

DIGITAL PRESERVATION - AN OVERVIEW

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Abstract

Digital preservation has been regarded as a matter of increasingly urgent priority. This paper will provide an overview of the major digital preservation activities and other digital preservation of digital records, developed in the library and information science in order to identify factors that play a key role in ensuring the long term preservation of their records.

Introduction

The purpose of preservation is to ensure protection of information of enduring value for access by present and future generations. Libraries and archives have served as the central institutional focus for preservation, and both types of institutions include preservation as one of their core functions. In recent decades, many major libraries and archives have established formal preservation programs for traditional materials which include regular allocation of resources for preservation, preventive measures to arrest deterioration of materials, remedial measures to restore the usability of selected materials, and the incorporation of preservation needs and requirements into overall program planning.

Role of Preservationists

Preservationists within the library and archival community have been instrumental in developing an array of tools and methodologies to reduce the decay of traditional materials and to restore books and documents that have deteriorated to such an extent that their longevity and usability are threatened. Provisions for fire protection and adequate environmental controls frequently are incorporated into new library and archival facilities.

Digital preservation raises challenges of a fundamentally different nature which are added to the problems of preserving traditional format materials. By digital preservation, I mean the planning, resource allocation, and application of preservation methods and technologies necessary to ensure that digital information of continuing value remains accessible and usable.

Recording media for digital materials are vulnerable to deterioration and catastrophic loss, and even under ideal conditions they are short lived relative to traditional format materials.

Strategies of Preservation

Challenges are the absence of established standards, protocols and proven methods for preserving digital information. With few exceptions, digital library research has focused on architectures and systems for information organization and retrieval, presentation and visualization and administration of intellectual property rights. The critical role of digital libraries and archives in ensuring the future accessibility of information with enduring value has taken a back seat to enhancing access to current and actively used materials. As a consequence, digital preservation remains largely experimental and replete with the risks associated with untested methods and digital preservation requirements have not been factored into the architecture, resource allocation or planning for digital libraries.

Digital Preservation Requirements

Digital preservation requirements may be expressed differently by archives, libraries, and other types of repositories that are struggling to meet escalating user expectations with limited financial and technical resources. Storage systems should be capable of handling digital information in a wide variety of formats, including text, data, print formats because many types of digital objects do not have print equivalents and cannot be preserved in non-digital formats. Ideally, storage media will have a long life expectancy, a high degree of disaster resistance, sufficient durability to withstand regular use, and very large storage capacities. Conversion from analog to digital formats and migration to new generations of technology will be rapid, accurate, and inexpensive enough to permit very large scale transfers of heterogeneous materials. Storage space requirements will be minimal and not demand highly sensitive environmental controls. To make digital preservation affordable to the widest possible range of organizations and individuals, equipment, media, and maintenance costs must be modest.

Current Methods of Preservation

Current methods fall far short of what is required to preserve digital materials. All current preservation methods involve trade-offs between what is desirable from the standpoint of functionality, dependability, and cost and what is possible and affordable with current technologies and methods. Consequently, most repositories are coping by employing interim and less than desirable strategies, if they are addressing digital preservation issues at all. For ex. The simplicity and universality of printing to paper or microfilm come at the expense of great losses in the functionality of digital information. Migration strategies that involve reformatting of digital materials to a simple standard format usually eliminate the structure of documents and relationships imbedded in databases. Computation capabilities, graphic display, indexing, and other features often are lost, thus limiting future analytical potential.

Normalization to standard formats is not always technically feasible and it usually is quite costly.

Preservation for Research and Development

The current state of digital preservation suggests several fruitful areas for research and development. I will discuss four areas: Storage media, Migration, Conversion and Management tools. These four domains are often mutually dependent and ultimately must be integrated into an infrastructure for digital preservation. Yet better solutions are necessary in all four areas before such integration can occur. Finally, I will share some observations about the issues of scale and cost that must be considered if we are going to achieve any degree of systematic preservation.

