Living in a Digital World: Recognising the Electronic and Post-custodial Realities

Greg O'Shea and David Roberts

Greg O'Shea is an Assistant Director in the Records Standards and Training Section of Australian Archives National Office where he is responsible for the development of electronic records policies and recordkeeping standards. Apart from two years in the mid-1980s as a Records Manager with the Department of Administrative Services, he has been with the Archives since 1978. He is the author of its *Managing Electronic Records: a shared responsibility* and primary author of its *Keeping Electronic Records: Policy for Electronic Recordkeeping in the Commonwealth Government.*

David Roberts is the Manager of the Records Management Office, a branch of the Archives Authority of New South Wales, where he leads the Authority's projects on Government-wide recordkeeping standards and electronic recordkeeping. From 1980 to February 1993 he worked with the Australian Archives, principally in the NSW Office in the areas of records disposal, information services and finding aids, and audiovisual and electronic records. He is the author of two chapters in *Keeping Archives* 2nd edition (1993) and of the Archives Authority's 1995 discussion paper, *Documenting the Future: Policy and Stategies for Electronic Recordkeeping in the New South Wales Public Sector.*

The authors examine the reality of the archival management of electronic records and the digital world we live in. They discuss issues surrounding keeping electronic records and examine the fundamental question of where records should be kept in the electronic age. In doing so they examine post-custodial ideas and strategies by means of some case examples and conclude by hypothesising whether, in a digital world, location really matters.

IRONICALLY, THE SUCCESS OF Madonna's song 'Living in a Material World' made it so much more certain she would be able to do so. Many have contributed to Madonna's success and her bank balance by purchasing her songs on digital CDs. With the aid of digital technology we can hear the songs in our living rooms where the CD player and stereo system convert the digital code back into sound waves for our listening pleasure.

It is useful to begin with the focus on materialism, with its credo of consumption of tangible possessions, because living in a digital world requires us to do very much the opposite, i.e. to focus on the intangible. This issue may be of little concern to the average citizen but our problem as recordkeeping professionals, and our contention in this article, is that because the world is becoming increasingly digital we can no longer purely focus on the material object. Our materialist mindset is no longer adequate to survive in an environment where many records are no longer visible or comprehensible to the human eye. Living in a digital world we can sometimes be forgiven for thinking we are entering into an archival 'Twilight Zone' where the metaphysical and abstract are common currency. The challenge for us is to begin to make sense of this seemingly abstract digital environment in our logical material minds.

Living in a digital world means conducting our working and personal lives from the most trivial of entertainment to the most important of government and corporate business transactions by communicating and using digital information and technology. It means communicating with people on the other side of the world (or the other end of the room) and doing business with them or merely engaging in a chat. We can see this occurring through:

- sending electronic mail or leaving messages on voice-mail, or even making a phone call;

- searching for information through the World Wide Web or a corporate intranet, including archival finding aids;

- chatting on Listservs with people we have never met (and maybe proposing marriage!);

- subscribing to digital newspapers and journals;

- down loading movies onto a PC delivered by optical fibre, or putting a CD into the CD drive;

- publishing interactive hypermedia on the World Wide Web;

- making purchases using EFTPOS and credit cards;

- ordering consumer goods and paying bills through the Internet; and

- waiting for Timothy Leary to die ![1]

None of this is science fiction. It is increasingly becoming a normal part of our lives. This article was prepared using digital technology. Even the systems in place which deliver us our basic power, water, telephone and transport services at some point rely on digital technology. We live in a digital world and our daily lives depend on it.

From the recordkeeping perspective, living in a digital world means documenting business conducted digitally, by generating and maintaining records of that business in digital form. Nicholas Negroponte in *Being Digital* reflects that paper records are created, maintained and delivered to users as atoms. Records in the digital world are created, maintained and delivered to users as bits or digital code.[2]

In the digital world, information can be made accessible to, or delivered to, anybody anywhere in the world. Once records are digital, you do not have to be where they are in order to use them. Indeed there is not necessarily a single place where the records generated by an organisation are kept. The relationships between the records comprising a recordkeeping system or documenting a sequence of transactions are logical relationships. The digital information representing the record may be stored physically in a number of places; in different locations on a hard disk, on different network servers, and in different buildings, cities or countries.

In the digital world, the physical arrangement of records is meaningless. What matters is that the logical relationships within and between recordkeeping systems are maintained so that our material logical minds can ultimately decipher the digital code.

Records as atoms are a phenomenon of the industrial age (and of the agricultural age before it); records as bits[3] are a phenomenon of the information age. To build the archives of the digital world, archivists and archives institutions must find ways of pursuing the archival mission of 'ensuring essential evidence' that reflects the nature of that world. To do this archivists must resolve a number of issues, which we summarise below.

Technological change

The major issue is coping with technological change. In policy proposals on electronic recordkeeping prepared for our respective governments, we discussed the implications of technological change for maintaining electronic records in an accessible and usable form over time.[4] None of what we said was new to archivists. The impact of technological change has been the subject of discussion in the literature for more than twenty years and has been a major theme in the strategies for managing electronic records adopted by archives institutions, which we discuss further below, during that time.

