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LESSON NO. :

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DIGITAL, VIRTUAL AND HYBRID LIBRARIES

Structure

2.1.0 Objective

The study of this lesson will help to understand various forms of electronic

Libraries such as Digital, Virtual and Hybrid. It will also help to understand various aspects related to these Libraries.

2.1.1 Introduction

Traditional Library is a place where the document resources are organized geographically at one place and the users go there to access these resources. Today's technology gives us the ability to move beyond traditional library and access the current information through Internet including audio-visual presentation. As we move from the industrial to the information age, we have the capability to overcome barriers previously presented by time, geographical limitations and print dependency. It is a challenge for us as librarians and information scientists to cope with the present wave.

Library Users expect the library to develop capabilities in the collection, storage, preservation and use of digital media if it is to retain its core role as a key resources for scholarship, research and innovation. Library success or effectiveness depends upon producing virtual products high in added value, rich in variety, and available instantly in response to user needs. At the heart of this revolution is fast new information technology, increased emphasis on quality accelerated product or service development, changing service environment and manpower, and new linkages between library, suppliers and users. As librarians, digital media gives us dreams fulfilled with vast and powerful tools for optimum management and integrated presentation of information. The benefits of these technology are compelling. Digital media can be fully indexed, both for content and context and can be instantly linked to other digital media of similar or associated subject matter. It can be searched, abstracted or ordered on any number of user defined parameters and stored in a manner that will not degrade with use or time. Networked digital media moves beyond the present barriers of the physical production of information and makes current, comprehensive information delivery a literal possibility.

Digital library, electronic library or virtual library, facilitates access to electronic information, print materials, and library services to ensure that the information needs of users are met regardless of their location. It enables libraries to deliver valuable information that already exists within library wall electronically to patrons outside those walls, to create new digital resources locally, and to integrate local digital resources with remote ones.

2.1.2 Digital Library

2.1.2.1 The Concept

A digital library is a library in which a significant proportion of the resources are available in machine readable format accessible by means of computers. The digital content may be locally held or accessed remotely via computer networks.

In libraries, the process of digitization began with the catalog, moved to periodical indexes and abstracting services, then to periodicals and large reference works, and finally to book publishing, some of the largest and most successful digital libraries are Project Gutenberg, ibiblio and the internet archive.

Digital Library is the outcome of the prolonged research and development in the field which is more pertinent to the electronic collections and its management of identification, micro and macro evaluation, selection, acquisition, resource sharing and document delivery. There is no homogeneous and globally accepted definition of a digital library. However, the electronic collections of information and record of the same through on-line and offline and also through various digitized collections such as CD-ROM, Floppy etc. relate to the existence of digital library in broad sense of the term.

Digital library is parallel to or at par with the electronic library and virtual library. The Library which provides collections and services in the electronic form through video disks, CD-ROM can be termed as electronic library; the library which provides electronic collections and/or services can be understood as digital library; and the library which, without any physical existence is concerned with web site is known as virtual library (Rajashekar 1998; p. 2). The digital library in the 21st century has become a vehicle for managing knowledge and information in a digital format which allows for interactive user interfaces and supports teaching, research and life long learning (Lupone;2000;p.30). Thus, the digital library, which is available in electronic form and is not virtually present in shape of marble edifice; is transforming access to information. According to William Saffady, The digital library concept can be pertained to the following areas (Matson; 1997; p.88).

a. Machine-readable data files, often with scientific and technical application;
b. Components of the emerging National Information Infrastructure;
c. Various on line databases and CD-ROM information products;
d. Computer storage devices on which information reside, such as optical disk, jukeboxes or magnetic tape autoloaders; and
e. Computerized networked library systems.

2.1.2.2 Scope

The Digital Libraries available in various forms are restricted not only to the size of files and the format contents which are available in a structured form of software on CD-ROM including video clips, full length movies, but also extend its jurisdiction to rapid communication, Boolean search, browsing of information on Internet through World Wide Web.

2.1.2.3 Definition

According to A.N. Yorkey (1966) "The digital libraries are electronic libraries

having large and diverse repositories of electronic objects. The digital objects include text, images, maps, sounds, videos, catalogues and indices, business and government databases as well as hypertext, hypermedia and multimedia compositions". The end users link to many digital libraries and information centres in a transparent form through the modern technologies. Further, the digital libraries provide a homogeneous presentation of a good number of repositories and allow the end users to comfortably connect and interact with information with regard to geographical location or time.

The collection of information, image, graphics, etc. in a digital library without any geographical circumscribe are disseminated all in digitized form through internet which are accessed by the Network service Provider and millions of users connect their PCs through Digital Collections Services (DCS) using Local Area Network (LAN) technology to get a transformed, authentic, pin-pointed information.

Digital library in its broad sense is a collection of information of library resources in digital format. Dwyer (1997) quote that digital library that maintains all, or a substantial part of its collection in computer format as an alternative or complicated to the traditional printed documents. Gladney et al (19940 using slightly complicated words express that "A Digital Library is an assemblage of digital computing, storage and communications machinery together with the content and software needed to reproduce, emulate, and extend the services provided by the conventional libraries based on paper and other material means of collecting cataloguing, finding and dissemination information," Association of Research Libraries (ARL, 1999), Washington While defining digital library noted that 'digital library', 'electronic library' or 'virtual library' are often used synonymously. A common thread to bind the terminology used to definitions is an emphasis on resources and technology. The elements that have been identified as common to these definitions are :

- The digital library is not a single entity;
- The digital library requires technology to link the resources of many;
- The linkages between the many digital libraries and information services are transparent to the end users.
- Universal access to digital libraries and information services is a goal;
- Digital library collections are not limited to document surrogates; they extend to digital artifacts that cannot be represented or distributed in printed formats.

2.1.2.4 Advantages

The traditional libraries are limited by storage space while digital libraries have the potential to store much more information, simply because digital information

require very little physical space to contain them. As such, the cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books, Digital libraries do away with most of such expenditures. The various advantages of Digital Libraries are as follows :

1. **No physical boundary.** The users of a digital library need not to go to the library physically. People from all over the world can gain access to the same information, as long as an internet connection is available.
2. **Round the clock availability.** A major advantage of digital libraries is that people from all over the world can gain access to the information at any time, as long as an internet connection is available.
3. **Multiple accesses.** The same resources can be used at the same time by a number of users.
4. **Structured approach.** Digital library provides access to much richer content in a more structured manner, i.e. we can easily move from the catalogue to the particular book then to a particular chapter and so on.
5. **Information retrieval.** The user is able to use any search term in the form of the word or phrase to browse entire collection for a particular item. Digital library can provide very user friendly interfaces, giving click able access to its resources.
6. **Preservation and conservation.** An exact copy of the original can be made any number of times without any degradation in quality.
7. **Space.** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information, simply because digital information requires very little physical space to store digital resources.
8. **Networking.** A particular digital library can provide the link to any other resources of other digital library very easily and thus a seamlessly integrated resource sharing can be achieved.

2.1.2.5 Factors Influencing the Digital Libraries

The environment in which library and information services operate is undergoing continuous change. Until 1980's libraries literally had a monopoly of provision of information. The users have to depend completely on libraries for information publication they need. However the escalating quantity and cost of publications made it impossible to stock all the publications that their users want. Although the quality of collection and provision of services are still crucially important factors, the past decades have seen great deal of change in the scholarly information provision. In addition to the greater flow of printed publications, a great increase in electronic sources has taken place. Information and communication technology and digitalization of information resulted in considerable changes in library acquisition and delivery of service.

Virtual library may be characterized library of the future by four key aspects. In the first place it will be a gateway to information, in whatever format this information comes in and wherever it is located. Secondly, because of the increasing complexity of information networks the library will be an expertise centre. Nevertheless, there will still be a pressing need for the library to be a physical entity, not only in the sense of being a social meeting place and place of scholarly interaction, but also as a place where students and other users are provided with modern study facilities and adequate user support. Furthermore, during the coming decades, the library will retain its importance as a collection centre of printed material.

To sum up, the factors that influenced towards development of digital library can be attributed to :

- Speed of information accessibility,
- Emergence of electronic resources,
- Escalating price of information sources,
- Demand from users for scholarly information,
- Information and communication technology, and
- Networking technology

2.1.2.6 Digital Library Services

Digital media capabilities bring significant opportunities for the library to improve access and the value, it provides from its collections. The digital library consists of critical mass of digitally held documents- words, still images, sound and any combination of these. These documents may be stored in more than one places in different institutions. Provision of the documents will be subject to agreement with and, as required payment to copyright and the intellectual property owners. The digital library is the gateway to the exciting new resources and networks that comprise the global information environment. It links from vast print collections to thousands of online texts, and from rare books to world wide networks.

Digital Library Services includes information about all the services, collections, digital resources, library instruction sessions and services. It identifies, evaluates, develops, and implements products and services that enable our members to develop and administer effective and useful digital resources. It also provides the tools, training, and consulting services which librarians need for cost-effective data creation, data management, project administration, and standards implementation.

Through the digital library, Library can enhance the services provided to users, and also to reach new users. Digital collections and services will supplement rather than replace the traditional collection and services. The specific services

of digital library include providing remote access library resources-both printed and non-printed, service deliveries and generation of information in library. Depending upon the by laws of regulations of the individual organizations, the access could be limited to members, or limited to certain resources like commercial databases, where only members can access them through password.

2.1.2.7 Digital Library Development

Successful digital library development requires an exploration of and very likely a significant change in perspective regarding the Library's priorities, including allocation of staff, appropriation of resources, the changing balance between print and digital collections, and the quality and content of staff learning opportunities. The creation of a Digital Library requires action in two major areas :

- The acquisition of Web-based digital content, and
- The provision of staff and organizational resources to support its use.

The range and availability of digital content are expanding rapidly. In order for the digital library to become a reality, more electronic content is required, including full text resources from a variety of publishers covering a range of disciplines. The effective use of information technology in support of the development of the digital library requires commitment and action in the key areas of infrastructure (hardware and software acquisition and maintenance) support and instructional delivery support.

Budgetary Support : Annual increases to the acquisitions budget are essential to allow for the planned growth of digital resources to meet student and faculty needs. A balance between digital and print materials is very important.

Infrastructure support : The development of a long-term-plan is essential to provide ongoing infrastructure upgrade and maintenance in order to increase the capacity of services. Internet connectivity preferably on lease line or dedicated line is desirable for the terminals within the Library or through networking in LAN environment.

Remote Access : Student and faculty access to networked information resources from residence, office and at home is a critical element in the transformation of teaching and learning through technology and should continue to be a priority for the library.

Hardware Upgrades : As the number of digital resources available through the Library continues to grow, it will be increasingly necessary to develop and implement a hardware replacement plan for library servers, workstations, scanners, CD-Writers and other peripherals.

Software Support : Along with hardware support the proper software support is essential to provide security, reliability and to enhance the performance of the digital library services. The digitalization needs strong database designer and a

web browser. SQL at the backend and Visual Basic .Net at the front-end could be the one of the option for creation of digital library in networked environment. Visual fox pro could be another option.

Staff Support : Human factors are the key for success. Staff learning and increased knowledge throughout the library regarding concepts and issues involved in digital libraries, electronic publishing and electronic information technology, as well as their impact on the Library should be taken care of by the staff. Staff should be technically competent and service oriented towards the users.

2.1.2.8 Products and Services of Digital Library

In the IT age, the development of computer technology has reached to its apex more specifically in the networking field where, the world has turned to a global village. Internet and the WWW technologies are providing a challenging technological environment and intellectual impetus for the development of digital libraries. The Internet could be able to establish a global connectivity of computers and the production of different indigenous products, tools, and techniques for networked information provisions and retrieval. The productions, which are in electronic from and stored in digitalized bit form, include.

a. Electronics Mail (E-mail);
b. File Transfer (Ftp);
c. Telnet (Remote Login);
d. Gopher;
e. WAIS and WWW for information/electronic publishing and access using the text coding standards such as Hypertext Mark up Language (HTML) and Standard Generalized Mark up Language (SGML) where. SGML is a Meta language to describe markup language implemented through HTML;
f. Electronic Journal (E-Journal);
g. Electronic News (E-News);
h. Table of contents;
i. Preprints;
j. Technical Reports;
k. Software and data archives including Library catalogues, discussion forms, preferences sources, course ware, directories etc.;

The E- Publishing which is a successful venture of electronic age can be defined as the publication process where the manuscripts are transferred to electronic format and distributed to the users by employing computers and telecommunications. In the most sophisticated interpretation, the full capabilities of electronic media including motion, sound and interactive features are exploited in the creation of a completely new publication in Machine -readable from which are distributed on magnetic tape and video discs and can be accessed

like any other database. CD-ROM, videodiscs and On-line bibliographic databases form a major part of E-publishing field. In the field of Telecommunication Technology, the Integrated Service, digital switches and digital paths are used to establish a varieties of services such as videotext; E-mail; digital fascimile; teletext; Database access; E-fund transfer; image and graphics exchange; document storage and transfer; video conferencing etc.

2.1.2.9 Recent Developments

The application of IT in Libraries and Information centres has raised the competency of information acquisition, processing, storing and retrieval and more particularly the electronic document delivery system. There is a tremendous implication of this in all quarters of digital libraries including the impact of electronic publishing in general and electronic journal in particular which proved to be an inherent capabilities for manipulation, searching and acquiring of information resources. The digital libraries could admit a direct interaction among the end users with the various networks and information resources in remote access areas without any geographical limitations. The Boolean search of full text through browsing made it a positive solution to the emerging problem of the scholar in the midst of ocean of information.

Added to this, the tremendous success of CD-ROM as the optical medium of choice for the thousands of publishing firms led to the generation of optical information storage system through CDs at par with E-Publishing for its storage of good quantum of data, durability, crystal presentation, and affordability. The Electronic Journals, periodically available through on-line are being produced published and distributed nationally or internationally via electronic networks. The major impact of the transfer of electronic information in the digital libraries is concerned with the quality, authenticity, and reliability of information services. In addition to this, the mode of transfer of information could be well effective through electronic clipping services, & electronic reference service, in digital libraries. The electronic preservation through selection, acquisition, organization and above all the standardization, creation of Met abases, display technologies are also the important components of impact of the digital libraries. The preservation is important as it captures culture and accesses important concepts of the present digital libraries which are evolving into digital community by uniting people with common interest in a new way.

During 1970's the digital library which were basically confined to minicomputers entered to a drastic revolutionary change in 1990's with the swift development of IT multidisciplinary development of software technologies which paved the way for inclusion of text, image, audio, video, graphics, including hypertext within the boundaries of digital libraries. The Internet made a positive contribution to

build the true image of digital libraries in shape of electronic storage of information, retrieval, document delivery, accessing of information through various databases, interlibrary-loan, acquisition, price control transfer of flies, transfer of information etc. Further, CD-ROM, optical videodisk and other latest technological developments also made significant contributions for understanding the digital library.

2.1.3 Virtual Library

2.1.3.1 Scope

Virtual Libraries consists only of resources available in digital format, which can be accessed locally, stored on a hard disk or accessed through computer networks, unlike digital libraries; virtual libraries do not consist of full text articles and multimedia. They are more of an index of relevant, hand picked links to external resources on World Wide Web. The selection and categorization of information sources of virtual library are generally handed by one expert or a group of experts.

The virtual library was first conceived and run by Tim Berners Lee and later expanded, organized and managed for several years by Arthur secret. The Late Bartrand Ibrahim was a key contributor to the pre-association phase of the Virtual Library development. The Virtual Library was incorporated as an association sans but Lucratif (Not for profit association) in the republic and canton of Geneva, Switzerland. The name Virtual Library Web site was redesigned in 2005 and many old or deal individual librarians were removed from the index of virtual library.

2.1.3.2 Definitions

Virtual Library may be defined as a library which has no physical existence, being constructed solely in electronic form. According to (Sarasevic, 2000) "Virtual Libraries are organized collections of digital information. They are constructed collections organized for a particular community of users, and they are designed to support the information needs of that community." Virtual libraries can offer resources from many sources, and in many formats, including audio and video. The items in these virtual collections do not have to reside on one server, but they share a common interface to assist the user in accessing the collection. The emphasis in virtual libraries is on organization and access. "The Design determines the type of learning that the virtual library supports", say Baldwin and Mitchell. Libraries can exist in two different spaces, a physical space and a virtual space. Each space enables different activities, and serves different purposes. Many libraries exist only in one space, while others maintain a hybrid space, both a physical and virtual space, in recognition of the distinct information uses and learning activities that can occur within each environment. All libraries, whether virtual or physical, create an environment for learning.

Holdings in virtual library are found in electronic stacks. In short we may say that it is a library that exists, without any regard to a physical space or location. It is a technological way to bring together the resources of various libraries and information services, both internal and external, all in one place, so users can find what they need quickly and easily.

2.1.3.3 Advantages

There are many advantages to going virtual. Some of the advantages include the following :

a. It saves and/or reduces the physical space taken up by library materials.
b. It often adds enhanced searching capabilities in a digital format.
c. The library materials are available at the user's desktop, regardless of where the user is physically located.
d. It allows for the inclusion of materials only available on the Internet or in digital format.
e. It provides the user with the capability to download and manipulate text.
f. It often allows for multiple, concurrent users.
g. It eliminates the problem of a book being missing or off the shelf.
h. It is less labour intensive.

2.1.3.4 Disadvantages

a. Every product has its own distinct user interface.
b. Users need to remember different passwords for different products.
c. The scope of coverage and available archives is often limited.
d. There are often difficulties with downloading or printing. Often there is no cost savings, especially when both the virtual and print products are maintained.
e. Everything is NOT available in digital format.
f. There are restrictions, which vary from vendor to vendor, on how the product can be used.
g. The virtual library relies on power and computer networks in order to be available for use.
h. Users can't spread everything out in front of them and use it all at once.
i. Users are most comfortable using books.

2.1.3.5 Development

The stages of development that are involved in creating a virtual library, or converting portions of a traditional print library into a virtual library, can be broken down into seven areas;

- The Decision Making Process
- New Training and Skills for Library Staff
- Installation and Testing

- Creating a Structure for Organizing and Accessing Materials
- Marketing and Promoting Materials
- Training Users
- Evaluation and Reevaluation

The last three are actually a continuous chain. With new users constantly coming and going, and changes and upgrades being made to the products, marketing, training and evaluating is an ongoing process.

2.1.3.6. Drawback and Limitations

1. Connectivity

Virtual libraries require connectivity. If there is no Internet connection, the virtual library is inaccessible. Although internet use is becoming more widespread, there are still many people who do not have internet access. The term digital divide has been applied to describe the gap between those people with access to the internet and information technology tools and those without.

2. Skilled Professionals

The term second-level digital divide appropriately describes the group of people who has access to the internet, but lacks the skills to utilize the information that is available effectively.

Virtual Libraries still require skilled professionals to organize, maintain, and help users reap the benefits of this virtual environment. The power of internet resources remains latent to those without the skills to use them. Although some virtual libraries are lists on web sites and require little internet searching ability, other virtual libraries demand the knowledge of Boolean searching and advanced searching skills to realize the potential of the databases. Users often experience trouble making effective choice when confronted with multiple databases, and feel difficulty with effective searching and are often unable to determine whether items they locate are relevant for their needs. Virtual spaces require scaffolding and coaching. Who will classify the knowledge and information ? The takes don't go away in the virtual environment. The teacher-librarian is needed more than ever in this virtual library guiding users in their selection, evaluation, and use of the many electronic option.

3. Storage of digital Information

There are other issues of a more technical nature that impact on the learning potential of resources available in virtual libraries. Storage of digital information is relatively new and the many of the long-term storage issues have not been settled, the permanency, or lack thereof, of digital information : achieving digital information to make it accessible in the future; and the long-term maintenance costs of information in digital format.

4. Acquisition of Resources

Virtual libraries have increased the number of resources available to library users, but, often, many of these resources would not be materials that the library would ordinary add to their collections. This is particularly true with online periodical databases available on a subscription basis. When libraries purchase online database, collection are no longer tailored for a particular community of learners.

2.1.3.7 Summary

Virtual Library has no physical boundary. The resources of virtual library are stored only on hard disk and can be accessed anywhere. Internet connectivity and skilled professionals are pre-requisite for a good functional virtual library.

2.1.4 Hybrid Library

2.1.4.1 Concept

The term 'Hybrid Library' has been coined in recent times to describe the way in which the libraries of the future will function; and it is already being widely used in the majority of developed countries. Hybrid libraries may be developed at all these levels. In terms of its 'concept', the hybrid library is generally defined as a library in which electronic and print based sources of information are made available together in an integrated way for consultation by users, local and remote; the hybrid library is a middle point between the traditional library and the fully digital library. Opinion is divided on the issue of whether the hybrid library is likely to be the main model for the foreseeable future or whether the hybrid library is a transitional stage leading to the fully digital library. There is, in reality, a very strong continuity between traditional library roles and missions and the objectives of digital library systems.

This thinking is based on the belief that the needs of serious information seekers can only be met by providing the user with access to both electronic and traditional information resources. Any modern quality library service must Endeavour to provide ready access to both types of resources. Furthermore, it should provide such access in an integrated fashion. Its search pathways should present to the user a combination of relevant electronic and traditional resources in response to searches based on author, title, subject, etc. Its browse pathways should similarly lead the user to both categories of resource.

The UK eLib Electronic Libraries program has coined the term "Hybrid Library" to cover services that unite the functions of the traditional library with those of electronic, digital or virtual library services :

A Hybrid Library is envisaged as the bringing together of technologies from electronic, digital or virtual library projects which have been taking place round the world as well as in the UK's eLib programmer, plus the electronic products and services already in libraries, and the historical functions of our local, physical

libraries.

A Hybrid information environment can be described as one where an appropriate range of heterogeneous information services is presented to the user in a consistent and integrated way via a single interface. It may include local and/or remote distributed services, both print and electronic. The environment will provide some or all of the following functions : discovery, location, request, delivery and use, regardless of the domain in which objects are held. Domains may include eg. Libraries, archives, museums, government. There may be dynamic configuration to reflect an individual user's interest (or a group's interest). The environment will depend on open systems and standard protocols. While the emergence of digital library services has increased the challenge of integration in some areas, it has created potential solutions in other areas, such as in integrating the discovery of local and remote resources, or of collection level and items level resources.

