
Digital Archives Program Plan

The Austin History Center – *Preparing for Austin's Digital Future*

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Introduction

Since its establishment, the Austin History Center (AHC) has served as a collecting archives, documenting the history, current events and activities of the City of Austin and Travis County. Taken together, the AHC collections tell a detailed, complex story about the government, businesses, residents, institutions, and neighborhoods of Texas' capital city and the surrounding county. These collections constitute a unique resource, not just for local residents, but also for scholars, historians and genealogists, many of whom travel great distances to use AHC resources. The AHC collections comprise a variety of media, including manuscripts, photographic images (over one million), drawings, artifacts, and most recently, digital materials (e.g., digital photographs, publications, and video). Although digital materials comprise a small part of its collections today, new donations will contain an increasingly larger number and variety of electronically created items; the AHC must be prepared to accept and preserve these materials for future use.

In 1985, the AHC's traditional archival mission was considerably expanded when it was designated an official repository for Austin municipal records. The intent of the Austin City Council in making this designation is not entirely clear, but in practice it has meant the identification and transfer of records deemed to be of "historical significance." Today, City records of historical significance are created electronically, just as are almost all other City records. In some cases, these documents are provided to the public only through electronic mediation. In these cases in particular, the preferred preservation format would normally be as a digital file. If the AHC is to continue to act as a repository for the City's historical records, it will have to be prepared to accept City records in digital form.

The AHC's service as an historical repository is a natural outgrowth of its mission to document the history, current events, and activities of Austin and Travis County. Similarly, the AHC's role as an archival repository for the City of Austin developed in conjunction with the City's establishment of a comprehensive City records management program. Any effort to establish a digital archives capability at the AHC must take into consideration both the Center's role as an historical repository and its function within the City's record management program. It should also be undertaken as part of the planning process for a City-wide digital asset management program.

This report examines the issue of digital archiving at the AHC from two perspectives. First, it examines the City of Austin's need to address the identification, management and preservation of its digital materials, including electronic records, whether they are deemed "historical" or not. Second, it examines the City's requirement for digital archiving in the context of the AHC's role as a collecting archives, a role in which the Center must be prepared to accept and preserve historical materials that will increasingly be presented in a variety of digital formats. The report closes with specific recommendations for the implementation of digital asset management policies and procedures and the establishment of two digital archives projects in Austin.

Readers unfamiliar with digital archives concepts and emerging standards for digital archives development may wish to begin at Appendix A – Concepts and Tools for Digital Archives.

1

Austin's Digital Preservation Imperative

Main points: The creation of digital documents, images, video and sound recordings, and databases has become commonplace among businesses, individuals, and especially, government. Most of the intellectual product of our society is now created electronically and some exists only in digital form. These items, in particular the voluminous records of e-government, have created new technological, intellectual, and economic challenges for records managers, information technologists, and archivists. In Austin, the identification, capture and preservation of electronic records and digital objects of “historical significance” will require a sustained commitment by the City and unprecedented levels of cooperation and collaboration among a variety of stakeholders. If it is to continue as both an institutional and collecting archives for the City, the Austin History Center must be prepared to act as a “trusted digital repository,” collecting, managing and preserving a wide range of digital media and formats.

Our digital world and its artifacts

Digital information and digital communications permeate government, commerce, and personal communications in our society. Digital media record not only government and business transactions but also our intellectual product. A report describing the 2002 National Science Foundation (NSF) Workshop on Research Challenges in Digital Archiving notes that our society's digital collections are “vast, heterogeneous, and growing at a rate that outpaces our ability to manage and preserve them.”¹ The use of email and electronic publishing (Web sites, blogs, documents), and the production of digital photographs and video and audio files has become commonplace not only for businesses and government in Austin, but also for many private citizens. Increasingly, the records of Austin's social and cultural institutions and its citizens are “born-digital,” and to capture their context and role in society they must be collected, managed, and preserved in their digital form.²

¹ Margaret Hedstrom (Principal Investigator), “It's About Time: Research Challenges in Digital Archiving and Long-term Preservation.” Report on the NSF Workshop on Research Challenges in Digital Archiving: Towards a National Infrastructure for Long-Term Preservation of Digital Information (Workshop Report – Draft, 12 August 2003, 4), <http://www.si.umich.edu/digarch/Report.Dft.2.doc>. (accessed October 24, 2003).

² Ibid., 6.

The trend towards e-government

Nowhere is the ubiquitous nature of the digital record more apparent than in government operations. Like all modern governmental bodies, the City of Austin and Travis County are undergoing a profound change in how the record of governmental activities is created, used by government employees and made available to the public. Popularly known as "electronic government" or "e-government," this trend has been described as "the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees."³ Researchers have observed 6 levels of e-government service: (1) Information publishing/dissemination; (2) "Official" two-way transactions; (3) Multi-purpose portals; (4) Portal personalization; (5) Clustering of common services; and (5) Full integration of e-government services and enterprise transformation.⁴ The City of Austin Communications and Technology Management Office is spearheading efforts to expand Austin's e-government initiatives with the intention of greatly broadening the range of services that are offered to citizens and City workers through technology. At present, Austin, like most cities its size, operates e-government services primarily at levels (1) and (2) but its online presence has been singled out for praise by various watchdog organizations. Among these is Brown University's Taubman Center for Public Policy which recently examined 1,933 city Web sites and ranked Austin's e-government initiatives as 13th in a group of the nation's 70 largest cities.⁵

The trend toward delivery of government information and services over the Web has taken firm hold in the United States with most federal, state, and local agencies demonstrating a Web presence.⁶ It is not clear, however, that these agencies have fully internalized the profound effect their move toward e-government will have on access to or long-term preservation of the public record. Critics of e-government initiatives have observed that despite enhancing access to government services, some e-government initiatives may ultimately reduce access to public information, in part because of "unfounded optimism about the benefits of increased reliance on integrated digital technologies."⁷ Austin's participation in the world of cyber government, albeit at an entry level, has already dramatically increased the amount of information produced and disseminated to the public electronically. Although digital technologies can radically improve the availability of public information in the short term, if long-term access is to be ensured City departments must adopt new methods for identifying and managing official records and public information. Austin's decision to embrace e-government brings with it a host of "e-responsibilities," responsibilities that have not gone unnoticed by City authorities. For example, in a recent report the Office of the City Clerk highlighted the scope of Austin's legal vulnerability because of its lack of a comprehensive electronic records management program.⁸

³ Rachel Silcock, "What is E-government?" *Parliamentary Affairs*, 54, no. 1 (2001): 88. Online. Ebsco Host: Ingenta. (accessed 24 October 2003).

⁴ *Ibid.*, 89-90.

⁵ Congressional Quarterly, Inc. Denver Tops e-Gov Rankings (23 September 2003): ¶ 2. <http://governing.com/articles/9ciegov.htm>, (accessed October 27, 2002).

⁶ Ramona S. McNeal and others, "Innovating in Digital Government in the American States," *Social Science Quarterly* 84, no. 1 (2003): Objective. Online. Academic Search Premier. (accessed 12 October 2003).

⁷ Philip Doty and Sanda Erdelez, "Information micro-practices in Texas rural courts: methods and issues for E-Government," *Government Information Quarterly* 19, no. 1 (2002): 370. Online. Wilson Web. (accessed 23 October 2003).

⁸ City of Austin. Office of the City Clerk. *City of Austin Records Management Annual Report Fiscal Year 2003*. (Austin, TX: City of Austin, 2003). [unpublished report].

The role of archives

The identification, acquisition and preservation of documents of historical importance and the vital records of government and business have long been the purview of public and private archives. Archives do not spring into being spontaneously, however, but are born through the allotment of resources to organizations and individuals that have been formally charged with collecting and preserving documentary evidence deemed to be of long-term value to society.⁹ Archives are also created through the knowledgeable and methodical application of archival processes such as appraisal, selection, organization and description. The creation and maintenance of archives requires commitment, planning and the application of considerable expertise. This is no less true of digital archives than of those entrusted with ancient manuscripts.

In 2002, the Research Libraries Group (RLG) and the Online Computer Library Center (OCLC) published a landmark study that described the characteristics of what have come to be known as “trusted digital repositories.”¹⁰ In the words of the RLG/OCLC report, “a trusted digital repository is one whose mission is to provide reliable, long-term access to managed digital resources to its designated community, now and in the future.”¹¹ The RLG-OCLC digital archives model does not specify a particular organizational or technical infrastructure, but instead describes the responsibilities and attributes that will characterize “trusted, reliable, sustainable digital repositories.”¹² Although intended for the use of institutions that create and preserve research materials, the report findings have been widely disseminated and have formed a commonly accepted baseline for the creation of digital archives among a variety of institutions, including governmental entities. Although they make a somewhat lengthy list, the major attributes and responsibilities identified in the report are listed below because they capture both the range and depth of commitment necessary to the establishment and maintenance of a digital archives program.

A trusted digital repository and its parent organization (if any) must:

- accept responsibility for the long-term maintenance of digital resources on behalf of its depositors and for the benefit of current and future users;
- have an organizational system that supports not only long-term viability of the repository, but also the digital information for which it has responsibility;
- demonstrate fiscal responsibility and sustainability;
- design its system(s) in accordance with commonly accepted conventions and standards to ensure the ongoing management, access, and security of materials deposited within it;
- establish methodologies for system evaluation that meet community expectations of trustworthiness;
- be depended upon to carry out its long-term responsibilities to depositors and users openly and explicitly;

⁹ Hedstrom, “It’s About Time: Research Challenges in Digital Archiving and Long-term Preservation,” 11.

¹⁰ Research Libraries Group – Online Computer Library Center. *Trusted Digital Repositories: Attributes and Responsibilities*. Research Libraries Group, May 2002, <http://www.rlg.org/longterm/repositories.pdf>. (accessed 10 November 2003).

¹¹ *Ibid.*, i.