Electronic records are generated and captured in a specific technological environment, depending for their continued accessibility and use on our ability to maintain or recreate them across changes in the hardware and software environments. Because electronic records are bits and not atoms, periodic migration from one storage medium to another and one systems platform to another overcomes much of the hardware dependence.[5]

To be able to read and use records in specific software formats, determined by the application software generating the records and the operating system on which the software ran, it is necessary to:

- maintain, or be able to recreate, the software environment in which the records were generated (although not the original software);

- migrate the records to new software formats, while minimising the loss to their evidential qualities associated with such migrations; and/or

- generate and capture electronic records in formats that will enable them to be, or at least make it more likely that they will be, accessible and usable for as long as they are required.

This involves identifying, and promoting the use of, information technology and telecommunications technical standards which can be applied in the creation, capture and storage of electronic records and metadata, to help ensure that the records can be carried across systems and time.[6] The most useful formats for this purpose are those of a non-proprietary nature that have the highest degree of acceptance, that is, supported by major vendors, adopted by users and defined in international standards.[7]

A further aspect of this issue is whether it is necessary to maintain over time, or to be able to recreate, the functionality of the computer system which

generated the records and the possible views of the data captured in a record at the time of the transaction that it documents.[8]

To a significant extent, the practical difficulties for our respective institutions to maintain software dependent electronic records outside the computing environment in which they were generated provided the basis for the adoption of the distributed custody model. As we will see below, the technological argument is only one of a number supporting a post-custodial stance. For the purposes of current practical policy, however, neither of our institutions is in a position to promote the extensive transfer of electronic records to our custody, because we cannot ensure their accessibility and their integrity as evidence over long periods of time.[9]

One of the developments which would overcome the software dependence of electronic records is the adoption of a standard for records as metadata encapsulated objects (MEO) to ensure interoperability between recordkeeping systems environments. This would give them independence of specific custodial settings. While the MEO model is not primarily directed towards solving the problems of technological change, one result of its adoption would be to make it much easier for archives institutions to take electronic records into their physical custody. On the other hand, it would make the alternative custodial models discussed below equally easier.[10]

Another development is the work being undertaken by the Public Record Office of Victoria, with the assistance of consultants Ernst & Young, to develop viable strategies for the long-term management of electronic records. Essentially this proposal would involve the systematic application of the standards tactic at the whole-of-government level.[11]

Authenticity as evidence

It is indisputable that electronic records must retain their authenticity over time if they are to function as evidence. A record is authentic when it is the document or transaction that it claims to be.[12] Specifically, to be authentic it must be possible to prove that records are what they purport to be and that their purported creators have indeed created them in a trustworthy environment.[13] In the world of paper records, we have maintained the authenticity of records by:

- maintaining, if at all possible, the original (physical) record, which is difficult to alter without detection; and

- authenticating copies being able to demonstrate that the record has been responsibly managed and protected throughout its existence.

In the digital world, notions of original and copy are meaningless. The document that we see on screen when we open it is a copy held in RAM (i.e. the memory) of part or all of the same document held on the computer's, or the network's, data storage devices (i.e. hard disk, network server or 'floppy'). When we save and close a new document for the first time, it is wiped from RAM, as it is on each subsequent occasion. Upon saving, for example, documents will not be returned to the previous location, but to any convenient location. In some cases documents will be split into smaller chunks with pointers.

It is only when we leave the digital world for the paper one, for example when we consider printing electronic records as a method—admittedly primitive—of capturing and maintaining them, that copies again become meaningful. Yet in this context, a copy is all we can ever have. A printed copy of an electronic mail message, containing appropriate metadata and attached to a correspondence file, may serve very effectively as a record. But it is in no sense the original record that effected the transaction.

It is now so widely recognised that attempting to maintain electronic records on their original data storage media, or even in their operating system and application software format, is no longer a viable strategy for their long-term management that it hardly seems necessary to mention it. Yet it is easy to forget that the fundamental archival strategy of migration takes us further from the exact form of the original record with each cycle. Provided we can be assured that the record remains authentic after each such migration, this is a normal and natural part of living in a digital world.[14]

In a number of Australian jurisdictions, evidence laws now recognise this reality through provisions in reformed legislation.[15] For example three major changes have been affected by the Commonwealth *Evidence Act 1995* to overcome the problems associated with the best evidence (original document) rule. They are:

- the abolition of the best evidence rule;

- the provision of a comprehensive range of ways for proving the contents of documents including tendering copies of documents (covering photocopies and multiple copies run off the word processor); and

- the facilitation of proof of public documents, official and business records, and documents and evidence produced by processes, machines or other devices which make it easier to prove a range of formal matters in relation to documents.

