



ISSN 2278 – 0211 (Online)

Immerging Digital Preservation Technology: It's Design, Initiatives and Challenges

Dr. P. Venkateshwar Rao

Assistant Professor, Lib. & Info. Sc., Univ. Coll of Science, Osmania University

Abstract:

More and more information is being created in digital form. This is done either through converting existing materials to digital form or increasingly born digital. There is no other format but digitize the original. There are increasing expectations in all spheres of life. The information we all need will be available on the Internet or at least in an off-line digital format, such as CD-ROM. Digital access has many advantages over paper based or microform access in terms of convenience and functionality.

The paper explores the perception of "Digital Preservation". It discusses about the need and importance of digital preservation in the modern world. It also covers the various strategies of it.

The paper reviews the design, standards of digital preservation and also examines the various instances on the process of digital preservation initiatives taken in this new generation of technology or digital era.

Keywords: *Digital Preservation, Digital Preservation Standards, Digital Preservation Design, Preservation Strategies.*

1. Introduction

Digital preservation refers to the management of digital information overtime. Preservation of digital information is widely considered to require more constant input of effort, time and money and handling of rapid technological and organizational advance is considered the main stumbling block for preserving digital information. The rate of change in computer technology shows that information can be in accessible within a decade.

Digital preservation is the dynamic organization of electronic data over time to make sure its accessibility. Digital preservation is the set of practices and behaviour that make sure continued access to information and all kinds of records, scientific and cultural heritage existing in digital formats. This comprises the preservation of information resulting from digital reformatting, but particularly information that is born-digital and has no analog matching part. In other world of digital imaging and digital resources, preservation is no longer just the result of a program but an ongoing process. In this regard the mode of digital information stored is important in ensuring its permanence. The enduring storage of digital information is supported by the insertion of preservation metadata. Further the digital preservation is rapidly becoming a principal medium to create, distribute and store content, from text to motion pictures to recorded sound. Increasingly, digital information embodies much of the nation's intellectual, social and cultural history.

2. Objectives

The present study has the following objectives:

- To study the challenges faced in the digital preservation.
- To design a curriculum useful for the digital preservation.

3. Digital Records Preservation

In general context the preservation is the conservation of knowledge. The area of conservation is the creation of text, extends to publication, hence to acquisition and then storage in the library for access and use. The term conservation has two parts: preservation and restoration. In other words preservation is the maintenance of objects close to their original conditions as far as possible or until they are no longer needed. Preservation highlights three facts-paper, books and digital technologies.

The Digital Preservation refers to the management of digital information overtime. Unlike the preservation of paper or microfilm, the preservation of digital information demands ongoing attention. This constant input of effort, time and money to handle rapid technological and organizational advancement is considered as main obstacle for preserving digital information beyond a couple of years. Indeed, while we are still able to read our written heritage from several thousand years ago, the digital information created merely a decade ago is in serious danger of being lost. Digital Preservation can therefore be seen as the set of processes and activities that ensure the continued access to information and all kinds of records, scientific and cultural heritage existing in digital formats.

3.1. Definition of Digital Records Preservation

Digital preservation is defined as: long-term, error-free storage of digital information, with means for retrieval and interpretation, for the entire time span the information is required for. Long-term is defined as “long enough to be concerned with the impacts of changing technologies, including support for new media and data formats, or with a changing user community. Long Term may extend indefinitely”. “Retrieval” means obtaining needed digital files from the long-term, error-free storage of the digital files. “Interpretation” means that the retrieved digital files, files that, for example, are of texts, charts, images or sounds, are decoded and transformed into usable representation. This is often interpreted as “rendering”, i.e., making it available for a human to access. However, in many cases it will mean “able to be processed by computational resources”.

3.2. Need and Purpose of Digital Records Preservation

- Users Perspective – Users expectations are always changing. Yet, users, especially, research scholars need both traditional documents and electronic documents or old information.
- Institution Responsibility – Libraries, archives and other custodians have responsibilities of their properties so institution should plan for digital materials including their maintenance preservation and distribution.
- Mission of Parent Institution – First object of libraries archives and other custodian is to satisfy the user’s expectation and users requirements. They should preserve materials in all formats.
- Storage Media – Storage media is having different formats such as text, data graphics, video, sound, different storage capacity like floppy disk, CD-ROM, VCD, etc., and different durability 2years, 5years or 40 years handling system materials is also available.

