- 7) Bulletin boards: (i.e.) electronic equivalent of news letters;
- 8) Shopping and other commercial transactions: Internet has a number of significant shopping mails;
- 9) *Document delivery*: A number of big libraries and document delivery services are also making available document search and. delivery service through the Internet.

A number of these services offer access to database records or documents. These documents may be divided into categories or collections on the basis of the following characteristics:

- Storage location
- Data type Format
- Method of transfer
- Size or length
- Subject matter or topic
- Depth of coverage
- Frequency of update and currency
- Language Originator
- Audience

It may be mentioned here that there are a number of directories of Internet resources. One of the most valuable directories is Bulletin Board for Libraries (BUBL). BUBL is an information service designed to support Library and Information Science professionals. Among a wide range of services, it includes directories of resources, users and lists current contents of LIS journals and electronic journals and texts.

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## 13.4 SEARCHING ON THE INTERNET

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A vast array of databases and services are available through the Internet. It is necessary to design interfaces that help users who search for information sources and services available on the Internet. This is because retrieval is recognised to be a complex and significant problem on the Internet. The reason for this is that the databases mounted on the net are in a wide variety of different formats, and different search retrieval software packages mounted on different computers and are providing access via different interfaces to subsets of the databases.

Tools used for searching the Internet often operate in client/server mode-Server software which enables the user to search the database in a more intuitive way has been set up on many computers on the Internet. The user's local system runs the equivalent client software which



communicates with the server software and provides a homogeneous interface to the data. In other words, the user does not need to know where the data is stored or how to manage the server system's file store structure.

### 13.4.1 The World Wide Web (WWW or W3)

The WWW is the multimedia part of the Internet displaying a hyper text type of structure and search facilities. It was first developed for sharing documents between the nuclear physicists of the European Particle Physics Laboratory (CERN) in Switzerland in 1989, but the first commercial Web Software by Next in 1991, popularised this form of access to the Internet. The main characteristics of the WWW organisation and structure are:

- Organising documents into pieces of information (pages) using a set of rules which tag and format the documents, The Hypertext Mark up Language (HTML).
- Every individual document or page is assigned a unique address, called Uniform Resource Locator (URL).
- Each URL can be linked with a hypertext type link to other URLs and even pieces of information within each document (buttons) can be linked to URLs to other pieces of information.
- These documents can be searched through interactive interface programs which allow users to browse and navigate through the documents and are called Web browsers.
- The communication between The Web browsers and the Web servers is regulated by a common language using a standardised set of rules called Hypertext Transfer Protocol (HTTP). The HTTP allows the interpretation of the HTML signs within each Web page in order to display correctly the page and to enable the transfer of files. A client programme or Web browser provides the user with control over the retrieval process and also over the links to be activated.

It is to be noted that individuals and organisations create home pages ,to present their own information or services. A collection of home pages located on the same server is called a Web site. Access to these pages is via the uniform Resource Locator (URL) using a browser. Some examples of browsers are Lynx, Netscape, etc. these addresses link the user to the host computer and their individual files, these are then displayed on the user's terminal (workstation). With the help of appropriate software users can read documents, view pictures, listen to sound, and retrieve information.

The hypertext structure of the Web means that retrieval is done through following the links between different web pages through browsing and navigation. In indexing terms, the hyperlinks on the WWW that form the basis of the browsing network are uncontrolled but humanly assigned indexing terms. There is no general control over which terms should be used as hyperlinks, but each hyperlink is individually coded by the creator of HTML (Hypertext Markup Language). It may be mentioned here that though browsers encourage movement through a network of linked documents, browsing is not an efficient approach to the identification of specific information. Different search tools have been devised in order to assist people in finding information on the largest repository of documents in the world. These search tools can be divided into two main categories: `subject directories' and `search engines.'

### 13.4.2 Subject Directories

Subject directories, also known as subject guides allow people to browse information by subject. They are hierarchically organised indexes of different subjects, with links to different web sites on each subject. The searcher can browse through the index in search of relevant subjects and navigate to the relevant web sites by clicking on hostspots which represent those sites: Subject directories are built by human indexers.

