CHAPTER 6

PROPOSING AN INTERNET BASED DIGITAL LIBRARY
In chapter 3 we have already discussed about Digital Library and its Importance. In this chapter we will discuss how to Digitize Library and once built, how to extend its use for Internet world. Recent developments in web technology have made possible to access digital Information resources from anywhere in the world. The concept of digital Libraries has become reality due to the arrival of the varieties of electronic publications especially e-Journals, conference proceedings, e-book etc. Libraries have initiated projects for digitizing their own collections procuring electronic publications and providing electronic access and services to their users. A same type of exploring internet based digital library has to be formed which will be a main library and other sub library which will be connected with network and they will serve in sub areas to provide and get the information of library. It is very essential that an academic library with full equipment in restructure should be built up because the present academic library is not serving the purpose due to lack of network and proper management in Maddaya Pradesh (M.P.) and Chhattisgarh. The condition of academic library is not satibfactory in which an academic library of Chhattisgarh state (C.G.) is very bad and unsatisfactory except some libraries; in other words it can be said that there is a collection of books only in the name of library.

Although the Internet based digital libraries have large number of benefits over the traditional libraries, the digital library concept is yet to be established in the Indian situation. To develop the system, same requirement may be essential which are following.
1. The components of a Internet based digital library
   • **IT infrastructure**
     It includes local library system with adequate number of computers with LAN/Intranet (hardware) and required software.
   • **Digital collection**
     digitized information in different media such as CD-ROM, Disks.
   • **System junction**
     A variety of system functions to coordinate, manage the existing and retrieval of data.
   • **Telecommunication facility**
     This facility allows communication between one host to another. It is required to access the databases - local or remote, access to networks of networks and provisions to provide e-mail services.
   • **Well-trained manpower**
     *Manpower is an important phase without which no proposed plan can be executed. To perform a function effectively and efficiently, proper knowledge and skills are required.*

2. Planning of Internet based digital library

   Planning is a process to achieve long-term goals or objectives by means of analysis and evaluation of the alternatives. The significance of systematic planning lies in achieving the goal in a systematic way. Planning points out the lacunae of a system before carrying out the actual tasks.
For the establishment of the Internet based digital library, committee should be formed. The members must be from different departments. Committee includes computer professional, heads of units and librarian. If necessary, consultants can be hired.

Internet based Digital library planning involves:

- **IT infrastructure planning**
- **Information Access**
- **Manpower planning**
- **Furniture and Space planning**
- **Services**
- **Financial planning**

2.1 **IT infrastructure planning**

In this phase we plan for hardware and software required for Internet based digital library.

2.1.1 **Hardware**

primary requirement to develop library system are hardware as computer system printer, keyboards, digital camera and other peripheral device, which may be helpful to such system to develop.

- **Server-Side Hardware**

  **Server:** *Servers are the heart of the digital library.*

  Server for digital library implementation need to be computationally powerful, have adequate main memory (RAM) to handle the expected work, have large amount of secure disc storage for the database(s) and digital objects and have good communication capabilities. A digital library may need a number of specialized server for different task so as to distribute the workload on to different server. It would require one or more library server(s) to host indices and databases
and one or more object sever (s) to store digital objects and other multimedia objects. Hardware for a smaller library many distinct activities can be performed on a single sever. It is important that the server is scalable so that additional storage, processing power or net working capabilities can be added wherever required.

Input Device: - Image-based digital library implementation requires input devices like scanners, digital cameras, video cameras, and photo CD system. Large ranges of choices are available for the se image capturing devices scanners are available in all sizes and shapes. Flatbed scanners or digital cameras mounted on book cradle are more suitable for libraries.

Scanner: - The scanner devices help in translating the images of text drawing photos etc, directly from the source into the digital from without the interference of a keyboard. After scanning the images can suitably be manipulated scanners and magnetic-ink character readers.

Optical scanners:- Optical scanners are capable of reading information recorded on papers employing light source and light sensors. The input can be typewritten coded as ink or pencil mark or coded are bars. Examples of optical scanners are the optical mark Readers and Bar-code Reader.

Optical Mark Recognition (OMR):- OMR uses a device which can read pencil marks and converts them into computer Readable from.

Optical Bar-Code Readers: - Bar codes are the vertical zebra striped marks, which are read by Bar-code Readers, code Readers are photoelectric scanners that translated the bar-code symbols into digital forms.
Magnetic - Ink Characters Recognition (MICR)
MICR is used by Banks to process large volume of cheques and deposit form written every day. MICR equipment detects the characters written on paper by magnetic ink. It interprets the characters and sends the corresponding data to the computer for processing.

Digital cameras:- In digital cameras no films are required. The images are directly captured in digital form immediate viewing on a television or computer display screens.