¹² *Ibid.*

- have policies, practices, and performance that can be audited and measured¹³

Among the operational responsibilities of a digital archives are:

- negotiates for and accepts appropriate information from information producers and rights holders;
- obtains sufficient control of the information provided to support long-term preservation;
- determines, either by itself or with others, the users that make up its designated community, which should be able to understand the information provided;
- ensures that the information to be preserved is “independently understandable” to the designated community; that is, that the community can understand the information without needing the assistance of experts;
- follows documented policies and procedures that ensure the information is preserved against all reasonable contingencies and enables the information to be disseminated as authenticated copies of the original or as traceable to the original;
- makes the preserved information available to the designated community; and
- works closely with the repository’s designated community to advocate the use of good and (where possible) standard practice in the creation of digital resources; this may include an outreach program for potential depositors.¹⁴

Some key concepts may be extracted from these lists. A digital archives program must be prepared to manage its assets for the *long term*. In the context of digital assets, long-term preservation has come to mean maintaining accessibility to the digital item over a period of time that may require multiple migrations or reformatting of the digital files. The materials must be equally available to *current and future users*. A digital archives program will require broad *organizational support* and *fiscal planning*. As well, such a program must support *self-evaluation* and its processes must be *auditable*. The digital archives must be able to assure protection of intellectual property *rights holders* and individual privacy. In developing its services, the archives must not only ensure its information is readily understandable by its users, but that it is provided in a way that can ensure authenticity while still imposing the fewest possible barriers to user access. And, finally, the archives must be prepared to engage potential depositors to encourage good practice in the creation of digital materials in order to maximize its potential pool of archival resources.

The problem of collecting and preserving the digital record

There are technological, intellectual, and economic implications for the long-term preservation of digital assets, no matter what media they are preserved in. The preservation of digital files and media is in many respects much more difficult than the

¹³ Ibid, 5.

¹⁴ Ibid, 21.

preservation of analog forms such as paper and film.”¹⁵ This difficulty arises because digital materials differ from analog materials in several significant ways, among them:

- Digital file hardware/software dependence (technological obsolescence)
- Storage media instability (media decay)
- Digital file susceptibility to alteration
- The consequences of “benign neglect” (digital materials that are not selected for preservation WILL be lost)¹⁶
- The need to commence preservation activity BEFORE creation of a digital object and to consider preservation needs at every stage of the object’s life

The first three problems are representative of a range of well-known technical challenges related to the preservation of digital objects and media over time. The last two problems, the consequences of benign neglect and the necessity of addressing preservation concerns before and throughout the life of a digital object, are less well known. These problems are, however, of both immediate and long-term importance and since solving them will require significant social and organizational change, they may be more difficult to resolve than problems that are susceptible to the application of new technology.

Ensuring the preservation of Austin’s digital patrimony, both governmental and non-governmental, will require not just the application of technology, but profound changes in organizational relationships and the allocation of responsibilities and resources among City departments. The establishment and maintenance of an enterprise-wide digital asset management program for Austin will be a political and social event as well as a technological process. The City of Austin, like other institutions that rely on digital technologies to conduct their business, faces a serious problem in that “the technologies, strategies, methodologies, and resources needed to manage digital information for the long-term have not kept pace with innovations in the creation and capture of digital information.”¹⁷ Many municipalities are playing “catch-up” in managing and preserving the huge number of digital assets they have produced—Austin is not alone. As a national leader in the use of technology in governance, however, may not Austin reasonably be expected to be a leader in the management and preservation of the documentary product created by that technology?

¹⁵ Consultative Committee for Space Data Systems (CCSDS), *Reference Model for an Open Archival Information System (OAIS)*. Recommendation for Space Data Systems Standards CCSDS 650.0-B-1. Blue Book. Issue I. (2002): 1-3, <http://www.classic.ccsds.org/documents/pdf/CCSDS-650.0-B-1.pdf> . (accessed 16 October 2003).

¹⁶ Hedstrom, 8.

¹⁷ Hedstrom, 4.

Austin's Records Management Environment

Main points: The identification, capture and preservation of Austin's electronic records will require the cooperation and participation of many agencies and individuals in the City government. Three key stakeholders are the Office of the City Clerk (Records Management), the Communication and Technology Management Office, and the Austin Public Library (Austin History Center). State and local records management regulations and statutes require that all official records, whatever their form, be subject to a records management program and that all public information, whatever its form, be available for public inspection throughout its life. As a product of its normal conduct of business, the City of Austin creates a wide range of digital materials including documents and publications, email, Web content, digital video and audio, images, and databases. Any of these materials may constitute official records that must be evaluated for possible permanent retention and continuing public access. Full integration of the City's archives and records management processes and establishment of a comprehensive electronic records management program will be crucial to the development of a digital archives program in Austin.

Organizational Environment

The development of a coherent, cost effective digital archives program for Austin will require the cooperation and participation of many agencies and individuals. At present, no single agency has been assigned responsibility for the long-term preservation of digital information produced or collected by City departments. It is possible, however, to identify three functional areas that must participate in the development of any digital archives program—the Office of the City Clerk (Records Management); the Communication and Technology Management Office; and the Austin Public Library (Austin History Center). The importance of collaboration among representatives of each of these functional areas in the development of digital preservation programs was highlighted by the Electronic Records Research Committee (ERRC) of the Texas State Records Management Interagency Coordinating Council (RMICC) in its *Electronic Records Research Report*¹⁸ published in November 1998:

¹⁸ State of Texas, Records Management Interagency Coordinating Council, Electronic Records Research Committee. *Electronic Records Research Report*, 01 November 1998, <http://www.tyc.state.tx.us/errc/errc-1.pdf>. (accessed 16 October 2003).

For the future assurance of accessibility and preservation of records in electronic format, IT professionals must understand the value of the information and accept responsibility for managing information (records) in their care. Records management and archival professionals must become aware of the problems created by information systems and the complexity of managing these systems. Each profession needs to become aware of the skills and abilities of the other, recognize how those skills can effect better management, and develop effective communications with one another.¹⁹

At present, there is a lack of programmatic integration between Austin's records management and archives programs. This situation has endured in part because paper records can survive for a very long time with little or no professional preservation management. Electronic records are much more fragile than paper, however, and while close collaboration between records managers, IT professionals, and archivists is desirable for the management of paper records, it is absolutely vital for the long-term preservation of electronic records.

Office of the City Clerk/Records Management

The Office of the City Clerk provides three important records management services to the City of Austin—records management consulting; records center services; and research support. The Research Division preserves and provides continuing access (archival service) for a variety of City documents, among them, City budget documents, City Code, City Council records, deeds, ordinances, and the meeting minutes of various City committees and panels. These documents are produced electronically, but record copies are printed. Documents that must be maintained permanently, often because of Texas State Open Records law, are microfilmed for long-term preservation. These records are not subject to archival appraisal and description.

The Records Center staff coordinates contracted services for the storage of City records and media and provides services such as the management and delivery of materials used to prepare records for transfer to the Records Center; retrieving, transferring, and storing records; processing file requests by City departments; and disposing of records in accordance with approved schedules.²⁰ At present, the Records Center does not support the storage or disposition of electronic records.

The primary responsibility for City-wide records management lies with the Office of the City Clerk, Records Management Program. Among the Records Management Program services are:

- Providing consulting services for the design and implementation of records management systems
- Preparing policies, standards, guidelines, records control schedules, and records management reports
- Supporting a City-wide network of records management customers

¹⁹ Ibid, 6.

²⁰ Office of the City Clerk: Records Management: Records Management Program. Austin City Connection Website, http://www.ci.austin.tx.us/cityclerk/r_center.htm. (accessed 12 October 2003).

Offering training and advisory services²¹

These responsibilities are fully elaborated in Records Management Services (RMS) Division guidelines laid out in the *City of Austin Records Management Policy Workbook*.²² At present, the Records Management staff is collaborating with the Communications Technology Management (CTM) Office in the preparation of enterprise-wide standards for the management and retention of electronic records. The RMS staff has also begun to develop guidelines for the management of electronic records and is overseeing the first City-wide records inventory to include all electronically created records as well as “hard copies” linked to the digital files.

Austin Public Library/Austin History Center

In 1985, the AHC was designated an official repository for Austin municipal records. The original intent of the City Council in making this designation is unclear, however. Was the AHC to operate as an institutional archives for the City or act only as a repository for city documents deemed to be “historically significant”? Volume I of the Austin, Texas Code of Ordinances: Title II, Chapter 2-7, designates the AHC as the repository for records “of continuing value to the city,” but fails to specify whether this is intended to mean only records of “historical value” or all records marked for permanent retention.²³

Since its designation as a City records repository, the AHC has, in fact, taken custody of only a small portion of the inactive, permanent records produced by City departments. The Ordinance mandates the deposit of records at the AHC only when they are “records with historical value” and states only that a records management officer “may agree” to transfer an historical document to the AHC; there is no obligation for him or her to do so. After deposit with the AHC, these records remain the property of the City department that created them except when that department is defunct and does not have a named successor—in that case, ownership of the records is transferred to the AHC.

The lack of programmatic integration between Austin’s archives and records management programs is evident in the fact that very few City records have been designated as historical and there is no systematic process for the deposit of City records (historical or otherwise) at the AHC. A local government record is normally deemed to have historical or other research importance if it provides significant evidence of how the government functions or if it provides significant information about people, places or events that involve the government. Under Austin’s present records ordinance, however, there is no provision for designating entire record series as “historical” and making them subject to evaluation by an archivist. Records with nonpermanent retention periods often are evaluated for their potential research or historical value only by the departmental records administrator and the records management officer. This situation creates such a significant potential for loss of “institutional memory” in the City of Austin that the problem was noted in the *City of Austin Records Management Annual Report Fiscal Year 2003*.

²¹ Office of the City Clerk: Records Management: Records Management Program. Austin City Connection Website, http://www.ci.austin.tx.us/cityclerk/r_rmp.htm. (accessed 12 October 2003).

