
New Models for Management of Electronic Records by Archives

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THE transformation of methods of communications which began in the last century with the introduction of the telegraph and the telephone has been accelerated and deepened in the past decade by the marriage of computing and telecommunications and integration of all forms of information in digital representations. By the end of this century we can anticipate that most business communication and much personal communication will be digitized and will be recorded, stored and transmitted electronically. This will apply equally to text, image, sound and multimedia and will be as prevalent in the home as in the office.

Archives have responded slowly to these dramatic changes and are only now formulating systematic programs to address electronic

records. Some of these programs are simple extensions into the electronic realm of traditional archival practices while others reflect radical departures in philosophy, program structure and strategy towards traditional archival functions. This article reviews the range of program variants and comments on some trends and promising innovations.

I. Program Orientation and Philosophy

Traditionally archives have been seen as custodial repositories for important records. They are what they collect. In this tradition most archives, including the National Archives of the United States, still assume that they will collect electronic records and equate their elec-

tronic records programs with what they have brought into their archives or will acquire in the future¹. Some other archives, including the National Archives of Canada and Switzerland are beginning to view electronic records also as an arena for regulating information systems of creating agencies, some of which may be authorized to control electronic archival records for extended periods of time². The Australian Archives has taken the more profound step of focusing their efforts on agency data management practices and assuming that the archives will not obtain custody except as a last resort³.

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The technical requirements of managing electronic records created in a wide variety of hardware and software systems are quite complex. While traditional repositories have responded to these challenges by enhancing the systems capabilities associated with their centralized repositories, some archives are beginning to examine the benefits of partially or completely distributed custody. Distributed custody makes

sense not only because the physical location of records in electronic formats doesn't make much difference in their delivery to users and because expertise in different hardware platforms is already found in different sites and is not necessarily easy to bring under one roof.

Will archives provide access to electronic records to users who visit their facilities or order tapes and disks from them as is now the case in data archives or will they support distributed access to all or some records? Clearly the same telecommunications technologies which encourage thinking about distributed custody can support access by remote users. Here the promises to archives include the potential use of archivally significant materials by archives researchers during the active and semi-active life of the records. The Australian Archives has committed itself to developing common interfaces to series of electronic records to support remote access. The Kentucky State Archives has made a database about state records including electronic records metadata available to public libraries throughout the state and is encouraging remote reference activity⁴.

One of the challenges of dealing with electronic records is that effective intervention must take place earlier in the life-cycle of the system than has been necessary traditionally. Many archivists feel that effective strategies will only be imple-

mented if archivists are involved in the definition of systems requirements and the design of electronic systems and remain active through the acquisition and implementation of systems even before the first records are created. Traditional programs are continuing to emphasize surveying electronic records holdings, but programs such as those in New York State Archives⁵ and the National Archives of Canada are intruding themselves into records management before records are created. This orientation aligns them with those responsible for administration of other citizen «Rights in Information» programs, such as privacy, security & freedom of information. In some countries, such as Sweden, the link between archival approaches to electronic records and freedom of information and privacy legislation is quite strong⁶.

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While traditional archival programs were themselves reflections of national policies, they rarely regarded themselves as part of a larger information policy. Newer national information policies, such as those promulgated by the Canadian Treas-

ury Board, explicitly recognize the relationship. As the United Nations Advisory Committee for Coordination of Information Systems (ACCIS) Panel report «Management of Electronic Records: Issues & Guidelines» made clear, policy is one of the major vehicles for realizing electronic records management and archives objectives⁷. Archives are increasingly recognizing that policy must be accompanied by action in the spheres of systems design, implementation, and standards development. The National Archives of Canada has again been a leader in pioneering the definition of archival functional requirements for office systems and promoting them as a standard for the Canadian government, but other programs, such as that of the National Archives of the U.S. have also placed an emphasis on influencing international communication, transaction and data representation standards so that archival requirements are supported.

II. Program Structure

To date most electronic records programs are treated within their own archival institutions as separate functions. They may look like «special media» such as photographs, maps, or sound recordings or they may be elevated to «Centers for» electronic records, but generally they are not integrated with the appraisal,

control or delivery of paper records. The National Archives of Canada recently reorganized to eliminate its longstanding machine-readable archives division and to reintegrate its functions with those of the Government Records Branch. Some other archives have integrated reference servicing while preserving separation at the front end of the life cycle and in holdings management. Over the longer term it is probably dysfunctional to separate electronic records, especially as paper records will be the «special media» of the next century.