The Commonwealth Evidence Act also relaxes and simplifies the hearsay rule, particularly for business, public and official records.[16] In short, the courts are learning to trust the authenticity of electronic records and the legislation is now there to assist in the process. If the legislation works effectively, that authenticity should normally only be challenged where there is a reasonable basis to do so.

The post-custodial archives

Post-custodialism does not mean non-custodial. Now and into the future, a range of options will be necessary to ensure the archival mission is fully satisfied. To the extent that post-custodialism could be described as a movement, it derives its philosophical roots from the wider theory of post-modernism i.e. 'post' (in post-modern) as a simple succession, a loss of faith in progress and, taking some license, a different way of thinking.[17]

Looking at the 'succession' in the development of policies and strategies for the archival management of electronic records we see roughly three phases; non-custodial, custodial and post-custodial.[18]

The non-custodial phase is somewhat difficult to date. This is because there is a gap between the onset of the technology which produced machine-readable records or interpreted machine-readable data and the institution of archival programs to deal with them. The question is which technology should we use for our start date? It could be argued that the non-custodial period is from the beginning of data processing using mechanical devices in 1890, when Herman Hollerith's tabulating device, involving the use of punched cards, was used for the 1890 U.S. Census,[19] and the establishment of the first machine-readable archives program in a public archival institution in 1968 at what is now the U.S. National Archives and Records Administration (NARA).[20] Conceptually, an earlier start date might be 1812, when Charles Babbage devised his 'difference engine' to perform simple computations or, more practically, the post-World War II development of electronic computers; ENIAC (1947 - the first electronic computer), EDSAC (1949 - the first stored program computer), and UNIVAC (1951 - the first commercially available computer).[21]

But perhaps this is too narrow a view. What are euphemistically referred to as 'Infrastructural electronic information systems' have been with us for a long time, although we have not responded to them in the same way as we have with computerisation. Telegraphy for the transmission of text and image and the telephone for the transmission of sound have been with us for well over a century, but archivists and records managers have treated the input and output of the former as printed material and the latter as non-record material despite the existence of the technology to record the transactions.[22] All these transactions are now, of course, increasingly transmitted digitally.

The custodial phase, beginning with the NARA program in 1968 is still with us. A variety of public archival institutions, taking their lead from NARA, began to survey and ultimately accession electronic records (data files). There is, of course, significant overlap between phase one and phase two, as many archival institutions are still yet to get past the first phase![23] The third phase is clearly post-custodial, although again we might have some trouble dating it, particularly as the second phase has not finished. Historical eras, however, are never that precise.

One possibility for the beginning of the post-custodial era is F. Gerald Ham's statement, in a plenary address to the Society of American Archivists 1980, when he 'challenged archivists to embrace a "post-custodial era"'.[24] Another possibility might be when Professor Elio Califano, speaking at the ICA Congress in Brussels in September 1964, posed the question of the position of archivists in the life cycle of electronic records by inviting them to play an active role in the drawing up of standards for the disposal, arrangement and preservation of electronic records, with technical decisions remaining the sole responsibility of record creators.[25]

This is assuming, of course, that we see post-custodialism in purely physical custodial terms or that we are just talking in terms of electronic records. If we extend our horizons to records generally then it is equally plausible to argue that post-custodial refers to an idea or an approach to archival management for all records which transcends physical space and format or transcends a narrow custodial or collecting focus.

Moving to the latter two meanings of 'post' in post-modern we can get a feel for this wider ambience. Generally speaking, post-custodialism represents both a dissatisfaction with the custodial thinking of the past and a new paradigm or intellectual framework in which to place that thinking. While the catalyst for this dissatisfaction and shift to a new paradigm have been the issues associated with electronic records and recordkeeping[26] the ideas and

practice of managing records across the whole life cycle (or continuum), rather than just within the archival institution has, of course, been with us for some time. The thoughts of Ian Maclean in Australia in the 1950s[27] and the development of the Commonwealth Record Series system are prime examples of the early development of, what we now call, post-custodial approaches. Indeed these early developments arguably confer on the Australian Archives the title of the first post-custodial archives![28]

Continuum Management

One of the essential features of the Australian approach to the management of electronic records, and to recordkeeping generally, as articulated in the polices of our respective organisations, is the rejection of the life cycle model in favour of the continuum model. For historical reasons, touched upon in the previous paragraph and elaborated in this section, Australian archivists may be more conditioned to accepting the premise that archival management begins beyond the walls of the archives.[29]

The traditional life cycle approach is based on the 'movement' of self-contained (dare we say metadata encapsulated!) paper based records from creation through administrative use to ultimate selection for destruction or retention as archives. Only archives are then transferred to the archival repository. Following this approach these decisions could only be made about those electronic records that survived to the end of the active life. Given that electronic records are dependent on software and hardware for interpretation and also given their susceptibility to inadvertent loss through technological obsolescence, this would be a huge risk.

As a consequence, as has been said by many commentators on many occasions, attention must be given to records and archival issues for electronic records from the outset i.e. from the systems development or upgrade stage. This is the continuum approach and it brings into sharp focus the need to re-orient, what some might perceive to be, the traditional archival mission.