2.1.4.2 Definition

A Hybrid Library is a library where 'new' electronic information resources and 'traditional' hardcopy resources co-exist and are brought together in an integrated information service, accessed via electronic gateways available both on - site, like a traditional library, and remotely via the internet or local computer networks. The hybrid library is different from a typical library website in two ways. One is the permanent and equal inclusion of print information sources alongside the electronic. A second is the attempt to focus and interpret the whole service - subject - specific and generic elements- for a particular group of users in a scalable fashion. The philosophical assumption underlying the hybrid library is that libraries are about organized access, rather than local collections - which become just a part of the means of delivery. The term 'hybrid library' gained prominence through the UK Electronic Libraries Programmer (eLib.)

Some consider the hybrid library to be a transitional stage between the traditional and the digital library. Others consider it to be the likely model for the foreseeable future. The latter model seems to be more plausible, given the enormous historical investment in print and the scale of the cultural changes needed to move to purely digital delivery.

2.1.4.3 Scope

The Hybrid Library is on the continuum between the conventional and digital library, where electronic and paper-based information sources are used alongside each other. The challenge associated with the management of the Hybrid Library is to encourage end-user resource discovery and information use, in a variety of formats and from a number of local and remote sources, in a seamlessly integrated way. The hybrid library should be seen as a worthwhile model in its own right,

which can be usefully developed and improved.

Hybird Library owns and subscribes to a range of resources and services which are supplied in a variety of formats and media; print monographs and serials, electronic journals, abstract and indexing services on CD-ROM, music CD-ROM, etc. However, there is currently no uniform way of managing and providing integrated access to these hybrid resources. Users are forced to interact with each service individually and waste time in repeating the same step to search different systems. At the same time, using different interfaces also increase the risk of inefficiencies—such as failure to discover relevant resources.

Although Library and information Services have long endeavored to adopt a user centered approach, the issue has now become even more acute because of the greater heterogeneity of user groups. It is recognized that information needs. IT skills and works- patterns of one set of users may differ radically from those of another set of users working on a remote site. Early investigations reveal some commonality of experience between the groups, chiefly.

- Users want more copies of key print sources.
- Users get frustrated when resources shown as available on the OPAC can not be located.
- IT and information handling skills are often inadequate.
- Users often have difficulty in searching the OPAC.
- There is demand for more support and guidance from Library and Information Services staff.

Hence there is a need for the close involvement of users, reinforced by clear evidence that their expressed needs are often at variance with those perceived by Library and Information Services staff.

2.1.4.4 Management and Organization

Successful hybrid library implementation involves closer integration among stakeholders such as library staff, computing staff, academic staff, and educational development staff. We have to assess to what extent organizational structures are changing in order to enable and support co-operative complementary working in the provision of learning support.

Other management aspects include training and development of service staff in order to achieve an appropriate skills mix, support and instruction for users, team-working and the management of change. Ultimately, these issues must be addressed strategically at the institutional level as the hybrid library promises to become a central element of teaching, learning and research activity. Development which may be cultural, organizational, strategic or personal, as well as technical and financial.

2.1.4.5 Human Resources Development In The Transition Towards The Hybrid Library

Developing and implementing services based on electronic information and being a partner in developing new teaching and learning environments requires that a whole new set of qualifications have to be available in the library. Besides operating the "old" paper based library, new services have to be invented and available technological solutions have to be implemented and applied in the daily operations.

One of the key factors in inventing and operating new services is the acquisition of new staff competence. The rapid changing environment, new technological tools and increasing customer expectations calls for new attributes and new approaches to library and information service.

Man power development should be given an important thrust. All the library professional should be given two months long intensive basic training course in computer operation. The training on operating Software must be given by competent people.

In short we may say that human resource development should concentrate on :

- Network Knowledge and general hardware Knowledge
- PC and peripheral equipment- "first aid" in case of technical problems
- Use your browser - browser functions, wall paper, bookmarks, save to disk etc.
- The WWW - OPAC for non-Library educated staff
- Internet Pointer Guide

2.1.4.6 To design the Jobs

Another important aspect to be considered is to design the jobs in the "electronic" Library. The basic assumption is that the work processes in the traditional "paper based" library are well know and well described and that it would be double task to describe the work processes in the "electronic" Library.

It is hard fact that the transition towards the hybird does not take place in a vacuum- the transition cannot be seen as an experiment in a laboratory where one can control all environmental conditions. The transition is mainly because of the attitude towards the change. The transition can be a very turbulent environment or a smooth peaceful changeover.

More radical steps towards the "electronic" library, plus the fact that the available technologies develop at a rapid pace, has made it rather clear that the "new" library world will do best by saying farewell to the well known, very specific and thus static job descriptions and instead provide each staff member with the necessary means to continuously create and up-date their own jobs.

Implementing a combination of different "tools" can do this. The most important

of these are :

1. Including a certain pressure or competition as to the necessity of being up-to-date, curious and self responsible, in order to be valuable for the organization.
2. Organizing the institution in such a way, that the individual staff have the competence to make decisions on their own, take individual and group initiatives without having to pass several levels of decision makers, thereby allowing staff to make mistake and learn.
3. Facilitate self organized or group organized education or development of competence "on demand" that is with very short notice, for instance by establishing the technological conditions for distance learning and communication.

In short, instead of creating the job description, the important thing is to provide the frame work for the individual staff member to create and change the job on a continuous basis.

2.1.5 Self Check Exercises

Exercise 1 Fill in the blanks

a. Digital Library in its broad sense is a collection of information of ……
b. The digital library requires …… to link the …… of many libraries.
c. Virtual Library has no …… being constructed solely in ……
d. A Hybrid Library is one where new …… and …… hard copy resources co-exist.

Exercise 2 Write down factors influencing digital Library.

Exercise 3 Write down Advantages of Virtual Library.

2.1.6 Answers to self check exercise

Exercise 1

a) Library resources in digital format.
b) Technology, resources
c) Physical existence, electronic form
d) Electronic Information resources, Traditional.

Exercise 2

- Speed of information accessibility,
- Emergence of electronic resources,
- Escalating price of information sources,
- Demand from users for scholarly information,
- Information and communication technology, and
- Networking technology

Exercise 3

- It saves and/or reduces the physical space taken up by library materials.
- It often adds enhanced searching capabilities in a digital format.
- The library materials are available at the user's desktop, regardless of where the user is physically located.
- It allows for the inclusion of materials only available on the Internet or in digital format.
- It provides the user with the capability to download and manipulate text.
- It often allows for multiple, concurrent users.
- It eliminates the problem of a book being missing or off the shelf.
- It is less labour intensive.

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LESSON NO. 2.2 **AUTHOR : VISHAL SINGH**

LIBRARY AND INFORMATION NETWORKS WITH SPECIAL REFERENCES TO INDIA : DELNET, INFLIBNET, ERNET, NICNET

Objective :

In this lesson, we will discuss the Information Networks with reference to India and some of the important Indian networks like Inflibnet, Delnet, Ernet and Nicnet.

2.2.1 Introduction

Library and Information network may be defined as a combined effort of two or more libraries to share their resources for providing better services to their user

community.

The first library cooperation activity in India is reported to be the catalogue of manuscripts compiled by Whitney strokes in 1868. Union catalogue development was a major cooperative effort in Indian libraries up to the 1960s. We can look at the following union catalogue development activities.

The 1960 also saw a large number of national seminars devoted to the concept of library cooperation. However with the advent of computers in library work, a change occurred. It is reported that the first use of the computer in the library work for the production of the union list of serials using the IBM/602 machine at INSDOC was performed in 1964. Since the library automation has been a matter of primary importance in Indian libraries. With the establishment of national informatics centre (NIC) in 1975 the development of NICNET in 1977, networking and communicating technology in India received a major boost. This as a whole had a major influence in resource sharing among various libraries and information centres through networks. The 1990s are said to be the golden period of library networking in India. There has been a plethora of publications and seminars on library networking during this period. Today besides INFLIBNET there are various library networks in India such as CALIBNET, DELNET, PUNENET, MYLIBNET etc.

Resources sharing is sharing of library resources such as document collection, staff members, technical facilities and mechanical aids among the participating libraries on the basic principle of cooperation, "All for one and one for All." In this respect it is possible to consolidate the document collection of participating libraries, exchange their technical capabilities and share their services. In this way it is possible to share the resources to provide online access to the vast amount of library and information sources to a larger user community at the least cost. The objective of resource sharing is obviously to make the greatest amount of best information available to the most users at the reasonable cost.

There has been a voluminous growth of published documents in the recent past. As a result no library is able to procure process or store all documents that its users demand. According to Kent, it is difficult for anyone single library to acquire even one percent of the total documents published in the world, due to one or more of the following reasons :

1. Growth of knowledge in different subjects.
2. Rapid increase of literature and growth of publication.

Therefore some resource sharing a necessary between one library and another library to acquire more information in a specific subject with low cost as published records are increasing at an incredible rate and their prices are keeping pace, in such circumstances library cooperation will assume a pivotal role and resource

sharing will become a focal point of cooperation.

2.2.1.1 Resources Sharing Through Networks :

Earlier, the idea of resource sharing for a long time was restricted to the area of lending of books and periodicals. Now it has become diversified and incorporated the various activities of the libraries such as abstracting and indexing, acquisition, bibliographic access, cataloguing, circulation, collection, development continuing, education for staff and user literature searching management and accounting, referral services, storage and union lists.

The first few decades have witnessed knowledge and information explosion the world over and inadequate and financial resources to do the best in terms of distribution of knowledge and information. Under these circumstances, resource sharing and cooperative functioning of libraries and information centres through networking became vital. Efficient resource sharing can be achieved by using recent advancement in IT, i.e. networking of libraries and information centres through LAN, MAN, WAN and so on.

Network of information/resource sharing is to use the computer and telecom link for transmission of information or data from one library to another. Keeping this concept in view, various library networks have been established for cooperation and resource sharing among libraries. Not all the networks confirm to the essential functions of library networks. It is noted that the essential functions should include :

* Promotion of resource sharing.
* Delivery of documents.
* Creation of resources sharing tools like bibliographic databases such as union lists of serials, union catalogue of books, bibliographic database of articles and other types of materials such as CDs, video recording, theses etc.
* Adoption of international standards for creation of records uniformly.

2.2.1.2 The Indian scenario in resource sharing :

Economic pressures, growth of publications and emergence of subject specialization have compelled the libraries and information centres to think of sharing and information resources and optimizing the use of existing resources within India as well as from abroad through various networking systems. Some of the notable networks in India are NICNET, ERNET, DELNET etc. In addition, there is a major initiative from the UGC called INFLIBNET, interconnecting universities, colleges and resource institutions countrywide.

(a) National level resources sharing :

INFLIBNET, a national level resource sharing of university libraries was set up in 1986. INFLIBNET is a multiple functions/service network with focus on resource sharing and cooperation through computer communication links. It is useful to

all the libraries and their readers. For this purposes, it is possible to create data banks in different subject fields, produce a number of bibliographic tools and information services. It is also possible to conserve a lot of library resources avoiding duplication at the national level.

(b) State level resource sharing :

In India, formation of a network of university libraries in all states is possible only if the concerned administrative and professional staff and supporting agency make a sincere attempt in this direction. They should plan to coordinate programs of all the universities in the state to form a uniform academic calendar. They have to establish a body like council of higher education to initiate a network of libraries in the state say KAULIBNET (Karnataka State University Library Network) in the interest of larger academic community. They should bring all the affiliated colleges within the fold of state level library network and extended the services to colleges.

(c) City Level Resource Sharing :

Specialized library networks have come up for individual cities like DELNET, CALIBNET, PUNENET etc. These networks are meant essentially for providing a centralized database of library information to be accessed by its user libraries, mostly in a particular city for the purpose of resource sharing.

2.2.2 INFLIBNET

Information and Library Network Centre (INFLIBNET) is an autonomous Inter-University Centre for the University Grants Commission (UGC) of India. It is a major National Program initiated by the UGC in 1991 with its Head Quarters at Gujarat University Campus, Ahmedabad. Initially started as a project under the IUCAA, it became an independent Inter-University Centre in 1996.

INFLIBNET is involved in modernizing university libraries in India and connecting them as well as other information centers in the country through a nation-wide high speed data network using the state-of-art technologies for the optimum utilization of information. INFLIBNET is set out to be a major player in promoting scholarly communication among academicians and researchers in India.

2.2.2.1 Objectives of INFLIBNET

The primary objectives of INFLIBNET as envisaged in Memorandum of Association are :

* To promote and establish communication facilities to improve capability in information transfer and access that provide support to scholarship learning, research and academic pursuit through cooperation and involvement of agencies concerned.
* To establish INFLIBNET : Information and Library Network a computer

communication network for linking libraries and information centres in universities, deemed to be universities, colleges, UGC information centres, institutions of national importance and R & D institutions, etc. avoiding duplication of efforts.

2.2.2.2 Functions of INFLIBNET

In order to fulfill the broad objectives, INFLIBNET will :

* Promote and implement computerization of operations and services in the libraries and information centres of the country, following a uniform standard.
* Evolve standards and uniform guidelines in techniques, methods, procedures, computer hardware and software, services and promote their adoption in actual practice by all libraries, in order to facilitate pooling, sharing and exchange of information towards optimal use of resources and facilities.
* Evolve a national network interconnecting various libraries and information centres in the country and to improve capability in information handling and service.
* Provide reliable access to document collection of libraries by creating on-line union catalogue of serials, theses/dissertations, books and non-book materials (manuscripts, audio-visuals, computer data, multimedia, etc.) in various libraries in India.
* Provide access to bibliographic information sources with citations, abstracts etc.
* Enable the users spread all over the country, irrespective of location and distance, to have access to information regarding serials, theses/dissertations, books, monographs and non-book materials by locating the sources where from available and to obtain it through the facilities of INFLIBNET and union catalogue of documents.
* Create databases of projects, institutions, specialists, etc. for providing on-line information service.
* Encourage co-operation among libraries, documentation centres and information centres in the country, so that the resources can be pooled for the benefit to helping the weaker resource centres by stronger ones.
* Train and develop human resources in the field of computerized library operations and networking to establish, manage and sustain INFLIBNET.
* Facilitate academic communication amongst scientists, engineers, social scientists, academics, faculties, researchers and students through electronic mail, file transfer, computer/audio/video conferencing, etc.
* Create and promote R&D and other facilities and technical positions for realizing the objectives of the Centre.
* Generate revenue by providing consultancies and information services.

* Do all other such things as may be necessary, incidental or conducive to the attainment of all or any of the above objectives.

2.2.2.3 Departments of INFLIBNET

2.2.2.3.1 Database Development and Management Group

1. Database Development and Management Group.

* Provide reliable access to document collection of libraries i.e. Union Catalogues etc.
* Provide access to the world wide bibliographical information.
* To maintain consistency and quality in databases created by the participating libraries.
* Evolve standards, uniform guidelines, methods, and procedures, both for data capturing as well as Hardware and Software.

Major Activities

Development, managing and updating of Union databases is one of the major activities of the INFLIBNET. This group is working hard to meet this objective. Nine databases have been developed and are continuously growing in terms of quality and quantity. Following is the list of databases :

* Books - Represents holding of participant libraries under the program.
* Theses - Doctoral theses submitted to various Indian universities till date.
* Serial Holdings - Holdings information of various university libraries about the serial.
* Current Serials - Currently subscribed journals by the universities.
* Secondary Serials/CD-ROMs - Holdings information of the universities.
* DDC Serials - Currently subscribed journals by the six universities identified as DDC.
* Experts - Useful data about specialists in various disciplines.
* Research Projects - Information about ongoing projects.
* NISSAT Project - Experts Database (Science & Technology).

Standards and Formats required for creation of Databases

(a) Guidelines for Data Capturing : A User Manual

To maintain consistency and quality in databases prepared by the INFLIBNET Centre and libraries, INFLIBNET Centre had constituted a taskforce consisting experts in this area. This taskforce has brought out a 100 pages document entitled Guidelines for Data Capturing : A User Manual. This document is prepared based on Common Communication Format (CCF), 1992 edition and same has been given to participating libraries for adoption.

(b) SOUL Guidelines for Data Capturing : A User Manual for Documents

This is designed to be a handy manual to create records in SOUL. The User guide

lists all bibliographical elements covered in the SOUL, with complete description of each field and sub-fields for Books, Theses, Serials etc. It also provides guidelines as per AACR - 2 as to how to render the information in each field and sub-field with examples.

(c) Creation and Maintenance of Authority File

INFLIBNET is suggested libraries to use Library of Congress Subject Headings (LCSH) as a standard for providing subject headings. INFLIBNET is going to create and maintain the Authority Files of names and subject headings in the machine readable form and it will be linked with the Union Catalogue and Library Automation Software Soul developed by INFLIBNET.

Infrastructure

Well equipped laboratory with latest Intel PIV/RISC computers running on different operating systems like DOS, Windows 2000/2003 and Linux/Unix.

2.2.2.3.2 Database Research and Development Group

Creation of union databases of Books, Serials, Theses etc. has been one of the major objectives of INFLIBNET and the Database Research and Development group has been set up to address the problems involved in the development, maintenance and updating of these union databases. Development of software tools for converting data from one format to another, effective retrieval and managing the databases are the major areas of work undertaken by this group.

Major Activities

* Database design, analysis and technical support.
* Assisting participating libraries in database development.
* Development of utilities for database creation, conversion and maintenance in different formats like CCF and MARC 21 etc.
* Development of Utility tools for Retrospective conversion of union catalogues.
* Administration (routine jobs like backup, turning and implementation of security policies etc.) of Union Database servers in the Centre.

Infrastructure

Well-equipped lab with latest Intel PIV/RISC computers running different operating systems like windows 95/98/2000/XP, LINUX, UNIX.

Development tools : Microsoft Visual Studio, SDK.

RDBMS : Microsoft ACCESS, Microsoft SQL SERVER 7.0/2000, ORACLE 8i/9i, SYBASE Adaptive Server.

2.2.2.3.3 E-Education Group

E-Education Group is concerned with the R & D and keeps abreast with latest technological changes in the area of computer technology. This group was established sometime in August 2001 and is responsible to implement Web-Based

Training (WBT) to technocrats and Professionals.

This group is promoting R & D activities in area of e-learning. One of the major objectives of this group is to collaborate with Universities/colleges for setting/ managing e-learning lab for various training/e-courses.

Major Activities

* The Group is concerned with all the technical and non-technical issues related to e-learning in general and Web Based Training in particular.
* Plan, evaluate, implementation, review of e-learning policies, models, softwares and technology.
* Setting up e-learning Lab at INFLIBNET premises. Development of retrieval software for CD-ROM based bibliographic Databases.
* Exploring various options regarding e-learning.
* Preparation of analysis, and minimum critical resources.
* Assessment, preparation and recommendation of system requirements for e-learning set up.
* Planning, preparation and recommendations for e-learning preparation work and infrastructure for the set up.
* Preparation of road map for e-learning activities for the coming next few years.

2.2.2.3.4 Software and R&D Group

Major objective of this group is to develop software for Library automation and other supporting tools for library automation. This group is also involved in supporting all other activities of the centre by providing adequate software help time to time. The mission of this group is to provide technological support to all activities of the centre with software developments using latest technologies and available development tools.

Major Activities

Development, managing and updating of Union databases is one of the major activities of this group. Eight databases have been developed and are continuously growing. Following is the list of databases :

* Development of New Version of SOUL
* Incorporation of Various Bibliographic standards in SOUL
* Constant Update of Current version based on user requirements
* Trouble Shooting and Customer support for SOUL users

Future Plans

* Development of fully web based library management system.
* Incorporation of Multilingual Interface (to be developed by Database R & D Group) in SOUL
* Incorporation of Data Conversion Utilities (To be developed by Database

R & D Group) for conversion of Various Bibliographic format including MARC and CCF in to SOUL

* Development of MARC 21 based database creation tool.

Infrastructure

Working Platforms of this group :

Operating Systems : Windows NT 4.0, Windows 2000, Windows XP, Windows 2003.

RDBMS : MSSQL Server 6.5, MS SQL Server 7.0, MS SQL Server 2000, Sybase 11.5, Oracle 9i

Development Tools : Power Builder 6.0, Microsoft Visual Studio 6.0, Microsoft Visual Studio, Met, Oracle, Internet developer suite, etc.

2.2.2.3.5 Web Development Group

Organization of vast information present on the Centre's website and making the website a resource gateway and a knowledge hub, to the user community is one of the main objectives of the INFLIBNET Centre. The web development group set up in promoting the access to the information in the field of research and academic pursuit by using latest web technologies is working towards in implementing this objective. The major areas of work undertaken by this group are to select, organize and present the quality resources of the Centre in a meaningful way that will be useful for the user community.

Major Activities

* INFLIBNET Website design and updating.
* Promoting the website of the centre and providing a complete statistical report of users accessing the website.
* Maintenance of various web services running at the site.
* Identifying the Hardware, Software requirements in improving the Center's Infrastructure with the latest available technologies.
* Installing and providing support for the available software at the Centre and advising the participating libraries with regard to hardware and software requirement.
* Bringing out SOUL software CD's for all the versions i.e. SOUL network version, SOUL Stand alone version & SOUL Demo version.

Future areas of development

Setting up an Intranet for managing the internal information of the Centre.

Infrastructure

Well equipped Pentium-IV systems running windows 98/2000 and Linux operating systems. The web server is hosted on a Pentium-IV system and is likely to switch over to a rack-mount machine. There is one CD writer to burn with SOUL software CD.

2.2.2.3.6 Networking and Quality Control Group

This group has been created for promoting R & D activities in area of Networking and Quality management. Major responsibility of this group is to manage, maintain and timely update the campus wide Network. One of the major objectives of this group is to coordinate with UGC-NETWORK, the proposed wide area network connecting all academic institutions under University Grants Commission for setting/managing data centre for various databases of INFLIBNET, Indian universities, Information Centres. This group is working progressively for implementing. Total Quality Control (TQC) for in-house developed software. Training/workshop in the area of network management, security design and state-of-the-art technologies for library professionals across the country is being initiated by the group. Consultancy work in the area of networking, network security of universities/colleges library is also going to become thrust area of this group.

Major Activities

* LAN/WAN Setup and maintenance of INFLIBNET.
* Assisting Universities/colleges for Campus LAN.
* Design network security policy.
* Network Traffic management.
* Network resources allocation to the other groups.
* System administration, configuration and tuning.
* Database administration and tuning.
* Disaster recovery plan for e-resources.
* System maintenance at Centre.
* Testing and Quality control of software developed at the centre.
* Guidelines, suggestions and standards to all development groups for maintaining quality.

Infrastructure

Well-equipped server laboratory with Intel PIV servers running on Windows NT/ 2000 Advance Server. Separate mail server is running on Lunix. Network is protected by Firewell running on Linux. Centre has 512 kbps & 2 mbps leased lines from ERNET for Internet connectivity.

