Records Management in a Digital World

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Perhaps more than at any time in recent memory, records and their management—or mismanagement—have been headline news. Some of the world’s biggest corporations—Coca Cola, Enron, Microsoft, Texaco, even the National Archives (the official repository of the nation’s records)—have been accused of destroying or mismanaging official records. While some of the investigations have focused on the shredding of paper records, increasing attention has turned to the destruction or misuse of electronic records and documents. Indeed, to some informed observers of the digital landscape, the proper management and preservation of electronic records is a “front burner” issue that can no longer be ignored. As testimony to this, in 1999 Gartner Group predicted that revenue related to records management functionality would grow from $15 million in 1999 to about $35 million in 2001.

College and university administrators should be interested in records management because records document the activities of the institution and are essential in making informed decisions, maintaining accountability, and generally fulfilling the college’s or university’s mission to society. Imagine not being able to locate a copy of a construction contract. What happens if a student claims to have completed a degree but your institution doesn’t have the records to verify or deny the claim? What if students can access and alter their own transcripts? What damage would be done if data for a research project were destroyed at the wrong time? Consider the confusion if staff are unable to locate the final version of an internal policy memorandum. What happens if a priceless digital archive collection is lost? Whether the area of focus is administration, instruction, or research, records management is crucial.

Numerous benefits are gained from an effective records management program. The key advantages are to

- comply with legal retention requirements;
- provide evidence of business transactions;
- identify records with short-term value and ensure that they are properly and efficiently destroyed at the appropriate time;
- preserve the organization’s vital and archival, historical records;
- provide a secure system where access is managed according to well-defined criteria;
- improve access and use, and provide for the efficient retrieval of information; and
- preserve the information and knowledge assets of the institution.

Increasingly, CIOs and university administrators discover that records, if properly managed and documented, are important assets that can assist the institution in meeting its goals and in conducting business more efficiently. After decades of
technology implementation, it is increasingly understood that “technology used to enable these information processes is considerably less important than the information that systems hold. Information is dynamic, capable of creating great value, and is the glue that holds enterprises together.”

There is a need for efficient electronic records management systems. Unfortunately, an abundance of good solutions and implementation strategies for addressing this need has not emerged, even though pieces are available (theoretical models, requirements and specification statements, policies and procedures, and records management software applications). This Research Bulletin provides an overview of the major issues and challenges associated with managing electronic records and examines emerging strategies for implementing electronic records management programs.

**Highlights of Managing Electronic Records**

What are records and records management? A commonly accepted definition of a record is recorded information in any form, created or received and maintained by an organization or person in the transaction of business or the conduct of affairs and kept as evidence of such activity. Three key characteristics must be kept in mind:

- A record provides evidence of a business transaction or personal activity.
- As evidence, the record must be authentic—there must be assurances that the record has not been altered, changed, or otherwise corrupted.
- The record must be reliable—it must be a complete record whose content you can trust.

The discipline of records management consists of principles and practices designed to efficiently manage and control records from their creation to their final disposition. The key word is manage. The ultimate goal of records management is to ensure that at no point during its life cycle will the fate of the record be left to chance; the record is managed or controlled at every stage. Only by managing records throughout the life cycle can one hope to achieve the goal of creating and preserving authentic and reliable records that accurately document the transactions or activities of the organization.

**Records Management or Recordkeeping Systems**

A records management or recordkeeping system is a concept that has received a great deal of attention, particularly as it applies to electronic records. A recordkeeping system can be defined as a special kind of information system that manages and preserves the records that provide evidence of business activities. In this context, the term “system” is used in its broadest sense to depict the organizational mission, business processes, policies, procedures, and practices, as well as human and automated mechanisms to ensure trustworthy recordkeeping.
In electronic applications, these systems are commonly referred to as electronic records management systems (ERMS), records management applications (RMA), or electronic recordkeeping systems (ERKS). The five primary objectives and requirements of an electronic recordkeeping system include

- **Capture records and metadata**
  - System creates and captures a record for all defined business transactions.
  - System captures all essential metadata describing content and structure of the record and the context of creation. (Metadata can be defined as a set of data elements used to describe, represent, and manage information objects over time.)

- **Keep records immutable and secure**
  - System maintains immutable records that are protected from accidental or intentional deletion or alteration while the record still has value.
  - System controls access to business records according to well-defined criteria.

- **Ensure records are usable**
  - System ensures that records can be easily accessed and retrieved in a timely manner in the normal course of all business processes or for reference or secondary uses.