Margaret Hedstrom points out that “digital preservation raises challenges of a fundamentally different nature which are added to the problems of preserving traditional format materials”.

Digital technology is developing rapidly and retrieval technologies can become superseded in a matter of years. When quicker, more competent and cheap storage and processing devices are developed; older version may be quickly restored.

When software or decoding technology is discarded, or a hardware device is no longer in manufacture, records created with such technologies are at great hazard of loss, simply because they are no longer accessible. This process is known as digital obsolescence. This challenge is intensified by a lack of established standards, protocols and proven techniques for tapes, but media standards for tapes have changed considerably over the last decade to ten years and there is no guarantee that tapes will be readable in the future. Recovering these materials may require special tools. So, we need to think and do the digital preservation that should be helpful and to be suitable in future purpose too. Hedstrom explained “architectures and systems for information organization and retrieval, presentation and visualization, and administration of intellectual property rights.” Hence the need of preservation of digital records should meet with a proper analysis on the selection and acquisition of relevant sources in order to protect the data on future point of view.

4. Digital Records Preservation Strategies

The following are the three strategies of digital preservation have been developed Feeney, (1999):

- Preserve the original software that was used to create and access the information. This is known as the technology preservation strategy. It also involves preserving both the original operating system and hardware on which to run it.
- Program future powerful computer systems to emulate order, obsolete computer platforms and operating systems as required. This is the technology emulation strategy.
- Ensure that the digital information is re-encoded in new formats before the old format becomes obsolete. This is the digital information migration strategy.

There are other several additional strategies to the preservation of electronic digital information like:

- Revitalizing
- Relocation
- System Preservation
- Harvesting
- Standardization

5. Standards of Digital Records Preservation

To regularize digital preservation practice and provide a set of suggestions for preservation program execution, the reference model for an Open Archival Information System (OAIS) was developed. The reference model includes the following responsibilities that an OAIS archive must abide by:

- Acquire adequate control of the information provided to the altitude needed to make certain enduring preservation.
- Haggle for and accept suitable information from information creators.
- Ascertain, either by it or in concurrence with other parties, which communities would become the selected communities, therefore, it can easily understand the information provided.
- Make certain that the information to be preserved is autonomously, comprehensible to the selected community. In other words, the community should be able to understand the information without needing the assistance of the experts who produced the information.

- Pursue standard policies and procedures which ensure that the information is preserved against all reasonable eventualities, and which enable the information to be distributed as legitimated copies of the original, or as perceptible to the original.

6. Initiatives of Digital Records Preservation

Some of the Digital Preservation Initiatives instances are listed as follows:

- Xena is a free java-based open source archiving solution that can be installed on any desktop PC. It converts proprietary document, graphics and audio file formats to open formats, and normalizes other binary files to ASCII with an XML file wrapper.
- DSpace is open source software that is accessible to anyone who has the WWW. DSpace takes data in multiple formats (text, video, audio, or data), distributes it over the web, indexes the data and preserves the data over time.
- PADI is a comprehensive archive of information on the topic of digital preservation from the National Library of Australia.
- Free availability of open source software like Greenstone, Eprints, Ganesha etc., are a use to anyone who has the World Wide Web.
- Simple DL can store multiple formats, including text, images, video, audio, and data, It uses Amazon S3 provide 99.99% durability for the files stored in its preservation system.

7. Challenges in Digital Records Preservation

The challenges that are faced in digital preservation as below:

- The biggest challenge being faced in digital preservation is obsolescence, as technology is changing continually and of course, at a very short span of time. There is a proliferation of not only new software with advanced features and updates, but also the changes in Operating System and the file formats.
- Storage media is another challenge, where the digital resources / objects needs to be preserved on various viable. Long lasting media for preservation. The once used computer tapes and floppy discs are al almost become either unusable or not in use I the present times. However, optical media promises a lifelong use i.e., for about 30-100 years depending on its being protected from various environmental hazards. HD-ROM (High Density Read only Memory) is expected to be the future storage media as on date which strongly felt by the IT specialists and library professionals.
- Migration is another challenge, which deals with the shifting of the digital resources into new or upcoming digital advancements without compromising the realities of the current standards. However, they should always have the roil back facility.
- Conversion is another challenge in transforming the data into present and more widely accepted and admissible format; The difference between migration and conversion is that the conversions are applied only when roll back facilities are not available.
- Authenticity of the context is the challenge to retain the authenticity of context of the resources with in which they were created. The material threatens the material to preserve within its context. The const to retain the older technology and maintaining them is costlier. It sometimes results in almost maintaining a museum of old software, hardware and related technologies.
- High Costs in digital object preservation are another issue need to be managed looking into the financial resources available with the libraries.
- There are other issues like Copy Right and Intellectual Property Rights are also the challenges need to be managed carefully.