²² City of Austin. Office of the City Clerk. Records Management Policy Workbook. (unpublished manuscript, Austin, Texas: City of Austin, 2002).

²³ City of Austin. *Austin, Texas Code of Ordinances: Vol. 1, Title II, Chapter 2-7*, (30 June 2003): § 2-7-14, http://www.amlegal.com/austin_nxt/gateway.dll?f=templates&fn=default.htm&vid=alp:austin_tx. (accessed 05 October 2003).

Communications and Technology Management Office

The City of Austin Communications and Technology Management (CTM) Office is charged with a wide range of responsibilities for the acquisition, development, and management of the City's information technology and communications systems. The development of an enterprise-wide digital asset management and preservation plan will necessarily impinge upon many, if not most, of CTM's areas of responsibility. The technical and procedural expertise embodied by CTM staff will, of course, prove invaluable in the establishment and operation of a digital archives program but will be particularly critical in the development of technical security features and the integration of existing systems with a digital archives technical infrastructure.

Regulatory Environment

State Guidelines for Electronic Records Management

The State of Texas has provided substantial records management guidance to municipal governments. Guidance regarding the status and management of electronic records is incorporated in several general records management publications and policy models. The Texas *Local Government Records Act* notes the role that local records play in fostering "efficient and cost-effective government" and charges local governments with the preservation of records of permanent value to "provide the people of the state with resources concerning their history and to document their rights of citizenship and property."²⁴ State guidelines also note, however, that the responsibility of local governments to preserve and provide access to public records is not limited to paper documents but also pertains to records created electronically in government offices and as a by-product of e-government. *Texas Government Code, Chapter 552* (Public Information) states that all information "collected, assembled, or maintained under a law or ordinance or in connection with the transaction of official business"²⁵ whatever its form, is considered public information and must be available for public inspection throughout its life. The media that may carry public information include a "magnetic, optical, or solid state device that can store an electronic signal."²⁶ *Local Government Bulletin C: Inventorying and Scheduling Records*²⁷ requires record inventory and scheduling activities be applied to all official records regardless of their form but provides little guidance on how to deal with inventory and scheduling problems peculiar to records in digital formats.

The bulk of the State's guidance on the management and preservation of electronic records is promulgated in the Texas State Library and Archives Commission's *Local Government Bulletin B: Electronic Records Standards and Procedures*.²⁸ This document describes minimum requirements only for "the maintenance, use, retention, and storage of any electronic record of local government whose retention period is 10 years or more"²⁹ (including records considered to be "archival"), and much of the guidance pertains to the

²⁴ (Texas State Library and Archives Commission. *Local Government Bulletin D: Local Government Records Act*, (September 1999): Section 201.002, <http://www.tsl.state.tx.us/slrn/recordspubs/locpdf.pdf>. (accessed 16 October 2003).

²⁵ State of Texas. *Texas Public Information Act*, Texas Government Code Chapter 552, § 552.003, <http://www.capitol.state.tx.us/statutes/go/go0055200toc.html>. (accessed 16 October 2003).

²⁶ Ibid.

²⁷ Texas State Library and Archives Commission. *Local Government Bulletin C: Inventorying and Scheduling Records*, (May 1998), <http://www.tsl.state.tx.us/slrn/recordspubs/locpdf.pdf>. (accessed 16 October 2003).

²⁸ Texas State Library and Archives Commission. *Local Government Bulletin B: Electronic Records Standards and Procedures*, (July 1998), <http://www.tsl.state.tx.us/slrn/recordspubs/lbullb.pdf>. (accessed 16 October 2003).

²⁹ Ibid, Section 205.003.

conditions under which electronic storage may be used to supplement or replace a hard-copy source document. This guidance proceeds from the premise that digital storage (or microfilming) of records will be the exception to normal records management practice. State guidelines do not require that electronically produced records be preserved in their digital form and State archivist may oblige a local government to produce some records on “permanent-durable paper.”³⁰

The *Electronic Records Standards and Procedures* provides a wealth of specific guidelines for the creation and management of electronic records programs and the use of electronic and microfilm storage of documents by local governments. However, certain shortcomings in the Commission’s approach to electronic records management were noted by the state’s Electronic Records and Research Committee (ERR) in its 1998 *Electronic Records Research Report*.³¹ Among the recommendations made by the ERRC in this report was that TSLAC rules for the management of electronic records in state agencies and local governments be amended so that all electronic records (not just those with a retention period of ten years or more) would be subject to the same management and preservation standards. The ERRC Records Management Interagency Coordinating Council (RMICC) went even further, however, recommending that the TSLAC no longer give agencies the option that “allows a paper copy to be maintained as record copy instead of an electronic copy.”³²

In making these recommendations, the ERRC expressed a range of concerns about the management of electronically produced records in Texas. First, it judged that rapid advances (or simply changes) in technology might well render electronically produced records inaccessible in far less than ten years. Since most government records in Texas are now produced electronically and most have a retention period of less than ten years, it is possible that the bulk of government records will remain useable only if a systematic program of preservation management is applied to them from the moment of their creation. Second, the ERRC believed that changes in Federal records management statutes and practice were creating a standard (de facto and eventually de jure) in which the printed (or microfilmed) output of an electronically created record would no longer be accepted as embodying the full information value of the original digital form.³³ An attested print copy of a plain text digital document might continue to be an acceptable substitute for the original digital form, but in the case of databases, Web pages, or other hypermedia publications, a “hard copy” could not hope to capture even a vestige of the functionality (and therefore the information value) of the original digital form. In its report, the ERRC makes a particular point of describing the necessity of managing and preserving email in its electronic form—advice that conflicts with TSLAC guidance to State agencies on email management which specifically allows the printing of emails for any designated retention period.³⁴

City of Austin Guidelines for Records Management

The City of Austin instituted a comprehensive records management program in 1981 and has regularly amended its records management code³⁵ to reflect changes in records management practice and the use of technology. Limited resources, in particular the lack

³⁰ *Local Government Bulletin D: Local Government Records Act*, (September 1999): Section 203.048.

³¹ State of Texas, Records Management Interagency Coordinating Council, Electronic Records Research Committee. *Electronic Records Research Report*, (01 November 1998): 11, 16, <http://www.tyc.state.tx.us/errc/errc-1.pdf>. (accessed 16 October 2003). See Chapter 4 for additional information on the ERRC report.

³² *Ibid*, 12.

³³ *Ibid*, 13.

³⁴ Texas State Library and Archives Commission. *Texas State Agencies Model Policy for Records Management Requirements for Electronic Mail*, (undated): 4, <http://www.tsl.state.tx.us/slr/recordspubs/email.pdf>. (accessed 09 October 2003).

³⁵ City of Austin. *Austin, Texas Code of Ordinances: Vol. 1, Title II, Chapter 2-7*

of a professional records management staff for much of the life of Austin's records management program, has often resulted in the City implementing the State's minimum requirements for local records management, with the result that City Code (like State guidelines) has sometimes lagged technological change. The most recent amendment to the City's records management code occurred in April 2003.³⁶ Among other things, this ordinance directs the appointment of a city records manager, establishes the membership of the City Records Management Committee, and details the records management duties and responsibilities of department directors, departmental records administrators, and records liaison officers. As in State guidelines, however, the management of electronic records is dealt with primarily in the context of the electronic storage and microfilming of paper records, although departmental records administrators are directed to "ensure that electronic records of continuing value to the city are migrated forward as technology changes" and to "ensure that records can be accessed in the form or medium in which the records are kept."³⁷ The ordinance also directs the City Clerk to provide explicit records management guidance through the publication of a records management plan.

Austin's records management plan is distributed as the *City of Austin Records Management Policy Workbook*.³⁸ This document describes the duties of the Records Management Services Division, and addresses the development of records control schedules, protection of vital and historical records, storage of inactive records, management of filing and information retrieval systems, management of micrographic, electronic and other records storage systems, and records management compliance requirements. The *Workbook* addresses the management of electronic records both specifically and by implication. It acknowledges the City's responsibility to develop records management procedures for all types of City records, including those retained in electronic format,³⁹ to provide records management consulting services to City departments on the management of electronic records⁴⁰ and to operate a "full-service" off-site storage and retrieval service⁴¹ (presumably including support for electronic records). Section 7 of this document speaks specifically to the City's responsibility for providing equitable management services for electronic records and notes the necessity for collaboration by a wide range of individuals and City agencies to:

- Ensure all records regardless of their format are listed on the Department's records control schedule
- Develop guidelines for retaining electronic records
- Ensure that electronic records are migrated forward as technology changes
- Ensure that resources are allocated for new systems or system enhancements
- Ensure those new systems or system enhancements address requirements for back up, recopying, disaster recovery, security, public access, audit trails, and other recordkeeping requirements
- Ensure the ability to access regardless of form or medium

³⁶ City of Austin. City Council. *Ordinance No. 030410-08: An Ordinance Amending Chapter 2-7 of the City Code relating to Records Management*, 10 April 2003.

³⁷ *Ibid.*, § 2-7-7 (8) and (10).

³⁸ City of Austin. 2002, *Records Management Policy Workbook*.

³⁹ *Ibid.*, 2.

⁴⁰ *Ibid.*

⁴¹ *Ibid.*, 8.

Train staff on procedures for managing electronic records⁴²

In response to the widespread use of email for the conduct of official business and requirements put forth in the *Local Government Records Act*, the Records Management Services Division provides training for departmental records administrators specifically on the management of official email. This training curriculum⁴³ describes an email record as “an electronic City record sent or received in the form of a message on an electronic mail system of a City department, including any attachments transmitted with the message” and emphasizes that email must be managed and scheduled in the same way as any other City record.⁴⁴ Potential penalties and legal liability that may be incurred through the improper management of email records is also emphasized. The guidance provided on email management is quite specific: record email must be inventoried with other records, disposed of according to records control schedule guidelines for their assigned record series, and their destruction must be logged. As well, email metadata must be preserved with the email whether it is stored electronically or printed. The provision that email may be printed for long term storage echoes TSLAC guidelines for email management and like the State guidelines it does not address the problem of linking printed emails with their attachments or the problem of hypermedia characteristics that may be lost when an email is printed.