2.2.2.4 Activities of INFLIBNET

2.2.2.4.1 Human Resource Development :

To enhance the skills of University Library staff for implementation of INFLIBNET Program, following training courses and workshops are conducted :

One month Training Program

This is mainly meant for operational staff of libraries. They are given exhaustive training on application of computers to library and information services. Eighteen

such programs were held covering most of the universities, and around 350 persons have been trained.

On-site Training Program

Staff from INFLIBNET Centre visited 31 universities, and conducted training for the library staff members for a week initiating automation process using CDS/ ISIS and ILMS software.

ILMS Training

Ten Librarians from different universities spent a week at INFLIBNET to solve their problems in using ILMS.

SOUL Training

Soul was installed at 600 + Libraries and onsite training of one week to the library staff was provided at each site.

Workshops

Six workshops for senior level staff via, University Librarians and Deputy Librarians were conducted.

2.2.2.4.2 Software development :

Library Management Software

For the automation of in-house functions of participating university libraries, INFLIBNET centre has developed a user-friendly state of art GUI based software named '**SOUL**' Software for University Libraries. This is based on Client/Server architecture. It uses a robust RDBMS as back end tool. This works on Windows and Windows NT environment with a number of new features.

Library Software Management

Utility Softwares :

Following utility softwares developed at the centre are available to the universities on request.

* To search the data from union databases (OPAC).
* Catalogue card generation.
* duplicate checking of records.
* Customized software for books, thesis, and serials.
* Data conversion from Dbase, FoxPro and text file to ISO-2709 format.

2.2.2.4.3 Database Development :

Development of Union databases is one of the major activities of INFLIBNET Centre. Eight databases have been developed and are continuously growing. They pertain to

* Books
* Theses
* Serial holdings
* Current serials

* Experts
* Research projects
* Secondary serials/CD-ROMs, and
* DDC serials

2.2.2.4.4 Networking :

Present Networking Management

"UGC-INFONET" linking more than 172 universities across the country.

Local Area Network

INFLIBNET Centre has suggested all the UGC funded universities to set up Local Area Network (LAN) using Hub/Switch and CAT 5 cables within their libraries for successful installation of SOUL software. Since SOUL is based on client/server architecture, it is essential that the server and all other nodes be connected by LAN.

INFLIBNET Centre desires that each university should establish a LAN in its campus linking all the departments including library. This LAN in turn will be connected to the UGC-INFONET.

2.2.3 (DELNET) Developing Library Network

Delnet started as a network of libraries in Delhi in 1988 and was named as Delhi Library Network. It is the first operational library network in India. It was initiated as a project of the India International Centre with the financial and technical assistance by National Information system for Science and Technology (NISSAT), Department of scientific and industrial research, Govt. of India. It was registered as a society in June 1992 under the society registration Act of 1860 and is currently being promoted by the National Informatics Center (NIC), Planning commission, Govt. of India and India International Centre, New Delhi.

During the recent years, increase in information has led to increase in the demands of the users. It has been noticed that in this area of information explosion, libraries in India are generally ill-equipped to handle and retrieve information effectively; the financial resources and the space requirement for housing library collection are limited in almost all of the libraries. Not a single library can afford to house every necessary document even in the area of its interest. Resource sharing thus assumes great importance at this juncture the option left with the forward looking librarians has been to promote the sharing resources by automation and networking.

2.2.3.1 Objectives of DELNET are the following :

* To promote sharing of resources among the libraries by developing a network of libraries, by collecting, storing and dissemination of information and by offering computerized services to the users.
* To offer guidance to the member libraries on cataloguing database

services, circulation, acquisition, serials control, online services, selection of hardware and software etc.

* To coordinate efforts for suitable collection development and reduce unnecessary duplication wherever possible.
* To establish a referral centre to facilitate catalogue search and maintain a central online union catalogue of books, serials, and non book materials of all the participating libraries.
* To develop specialist bibliographic database of books, serials and non book materials.
* To possess and maintain electronic and mechanical equipment for fast communication of information and delivery of electronic mail.
* to coordinate with other regional, national and international networks for exchange of information and documents.

2.2.3.2 Delnet Services

2.2.3.2.1 Promotion of database creation :

For effective networking, standard bibliographic data should be available in machine readable form with the libraries. So, efforts were made from the very beginning to promote standardization of databases in the DELNET libraries. Regular meetings of librarians and computer specialists were organized to discuss mutual problems and the areas of cooperation. DELNET provide technical assistance to member libraries in the following areas :

* Creation and maintenance of bibliographic databases.
* Serials control
* User services
* Hardware and software requirements.
* Union catalogue preparation.
* Current awareness and SDI services.
* Authority data completion.
* Subject profile construction.
* Abstracting services.
* Inter-library loan and user services.
* Document copying facilities.
* Access to local, national and international databases.

2.2.3.2.2 Resource sharing

DELNET saved foreign exchange worth Rs. 10 million by rationalizing subscriptions to foreign periodicals during 1991, 1992 and 1993 through resource sharing. It is hoped that in the years to come, DELNET would be able to save more foreign exchange for India through sharing of periodicals resources. DELNET has also introduced its own courier with the financial help of NIC for interlibrary

lending among the participating libraries. The service is well used.

2.2.3.2.3 Standardization

A standardization committee of DELNET has been meeting from time to time. The standardization committee takes into account the following areas :

* Input output format
* Communication format for interchanging bibliographic data.
* Bibliographic description : mandatory and optional data elements.
* Classification scheme and subject headings.
* Thesaurus
* Authority files.
* Language scripts into roman scripts.
* Forms of heading.
* Identification numbers, codes and abbreviations.
* Data input for abstracting and indexing.
* Search/command language.

2.2.3.2.4 Online databases

DELNET has around twenty databases available online for its users. These are :

(a). Union catalogue of books: UCF
(b). CD-ROM database.
(c). Union list of Video recordings.
(d). Union list of Sound recordings.
(e). Union list of current periodicals.
(f). Union catalogue of periodicals.
(g). Database of periodic articles.
(h). Indian specialist database.
(i). Union list of Newspaper.
(j). Urdu manuscripts database.
(k). Books in print database.
(l). DEVINSA database.
(m). Serials: Petroleum and Natural gas.
(n). Multilingual books: sample database
(o). Database of thesis and dissertations.
(p). Union cataloguing of Hindi books.
(q). Jain database.
(r). Directory of libraries.
(s). Union catalogue of books: MARC Format
(t). Union list of Serials of Management Libraries

2.2.3.2.5 Electronic Mail Service

DELNET provides RENNIC Email facility to its member libraries, which is introduced by National Informatics Centre. This gives access to both national and international Email users and also to Internet users. Email is being used not only for communication between institutions but also for inter-library loan requests.

Full Internet Connectivity

DELNET is providing full Internet facility through NIC to the member libraries.

Web Page

DELNET also has a web page (http:/ /www.delnet.nic.in/) on Internet. This enables

all internet users the world over to know about DELNET and its activities.

2.2.3.2.6 Products

DELSIS

A major breakthrough has been achieved by DELNET with the launch of DELSIS, powerful library networking software. DELSIS (DELNET system for information services) is an integrated modular system, which support DELNET online databases.

It provides powerful and existence facilities for online enquires for books, serials, bibliographical details about the specialist and supports the cataloguing of books in Indian languages.

2.2.3.3 Features of DELSIS

* DELSIS is a user friendly menu driven package.
* Its versatile options allow the users to retrieve the information quickly.
* It contains the modules for Online Public Access Catalogue as well as the modules for the creation of databases e.g. Addition, deletion, insertion of records etc.
* The Online Public Access Catalogue components of DELSIS can meet the needs of the users, irrespective of whether the user has little computer experience or is familiar with using computer to perform various library tasks.

DEL-WINDOWS

DELNET has released the DEL-WINDOWS version 1.0 after the successful creation and implementation of DELSIS Unix version. It is an efficient tool for creating and retrieving bibliographic databases and catalogues.

Some of the salient features are :

It is simple and easy to use.

It is user-friendly with adequate windows menus for data inputting and search capabilities.

It provides the option for creating the bibliographic records either using ECF or the MARC format.

DELSEARCH

DELNET has opened a new chapter in the information retrieval procedure by devising the new database access mechanism through DELSEARCH. It is an offline remote database access system through Email. It is the first of its kind and is the most economical and user-friendly remote database access system.

2.2.3.4 The Other Services

ILL Online

DELNET members can place their inter-library loan request through the ILL facility, which is available on the union catalogue of books database. The member requests appear on the main server, which are monitored by DELNET staff at regular intervals

and the books are acquired and supplied to the requesting library through the courier.

DEL-LISTSERVE

DELNET has created a listserv service called DEL-LISTSERV to provide current awareness services to users and allow the member libraries to receive the latest daily information from the internet automatically in the form of electronic mail.

Retro-conversion

DELNET offers retro-conversion facilities to the libraries through specialized agencies and also facilities the use of modern tools such as CD-ROM's and online facilities of retro-conversion.

Referral services

DELNET maintains a referral centre that provides reference facilities to participating libraries. The referral centre also looks after the access to the central database and monitors access to central databases.

Document transfer facilities

DELNET provides the facility for transferring or copying of the documents to its users.

Training Programs

DELNET conducts training programs in the use of DELNET services, software, Email, AACR-II and LC subject headings, internet etc. from time to time; information about future training programs is available on the request.

Lectures and Workshops

DELNET organizes lectures by networking specialist working in different parts of the world. The lectures are open to members; specialists and users in general. DELNET also organizes national workshops, seminars and meets on library networking from time to time.

Newsletter

DELNET publishes a newsletter in order to spread the message and increase the awareness about library networking in India. Through this newsletter, DELNET communicates to its members the progress, it is making in various fields.

2.2.3.5 The Future of DELNET

The future of DELNET is very promising. Its membership with India and outside India is going to take a quantum jump. The DELNET is growing in number and size and as a variety of information on South Asia is becoming available through DELNET, it is expected that all the institutions outside India specializing in South Asian studies to take DELNET membership. DELNET databases are going to be accessible through Internet which will make accessibility very fast. Internet users in India are increasing and it will increase DELNET presence in different parts of India.

2.2.4 ERNET

ERNET was initiated in 1986 by the department of Electronics (DoE), with funding support from the government of India and United Nations Development Program (UNDP), involving eight premier institutions as participating agencies-NCST (National Centre for Software Technology) Bombay, IISc (Indian Institute of Science) Bangalore, five IITs (Indian Institute of Technology) at Delhi, Bombay, Kanpur, Kharagpur and Madras, and the DoE, New Delhi. ERNET began as a multiprotocol network with both the TCP/IP and the OSI-IP protocol stacks running over the leased line portion of the backbone. Since 1995, however almost all the traffic is carried over TCP/IP.

ERNET (Education and research network) has made a significant contribution to the emergence of networking in the country. It practically brought the interest to the India and has built up national capabilities in the area of networking, especially in protocol software engineering. It has not only succeeds in building a large network that provides various facilities to the intellectual segment of Indian society-the research and education community, it has over the years become a trendsetter in the field of networking, UNDP has lauded ERNET as one of the most successful programs it has funded. The Govt. of India has committed itself to further strengthen the project by including it in the 9th plan with the allocation of funds and creation of a new organizational set-up in the form of a society. The Science community of the country has also recognized ERNET's contribution--both for infrastructure services as well as for R&D. The Scientific Advisory Committee to the Cabinet has adopted ERNET as the platform for launching an S&T network in the country.

2.2.4.1 The Objectives of ERNET India

* Research and development.
* Training and Consultancy.
* Content development.
* ERNET operations, i.e. providing state of the art communication infrastructure and services to academic and research institutions, Govt. organizations, NGOs, Private sector R&D organizations and various other non commercial organizations.

2.2.4.2 Achievements

Foundation of national capability building in the area of computer networking laid through :

* Generating manpower at different levels.
* Making the world of standards (TCP/IP, OSI etc) well understood.
* Setting up of a chain of core groups at the participating agencies with a minimal set of lab facilities and creation of skilled manpower to carry

out R&D.

* Providing an insight into emerging issues such as ATM networks, Networked multimedia, and the information structure.

Network infrastructure and services set up, including :

* Installation, maintenance and operation of large campus LANs.
* Design, commissioning and testing of SATWAN hub and the installation of VSATs.
* Seamless interconnection of LAN-WAN segments, and multiprotocol capability provided.
* Provision of the whole range of Internet services.
* Deployment of TDM/TDMA based VSAT network for internet access.

2.2.4.3 Research and Development

Research and development in the area of computer networking has been the forte of ERNET. The ERNET backbone is a judicious mix of terrestrial and satellite based wide area networks. The satellite WAN, using VAST technology has facilitated reliable and quick access from remote areas. The VAST network act as an overlay for the terrestrial WAN by providing backup links between the backbone sites. International connectivity is achieved through gateways at New Delhi, Bombay, Bangalore and Calcutta, with a total capacity of 6.64 Mb. Daily traffic over ERNET exceeds 20 GB. ERNET architecture is based on industry standard TCP/IP protocol, ensuring connectivity from heterogeneous computer systems and local area networks at user sites.

ERNET International Gateway : ERNET Head Quarter New Delhi, ERNET HUB Bangalore, NCST JUHU Mumbai, Inter University Centre for Astronomy and Astrophysics (IUCAA) Pune, IIT Chennai, University of Hyderabad, IISc Bangalore, Orissa computer Application Center (OCAC) Bhubneshwar, Variable Energy Cyclotron Centre (VECC) Calcutta.

2.2.4.4 ERNET Backbone Sites

ERNET is supported by the following backbone sites which enable organizations located at different geographical locations to access various services. ERNET head quarter, New Delhi.

Centre for Software Technology, Mumbai.

Indian Institute of Science, Bangalore.

Institute of Technology, Chennai.

Indian Institute of Technology, Kanpur.

Indian Institute of Technology, Guwahati.

University of Hyderabad.

Centre for Advance Technology, Indore.

Inter University Centre for Astronomy and Astrophysics, Pune.

Orissa Computer Application Centre, Bhubneshwar.
ERNET VSAT HUB, Bangalore.
Communication is the key-in more ways than one. And a prerequisite for communicating is a connection, a link. ERNET India supports different connectivity options to connect wider user bases located even in remote areas.

2.2.4.5 Connectivity Options :

The various connectivity options available to ERNET users are :

* **Dial up UUCP**

Services accessible: Email, newsgroup services
Requirements: Telephone connection, high speed modem, a PC 386/486 machine running Windows/Unix or a LAN.
Advantages: Ideal as a starting point, especially for a small user sites, at a close distance from an ERNET backbone. Provides a store and forward system, and can be programmed for dialling at night to minimize cost.

* **Dial up IP**

Services accessible: Full range of IP services.
Requirements: Telephone connection, high speed modem, a PC 386/486 machine running windows/Unix or a LAN.
Advantages: This is more of a stop gap before a leased line/ VSAT/ radio link becomes operational.

* **Leased Lines (analog or digital)**

Services accessible: Full range of IP services.
Requirements: Leased line between the site and the nearest ERNET backbone, a pair of high performance modem for analog lines, or a CSU/DSU pair for digital lines, PC 386/486 system running Windows or Unix, and TCP/IP protocols, a router to provide access to LAN interconnected at user site.
Advantages: Provide a cost effective link and economy of online access to network resources.

* **VSAT**

(a).TDM/TDMA

Services accessible: All IP services.
Requirements: VSAT terminal installation, router, high performance modem V.32 bis, system running Unix or Windows NT with TCP/IP, or a cluster of such systems.
Advantages: Recommended for a large organizations or sites requiring high level of reliability especially when distance to ERNET backbone is large. Also the only feasible option for remote areas where leased lines are not practical.

(b). SCPC (Single Channel per Carrier)

Advantages: High speed of 64 Kbps to 2 mbps.

* **Radio link**

Services accessible: All IP services.
Requirements: Radio modems, router, system running UNIX or Windows NT with TCP/IP, or a cluster of such systems.
Advantages: Recommended for large organizations or sites requiring high level of reliability especially when distance to ERNET backbone is well within the line of site.

2.2.5 NICNET

The national informatics centre (NIC) was setup in March, 1975 by the government of India to play a promotional role in creating computer awareness and for developing and implementing computer based information systems for decision support in ministries and departments of central government. The last decade has witnessed NIC emerge as an agent of change which has quietly changed the work culture and the process of decision making in a number of government departments and their subordinate organizations through out the country.

NIC provides state of art solutions and decision support for information management and decision support requirements of the government of India and the corporate sector. NIC has set up a satellite based nation wide computer communication network, called NICNET, with over 800 nodes connecting the national capital, the state capitals and districts headquarters. The information technology services provided by the NIC range from conducting feasibility studies for developing and implementing computer based information systems, undertaking large networks and imparting training. NIC has developed extensive expertise in integrating IT based systems with the working of user organizations. NIC continues to provide value added services network such as E-mail, database access, internet etc. NIC has emerged as an agent of change in the user's organization by providing cost effective training solutions in the key IT areas.

2.2.5.1 Facilities and services

The facilities offered over NICNET include :

2.2.5.1.1 Gateway to Internet

With the incorporation of NICNET national information highway as an overlay network over the existing network, NICNET has become a very viable gateway to internet, in the country. NICNET maintains its leading edge with the incorporation of a powerful Ku-based national info highway as an overlay network on the existing SSMA/CDMA architecture. It is connected to over 200 international networks in 160 countries through gateway packet switched service (GPSS) and has dedicated internet access through a direct high speed link to SPRINTNET, USA.

2.2.5.1.2 Electronic mail

Email allows a user to send message electronically to individuals or group of individuals as long as there are networks connecting them. For many users Email

is the first real exposure to, and use of internet. Internet mail makes mail delivery more reliable. One can also make requests for database searches through electronic mail and have the results mailed back.

2.2.5.1.3 USENET

USENET is the bulletin board service (BBS) of internet. Electronic BBS are very effective way to share information. The messages in USENET are organized into thousand to topical groups or "newsgroups" which cover specific areas of interest. USENET is read and contributed to, on a daily basis by millions of people. There are several ways one can be USENET user. For example, a user can read lots, ask question, answer questions, participate in discussions etc.

2.2.5.1.4 Telnet Protocol

Telnet allows an internet user to login to a remote host from the user host. Once connected and logged into the remote host, the user can enter data, run programs, or do any other operations just as if he were logged in directly to the remote host. While running telnet, the program effectively makes the local computer invisible during the session on the remote computer.

2.2.5.1.5 FTP

File transfer protocol makes it possible to move a file from one computer to another, even if each computer has different operating system and file storage formats. The files may be data, programs, text anything that can be stored on line. Users are required to login to each computer, thus ensuring that they have the right to take and put files on those computers.

2.2.5.1.6 EDI over NICNET

Electronic data interchange (EDI) service over NICNET provides an electronic mailbox facility for receiving EDI messages, storing and forwarding them to the trading partners of the Indian exporters and importers.

2.2.5.1.7 Research and Education Network of NIC (RENNIC)

NICNET, the nation wide satellite based computer communication network offers network service to research, education and medical institutions at their very doorsteps through RENNIC with several objectives :

* To promote creation and use of on-line databases in the country.
* To facilitate more openness among academic and researchers.
* To facilities library networking services.
* To provide on-line access to vast expanse of international databases.

2.2.5.1.8 Multimedia video conferencing through NICNET

NIC has created a high quality video conferencing facility utilizing 'NICNET'. National info highway, which operates from 128 kpbs to 2 mpbs.

At present NIC centres at Delhi, Calcutta, Bangalore, Pune and Ahmedabad are connected with the studio group video conferencing systems. NIC is also providing

desktop video conferencing services from another major 7 cities-Patna, Jaipur, Hyderabad, Mumbai, Bhopal, Chennai and Chandigarh in addition to Delhi.

NIC has planned for multimedia communication to be a major priority in the next few years. Multimedia systems development program was launched by NIC in September 1991 with the overall objective of introducing multimedia technology as an integral part of informatics services provided by NIC. Multimedia engineering and facility division (MEFD) has been set up as a part of NIC's ambitious plans in the field of multimedia communications. Utilizing this resource, NIC has the vision to provide low cost multimedia solutions to the Indian market.

NIC will also be creating studies for video conferencing on internet/intranet using MBONE technology (one way video broadcast/two way audio) which will be useful in the field of distance education.

2.2.5.1.9 Bibliographic Information Services

NIC has been providing NICNET based MEDLARS services in the area of bio-medical services and health care in the country. The MEDLAR database is the very large database having more than 6 million records of more than 15 Gigabytes. More than 120 institutions in the country utilize this service. NICNET based medical information network connecting all the medical colleges and hospital in the state of Tamil Nadu has been established. In association with Indian bio-medical research institution, NIC continued to disseminate to all concerned information related to diseases such as Buffalo parks, Dengue, Malaria, Meningitis and kala-azar, which are feared to be assuming epidemic proportions, by compiling information from all the possible sources.

2.2.5.1.10 Judis-CDrom

NIC is serving the legal community through IT since 1992 when the COURTIS (Court Information System) project was commissioned for streamlining registries of various courts. Since then, NIC with the constant support of the supreme court of India has taken great strides. Today all high courts have been computerized and interconnect through NIC's satellite based computer communication network NICNET; most of them are taking out automatised daily cause list on computers. COURTNIC and NICNET have enable the readily availability of information on cases pending in the supreme court at high courts and also from any of the thousand VSAT nodes of NICNET spread across the country.

2.2.5.1.11 General Information Services Terminal

NIC has set up GISTNIC services as well as GISTNIC web for common public and government departments and organizations.

2.2.5.1.12 BASISplus and TECHLIBplus software for library automation

NIC has introduced BASISplus and TECHLIBplus software products for the

development of text databases and documentation management. BASISplus is a relational DBMS, with full text retrieval and management capabilities in the client/ server environment. TECHLIBplus is a complete library automation package having facilities for:

1. Online patron access catalogue.
2. Cataloguing.
3. Serials control
4. Circulation control
5. Acquisition control
6. And Administration.

BASISplus provides facilities of development of websites over NICNET and also WWW-based application for Intranet/Internet environment. Interfaces to Oracle databases and Foxplus databases have also been developed to operate in client/ server mode. NIC has become the value-added seller of BASISplus in India.

2.2.5.1.13 Training

NIC conducts awareness programs in IT for

1. Central/state government officials.
2. Department of Personnel and Training sponsored training program in information tools, application of NICNET based information system in Decentralized planning, and NICNET based computer aided project management system.
3. Executive development programs.
4. Sectoral development programs.
5. Update programs in the area of Internet, technology, networking technology, GIS technology, database technology and multimedia technology.