As many readers would appreciate, this is not a new concept in Australia and the notion of traditional archival missions is somewhat difficult to pin down given differing approaches between the Commonwealth and the States.[30] In the 1950s and 1960s Ian Maclean developed the national archival function very much along the lines of involvement in all phases of the records life cycle.[31] Put simply:

> Various aspects of records management such as current records keeping, disposal programming and archives keeping, [cannot] be kept in a watertight compartment. They [are] rather, inter-related parts of the total field of public records administration.[32]

This was very much the case in the development of the disposal function at the Australian Archives[33] but was most clearly manifest in the development of the Commonwealth Record Series system for the intellectual control of Commonwealth records:

> The CRS system represents a logical and comprehensive solution to the issues of archival control. By using the record series as the basis for intellectual control, derived as it is from the natural process of recordkeeping by agencies, the system accommodates a philosophy that allows archivists [and everyone else] to see archival arrangement and description as extending *beyond the walls of their repositories.* The separate registration and description of series and agencies as free-floating entities in the control system provide flexibility to adapt to changes in the administrative arrangements without major reworking of existing control and descriptive documentation.[34]

Peter Scott in his seminal article on the CRS system, echoing Ian Maclean, suggests that:

> ...an archivist may be defined essentially as a preserver and interpreter of recordkeeping systems. The role of the archivist, as an analyst of recordkeeping systems of the past, may also be developed to include current systems; for with the simple numerical series control, series registration may be extended to cover series that are not yet in archival custody.[35]

A major consequence of the continuum approach (and the reason for the argument in this article) is the breaking of the connection between the status of records and their physical custody. If records are to be managed as archival resources from systems development and creation and some of those records have continuing value then the location of those records is no longer such an issue, as they can logically sit for some or all of their accessible life in one or many electronic environments. Thus, in government jurisdictions, options for the physical location of electronic records can include the creating agency; its successor or successors; groups of related agencies, especially where data sharing and exchange leads to a common IT environment; outsourcing to commercial service providers; the archives institution; cooperative ventures between archives in different jurisdictions across the country, the continent or the world; and a mix or any or all of these. It no longer matters in a business sense. It no longer matters in an archival sense, if it ever did.[36]

Australian post-custodialists, at least, consider that, in Jenkinsonian terms, the defence of the record is about guardianship not possession. Beginning with Ian Maclean, Australian archivists have seen Jenkinson's vision in the wider recordkeeping context rather than a purely custodial context.[37]

So is distributed custody really the issue or is it the need to concentrate on defending the record and ensuring that records (especially electronic records) are created and managed as evidence in the first place and remain accessible? To us the answer is self-evident. Despite this many archival institutions (and by implication many archivists) still appear to be unable to seriously deal with the issue.[38]

The Custodial Approach

Before examining the development of post-custodial strategies we should examine the custodial approach to help put the development of post-custodial approaches into context.

It is significant to note that all the institutions which have developed post-custodial strategies, cited in the case examples that follow, have with one exception been down the custodial path for electronic records. It is also important to note, as mentioned earlier, that post-custodial strategies are not non-custodial and do embrace the need for archival institutions to be technologically capable of dealing with some electronic records, including their own.

Once archival institutions established programs for electronic records it was logical for these records to be brought into archival custody. This was after all what archival institutions did and it was consistent with similar programs already established to manage other special media, such as microform, and audio-visual material. For many years these records were treated as special media and the major concern about their preservation centred around the longevity of the media.

Programs for the management of these records were of two fundamental types. The first type involved the accessioning of data files and associated documentation and ultimately the provision of access by the archives institution. These programs took as their model the Data Archive prevalent in academic institutions. The second type involved the storage of electronic media only, where access is the responsibility of the researcher.

As time passed the purely custodial strategy came under pressure from a variety of directions:

- increasing technological change and hardware, software and media obsolescence raised questions about the ability of archival institutions to maintain even the relatively small collections of data in their custody without large infusions of capital;

- a misunderstanding of the nature of records and recordkeeping saw institutions accession input and output documentation and raw data but not records;

- accessioning of data without preserving the link between the data and the recordkeeping systems of the creator and thus breaking the cardinal rule of archival control;

- the reliance on the flat file ASCII methodology when increasingly complex electronic records cannot exist in that form;

- a realisation that the volume, variety and complexity of electronic records could not possibly be managed by a single, relatively poorly funded, archival institution or by using a single standard;

- a realisation of the critical role of the creating institution in maintaining access to electronic records in the short, medium and longer term regardless of the ultimate custodian;

- an even more fundamental realisation that if archivists were not involved in the records creation process then there might not be any records to accession; and

- archivists and archival programs were, by themselves, not in a position to deal with the preservation of electronic records.[39]

Post-custodial strategies: overseas examples

In this section we will look at some examples of post-custodial strategies both here and overseas. We highlight the policy and strategic approaches as examples of post-custodial developments in train. The intention here is to highlight the significant aspects, not to be exhaustive.