City of Austin electronic records environment

City records management policies mandate that City departments list all records, regardless of their format, on their local records control schedule. The knowledge and skills needed to appraise non-paper files and data sets for record status have not routinely been available at the departmental level, however. The rapid proliferation of digital file types, the ease with which documents may be created at the desktop in the normal course of business, and the potential for dispersed storage of these records (e.g., on a mainframe, remote file server, local hard disk, or removable storage medium) have all increased the difficulty of identifying and controlling records produced electronically by City employees. Most people are familiar with the electronic production of text documents and will readily agree that official records may be created through the use of a word processing application at a personal computer. But text documents comprise a small portion of the official records that may be created electronically in City government on any given day and in many instances a City employee may not even be aware that they are creating official records. The implementation of new technologies has greatly increased automated data production, but few of the City’s information management systems are designed to meet record keeping requirements.

A wide variety of electronic applications may produce electronic records. Among the most commonly used are text editing applications, spreadsheet and database applications, computer-assisted design (CAD) programs, email, voicemail and Instant Messaging (IM) systems, workgroup applications, video and audio conferencing, and imaging systems (digital photography and videography). These records may be stored in a variety of ways, including magnetic media (diskettes, hard drives, tape) and optical media (CD-ROM, COLD, DVD, WORM disk, and erasable optical disk). Because Austin does not employ an enterprise-wide Records Management Application (RMA) and has never conducted a

⁴² Ibid, 13-14.

⁴³ City of Austin. Office of the City Clerk. Records Management Services. Records Management and E-mail. (unpublished PowerPoint Presentation, 18 September 2003).

⁴⁴ See also Texas State Library and Archives Commission. *Local Schedule GR (3rd edition) Retention Schedule for Records Common to All Local Government*, 01 November 1995, <http://www.tsl.state.tx.us/slr/recordspubs/gr.html>. (accessed 09 October 2003).

records inventory that includes all electronic applications and digital storage media used by City departments, it is not possible to calculate the amount of electronic records presently produced and stored by the City. At a minimum, however, the City's electronically produced records may be expected to be voluminous and to include a broad range of text documents and multimedia publications (some produced and distributed only electronically), Web content,⁴⁵ email (with attachments), large and small databases (including GIS and other online databases), digital images (still and video), digital audio, and the product of CAD programs. The identification of official records in all of these formats will require the application of specialized appraisal techniques. Their capture and preservation will require equally specialized processes and procedures.

⁴⁵ The capture and preservation of Web content presents particular difficulties. Snapshots may not collect significant content changes. Password protection, Javascript, and "deep Web" databases or server-side repositories may not be captured by normal copy methods. Simply copying the Web site files may not meet the requirements for capture of authentic and reliable records, and capture for backup/restoration is not done with a commitment to migrate the content so that accessibility can be maintained through changing file formats, encoding standards, and software obsolescence. At present, the content of the [Austin City Connection Web site](#) is captured to CDROM on a periodic basis, but there is no plan in place for long-term preservation of the media or its contents.

Austin History Center Archives Environment

Main points: The Austin History Center serves as an institutional archives for the City of Austin and as a collecting archives for Austin and Travis County. The variety, complexity and organization of its archival collections are natural outgrowths of the Center's multiple roles but a lack of integration in the City's archives and records management processes has negatively affected the AHC's institutional archives function. In the course of carrying out its institutional and collecting archives missions, the AHC has already begun to acquire digital materials that require careful, methodical appraisal and processing if they are to be effectively and efficiently preserved. Significant among its holdings are costly digital surrogates of photographs and drawings held in the AHC's collections. Many of these digital files are in proprietary formats that are not suitable for long-term preservation and are stored on unstable media.

Organizational

The AHC began its institutional life in 1955 as a part of the reference section of the Austin Public Library (APL). In 1961 this collection became a separate division of the APL which, in 1983, was named the Austin History Center. The AHC's role as an historical repository was significantly enhanced in 1980, when it became a designated depository for historical Travis County records under the Texas State Library's Regional Historical Resource Depository (RHRD) program.

In 1985, the AHC was designated an official repository for Austin municipal records. In municipal archives, records acquisition and preservation policies are normally determined largely by the city's operational requirements and its obligation to be accountable to its citizens. In Austin, for example, official records are selected for permanent retention by City departments based on their own administrative needs, State guidelines for local records management, and the requirements of the Texas Public Information Act.⁴⁶ But many government records also have value as historical evidence, and those documents can play an important role in creating the collective memory of our society. In Austin, however, a lack of programmatic integration between the City's records management and

⁴⁶ State of Texas. *Texas Public Information Act*, Texas Government Code Chapter 552, <http://www.capitol.state.tx.us/statutes/go/go0055200toc.html>. (accessed 16 October 2003).

archival programs has impeded this important function of public documents and few records series have actually been appraised for their historical or research value.

Most City records designated for permanent retention are retained as administrative resources at the creating department or the City Records Management Center. Although this practice may fulfill the City's statutory obligations for public accountability, it impedes the role of the AHC as an institutional repository, and because most City records never receive the benefit of archival appraisal and processing, their contents are not made readily accessible for use by researchers and historians. As well, when records are stored in a records center or office environment, they are more susceptible to environmental deterioration and potential damage or loss than they would be if preserved in an archives.

In a sense, the AHC's history as a collecting repository for essentially private papers has impeded its role as an official institutional archives because its appraisal program has never been fully integrated with the City's records management program. While the lack of programmatic integration between Austin's archives and records management programs is very apparent in small number of City records that ultimately make it to the AHC, many records of historical significance probably endure in City offices or at the Records Center, albeit in a form less than fully accessible to researchers and historians. A similar situation exists in the relationship between the AHC and the records management program of Travis County. As the Regional Historical Resource Depository for Travis County, the AHC receives a variety of records designated as "historical" by the County, although a comprehensive functional appraisal of County records for their historical value has never been done. As is the case with Austin's records, some of the County's most important "documents," such as birth records, are now produced and maintained electronically calling into question the adequacy of the current process for the selection and transfer of archival records. In short, while the programmatic integration of records management and archival services is highly preferable for the management of paper records, it will be critical to the effective management and long-term preservation of electronic records.

In addition to acting, at least in part, as an institutional repository for the City of Austin, the AHC also collects and preserves information about the region's "businesses, residents, institutions, and neighborhoods."⁴⁷ In the course of fulfilling its mission, the AHC has developed a wealth of procedural and technical expertise in archival enterprise. This expertise is being challenged, however, by the Center's recent and growing acquisition of archival materials (governmental and non-governmental) in a variety of digital formats. If the AHC is to continue to serve in its dual roles as an institutional archives and a collecting repository, it must be prepared to accept and preserve materials in a variety of formats, including digital forms.

AHC digital assets (scope, content, & format)

Although the quantity of digital materials held at the AHC is small at present, the amount will increase exponentially as the City records management program develops a more systematic process for the appraisal and selection of City documents for archival value. The AHC can also expect the quantity of digital materials among private donations to increase steadily over the coming years. At present, many potential donors (organizations, businesses, and individuals) are unaware that documents and records they produce electronically can be preserved in digital form as archival records. In future, however, the bulk of personal and business records, correspondence, and other documentary materials may be available to the archives only in digital form. Archivists at the National Archives of Canada, for instance, have noted a steady increase in the amount of digital materials

⁴⁷ Austin History Center Home Page: About Us. Austin City Connection Web site, <http://www.ci.austin.tx.us/library/ahc/about.htm> (accessed 12 November 2003).

included in donations of private papers.⁴⁸ As well, the widespread and rapidly increasing use of digital photography and videography will undoubtedly result in the donation of images of great historical importance in their digital form.

At present, the AHC holds (or has delayed acceptance of) a variety digital materials in a number of their collections. A summary of the AHC's collections and the types of digital materials held or anticipated in the near future is provided below:

General Collection

- Traditional library materials – publications, maps, and Web content
- Current records and publications of City of Austin and Travis County government records and publications – Web content, publications, databases, digital video.
- Current publications/records of selected local organizations – publications, email, business records, photographs

Archives

- Clipping Files — no known digital files
- Maps – databases and images (including GIS data)
- Periodicals – Web content, publications and newsletters (e.g., Austin Symphony and Austin Freenet), databases (e.g., Austin American Statesman newspaper index database)
- Manuscript Archives — photographs, personal and business records and correspondence, Web content, databases, publications, email
- City/County records — demographic/census data; City of Austin technical standards information; vital records databases
- Architectural Archives — no known digital files; possible future deposit of CAD files
- Recordings Collection — digital video; digital audio; Note: videotapes of the Austin Music Network are now received by the AHC only in digital video format.
- Photographic Collection — “born digital” and digitized images; the AHC expects future deposits from the Austin American Statesman photo morgue to be made in digital form
- Mexican American Collection — newsletters; photographs

AHC digital preservation program status

The AHC has not established file format or media standards for digital materials donated to or created by the Center. Even among the relatively small number of digital items now

⁴⁸ Lucie Paquet, “Appraisal, Acquisition, and Control of Personal Electronic Records: From Myth to Reality,” *Archives and Manuscripts* (November 2000): 74. See also Adrian Cunningham, “Waiting for the Ghost Train: Strategies for Managing Electronic Personal Records Before it is Too Late.” *Archival Issues* 24, no. 1 (1999): 55-64. Online. WilsonWeb. (accessed 24 October 2003).

held by the Center there is a wide variation in file formats, especially for image files, some of which are in proprietary formats unsuitable for long-term preservation. Digital files arrive at the Center by email attachment, deposit on a central server, CD, DVD, tape, diskette, and most recently, portable film drive. In almost all cases, the digital files arrive without related contextual or descriptive information. Some files have been stored on unstable media that should be stored under controlled conditions and periodically refreshed.