2.2.6 Keywords :

Networks, RENNIC, Delsis, INFLIBNET, ERNET, DELNET, NICNET.

2.2.7 Self Check Exercise :

Q.1. Discuss major Library and Information networks with special reference to India.

Q.2. What is INFLIBNET ? What are its functions ? Discuss the various departments of INFLIBNET.

Q.3. What is DELNET ? What are the various services provided by the DELNET ?

Q.4. write an essay on ERNET.

Q.5. Write an essay on NICNET.

2.2.8 Suggested Readings :

"Information Networks in India" by R.S.Aswal, ESS ESS Publications, New Delhi.

LESSON NO : 2.3 **Writer : Mr. Vishal Singh**

THE INTERNET : MULTIMEDIA, HYPERMEDIA AND WWW

Objective :

In this lesson, we will discuss the Internet, its working, protocols and its applications in libraries. We will also discuss Multimedia, Hypermedia and the World Wide Web.

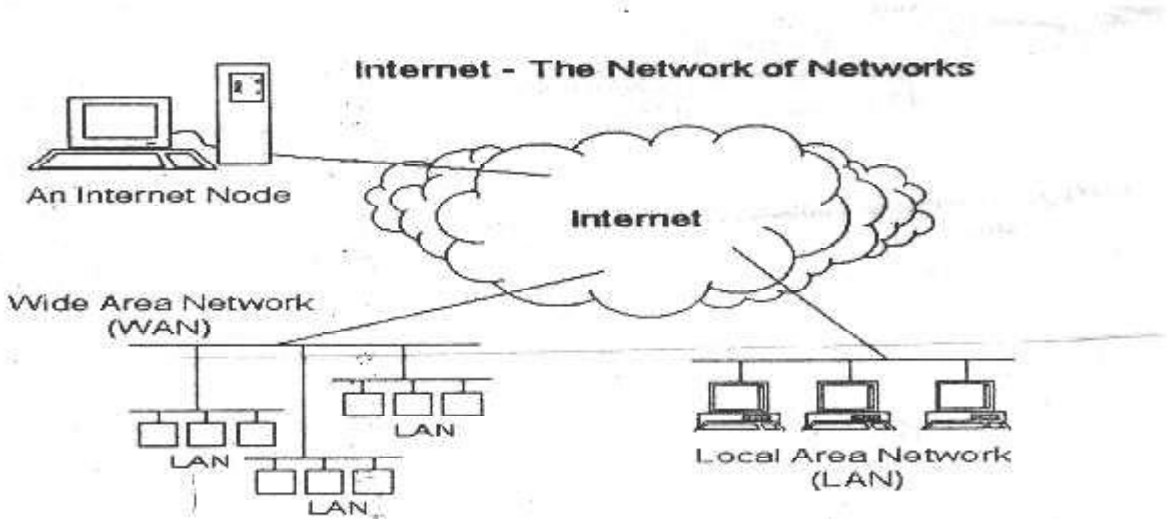
2.3.1 Introduction : Internet

The Internet is a computer network made up of thousands of networks worldwide. No one knows exactly how many computers are connected to the Internet. It is certain, however, that these number in the millions and are growing.

No one is incharge of the Internet. There are organizations which develop technical aspects of this network and set standards for creating applications on it, but no governing body is in control. The Internet backbone, through which Internet traffic flows, is owned by private companies.

All computers on the Internet communicate with one another using the Transmission Control Protocol/Internet Protocol suite, abbreviated to TCP/IP. Computers on the Internet use client/server architecture. This means that the remote server machine provides file and services to the user's local client machine. Software can be installed on a client computer to take advantage of the latest access technology.

An Internet user has access to a wide variety of services : electronic mail, file transfer, vast information resources, interest group membership, interactive collaboration, multimedia displays, real-time broadcasting, breaking news, shopping opportunities, and much more.



2.3. 1.1. How does the Internet work ?

The internet is defined as a "network of networks". The formal definition of the network is : "An interconnection of two or more autonomous computers". Interconnection means that the computers are able to exchange message and

data. Autonomous means that no computer can forcefully start, stop, or control another computer. At its most complexes, as in the internet, a network is a globe spanning, heterogeneous mix of technologies and operating systems.
The internet mostly connects network of computers. Think of a corporate wide network; each department has a LAN that allows it to share files and may be a printer or two. Several departments, working together, interconnect their networks so that information may be shared more easily among the departments. These "regional" networks are interconnected based on geography (same city, same state, same group of states) or function (accounts-receivable grouped with accounts payable into an accounting network, for example).
Then the regional networks are connected together onto a corporate network, sometime called a "backbone". So, there is a user connected to a Local Net; a Local Net connected into a regional Net; and regional Nets connected to a backbone. This is the Global Internet.
Unlike commercial networks such as CompuServe or Prodigy, the internet is not run by one central computer or computers. This is both its greatest strength and greatest weakness. The approach means it is virtually impossible for the entire Net to crash at once-even if one computer shutdown, the rest of the network stays up. The design also reduces the cost for an individual or organization to get onto the network. But thousand of connected computers can also make it difficult to navigate the Net and find what you want–especially as different computer may have different commands for plumbing their resources. It is only recently that Net users have begun to develop the sorts of navigational tools and "maps" that will let neophytes get around without getting lost.
Nobody really knows how many computers and networks actually make up this Net. Some estimates say there are now as many as 5,000 networks connecting nearly 2 million computers and more than 15 million people around the world. Whatever the actual numbers, however, it is clear they are only increasing.

2.3.1.2. Data Flow across the Net

Consider the transfer of message from one computer to another. Each message has an address on it. The E-mail handling system on the sender's computer packages the message and perhaps for "shipping". The message is broken up into small pieces called "packets". Packets are one of the basic units of measurement on the internet. Packets have different sizes, depending on what application "packed" them. You can think of them as envelopes or suitcase full of information. The packets are all addressed to the final destination. In fact the packets that contain the message may not all travel the same path. Along the possible path are special purpose computers called "routers". These computers do nothing but look at network addressed and figure out from the address what is the current best route to the destination address.
Routers make their decisions based on information that is constantly reaching them from all over the Net. They hear from other routers about links that are down, about others that may be congested and slow, or about routers that are

no longer accepting packets from certain destinations. Each packet's destination and proposed route is evaluated individually, in the blink of eye and sent off along the best route for that particular packet at that particular moment.

The same sort of decision making is made for all packets that traverse to internet. Each time a packet is forwarded either to another route near its ultimate destination or to that destination if the router is the final router on the path. The destination computer is the one that unpacks the packets, throw away "envelopes", and hands of the E-mail message.

2.3.1.3 Internet Addressing

There are two kinds of addresses in the internet : Domain Names & IP Addresses.

1. **Domain Name System (DNS):** Every computer on the internet has a domain name. The names of the domain describe organizational or geographic realities. They indicate what country the network is in, what kind of organization owns it, and in some cases, the names are defined in even more detail. Domains can be Non-geographic or Geographic.
2. **IP Addresses :** Every node on the internet, every end point (which might be a computer or a dial-in modem), has a unique identifying address. These unique identifiers are called Internet Protocol Addresses. The computer or server is known as a host, and the IP address, its physical network connection is known as the host address. The IP address can be difficult to remember, is easy to enter incorrectly, and will not necessary remain same if someone need to reorganize his or her network. The difficulty with these addresses is what led to the creation of DNS names, which map IP addresses to a set of more easily remembered words.

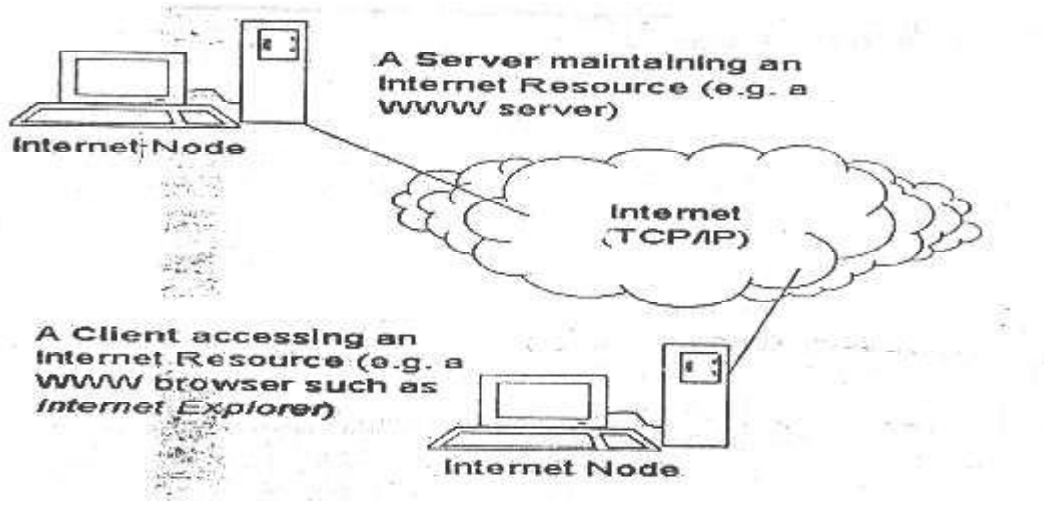
The IP address is a set of numbers that express the exact physical connection between a computer and the network on the internet. In some senses you can think of them in the same way you think about the telephone numbers: a phone number uniquely describes your connection to the telephone network.

2.3.1.4 Internet Protocols

Protocols are the rules that the networks all use to understand each other. The various protocols are set of technical specifications that let computer exchange information, no matter what kind of computer they are, or what kind of technology hooks them together. Vendors of software and hardware want their products to be useful on the internet, and so make sure those products understand and operate with the internet protocols. The term interoperability has been coined to describe this ability of disparate types of hardware and software to work together under a common set of rules.

TCP/IP is a set of protocols developed to allow cooperating computers to share resources across a network. It was developed by a community of researchers centered around the ARPAnet. Certainly the ARPAnet is the best known TCP/ IP network. However, as of June, 87, at last 130 different vendors had products that support TCP/IP and thousand of networks of all kinds use it.

Whatever it is called, TCP/IP is a family of protocols. A few provide "low-level" Functions needed for its applications. These include IP, TCP and UDP. Others are protocols for doing specific tasks, e.g., transferring files between computers, sending mail, or finding out who is logged in on another computer. Initially TCP/IP was used mostly between minicomputers and mainframes. These machines had their own disks, and generally were self-contained.



2.3.1.5 Internet Application in Libraries

Internet is undoubtedly a growing technological phenomenon. It is a source of electronic information. Further it is an excellent medium for communication. Because of these reasons internet is influencing the practice of librarianship throughout the world. The technological changes are constantly influencing the libraries and their services. In the few years internet even became a hot topic at conferences and in library literature. It is changing the way in which libraries and information personnel communicate. As a matter of fact access to the networked information resources offer a supplement to the collection of libraries. Librarians working in the technical services interact with vendors in a number of ways in order to face the issue of cataloguing the net resources. The electronic publishing on internet is affecting the documentation of such resources leading to complexities in citation.

Internet use in libraries has brought efficiency in services ranging from acquisition of documents to the retrieval of information as well as creation of new knowledge. It is used in libraries, broadly for the following functions:

Library management includes all library functions taking place behind the scene as well as with the users of the library. The most important functions are discussed below:

Use of internet in Acquisition

- Tender for books can be floated on the internet.
- Checking of duplication before ordering.
- Books order can be sent through the web
- The availability of the addresses of booksellers, publishers, distributors and their catalogues help in selection and purchase of the library materials.
- Library orders can be sent through E-mail.
- Users can know about the possible availability of the desired books in the library through internet.
- The information available on the web relating to acquisition of books or for comments can be sent to the library through the internet.

Use of Internet in serials control

- Communication of the approval for journals on the internet.
- Web based ordering exercise.
- Access to journals by users through the web.
- Selection of journals through the list of publishers and their catalogues available on the web.
- Listing of the received journals through internet access.
- Availability of the union catalogue of journals.
- Viewing of full text of journals.

Reference and Information Service.

Internet is also used to answer the question of the users in the library. So internet can help in the following ways:

- Identification of reference sources according to the needs of the users.
- Search of subject directories on internet in answering the queries.
- Guiding users to the reference sources to enable them to search the desired information on their own.
- Identification of the available sources and listing them for future use.
- Identification of the full-text journals available freely on the web.
- Internet is useful for providing access to databases. OPAC, current contents etc.
- It is useful for maintaining uptodate information about library services, collection staff etc.

Library Management

The following techniques are used in the library management :

Electronic Mail: Librarians use Email to communicate with colleagues and customers. They participate in electronic discussion groups, share experiences and ideas with other librarians, and create and monitor discussion group of interest to their customers.

Telnet: Librarians use telnet to connect to remote computer resources. They explore other library catalogues, access commercial and non commercial database services, and share the resources of campus-wide information systems and community free-nets.

File transfer protocol: File transfer protocol enables librarians to obtain software programs, text, images, and sound files from the net and then offer them to their customers. Librarians and information professionals contribute to the internet community by making library catalogues and local database available on the network; creating gopher sites that offer logical, well organized, menu-driven access to services and resources on the internet; and establishing the WWW servers that provide the graphical user interface for browsing the resources of the internet.

So, with the use of internet, the role of library has highly revolutionized. The user who had geographical limitations can now have access to the information available anywhere in the world.

2.3.2 Multimedia

Multimedia is a method of instruction that uses the computer to present information with text, graphics, audio or video. It is referred to as computer based training (CBT) or web based training (WBT). It can take the form of training, presentations, software simulation, job simulation, testing reference or online help. Since multimedia instruction is often delivered over the internet, it can look just like set of web pages, but it can also be delivered on CD-ROM, on diskette or over a Local Area Network (LAN) or company internet. To actually see, hear, or otherwise experience these media, you need a computer equipped with the right hardware such as sound card, enough memory to make movies play smoothly, a big enough hard drive to store large file-formats files and so on. And you need software installed on your computer, either as a part of a web browser or as a stand alone program that can interpret and display—or just "play"—the various media file formats. If you can put together all the ingredients then you can start to experience the internet as the world's largest CD-ROM, with new content appearing online daily.

Every web browser can at least download files. So if you can get a stand-alone program to interpret a multimedia file you have downloaded, then you can experience that medium even without a sophisticated web browser.

2.3.2.1 Delivery of Multimedia

There are two basic methods for delivering multimedia.

1. CD-ROM has become the most cost effective method of delivery for multimedia materials. These devices are used to store large amounts of some combination of text, graphics, sound and moving video.

2. Distributed networks allow computers to be connected to other computers which can provide an almost endless array of multimedia material. The internet is currently providing a distributed network approach to the delivery of multimedia material.

2.3.2.2 Advantages of Multimedia

The advantages of Multimedia are as under :

- **It's interactive:** Learners are actively engaged. Interactive may include multiple choice questions, fill-in-the-blanks, selecting all right answers or matching by dragging or dropping graphics. Feedback engages the learner even more. For example, an incorrect answer could provide a hint along with a "sorry that's incorrect" response.
- **It is tailored to learner needs:** Learners can take the training when they want, as often as they want, and at a pace that's right for them.
- **It is cost effective:** Companies don't need to pay for trainers, travel or classrooms. It is especially useful in situations where the users are spread over the wide area.
- **It is efficient and effective:** Learners typically learn more in a shorter period of time with multimedia instruction, as learners are more interested in multimediamessages which combine the element of text, audio, graphics and video.
- **It is easy to revise and update:** Especially with internet delivery, changes made to one copy are immediately available to all learners.

For example, a company that manufactures car utility racks can easily alter installation instructions for consumers as car manufacturers introduce new car models every year.

2.3.2.3 Suitability of Multimedia

Cost : The expanse can vary widely. One can fine off-the-shelf or off-the-web training at very reasonable cost, and sometime even for free. Custom development of computer based training can be expensive, but may be worth it if employee or customer training is crucial.

Number of Learners: A very large audience, such as a large customer base, may reduce cost greatly and possibly allow delivering instruction more effectively and economically than with paper based instruction.

Location of Learners: If the learners are spread over broad geographical areas, such as with sales reps or travelling technicians, CBT or WBT may be the only way to provide accurate and effective training to everyone.

Availability of Computers: Equipment doesn't have to be sophisticated– all you may need is an internet connection.

2.3.2.4 The Types of Media

1. Pictures

The first geographical web browser, Mosaic, could display only one picture

format when it first appeared-CompuServe's GIF (Graphic Interchange Format), which is a compressed file format. The other major picture format is called JPEG (named for the Joint Photographics Experts Group that designed the format). At first, Mosaic could only display JPEG in a helper application. When Netscape came along, it supported in-line JPEG, which now most browsers can now also handle. JPEG can be compressed to much smaller file sizes than equivalent GIFs, but more they are "squished" the worse the quality of the images becomes.

2. Sounds and Music

There are many different file formats available on the Net. The most common of these include Microsoft's WAV (Wave) format, perhaps the most widespread; the Macintosh AIFF format; the UNIX (originally NeXT).au format. Many websites offer sounds in more than one format, in order to make it easier for each user so download a file format local to their type of computer.

Other sound format includes MIDI (Musical Instrument Digital Interface); the Amiga SND format and MP2 or MPA, which are MPEG formats (MPEG is a movie format, but movies, of course, often also includes sounds, so the MPEG standard specifies a sound format as well.

A new approach to sound files (for movies files as well) is Streamlining. Streamlining is when files are sent a little at a time and start playing almost immediately. This model differs from those in which an entire file is sent and a part playing only after it has been completely downloaded. The most popular streaming format these days is called Real Player or Real Audio. This format allows sounds to be broadcast something like the way they are in radio. Microsoft has also developed a competing sound-streaming format called **True sound**.

3. Movies and Animations

As with sounds and pictures, there are various competing movie and animation formats available on the Net. Technically, the difference between the movie and an animation is that movies use video or film images (variations on photographic technology) while animations use drawn illustrations.

Probably, the most widespread movie format is the **MPEG** (Motion Pictures Experts Group) format, a compressed format. Another popular format is **QuickTime,** which started on the Macintosh platform but can now be displayed on most computers. Quick Time Files usually have a .qt or .move extension. A third common movie format, native to the windows platform is .**avi**.

4. 3D Environments

The future of the Net may be glimpsed in the still-evolving 3D formats with which real or imaginary spaces are depicted in perspective, and the user has the ability to move around, viewing the space from multiple angles.

The most common format for 3D world on the web is called VRML, which stands for Virtual Reality Modeling Language. While VRML is an evolving standard, there are multiple competing implementations of it out there, including a version of QuickTime called, naturally enough QuickTime VR. VRML files have

usually .wrl extension. One of the future goals of VRML developers is to create worlds in which many users can meet and interact, as if in person. There are also some special browsers out there, such as one called WebFX, designed specifically for viewing and moving through 3D spaces.

2.3.2.5 Different Ways to View Multimedia

1. Plug-ins

The most sophisticated way to work with multimedia files is to plug special add-on software directly into a browser. Such a program, usually called a plug-in, is an application that works in tandem with another program, enhancing its features as if you had taken a piece of hardware and added it to your computer to give it more features. Only Netscape Navigator has really exploited this approach fully. Its nearest competitor, Microsoft Internet Explorer, can handle only one specific add-in, what Microsoft, which always use its own term, called plug-ins. With plug-ins installed, a browser can then display an unusual format in-line, meaning inside the browser window, instead of launching an external program to display the file.

2. Viewers and Players

A viewer program is one that can be used to view or play a specific type of file. Even with the character-based browser like the UNIX program Lynx, you can still download files. It's true that you will then have to get the file from UNIX account to your desktop computer, but after that, you can "play" the file downloaded if you have the appropriate software (such as sound recorder for windows) installed on your PC. This approach will also work with browsers. Such as AOL's, that are not equipped to launch external programs automatically.

3. Compressed Files and Streaming Media

One of the strategies used to address bandwidth limitation is to compress files as much as possible, most often using widely accepted compression standards. This might mean converting media files, such as images, to compressed formats or it might mean compressing the original files with a "Zip" type program, and requiring that the recipient decompress it herself.

4. Helper Applications

Mosaic, Netscape Navigator and other browsers based on the graphical model have the ability to launch external programs called helper applications–when a non standard file format is selected. Helper applications will let your browser open files in formats it could not otherwise handle, such as Sun audio file. They do, however, have to be "taught" where to look for the helper application. You can either do this in advance, by entering the options or preferences area of the browser and looking for the helper applications or you can attempt to download a media file and then when the browser tells you it doesn't recognize the file format, you can educate it about which viewer to use with that type of file. You do this simply by typing the path and file name for the correct program, or by clicking on a browse button and rummaging around on your hard disk for program you need. After that, your browser will automatically launch the

right helper application whenever you select that type of media file again.

2.3.2.6 Applications of Multimedia

The multimedia is being used prominently in the following applications, but the day is not far off when we would see the multimedia messages around us everywhere.

1. Education

It is the most productive application of the multimedia. The earlier concept of "guru is the only source of knowledge" has undergone a sea change. The modern communication technologies have provided the student with many sources of information and education. The role of the teacher has transformed from "teacher" to a facilitator and a guide. The multimedia has provided the teachers with opportunities to go beyond traditional teaching methods. While the students have got a new way to discover the new learning methods. The market is flooded with the educational CDs which provide a good learning material for the students. The qualitative and mind boggling information on English pronunciation, learning other languages (French or German) physics, chemistry etc. The list is endless. The distance education branch of the universities has done away with providing voluminous study material. These days, the CD-ROMs have replaced the conventional study material. The highly informative encyclopedia has virtually changed rules of the games. The encyclopedia Britannica and encyclopedia Americana is now available on CDs which otherwise takes the space of a full almirah in the library. Moreover, these CDs come with a search function. Just insert the CD and type the topic of interest and the material is there on the computer screen. Otherwise it takes hours together to search the bulky books of encyclopedias.

2. Business:

The corporate sectors are embracing the multimedia techniques very fast. The advertising executives can use various techniques of multimedia presentation while dealing with the clients. A visit to the trade fair shows and the exhibitions give an amazing picture of applications in business. The stalls of the companies have full size screens and computer monitors which keep on displaying their company, objectives, manpower, products and services etc. The customer feels impressed with the style of presentation and thrilling combination of sound and pictures.

3. Medical Sciences:

Medical education has benefitted immensely from the multimedia. The Internal structure of human beings and other animals are available on the CDs. A separate CD is available for each organ of the human body, like heart, brain, digestive system and reproductive system, etc. The art of successful operations can easily be learnt through multimedia. These days, multimedia CDs are used to convince the patients for their diagnose and treatment.