Storage Devices; - Since digital libraries require large amounts of storage particular attention need to be given on the storage solution. Digital library collections that are too large to store entirely on a disk use hierarchiat storage mechanisms (HSM). In an HSM, the most frequently use data is kept on test disks while less frequently used data is kept in near line such as an automated (robotic) tape library. An HSM can automatically migrate data from tape to disk and vice-versa as required. Intelligent storage networks and snap servers are now available in which the physical storage devices are intelligently controlled and made available to a affordable cost, optical storage devices including WORM, CDROM DVDROM or optic-magnetic devices in standalone or net worked mode, are attractive alternatives for long-term storage of digital information optical drives record information by writing data onto the disc with a laser beam. The media after enormous storage capabilities. A number of RAID (Redundant Array of Inexpensive Disks) models are also available for greater security and performance. The RAID Technology
distributes the data across a number of disks in a way that even if one or more disks fail, the system would still function while the failed component is replaced.

- **Client-Side Hardware**

  Client’s are the machines that reside on the user’s desks. Planners of the digital library, therefore, need to prescribe minimum level of hardware that users would require so as to achieving efficient and effective interaction with the digital library. Most digital libraries require an Internet enabled multimedia PC equipped with an Internet Browser like Internet Explorer or Netscape Navigator as their clients.

2.1.2 Software

To operate any computer system such software is necessary as same library system such library software is same as MS off., Internet explore and lib. Software package and other software package.

- **Server-Side Software: -** *A typical digital library require a number of software which may be obtained as a single integrated package from a single vendor or it may be a system with components added onto an open architecture framework. Some of the important software used in construction of a digital library is given below*

  **Image Capturing or Scanning Software: -** *The process of converting a paper document into a computer possible digital image is done using software variably called document imaging system, electronic filing system or document management system, etc. Simple scanning software also comes with the scanners.*
Image Enhancement And Manipulation:- The captured images may need manipulation to enhance their quality few important image enhancement packages.

*Adobe’s Photoshop,*

*Jasc Inc’s Paintshop Pro 6.02,*

*Eastman software, Inc.*

*Corel corporation*

*Alchemy Mind works.*

Integrated library system:- Automation of library function dose not makes it a digital library. However digital library must be automated in most of its essential. some of the important integrated library systems available in India.

Web servers: - Setting up web based digital library requires a web sever program many sever programs are available for different platforms each with different features and cost varying from free to very expensive. Some of the important web server programs.

*Servers for Unix Systems.*

*NCSAHTTPD*

*Apache*

*Jigsaw 2.1.1*

*Netra (for sun solaris)*

*Servers for Windows NT*

*Internet information server (IIS).*

Information Retrieval: - Internet search engines may be used on their own or be connected to an integrated library system or DBMS to proved a full searchable collection. All Internet search Engineers are basically free text search engines.
ICE: Indexing kit for web servers
Extropia
Oingo free search
Swish - E

Optical character recognition (OCR) software: - Most document imaging software have OCR package in built
However, OCR packages are also available as separate utilities
Text Bridge (Xerox)
Ommipage (Caire)

Database Management Software: - The Database management software provides structured storage and retrieval facilities to the contents of a digital library. Digital library use a variety of database management system ranging from relational and extended relational database management system to object oriented database system. Using SQL can access the relational DBMS software listed below
Oracle
Informix
Sybase
SQL server

Right Management: - Right Management Software controls and monitor accesses to contents a digital library. The software listed below also provide protection from unauthorized access manipulation of data.

- Client - side software components: - The Client side PC may also require the following software packages (Plugins) to download format specific deliverables from a digital library and scaled
2.2 Information Access

Network technology helps the user to access digitized information from their desk. To execute the network system and connect each other a proper network essential which will supple the information one place other as V-SAT, LAN, WAN, MAN

- **Computer Network** :- By means of computer network an interconnected collection of autonomous computers, telephones, or other communications devices can communicate with each. Two computers are said to be interconnected if they are able to exchange information. The connection can be made not only by wire but also from fiber optics, microwaves and communication satellites. With a network, users must explicitly logon to one machine, explicitly submit jobs remotely, explicitly moves file around and generally handle all the network management personally.

- **The Benefits of Network** :- People and organizations use computers in networks for several reasons. These include the following:
Principle devices such as laser printers, disk devices, and scanner are often gait expensive; consequently, to justify their purchase management wants to maximize their use. Usually the best way to do this is to contact the principle to a network serving several computer users.  

In most organizations people use some software and need access to the same information. It is expensive for a company to buy a separate word processing program that will serve many employers than to buy a separate word processing program for each employee. More ever if all employees have access to the same data on a shared storage devices, the organization can save money and avoid serious problems. If each employee has a separate machine some employees may update customer address, while other remain ignorant of the changes, updating information on a shared server is much lazier than updating every users individual system.  