The establishment and communication of archival standards for digital file formats and storage media are only two of the many actions the AHC will have to take in the establishment of a digital archives program. In addition to the establishment of a technical infrastructure, the Center will have to establish policies and procedures for accessioning, managing, and delivering digital assets. It will also have to develop metadata frameworks that encompass the descriptive, contextual and technical information necessary for continued use and preservation of the Center's digital archival objects.⁴⁹ The AHC has begun work on metadata development for images through the creation of a Visual Resource Database (VRD). The success of all of these efforts will depend, in large part, on the AHC's ability to develop expertise in digital archives development and management that it does not now possess.

Properly constructed and managed digital archives will increase the accessibility of City and County documentary and database resources to City and County employees and can enable cost savings through the storage of "born digital" documents in their digital form. A digital archives program at the AHC would also directly benefit Austin's e-government initiatives and development strategy by making the Center's resources available to a broader audience. In addition to improving access for City and County residents, digital archives services will support non-resident journalists, researchers, and genealogists, among others, who will be able to gain access to important primary research materials without driving to Austin and contributing to the City's deteriorating air quality and traffic congestion.

⁴⁹ Maggie Jones and Neil Beagrie. *Preservation Management of Digital Materials: A Handbook* (London: The British Library, 2003), 11.

A Way Forward

Why establish a digital archives program?

In a recent report, a panel of experts reporting to the National Science Foundation's (NSF) Digital Library Initiative and the European Union Network of Excellence for Digital Libraries (DELOS) described six imperatives for the preservation of digital information –

- Protection and conservation of cultural memory
- Global access to open knowledge and support for cross-disciplinary collaboration
- Preservation for accountability
- Reduction of costs by information re-use
- Foundation of a knowledge economy
- Development of digital libraries⁵⁰

In establishing and continuing its support of the AHC, the City of Austin has acknowledged a responsibility to future generations for the preservation of its cultural heritage. This responsibility is not diminished because the businesses, residents, institutions, and neighborhoods of Austin and Travis County now create and preserve information in bits and bytes rather than on paper. The City of Austin has also gone to considerable expense to enable the electronic creation and distribution of public information for the benefit of its citizens and other interested users. It has expended funds to digitize printed materials to increase their public availability and usefulness, not just to satisfy statutory requirement for public accountability, but because City leaders recognize the important role played by government in fostering the exchange of information in society.

A next logical step for the City is to implement programs to preserve and enable re-use of its store of digital information, much of which may be too expensive or impossible to

⁵⁰ NSF-DELOS, Working Group on Digital Archiving and Preservation, "Invest to Save," (2003): 4-5, <http://delos-noe.iei.pi.cnr.it/activities/internationalforum/Joint-WGs/digitalarchiving/Digitalarchiving.pdf>. (accessed 28 November 2003).

regenerate. For Austin, it may be useful to establish a digital asset preservation program within the structure of a larger Knowledge Management (KM) plan designed to promote knowledge sharing and the capture and retention of intellectual capital for future us. A carefully designed and managed City KM program could further enhance Austin's already dynamic intellectual culture—a culture that attracts a wide range of highly creative and productive professionals.⁵¹

Commitment

Despite the seriousness of the problem at hand, there is no need to irrevocably commit at this point to any one model for managing digital assets; given continuous changes in the “state of the art” it is preferable, in fact, that stakeholders continue to explore the range of available technical and organizational options for some time. All digital preservationists agree, however, that it is vital for any organization to begin the process of exploring its options as early as possible and that it would imperil an organization's digital assets to wait until all the technical challenges of digital preservation have been overcome.⁵²

Noted British archivists Beagrie and Jones identify three levels of commitment that must be accomplished to achieve success in the development of a comprehensive and effective digital asset preservation program:

- Senior policy makers: establishment of policy and commitment of resources
- Mid-management: policy implementation
- Operational: development of procedures for implementing policy

At all levels, the key will be collaboration, both within City departments and inter-departmentally. Implementation of new policies and procedures will require significant flexibility on the part of organizations and individuals. In particular, the development of new procedures for records creation, management, and transfer will require close cooperation between record creators, record managers, and digital preservationists.

Whatever digital asset preservation program is developed, it must be grounded in the realities of the City's operational, legal, and social commitments and it must be sustainable over the long term.

Cost

The greatest cost of digital object preservation (no matter how that object is created) may well reside in the cost of maintaining access to digital items over time and it is difficult to separate preservation costs from access costs. The State of Texas ERRC notes that “cost comparisons with the old paper methods are difficult, because it is virtually impossible to estimate the value of increased speed, accuracy, and functionality of electronic records.”⁵³ If digital information is to remain fully accessible over the long term, the cost of their preservation may well prove to be higher at start-up and over the long-term than the preservation of analog materials. These costs must be weighed against the social, monetary, and cultural costs of failing to undertake preservation of the City's digital

⁵¹ In his 2002 book, *The Rise of the Creative Class : And How It's Transforming Work, Leisure, Community and Everyday Life* (New York, NY : Basic Books), Richard Florida lists Austin second after San Francisco as the city with the social climate most conducive to the nurturing of a highly economically productive “creative class.”

⁵² Philip C. Bantin. “Strategies for managing electronic records: a new archival paradigm? An affirmation of our archival traditions?” *Archival Issues* 23, no. 1 (1998): 34. Online. WilsonWeb. (accessed 24 October 2003) and Jones and Beagrie, 2003, 4-7.

⁵³ ERRC, 1998, 19.

assets, however.⁵⁴ As Hedstrom notes, “in this respect, the economic models for digital archives resemble the economics of public goods, where the primary beneficiaries of current investments may be future generations.”⁵⁵

One aspect of the cost of digital preservation that has already become clear, however, is that the cost of planned, methodical preservation is far less than the cost of so-called “forensic” preservation. That is, the identification, retrieval, acquisition, and reformatting of digital materials that exist outside a digital asset management structure is far more expensive than the preservation of digital items subject to early and cooperative preservation efforts. And, of course, there is the incalculable cost (including potential legal liability) of digital assets that have already been irretrievably lost.⁵⁶

Some costs will be incurred no matter what of the digital preservation model that is selected by the City.⁵⁷ Certain organizational and technical infrastructure changes will have to be made and a certain level of local expertise will have to be developed. Roles and responsibilities must be defined; criteria for identification and selection must be established; methods for collection and transfer must be developed; and metadata standards must be adopted and tailored to Austin’s particular needs. Above all, any digital preservation program should be integrated with the City’s Knowledge Management strategy – digital preservation goals must be grounded in a larger strategic vision for public information access and use that extends well into Austin’s future.

State initiatives

Austin is not alone in facing the challenge of digital preservation and in seeking solutions. The TSLAC strategic report for 2003-2007 notes that at the State level:

The documentation of electronic records of archival value is almost nonexistent. Agencies continue to create complex relational databases, geographic information systems, and other increasingly sophisticated electronic records. To insure the preservation of electronic records of long-term value, records retention requirements must be addressed in the planning and design stages of new information systems. Agencies need assistance in determining what has archival value and should be transferred to the State Archives for permanent retention, and what should be retained permanently in the agency, in accordance with requirements for their storage and access as determined by the commission. Our Archives and Information Services Division does not have enough trained professional archivists to identify and appraise those systems. Further, we do not possess the necessary hardware and software to permit the transfer of and access to the content of those information systems.⁵⁸

Many of the issues described in the TSLAC report were identified by the Records Management Interagency Coordinating Council (RMICC) of the Texas State Electronic Records Research Committee (ERRC) in its 1998 study of electronic records management policies and procedures at the State level. The scope of the ERRC study was broad and included:

⁵⁴ For a cost-benefit summary, see Stephen Chapman, “Counting the Costs of Digital Preservation: Is Repository Storage Affordable?” *Journal of Digital Information* 4, no. 2 (2003).

<http://jodi.ecs.soton.ac.uk/Articles/v04/i02/Chapman/chapman-final.pdf>. (accessed 01 December 2003).

⁵⁵ Hedstrom, 2003, 8.

⁵⁶ Jones and Beagrie, 28.

⁵⁷ A recent comparison of the cost of “self-service” and contracted third-party digital preservation programs found that costs varied according to a number of factors including file format accepted in the repository and the owner’s risk tolerance and standards for content integrity.

⁵⁸ Texas State Library and Archives Commission. *Helping Texans turn information into knowledge : agency strategic plan, fiscal years 2003-2007*. (Austin, TX: Texas State Library and Archives Commission, 2002), 47, http://www.tsl.state.tx.us/pubs/stratplan_0307.pdf. (accessed 23 November 2003).

- The functional requirements for keeping and archiving records in an electronic format
- Possible cost-effective guidelines for using records in an electronic format
- A possible policy for state government's archiving of records in an electronic format
- Possible standards and policies for formatting information in an electronic format
- Feasible ways to develop a searchable database that contains state agency documents in an electronic format.⁵⁹

The TSLAC has begun to take action on recommendations made by the ERRC in each study area. The TSLAC strategic plan for FY 2003-2007 notes that the State has already “initiated a program to provide for the preservation and access of historic state government publications in electronic format.”⁶⁰ The most significant initiative is an enhancement to the agency's Texas Records and Information Locator service (TRAIL) program.⁶¹ The Electronic Depository Program (EDP) will “harvest the content of Texas State agency Web sites, extract and index descriptive information about that content, and securely store the original electronic files.” The TSLAC expects this digital preservation effort to make electronic access to state government resources “permanent and comprehensive.”⁶²

Although the TRAIL enhancement project is directed at the preservation of materials produced by State government, the TSLAC understands that local governments face similar challenges in digital asset management and preservation and it is exploring options for funding records management and preservation grants to local governments.⁶³ Austin should **actively** pursue opportunities to engage TSLAC support and funds for the City's digital preservation initiatives.