New York State Administration

In August 1988, the State of New York released *A Strategic Plan for Managing and Preserving Electronic Records in New York State Government.* The report was jointly developed by the University of the State of New York, the State Education Department and the State Archives and Records Administration. It represented the final recommendations of the Special Media Records Project which had been initiated in 1985 to 'assess the adequacy of State Government policies and procedures for the management of computer-generated, machine-readable records, and develop a program for the long-term preservation of selected, valuable machine-readable records at the State Archives'.

The significance of this Strategic Plan lay in its acknowledgment that to be successful, archival programs for the management of electronic records must begin with the creation phase. The report confirms 'that the archival preservation of machine-readable records is dependent upon the quality of records and information management programs in State agencies'. Also interesting is the view that government-wide initiatives are required to ensure State agencies assume more responsibility for managing their electronic records showing a clear recognition of the need for archival institutions to be involved in more than programs for managing archival collections.[40]

The Special Media Project report criticised, on various grounds, traditional 'flat-file' management approaches as being costly and significantly reducing the usefulness of the data; being inadequate for dealing with the increasing variety of systems and databases that store non-numeric data, such as cartographic databases, CADS systems and text retrieval; argued that a definition for a record in this new environment needed to be developed; and said that because of the ease of duplication in the electronic environment the physical entity, hitherto the locus of preservation, was no longer as important.

The United Nations

In early 1990 the United Nations released a strategy document entitled *The Management of Electronic Records: Issues and Guidelines* prepared by the Technical Panel on Electronic Records Management (TP/REM) formed in September of 1987.[41] The panel consisted of representatives from a range of UN bodies and was chaired by Rick Barry, Chief of the Information Services Division of the World Bank. Apart from UN personnel, David Bearman and Tora Bikson were involved as consultants and Charles Dollar as an observer. This particular

project was significant because it was conducted in a business environment rather than an archival regulatory environment.

The objectives of the TP/REM included to develop guidelines and recommendations for electronic archives and records management as well as for technology standards to facilitate their implementation and to focus on recorded transactions as the basic building block of electronic records management policy, because electronic data is invisible, it is stored randomly and it easy to alter or update.

The most significant recommendations of the TP/REM final report were:

- electronic records should be seen as record transactions so that any communicated information in electronic form qualifies as a record;

- records management requirements of electronic information systems should be identified and documented during the design process;

- policy must dictate when to re-evaluate the retention of electronic records being kept for their 'continuing value' and the reassessment of archival value should be linked to the timing of data migrations;

- records managers and archivists should define policies and regulate the activities of line offices, rather than take records directly into their own hands;

- records managers and archivists need to be aware of emerging information systems standards and employ the tools used in information systems management to control multiple independent information systems;

- systems should be documented during their active life rather than at some subsequent stage; and significantly

- one should identify objectives of acquisition tactics because no single tactic for retiring data and systems documentation will provide a comprehensive view of the system and the information it contained over time; *nothing in any of these approaches requires that when records and records systems are marked for retention, that they be physically transferred to a separate facility, or in any way change their physical custody;* and

- the value of records as information depends on preservation of the context of their use as well as of their content.

The National Archives of Canada

The National Archives of Canada (NAC) was one of the early pioneers in taking a custodial approach to electronic records, establishing a Machine-Readable Records Section in the mid-1970s[42] Over the years they have been at the forefront of developments in this field.[43]

In November 1993 the NAC released a new policy which allowed for certain categories of electronic records to remain with the agencies which created them. This marked a clear departure from previous practice and is, to the best of our knowledge, the first formal policy statement from a national archival institution on this issue. The logic of the arguments being presented by such people as David Bearman and Margaret Hedstrom in the early 1990s, the conclusions reached by the lengthy research at such places as the UN, and the inescapable conclusion that traditional approaches were not being effective provided sufficient catalyst for NAC to chart a new course.

The policy statement outlined categories of electronic records which might, with the approval of the National Archives, remain in agency custody while at the same time re-affirmed that those records which do not meet these conditions would still be acquired by NAC. The policy also covered standard agreements and conditions for records remaining in the custody of the creator.

The circumstances under which records might remain in situ are:

- where the cost of transfer or other technical consideration (software copyright, data complexity, software and hardware dependency) make it impossible for the NAC to acquire the record at that time; and/or

- where institutions for whatever reasons (security, sensitivity) refuse to transfer the record to the National Archives, at least until the expiry of a lengthy retention period; and/or

- where the creating institution has as its own operational requirement the provision of extensive and elaborate reference service, and has the resources and the willingness to provide such services to Canadians which for now the National Archives cannot match; and/or

- where there are statutory provisions that prevent transfer to the NAC.[44]

The NAC has also instituted a monitoring program for electronic records left in institutions. This involves a formal appraisal justification and the addition of certain terms and conditions into an Agency Agreement. The senior official

of the agency responsible for information management and records disposition is required to formally sign the agreement. NAC keeps track of the agreements via a database for regular monitoring purposes.