One of the greatest features of networks are electronic mail. With e-mail everyone on a network can easily keep other posted about important information.  

Before networks become common place an individual employee might be the only one with a particular piece for information, which was stored in his or her desktop computer. If the employee was dismissed or it a fire or food demolished the office the company would lose that information. Today such data would be backed up or duplicated on a networked storage device should be other.  

Network enable users to tap into numerous databases whether private company databases or public databases available online through the Internet.
Uses of Computer Network/Application of CP Implementation in Companies—Many organizations have a substantial number of computers in separation often located far apart initially such of them computers may have worked in isolation from the others but at some point management may have decided to contact them to be able to extract and correlate information about the entire company.\(^{15}\)

The issue is resource sharing and the goal is to make all programs equipment and especially data available to anyone on the network without regard to the physical location of the resources and the user. Saying that it is an attempt to and the “tyranny of geography” may summarize this goal.

Second goal is to possible “high reliability” by having alternative sources of supply. In addition the presence of multiple CPUs means that if one goes down. The others may be able to take over its work although at reduced performance.

Another goal is “saving money”. Small computers have a much better price/performance ratio than large ones. Another networking goal is “scalability”, the ability to increase system performance gradually as the workload grows just by adding more processor.

Adaptation by Common People—Common people has adapted the computer network when it offered a huge price/ performance advantage over mainframes. Starting in the 1990s computer networks began to start delivering services to private individual at borne. These services and the motivations for using them are quite different than the “corporate efficiency”
The application as: 1 Access to remote information, 2 Person-to-person communications, 3 Interactive entertainments, involve interactions between a person and a remote database. The ability to merge information, communication and entertainment will surely give rise to a massive new industry based on computer networking.

• **Types of Networking:-** Networks, which consist of various combinations of computers, storage devices and communications devices, max is dividing into three main categories, differing primarily in their geographical ranges.

  **Local Area Network (LAN) -** A local area network contacts computers and devices in a limited geographical area. Such as, one office, one building or, a group of buildings close together (for instance, a collage campus) a small LAN in a modest office, or even in a home might link a file server with a few terminals or PCs and a printer or two such small LANs have been called TANs for “Tiny area networks”.

There is some terminology in LAN. These are as-

*Host computer- It control the other terminals.*

*Hade- It is a device that is attached to a network. Fore microcomputer, terminals, storage device, or printer.*

*Back bone- it is a high speed networks that contacts LANs and MANs to the Internet.*

**Topology of LAN**

The logical layout or shape of a network is called a topology. The three basic topologies are star, ring and bus.
Star Network – A star network is one in which all microcomputer and other communications devices are connected to a central server. Messages are passed from a workstation to the server. The central server monitors the flow of traffic. The server provides logical locations for directly attaching the major shared resources. Compound star Networks are those in which a workstation on one network max acts as server and/or controller for a secondary network.

Ring Network – A ring network is one in which all microcomputers and other communication devices are commented in a continuous loop. Data is accepted from one of the neighboring nodes and is transmitted form note to note around the ring. After passing through each note it returns to the sending note which remover it. There is no central server. An example of the ring network is IBM token ring network, in which a bit pattern (called a “token”) determines. The advantage is that, if a connection is broken, the entire network stops working.

Bus network – The bus network works like a bus system at rush hour, with various buses pausing in different bus zone to pickup passengers. In a bus network, all communications devices are connected to a common channel. Messages are broad cost along the work bus. In order to receive a transmission, the workstations must be able to recognize their own address. The advantages of a bus network is that if may be organized as a client server or peer to peer network. The disadvantages is that extra circuitry and soft ware are needed to avoid collisions between data if a connection in the bus is broken – as when some one moves a desk and knocks the connection out – the entire network may stop working.
Ethernet – When we deal with smaller LANs, such as bus and star LAN we often heard the term of Ethernet a LAN access technology widely used in business. Ethernet works with all operating system, but its use does require special hardware and software. Since the name “Ethernet” refers to the cable, so there is four types cabling are commonly used. These are as.

10Base 5 – Thick coax cable Max segment. 500m, Nodes/seg 100. It is good for backbones.

Bases 2 – It is a thin Coax cable. Its max. Segment is 200m. and it has 30 nodes/seg. It is a cheapest system.

Base T – It is a twisted pair. Its max. Segment is 100m. and it has 1024 nodes/seg. It has easy maintenances.

It is a fiber optics cables. Its max segment is 2000m it has 1024 nodes/seg. It is best between buildings.  

Metropolitan Area Network (MAN) – The second category of network system is MAN. A Metropolitan area network is a communication network covering a city or a suburb. The purpose of a MAN is often to by pass local telephone companies when accessing long-distance services. Many cellular hone systems are MANs.

A MAN just has one or two cables and does not contain switching elements, which short packets over one of serial potential output lines.