Developing expertise

Pilot Projects

Making the decision to establish a digital archives for the City of Austin will require a general understanding among senior decision makers of the benefits and costs of undertaking a digital archives program. As is the case in many technical projects, the start-up and continuing costs of contracting services from a commercial vendor must be weighed against the less defined costs of pursuing a “build-your-own” program. Technical staff will need to develop an in depth understanding of the personnel, material, and technical resources required to create and support a digital archiving program before advising decision makers on the best course of action for the City. As well, the selection of either contracted or “home-grown” digital archives services will require the participation of management and support staff in the development of new policies and procedures for information creation, records management, and the identification and selection of archival materials by City departments. The development of pilot projects would allow Austin to “test the waters” of digital preservation and see just how chilly they are before diving in.

⁵⁹ ERRC, 1998, 3

⁶⁰ TSLAC, 2002, 11.

⁶¹ TRAIL may be accessed at www.tsl.state.tx.us/trail

⁶² *Ibid*, 38-39.

⁶³ *Ibid*, 54.

Model policies and procedures for the creation, management, and long term preservation of digital resources may be obtained from a variety of organizations and government entities worldwide. No model may be imported wholesale, however; it must be adapted to the specific needs of the City of Austin. The establishment of small digital archives pilot projects under the auspices of the City Records Management Committee would provide a wealth of in-house knowledge and experience to inform decisions on how best to apply emerging standards and adapt current digital asset management models to local requirements.

Recommendations

Recommendation 1

The City Clerk should appoint a Digital Asset Management Task Force (DAMTF) from members of the Records Management Committee.⁶⁴ At a minimum, the Task Force should include representatives from the Records Management and Records Center Office, the Austin Public Library, Austin History Center, and the CTM Project Management Office.

Recommendation 2

Begin to develop a digital asset long-term preservation strategy. The DAMTF should act by consensus on the following recommended actions:

1. Policy Actions

- Describe the division of responsibilities among City departments for the management and long-term preservation of electronic records
- Recommend a lead agency to coordinate departmental participation in the City's digital archives program
- Develop policy to establish specific designated custodians for electronic records scheduled for permanent retention.
- Develop policy to ensure that technical and procedural requirements for long-term preservation of electronic records are included in assessment criteria for technology acquisitions
- Develop audit, security, and disaster recovery policies for City electronic records

2. Procedural Actions

- Ensure that all electronic records, including email, Web sites, and databases, are included in the current city-wide records inventory
- Ensure that general and departmental record schedules include all forms of electronic records and identify the "archival" format of each record

⁶⁴ Established by City of Austin Ordinance No. 030410-08, this body has been specifically charged with assisting the records management officer in the "development, implementation, and management of the records management program [§ 2-7-4 (C) (1)] and to "review the performance of the program on a regular basis and propose necessary changes and improvements [§ 2-7-4 (C) (2)].

- Participate as an advisory body in the acquisition of an RMA for any City department

Recommendation 3

Establish an **OAIS-based** digital archives pilot project (to include online and off-line digital materials) at the Austin History Center to serve as a vehicle for the development of technical expertise, policy, and procedures for the management of archival digital materials.

- Conduct a macro-appraisal of a selected agency to identify archival electronic records and establish procedures for record collection and transfer to the archives
- Develop a model for ingest, management, and delivery of the archival electronic records that may be applied to a full-scale digital archives
- Develop a model for ingest, management and delivery of non-record archival digital objects that may be applied to a full-scale digital archives
- Develop a metadata framework (for digital object discovery, management and preservation) for all classes of archival digital objects (record and non-record) ingested by the archives
- Target staff members for development of necessary skill sets; engage new records management and archives concepts and methodologies as needed to achieve program goals
- Enable networking with outside organizations involved in digital preservation initiatives and research
- Establish a core digital collection for the development of online finding aids to be made available through the Texas Archives Online (TARO) project⁶⁵.

Recommendation 4

Seek funding and support from the TSLAC and National Historical Publications and Records Commission (NHPRC) and the University of Texas at Austin, School of Information to establish an email archiving pilot project for the City of Austin. A 2002 study of email management done by the School of Information for the Texas State government proposed the development of an OAIS-based email repository for State agencies. This model, the Texas Email Repository Model (TERM),⁶⁶ is a superb example of how the OAIS concept may be applied to a particularly intractable digital data preservation problem. The development of a TSLAC-sponsored email repository program for Austin would provide a forum for the development and testing of email management policies, procedures, technologies, and methods that could later be scaled to the State-wide level.

⁶⁵ Information about the TARO project may be found at: <http://www.lib.utexas.edu/taro/taro-about.html>

⁶⁶ Marlan Green, Sue Soy, Stan Gunn, and Patricia Galloway. "Coming to TERM: Designing the Texas Email Repository Model." *D-Lib Magazine* 8, (2002), <http://www.dlib.org/dlib/september02/galloway09galloway.html>. (accessed 15 October 2003).

A

Concepts and Tools for Digital Archives

Main points: Multiple strategies and approaches are normally needed for the management and preservation of enterprise digital assets. Many factors, among these the records management environment, statutory requirements, the nature of the material, use and access requirements and cost will play a part in determining the approaches and tools best suited for a particular digital preservation program. A community of practice has developed in response to the widely perceived need for governments, institutions, and individuals to preserve their digital assets. This community has developed some digital preservation models, standards, and toolsets to assist early adopters in taking the first critical steps toward cost effective, responsible digital asset management. A common thread in worldwide research and development efforts has been the recognition that the fragility and ephemerality of digital objects mandates that preservation efforts begin prior to their creation and continue throughout their life,

Electronic Records Management Environments

The present City of Austin records management program is based on the life cycle model of records management. Developed in the context of paper records, the life cycle model describes multiple stages in the "life" of a record and assigns responsibility for management of the record at each stage. At creation and during its active life, the creator of the record has primary responsibility for its management, although records managers may influence the record creator through the establishment of specific records management procedures. When the record reaches the end of its active life, the records manager normally assumes control, taking responsibility for the record's destruction or its storage at a records center where it will remain accessible to the creator for continued operational use (semi-active). When the record is past operational usefulness (inactive), the archivist takes control of records that have been assessed to have enduring secondary value for researchers or historians. Through archival description and preservation, the

archivist, in a sense, gives the records a new purpose by making them accessible to new range of potential users.⁶⁷

The advent of the electronic record has not changed the fundamental mandates of the records manager or the archivist. It has, however, made it more difficult to fulfill those mandates. An electronic record is often a compound of multiple data streams and it may not be easily described or bounded. The content, structure, and context of an electronic record exist only through technical mediation. Above all, an electronic record, though in some senses both persistent and malleable (amenable to re-use and repurposing), is also ephemeral and fragile. Where and how does one capture it even if one can figure out what “it” is? Where and how does one establish the archival boundary when the object of one’s attention has a chameleon nature? The records life-cycle model is, in many ways, inadequate to the management of electronic records.

One approach to addressing the problem of electronic records management has been to view an electronic record as a process or functionality rather than as a bounded object. The most well-known records management model of this type is the Records Continuum⁶⁸ Model (RCM) that has been adopted by the Australian Commonwealth Government.⁶⁹ This model presents records management as a continuous process that begins before a record is created (in the design of recordkeeping systems) and continues throughout the existence of the record. The RCM differs substantially from the life-cycle model in that it encourages active, early intervention by the archivist in the records management process.

The RCM does more than simply conflate the mandates of the records manager and the archivist, however. It also encourages the development of a symbiotic relationship among record creators, managers, archivists, and technical support staff who work together to ensure that the organization’s policies, procedures, hardware and software work together to ensure that electronic records remain authentic, complete, and accessible throughout their life. In the RCM, the “archival threshold”⁷⁰ becomes a **function** rather than a **place** and an organization may emulate the threshold at many points in its business process.

Distributed custody vs. centralized custody

The concept of archives as a function rather than a place suggests that an effective archival environment could be created for electronic records within the structure of the creating organization rather than in a central facility. In practice, however, distributed custodianship of archival electronic records has proved problematic since the standards, procedures, and systems to enable long-term preservation of digital objects must fully permeate all organizational entities that produce electronic records. Proponents of the centralized archiving of electronic records point out that a record creator, who has no need for a record beyond its original purpose, may not wish to incur the expense of long-term preservation (and may even actively seek wholesale destruction). As well, distributed custody schemes may impede user access to public information despite technological advances that have improved information description and discovery.

⁶⁷ Bantin, 1998, 17-34.

⁶⁸ The origin of the term “records continuum” is somewhat obscure, but a complete articulation of the model can be found in two articles by Frank Upward that were published in *Archives and Manuscripts* (Upward, 1996 and Upward, 1997).

⁶⁹ Sue McKemmish, Glenda Acland, Nigel Ward, And Barbara Reed, “Describing Records in Context in the Continuum: The Australian Recordkeeping Metadata Schema*,” (2000).
<http://rcrg.dstc.edu.au/publications/archiv01.htm#7>. (accessed 28 November 2003).

⁷⁰ Luciana Duranti, “Archives as a Place,” *Archives and Manuscripts* 24, no. 2, (1996): 244. In Duranti’s words, “the organization must establish an architecture in which the records of all creating bodies, once received, can be put into clearly defined and stable relationships, and in which their broader context can be identified and the associations among the records never broken.” Ibid, 253.

It is the case, however, that electronic records are difficult to capture, manage, and preserve, no matter who is doing it or where it is being done. That said, certain characteristics of electronic records exacerbate the difficulties in distributed archiving schemes, such as the enforcement of common archival standards, record sharing protocols, and the assurance of continued usability. The most well-known experiment with a large-scale distributed custody digital preservation model was conducted by the National Archives of Australia (NAA) during the 1990's. Implementing and maintaining digital repositories in dispersed locations proved difficult and inefficient, however, and in March 2000 the NAA moved to a custodial model. It is also instructive that the U.S. National Archives and Records Administration (NARA) now proposes taking physical custody of Federal records as soon as possible after they are created, a process sometimes known as "escrow archiving."