4. Entertainment:

The prime usage of the multimedia is the entertainment. The games on the

CDs form the best entertainment material for the children, the movie magic and masti concept of the entertainment is made possible by CDs. The idea of Infotainment (Information + Entertainment) has evolved recently. The children are provided the information colored with entertainment to make it interesting. The Entertainment is such another word used for Education and Entertainment.

5. Public Places:

The multimedia has been put to use at important public places like airports, railway stations, bus stands—inside the buildings etc. The railway stations various multimedia information kiosks to know the train timings—arrival and departure, status of reservation of tickets, route of the train etc. The airports have the same facility for the airplanes. The passenger needs not to run from pillar to post to satisfy his query. In multistory buildings, the multimedia presentation can guide a person to his destination.

6. Media:

The advertising industry has started making creative and unbelievable ad films by using multimedia. Salman Khan and Sunil Shetty cannot jump from the train for a bottle of coke. This is made possible by using multimedia. Such ad films cost less and are more interesting. The creativity element of the advertising has indeed received a big boost after the arrival of multimedia. The film industry uses special effects in audio and video. The heavy destruction, collision of vehicles, fire and bomb explosion are not real but done on multimedia computers. Virtual Reality (the special effect which is just like real but is not real. The water gushing out from the sinking Titanic ship was so realistic that the viewers felt that the water is actually flowing under their seats. The fighter pilots apply this simulation technique of virtual reality to train themselves in the artificial environment.

7. Animation:

Films in which drawings are photographed to create the illusion of movement, usually by means of exposing the film frame by frame. Alternative forms include use of puppets and clay-figure. More recently, computer techniques have been used to produce animation. The key exponent of cartoon animation was Walt Disney, who inspired the first wave of the large Japanese animation industry, but a reaction to his representational style subsequently produced a more graphic approach by both North American rivals and Eastern European practitioners. In the USA Winsor McCay, creator of the newspaper cartoon hero Little Nemo. Showed a series often animated films 1911-21 featuring Gertie the Dinasaur, which pioneered the modern cartoon film Japanese anime took off with the TV serials Tetsuwan atomu/Astro Boy 1963-67 by Osamu Tezuka (192.S-19H9). By 1992 about 40 animated weekly TV serials were produced in Japan; as well as feature-length films for video release. The former are mainly family-oriented; the latter, such as Akira 1939 by Katsuhiro Otomo, usually action-packed and aimed at youths. Ghost in the Shell 1995 by Mamuro Oshii, set in the year 2029 and based on a comic by Masamune Shirow: was given an

international cinema release. The first frame-by-frame animation film is thought to be J.S. Blackton's Humorous Phases of Funny Faces 1906. In France, Emil Cohl began producing Vivacious cartoons such as Fantasmagorie 1908 and Les Joyeux Microbes 1909 animated. Computer-generated graphics that appear to move across the screen-Traditional animation involves a great deal of drudgery in creating the 24 frames per second needed to deceive the human eye into seeing a moving picture on film. In computer-generated animation, while humans still create the key frames that specify the starting and ending points of a particular sequence–a character running through a landscape, for example–computers are faster and more accurate at calculating the in-between positions and generating the frames.

The first completely computer generated character to appear in a major motion picture was the sea-water creature in James Cameron's film The Abyss 1990, developed at the leading special effects shop Industrial Light & Magic. It was quickly followed by the liquid-metal man in Camel-oil's Terminator 2,1991. The first entirely computer-animated full-length feature film was Pixar's Toy Shop, 1995, which was the first film ever to achieve independent motion of character and backgrounds in the same sequence.

2.3.2.7 Impact of Multimedia on Library Services

Multimedia not only helps the users in providing information from different media on one platform, but also saves on space. Money, maintenance, operational inconveniences etc. The major advantages of multimedia in libraries are:

1. It can help satisfying different information needs such as reference, enrichment, entertainment, leisure etc.
2. It can help meeting various types of information preference of the users such as scholarly, scientific, vocational, artistic, recreational, etc.
3. Being a digital format, information can also be assessed by remote users on a network. It also helps in overcoming the accommodate users.
4. It is interesting and easy to use over existing form such as print microforms, online etc.
5. Its control and interactivity helps the users and provides the benefits of books and human beings.

"Nowadays many libraries feel that the multimedia should be integrated into the regular services by the libraries. Even in advanced countries libraries do not have a separate department of personnel responsible for multimedia products or services. For the past two three years, use of electronic resources, particularly multimedia in libraries has improved considerably." In India, most of the libraries are using multimedia resources for reference service and instructional purpose.

2.3.3 Hypermedia

Hypermedia is a term created by Ted Nelson in 1970. It used as a logical

extension of the term, hypertext, in which graphics, audio, video, plain text, and non-linear hyperlinks interwine to create a generally non-linear medium of information. This contrasts with multimedia, which, although often capable of random access in terms of the physical medium, is essentially linear in nature. The World Wide Web is a classic example of hypermedia.

Hypermedia can be thought of as a visual, interactive and non-linear medium for communication, which is based on a human-computer interaction paradigm where the user can browse through a database using point and click interaction techniques. Thus, a graphical user interface and direct manipulation is essential to hypermedia.

Imagine having access to a large database which contains information on a wide range of topics, like an encyclopedia. The database can contain text, pictures, animations, sound, and even video recordings. The distinctive features of hypermedia is the ability to browse through the material in a variety of ways. This is accomplished by inserting connections between different parts of the material, linking them together. These links can be followed by the user in a very rapid fashion, using point and click interaction techniques.

Typical applications for hypermedia systems include: information dissemination, interactive encyclopedias, learning, education, reference databases, interactive presentations, simulations, idea processing, writing tools, personal information management, collaboration tools, games and entertainment, like interactive fiction and adventure games.

Hypermedia is an elaborated form of hypertext. The terms 'hypertext' and 'hypermedia' were coined by Ted Nelson in the early 1970's. He envisioned a system called Xanadu, where all the literature of the world would be linked together in a gigantic world-wide distributed database. Annotations and cross-references would make it possible to browse through the literature quickly and easily. The difference between hypertext and hypermedia is that hypermedia, in addition to text, makes use of other forms of representation, like pictures, animations, and sound.

Many other researchers and computer pioneers have contributed to the evolution of hypermedia. Douglas Engelbart has made major contributions to the concepts and the technology underlying hypermedia, such as the invention of the mouse pointing device.

2.3.3.1 Networks of nodes and links

In hypermedia terminology, associations between different information items are called links, and the individual items are called nodes. A node can contain one or more links to other nodes, forming a network of nodes and links. Here a hypermedia network is also called hypermedia structure.

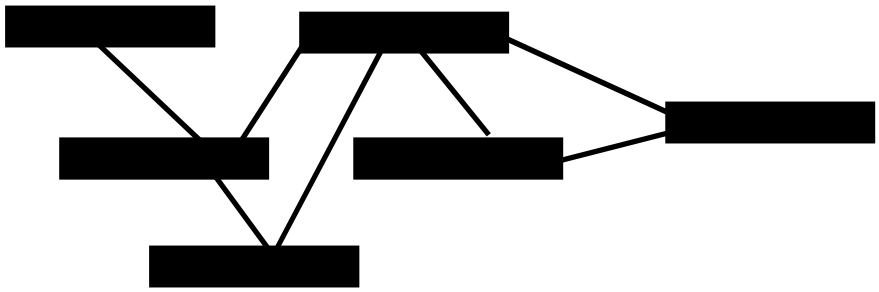


Figure : A hypermedia network. Nodes which contain information are related using links. Links and nodes can form a network of arbitrary structure and size

The user can move around the network in many different ways, randomly, purposefully, and so on. The ability to move quickly around the hypermedia network is critical to usability and is what makes browsing practical.

2.3.3.2 Ways to present information on the screen

Nodes can be presented on the display screen in a variety of ways. One approach is to display nodes in separate, possibly overlapping windows. Notes Cards is an example of a system which uses this method. Another approach is to display one node at a time using the entire screen space. This method is used in, for instance, HyperCard.

2.3.3.3 Reading Hypermedia

Hypermedia differs from printed media in a number of ways. The major difference is that hypermedia is non-linear in its form. It is possible to access the material in many different ways and jump around between different information items, given that the author has provided the necessary links.

While printed material, for example books, use well known design conventions, like table of contents, index, page numbers etc., hypermedia systems often lack such well established design elements. The form of hypermedia systems is still experimental. Often each hypermedia author uses her own style and conventions. Hypermedia is also more abstract in its nature than printed media. Paper exists in the real world. In the simulated world of hypermedia it is not yet possible to physically touch and feel nodes and links.

2.3.3.4 Browsing and Navigation

Browsing and navigation are used frequently in the hypermedia literature. Both browsing and navigation describe the process of moving around the hypermedia network by traversing links.

The navigation process aims at finding some particular information item in the database, efficiently and quickly. It is like a captain on a ship who navigates across the sea in order to reach the destination. Browsing, by contrast, is more aimless. The user can browse around a hypermedia system without any specific question or precise idea about what she looking for. Browsing is like shopping

for Christmas, we often have no specific idea of what we are looking for, we just know that we want to find a Christmas gift. When we browse through a department store, we may eventually come across a suitable present.

When navigating a hypermedia network the user must be oriented. She must know where she is and she must have an overall view of the world in order to find her way. If she becomes disoriented she might not be able to reach her goal as quickly as desirable. Instead she has to spend time on getting oriented again. This is like the captain at sea, who carefully must keep track of landmarks which can help the user back on track if she gets disoriented. Even though it is possible to browse through a hypermedia network without being oriented, the user is likely to end up frustrated and confused if she does not know where she is. Thus, orientation is desirable for browsing tasks too.

2.3.3.4 Hypermedia tools

A hypermedia system consists of a database and a user interface for browsing and navigating through the database. The database contains information in the form of a model of some domain. We will call the database of a hypermedia system for a hypermedia structure. The most common data model for implementing hypermedia structures is a network of nodes and links.

A hypermedia tool consists of an editor and optionally a high level language for creating hypermedia systems. Almost all tools place restrictions on what they can be used for. Most tools are, for example, restricted to a particular model for how information is presented on the screen. NoteCards, Hyper-Card and ToolBook are examples of tools for creating hypermedia systems.

2.3.3.6 Advantages of Hypermedia

1. One of the major advantages of hypermedia is the ability to quickly follow associations and look up related material. References can be traced both backwards and forward in a way which can be difficult and time consuming with printed media.
2. Through hypermedia, information can also be structured in a variety of ways. Multiple organizations of the same material allow for specialized structures for different user categories.
3. Hypermedia has a strong potential for learning applications since learning by exploration might be facilitated in a natural way. The student can browse the material and find new information as he/she explores a subject area.
4. Another possible advantage of hypermedia for learning applications is that hypermedia systems are usually considered as fun to use. The potential for visual richness and high degree of feedback could be regarded as positive by the users.
5. The exposure to hypermedia authoring tools help learners in improving his writing and process skills and gives learner a new and different perspective on how to organize and present information.

2.3.3.7 Disadvantages of Hypermedia

1. The ease of browsing might increase the risk that the learner skips through the material much too quick, and thus get a low and disjointed conception of the subject.
2. The risk of getting disoriented can result in confusion rather than understanding, especially if the user jumps around between different nodes in a more or less random manner.
3. To take full advantage of the benefits of hypermedia technology learners need sufficient on-line development time. The problem is further exacerbated when available computers are not configured for hypermedia authoring. For example, they may lack the capacity to digitize sound or input video.

2.3.4. World Wide Web (WWW)

The World Wide Web was developed in 1989 by Tim Berners-Lee of the European Particle Physics Lab (CERN) in Switzerland. The initial purpose of the Web was to use networked hypertext to facilitate communication among its members, who were located in several countries. Web was soon spread beyond CERN, and a rapid growth in the number of both developers and users ensued. In addition to hypertext, the Web began to incorporate graphics, video, and sound. The use of the Web has reached global proportions and has become a defining aspect of human culture in an amazingly short period of time.

World Wide Web has accelerated the growth of internet by giving it easy to use, “point and click” graphical interface. Users are attracted to the World Wide Web because it is interactive, easy to use, combines graphics, text, sound, animation making and it is a rich communication medium. The World Wide Web is many things to its millions of users. It is used as a market-place, art gallery, library, school, publishing house and what ever else its author creates. The WWW provides a network of interactive documents and software to access them. It is based on documents called pages that combine text, pictures, forms, sound, animation and hypertexts links called hyperlinks. To navigate the WWW users “surf” from one page to another by using “point and click” operation on the hypertext in text and graphics.

The World Wide Web also referred to as the WWW or W3 or simply “the web”, is the universe of information available via the hypertext transfer protocol (HTTP). The web presents information as a series of “document” called as web pages that are prepared using the hypertext mark up language (HTML). By making use of HTML, the documents author can specially code sections of the document to “point” to other information resources. These specially coded sections often referred to as “hypertext-links”. The user viewing a web page can select the hypertext links and can easily connect to the information resource that the links points to. These links lead to other documents, images, sounds, databases (like library catalogs) etc. While accessing the WWW, it is not necessary to follow a hierarchical path to information resources. Thus, we can easily :

1. Jump from one link to another.

2. Jump to specific part of a document.
3. Go directly to a resource, if you know a URL (uniform resource locator).

So as the web page is not hierarchical and handles graphics, it offers a great deal of flexibility to the user.

2.3.4.1 Internet Protocols

Almost every protocol type available on the Internet is accessible on the Web. Internet protocols are sets of rules that allow for intermachine communication on the Internet. The following is a sample of major protocols accessible on the Web:

E-mail (Simple Mail Transport Protocol or SMTP)
Distributes electronic messages and files to one or more electronic mailboxes.

Telnet (Telnet Protocol)
Facilitates login to a computer host to execute commands.

FTP (File Transfer Protocol)
Transfers text or binary files between an FTP server and client

Usenet (Network News Transfer Protocol or NNTP)
Distributes Usenet news articles derived from topical discussions on newsgroups.

HTTP (Hypertext Transfer Protocol)
Transmits hypertext over networks. This is the protocol of the Web.

The World Wide Web provides a single interface for accessing all these protocols. This creates a convenient and user-friendly environment. Once upon a time, it was necessary to be conversant in these protocols within separate, command-level environments. The Web gathers these protocols together into a single system. Because of this feature, and because of the Web's ability to work with multimedia and advanced programming languages, the Web is by far the most popular component of the Internet.

2.3.4.2 Hypertext and Links: The Motion of the Web

The operation of the Web relies primarily on hypertext as its means of information retrieval. Hypertext is a document containing words that connect to other documents. These words are called links and are selectable by the user. A single hypertext document can contain links to many documents. In the context of the Web, words or graphics may serve as links to other documents, images, video, and sound. Links may or may not follow a logical path, as each connection is created by the author of the source document. Overall, the Web contains a complex virtual web of connections among a vast number of documents, graphics, videos, and sounds.

Producing hypertext for the Web is accomplished by creating documents with a language called Hypertext Markup Language, or HTML. With HTML, tags are placed within the text to accomplish document formatting, visual features such as font size, italics and bold, and the creation of hypertext links. Graphics may also be incorporated into an HTML document.

HTML is a sub language of SGML, or Standard Generalised Markup Language. SGML is a system that defines and standardizes the structure of the document. Both SGML and HTML utilize descriptive markup to define the structure of an area of text. HTML is standardized and portable. A document that has been prepared using HTML markup "tags" can be viewed using a variety of web browsers such as Netscape and Lynx. A browser interprets the tags in an HTML file and presents the file as a formatted, readable web page. In addition, HTML documents can be viewed on all types of system, such as Macintosh, PC and UNIX machines.

2.3.4.3 Pages on the Web

A web page is a single unit of information, often called a document that is available via the World Wide Web. A web page can be longer than one computer screen and can use more than one piece of paper when it is printed out. A web page is created using HTML. It consists of standardized codes or "tags" that are used to define the structure of information on a web page. These codes enable web pages to have many features including bold text, italic text, headings, paragraph breaks and numbered or bulleted list. A web page can be created by user activity. For example, if you visit a Web search engine and enter keywords on the topic of your choice, a page will be created containing the results of your search. In fact, a growing amount of information found on the Web today is served from databases, creating temporary Web pages "on the fly" in response to user queries.

Access to Web pages may be accomplished by:

1. Entering an Internet address and retrieving a page directly
2. Browsing through pages and selecting links to move from one page to another
3. Searching through subject directories linked to organized collections of web pages.
4. Entering a search statement at a search engine to retrieve pages on the topic of your choice.

2.3.4.4 Retrieving Documents on the Web: The URL and Domain Name System

URL stands for Uniform Resource Locator. The URL specifies the Internet address of a file stored on a host computer connected to Internet. Every file on the Internet has a unique URL. Web browsers use the URL to retrieve the file from the host computer and the specific directory in which it resides. This file is downloaded to the user's client computer and displayed on the monitor connected to the machine.

URLs are translated into numeric addresses using the **Domain Name System** (DNS). The DNS is a worldwide system of servers that stores location pointers to Web sites. The numeric address, called the IP (Internet Protocol) address, is actually the "real" URL. Since numeric strings are difficult for humans to use, alphanumeric addresses are employed by end users. Once the translation is

made by the DNS, the browser can contact the Web server and ask for a specific file located in its site.

Anatomy of a URL

This is the format of the URL:

Protocol:/host/path/filename

For example, this is a URL on the Web site of the U.S. House of Representatives: http:/www.house.gov/house/2004_House_Calendar.html

This URL is typical of addresses hosted in domains in the United States. Structure of this URL:

1. Protocol: http
2. Host computer name: www
3. Second-level domain name: house
4. Top-level domain name:gov
5. Directory name:house
6. File name:2004_House_Calendar_html

Note how much information about the content of the file is present in this well-constructed URL.

Several top-level domains (TLDs) which are common:

Com	commercial enterprise
Edu	educational institution
Gov	U.S. government entity
mil	U.S. military entity
net	network access provider
org	usually nonprofit organizations

New domain names were approved in November 2000 by the Internet Corporation for Assigned Names and Numbers **(ICANN): biz, .museum, .info, .pro (for professionals) .name** (for individuals), **aero** (for the aerospace industry), **and .coop** (for cooperatives). ICANN continues to investigate proposals for adding additional domain names, for example, .mobi for sites designed for mobile devices, and jobs for the human resources community.

In addition, dozens of domain names have been assigned to identify and locate files stored on host computers in countries around the world. These are referred to as **two-letter Internet country codes,** and have been standardized by the International Organization as ISO 3166.

For example:

In	India
Au	Australia
Jp	Japan
Uk	United Kingdom

2.3.4.5 How to Access the World Wide Web: Web Broswers

To access the World Wide Web, you must use a Web browser. A browser is a software program that allows users to access and navigate the World Wide Web. There are two types of browsers:

1. Graphical: Text, images, audio, and video are retrievable through a graphical software program such as Internet Explorer, Firefox, Netscape, Mozilla and Opera. These browsers are available for Windows, Linux and other operating systems. Navigation is accomplished by pointing and clicking with a mouse on highlighted words and graphics.

You can install a graphical browser on your computer. For example, Internet Explorer is a part of the Windows operating system, and is also available on the Microsoft site:http://www.microsoft.com.

2. Text: Lynx is a browser that provides access to the Web in text-only mode. Navigation is accomplished by highlighting emphasized words in the screen with the arrow up and down keys, and then pressing the forward arrow (or Enter) key to follow the link. In these days of graphical browsers, it may be hard to believe that Lynx was once very popular.

2.3.4.6 Extending the Browser: Plug-Ins

When the browser encounters a sound, image or video file, it hands off the data to other programs, called plug-ins, to run or display the file. Working in conjunction with plug-ins, browsers can offer a seamless multimedia experience. Many plug-Ins are available for free. File formats requiring plug-ins are known as MIME types. MIME stands for Multimedia Internet Mail Extension, and was originally developed to help e-mail software handle a variety of binary (non-ASCII) file attachments.

A common plug-in utilized on the Web is the Abode Acrobat Reader. The Acrobat Reader allows you to view documents created in Abode's Portable Document Format (PDF). These documents are the MIME type "application/pdf" and are associated with the file extension .pdf. When the Acrobat Reader has been downloaded to your computer, the program will open and display the file requested when you click on a hyperlinked file name with the suffix .pdf. The latest versions of the Acrobat Reader allow for the viewing of documents within the browser window.

Web browsers are often standardized with a small suite of plug-ins, especially for playing multimedia content. Additional plug-ins may be obtained at the browser's Web site, at special download sites on the Web, or from the Web sites of the companies that created the programs.

2.3.4.7 Beyond Plug-Ins: Active X

ActiveX is a technology developed by Microsoft which makes plug-ins less necessary. ActiveX offers the opportunity to embed animated objects, data, and computer code on Web pages. A Web browser supporting ActiveX can render most items encountered on a Web page. As just one example, Active X allows you to view and edit PowerPoint presentations directly within your Web browser.

ActiveX works best with Microsoft's Internet Explorer.

2.3.5 Keywods:

Internet, DNS, IP address, TCP/IP, Protocols, Plug-ins, Multimedia, Hypermedia, Browsers, Hypertext, HTTP.

2.3.6 Self Check Exercise

Q. What is Internet ? Discuss its application in Libraries.

Q. What are Protocols ? What do you understand by TCP/IP ?

Q. What is Multimedia ? Explain the various types of media and different ways to view Multimedia.

Q. Write an essay on World Wide Web.

Q. Write down short notes on the following:

1. TCP/IP
2. Domain Name System (DNS)
3. IP address
4. URL
5. Multimedia
6. Hypermedia
7. W.W.W

2.3.7 Suggested Readings:

Internet for Everyone' by Leon & Leon, APH Publishing Corporation, New Delhi
Information Technology–Applications' by P.S.G. Kumar, BR Publications, Delhi
The ABCs of the Internet" by Christian Crumlish, BPB Publications, New Delhi

LESSON NO : 2.4 **AUTHOR : MR. VISHAL SINGH**

THE INTERNET BASED RESOURCES AND SERVICES : PART-I

Objective:

In this lesson, we will discuss the basic services provided by the Internet, Email, File transfer protocol, HTTP and Remote logon.

2.4.1 Introduction: Internet Services

As we have already discussed the Internet in the previous lesson along with its working, protocols and its application in libraries. So now we are discussing the various services provided by the internet.

There are basically four things we can do on the internet.