Apart from general subject directories, there are also two other types of directories specialised subject directories and clearing houses. Specialised directories specialise in their specific areas and provide access to the most important sites and resources in those areas, where as clearing houses are collections of various specialised search directories, either by including the search directory on their web sites or by providing a link to the web sites of these specialised directories. This facilitates easy location of specialised information on the Internet.



### 13.4.3 Search Engines

Search engines are mechanisms which aid users to search the entire Internet for relevant information. They are based on allowing users to enter keywords that are matched against a database. Unlike subject directories, which use human indexers to build their indexes, search engines use software programs which create automatically their own databases containing lists of web pages. Search engines are composed of three different parts: i) a program called a spider (or robot or crawler), ii) a database with an index and iii) search software. Spiders wander through the web, crawling from site to site, following links between pages. Different search engines use different types of spiders, whereas some visit every possible site, others are based on more selective principles and visit only the most popular sites. The first type of spider finds a huge volume of information in a short space of time; the second type generates a smaller number of pages with perhaps more relevant information. Every page found by a spider is stored in a database and an index of its contents is built by extracting automatically words from the web pages and ranking them alphabetically using some principles which inverted files use. The index is, therefore, a list of every word (except stop words) with a pointer to its location -on the database.

Again, different search engines will follow different principles. For example some will index every single word on every web page, while other search engines index only the title and top level phrases of a web site. The third element of the search engine is the search software, which is a program, which compares search queries keyed in by the people (users) with the index, finds matches and ranks them in order of relevance. The criteria for judging relevance will vary according to the search engine.

The different approaches, which search engines use in crawling the web, finding new pages and indexing them will produce totally different results. That is why when searching the same topic in different search engines there can be differences in the results obtained. Due to the way the search engines operate search engines are more oriented to find larger volumes of information and more specific information than subject directories. This is because they are based on searching Web pages and indexing automatically precise words from the sites (rather than using a pre-defined index) as subject directories do.

Examples of search engines include:

Alta Vista (<http://altavista.Digital.Conti>)

Excite (<http://www.Excite.Corn/>)

Hot Bot (<http://www.Hotbot.Corn/>)

Infoseek (<http://www.Infoseek.Corn/>)

Lycos (<http://www.Lycos.Conti>)

As different search engines possess different strengths, new search tools have been devised recently, which enable people to search simultaneously the different databases of search engines, while using one single interface. These tools are called multi-threaded search engines. Though, these do not have all the search flexibility of individual search engines, they are very fast and can search through vast quantities of information. Some examples of multi-thread (meta) search engines are:

i) Dogpile (<http://www.Dogpile.com>)

ii) Metacrawler (<http://www.Metacrawler.com>)

### 13.4.4 Evaluating Internet Resources

The use of the Internet for conducting business (whether it is providing library services or any other transaction) efficiently and effectively should be considered as one of its prime objectives. It is necessary to evaluate what internet information, services and facilities staff within an-organisation need for their work and how the Internet can be used as a facilitator of their scientific, technical as well as business communication and collaboration.

It may be that the library is concerned to use Internet resources to answer questions on behalf of users, or to offer services that direct users to specific Internet resources, in either case, it is necessary to evaluate the Internet resources. Though there are no explicit criteria available for this purpose, traditional criteria used for print evaluation may be useful in the evaluation of Internet resources to some extent. The answers to some of the questions given below might



be useful in the process of evaluating the resources:

- i) What is the intended audience? Is it academic or public?
- ii) What is the frequency updating? Is there information on updating?
- iii) What is the affiliated institution?
- iv) What are the resource developer's areas of expertise? Is there an about section that describes the author/creator of the source?
- v) What is the relationship between resources and other resources on the same topic? Are there any links or references to these related resources?
- vi) Are there any reviews or evaluation of the site? What do these say?
- vii) Is there any permission needed for access, and are any charges made for access?

The answers to the questions posed above furnish basic information for identifying and the assessing the suitability of these resources for use by the library.

### **13.4.5 Uses of Internet Access in Libraries**

Users of Internet Access in Libraries and a web site, may be in a position to offer some of the under mentioned services to their users:

- The basic information relating to the functioning of the library can be provided through the Internet. This gives the users of the library an opportunity to establish direct e-mail links which allows users to send messages;
- New ways of access to library facilities such as remote access to catalogues,
- New information services such as a home page linked to a collection of electronic texts, databases and other Internet resources;
- Interactive home pages offering facilities such as reservation of library material and interlibrary loan and reference questions;
- Links to remote information and connections to information resources around the world.