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One cause for separation at the front end is that traditional archives often single out electronic records in their legislation as a special medium rather than as a method of conducting business. In this type of authorizing legislation electronic records or «magnetic media» have recently been appended to lists of record types including correspondence and reports, maps, publications, photographs, sound recordings and motion pictures. Other archives are rewriting or reinterpreting their legislation to emphasize documentation of transactions in whatever form the

documentation or the transaction exists.

Such redefinitions require that archives have staff skilled to manage data. Oddly, archives are still staffed almost exclusively by archivists rather than having on their staffs information systems specialists and data administrators. Instead of taking the view that archives are a function which will increasingly employ lots of specialized professionals, archives throughout the world seem determined to educate archivists in all they would need to know to become information managers⁸. Even electronic archives programs, which hire people with skills in data administration, data processing, and network management, seem to be insisting on training them as archivists rather than simply employing them as specialists in other disciplines working within archival agencies.

One consequence is that archives tend to view the primary audience for their theoretical and practical findings about electronic records as other archivists and records administrators. When the Australian Archives recently issued a videotape to explain the requirements for managing electronic records to senior administrators and sought their advice on how to run an electronic archival records program, it was breaking new ground⁹. In the United Nations ACCIS panel report this author argued for making the case to information

technology staff and program managers because the records were created as a consequence of software implemented by the one on behalf of the other. The New York State Archives has encouraged its staff to become active in the New York State Forum on Information Resource Management as a way of giving archivists a broader exposure to the other information professions.

III. Strategies for Lifecycle Archival Functions

Traditional archival practice has rarely had to formulate concrete strategies for the identification of records; after all, records were physical things which had to be handled and stored and were easy to identify when you saw them. Electronic records are not however physical, but «virtual» things. They cannot be seen and many users do not seem to realize when they have created an electronic record or if they have disposed of one. As a consequence archivists have had to adopt explicit strategies to identify electronic records. Traditional approaches have been extended to inventorying places where such records are stored (data centers and disk drives). More innovative programs, such as that at the World Bank, have identified the business functions which could generate records or archival significance using «enterprise» or «business sys-

tems» analysis methodologies and are locating the electronic functions serving business applications with archival importance instead of looking for records themselves¹⁰. This places them in a more proactive stance.

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Proactivity is particularly important because the character of documents is changing in the electronic world. Where archives previously were able to make many judgments about retention based on identifying the form of documentation (such as reports, diaries, memoranda of record, correspondence, telephone messages) these forms are less distinctive in electronic systems and many new forms are emerging which are closely linked to specific processes. Nowhere in the paper archives do we have documents which update their contents automatically based on the state of remote databases! Yet documents of this kind, which are intimately related to business processes of reporting and briefing, con-

tain important archival data in the form of the models which they execute rather than in the form of their content at any particular moment. Few archives are exploring new forms of documentation and their implications for archives, because traditional archivists still think of records as outputs rather than as transactions.

Redefining the record as a transaction forces archives to look at the types of transactions for which they must provide accountability rather than asking what kinds of records they should keep. In the electronic world, many important kinds of transactions do not typically leave a record at all. For example, searching a database in order to generate reports may be an important decision making process but it doesn't generally lead to creation of an electronic record or even assure the preservation of the particular «view» of the data or the analytical or reporting models being employed in its presentation. Some Dutch and American archivists are exploring relationships between transactions and forms of record and their implications for archival data capture, and these investigations are beginning to influence the way in which archivists view data and evidence¹¹.

Traditionally there has been less difference between the record as data and its function as evidence than there is in the electronic world. In paper the data of the record and its

physical form were united in a medium which was the actual vehicle of communication and thus the carrier as well as the record of the transaction. In the electronic system, data is quite independent of the views which enable users to see it or the uses to which it is put. Saving databases does not preserve evidence, only information. Evidence resides in the conjunction of structure (as defined by software control rather than physical layout), context and data in a transaction. Evidence is, therefore, not something which can be validated after the fact.

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For these reasons, archives probably need to be involved with electronic systems closer to the planning or design phase than to the system retirement date. Some archives, such as the Swiss Bundesarchiv, have put themselves in the loop to receive information about systems at the proposal stage, but most, such as the National Archives in the United States still view record systems as passive mechanisms for holding rec-

ords rather than as the forges in which they are formed. Strategies for controlling records creating organizations are direct reflections of the view each archives takes of the archival task in an electronic era. Those who focus on «data migration» and media standards continue to see the electronic record as a physical artifact rather than a set of transient relations between data around a business function.