Appraisal and selection

Electronic records, like paper records, must be appraised for their primary (administrative, legal, and fiscal) and secondary (evidential and informational) value. In all cases, the creator's need to destroy records that are no longer useful to the organization (and that may, in fact, constitute a legal or financial liability) must be weighed against the public's need for organizational accountability and the record's potential usefulness to researchers and historians. The appraisal and selection of digital materials differs from the appraisal of analog materials (record or non-record) in a number of ways, however. Among the most significant are their volume, manipulability, and fragility.

In the case of digital materials, the appraiser must also be concerned with the availability of documentation that describes the information contained in the digital files and the relationship of one file to another or to the entire body of the organization's records. The appraiser must also assess the "readability" of the material (e.g., the existence of proprietary file formats or hardware dependence). The appraisal and selection of electronic records present other difficulties as well. Electronic records are often maintained as databases that present information in a disaggregate form. Micro-level information is highly manipulable and can often be linked to other data to create entirely new information aggregates, but the uniqueness of the information may be difficult to assess, thereby complicating selection.

Many of the difficulties inherent in the appraisal and selection of electronic records can be alleviated through early intervention by the archivist. In a 2002 report on its plans for redesigning Federal records management, NARA describes its intent to "take on the preservation responsibilities for [the] agencies prior to legal accessioning" in the expectation that "this would result in more accurate descriptions, earlier transfers, better preservation, while avoiding the loss of records that is likely to occur with lengthy agency retention."⁷¹ NARA proposed that its services include doing preservation and description work for records that must, for legal or administrative reasons, remain in the custody of the creating agency. Early archival intervention of this sort, sometimes referred to as "pre-accessioning," is very much the type of activity envisioned by proponents of the RCM.

⁷¹ U.S. National Archives and Records Administration. *National Archives and Records Administration Proposal for A Redesign of Federal Records Management*, Summary of Proposed Strategies and Tactics, July 2002. http://www.archives.gov/records_management/initiatives/rm_redesign.html#top. (accessed 20 November 2003).

Legal considerations in digital preservation

Ensuring complete, reliable, authentic records

One of the most important functions of a records management program is to ensure that the records created in an organization are “comprehensive, identifiable (bounded), complete (containing content, structure, and context) and authorized.”⁷² In the case of electronic records, the creation of complete, reliable and authentic records results not just from the application of specific technologies, but also from the administrative and procedural context of their creation. The delineation of minimum standards for completeness, reliability and authenticity in specific classes of electronic records has been the focus of many publicly and privately funded research programs for almost a decade. Despite these efforts, Federal and State guidelines for the creation, management, and preservation of electronic records address the problems of completeness, reliability and authenticity only sporadically.

Most of the guidelines that have been produced by federal and state agencies have dealt with technical specifications for electronic records management systems. Appendix C to the ERRC *Electronic Records Research Report*, published in 1998, describes recommended baseline functional requirements for systems managing electronic records in Texas State agencies. This document was based on the 1997 issue of the Department of Defense *Design Criteria Standard for Electronic Records Management Software Applications*, DOD 5015.2-STD.⁷³ In citing this document, the Functional Requirements Workgroup of the ERRC notes that:

The DoD requirements are the product of research and consultation among records managers, archivists, academicians, and information and systems professionals. They are, as well, realistic and realizable. The Workgroup believes that we have successfully adapted the DoD requirements to Texas.⁷⁴

DOD 5015.2-STD, however, addresses only the functionality of Record Management Applications used by DOD elements to create and manage electronic records, not the entire range of administrative and procedural tasks that must also be undertaken to create complete, reliable and authentic records. It is nevertheless, a good place to start in understanding the range of issues involved in the creation and management of electronic records by government entities. A list of DOD 5015.2-STD compliant RMA systems is available at <http://jirc.fhu.disa.mil/recmgt/register.htm>.

Rights Management (RM)

When Americans speak of intellectual property rights and of their rights to privacy and to information, they refer to the instantiation of specific legal rights that have developed through years of legislation, judicial decision, and practice. In the field of information

⁷² David Bearman, “Item Level Control and Electronic Recordkeeping”, *Archives and Museum Informatics* 10, no. 3, II (1), “<http://www.archimuse.com/papers/nhprc/item-lvl.html>.” (accessed 01 December 2003).

⁷³ Department of Defense. *Design Criteria Standard for Electronic Records Management Software Applications*. DoD 5015.2-STD. (Washington, D.C., 2002).
http://www.dtic.mil/whs/directives/corres/pdf/50152std_061902/p50152s.pdf, Online. Defense Technical Information Center. (accessed 12 October 2003).

⁷⁴ State of Texas, Records Management Interagency Coordinating Council, Electronic Records Research Committee, Functional Requirements Workgroup. *Electronic Records Research Report, Appendix C: Functional Requirements for Managing Electronic Records*, 12 October 1998, C-5. <http://www.tyc.state.tx.us/errc/errc-1.pdf> (accessed 16 October 2003).

management, the term Rights Management (RM) is used to describe the expression and protection of these legal rights in day-to-day business and social transactions. The terminology and the mechanisms that information professionals have traditionally used in the management of these rights were developed, for the most part, in the context of print media and express the uses and limitations afforded by those media. Through extensive debate, and by leveraging these traditional uses and limitations, a carefully crafted balance has been achieved between the rights of stakeholders in the creation of information and the rights of stakeholders in the use of information.

In the past decade this carefully crafted balance has been challenged, and in some cases overturned, by the increasingly diverse use of digital media for the embodiment and conveyance of intellectual content as well as for the collection, aggregation, and transmission of all types of information. To enable the management of information rights in a digital context, information professionals must develop new terminology, new conceptual models, and new tools. In the creation and management of a digital asset management program, Austin will encounter a wide range of RM challenges. The City's requirement to adhere to provisions of the Texas Public Information Act has already been mentioned, but other laws also apply to the handling of digital information. Among these are Intellectual Property (IP) and copyright laws and privacy statutes.

Intellectual Property & copyright

IP and copyright laws pose particular challenges to digital preservation. There are implications for the preservation of necessary supporting software as well as for the preservation of the digital objects themselves. The Digital Millennium Copyright Act (DMCA), in particular, prohibits a range of potential solutions to the problem of preserving supporting software to ensure long-term accessibility for dependent digital files. Management of IP and copyright restrictions will be more complex for materials acquired for long-term preservation from donations outside the scope of City public records than for information in the public domain. To a large extent, the difficulties that pertain to IP and copyright may be ameliorated by the establishment of standard procedures and instruments for negotiating the archive's rights in the material that is being deposited. An excellent summary of the issues attending the creation of licenses and deposit agreements for digital materials is provided by Jones and Beagrie in their handbook *Preservation Management of Digital Materials*.⁷⁵

Privacy and confidentiality

Though individual and public rights in law relative to privacy and information access have slowly been refined, and in some cases expanded, through legal decision, for the most part, limitations on public access to public records and limitations on public access to private records (such as medical records) have been de facto enforced by the limited media in which these records were available. When a request for public information could be initiated only by the writing of a letter and providing the requested information required hand-searching and copying of hundreds of documents, there was a natural damping effect on the collection and reuse of public information (or of private information held by the government). In the same vein, private records were protected from public access not only by legal remedies, but also by the physical limitations of their form (e.g., they could be locked in a file cabinet or stored in a limited access proprietary computer system).

To a great extent, the limitations to information distribution imposed by paper records have been eliminated by increasing availability of government information through e-government initiatives. The publication of records in digital formats and the distribution of

⁷⁵ Jones and Beagrie, 2003, 51.

records by electronic means greatly increases not only the amount of available information, but affordances for re-formatting and re-use of that information. In particular, users are now able to aggregate and compare information from disparate sources in ways that were unimaginable only a few years ago. The past decade has seen a dramatic increase in the collection and communication of public and private information through digital media, an increase that has had profound implications for both privacy and the availability of public information.

In Austin, a variety of federal, state, and local laws and ordinances impose limitations on access to certain public records. As well, private donors may stipulate use and access restrictions on donated materials. In either case, technical and procedural methods for limiting access and use, or for providing redaction⁷⁶ services, may be required for a variety of digital resources maintained in the City archives.

Digital archives development tools

Standards

It is possible for digital objects to exist independently of the technology that created them, a characteristic sometimes referred to as “persistence,” but persistence can only be accomplished when the materials are created and described according to rigorous standards.⁷⁷ It is very likely that many digital objects, even those created under conditions optimized for the creation of well described and constructed digital materials, will not meet the rigorous technical requirements for full persistence. However, any organization can increase a digital asset’s potential for full persistence through the development of an architecture that identifies specifications for digital materials that will require long-term preservation and integrates the systems that create them with the systems that will preserve them. The development of this type of integrated architecture requires an investment in planning and the creation and enforcement of information management policies that support a preservation strategy. A well-established standard for digital archives architectures is the International Organization for Standardization (ISO) Reference Model for an Open Archival Information System (OAIS).⁷⁸

The Open Archival Information System (OAIS)

The OAIS model describes an archival architecture that includes people, systems and procedures. It is intended to create a digital archives environment adequate to support organizations that have committed to the collection and long term preservation of digital information for a designated user community. In the OAIS model, “long term” means the data will be kept long enough that the archives will have to deal with changing technology, new formats, and alteration in the needs and demands of the user community—and it can mean indefinitely.⁷⁹

The OAIS model can support a variety of archives types, including those that are required to accept a steady flow of input as well as those that receive materials only occasionally. It can also support highly complex or very simple structures for access services and user control.⁸⁰ The OAIS model enables all necessary archival information preservation

⁷⁶ Redaction is the removal of confidential information from a document.