A key aspect of a MAN is that there is a broad Cost medium to which all the components are attached.
Wide Area Network (WAN) – A wide area network is a communications network that covers a wide geographical area such as a country or the world. Most long-distance and regional bell toughened companies are WANs. A WAN may use a combination of satellites, fiber optic cable, microwave and copper wire connection and link a variety of computer, from mainframes to terminals.

In most WANs, the network contains mummeries cables or telephone lines, each one connecting a pair of routers if two routers that do not share a cable never the less wish to communicate, they must do this indirectly, via other routers. Where a packet is sent form one router to another via one or more intermediateouters the packet is received at each intermediate router in its entirely, stored there infill the required output line is free, and then forwarded. A subnet using this principle is called a point – to point and forward.

2.3 Manpower planning

Human resources are necessary to central and managing to institutions as the library runs as institution.

- Technical staff for maintenance hardware and software.
- Skilled staff for using programmed such trained staff will be competent for operating and he will avail to full fill requirement he also competent to operating library software package.
- Overall in charge (librarian): - He may be such person who will be responsibility to full fill the requirement to the user and he also remove the problem.
2.4 Service

such services shall be provided this library user, which will fulfill requirement of the members of the library. After converting a traditional library into a digital library the following services can be provided.

**Online catalogue transaction:** in order to provide the timely information about the status of the document generated for daily transactions are published on web. This enables the user to watch the status of the document from this workplace and to reserve that particular document if required.

**Current Awareness service:** list of the latest additions to the library can be displayed virtually on the web for users' attention.

**Selective dissemination of information:** users E-mail requests are collected and matched against the latest documents. The matched ones are sent back to the required user.

**E-mail distribution forum:** there are several e-mail discussions for a on different subjects. Most of the user went to subscribe to these forms. This leads to the unwarranted traffic, which in turn is a burden to this server. To reduce this clog librarian can play a significant role by subscribing to those forum through a separate account. Mails received from each forum are distributed to the users who want to participate in the particular discussion forum.

**Research Update:** The current information about the ongoing activities in a particular field of study has to be collected by surfing the net. This information avoids duplication
of research work. Farther, latest, interesting and general information on net is downloaded and stored in standard format for users attention. Different names such watch, outline, Birds view can be given.

**Global Link List Service:** This service provides a comprehensive list of libraries, which are of users interest. To provide a well-structured list, we have to identify other libraries objectives, which can meet our requirements. A click of that button takes the user to that named site.

### 2.5 Furniture and Space Planning

In an ideal DL, furniture required is different from that of a traditional library. New types of furniture are available in market to suit this environment. Obviously space required for a user also increases. In an ideal DL all information is in digital format, which results in a situation to provide a terminal to each user, whereas when we convert traditional library into a DL this type of variation will not arise. The Internet liaisons become the single most important platform enabling connectivity to service provider, its customers and suppliers and employees. The management has to take sufficient interest to provide infrastructure to facilitate speed of information access and data transmission. Infrastructure cannot be developed overnight. It is an ongoing long-term project. The development of a long-term plan is essential to provide ongoing infrastructure upgrade and maintenance in order to increase the capacity of services. The larger bandwidth of 128 KBPS Internet connectivity preferably on lease line or dedicated line is desirable for the terminals within the Library or through networking in LAN Environment.
2.6 **Financial Planning**

It is the final stage in planning. Annual increases to the acquisitions budget are essential to allow for the planned growth of digital resources to meet student and faculty needs. Following items are required for an Internet based digital library.

- **IT infrastructure**
  - Hardware requirements
  - Software requirements

- **Information Access**
  - Network technology
  - Internet technology

- **Digital resources**
  - E-Book
  - E-Journal

- **Human resources**

3. **Proposed Model**

Therefore there is a vast need in Maddaya Pradesh Chhattisgarh State for academic library that will serve the purpose to eliminate the backwardness of the area.

Hence it is proposed that there should be an academic library well equipped and linked with a central library and other libraries should function as sub libraries and all should be connected with network information technology. The central library should be linked with the worked database of book (information), the members of sub library may get the information directly from network. For all these it is necessary that library should be digital and must be connected with the information technology.
In this way such type of system has been shown in figure No. 1. Given below in fig no. 1 an central library has been shown connected by the media of VSAT – to the world database of information and same sub library S1,S2,S3, etc. have been shown in different area which are shown also commented with VSAT to the central library and also all sub library shown connoted with each other under the system any sub library can called the information form the world data base of books they will first requirements and it will be responsibility to fulfill the requirement of the user.

Technology oriented libraries have become the order of the day. The user very fast in this environment and it also desires information storage, access and retrieval. Providing services using Internet is very easy. Once the system is established maintenance become very easy; recurring cost will be minimum.
REFERENCE


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