8. Curriculum Design for Digital Records Preservation

The following are some point to be kept in mind in connection with the development of curriculum design for digital preservation:

- Draft a set of guidelines, standards and practices for digital preservation.
- Develop policies for acquisition, conversion storage and maintenance of digital material.
- Sharing of technical information regarding digital preservation strategy.
- Develop technical skills to the staff to meet new technological demands.
- Sufficient amount should be provided to concerned authority regarding preservation strategy.
- Creation of making awareness regarding utility of digital object and its preservation.
- Keep sufficient metadata and indexes to be able to indentify “at risk” file formats contained in the archive and actively manage them.
- Keep virtual machines with images that are representative of key releases of platform software, including operating systems, web browsers, plug-in and so on.
- Work with the web archiving community to ensure full collaboration with the major projects and initiatives around the world.
- All latest technological equipment should be adopted.
- It is advisable to use, where possible, software with open specifications, non-proprietary and well documented, and should allow to execute all the necessary operations defined within the Digital Preservation Plan, be robust, easy to use and include an intuitive interface.

- Continue to work on open standards-based archive technologies, to ensure customers receive the full benefit of preservation initiatives worldwide.
- Take into account the technical characteristics of electronic record documents and information system, as the context, the storage medium, inter-relationships between different records, files and metadata.
- Keep in mind the characteristics of the process of preservation, related to usability, scalability and complexity.
- Use of standard formats and applications with open specifications ensures a continuity of use and support when compared with proprietary formats and application.

Further a model for the development of digital preservation is shown as follows:

- Step 1. Planning the Digital Preservation System.
- Step 2. Finalizing the Digital Collection / Material.
- Step 3. Identifying / assessing the needs of the users of Digital Collection / Material.
- Step 4. Determining Digital Collection Development Policy and developing digital Material (Software and Hardware).
- Step 5. Fixing Responsibilities and Commitments.
- Step 6. Deciding Technological Requirements.
- Step 7. Deciding Resource Sharing Policy.
- Step 8 .Funding and Staffing.
- Step 9. Governance and Management.

9. Conclusion

Preservation of digital information has to deal not only with maintenance of the files themselves but also with ways of keeping them accessible. This means that either the programmes have to be preserved as well and some how kept running on new platforms, or the files have to be converted to another format that can be interpreted by new programmes. As the digital world moves on all the time, this is a continuous process if materials need to be kept accessible for decades.

Preservation of digital resources is most important aspect of the digital information. Professionals should have sufficient knowledge regarding preservation of electronic resources. Despite the present lack of communal interest in digital preservation, it is necessary to believe, that the efforts of information professionals and archivists will be appreciated in the future. The traces of information that we are able to save from our digital vellum will be valuable sources of information to the future.

Preservation of digital information unknown area to most to adopt organizational structures and redefine tasks of staff. Cooperation and exchange of experience will be essential to avoid expensive mistakes, and training programmes for staff and priority for all institutions facing digital challenge.

10. References

1. Alison, Bullock. Preservation of Digital Information: Issues and current status. Network Notes#60.
2. Brain, Lavoie and Loran, Dempsey. Thirteen ways of looking at.....Digital Preservation and Access. – <http://www.clir.org>
3. Desh Pande, J.N. and Pange, B/M. Digitization of library materials. University News 37 (38), 1999, pp-9-12.
4. Levy, D.M. & Marshall, C.C. (1995), Going digital: a look at assumptions underlying digital libraries, "Communications of the ACM, 58, No. 4,pp 77-84.
5. Flugstad, Myron. (2007). Website Archiving: the Long-Term Preservation of Local Born Digital Resources. Arkansas Libraries, Vol 64(3), pp-5-7.
6. Online computer Library Center, Ins. (2006), OCLC Digital Archive Preservation Policy and supporting Documentation, p-5
7. <http://archive.ifla.org/IV/ifla63/63kuny1.pdf>
8. http://en.wikipedia.org/wiki/Digital_preservation
9. <http://www.uky.edu/~kieran/DL/hedstrom.html>