National Archives and Records Administration, USA

As we pointed out earlier, NARA was the first archival institution to establish a specific program for the management of electronic records. It has long served as the model for the management of electronic records in archival institutions but has come in for a certain amount of criticism for its adherence to the data archive model.[45]

This is not the place to delve into the details of that criticism. However, we do wish to make reference to one of the most recent statements emanating from NARA, its Strategic Plan of the National Archives and Records Administration 1997–2007, which suggests a re-thinking of strategy has occurred. Entitled 'Ready Access to Essential Evidence', the strategic plan was the result of an extensive consultative process, both internally and externally. From our viewpoint this strategic vision is striking for its boldness, its simplicity and for the way in which it embraces a post-custodial future. Visions are, of course, just so many words but they do signal an intent. From the vision and other statements in the body of the strategic plan it would appear that NARA have recognised the post-custodial realities. This is strikingly borne out by the admission that, 'we are still struggling to prepare for a future that is already here', and the reference to the PROFS case where it took NARA two years, twenty-five employees (and presumably large sums of money) to preserve the electronic records from the White House offices.[46]

Some of the key directions identified in the Strategic Plan include:

- with federal records in the custody of agencies as well as in archives, from creation through ultimate use...

- at the record's life-cycle's front-end, where record systems are designed, records are created, and filing systems are organised;

- contributing to the design of [agency] recordkeeping systems;

- involvement in the development of standards; and

- developing and refining of standards enabling NARA to leave record material, particularly electronic record material, outside its custody.[47]

The National Archives of the Netherlands (Rijkarchiefdienst)

The National Archives of the Netherlands (Rijkarchiefdienst) has been for some years now at the forefront of innovative archival thinking. In anticipation of a legislative amendment reducing the compulsory transfer period for records from fifty years to twenty years a project team (PIVOT) has been working to re-orient appraisal strategies. The new strategy is focused towards broadly based functional appraisal to cope with the expected influx of records.[48]

Over a similar time frame an increasing focus has also been placed on the management of electronic records.[49] More recently the National Archives, in cooperation with the municipal archives of Amsterdam, Rotterdam, The Hague and Utrecht, the Royal Society of Archivists in the Netherlands and the Conference of Archives of Local Authorities, formed a working group to produce a strategy for the management of electronic records in the Netherlands. The final report of the working group entitled *Beyond the Paper Era* outlines a vision and strategy for electronic records management in the Netherlands.

In the conclusions and recommendations of the report it is recognised that:

- electronic records may no longer be readable at the time they are transferred to the archives;

- the archives needs to be active in the electronic recordkeeping process;

- there needs to be a fundamental shift in the relationship between archives and agencies;

- contracts or agreements need to be developed between the parties to regulate the cooperation between government agencies and archives; and

- some electronic records are so extensive and complicated that it would be very expensive or impossible to separate them from the environment in which they were created; in these cases the agency would continue to perform functions relating to physical control, preservation and access.[50]

Post-custodial Strategies: Australian examples

Australian Archives

In the early 1970s the Australian Archives began to accumulate a vast array of computer generated formats, the majority of which were created by the oil exploration industry; the records of seismic searches both onshore and on the continental shelf. By legislation these 'electronic records' were required to be deposited with Government after a specified period of time. The Australian Archives was chosen as the repository for these records.

Initially the Archives felt it needed to establish the technology to enable these seismic records to be accessed and maintained over time. This was, after all, what archival institutions did—take records in and provide access to them in situ. Special shelving was purchased, computers were acquired which could read the seismic records and plans were drawn up, but relatively soon a number of problems presented themselves:

- the formats began to change as did the technology required to read it;

- it was calculated that the cost of running the technology in-house would take a major proportion of the Archives' budget;

- the technology would only be suitable for dealing with the seismic records and no other;

- specially trained staff would be needed to deal with what was a small niche of electronic records generated by the Federal Government agencies; and

- as the volume of records increased we were in danger of becoming an arm of BP or Shell rather than the Government's archival authority.

By the mid 1980s, the inescapable conclusion derived from these lessons was that active access to over twelve shelf kilometres of records could not be maintained. The best that could be achieved was to provide resources for passive storage and intellectual control only and to use private computing bureaus to assist the petroleum companies with their access requirements. The companies were required to pay for the access costs.[51]

This seminal experience made the organisation very wary about becoming a centralised archival repository for electronic records.

In 1992 an Electronic Records Project was established to develop policies and strategies for the long-term management of electronic records. The project team determined that passive access was not a viable option, that active access needed to be pursued and in that context the most likely form of access for the foreseeable future was some form of networked access. This decision was based on the fact that the Archives did not have the ability to provide access to electronic records by electronic means (and would not within the short term to medium term); and that individual agencies would be able to manage their own electronic records more effectively than the Archives.