The physical habit of some archives means that they are continuing to employ the records schedule as a mechanism for control of electronic records in spite of evidence that records don't survive unless agency staff can identify them, recognize their importance as evidence, and have tools to assure their continued accessibility. Some archives are beginning to explore «negotiation» with agencies over outcomes rather than presuming to dictate the continued retention of records and their transfer to archives. The National Archives of both the United States and Canada have conducted such negotiations surrounding vast quantities of scientific observational data of longterm value in scientific agencies where the importance of the information was appreciated by science administrators. The National Air and Space Administration in the United States has required data management plans as part of its mission approval process for a number of years and these plans have

had to address the longterm accessibility of data from the missions¹².

While traditional archives programs focus on disposition, especially on making decisions about what to destroy, the newer emphasis on data management reflected at NASA is also found in the Australian Archives policies for electronic records. The concept of data management is one that recognizes that the value of information as evidence depends on how well it was managed during its active life. In this model the archivist becomes something of an information auditor, examining plans for systems before their development or acquisition and testing regularly to assure that management requirements, including archival requirements, are being met in the implementation.

Like the auditor, the electronic records archivist must take the view that the business case for archiving evidence is better made with the techniques of risk management than by cost/benefit analysis. Ultimately the job of the archives is to assure accountability and the cost of the lack of accountability is organizational legitimacy and perhaps legal liability which are more concrete than the imagined future benefits to humanity and society of keeping archives in cost/benefit equations. The archival function of appraisal thus becomes a quite new process which begins with the organization rather than the record and must consider

not the «values» of the record but the risks to the organization of retaining or destroying evidence. If it is decided to keep evidence, the process must consider how to preserve not only the «Record», with its data, structure and context, but also the system (hardware/software functionality) and the view from the business application.

So called «data archives», which are actually data libraries, and which reformat data to standard structures for use by researchers interested in its informational content, have emphasized the physical formats in which the records should be transferred to the repository over data interchange standards or preserving software functionality. However, because evidential electronic archives must be concerned with structure and context as well as data, they are increasingly trying to identify interchange formats that assure some interoperability and preserve some evidence. The National Archives of Canada and of the United States are also becoming involved with International Standards Organization committees developing standards for complete interoperability.

Some archives have decided not to effect transfer of records at all. The Australian Archives has defined a strategy in which the records will remain in agency custody and be migrated with current records in such a way as to preserve maximum functionality at minimum long-term

expense to the government. Other archives have taken the view that software documentation, including such external documentation as films made for training and public relations purposes, can capture functionality adequately. Most traditional archives are still unsure of the significance of the way the system worked, probably because their experiences to date are with systems which do little more than store and retrieve information.

As a consequence, documentation practices in traditional archives still focus nearly exclusively on the content of the records and their technical characteristics. Some electronic archives are beginning to document the contexts of the records and the functions of the systems that created them. Documentation of the «views» of databases assigned to different offices, the analysis and reporting capabilities provided to users of a system, the nature security provided for functions and data, and the algorithms of processing routines, is captured in «meta-data» systems, or Information Resource Directory Systems (IRDS) rather than card catalogs or prose finding aids¹³. The radical departure for most archives is not so much in documenting these new aspects or record systems as in when archival description takes place. Electronic archives focusing on metadata will by necessity acquire documentation during the design phases and active life of systems

rather than «describing» records post accessioning. Active programs of metadata management are under way at the Kentucky State Archives and in records management programs of some agencies of the U.S. Government such as the Environmental Protection Agency¹⁴.

Meta-data is a tool for control and migration of electronic information systems, but it also serves as a finding aid for access to and use of archival electronic records. Metadata can be used by remote users, across local and wide area networks, as easily as by on-site visitors to the archives. Because metadata is the tool that must be used to recreate the records in the system as evidence (e.g., the way they actually were when the system was being used actively) it is an essential intermediary to any retrieval and will be required by users, wherever they are, to document archival transactions. The terms of metadata may need to be interpreted to users, but the interpretation is less a traditional archival reference function than a technical function for information technology staff. In this respect electronic records are revealing a fundamental strategic difference between archives in provision of reference service to electronic records. Traditional programs are trying to manage electronic records using archivists alone, while more adventurous programs are acting through the technical staffs in the organizations which created records

and through intermediaries providing network, data processing, and systems management services.

