
ROLE OF STORAGE DEVICES IN DIGITAL LIBRARY ENVIRONMENT

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Abstract

In this present paper, the latest technology deal with the digital library and the role of storage devices in digital library with spend emphasis on CD ROM. Also describe the features of external storage models.

Keywords : Digital Library, Storage Devices, CD ROM

1. INTRODUCTION

Storing documents is one of the foremost jobs of present digital library and it's professional. In order to store a large number of digital collections and to retrieve them at any point of time, the necessity for having a computerized system in this regard was felt; digitalization of printed material was the result. It is highly valuable for storing the information in an organized manner and retrieves the same quickly. Managing documents in the proper order is very much necessary in library to provide better services to the user community and some permanent solution to preserve the library material was needed. The permanent solution will be digitalizing the printed materials, which can be transmitted and received anywhere in the world where the infrastructure to send and receive is in place. This new access of technology will help to preserve the information in digital form for future use for future generation.

2. WHAT IS DIGITAL LIBRARY ?

Although Metrics for traditional libraries such as precision and recall can be directly applicable to some aspects of a digital library and have been widely accepted, the digital library is much more complex and there is much more to be considered. Matrices are required to deal with issues such as the distributed nature of the digital library, the importance of user interfaces to the system, and the need for systems approaches to deal with heterogeneity among the various components and content of the digital library.

The main activities of users can be classified into five categories:

1. Locating and selecting among relevant sources
2. Retrieving information from them
3. Interpreting what was retrieved
4. Managing the filtered-out information locally, and
5. Sharing results with others

Definition of Digital Library : A Digital Library can be define as "Computer-based information system for acquiring storing, organizing, searching, distributing and displaying digital materials for end-user access; not necessarily network-based but designed and constructed so as to be capable of attaching or being attached to a network"

It means it is clear that fundamental mission of libraries for the users are not changed i.e. easy access to knowledge and information but the processes tools, techniques are totally changed.

Digital Libraries are viewed as systemic providing a community of users with coherent access to a large, organized repository of information and knowledge. This organization of information is characterized by the absence of prior detailed knowledge of uses of the information. The ability of the use to access, recognize, and utilize this repository is enriched by the capabilities of digital technologies. More people are recognizing that digital library is not a topic only computer and information science, but advances in digital library also depend on efforts from legal community. Digital libraries are libraries extended and enhanced through digital technology. Important aspects of a library that may be extended and enhanced include:

- a. the collection of the library
- b. the organization and management of the collection
- c. access to library items and the processing of the information contained in the items
- d. to communicate information

The following tables shows some difference between Traditional Library environment and Digital Library environment.

Knowledge Transfer methods	In Traditional Library	In Digital Library
Between Users	Personal meeting, "Users meet and discussion, Conversation over telephone, Fax, Letters etc.	Message boards/ discussion groups. Email, Chat, Alerts, Electronic Comments on Resource etc.
Between Library Staff and Users	Library Orientation programmes, Seminars, Reference service, Letters, Notice, CAS and SDI services, Newsletters, Brochure etc.	Online Message Board, Email, Online Alerts, Online Announcements, Online News, Online Learning etc.
Between Library Staff / Administrative	Letters, Paper files, Memos, Notice, Meetings	Email, Alerts, Scheduler, Calendars, online address book, document clusters

3. PURPOSE & FUNCTION OF DIGITAL LIBRARY

PURPOSE OF DIGITAL LIBRARY

- a) to speed up the systematic development of the means to collect, store and organized information and knowledge in digital form, and of digital library collection
- b) to promote the economical and efficient delivery of information to all parts of society
- c) to encourage cooperative efforts which leverage the considerable investment in research resource, computing and communications network
- d) to strengthen communication and collaboration between and among the research business, government and educational communities
- e) to contribute to the lifelong learning opportunities of all people

FUNCTION OF DIGITAL LIBRARY

- a) Provide access to very large amount of information resources to the users wherever they are and whenever they need.
- b) Focus on providing access to primary information apart from the secondary sources
- c) Support multimedia content along with the text makes the information more useful and understandable to the users.
- d) Network accessibility in an Internet and Intranet environment
- e) Provide user-friendly interface to enable the users for access information comfortably
- f) Provide hypertext links for navigation through the required reference
- g) Support client server architecture
- h) Support advanced search and retrieval for better output to the users
- i) Integration with other digital libraries

4. WHAT IS STORAGE TECHNOLOGY

Computer technology may conveniently be grouped into: processor technology, storage technology and software aspects.

In storage technology considering advances in devices for digital information storage it may be stated that most of the primary storage in computers is now supplied by semi-conductor circuits. There have been significant developments in memory technology affecting three areas of performance spectrum; the high speed, high performance the midrange and the low speed bulk memory systems.