Mounting web site on WWW does not require expensive or sophisticated equipment. The basic components of a configuration may consist of an appropriate computer running under any operating system to use as a server. Computer systems running under DOS, Windows and UNIX can be used as server for creating WWW documents. Network access dial-up, It is needless to mention that different types of software would be necessary for the purpose. Some of there are mentioned below:

- Server software to operate a server allowing client to interact with the information of your server
- Word-processing software for HTML work
- Gopher software to create images and icons, and
- Scripting and programming software that allows the extension of the interaction between the client and the server.

The best strategy for any library would be to select some high quality sources of high potential interest to users and to make these easily available through the interface. It is also necessary to organise workshops on searching the Internet resources and allow users to develop their own skills in identifying, evaluating and selecting specific resources relevant to their interests.

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## **13.5 INTRANETS**

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In this section, we shall try to know what Intranets are and how they are beneficial. In simple terms, an Intranet is an internal communication mechanism of an organisation. It uses the Internet technology for the purpose. Generally speaking Intranets utilise two of the key applications of the Internet: the web browsers with their graphical interfaces, and e-mail.

These are being used to support a wide range of information services, including access to document collections in document management systems and e-mail.







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## 13.6 SUMMARY

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In this Unit, an attempt has been made to expose you to the concept of the Internet, its capabilities and services.

It has been stated that the Internet is a series of linked networks, which operates on the basis of standard network protocols. It was explained to you that the World Wide Web is an important component of the Internet and services and resources available over the Internet include; listservs and discussion groups, subject databases, community information, government resources, library catalogues, bulletin boards, document delivery and commercial transactions and others. It was also emphasised that since there is a vast array of resources and databases available through the Internet, there is a need to design interfaces that help users search the information resources and services available. It has been mentioned that two types of tools, browsers (subject directories) and search engines are used to search the Internet. It was explained that browsers support browsing and moving between sites and pages on the basis of hyperlinks, but the identification of specific resources requires a search engine. Potential library applications of the Internet have been enumerated and explained. These include: new ways of accessing library facilities, interactive home pages, linking to remote information, staff development, acquisitions, cataloguing and classification. The Unit also briefly discusses the concept of Intranets and their benefits in the design of an internal communication system. In this connection, it was mentioned that the Intranets use Internet technology for an organisation's internal communication system. The types of applications depend upon whether flat-content Intranets or interactive intranets are in use. The issues that need attention to support further development of Internet technologies are the World Wide Wait, security, ownership and structure of the Internet. If the Internet is going to be used extensively by the librarians, a number of steps will have to be taken to make it more useful. The most important step in this direction would be to develop and implement a standard for organising and evaluating information on the Internet.

The Unit also contains the normal features of Self Check Exercises, answers to them and a list of Key Words. These items of information will be of help to you in understanding the Internet and its use.

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## 13.7 ANSWERS TO SELF CHECK EXERCISE

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- 1) The Internet consists of tens and thousands of interconnected packet-switched computer networks. The Internet has developed largely without any central plan and no single institution can control and speak for the entire system.

The technology of the Internet allows new types of services to be layered on top of existing protocols. Numerous users can share physical facilities, and the traffic mix through any point, changes constantly through the actions of distributed network of thousands of routers.

For the purposes of understanding how the Internet works, four basic types of entities can be identified. These are: end users, Internet Service Providers, backbone providers, and network access point operators. End users access or send information either through individual connections or through organisations such as universities and business concerns. End users include both those who use the Internet primarily to receive information, and content creators who use the Internet to distribute information to other end users. Internet Service Providers connect those end users to Internet. Backbone Providers route the traffic (data communications) between Information Service Providers and interconnect with others,

It is easier to view the Internet in two related but distinct parts: they are the communications network, which is the immense web of interconnected local and wide area networks, telephone lines, cables, fibre-optics and satellite links which provide the medium for the transfer of information around the Internet, and the computers and computing sites which actually hold and process the data which is available to be transmitted across the network. It may be mentioned here that the communications network is basically a physical network of connections, which provide the means of passing signals from one place to another. The adoption of common set of protocols or standard ways of talking makes it easy to use. In other words, these protocols enable data to be passed easily from one place to another on the network. TCP/IP (Transmission Control Protocol/Internet Protocol) is at the heart of the Internet communications. The TCP/IP may be thought of as a common language and rules which all parts of the Internet share and understand.