A range of consultants were involved in the project. Those looking at the technical side of the networked access model concluded that a distributed networked environment for the maintenance of and provision of access to electronic records was technically possible. This would involve linkages between systems with access and control information, most likely the Archives' own system, and systems in agencies containing the records.[52]

The reasoning for this conclusion can be best derived from the project's final report:

> The best possible option for the provision of client access to the full 'functionality' of records involves leaving the records in the agency and in the original operating environment—the software and structure in which the records were created...Records left in agency custody will not incur the costs of record and metadata transfer. This could either be on-line or in an archive database that best approximates the original environment and functionality. Access would be through a communication network. The degree of system integrity dictates the functionality that can be provided for electronic records. Re-construction of an environment is easier where the intellectual information exists to allow the relationships within the archival dataset to be reproduced (or imitated).

> If records are extracted from the original operating environment then, whether located in an agency or in the Archives, an artificial environment is required to re-create or display the records. This environment is dependent on the provision of metadata and data dictionaries by the agency at the time of transfer. This limits the level of systems functionality available to users.

> The least desirable option is where uncontrolled records, from defunct agencies, are transferred to the Archives. In that scenario the metadata and data dictionaries may not be present. This would entail major cost including conversion and human resource time.[53]

In March 1995, drawing on the policies developed during the Electronic Records Project, and other parallel developments, such as Monash University research and the Pittsburgh Project, the Australian Archives released *Managing*

Electronic Records: a shared responsibility; this was followed in September by *Keeping Electronic Records: policy for Electronic Recordkeeping in the Commonwealth Government.* These two documents marked a departure from traditional archival practices for the Australian Archives and pointed toward a future of more active involvement in the records creation and recordkeeping process.

The essential features of the policy outlined in the policy documents are:

- the development of a distributed custody regime where electronic records of value generally remain within the agency environment in which they were created;

- records are created and then migrated through systems and software changes to maintain accessibility and evidential values over time;

- agencies and the archives maintain metadata and contextual information sufficient to enable continued official and ultimate public access;

- agencies and the archives reach agreements about the values of records and the length of time for which they should be kept;

- records, authorised for retention or destruction, should only be maintained for the length of time for which they have value and no longer;

- recordkeeping requirements should be built into electronic systems to ensure that, as far as possible, the process of retention or destruction occurs automatically;

- *records* are no longer defined in terms of purely physical characteristics but in terms of the following criteria:

  - a record is that which is created and kept as evidence of agency or individual functions, activities or transactions

  - to be considered evidence, a record must possess content, structure and context and be part of a recordkeeping system;

- the Archives will take electronic records into custody, in limited circumstances, where an agency or function ceases, where there is no identifiable successor or by agreement reached with individual agencies;[54] and

- the development of electronic records policies is part of the overall strategy to provide advice to Commonwealth agencies on the accountable creation and management of Commonwealth records generally.[55]

Archives Authority of NSW

In July of 1995 the Archives Authority released *Documenting the Future: Policy and Strategies for Electronic Recordkeeping in the New South Wales Public Sector.* Fundamentally the strategy is the same as that adopted by the Australian Archives, although the Archives Authority policy is more explicit about the re-invention of the institution and the archival function. This focus is on a recordkeeping and standards regime required to move the 'archives into cyberspace'. In summary the elements of this approach are:

- capture and management of the metadata necessary for the understanding, management and use of electronic records;

- build recordkeeping systems and functions as elements into the Archives Authorities' control systems and participate in the development of national standards for the archival description of electronic records;

- provide networked access to electronic records, including as electronic state archives with an appropriate charging regime for networked based services;   .

- promote the development of a NSW Government information locator system or equivalent;

- extend the methodologies for designing and implementing recordkeeping systems to agency electronic systems and the appraisal of conventional records;

- take a strategic approach to the application of resources for identifying electronic State archives;

- modify the role of the Archives Authority in authorising records disposal to meet the requirements of the proposed strategies and methods; and

- adopt the distributed custody model for electronic State archives, with the agency migrating electronic records to successive hardware and software environments.[56]

With regard to this last element, *Documenting the Future* noted that 'the distributed custody model does not involve the archives institution abandoning responsibility for electronic records of continuing value. It is better seen as an extension of "approved place of deposit" arrangements which already exist in some archival jurisdictions, whereby agencies may keep physical custody of records'.[57] The proposal recognised the problem of defunct agencies and the need to explore alternative custodial models. It is not simply a question of 'in the agency or in the archives?'.

Many of these strategies were to be supported by new State records legislation, the drafting of which was being finalised at the time of writing. The draft bill, among a wide range of important reforms, provides a statutory basis for the flexible and pragmatic application of a distributed custody model which is not limited to electronic records.

Conclusion

Our own experience, based on years of working with electronic records and data, physically and strategically, is that quite simply archival institutions alone *cannot* preserve electronic records of value. Where records are does not matter so long as they are appropriately created and the valuable are preserved (as authentic evidence of transactions) and remain accessible and the rest are appropriately destroyed when they cease to have administrative value.

As we have shown in this article, the ideas and strategies are there. The challenge is for us all to work together and get on with the job, rather than indulging in academic debates.