It is now possible that even a small computer system might have cache memory, a small associative memory retaining most recently referenced information and in a readily available place. In some cases, cache memory may be at the top of a hierarchy of memories having a wide variety of characteristics. Memory management, dynamic memory allocation, and virtual memory schemes, generally found in large computer systems, are now appearing on computers which are small and less costly.

The development of charge coupled devices (CCDs) and bubble memories have filled the gap which previously existed in the continuum of memory devices such as Fixed-head magnetic disk and these are slower than other semi-conductor memories. These memories have advantage over magnetic disk in that they contain no mechanical parts and could be used to store significant amount of information and can be treated as a structured file system.

There has been continuous improvement in recording densities of magnetic media. Floppy disk and microfloppies provide a convenient media to store data. The development of video disk has added a new dimension to the information storage technology. Video disks could be used to store large volumes of information in digital form. These kinds of mass storage are believed to be very useful in the development of information storage and retrieval systems. It may be stated that all these innovations in storage technology provide us a variety of alternatives depending on the requirements of speed of operation.

5. TYPES OF COMPUTER STORAGE

Computers systems include two types of digital information storage: internal storage, within the CPU and the Backing (Bake up) storage on external devices such as disks or tapes. Different types of storage

media differ according to a number of criteria such as speed of operation, capacity cost, reliabilities, the degree to which information is immediately accessible etc.

The various types of storage devices are available in computer market like Network Storage, Backup Storage, Internal Storage and PC Storage Products but we think the manufacture wise classification are different.

Internal Storage Devices : Internal storage is also known as main, primary or (for historical reasons) core storage, or memory. It is used to hold those instructions and data required at any moment while a program is running, which must be available instantaneously. Silicon semiconductor chips are now invariably used for internal storage; these are categories as either RAM (random access memory) or ROM (read only memory) chips.

ROMs are used for data which is never altered for example, a computer's operating system instructions, while RAM is used for data which is liable to change often, and instructions used in the execution of a program

Backup storage : Backup storage, also termed external storage, is used to hold programs and data which are read into internal storage when required. The most common form now, as for the last thirty years, is magnetic storage media, either tapes or disks. With both of these, data is recorded onto a plastic surface, coated with a varnish containing an oxide which can be magnetized in one or two directions; each magnetization representing one bit of data. Data is written or read with the help of read/write heads. Small electromagnets, close to the surface.

Magnetic Tapes are very commonly used for storing large quantum of data for which rapid access is not necessary; especially for archival data backup etc. Tapes are cheap means of storing data but access is generally slow. Small cassette tapes, of relatively low capacity are used with microcomputers.

Magnetic Disks are most widely used form of baking storage, suitable for holding information required rapidly for example, data for running program. In the type of disk drive in large computer system, data is recorded on the flat surfaces of circular disks revolving on a common spindle, with one read/write head for each disk. Access times typically 0.01 second, although much faster than tape, are rather slow by comparison with other computer operations and disk access times are one of the main limiting factors in the speed of operation of retrieval system with information stored on disk.

Disk capacities have increased greatly, from original values of about 10 MB to present units with 1 GB which is one thousand million bytes. Smaller computer systems use Winchester disks, with a single hard disk in a sealed unit, floppy disks, which are compact, cheap and convenient for transfer of programs and data. They are limited in storage capacity, with relatively slow access times, and less movement than a hard disk in day to day use. Floppy disks are available in two sizes, 1.44 MB and 1.2 MB but now-a-days 1.2 MB floppy are not used.

So, we would mention only two types one is Internal Storage and External Storage. In Internal Storage device it may be Network Storage, Internet Storage, Hard Disk Storage, etc. and External Storage devices like Floppy, CD ROM, CD Writer, DVD, USB Port, Pen drive and many more but we discuss only external storage drives.

Storage Device type	Size & Capacity	Features
Floppy	1.44 MB	Very cheap, easily available and small data transfer its very useful
CD Drive	700MB / 80Min 52x combo drive	CD Drive provide only reading facility
CD Writer(D+R+W)	52x internal and ext. writer	Back up and restore eight times faster than tape, drag-and-drop files
DVD	USB 2.0 interface built	Digital multimedia information, larger storage capacity for audiovisual content Buffer under runs eliminating
REV up	35 GB/90 GB drive 128 bits data encryption & password protection	1 Transfer speed up to 8x faster than tape and more than twice as fast as DVD for immediate full-system recovery 2 Proven hard disk technology for ultimate reliability 3 Professional backup software included
Pen Drive	Up to 1 GB or more	High quality
USB Memory Key	64MB to 256 MB capacity	Store and share loads of information with your choice of flexible, high-quality portable storage drive
AIT Drives	70 GB to 200 GB (compres)	highest density in tape with a 3.5 inch form factor AIT one of the fastest tape formats in terms of data retrieval and also more reliable and lower cost
DDS Data Cartri.	72 GB 10 years archival life	High performance reliable back-up at a great value
Zip Drive	100 MB to 250 MB internal and external drive	More speedy and capacity wise best rather than floppy
Ultrim Cartridge	200 GB to 400 GB	Per tape is exhaustively qualified for better use

In the above mentioned description of different types of readily available storage devices but the common and maximum uses of the only CD or CD Drive so we discussed how CD useful in digital library environment and also replacement of book in traditional library to digital library.