- **Schedule records for disposition**
  - System provides for the automated retention of records with long-term value in accordance with authorized and approved disposition schedules.
  - System provides for the automated destruction of records in accordance with authorized and approved disposition schedules.

- **Preserve records**
  - System ensures that records, including relevant metadata, notes, attachments, and others, can be converted or migrated to new system hardware, software, and storage media without loss of vital information.

**Characteristics of Electronic Records**

Electronic documents possess three primary qualities that distinguish them from non-electronic records.

- Electronic documents are logically constructed, often virtual objects. Unlike paper records, electronic documents do not exist as physical objects, but typically as bits or bytes of data stored in tables in different parts of the
application. In and of themselves, these data elements convey very little information; they only have meaning when the data is manipulated by software programs and assembled into the records or documents we are accustomed to viewing. Once erased from the screen, the document in many systems continues to exist only as discrete data stored in tables. Because of the transitory nature of these documents, they are commonly referred to as database or virtual views.

- Electronic documents are dynamic in that they can be easily and quickly updated. In its most efficient form, this updating function is automatic, with documents reconfigured and updated “on-the-fly” in response to immediate information needs.

- Electronic documents can be assembled into complex/compound objects. Electronic documents can be combined with other media, such as text, images, or sound into single documents, or can be linked to other documents, creating a sophisticated set of logical relationships among documents.

All of these characteristics have serious implications for the way one manages electronic documents throughout their life cycle.

**Systems Managing Electronic Documents and Records**

There are three prominent types of systems that manage electronic documents and records today: online transaction processing (OLTP) systems, decision support systems (DSS), and electronic document management systems (EDMS).

The primary goal of OLTP systems is to automate routine and ongoing computing-intensive business transactions, such as those undertaken in the financial and human resource functional areas. The emphases are on processing data (sorting, listing, updating, merging), on reducing clerical costs, and on outputting documents required to do business (bills, paychecks, orders). These systems are designed to provide current, up-to-date, accurate, and consistent data, and to produce documents that will support ongoing business needs.

DSS programs—unlike operational databases that are set up to handle transactions and are kept current as of the last transaction—are analytical, subject-oriented systems that are designed to assist managers in strategic planning. The primary objectives of DSS applications are to aggregate transactions as snapshots in time and to produce flexible, on-demand reports for managers.

EDMS applications focus on the control and management of documents of all types—text, images, graphics, and complex/compound documents. The ultimate objective of the systems is to support the day-to-day use of documents for the ongoing business needs of the organization. EDMS functionality typically includes document capture, indexing of documents, storage management, version control, integration with desktop applications, and retrieval tools to access the documents.
EDMS applications more closely resemble recordkeeping systems than any other type of information system. However, even EDMS applications lack some of the key requirements necessary to manage documents over their entire life cycle and to create reliable and authentic records that provide evidence of critical activities of the institution.

**Weaknesses of Recordkeeping Systems**

The primary data and information systems employed by most institutions do not routinely and systematically fulfill the five major requirements of a recordkeeping system (discussed earlier).

**Records capture**

In OLTP and DSS, business records are not routinely stored and captured as stable, finite, physical entities. Transaction processing systems are primarily concerned with providing access to current data that will support ongoing business needs. Decision support systems are largely focused on transforming data into reports and other information packages to assist in making decisions. Neither system is designed to capture records or evidence of business transactions, nor to manage those records for as long as required.

**Systematic preservation of immutable records**

Most information systems do not capture the record at the point of creation. Furthermore, it may be impossible to recreate the record at a later date. Databases are dynamic, volatile systems, in a state of continual change. Data updates occur frequently, and with database management software managing the system, these revisions are made in every file containing that revised data element. Moreover, databases typically maintain only the current value for any given data element. Consequently, once a virtual view of a document is erased from the screen, it may or may not be possible to recreate the record exactly as it originally appeared. Historical data, if kept at all, is usually incomplete or summarized. As a result, historical “snapshots” of a database do not routinely capture the data values needed to reconstruct a specific record. While EDMS applications do a better job of preserving and managing original documents and versions of the records, these systems typically have less control over modification and deletion than would be permitted in a recordkeeping system.