Conclusions

Electronic records are not simply a new medium for documentation. Their existence reflects the introduction into organizations of new methods of communication and the advent of dramatic changes in the way organizations conduct their business. Archives which apply traditional methods to the management of electronic records may not yet have experienced the significance of the changes organizational behavior, but they would do well to pay close attention to the changes in archival program philosophy, structure and tactics that are evolving in archival programs which are more deeply involved with the electronic information systems revolution. In these tentative shifts of orientation are the seeds of the non-custodial, evidence focussed, direct-to-client service delivery oriented, archival programs of the future.

Footnotes

¹ The U.S. National Archives and Records Administration has been increasing its investment in its Center for Electronic Records dramatically, but is still acquiring an infinitesimal proportion of the potential archival record. A recent study by the National Academy of Pub-

lic Administration identified hundreds of large databases throughout the government as archival. This is many times the amount of data that has been accessioned by NARA to date. [National Academy of Public Administration, *The Archives of the Future: Archival Strategies for the Treatment of Electronic Databases. A Report for the National Archives and Records Administration*, (Washington DC, NAPA, December 2, 1991)] Several other government reports in the past few years have criticized NARA's approach to collecting electronic records as misguided. [National Academy of Public Administration, *The Effects of Electronic Record Keeping on the Historical Record of the U.S. Government*, (Washington DC, NAPA, January 1989); US Congress, Committee on Government Operations, *Taking a Byte out of History: The Archival Preservation of Federal Computer Records*, House report 101-978 (Washington DC, GPO, Nov. 6, 1990).

² National Archives of Canada, Automated Information Systems Division, «Conserving Valuable Information within the Health Protection Branch, A Discussion Document...» (Ottawa, Unpub, March 25, 1988).

³ *Archives & Museum Informatics*, vol. 6 (2), Summer 1992, p. 11-12

⁴ Charles ROBB, «Information Resource Management in Kentucky State Government», *Archives & Museum Informatics*, vol. 5 (4) Winter 1991, p. 2-4; see also Kentucky Information Systems Commission, *Current Issues in Government Information Policy Conference Proceedings*, Louisville KY, March 7-8, 1991 (Frankfort KY, KISK, June 1991); Florida State Legislature, Joint Committee on Information Technology, *Remote Computer Access to Public Records in Florida*, January 1985.

⁵ New York State Archives and Records Administration, *A Strategic Plan for Managing and Preserving Electronic Records in New York State Government* (Albany, State Education Dept., August 1988), National Association of Government Archives and Records Administrators, *A New Age: Electronic information Systems, State Governments, and the Preservation of the Archival Record* (Lexington KY, Council of State Governments, 1991.

⁶ David BEARMAN, «Diplomatics, Weberian Bureaucracy and the Management of Electronic Records in Europe and America», *American Archivist*, vol. 55 Winter 1992, p. 168-180; Claes GRANSTROM, «Will archival theories be sufficient in the future?», Paper delivered at the *Seminar on the Impact of Information Technology and Information Handling on Offices and Archives*, Marburg, Germany 17-19 October 1991.

⁷ David BEARMAN, «Electronic Records Management Guidelines: A Manual for Policy Development and Implementation», Chapter II of *Management of Electronic Records: Issues and Guidelines* (New York, United Nations, 1989).

⁸ A recent example of this is the Curriculum Guidelines developed by the SAA Committee on Automated Records and Techniques early in 1933.

⁹ Australian Archives, videotape, 12 992.

¹⁰ Richard BARRY, «Getting it Right: Managing Organizations in a Runway Electronic Information Age», paper delivered at the *Seminar on the Impact of Information Technology and Information Handling on Offices and Archives*, Marburg, Germany 17-19 October 1991.

¹¹ Peter SIGMOND, «Form, Function and Archival Value», *Archivaria*, (33), Winter 1991-92, p. 141-147; David BEARMAN & Peter SIGMOND, «Explorations of the Use of Forms of Material and Authority Files by Dutch Archivists», *American Archivist*, 1987, p. 249-53.

¹² The NASA data management program was presented at a recent National Research Council ad hoc panel meeting at which the National Archives and Records Administration sought NRC help in defining the archival significance of scientific data and in identifying tactics for its longterm preservation. For an account of the meeting, see *Archives and Museum Informatics*, vol. 6 (1) Spring 1992.

¹³ For an examination of the archival implications of the IRDS, see David BEARMAN, «Information Technology Standards and Archives», *Janus*, 1992.2, p. 161-166.

¹⁴ Michael MILLER, «Is the Past Prologue? Appraisal and New Technologies», in David BEARMAN ed., *Archival Management of Electronic Records*, *Archives and Museum Informatics Technical Report*, (13) 1991 p. 38-49.