The contents of a digital library get to the readers via direct physical transmission: one person talked to another. These kinds of transmission have so many disadvantages. The other transmission methods like physical objects (books and CD ROMs) computer network technologies can perform the duty in a better way. The mainly used physical objects are books and CD ROMs.

Books are the permanent version of information. The economics of scale in modern publishing are such that it is difficult to issue a book today in a small press run. Since so many to the costs of printing a book are incurred before the first copy comes off the press, a small press run means high costs and thus high prices. Scholarly journals are even more affected by the push by authors to see their names in print. Their prices have been raised to levels that no one could have imagined 30 years ago; today a journal subscription can cost as much as a new car. Since the authors are not being paid for their contributions, and since journals do not carry a retailer's mark-up, these prices reflect the very small number of libraries that are still willing to subscribe.

6. CD ROM

The first product in evolutionary optical storage of information is CD ROM. It is a permanent optical-based storage device that in conjunction with an associated drive becomes a powerful peripheral for the PC. The CD ROM puts multi megabytes permanently store data bases at user front end of a PC. Its only drawback is that the end users cannot put his own information on it.

CD ROM stands for Compact Disc Read Only Memory. A compact disc is a 12cm diameter disc made from polycarbonate substrate and a reflective metalised layer. A disc weighs 16 grammas. A typical CD ROM can store about 650 MB data. One would get a better idea of the size of the data that a CD ROM can hold if we say that a CD ROM can hold about 250000 pages of text (each page containing some characters) of 5000 handling systems and services

CD ROM can store full motion video, animation, graphics, text and high resolution audio. One should keep in mind that a floppy drive cannot run a CD ROM. For running a CD ROM one would require a CD ROM drive. The time taken by a CD drive to find and grab a piece of information is known access time. This is usually in milliseconds (one-thousand of a trice). The smaller the access time, the better the drive; the amount of data transferred form the CD ROM to the computer in unit time is known as transfer rate. The basic rate is 150 kilo bytes per second (kpbs) and "4x" drive transfers at the rate of 600 (4*50) kbpsz. Today "16 xs" become the normal CD drive. However, in the market "24 xs" is also available.

One would require more the 450 high density floppy diskettes to store an equivalent amount of information on CD compared to hard disc or floppy diskettes. Read Only Memory means that the information stored on a compact disc can only be read but it cannot be modified. As CD ROM stores text, graphic or still images audio and video or moving images, one would need to install a sound card and speaker to enjoy the world of multimedia that a CD ROM offers.

The music (audio only) CDs were followed by CD ROMs. As mentioned earlier, CD ROM can hold a variety of multimedia information. At one point of time, it was called CD-I or compact disc interactively to the user's instructions. Of course, today such terminology has become irrelevant as almost every CD ROM available in the market is interactive.

The benefits of storing data in the CD ROM are:

- high storage capacity (650 MB)
- no head crash
- low error rate, correctable data
- long life
- random access
- early transportable
- OS independent file system
- low cost
- reliable medium
- less shelf space

This benefits that made CD ROM practically attractive in today's competing information environment are:

- Multi-Media: the ability to deliver unlimited end users access to over 600 MB information delivered using ordinary post means. It can be used for text, graphics, data, audio and video in one simple purchase.
- Multiplatform: It is the first truly system independent media with appropriate SWI, CD ROM allows equal access to information regardless of the computer HW or SW platforms used by the end users.
- Multilingual: Sophisticated CD ROM systems today allow the end users to select the operating language at choice and change it on-the-fly.

The technology which will most characterize the nineties is multimedia, Multimedia technology integrates text, images, graphics, video, animation, sound or music. It is interactive on the lines of technological barriers, for examples, extra disk space required to store multimedia formats and broad bandwidth to transmit the text.

7. CONCLUSION

This articles based on the premises that what happens in libraries is a result of what happens in the society at large. We are in the early stage of a transition from a print based to a digital society. The latest technologies offer cheap computer processing power, cheap mass storage, inexpensive and ubiquitous access to high speed networks, and retrieval devices give us the ability to create, to manipulate, to store and especially to transfer large quantities of information in digital form at low cost.

The products of these technologies are today as primitive and imperfect as the book in the 1945s, but the abilities they offer will have profound effects on the academic world. Digital information can be stored on any medium that is able to represent binary digit 0 and 1.

Conversation from the conventional storage to digitized format requires discrete analysis as the primary function, based on user electronic storage and retrieval systems could be defined and a target concept could be developed. The document analysis includes. Formal analysis, Analysis of content, Qualitative analysis and Legal analysis. Some of the common digitized storage media that are presently used world over the hyper books, CD ROM, Multimedia.

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