**Systematic preservation of complete, fully documented records**

All of the most popular information systems fail to meet the requirement for capturing and preserving fully documented digital objects. Two major problems exist: (1) metadata that was never created, and (2) metadata that exists but is not linked to or part of the record. System metadata, as typically defined by systems designers and technologists, is often not as complete as necessary to describe a record. Transaction logs maintained in typical information systems do contain certain critical data on updates and revisions, but these logs often do not provide enough essential metadata to fully describe and document the business transaction. Of particular concern is the paucity of metadata related to the context of creation and use, and metadata related to the management of the record over time, which would include documentation on such critical issues as how
to provide access to the record and when to dispose of the record. The availability of this contextual and management metadata could very well mean the difference between a useful and useless record, or between one that is properly or improperly managed.

In addition, some vital metadata may not have a logical association with the content data. That is, there are no links between or pointers to and from metadata describing and defining the record and the data composing the record. In some cases, the metadata may not be a part of the automated system at all, but may exist only as a paper document totally disassociated from the records it is describing. Even if links or pointers do exist, the logical relationship among the different parts of the record can become disconnected over time, or the various data elements of the record may be preserved or discarded according to different schedules from those of the metadata.

**Systematic retention and disposition of records**

In many systems, the primary disposition strategy consists of copying or backing up data and moving this data to near-line, and eventually off-line, storage status. In this strategy, no appraisal decisions are made on what to keep and why. Some EDMS applications may include retention controls, but the majority of these systems do not include the rigorous controls for disposing and retaining records that must be a required feature of any recordkeeping system.

**Long-term preservation of records**

In most institutions the typical strategy for protecting data is to generate daily back-ups of all system data. While the back-up strategy is a necessary and useful activity, it must be regarded more as a disaster preparedness plan than as a preservation strategy. Unlike a true preservation strategy, the back-up solution does not deal with the root causes of the deterioration and obsolescence of digital records: hardware obsolescence; storage medium deterioration; and the biggest problem of all, software dependence, or as Rothenberg said, “the fact that digital documents are in general dependent on application software to make them accessible and meaningful.” Overall, the back-up strategy does not contribute to the overall preservation goals of ensuring readability and intelligibility in order to facilitate data exchange over time.

Although the most commonly used information systems do contain some recordkeeping functionality, they are, on the whole, poor recordkeeping systems. This is not surprising because these systems were never designed to be recordkeeping systems. Systems do only what they’re designed to do, and the purpose, goals, and scope of OLTP, DSS, and EDMS are clearly not to manage records over their entire life cycle. To meet the requirements of recordkeeping, institutions will need either to modify existing data and information systems or to design new recordkeeping environments that can be integrated with existing legacy systems.

**What It Means to Higher Education**

Any electronic records management solution or strategy must include a management and a technology component. The management component will consist of sets of
recordkeeping requirements and metadata specifications, institutional policies and procedures, and disposition schedules. The technology component will include software applications designed to implement the strategies outlined in the statements of requirements.

Management Solutions

The management portion of a records management program should include the following documents:

- **Records policy.** The purpose of this policy is to establish a set of institutional requirements for the responsible management of records, in both electronic and non-electronic form. Sections of the policy should include statements on authority, benefits, and responsibilities, as well as sections that briefly outline how records will be managed throughout the life cycle, including the capture, disposition, access and use, and preservation functions.

- **Electronic records policy.** Although an electronic records policy would be very similar to the general records policy, it emphasizes issues specific to electronic records, such as the challenges associated with capturing and preserving electronic records.

- **E-mail policy.** Increasingly, e-mail is emerging as a critical piece of documentation in understanding how decisions are made. It is also a record that is often poorly managed. For these reasons, creation of a separate policy on e-mail is good practice. Key elements of this policy would be statements defining e-mail as a potential business record and requirements that ensure the reliability, security, and accessibility of e-mail records.

- **Imaging policy.** The creation of digital images, many of which are critical business records, occurs at all levels of an institution, but like e-mail, these images are rarely managed centrally and effectively throughout their life cycle. Key elements of this policy would include statements about compliance with standards related to the creation and storage of images, and the training of key staff involved in the process.

- **Recordkeeping requirements.** This document outlines in some detail the recordkeeping design requirements for systems that capture and manage electronic records. As such, it is the key document for communicating to system designers what types of functionality to create or design into any information system. The requirements statement would include sections on all stages of the records life cycle, with enough specificity on each requirement to allow designers to translate the specification into a design feature.

- **Metadata specifications.** This document defines the specific metadata elements that must be present with content to ensure that the record is completely documented. Categories of metadata typically would include audit trail information on activities performed on records and metadata on the context of creation and transmission, on relationships between functions and processes,
on access and use, on disposition, on preservation history, and on how to open and read the record.