⁷⁷ William G. LeFurgy “Levels of Service for Digital Repositories.” *D-Lib Magazine* 8, no. 5, May 2002, Introduction, <http://www.dlib.org/dlib/may02/lefurgy/05lefurgy.html>. (accessed 12 October 2003).

⁷⁸ Consultative Committee for Space Data Systems (CCSDS). “Recommendation for Space Data System Standards: Reference Model for an Open Archival Information System (OAIS),” January 2002, 1-1. <http://www.classic.ccsds.org/documents/pdf/CCSDS-650.0-B-1.pdf>. (accessed 16 October 2003)

⁷⁹ *Ibid.*

⁸⁰ *Ibid.*, 2-2.

functions including ingest, archival storage, data management, access, and dissemination and provides some support mechanisms for the migration of digital information to new media and formats.⁸¹

Effective digital preservation also requires the adoption of, and adherence to, standards for creating and managing digital assets. The DOD standard for RMA's, described above, provides a framework applicable to the systems used to create records electronically. Two other areas where standards may be usefully applied are in the designation of file formats for archival storage and in the creation of metadata.

File formats

Although standardizing file formats is unlikely to be a complete solution to the long-term problem of preserving digital assets, it can facilitate preservation in the short-term. Among the reasons for being selective in the number and type of file formats accepted for preservation are known risks in the migration of some formats,⁸² the difficulty of tracking the occurrence of specific formats in the repository, and the cost of migrating files and preserving software (if even possible).⁸³

As noted above, the DMCA specifically prohibits migration of proprietary software to new media and the "reverse engineering" of proprietary software, even for archival preservation of software for application-dependent documents. Some governmental organizations have responded by launching initiatives to increase the amount of open source software used in their organizations.⁸⁴

Metadata

Metadata, commonly defined as "data about data," can be used in a variety of ways to support the preservation of digital objects. The OCLC/RLG Working Group on Preservation Metadata describes three primary functions for metadata in the management of digital objects:

- **Descriptive:** facilitating resource discovery and identification
- **Administrative:** supporting resource management within a collection
- **Structural:** binding together the components of complex information objects⁸⁵

⁸¹ Ibid.

⁸² See Gregory W. Lawrence, William R. Kehoe, Oya Y. Rieger, William H. Walters and Anne R. Kenney. *Risk Management of Digital Information: A File Format Investigation*, Washington, DC: Council on Library and Information Resources, June 2000. <http://www.clir.org/pubs/reports/pub93/pub93.pdf>. (accessed 01 December 2003).

⁸³ A thorough examination of the costs of preserving file access over time is available in Tony Hendley's 1998 report for the British Library Research and Innovation Center, *Comparison of Methods and Costs of Digital Preservation*, *British Library and Research Innovation Report 106*, available at <http://www.ukoln.ac.uk/services/elib/papers/tavistock/hendley/hendley.html>. A sample of an archival file format standard may be found at the Florida Center for Library Automation Website, <http://www.fcla.edu/digitalArchive/pdfs/recFormats.pdf>.

⁸⁴ Information on these initiatives can be obtained at the OpenSector.org Website: <http://www.opensector.org/>.

⁸⁵ Online Computer Library Center - Research Libraries Group, Working Group on Preservation Metadata. "Preservation Metadata for Digital Objects: A Review of the State of the Art." (White Paper, January 2001), 2, http://www.oclc.org/research/projects/pmwg/presmeta_wp.pdf. (accessed 10 November 2003).

Because digital preservation is substantially facilitated by the use of detailed metadata, many government agencies and research organizations have established metadata schemes. A comparison of four of the most influential preservation metadata initiatives⁸⁶ is provided in the OCLC/RLG Working Group report noted above. Although many of these schemes share common elements, they do not constitute a consistent body of guidance for best practice in the development of preservation metadata.

In its report to the TSLAC, the Texas ERRC Functional Requirements Workgroup recommends the following metadata set as the minimum acceptable for government created electronic records: Subject, Date Filed, Addressee(s), Format, Location of Record, Document Creation Date, Author or Originator, Originating Organization.⁸⁷ For official records, much of the required metadata could be produced automatically during the life of a record through the use of a properly designed RMA. While the metadata produced by an RMA may be useful by the archives to support long-term preservation of a digital object, in most cases, additional metadata fields will have to be associated with the object to ensure long-term preservation and accessibility. The OCLC/RLG Working Group notes in particular the usefulness of metadata to:

- store technical information supporting preservation decisions and actions
- document preservation actions taken, such as migration or emulation policies
- record the effects of preservation strategies
- ensure the authenticity of digital resources over time
- note information about collection management and the management of rights⁸⁸

At a minimum, a digital archives must define a set of standard metadata elements adequate to identify, authenticate, describe and manage their digital objects in a systematic way.

Digital asset management models

Digital library models

In its recent report for the Network for Excellence in Libraries (DELOS) and the National Science Foundation (NSF), the DELOS/NSF Working Group on “Reference Models for Digital Libraries: Actors and Roles” describes a digital library as “an information system for which the information base represents a collection of objects (digital, physical, or abstract objects), mainly used for learning and research.”⁸⁹ Digital library software suites normally include highly developed toolsets for description, discovery, sharing and presentation of a wide variety of materials through an online interface. Two good examples of digital library

⁸⁶ The four projects are: the CURL Exemplars in Digital Archives project (CEDARS); the National Library of Australia (NLA) initiative; the Networked European Deposit Library (NEDLIB) project; and Harvard University's Digital Repository Service (DRS) model.

⁸⁷ ERRC, 1998, C-10.

⁸⁸ OCLC-RLG, 2001, 4.

⁸⁹ DELOS/NSF Working Group on “Reference Models for Digital Libraries: Actors and Roles,” Final Report, (June 2003): 4, <http://delos-noe.iei.pi.cnr.it/activities/internationalforum/Joint-WGs/actors/Actors-Roles.pdf>. (accessed 27 November 2003).

software suite are the ContentDM™ digital collection management toolset produced by DiMeMa, Inc.⁹⁰ and the Hyperion Digital Media Archive™ produced by the Sirsi Corporation.⁹¹ Offering features such as full-text searching, XML export of metadata descriptions and Z39.50 compatibility, the design emphasis in these systems is on information discovery by potential users. Although they can store and present a wide variety of digital file formats, they are not structured to support preservation management of the digital files.

Digital archives models

In contrast to digital libraries, the design of digital archives emphasizes the creation of a technical and administrative environment adequate to support organizations that have committed to the collection and long term preservation of digital information. Digital archives systems are available both as “build-it-yourself” systems based on open source software and through contract (third party) services. Because digital archiving is an extremely new field, new standards, services and systems appear almost daily. Whether Austin chooses to create its own digital archives using open source software or contract for digital archiving services, those involved with the digital archives program should expect to cope with frequent changes in system technology and functionality over the long term.

Self service

An example of the “build-it-yourself” digital archives system is the OAIS-compliant DSpace™ digital institutional repository created jointly by MIT Libraries and Hewlett-Packard.⁹² Although DSpace will run on a Windows server, it is primarily designed for UNIX or Linux and the CTM's recent experimentation with Linux-based servers suggests the possibility of cost savings by implementing a completely open source digital archives installation for Austin.⁹³

Contract (third party) services

Outsourcing digital preservation services and infrastructure brings with it a variety of benefits and disadvantages. Among the significant issues that may be raised in third party contracts for digital preservation are quality control; security; rights management; access; and limited development of local expertise. A useful summary of the advantages and disadvantages of using third-party services is provided by Jones and Beagrie.⁹⁴

⁹⁰ Web site: <http://contentdm.com/index.html>.

⁹¹ Web site: <http://www.sirsi.com/Sirsiproducts/hyperion.html>.

⁹² Web site: <http://dspace.org/index.html>.

⁹³ Joe Barr, “Austin, Texas to Begin Linux Pilot Project.” *Linux Journal: Currents*. <http://www.linuxjournal.com/article.php?sid=6974>, (accessed 27 October 2002).

⁹⁴ Jones and Beagrie, 2003, 48, Figure 2..

Digital Archives Demonstration Collections

To illustrate some of the benefits and costs of establishing a digital archives for Austin, a small demonstration digital archives collection has been created in conjunction with the production of this report. The demonstration archives was created with the support of students, faculty and staff of the University of Texas at Austin, School of Information (ISchool) and the staff of the Austin History Center. Built on the [ISchool's DSpace](#)⁹⁵ test bed, the demonstration collections are intended to serve as an introductory training ground in digital archives development and management for City archives, records management, and IT staff. They may also be used to demonstrate basic digital archives concepts and functionalities for City leaders. These demonstration collections are not intended, however, to support the City of Austin's or the Austin History Center's long-term digital preservation requirements.

The DSpace administration toolset allows for the creation and management of digital materials at multiple levels. The highest level of control is created by establishment of a user community. The demonstration collections are presented in two communities: the Austin History Center, and the City of Austin. Each community may create an unlimited number of multi-media collections, each with different context, management parameters, and users.

Access controls may be implemented through the creation of "e-people" who are given specific rights vis-à-vis collection contents. A collection may be made created with no restrictions on access or use or an e-person or a group of e-people may be given specific rights. For example, some members of the community may be given permission to submit items, some only to view items. Control may also be exerted at the collection or item level.

DSpace also provides a robust metadata framework that is presently based on the widely used [Dublin Core](#) metadata set. DSpace supports the Open Archives Initiative's Protocol for Metadata Harvesting ([OAI-PMH](#)) v2.0 and has documented Java APIs to allow interoperation with other systems. DSpace supports two levels of digital preservation: bit preservation and functional preservation. The item submission process automatically creates a file format registry that can be used for tracking migration requirements.

⁹⁵ Developed jointly by MIT Libraries and Hewlett-Packard (HP), DSpaceTM is an open source software system that enables institutions to capture, store, index, preserve, and redistribute digital materials including text, images, video, and audio files (MIT Libraries & Hewlett-Packard Company, 2003, <http://www.dspace.org/introduction/index.html>, Introducing DSpace).

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