1. Communication
2. Document or file transfer
3. Interactive browsing
4. Bulletin boards

These are the tools for doing these activities:

1. **FTP-** (file transfer protocol)–moving electronic documents, images,sounds etc.
2. **TELNET-**accessing another computer system's database or archives
3. **WAIS-** a powerful tool for searching some large database
4. **Gopher-** an information browser that lets us retrieve what we find
5. **WWW** (World Wide Web)–a hypertext interface to information on the internet.
6. **USENET**-global bulletin board service.
7. **Archie**-a simple but effective mechanism for searching FTP archives.
8. **Veronica**-an enhancement to gopher that searches many gopher databases.
9. **Email-**Electronic message exchange.
10. **Chat & Instant Messaging**-Real time talk.

The details of these services are:

1. FTP–FTP is a protocol or set of rules, that enables the file to be transferred from one computer to another. It is part of the TCP/IP protocol suite. Files that are available are stored on the computers called FTP servers. An FTP client program is an interface that allows the user to locate the files to be transferred and initiate the transfer process.

2. Telnet–Telnet is the protocol that enables one computer to establish connection to another computer accepting the connection is referred to as remote or host computer. Telnet can provide access to many resources around the world, such as library catalogs, databases, and other internet tools and applications.

3. WAIS–WAIS is an internet search tool that has the capacity of searching many databases at one time. WAIS can be accessed via telnet; gopher or a WAIS client program and increasingly, WAIS indexed databases are accessible through the WWW.

4. Gopher–Gopher is a protocol designed to search, retrieve and display documents from remote sites on the internet. In addition to document display and document retrieval, it is possible to initiate online connections with other systems via Gopher.

5. WWW–The World Wide Web is a system, based on hypertext and HTTP, for providing, organizing, and accessing a wide variety of resources (text,

images and sounds) that are available via the internet.

6. Usenet–Usenet is conceptually a huge bulletin board system. This allows us to send messages to a specific person or group. Network news lets one to send messages on an electronic bulletin board for any one to see. Both Email and news groups are extremely useful internet tools.

7. Archie–Archie is a companion software tool to FTP. The Archie program searches a constantly updated index FTP sites, file names and descriptions. Archie system helps us to find information located anywhere on the internet.

8. Veronica–Veronica ("Very common rodent-oriented network index to computerized archives") is the companion tool to gopher. It is a search tool that allows one to quickly scan gopher for particular files and directories. It is program that one can access through gopher.

9. Email–It is the most commonly used application on the internet. The main attraction of Email lies in its speed, it is much more powerful than paper mail. With Email we can send and receive anything we use or create on computer words, documents, programmes, photos, images and sounds. It is much cheaper than other modes of communication services.

10. Chat & Instant Messaging–Chat programs allow users on the Internet to communicate with each other by typing in real time. They are sometimes included as a feature of a Web site, where users can log into the "chat room" to exchange comments and information about the topics addressed on the site. Chat may take other, more wide-ranging forms. For example, America Online is well known for sponsoring a number of topical chat rooms.

A variation of chat is the phenomenon of instant messaging. With instant messaging, a user on the Web can contact another user currently logged in and type a conversation. Most famous is America Online's Instant Messenger. ICQ, MSN and Yahoo also offer chat programs.

2.4.2 Electronic Mail

Electronic mail or Email allows information to be sent between people and computers on the internet. It is the most widely used internet resource. Just as written letter can be sent to multiple recipients, an electronic mail message can be sent to one or more Email address. An Email address identifies a person and the computer for purpose of exchanging electronic mail messages. The basic structure of an Email address is:

Username@host.subdomain.second-level-domain.first-level-domain.

Two examples based on the above structure are given below:

1. amit@giasmd01.vsnl.net.in
2. vishal111@yahoo.com

An Email address is read from left to right. For example, vishal111@yahoo.com is read as vishal111at the yahoo dot com, where

- "Vishal" is the name of the person sending or receiving the message; this is referred to as the username.

- "Yahoo" is part of the domain name of the organization.
- "Com" is also part of the domain name and indicates that "yahoo" is a commercial organization.

The internet mail system works because the SMTP, Simple mail transfer protocol. SMTP is a part of the TCP/IP suite of protocols. SMTP is a protocol, or set of rules that enable electronic mail to move smoothly through the internet. Because of SMTP, a Unix machine can send mail to a PC or Macintosh computer and Vice-versa.

Electronic mail works on the client/server principle. A client program enables the user to interact with the server in order to access information and services on the server computer. To read and send mail user need to access the computer where their mail resides (the server). The client application is the interface which lets the user read, reply to, forward, compose and send new messages.

2.4.2.1 Generic definition:

Email is an ambiguous term. Strictly speaking, email includes all technologies that support electronic transmission of text and graphics. Here is how the American Electronic Mail Association (EMA) defines it:

"Electronic Mail is the generic name for non-interactive communication of text, data, image or voice messages between a senders designated recipients by systems utilizing telecommunications links. Thus, telegraph, telex, voice-mail and computer based messaging systems (CBMS) fall within the preview of Email."

1. Non-interactive : There is no synchronous communication with each other. Other person may not be "on-line".
2. Text, data, image or voice messages: All these can be transferred via Email in case of voice mail; recorded voice messages take the place documents or letters.
3. Between senders & designated recipients: Email messages are from machine to machine.

2.4.2.2 How does it work ?

In a typical Email network, there is transfer of information between three computer systems your very own, the service provides and the receivers system. Imagine the first computer you have. You want to send message to Bombay. You type out the message on your computer and into the computer belonging to the mail provider by dialing up. As soon as you logged in, to the Email provider he starts charging you. This is not be confused with the STD bill. As long as you plugged, you continually charged. The Email service provides you with identification number. This infact includes address of your mail box located at the vendor's machine. The message is transmitted and deposited into the mailbox of the recipient. As a user you are given a password by the vendor. You can access your mail box and retrieve mail only after you give the password. Total secrecy is assured.

As a user, all you need is a modem, a computer terminal and a telephone line.

This set up, called the front-end is connected to a location where Email provider has installed computer capable of handling large amount of data. These computers have predestinated memory spaces which are allotted to each local subscriber. These spaces are called Mail Boxes. “Something at in to P.O. Box or a P.O. Bag”.

Now let’s see what a typical Email message looks like. An Email is made up of two-parts the header and the body.

1. **The Header–**The header consists of information about the sender and the recipient, the date and the subject. In addition Cc: option allows you to specify if you want carbon copies ‘to be sent to one or more addresses.

2. **The Body–**It contains the text of the message. It is separated from the header by exactly one bland line. The message is normally ASCII mode. Binary data in raw form as also accepted by some systems. The maximum message size varies from 64 kb to 100 kb in most systems.

2.4.2.3 Functions of Email

There are only few basic functions in an Email and almost all mailers handle them. The are :

1. Read
2. Compose (new message)
3. Reply (to message you have received)
4. Forward (message you have received)
5. Refile (save the message away)
6. Delete

2.4.2.4 Advantages of using Email:

1. Managing Email is Easy:

You can manage all your correspondence on screen and so can your customers. Your proposal can be answered, revised, stored, and sent to others, all without reams of paper involved.

2. Email is Fast:

Email is delivered instantly....from your office to anywhere in the world. No other method of delivery can provide this service. Timely buying and selling decisions can be made in a herartbeat.

3. Email is Inexpensive:

Compared to telephone calls, faxes, or over night courier service, Email is less expensive.

4. Email is Easy to Filter:

The subject line on an Email makes it easy to prioritize messages. The reader can identify correspondence quickly and deal with it immediately. Unlike regular mail which needs to be opened and reviewed, or voice mail which requires you to either listen to or scan all your messages for those that require immediate attention.

5. Transmission is Secure and Reliable:

The level of security in transmitting Email messages is very high, and the

industry continues to strive to develop even tighter security levels. Email is private. Often telephone and fax messages are not. If the address information is correct, rarely does an Email go astray. Fax machines can be out of order or out of paper and this prevents an important message from being delivered in a timely manner.

6. It's easy to send your message to more than one person

You just type in several Email addresses. You can also keep mailing lists on your computer, which allows quick distribution to many people, thousands even.

7. Most Email systems have a reply button that enables you to include all or part of the original message when you are writing a reply. This feature is a small one, but it really speeds replying messages. In composing a letter or even when making a phone call, people spend a lot of time establishing a context for your reply.

8. You can send letters, notes, files, data, or reports all use the same techniques. Once you learn how to use your Email program, everything is sent the same way.

9. You don't' have to worry about interrupting someone when you send Email. The Email is sent and delivered by one computer system communicating with the Internet. Although it is put into someone's mailbox, the recipient isn't interrupted by the arrival of Email.

10. The cost to you for Email has nothing to do with distance, and in many cases, the cost doesn't depend on the size of the message. Most Internet access charges are based on the number of hours per month you access the Internet, or you pay a flat monthly fee.

2.4.2.5 Limitations of Email

1. Email isn't necessarily private : Since messages are passed from one system to another, and sometimes through several systems or networks, there are many opportunities for someone to intercept or read Email. Many types of computer systems have protections built in to stop users from reading others' Email, but it's still possible for a system administrator to read the Email on a system or for someone to bypass the security of a computer system.

2. Some Email systems can send or receive text files only: Even though you can send and receive images, programs, files produced by word processing programs, or multimedia messages, some folks may not be able to properly view your message.

3. It's difficult to express emotion using Email : The recipient doesn't have the benefit of seeing your facial expressions or hearing your voice. You have to be careful with humor or sarcasm, since it's easy for someone to take your message the wrong way.

4. You can receive too much or unwanted Email : You can receive "junk" Email in the same way you receive other types of junk mail. On the Internet, junk mail is called *spam.* You may have to take active steps to delete the Email

you receive and try to stop it from being sent to you in the first place.

5. You may not know about the person with whom you are communicating: The communication is often all in text and it's possible for us to get an incorrect impression of the person sending Email. Also, some people misinterpret themselves.

2.4.2.6 Email–Attachments

A powerful feature of electronic mail is the ability to attach text or graphics files created by other programs. Attachments are separate computer files attached to the Email message. The recipient can display, print or save the attachment as a separate document. You can use this feature to send draft documents to a co-author. They can read the document on their own computer, make changes, and return the edited version to you.

Text files

–A basic text file

–.TXT

Hypertext Markup Language (HTML) files

–HTML is the language used to create Internet pages. Some Email programs send messages in this format.

–.HTML

–.HTM

Word Processor files

–Word processor programs are usually able to read each other's file format

–They can also read the basic TXT, RTF and HTML files

–.DOC (MS Word)

–.WPF (Word Perfect)

–.PDF (Abode Acrobat)

–.RTF (Rich Text Format)

Graphics (picture) files

These are the most common graphics file formats

–.JPG

–.MPG

–.GIF

Executable Files (Programs)

–May contain viruses-download at your peril

Multiple File Extensions

–Beware of files with multiple file name extensions. These are often virus-infected

2.4.2.7 How to join an Email service

To join a public Email network in India, you don't have to be a multinational company or an eccentric millionaire. Nor do you have to be a computer whiz.

1. Special equipment : All you need is PC, a telephone, a modem with its software and a healthy interest in the acquisition of information.

2. Computer expert : One has to be a computer expert in dealing the matter.

3. MODEMS: A device for connecting the PC to internet through telephone

lines. Modem can be internal, which is fixed inside the computer itself, or it can be external which can be separately placed outside the computer.

4. Service Provider : The connection can be bought from any of the service provider operating in the region, e.g., Glide, BSNL, etc.

2.4.2.8 Email Etiquette

Because Email is so new, we have no hard and fast rules about what may be said in a message . These rules are evolving because of our increased use of Email, as well as the advent of new technology that continually affects how we apply it. However, since this correspondence is owned by the business, some general rules of etiquette should be observed.

1. Be brief and to the point : A long Email message just like a long letter is hard to wade through. Most Email messages are short. One line may be enough; two pages are usually too much. Some people write long messages in an effort to avoid being misunderstood. However, this may produce exactly the opposite effect: people will skip the message and pick whatever point catches their attention.

2. Organize the message : Facilitate the reading of the message by stating its main point early (in the first sentence or paragraph) and placing details in the middle. For those are messages that are quite lengthy, include an overview, headers, and a summary.

3. Use a descriptive subject line: If you use a descriptive subject line to tell the readers what the Email is about, you will get the interested readers to open and read the rest of the Email. Try to give the readers enough information in the subject line for them to act upon it. However, don't write too long a subject line, as most Email programs limit what will show up on the inbox window.

4. Format text for professional appearance: Fonts and colors are a nonverbal component of an Email. For most business Email, use a simple font and black text. Colored text and script fonts create a less formal feeling, so use them wisely with careful consideration of the reader and of the message you want to send.

5. Be friendly and courteous: Because Email developed as a casual form of communication, we tend to be less careful about what we write. We actually need to be extra careful because Email lacks body language and speech inflection, which provide valuable communication clues in a face-to-face conversation.

Extra care should be taken to make Email friendly and courteous. A seemingly neutral message may be received more negatively than you would like. Therefore, you should use common courtesies, such as please and thank you. As a receiver of Email, always be sure to give correspondents the benefit of the doubt when unsure about their mood. If a message's meaning is ambiguous, ask for clarification before jumping to conclusions.

6. Restrict messages to those who "need to know" : Limit the recipients of Email message. Define and narrow your audience to those who truly need

the information you are sending.

7. Keep it Simple : Don't use exotic features of your word processing software like bold, italics, etc. resist temptation. They may not travel well across protocol of different networks and may show up terribly on the recipient terminal.

8. Identify yourself : Make up a signature block that contains appropriate contact information and organization, title, telephone number, fax number or postal address.

9. Attach wisely and sparingly: Attachments can be a source of frustration and even destruction when not used properly. When sending an attachment, try to use a platform that allows your recipient to open the attachment the first time. Don't send a large file without warning the recipient first.

10. Be careful with icons and graphics : Icons and graphics can also be sources of frustration because they can trip up servers. If you use them, be sure they are clean, simple and well-designed. If your message is professional, your icons and graphics should look the part.

11. Use the reply function : Automatic quoting is a unique capability within Email that enables maintaining a record of conversations without retyping anything. This feature allows you to include the context from previous messages to facilitate picking up the thread of the conversation.

Sometimes, typing your response after each quoted question is helpful. Other times, confining all of your responses to a single paragraph is a more appropriate strategy. You may want to preview your strategy to a reader so they don't miss any important information.

However, remember to quote only those elements of that message that will facilitate the understanding of the reply. Delete any portions that are not relevant.

Also, use the reply function only when you are actually replying to the message you have received. Don't use it as an easy way to enter Email address when you intend to discuss a completely different topic.

12. Don't use emotions : Emotions are symbols put together to look like sideways smiley faces, sad faces, etc. In business communication, use emotions only when you know the correspondent well enough to be informal.

2.4.3 File Transfer Protocol

FTP or file transfer protocol is a commonly used protocol for exchanging files over any network that supports the TCP/IP protocol (such as the Internet or an intranet). There are two computers involved in an FTP transfer: a server and a client. The FTP server, running FTP server software, listens on the network for connection requests from other computers. The client computer, running FTP client software, initiates a connection to the server. Once connected, the client can do a number of file manipulation operations such as uploading files to the server, download files from the server, rename or delete files on the server and so on. Any software company or individual programmer is able to create FTP server or client software because the protocol is an open standard. Virtually

every computer platform supports the FTP protocol. This allows any computer connected to a TCP/IP based network to manipulate files on another computer on that network regardless of which operating systems are involved (if the computers permit FTP access). There are many existing FTP client and server programs, and many of these are free.

2.4.3.1 Objectives of FTP

1. To promote sharing of files (computer programs and/or data),
2. To encourage indirect or implicit (via programs) use of remote computers,
3. To shield a user from variations in file storage systems among different hosts,
4. To transfer data reliably and efficiently.

2.4.3.2 FTP in Review

As well as web servers, mail servers and chat servers, the Internet houses FTP servers. These are servers that are like libraries of software or files that you can go to and "download". "Downloading" means copying a file to your computer. Conversely, "uploading" means to transmit a file from your computer to another computer on the Internet.

Typically, when you visit an FTP server with a WYSIWYG FTP program (like CuteFTP) you will be presented with a list of directories. A directory is identified by the characters "dir", for "directory" or little yellow folder icon. If you click on this line you will go down the directory tree to more directories or to the files in that directory or both.

Today, most FTP sites can be viewed using a standard web browser. The web browser will list the directories and files in blue (denoting a link below). You can click on these links to start a download.

Simply type the URL of the server into the location box. For example, ftp:/name of site/ will give you a listing of all the directories of the FTP server, ftp://name.of.site/directory/ which will give you a listing of all the files available in that directory; ftp://name.of.site/directory/filename will download the actual file to your computer. Many FTP servers are 'anonymous FTP' servers, which means you can log in with the username 'anonymous' and your Email address as the password.

In the past you need a special piece of software to view the files on an FTP server. You still need file transfer software if you want to "upload" files to an FTP or web server. This is required if you want to put pages on the web. There are a number of FTP programs around. The two most used packages are CuteFTP and WSFTP LE. These can be downloaded from many web sites. Inside an FTP program you will notice that the window is divided into two panes. The pane on the left shows directories and files on your computer. The window on the right is the public access area of the FTP server you are visiting.

2.4.3.3 Moving Around FTP Directories

You can move through levels of directories in the same way you do in Windows

Explorer in Windows. In other words, double mouse click on a directory to see its contents. Move up the directories by clicking on the up arrow and down directories by clicking on the directory's icon.
Let's say you had built a web site and you wanted to upload all your files to your ISP's web server. In the left pane you would go to the directory with your HTML files and picture files in it. In the right pane you would find your "work space" (supplied by your ISP, Usually 5MB). In the left pane you would highlight the files you want to move to the web server and then click the left pointing arrow. Note that you can delete and rename files in your FTP program.

2.4.3.4 Some Useful FTP Commands

* **ascii**
  Changes to text mode. This is necessary for uploading a homepage file. (index.html.)
- **binary**
- Changes to binary mode. Necessary to upload a binary file, such as a picture.
- **dir**
  List files, with more info than "Ls"
- **put** (filename)
  Upload (filename) from your machine
- **get** (filename)
  Download (filename) to your machine.
- **CD** (directory name)
  Changes directory on the remote machine.
- **LCD** (directory name)
  Changes directory on your local (home) computer.
  mget (files)
  Download multiple files to your machine.
  mput (files)
  Download multiple files to your machine.
- **bye**
  Close the ftp session.
- **quit/close/bye/disconnect:** to disconnect from the FTP server.
- **help**

Shows a list of available ftp commands.

2.4.3.5 Anonymous FTP

On connection to an FTP server, you would typically be asked the login details – a username and password. However, some servers enable what has come to be known as anonymous FTP. On Anonymous FTP servers you can log in with 'anonymous' as username and your Email as password. You would then have access to all the data which has been placed in the anonymous FTP section.

2.4.3.6 Modes of FTP

There are two modes, basically for using FTP. In one mode, you sign on with your own account or ID and transfer files. In the other, you sign on as a guest or as an anonymous user and transfer files. With the anonymous FTP, your privileges on the host system will be severely limited for security reasons. That's because host that provides anonymous FTP do so specifically to make certain

files available to anyone who wants them.

File Modes

There are two modes for transferring files in FTP:

1. ASCII mode is used for plain text, BinHex (Macintosh Transfer Format), uuencoded (Unix Transfer Encoding) and postscript files.
2. Binary mode (also, confusingly called I mode on some servers) is for everything else.

2.4.3.7 FTP and web browsers

Most recent web browsers and file managers can connect to FTP servers, although they may lack the support for protocol extensions such as FTPS. This allows manipulation of remote files over FTP through an interface similar to that used for local files. This is done via an FTP URL, which takes the form ftp(s):/ /<ftpserveraddres>. A password can optionally be given in the URL, e.g., : (ftp(s):/ /<login> : <password> <ftpserveraddress>:<port>, Most web-browsers require the use of passive mode FTP, which not all FTP servers are capable of handling.

2.4.3.8 Security Problems

FTP is an inherently insecure method of transferring files because there is no way for the original FTP specification to transfer data in an encrypted fashion. What this means is that under most network configurations, user names, passwords, FTP commands and transferred files can be "sniffed" or viewed by someone else on the same network using a protocol analyzer (or "sniffer"). It should be noted that this is a problem common to many Internet protocols written prior to the creation of SSL such as HTTP, SMTP and Telnet. The common solution to this problem is to use SFTP (SSH File Transfer Protocol) which is based on SSH, or FTPS (FTP over SSL), which adds SSL or TLS encryption to FTP.

2.4.3.9 Criticisms of FTP

1. Passwords and file contents are sent in clear text, which can be intercepted by eavesdroppers.
2. No integrity check on the receiver side. If transfer is interrupted the receiver has no way to know if the received file is complete or not. It is necessary to manage this externally for example with MDS sums or cyclic redundancy checking.
3. FTP is an extremely high latency protocol due to the number of commands needed to initiate a transfer.
4. Multiple TCP/IP connections are used, one for the control connection, and one for each download, upload, or directory listing. Firewall software needs additional logic to account for these connections.
5. It is hard to filter active mode FTP traffic on the client side by using a firewall, since the client must open an arbitrary port in order to receive the connection. This problem is largely resolved by using passive mode FTP.

2.4.4 Remote Logon or Remote Login

By remote login we mean a user sitting on his terminal logging on to a machine located anywhere in the world. Remote login allows a user's workstation or terminal to behave as though it is directly connected to the machine where the user is logged in. The user must have a login account and password to access the remote computer. This is an en extremely useful facility. For e.g. A company in India can develop and install software for a company in USA and continue to maintain it for India. Two researchers in 2 two countries can collaborate using Email, file transfer and remote login.

2.4.5 HTTP Protocol

Computers on the World Wide Web use the HyperText Transfer Protocol to talk with ech other. The HTTP provides a set of instructions for accurate information exchange. The communication between the client (your browser) and the server (a software located on a remote computer) involves requests sent by the client and responses from the server.

HTTP is a request/response protocol between clients and servers. The originating client, such as a web browser, spider, or other end-user tool, is referred to as the user agent. The destination server, which stores or creates resources such as HTML files and images, is called the origin server. In between the user agent and origin server may be several intermediaries, such as proxies, gateways, and tunnels.

An HTTP client initiates a request by establishing a Transmission Control Protocol (TCP) connection to a particular port on a remote host (port 80 by default). An HTTP server listening on that port waits for the client to send a Request Message.

Upon receiving the request, the server sends back a status line, such as “HTTP/ 1.1 200 OK”, and a message of its own, the body of which is perhaps the requested file, an error message, or some other information.

Resources to be accessed by HTTP are identified using Uniform Resource Identifiers (URIs) (or, more specifically, URLs) using the http: or https URI schemes.