- **Retention and disposition schedules.** These schedules describe how long the institution must retain records. At a minimum, these schedules would include name or type of record, identification of the creating office or the functional area, and a designation of how long (in years) the original record and copies must be retained.

**Technology Solutions**

There are two basic strategies for creating a recordkeeping environment: (1) modify an existing legacy system to function more effectively as a recordkeeping system; or (2) create a separate but integrated recordkeeping system where records from data and information systems are deposited and managed. For the latter option, there are two implementation strategies: build your own recordkeeping environment, or purchase an off-the-shelf product.

In the past five years, software vendors have increasingly incorporated recordkeeping functionality into their products. This trend has resulted in the emergence of three types of recordkeeping software packages: stand-alone recordkeeping applications, document or knowledge management applications modified to include recordkeeping functionality, and the so-called integrated or hybrid recordkeeping environments that combine the functionality of two different software applications. A list of some of the more prominent examples from each category can be found in Appendix 1. All the applications listed in Appendix 1 have been tested and determined to be compliant with what has emerged as perhaps the most influential set of recordkeeping standards, the United States Department of Defense Record Management Application Standard 5015.2-STD. However, it should be noted that all these recordkeeping applications have been on the market for only a short time; consequently very little information is available on their performance in a variety of institutional settings.

**Key questions to ask**

- Has your institution developed policies and procedures for the management of electronic records?
- Does your institution have a records management program?
- Has your institution created enterprise-wide committees, such as a committee of data/information stewards or managers that establish overall policy and guidelines for the management of data and information, and regularly review the performance of the overall information management function?
- Has your institution created and implemented retention and disposition schedules?
- What risks does the institution face by not having an active records management program?
Where to Learn More


- “Electronic Recordkeeping Resources” <http://www-personal.si.umich.edu/~calz/ermlinks/ermlinks.htm#top>.


- ”Model Requirements for the Management of Electronic Records (MoReq)” <http://www.cornwell.co.uk/moreq>.