Migration

Better methods for migration of digital materials to new generations of hardware and software are much needed for digital preservation regardless of breakthroughs in mass storage technologies. Planning for migration is difficult because there is limited experience with the type of migrations needed to maintain access to complex digital objects over extended periods of time. When a custodian assumes responsibility for preserving a digital object it may be difficult to predict when migration will be necessary, how much reformatting will be needed, and how much migration will cost. There are no reliable or comprehensive data on costs associated with migrations, either for specific technologies and formats or for particular collections, and little research underway on methodologies that would reduce the costs and burdens of migration.

There are few well developed methods for preserving and migrating software so that it might be used to recreate digital documents that have the “look and feel” of the original sources. Maintaining repositories of obsolete hardware and software has been discussed periodically, but usually dismissed out of hand as too expensive and not demonstrably feasible. This approach deserves more serious consideration as a strategy for maintaining continuing access to certain types of digital materials. Feasibility studies and cost benefit analysis should be conducted to determine the technological, economic, and commercial feasibility of maintaining selected legacy software systems and performing specialized migrations or alternatively of building and maintaining software emulators. Such an approach would support replay of original sources and contribute to the preservation of software as a significant cultural and intellectual resources in its own right.

The higher resolution conversion technologies are another critical element needed to make digital preservation feasible on a large scale. Most archivists and librarians accept the fact that we live in a hybrid environment where paper, microfilm, video, and magnetic and optical media need to interoperate in a more integrated and transparent manner. The vast majority of primary sources today still resides on paper and or microfilm with little chance that we will see the mass conversion of existing archival and library holdings to digital formats. Research and

planning for digital preservation must recognize that we will be dealing with conversion for a long time and that investments in improving capture rates, accuracy, resolution and verification will have long – term benefits. Moreover, improvements in conversion technologies may support hybrid solutions to preservation and access problems by permitting repositories to store certain formats of digital material on stable media, such as microfilm, with on demand conversion to digital from for analysis and reuse.

Preservation of Management Tools

Research and development of tools that would imbed more intelligence about the preservation status of digital material into the objects themselves would make monitoring and maintenance of large digital collections more automatic. Current methods for monitoring the physical status of digital materials are labor intensive, unreliable and potentially damaging to the materials themselves. Recommended procedures for monitoring physical deterioration of magnetic tape, for ex involve reading a small sample of tapes periodically to determine whether any data losses have occurred. The potential exists to build monitoring and reporting mechanisms into digital objects, storage systems and network architecture that could support self – reporting of physical status and initiate automatic maintenance procedures.

Conclusion

It would be beneficial both the preservation community and to those conducting research on issues of longevity, migration and conversion if there were more venues for exchange of ideas, requirements and recent developments. Without a continuing dialogue between humanists, preservationists, and the scientific community it is difficult to include preservation requirements in scientific research endeavors, and it is challenging for those of us outside the scientific community to keep up with and evaluate new products. I hope that the discussion we are beginning at this conference will lead to more regular and formal processes for linking the needs of scholars and preservationists with the research agendas and projects of scientists.

References

1. Eaton, Fynnette L.(1993) "The National Archives and Electronic Records for preservation,"in preservation of electronic formats : Electronic formats for preservation, Janice Mohlhenrich ed., Ft.Atkinson, WI:Highsmith Press : 41 – 61.
2. Lynch, David M. and Catherine C.Marshall. (1995). "Going digital: A look at assumptions underlying digital libraries," Communications of the ACM, 58 No. 4: 77- 84.
3. O'Toole, James M. (1989) "On the Idea of permanace," American archivist, 52, No. 1: 10 -25
4. The preservation of archival materials. (1993). Washington, D.C.: Commission on preservation and access.
5. Preserving the intellectual heritage: A report of the Bellagio conference. (1993). Washington, D.C.: The commission on preservation and access.