2.4.5.1 Request Message

The request message consists of the following:

- Request line, such as GET/images/logo.gif HTTP/1.1, which requests the file logo.gif from the/images directory
- Headers, such as Accept-Language: en
- An empty line
- An optional message body

The request line and headers must all end with CRLF (i.e. a carriage return followed by a line feed).

The empty line must consist of only CRLF and no other whitespace.

Some headers are optional, while others (such as Host) are required by the HTP/ 1.1 Protocol

2.4.5.2 Request methods

HTTP defines eight methods indicating the desired action to be performed on the identified resource.

GET

Requests a representation of the specified resource. By far the most common method used on the Web today.

HEAD

Asks for the response identical to the one that would correspond to a GET request, but without the response body. This is useful for retrieving meta-information written in response headers, without having to transport the entire content.

POST

Submits user data (e.g. from a HTML form) to the identified resource. The data is included in the body of the request.

PUT

Uploads a representation of the specified resource.

DELETE

Deletes the specified resource (rarely implemented)

TRACE

Echoes back the received requests, so that a client can see what intermediate servers are adding or changing in the request.

OPTIONS

Returns the HTP methods that the server supports. This can be used to check the functionality of a web server.

CONNNECT

For use with a proxy that can change to being an SSL tunnel.

Methods GET and HEAD are defined as safe, i.e., intended only for information retrieval. Unsafe methods (such as POST, PUT and DELETE) should be displayed to the user in a special way (e.g. as buttons rather than links), making the user aware of possible side effect of their actions (e.g. financial transaction).

Methods GET, HEAD, PUT and DELETE are defined to be idempotent, meaning that multiple identical requests should have the same effect as a single request. Also, the methods OPTIONS and TRACE should not have side effects, and so are inherently idempotent.

Despite the specified idempotence of GET requests, in practice, GET requests are often used to pass HTML from values or other data to an HTTP server. These requests can cause changes on the server, through CGI execution, which may result in different effects for successive identical requests. For example, an HTML page may use a link to cause the deletion of a database record; merely GET-ing a particular URL to fail, on account of the database record already being deleted. This behavior is technically discouraged (non-idempotent actions should ideally be initiated by a POST request) but is very common on the modern World Wide Web. Such behavior can cause problems because various

schemes for catching web pages, such as search engines, which by design GET pages before a user initiates a request, can cause unintentional changes on a server.
HTTP servers are supposed to implement at least GET and HEAD methods, and whenever possible, also OPTIONS method.

2.4.5.3 HTTP versions

HTTP differs from other TCP-base protocols such as FTP, because HTTP has different protocol versions:

0.9

Depreciated. Was never widely used. Only supports one command, GET. Does not support headers. Since this version does not support POST the client can't pass much information to the server.

HTTP/1.0

Still in wide use, especially by proxy servers. Allows persistent connections (alias keep- alive connections, more than one request-response per TCP/IP connection) when explicitly negotiated; however, this only works well when not using proxy servers.

HTTP/1.1

Current version; persistent connections enabled by default and works well with proxies. Also supports request pipeline, allowing multiple requests to be sent at the same time, allowing the server to prepare for the workload and potentially transfer the requested resources more quickly to the client.

2.4.5.4 HTTP Properties

1. Client-Server Architecture

The HTTP protocol is based on a request/response paradigm. The communication generally takes place over a TCP/IP connection on the Internet. The default port is 80, but other ports can be used.
This does not preclude the HTTP/1.0 protocol from being implemented on top of any other protocol on the Internet, so long as reliability can be guaranteed. A requesting program (a client) establishes a connection with a receiving program (a server) and sends a request to the server in the form of a request method, URI, and protocol versions, followed by a message containing request modifiers, client information, and possible body content. The server responds with a status line, including its protocol version and a success or error code, followed by a message containing server information, entity met information, and possible body content.

2. A comprehensive addressing scheme

The HTTP protocol uses the concept of reference provided by the Universal Resource Identifier (URI) as a location (URL) or name (URN), for indicating the resource on which a method is to be applied. When an HTML hyperlink is composed, the URL (Uniform Resource Locator) is of the general form http:// hpst:port-number/path/file.html. More generally, a URL reference is of the type

service:/host/file. file-extension and in this way, the HTTP protocol can subsume the more basic Internet services.

HTTP/1.0 is also used for communication between user agents and various gateways, allowing hypermedia access to existing Internet protocols like SMTP, NNTP, FTP, Gopher, and WAIS. HTTP/1.0 is designed to allow communication with such gateways, via proxy servers, without any loss of the data conveyed by those earlier protocols.

3. The HTTP protocol is connectionless

Although we have just said that the client establishes a connection with a server, the protocol is called connectionless because once the single request has been satisfied, the connection is dropped. Other protocols typically keep the connection open, e.g., in an FTP session you can move around in remote directories, and the server keeps track of who you are, and where you are.

4. The HTTP protocol is stateless

After the server has responded to the client's request, the connection between client and server is dropped and forgotten. There is no "memory" between the client connections. The pure HTTP server implementation treats every request as if it was brand-new, i.e. without context.

2.4.6 Keywords : WWW, FTP, Telnet, WAIS, Gopher, Usenet, Archie, Veronica, Email, Attachments.

2.4.7 Self Check Exercise:

Q. What is Internet ? Discuss the various services provided by the internet.

Q. What is an Email ? What are its functions and advantages ?

Q. Write an essay on File Transfer Protocol.

Q. What is HTTP ? Explain the various request methods and properties of HTTP.

Q. Write short notes on the following :
FTP
HTTP
Email
ETIQUETTE

2.4.8 Suggested Readings :

"Internet for Everyone" by Leon & Leon, APH Publishing Corporation, New Delhi

"Information Technology–Applications" by P.S.G. Kumar, BR Publications, Delhi

"The ABCs for the Internet" by Christian Crumlish, BPB Publications, New Delhi

LESSON NO : 2.5 **AUTHOR : VISHAL SINGH**

THE INTERNET BASED RESOURCES AND SERVICES : PART-II

Objective:

In this lesson, we will discuss the Web browsers, Search engine with searching techniques, Web portals, gateways, electronic journals, mailing list, bulletin boards, computer conference and virtual seminar.

2.5.1 Introduction :

As we have already discussed the Internet in the lesson no.9 and some of its components in Lesson No.10. So the rest we are discussing in this lesson.

Web Browser:

A browser is a piece of software that acts as an interface between the user and the inner-workings of the internet, specially the World Wide Web. Browsers are also referred to as web clients, or universal clients, because in the client/ server model, the browser functions as the client program.

The browser acts on behalf of the user and does the following:

- Contact a web server and sends request for information.
- Receives the information and then displays it on the user's computer.

A browser as mentioned above, can be graphical or text based and can make the internet easier to use and more intuitive.

A graphical browser permits the user to view images on his/or her computer, "point and click" with a mouse to select hypertext links, and uses drop-down menus and toolbar buttons to navigate and access resources on the internet. The WWW incorporates hypertext, photographs, sound, video, etc. that can be fully experienced through a graphical browser. Browser often includes "helper applications" which are actually software programs that are needed to display images, hear sounds or run animation sequences. These helper applications are automatically invoked by the browser when a user selects a link to a resource that requires them.

2.5.1.1 Using Web Browsers:

Generally, when you start a browser, you begin at a home page, a starting place you designate for your web-crawling sessions. This will either be default home page for your browser or custom home page that you have created. You can also start some browser by pointing them directly at a web address. Some Email programs, such as Eudora, now allows you to double click a URL in an Email message to automatically start up your most recently installed browser and bring up the selected web page.

Once you are connected, you can do number of activities such as reading the web page, following a link, insert a page to bookmark etc. Following is the brief detail of such activities that can be performed by using the web. Almost all the web browsers support these basic facilities.

1. **Reading a page in a web browser:** Web pages can consist of formatted text and headings, illustrations, background art and colour effect, and hyperlinks, which can be highlighted text or art. In most graphical browsers, links are shown in blue (unless the creator of the page has decided otherwise) and are underlined (unless the creator has decided otherwise and custom the program). Often a page won't fit on the screen all at once. Graphical browsers use scroll bars, just as other programs do, to enable you to see materials that doesn't fit on the screen. If you are hunting for a specific piece of information on a long document page, try searching for keywords, usually with a menu command.

2. Following a link : In graphical browsers, following a link entails positioning the mouse pointer over the link (the pointer will change to show you that you are over an active link) and then click once. All the browsers have a back command, often a shortcut button, for retracing our steps back to the previous page. Once you have gone back you can also go forward, using forward command, to return along your original path to further point you have gotten to. Also, you can usually bring you a history list of all that pages have been visited to since you started the program that session.

3. Knowing where to go : It is hard to get oriented in the web, since there is no real starting point. Your default homepage should provide some pretty useful places to start through. In most browsers, if you have a specific web address in mind, you can type a URL directly to visit a web page without have to follow a trial of links that lead to. Also, at any time, you can return to the default home page. Graphical browsers have a home button, often decorated with an icon representing a house for this purpose.

4. Making a bookmark: As you travel around the web, you can save interesting destinations by making bookmarks (also called favourite places or items). Once you have made a bookmark you have created your own personal shortcut to a favourite destination. You won't have to find your back to the page in question next time you want to go there.

5. Saving or Mailing a document: If a web page contains information you want to send to someone or have stored on your computer, you can either use browsers mail command to send the document to yourself or someone else, or you can use the save command to save a copy of the document on your hard disk, much the same way you'd save a file in a word processor.

6. Peeking behind scenes: If you need to see, the URL associated with a specific link, you can do so. For instance, in most browsers, when you place the pointer over a link, the associated link appears in the status bar at the bottom of the program. Some browsers enable you to copy a URL by right clicking and holding the link to it. You can then paste it into another document for future reference or paste it into an Email message to tell someone else how to get the page in the question. If you want to see how a web page was constructed you can generally view the source file underlying a page by selecting view/ source.

7. Changing your homepage: The command differ from browser to browser, but most web browsers allow you to change your default home page to different page so you can start exploring the web from any vintage point.

8. Web help and info: There are number of helpful resources for the web, both hypertext and plain text documents. Many individual browsers also offer dedicated help files accessible through a menu command.

2.5.1.2 Different types of Web browsers:

External Web browsers: Most of the on-line services are now offering to the WWW by launching an external browser such as Mosaic. Netscape Navigator, Internet Explorer etc. direct access ISP (Internet service provider) usually enables you to run whichever browser you like to run over the dial-up

connection.

Built in browsers: Some of the online services, however, have their browser built-in, as with any other module available within the access program. Netcom's Net Cruiser has built-in web module, but it also enables web browsers to run alongside Net Cruiser, piggybacking on the internet connection provided by the Netcom software. The UNIX shell only accounts require that you run a character based UNIX browser, such as lynx or original WWW. They won't be able to show pictures, but they can take you anywhere you want to go and you can always download binary files that the character-based browsers are not able to display.

Graphical Web browser: Most of the browsers today allow its users to view the web page as collection text and graphic images. These are usually called graphical browsers-are easy to use and show information in more appealing form.

Character based browser: Browsers like UNIX shell based are character based browsers. They can display any character information, so the web pages are nothing but the plain text document files. The advantage of character based browsers is that they can download the binary documents that graphical browsers can not display.

Following are the various web browsers used for surfing the web:

1. AOL (America Online)

AOL can be initiated by going to the internet connection area and choosing WWW, by clicking on AOL content that includes the word web at the end of its title or by going to key word web.

- It has no search command for the contents of the web page.
- There is no way to mail a document directly through AOL.
- It doesn't allow you to see the underlying HTML source from a web page.
- It has a back and forward buttons, and you can see a list of sites you have visited in the drop down list box directly below the buttons.
- It provides the home button to return to home location, favourite places list to add the interesting destinations just by pressing the heart button in the upper corner of the window.

2. CompuServe Mosaic

- CompuServe offers a licensed version of the original graphical web browser, mosaic. You can start it by selecting services+>CompuServe mosaic.
- It provides you with a full PPP (Point to Point Protocol) connection which means you can launch any external web browser, such as Netscape, alongside your CompuServe connection.
- It allows you to search long web page by edit=>find.
- It has backward and forward buttons, you can bring up the list of sites visited by selecting navigate=>history.

- To come to home page: home button.
- To save a web document: view=>load to disk mode and checkmark the document you want to save.
- To save interesting sites: Add button/personal favourite menu.
- To view HTML source: file=>web page source.
- To change location type URL address in the homepage box by selecting view=>options.

3. Mosaic:

- NCSA Mosaic is the original graphical web server. Other versions are Spyglass Mosaic, AIR Mosaic, and CompuServe Mosaic.
- To search a long web page: edit->find.
- Back/forward buttons and navigate=>sessions history to return to any of the visited sites.
- To come to home: home button.
- To save interesting web sites: navigate=>add current to hotlist.
- To go to hotlist item: hotlist=>starting point=>hotlist item.
- To save a document: file=>save as.
- To send mail: file=>send mail.
- To view HTML source: file=>document source.
- It also has an auto surf feature so that when you browse a website, Mosaic can pull down and catch all the pages at site, letting you browse them at your leisure and in a lot less time.

4. Lynx

- For character based UNIX account internet connections, it is one of the best browsers. It is a full screen program that is very easy to use.
- Start lynx by typing "'lynx" at the lynx prompt. It can also be run by "telnetting" to a public access browser by typing 'telnet ukanaix'.cc.ukans.edu' and then logging in as 'WWW'. One can also start lynx from a particular URL by typing 'lynx Url'.
- Most of the web pages will be regular text and headings, and the current hypertext link is shown in boldface, whereas the current link is shown in reverse video.
- It allows various facilities to see the next screenful of page, to go back up a page, to move down to the next link, to fix a messed up screen, to search for specific text, to repeat a search, to select the current link and jump to the address it refers to, to return to the previous link etc.
- You can always retrace your steps in lynx by pressing 4(Numlock).
- Press one to go to internet resources meta-index, which include many more starting points for you to try.
- Press 'g' to enter a URL directly at any time, and 'm' to return to home page. To save interesting locations 'a' is processed and 'v' for bookmark.

5. Internet explorer

- It works seamlessly with the network, but it also stands alone as a web browser that can work with any internet connection. It can be started by double clicking the icon on desktop against "internet explorer" in windows 95/98/XP.
- One can download the internet explorer from Microsoft's web site:/ www.microsoft.com
- To search long page edit=>find.
- To move URL site directly file=>open and place the address in the address box. You can leave the http://part of any URL when typing it into the address box, though you will have to type other protocols, such as ftp://,gopher://, and so on.
- To move to home page there is home button. When internet explorer starts without particular site specification it displays the start page instead of home page as other browsers refer to it.
- To save file=>save.
- To mail file=?send.
- To save interesting site favourites=>add to favourites.
- To view HTML source view=>source.

6. Net Crusier

- It includes a browser module for the web. To start it press web icon. This takes you to the Netcom Homeport, a pretty good jumping-off point. (with features such as news, sports, government, computing, weather, education, science, shopping, arts and ent., business, career net)
- The connection to the internet that Net Cruiser establishes for you can support external programs, such as stand alone web browsers. So if you get rid of the limitations of Net Cruiser's web module, consider running an outside browser, such as Netscape Navigator.
- With back/forward buttons it has WWW=>history to see the list of visited sites.
- To search: search button/edit=>find.
- To add a bookmark: WWW=>bookwark.
- To save a document: save button/file=>save.
- It doesn't support mail facility directly.
- To see HTML source: view=>source file.
- Net Cruiser's web module sometime has trouble downloading artwork and "conk out" before finishing. When this happens, you should still be able to read the context of the page.

7. Netscape Navigator:

- This is the most popular browser, can be initiated by pressing the Netscape Navigator icon, which opens the Netscape Homepage.
- To move between pages: back/forward buttons and the Go menu to see the list of all the pages you have visited in current session.

- To move to a particular page: file=>location and type the address in the location box.
- To make bookmark: boomarks=>add.
- To save a file: file=>save as
- For mail: file=>mail document. The attachments are also allowed.
- To see the HTML source: view=>document source.
- Options=>general preferences to change the home page and other mail and news preferences.

2.5.2 Search Engine:

A web search engine is an interactive tool to help people locate information available in the WWW. Web search engines are actually databases that contain reference to thousand of resources.

There are many search engines available on the web. A search engine is an interface between the user and the underlying database. The interface presents the user with a place to type in a search string, which may be a word, phrase, date or some other criterion, and a way to submit the request.

The search engine runs the search string against the database, returns a list of resources that match the criteria and display the results of the user.

2.5.2.1 How search engine works:

Most web search engines use automated tools and programs to gather resources. These tools often referred to as worms, spiders, crawlers and robots, search thousand of information world wide, collect information and store information in the database.

When they find new and updated pages, they copy this information back home to be included in an updated version of the index at the search engine site. The spider will also follow any new links which it finds and repeat the process until it can not find any more new pages, at which point it will retrace its step and follow a new route.

This has a number of implications as far as the searcher is concerned. Given the size of the World Wide Web, this is a full-time job, and even the fastest computers have trouble keeping up with the flood of new pages onto the web. This has been overcome to a certain extent in that website authors can contact search engines to inform them of new or updated pages which should be included in the indexes.

A search engine cannot possibly contain every piece of information that is on the WWW; therefore, search engine will not include very available web resource. In addition, because search engine collects resources differently, the same query can be typed into several search engines is likely to produce differently results.

2.5.2.2 Types of Search Engines:

There are basically five types of search engines available to you:

1. Free-text search engine

Free text search engines are very easy to describe. You can simply search

for any single keyword, a number of words or in some cases a phrase. You are not limited in any way as to your choice–you may wish to search for the name of a company, a line of poetry, a number, a person's name, a foreign language term, just about anything.

This approach has both advantages and disadvantages, as you would expect. Free-text search engines are very useful if you know exactly what you are looking for, or if you are looking for a concept which can be defined in a small number of words. They are less useful if you want a broad overview of a subject, or are searching in an area that you don't know very well and consequently have no idea as to the best terms to use.

2. Index or directory based search engines

These search engines take a rather different approach to providing you with information on the sites that you might wish to visit. Their emphasis is on classifying information under a series of major subject headings, and then subdividing these into a tree structure of more specific headings and sites are listed as appropriate in this directory structure. If this approach sounds familiar, that is, because it is as anyone who as ever used a library classification scheme will know. The advantage of this approach is obvious as the headings and subheadings can be used to guide the users through the vast amount of information.

3. Multi or Meta search engines

The next type of search engine is not really a search engine at all, since a multi-search engine does not actually search anything itself. Instead it takes your query and passes it on to a selected group of search engines. Once the results start coming in from these individual search engines, a multi-search engine displays the result on the screen. The more advanced engine will collate the results, removing duplicate and put them in some sort of sensible order.

Multi-search engines are useful if you want to try and obtain a comprehensive listing of websites that cover a particular subject. Individual search engines may well not be fully comprehensive, and one may index sites that another has missed and vice-versa.

3. Natural language search engines

This is a very small category with only very few engines; the most popular is probably Ask Jeeves at http//www.aj.com. Search engines in this category will take your search terms and will attempt to map them to other terms as well, so a search for 'tax revenue' will look also for financial, business and economic information.

They can be very useful if you are having real problems finding information; for example, was able to find a list of gases that are partially soluble in water by asking the question 'which gases are partially soluble in water?' I doubt that I would have been able to find that information as quickly or as easily using any other search engine.

4. Resource or Site-specific search engines

The final category of search engine is perhaps the largest, but paradoxically the least used, probably as a result of their diversity. A resource specific engine may well have been created simply to search one particular resource, such as the Bible, a dictionary or an encyclopedia. There is very little which can be said about these search engines, since they are all very different to look at and to use.

One type of resource-specific search engine which is worth mentioning here is little detail is what is generally referred to as 'people finder' or 'people searcher'. These engines will, as the name implies, find people on the internet. You obviously need to know a little bit about the person you are looking for, such as their name, where they come from and any other information you have available. A people searcher will then attempt to locate individuals in its database that match the information you have provided and will list them for you, thus allowing you to contact them. Usually, the Email address is given, but in some cases you can also discover their geographical address and even phone number.

2.5.2.3 List of Some useful Search Engines:

1. Alta Vista

Alta Vista was created in 1995 by digital equipment corporation, and was originally designed to index the entire internet. It is a very fast, up-to-date search service of the entire full-text of web pages and articles. It searches for exact phrases, word(s), Boolean operators (and/or, not, near); URL's addresses, page titles and related links. To ensure the most current database contents, Alta Vista uses a web spider program to routinely search every web page. Pages that do not change often are checked for updates less frequently than pages that changes often.

Alta Vista is a search engine; it helps users to find great deal of information on the Internet. Individuals can search for what they need by typing in the keyword or words they are looking for information about.

2. Yahoo

Yahoo is a fine search engine. Yahoo offers its visitors a wide range of services that are organized by categories. Some examples of categories that can be searched include Business and Economy, News and Media, Health, Government and Science just to name a few. Yahoo also offers links to Email, messenger, jobs, and even shopping. The user also has the option of choosing an advanced search or a search of the most popular sites. The page is arranged in a very colorful and easily maneuverable setup. The site is published by Yahoo Inc. and was copyrighted by this company in 2003.

Its homepage contains links to entertainment, shopping, current news, sports, weather, music and more. There is also a directory enabling users to search for information by categories. "Yahoo" is a site that provides a plethora of services. It is best known for its search engine; however, you can access a multitude of

other things, with their main categories being Shop, Find, Connect, Organize, Fun, and Info. The layout of the site is cluttered, yet not hard to use. There are many links for search categories, services, products, news, and more, however, all the links of the like kinds are grouped together, making the site easy to navigate.

3. Google

"Google" is the premier search tool on the Internet. "Google" allow visitors to select a category and search for results based on a word or phrase entered. Categories include the Web, Images, Groups, Directory and News.

Google is a search engine; it helps users to find great deal of information on the Internet. Individuals can search for what they need by typing in the keyword or words they are looking for information about. The search can also be made more specific if users decide to do an advanced search. This would allow them to pick certain words that the source they are searching for must contain and other words it must omit.

Google is one of the most complete search engines on the Internet today. When the site is first accessed, the page is very plain, the main part being a text box with a flashing cursor. After entering a search expression, Google returns a list of hyperlinks to relative Web pages. Each hyperlink is accompanied by the URL of that page. Links at the bottom of each page take you to pages on company information, advertising information, search solutions, and services and tools.