Endnotes


About the Author

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## Appendix 1

### Sample Recordkeeping Systems

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<thead>
<tr>
<th>Type of System</th>
<th>Product</th>
<th>Comments</th>
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<tr>
<td>Stand-alone records management applications</td>
<td>FileSurf by MDY Advanced Technologies, Inc.</td>
<td>&quot;FileSurf is an enterprise solution for the total management of your corporate knowledge base. FileSurf manages all information regardless of whether the information is in e-mails, electronic, or physical files. FileSurf provides your organization with a single application for capturing, tracking, and applying retention policy across all company information. You can use FileSurf to quickly find, retrieve, view, copy, and request records from any desktop, using a Web browser or networked PC. FileSurf maintains a complete audit trail of the document’s history including access, usage, and final disposition.” Quotation from the MDY Web site at <a href="http://www.mdy.com/">http://www.mdy.com/</a>.</td>
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<td></td>
<td>ForeMost Enterprise by TrueArc, Inc.</td>
<td>“ForeMost Enterprise provides: Robust records management functionality, scalability, security of your digital information, real-time access to your information, robust records management tools, expanded file plan categories support, sophisticated retention information, consistent management of paper and electronic information, professional report writing, virtually unlimited security levels, advanced access control through access control lists (ACLs), real-time search.” Quotation from the TrueArc Web site at <a href="http://www.provsys.com/">http://www.provsys.com/</a>.</td>
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<td>Hummingbird RM Family by Hummingbird, LTD</td>
<td>“Hummingbird RM is a component of Hummingbird Enterprise, the new EIMS from Hummingbird, that transforms Hummingbird DMTM into a fully functional, standards compliant records management solution, creating an organized, secure environment that manages the complete lifecycle of all corporate knowledge assets—physical and electronic—from creation to destruction.” Quotation from the Hummingbird Web site at <a href="http://www.hummingbird.com/">http://www.hummingbird.com/</a>.</td>
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<td>Stand-alone records management applications (continued)</td>
<td>iRIMS 2001 by Open Text Corporation</td>
<td>“iRIMS makes records management a part of daily operations by delivering complete lifecycle management for all of your corporate records and information holdings, in paper or electronic format. Certified to meet internationally recognized U.S. Department of Defense standard 5015.2 for Electronic Records Management, iRIMS helps global enterprises to secure critical information, ensure file control, consistency, and collaboration by supporting record classification, retention and disposition rules, searching, reporting, and security access.” Quotation from the Open Text Web site at <a href="http://www.opentext.com/irims/">http://www.opentext.com/irims/</a>.</td>
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<td>OBJECTIVE 2000 by Objective Corporation</td>
<td>“Delivering a platform for accountability of business records and effective lifecycle management, Objective Records provides organizations with the ability to manage both physical and electronic records within a single solution… Objective delivers the flexibility to practice centralised or decentralised records management.” Quotation from the Objective Web site at <a href="http://www.objective.com/">http://www.objective.com/</a>.</td>
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<td>Tarian eRecords Engine by Tarian Software, Inc.</td>
<td>“Instead of an ERMS application delivered to the user’s desktop, Tarian’s eRecords Engine technology can be embedded (integrated) directly inside business application software already found on corporate desktops. The business application that contains Tarian’s engine (the Host Application) now directly offers full electronic recordkeeping capability, without the need for a second ERMS application. The technology is 100% Web-based, and can be easily embedded in any form of Web-based business software including e-mail, imaging, document management, ERM, workflow, or in-house applications.” Quotation from the Tarian Web site at <a href="http://www.tariansoftware.com/">http://www.tariansoftware.com/</a>.</td>
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<td>Information and knowledge applications modified to include recordkeeping functionality</td>
<td>R2M (Relativity Records Manager) by Relativity, Inc.</td>
<td>“R2M incorporates records management seamlessly into a document management environment. The environment is open structured and can be presented as defined by the document and records managers. All documents, including records, must be brought into the document management environment prior to any other activity being taken upon them. As implemented, a record in R2M is simply a specially managed document. R2M extends the concept of the document lifecycle to include record dispositions.” Quotation from the DoD 5015.2-STD Test Summary Report at <a href="http://jitc.fhu.disa.mil/recmgt/r2m/r2m-sum.htm">http://jitc.fhu.disa.mil/recmgt/r2m/r2m-sum.htm</a>.</td>
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<td>eManage 2000 by ByteQuest Technologies, Inc.</td>
<td>“eManage incorporates records management seamlessly into its knowledge management environment… ByteQuest uses the terms “record” and “document” interchangeably. All documents, including records must be brought into the knowledge tree prior to any other activity being taken upon them. As implemented, a record in eManage is simply a specially managed document. eManage extends the concept of the document lifecycle to include record dispositions.” Quotation from the DoD 5015.2-STD Test Summary Report at <a href="http://jitc.fhu.disa.mil/recmgt/emanage/emanage_sum.htm">http://jitc.fhu.disa.mil/recmgt/emanage/emanage_sum.htm</a>.</td>
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<td>Integrated or hybrid products that combine document management, content management, knowledge management software with recordkeeping software</td>
<td>FileNET IDM Content Services 5.1.1 and ForeMost Enterprise 2.0</td>
<td>“FileNET/ForeMost is an integrated product that combines the document management capabilities of FileNET IDM Content Services with the records management capabilities of ForeMost Enterprise. ForeMost provides the records management functionality for the pairing and uses the FileNET repository for storing records filed from FileNET.” Quotation from the DoD 5015.2-STD Test Summary Report at <a href="http://jitc.fhu.disa.mil/recmgt/filenet/filenet.htm">http://jitc.fhu.disa.mil/recmgt/filenet/filenet.htm</a>.</td>
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<td>IBM e-Records Solution (IeRS) by IBM Corporation</td>
<td>“IBM’s IeRS is a combination of IBM’s Content Manager v7.1 and Tarian Software’s Tarian e-Records (TeR) v1.0. IBM’s Content Manager provides document management and workflow capabilities. TeR v1.0 is a Web-based records management application and provides the records management and access portions of the solution.” Quotation from the DoD 5015.2-STD Test Summary Report at <a href="http://jitc.fhu.disa.mil/recmgt/ibmerecords/ibm_ter_sum.htm">http://jitc.fhu.disa.mil/recmgt/ibmerecords/ibm_ter_sum.htm</a>.</td>
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<td>Integrated or hybrid products (continued)</td>
<td>eManage 2000 with Microsoft SharePoint Portal Server 2001</td>
<td>“SharePoint is a corporate portal solution from Microsoft. SharePoint provides document management capabilities accessible via the Web, through MS Office products and Windows Explorer. Its integration with eManage gives SharePoint users the ability to declare a document as a record, and then use eManage to control the life cycle of the record.” Quotation from the DoD 5015.2-STD Test Summary Report at <a href="http://jitc.fhu.disa.mil/recmgt/emanage_2000/emanage_sharept_sum.htm">http://jitc.fhu.disa.mil/recmgt/emanage_2000/emanage_sharept_sum.htm</a>.</td>
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