It may be mentioned here that the procedure is associated with a new type of switching methodology known as packet switching. Packet switching techniques take a structured approach in that they divide an individual message or information into separate packets, each of which is transmitted independently through the network. In other words, the Internet works by breaking down all the information *which* needs to be transmitted into packets, which contain not only the data to be transmitted, but also information indicating where it came from and to what other packets of data it is related to and where they are to reach. Since the packets are in a standard form, and a standard method of addressing is used for them, they can be passed from any Internet aware point on the network. The advantages of this technique are two fold: since the network has to deal with smaller standard size packets in a pre-determined way, faster transmission can be achieved and the network is able to make its own decisions on routing and can change as per requirement without causing any disadvantage to the end user.

Internet follows a method known as client/server architecture. As its name implies, it is constituted of two programs: a client and a server for each application. The client and a server for each application. The client software runs on the local machine, the PC. The server software runs on another machine, perhaps a mainframe called the host or the server of the information we want to retrieve. The application works by the combination of both the pieces of software working cooperatively together. Software tools for client/server systems always work in pairs and share the computing workload.

The server program is responsible for holding the data which is to be made available and for finding and returning data requested by the clients. Most importantly server provides the means of allowing common access to data mounted on it. It is the client program which is responsible for dealing with the user and provides the interface between the user once he obtains Internet connection.

- 2) The Internet has its origins in a network called the ARPAnet, developed in early 1970s by the Advanced Research Projects Agency (ARPA) in the US. It was first used for the transfer of intelligence within the US Department of Defence, but, later on it was adopted by the academic community to build an academic network for information exchange. By late 1980s, access to the Net was open to the general public, as network technology introduced client server architecture and ethernet local area network, supporting end-user access to networks. By mid 1990s, the Internet was made up of over 60,000 networks. Basic descriptions of the Internet generally start by identifying it as a network of networks, run cooperatively with a minimum of supervision, where the participating networks agree on the common protocols and rules. Nobody, therefore, is officially in charge or controls the Internet. It has opened up wide vistas of sources (including graphic, sound and text materials)- on a global basis that previously were unavailable to the average library or individual searcher. The sheer volume of material available on the Internet is enormous, and continues to expand at an alarming rate. If it is to be used, the searcher must have the proper equipment, software and Internet connections.

‘On the other hand, the World Wide Web (or WWW or W3) is the multimedia part of the Internet, displaying a hypertext type of structure and search facilities (browsing and navigation). It was first developed for sharing documents between nuclear physicists of the European Particle Physics Laboratory (CERN) in Switzerland in 1989, but the first commercial Web software, by NEXT, in 1991, soon popularised this form of access to the Internet. The main characteristics of the World, Wide Web organisation and structure are as follows:

- organising documents into pieces of information (pages), using a set of rules which tag and format the documents, the Hyper Text Markup Language (HTML);
- every individual document or page is assigned a unique address, called the Uniform Resource Locator (URL);
- each URL can be linked with a hypertext type of link to other URLs and even pieces of information within each document can be linked to URLs or to other pieces of information
- these documents can be searched through interactive interface programs which allow users to browse and navigate through the documents and are called web browsers;
- the communication between the web browsers and the web servers is regulated by a common language using a standardised set of rules called Hyper Transfer Protocol



(HTTP), HTTP allows the interpretation of the HTML signs within *each* Web page, in order to display correctly the page and to enable the transfer of files.

The above points clearly explain the essential difference between the Internet and the World Wide Web.

- 3) People and organisations create home pages to present their own information or service on the Web. A collection of home pages located on the same server is commonly known as a Website. Access to these pages is via the Uniform Resource Locator (URL), using a browser. Some of the examples of browsers are Lynx, Netscape. The URL addresses link the user to the host computer and their individual files; these are then displayed on the users personal computer or workstation. With appropriate software, users can read documents, view pictures, listen to the sound and retrieve information.