4. Lycos

It is a popular search engine on the internet. Lycos is the largest catalogue, which include 90% of the entire web. It's "spiders" are constantly scanning the internet, automatically keeping tracks of new documents that appear, as well as changes and deletions to documents that already exist. Lycos provides the fastest possible search with the widest retrieval of information on the net. Currently, it catalogues three kinds of files: HTTP, Gopher and FTP files. The search can be performed by keyword(s) or simple Boolean (and/or), with options of loose or strong match and the number of displayed hits. The summary-information of each page helps to focus the search. "Point communications" owned by Lycos, offers a list of most popular web's sites, with review and ratings.

5. Ask Jeeves

"Ask Jeeves" is a search engine on the Internet. By entering a question, word, or phrase and clicking on the search button, users can receive results that most closely match their entry. The home page includes this search bar, as well as links to news and shopping. In addition, there are buttons at the bottom of the page for Interesting Queries, Breaking News, Browse by Subject, and AJ Kids. There is also an option to add the search feature of "Ask Jeeves" to the toolbar of your browser, which provides convenient searching without the hassle of first going to the homepage of the website. This site is designed to provide convenient searches, news, and shopping. Its primary audience includes Internet users everywhere. The site is published by Ask Jeeves, Inc. and was

copyrighted by this company in 2003.

6. Infoseek

Infoseek is another popular search engine. It allows users choose the best search mode depending on the level of search assistance they require. Two Info seek search engines are offered as part of Info seek service : general and advanced. General offers comprehensive query results. It is especially good if you have a general idea of what you are seeking, but you do not have specific details. Advanced (search options link) is intended for experienced searchers who know what they want and how they get it quickly. One way to narrow your search to places other than web pages with Info seek is by using its drop-down menu.

As with most search engines, the returns that most closely match your search results are cited first. To narrow your search even further, Infoseek offers you the choice of searching only within the results. Like many search engines, Infoseek return your results in terms of the percentage of its accuracy, with the highest likely return results first.

7. Excite

The first concept based navigational tool, which searches web pages and the past two weeks of Usenet postings. Search by a keyword or concept (in plain English). Excite finds not only sites and articles in response to a keyword, but also relevant pages connected by a concept. In addition to Netsearch, Excite's Netreviews provides a catalogue of reviewed sites organized by subject, and current news from Reuters.

8. Web Crawler

It has fast and simple search of indexed web pages. Also provides a list of most popular web sites and information on web statistics. The search is by a keyword, string of words, or, and, not, any. It searches the entire net everyday. Also, you can browse through category.

2.5.2.4 Searching Techniques:

Boolean searching–the operators AND, NOT, OR.

We can easily learn the techniques of searching with the help of the following example:

Suppose you want pizza with pepperoni and ham, but without olives and garlic. Here's how your order will using Boolean operators:

Pizza AND pepperoni AND ham NOT olives NOT garlic.

A search engine would interpret this Boolean expression in the following way:

The user wants me to show him or her links to all the pages that include the word *pizza* as well as the word *pepperoni* and the word *ham*, but he or she wants me to subtract pages that include the word *olives* or the word *garlic*.

The operator AND means that the word that follows has to be in the text of the pages that are to be listed. Pages including the words following NOT will not be listed.

If you suspect that the restaurant is out of pepperoni, you may be a little more open-minded about this, and say: "I would like pepperoni or burger". In Boolean terms that is:
Pepperoni OR burger

On the Net an order like this one will give you all the pages that include the word pepperoni, all the pages that include the word burger and all the pages that include both of these words.
What happens if you take out the operators AND, NOT and or and write the following line instead ?
Pizza pepperoni harm olives garlic.
Most search engines interpret the space between the words as AND. That is, they will give you all the pages that include all these words and, some engines may interpret the space between the words as OR. This means that they will even give you pages that include only one of these words. You will, for instance, end up with a lot of irrelevant information about the garlic industry.

Phrases

Search engines are useful, but they are extremely stupid. If you ask them for a *pan pizza* they may not only give you pages on *pizza* and *pan pizza,* but also information about *the god Pan, Pan flutes, frying pans, Peter Pan, Pan Arabian co-operation* and more. You need a way of telling the search engine that *pan pizza* is an expression or a phrase. For this you use double quotation mark: "……", like this:
"Pan Pizza" AND "Italian pepperoni" AND "black olvies"
This will tell the search engine to look for pages that include the text string *pan pizza*, not the word *pan* in general.

The NEAR-operator

What if you are looking for a sequence of words that are normally connected, but that may be split by other words ? If you were looking for information on the inventor Thomas Alva Edison, you could possibly search for a phrase, like this:
"Thomas Alva Edison"
But this search would not bring you pages where the name is given as *Thomas A. **Edison or Thomas Edison.*** **You could solve this problem by entering**
"Thomas Alva Edison" OR "Thomas A. Edison" OR "Thomas Edison"
Or you could use the NEAR search operator. NEAR means "show me pages where these words are near each other".
Thomas NEAR Edison
How near is NEAR ? That depends. In Alta Vista the words used to be less than 10 words apart.
Ne**sting (Brackets)**
Search engines may get confused. What does the following search imply, really ?
"Pan pizza" AND pepperoni OR ham AND olives.
The use of parentheses–nesting–will clear things up:
"Pan pizza" AND (pepperoni or ham) AND olives
This means that you want a pizza with olives, but are uncertain whether you want

pepperoni or ham on that pizza.
On the other hand:
("pan pizza" AND pepperoni) OR (ham AND olives)
means that you have to choose between a pepperoni pan pizza and a dish based on ham and olives.
Some search engines want you to write the Boolean operators in CAPITAL letters. The rest will ignore the difference between upper and lower case. If you use capital letters you are on the safe side.

Case sensitivity

Please note that some search engines are partially case sensitive. If you spell a word or a phrase with lower case letters in the search form, the engine will match both upper and lower case letters on the webpage.
Searches for "apple computer" will give you pages with apple computer. Apple Computer and even APPLE COMPUTER. It is normally not the other way round. A search for "Bill Gates" will give you Bill Gates but not bill gates.
As you can see, this might be useful when you are looking for persons. By using capital letters in "Bill Gates", you avoid pages including the words bill (meaning invoice) and gates (meaning portals) only.

Search Engine Math–The Easier Way

Now, if you find Boolean operators too intimidating, there is an easier way called as search engine math. Before learning math, it's a helpful reminder that the more specific your search is, the more likely you will find what you want. Don't be afraid to tell a search engine exactly what you are looking for.
It goes like this:
+pizza+pepperoni+ham – olives – garlic
Put a plus sign in front of words that must be present on the webpage. A minus sign in front of a word will tell the search engine to subtract pages that contain that particular word. Hence + equals the Boolean search term AND, and – the term NOT.
In most search engines you can combine the pluses and minuses with quotation marks as explained above. However, you cannot use brackets or the OR-operator.
Here is one example:
+"pan pizza" – olives pepperoni
This means that the pages the search engine shows you must include the phrase *pan pizza,* they must not include the word olives, and they should preferably include the word *pepperoni.*

2.5.3 Web portal:

A web portal is a web that provides a starting point or gateway to other resources on the Internet or an intranet. Internet portals are also known as enterprise information portals (EIP). The building blocks of portals are portlets, which contain portions of content published using markup languages such as HTML and XML.
We can say that it is a web site or service that offers a broad array of resources and services, such as Email, forums, search engines, and on-line shopping malls. The first Web portals were online services, such as AOL, that provided access to the Web, but by

now most of the traditional search engines have transformed themselves into Web Portals to attract and keep a larger audience.

Portals typically provide personalized capabilities to their users. They are designed to use distributed applications, different numbers and types of middleware, and hardware to provide services from a number of different sources. In addition, business portals are designed to share collaboration in workplaces. A further business-driven requirement of portal is that the content be able to work on multiple platforms such as personal computers, personal digital assistants (PDAs) and cell phones.

2.5.3.1 Development of Web Portals:

In the late 1990s, the web portal was a hot commodity. After the rapid diffusion of web in the mid-1990s, many companies tried to build or acquire a portal, to have a piece of the Internet market. The web portal gained special attention because it was, for many users, the starting point of their web browser. Netscape Netcentre became a part of America Online, the Walt Disney Company launched Go.com, and Excite became a part of AT&T during the late 1990s. Lycos was said to be a good target for other media companies such as CBS.

Many of the portals started initially as either Internet directories and/or search engines (Excite, Lycos, AltaVista and Infoseek among the old ones). The expansion of service provision occurred as a strategy to secure the user-base and lengthen the time a user stays on the portal. Services which require user registration such as free Email, customization features, and chat rooms were considered to enhance repeat use of the portal. Game, chat Email, news, and other services also tend to make users' stay longer, thereby increasing the advertisement revenue.

2.5.3.2 Types of Web portals:

Regional web portals

Along with the development and success of International web portals such as Yahoo!, regional variants have also sprung up which include Yahoo! (UK (http://www.yahoo.co.uk/), Canada (http://www.yahoo.ca/), Germany (http://www.yahoo.de/), Canadian content (http://www.canadiancontent.net/) and Fireball, de (http://www.fireball.de/) among others. Regional portals are also known to contain local information like weather, street maps, local business and more.

Web portals have also emerged from countries like India (Rediff) and China (Sina). Such portals reach out to the widespread Diaspora spread across the world.

Government web portals

At the end of the dot-com boom in the 1990s, many governments had already committed to creating portal sites for their citizens. In the United States the main portal is First.gov; in the United Kingdom the main portals are directgov (http://www.direct.gov.uk) (for citizens) and businesslink.gov.uk (for businesses). A number of major international surveys are run to measure the transactional capabilities of these portals, the most notable being that run by Accenture. The Government of Canada site (http://canada.gc.ca/) is frequently identified as the leading government-to-citizen portal for its ease of use and transactional capabilities.

Many U.S. states have their own portals which provide direct access to eCommerce applications (i.e. Hawaii Business Express and myIndianaLicense), agency and

department web sites, and more specific information about living in, doing business in and getting around the state.

Mini Portals

Some localized portals are based on local interests, and edited and maintained by individuals. While they do not provide the same levels of services as major portals, they are a good place for collaboration of ideas, for commonly interested people. Some examples of Web Portals are KNET at www.silvernet.bravehost.com and xbox.net, and the Web Index.

Enterprise Information Portals

In the early 2000s, a major industry shift in Web portal focus has been the corporate intranet portal, or "enterprise Web". Where expecting millions of unaffiliated users to return to a public Web portal has been something of a mediocre financial success, using a private Web portal to unite the Web communications and thinking inside a large corporation has begun to be seen by many as both a labor-saving and money-saving technology. Some corporate analysts have predicted that enterprise information portal spending will be one of the top five areas for growth in the Internet technologies sector during the first decade of the 21st century.

* **Content and document management**—services that support the full life cycle of content and document creation and provide mechanisms for authoring, approval, version control and scheduled publishing. Some portal solutions provide aim to remove the need for a third-party content management system.
* **Collaboration**—portal members can communicate synchronously (though chat or messaging) or asynchronously through threaded discussion and Email digest (forums) and blogs.
* **Search & Navigation**—Content is meant to be read, so on the usage side of the equation, being able to find and retrieve targeted content is the essential task. As more content is added to repositories, the more valuable those repositories become. Unfortunately, retrieving useful information becomes more difficult as the volume of information grows unless effective search and navigation methods are employed.
* **Personalization**—the ability for portal members to subscribe to specific types of content and services. Users can customize the look and feel of their environment.
* **Entitlement**—the ability for portal administrators to limit specific types of content and services users has access too. For example, a company's proprietary information can be entitled for only company employees access.
* **Integration**—the connection of functions and data from multiple systems into new components/portlets.
* **Single sign-on**—most enterprise portals provide single sing-on capabilities to their users. This requires a user to authenticate only once. Access control lists manage the mapping between portal content and services over the portal user base.

Enterprise portals may be referred to by the community they serve. For instance, an employee-facing portal may be described as a "Business-to-employee" portal,

or B2E portal. Other enterprise portal classifications are "B2C" (business-to-customer/consumer), "B2D" (business-to dealer/distributor), "B2B" (business-to-business/supplier), and "B2G" (business-to-government). Enterprises may develop multiple "B2x" portals based on business structure and strategic focus, but leverage a common architectural framework, reusable component libraries, and standardized project Methodologies.

2.5.3.3 List of some useful web portals:

* **Yahoo (www.yahoo.com)**
  Yahoo! Internet portal provides Email, news, shopping, web search, music, fantasy sports, and many other online products and services to consumers and business worldwide.
* **Alta Vista (www.altavista.com)**
  Alta Vista provides web and newsgroup search engines, as well as paid submission services.
* **Lycos (www.lycos.com)**
  Official site for Lycos, the online destination site combining elements of navigation, community and commerce.
* **Excite (www.excite.com)**
  Excite provides search, news, Email, personals, portfolio tracking, other services.
* **MS (www.msn.com)**
  MSN's all-in-one Internet portal, the home of Hotmail, MSN Messenger, MSNBC News, Encarta, and Slate Magazine.
* **America Online (AOL) (www.aol.com)**
  AOL offers services such as Internet access, E-mail account, instant messaging, chat, and other online features.
* **Go.com (www.go.com).**
  Disney's web portal.
* **Rediff.com (www.rediff.com)**
  Sports, news, and entertainment information from an Indian perspective.
  Sify.com (www.sify.com)
  News, sports, arts, culture and more about all things Indian.

2.5.4 Gateways :

Gateways is the common term in the field of IT. It has two meanings which are as follows :

1. **Gateway in terms of E-commerce** : Gateway is phrase used by the webmasters and search engine optimizers to describe a webpage designed to attract visitors and search engines to a particular website. A typical gateway page is small, simple and highly optimized. Its primary goal is to attract visitors searching for relevant keywords or phrases, and provide hyperlinks to pages within the website.

2. **Gateway in terms of networking :** Gateway potentially operates in all seven layers of the OSI model. A gateway is protocol converter; a gateway

can accept a packet formatted for one protocol and convert it to a packet formatted for another protocol, e.g. TCP/IP before forwarding it. A gateway is generally software installed within router. The gateway understands the protocols used by each network links in to the router and is therefore able to translate from one to another.

2.5.5 E-jounals:

A publication, often scholarly, that is made accessible in a computerized format and distributed over the internet. An electronic journal or e-journal may have a traditional paper counterpart or historical antecedent. This means that you can access selected electronic articles from home, within the Trust, another workplace or even your local public library or even an Internet café. For example, the journal scientific American can be found in both paper and electronic versions of the university.

There are literally thousand of electronic journals which offer high quality information totally free of charge. These are often in receipt of funding from the organization or another, and exist to promote the free flow of information in their chosen subject area. When electronic journals are first established, access to them is free. There are many reasons for this. First potential readers need to be encouraged to visit the site.

Secondly, it is quite difficult to price access to an electronic journal in comparison with a printed version; should it be less, since the publisher does not have the printing and distribution overheads; the same price, since the quality of data should be the same; or indeed should it cost more, since readers are getting quicker access to information which can be presented in a wider variety of media ? What is swiftly become clear to many publishers is that some sort of change is necessary, since they have to pay writers, designers and programmers, and cover the equipment costs. So finally, we can say that it is a very good method of providing information to the people through the internet.

Advantages of Electronic Journals:

* **Speed**
  Articles can be put on the Web as soon as they are ready, without having to wait may be months for a space in a journal issue.
* **Easily searchable**
  Search ability is one of the core advantages of a digital format.
* **Interactive**

The rapid turnaround time means that articles can be read, commented on by the journal's readers, and amended much more quickly that can be done with print. The ease with which E-mail can be sent, or forms filled in means that there can be much greater feedback through the Web.

* **Accessible**
  E journals are easily accessible and are far cheaper for the researchers to get one computer with Internet access than to subscribe to many journals.

* **Add value**

Rather than just recreate a print journal in exact format, advantage should be taken of all the possibilities of the Web to add value, for example by using animation, virtual reality and interactive mathematical charts. Also a large amount of supporting data can be linked to from the article if the reader wanted to look more deeply into the results.

* **Inexpensive**

This is a hotly debated point, claiming that a 70% saving over print costs can be made, while Whisler argues that only a 20% saving can be made as distribution costs are a low proportion of the final journal price, and even that saving will be eaten up by extra costs caused by new features.

* **Flexibility**

E-journals are able to evolve quickly as they are not tied to a format, printer or distribution network.

Disadvantages of Electronic Journals

***Difficulty reading computer screens:**

The main disadvantages of digital information are the limitations of the computer monitor. This leads to problems with reading. Although the ideal would be to read information on the screen, think that with printing facilities, this ought not to be a huge constraint on the development of E-journals, because at the moment most people photocopy library copies of journals before taking them away anyway.

* **Archiving**

The main considerations for archiving of electronic journals are: (i) should the publishers or libraries archive the digital data? (ii) whose responsibility would it be to upgrade old data to newer formats? and (ii) if the publisher goes bust, or the editor of an independent journal gets bored or leaves their institution, what will happen to the archives? Without satisfactory answers to these questions, the role of the scholarly journal as an archival record will be compromised.

* **Perishable citation**

Once printed, the details of a paper journal remain constant, thus finding them again is straightforward, and however, web sites change their URLs or frequently disappear altogher.

* **Authenticity**

Clarke (1998) worries about the “malleability of content in electronic form” and are concerned about establishing the source and authority of material in general, although I think that E-journals will only survive if they can convince readers of their credibility.

***Search engines ignore PDF files**

Search engines ignore a PDF file, which is the format that a large proportion of E-journals use, particularly those which are direct copies of print versions.

2.5.6 Mailing Lists:

Mailing lists are a special usage of Email that allows for widespread distribution

of information to many internet users. Software is installed on a server which process incoming Email messages, and depending on their content, either act on them internally or distributes the message to all users subscribed to the mailing list. Popular examples of mailing list software include GNU Mailman, **LISTERV** and **Majordomo**. Today mailing lists are most often used for collaboration on various projects and as a way of distributing current news and other such information. One very popular mailing list is **Bugtraq.**

Sometime these take the form of what is termed as "discussion list": a subscriber uses the mailing list to send messages to all the other subscribers, who may answer in similar fashion. Thus, actual discussion and information exchange can happen. Mailing lists of this type are usually topic oriented (for example, politics, scientific discussion, joke contests); even if the topic can range from extremely narrow to "whatever you think could interest us".

Free web based services offering an easy way to run and maintain such lists were popular in the late 1990s. But many of these were taken over or went dust, so that the only popular provider is now Yahoo! Groups. This is used by a wide range of groups, including organizations that might at first glance be considered 'rivals' to Yahoo! MSN Groups appear to be pushing hard to catch up to Yahoo! The new version of Google Groups also includes free mailing list services as well as access to the Usenet.

Some mailing lists are open to anyone who wants to join them, while others require an approval from the list owner before one can join. In even stricter mailing lists, every message must be approved by a moderator before being sent to the rest of the subscribers. Moderator approval is usually employed to keep a high average quality of post and weed out spam. The commands subscribe and unsubscribe are often used to have your name added to or removed from an electronic mailing list.

2.5.7 Bulletin Board System:

BBS is an electronic message system for reading and posting message. It is usually comprised of small group of users who have a common interest distributed to some geographical area. BBSs are not very expensive and sometime free to callers. Subscribers reach bulletin board via telephone lines. BBSs provide E-mail services as well as chatting room forums on special subjects of interest to the individual. Now a day's several BBSs are available on the internet.

BBS is similar to news-groups. It contains programs documents, graphics, sound or video clips etc. if it can be put in a computer file, it can be attached to a file. Most of what is found on a BBS can be downloaded. Members send information files to BBS also. Exchange of "personal mail" is also another feature of BBS. FAO, NATIS, DDA, DOE are some of the examples of BBS.

A typical BBS has:

* A computer
* One or more modems

* One or more phones lines
* A BBS software package
* A System operator

The BBS software usually provides:

* Login screen
* Welcome screen
* One or more messages bases
* File area
* Online games
* Multi-user chat
* Internet Email

2.5.8 Computer Conference:

Computer conference allows a group of people to hold a discussion via computer. Members of the group can use the system to post messages to the whole group, and discussions can thus take place over a period of time.

It is similar to many ways to Email, except that the way it organizes messages make it much easier to follow the threads of discussions between group members.

* Participants at any number of sites can engage in synchronous and asynchronous interaction by entering messages, mostly via their keyboards, and reading messages as they appear on the computer screen.
* Messages can be held by computer until the user logs in and chooses to read them.

Computer conferencing environments add of the functionalities of Email systems to the additional benefit of allowing designated groups of user's access to common, shared data bases of previously sent messages.

Although different definitions of "computer conferences" are used, word "conference" means discussion between people on certain topic or topics.

Characteristics of Computer Conferences

* According to way of connection: online (synchronous) or offline (asynchronous). The difference between them can be so big, that sometime people call CC onlyone of the types.
* According to number pf participants: one to one, one to many, many to one and many to many.
* According to type of information: text based text and graphics, audio-based and video-based.
* According to the scope: Computer conference may be used on a local network, or on a global network, like internet. Usually on-line, audio and video-based computer conferences are used on local network since they are transfer.

2.5.9 Virtual Seminars:

Virtual seminars are efficient, low-cost opportunities to learn from industry experts in the comfort of your own office. By logging into a secure website and

dialing in on the phone, attendees see and hear real time presentations—and participate in live question and answer sessions—all from their own desks or conference rooms.

The benefits of Virtual Seminar are as follows:

1. Students who often feel that they don't get the chance to participate in classroom discussions now have every opportunity to do so.
2. Time is an important component of the virtual environment. Students have the opportunity to participate the conference at their own convenience, without the confinement of a set classroom time or place.
3. Students are able to interact with those, who may live in different geographical regions and very different communities.
4. These seminars save the travel time and money of the students.

2.5.10 Keywords :

Gateways, Portals, Browsers, Search engines, BBS, mailing list, E-journals.

2.5.11 Self Check Exercise:

Q What role the browsers play in the use of Web ? Explain the various types of Web browsers.

Q. What is a Search engine ? Explain the various types of Search engines and mention the essential rules for Web searching.

Q. What is a Portal ? Explain the various types of portals.

Q. Write short notes on the following:
Gateways
Computer Conference
Virtual Seminar
Mailing list
E-journals
Bulletin Boards

2.5.12 Suggested Readings:

1. Internet for Everyone" by Leon & Leon, APH Publishing Corporation, New Delhi
2. Information Technology–Applications" by P.S.G. Kumar, BR Publications, Delhi
3. The ABCs of the Internet by Christrain Crumlish, BPB Publications, New Delhi.

Type Setting By :
Computer Lab, Deptt. of Distance Education, Punjabi University, Patiala.