The Web browser is a client application that facilitates navigation of World Wide Web and renders multimedia documents coded in the HTML for display on the user's computer. Though browsers facilitate movement through a network of linked documents, browsing is not an effective approach to the identification of specific information. This, in fact, requires what is called a search engine.

A search engine is a retrieval mechanism, which performs the basic retrieval task. Search engines use software programs which create automatically their own databases, containing lists of Web pages. Search engines are composed of three different parts: a program called spider (or crawler), a database with an index, and search software. Spiders wander through the Web, crawling from site to site.

Different search engines use different types of spiders. Some spiders visit every possible site, others are based on more selective principles and visit only the most popular sites. The first type of spider finds a huge volume of information in a short space of time while the second type generates a smaller number of pages, with more relevant results. Every page found by a spider is stored in a database and an index of its contents is built, by extracting automatically words from the web pages and ranking them alphabetically using the same principles which inverted files use. The index, is, therefore, a list of words found with pointers to their location on the database. The third element of the search engine is the search software, which is a program which compares search queries keyed in by users with the index, finds matches and ranks them in order of their relevance to the queries. The criteria for judging relevance will vary according to the search engine. The primary purpose of search engines is to provide access to the resources that are available on the WWW and stored on many different servers. Examples of some important search engines are: Alta Vista, Excite and Lycos.

- 4) In looking at the Internet objectively, most librarians feel that it has opened up wide vistas of sources (including graphic, sound, and text materials) on a global basis that were previously unavailable to the average library or individual searcher or user. Of course, it assumes that the searcher (library or an individual user) possesses the proper equipment, software and Internet connections before anything is initiated.

Libraries that establish a server and a Website may offer any combination of the following to enhance their service to their users.

- i) Basic library information, such as hours of operation, contact people, addresses and policies. There is an opportunity' to make such information more interesting than through other media such as through the inclusion of pictures of staff, a short sound file, or direct e-mail links which enable users to send messages.
- ii) New access to library facilities, such as: remote access to catalogues, improved OPAC search interfaces, show case to library resources, new information services, such as a home page linked to a collection of electronic texts, databases and other Internet resources;
- iii) Interactive home pages offering facilities such as inter-library loan and circulation, and reference questions;
- iv) Links to remote information and connections to information resources around the world. Library staff can identify host-lists and bookmark files of frequently used.

Other uses of the Internet support some of the operations of the libraries and thereby have an indirect impact on customer, service include:

- a) **Staff Development:** Offering a WWW service provides staff to keep' involved in developments in this field;



- b) **Acquisitions:** The Internet can provide access to databases provided by publishers and booksellers and thus aid the collection development process;
- c) **Cataloguing and Classification:** Web pages can be used to distribute and access rules, schemes and recommendations concerning cataloguing and classification;
- d) **Inter-Library Lending and Document Delivery:** The use of the networked public access catalogues of other libraries, document delivery services and others can support identification of requested documents by the users.

The above are some of the uses of Internet access in libraries.,

- 5) An Intranet is an organisation's internal communications system using Internet Technology. It is a private transmission control system that usually supports the same protocols and services as the Public Internet including e-mail, news and Web pages. Intranets use two of the key applications of the Internet, namely the Web browsers, with their graphical user interfaces and e-mail. These are being used to support a wide range of information services, including for example, access to document collections in document management systems and e-mail.

The Internet technology is attractive to organisations to be used in the Intranets because it is more cost-effective. Attaining cost-effective communications entails making information directly accessible to people who need it. Intranets provide direct access to information, so people can easily find what they need without involving any one else.

From the perspective managing information, an intranet can extend the reach of distribution and simplify logistics. For example, it can become quite cumbersome to maintain the distribution list for a typical quarterly status report sent to large mailing list. If anything changes before the next report is due, an update can easily be developed and posted on an Intranet, giving everyone access to the new information. Publishing information on Intranet is simple, since Intranets use the same protocols as the Internet. A number of Web publishing tools are available that quickly turn individual documents into Hyper Text mark-Up language format eliminating the time consuming effort of manual tagging.

Enhanced timely information exchange within organisation is another benefit of an Intranet. In all these aspects Internet technology is useful because of the following reasons.

The interface is easy to use. It also encompasses access to multi media formats;

- 1) A single interface for all formats of information using the Internet open standard removes the requirement for an organisation's network to provide several dedicated interfaces traditionally needed to interrogate proprietary systems such as databanks bibliographic retrieval systems.
- 2) Cost-effective
- 3) Provides improved access in a number of respects.
- 4) Allows maintenance of current documents by offering access to electronic documents that will always be the latest version. This eliminates reprographic costs.

The above are the reasons why Intranets make use of Internet technology.

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## 13.8 KEY WORDS

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**Agent:** A software program which performs tasks for a user, usually relating to the gathering of pre-defined types of information.

**Browser:** A client program for accessing Internet resources.

**BUBL:** The Bulletin Board for Libraries. An important LIS gateway.

**Client:** A program which runs on a local machine, controlling local display, input and output functions, and communications with a server on a remote host for the retrieval of data.

**Gateway:** A site or system which provides access to other sites or systems as its primary function.

**HTML (HyperText Mark-Up Language):** The basic language used in preparing pages for the WWW



**HTTP:** Hyper Text Transfer Protocol.

**Home Page:** The home page acts as a point of entry into the network of web pages in your site. The WWW URL for your home page is the Web address you will use to point users to your web site. Proper design of your home page is important for the success of your site.

**Line Mode:** A text-based connection between computers, commonly used for dial-up connections.

**Meta Search Engine:** Meta search engines are search sites that allow the use of multiple search engines simultaneously through a single interface.

**Node:** A connection point, e.g., to a network.

**Packet:** A basic chunk of data transmitted across a network. A file can be broken into a number of packets for transmission, each packet proceeding independently, and then reassembled into a file at the receiving end.

**Packet-Switching:** The method employed to pass packets across the telecommunications system by variable routes.

**PDF (Portable Document Format):** A proprietary page layout language system produced by Adobe.

**PPP (Point-to-Point Protocol):** A protocol commonly used for establishing full connection to the Internet via telephone and modem link.

**Protocol:** A definition or standard describing how computers will act when communicating with each other.

**Remote Login:** Logging into a computer at another site from your local terminal, which acts as if it was a terminal at that site.

**Search Engine:** Search engines allow users to search the entire Internet for relevant information including USENET news groups users typically enter criteria based on key words and/or phrases. The criteria are compared to a database or material that has been collected from servers all over the Internet.

**Server:** A program which runs on a machine, organising data and responding to requests from client programs for access to that data. Also, in common usage, the machine on which such a program runs:

**SGML:** Standard Generalised Mark-Up Language.

**SLIP (Serial Line Internet Protocol):** A protocol commonly used for establishing a full connection from a PC to the Internet via telephone and modem link.

**Spider:** Search engines are composed of three different parts. One of the parts is called spider. It is a software program. Spiders wander through the Web crawling from site to site following links between pages. There are different types of Spiders. Some visit every possible site while others are based on more selective principles and visit only the most popular sites.

**TCP/IP (Transmission Control Protocol/Internet Protocol):** The basic protocols on which all Internet communication is founded.

**Tagged Text Mark-Up Language (TTML):** A subset of Hyper Text Mark-Up Language (HTML), is a protocol for presenting information accessed from the Internet on digital phones that comply with GSM telecommunications standard.

**URL (Uniform Resource Locator):** A standard format for describing the type and location of an information resource to be accessed over the Internet, most commonly via the WWW.

**USENET** The largest grouping of public newsgroups, based in the USA (in) famous for the scope and Weirdness of some of its groups.

**WAIS (Wide Area Information Server):** is a networked information retrieval system that uses the Z.39.50 query protocol to communicate between clients and servers. Though the term 'wide area' implies the use of large networks such as the Internet to connect clients and servers, WAIS can also be used between client and server on the same LAN.



**Web Browser:** is a client application that facilitates navigation of the world Wide Web and renders multi-media documents coded in HTML for display on the users computer.

**World Wide Web (WWW):** It began as a networked information project in 1980 which finally developed into World Wide Web in 1990. The Web itself can be best described as a dynamic, interactive, graphically oriented, distributed, platform-independent, hypertext information system.

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## 13.9 REFERENCES AND FURTHER READING

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