Records as atoms are a phenomena of earlier ages; records as bits are a phenomenon of the information age. Living in a digital world is what we have to come to terms with. Records are increasingly not material but intangible, not physical but metaphysical. Archivists and archives institutions must meet the challenges of life in a digital world or not survive as credible players in the recordkeeping and information world. What matters ultimately is not where the records are but being able to retrieve them when required now and into the future.

Endnotes

1.   Leary's Health update at http://www.leary.com:8081/health.html provided realtime details of his condition up to and including the moment of his death from cancer earlier this year.
2.   Nicholas Negroponte, *Being Digital*, Hodder and Stoughton, 1995, pp. 14 onwards.

3. Atoms being the building blocks for all life forms, Bits being the binary building blocks of all computerised transactions.

4. Australian Archives, *Managing Electronic Records: a Shared Responsibility*, March 1995, p. 5; Archives Authority of New South Wales, *Documenting the Future: Policy and Strategies for Electronic Recordkeeping in the New South Wales Public Sector*, July 1995, p. 22; Australian Archives, *Keeping Electronic Records: Policy for Electronic Recordkeeping in the Commonwealth Government*, September 1995, pp. 11–12.

5. Assuming that recordkeeping is built into electronic information systems and business processes to ensure that electronic records are indeed generated and captured to meet identified recordkeeping requirements in the first place, which is another matter.

6. Described in David Bearman, *Electronic Evidence: Strategies for Managing Records in Contemporary Organizations*, Archives and Museum Informatics, Pittsburgh, 1994 and discussed in *Documenting the Future*, pp. 37–38 and *Keeping Electronic Records*, p. 28.

7. *Documenting the Future*, p. 37.

8. Discussed, for example, by Chris Hurley and Ricky Tuck in 'PRO Victoria—Help Wanted', *Electronic Records Special Interest Group Newsletter*, November 1995, pp. 1–4.

9. Discussed in *Keeping Electronic Records* at pp. 15–19 and *Documenting the Future*, pp. 50–52.

10. David Bearman, 'Item Level Control and Electronic Recordkeeping', paper presented at the Society of American Archivists Annual Meeting, 29 August 1996. The *metadata encapsulated object* and the associated reference model for business acceptable communications are described in Bearman's 'Towards a Reference Model for Business Acceptable Communications' and 'Virtual Archives', both appearing in Richard Cox (ed.), *Recordkeeping Functional Requirements Project: Reports and Working Papers—Progress Report Two*, University of Pittsburgh, March 1995.

11. Ernst and Young, *Keeping Electronic Records Forever*, a report commissioned by the Public Record Office of Victoria, September, 1996.

12. Luciana Duranti, 'Reliability and Authenticity: The Concepts and Their Implications', *Archivaria*, no. 35, Spring 1995, p. 7.

13. Australian Standard AS 4390, *Records Management, Part 3: Strategies*, Clause 5.3 (vii).

14. Discussed in *Keeping Electronic Records* at pp. 17–18; *Documenting the Future* at pp. 25–26; and in many other sources.

15. *Evidence Act* (Commonwealth), no. 2 of 1995; *Evidence Act* (New South Wales), no. 25 of 1995.

16. For a an excellent coverage of this issue see Department of Premier and Cabinet Information Strategy Unit, *Guidelines for the Legal Acceptability of Electronic Records* (Draft) Hobart, September 1996.

17. Frank Upward, 'Structuring the Records Continuum; Part One: Post-custodial principles and properties', elsewhere in this issue.

18. From the 1960s to the mid-1980s electronic records were referred to as machine-readable records. For the sake of clarity we will only use electronic records in this article.

19. Charles Dollar, 'Machine-Readable Records of the Federal Government and the National Archives', in *Archivists and Machine-Readable Records; proceedings of the Conference on Archival Management of Machine-Readable Records, February 7–10 1979*, eds Carolyn Geda et. al., Society of American Archivists, Chicago, 1980, p. 79.

20. G. J. Rosenkrantz, 'Machine-Readable Archives: United States Experience 1968–1974', in *Proceedings of an International Seminar on Automatic Data Processing in Archives*, London, 1974, pp. 136–53.

21. G. B. Davis, *Introduction to Computers*, Third Edition, McGraw-Hill International, 1981, pp. 9–10.

22. The Advisory Committee for Coordination of Information Systems, *Management of Electronic Records: Issues and Guidelines*, United Nations, New York, 1990, pp. 20–21. (Incidentally, why is voice mail captured in an e-mail system for potential record purposes, but not telephone conversations or video conferencing? They are all transactions and all transmitted via the same technology. What if they were?)

23. The ICA Electronic Records Committee, *Survey of Archival Institutions*, 1995.

24. F. Gerald Ham, 'Archival Strategies for the Post-Custodial Era', *American Archivist*, vol. 44, no. 3, Summer 1981, pp. 207–216.

25. Christine Nougaret, 'The Impact of Information Technology on Archives and Archival Work', *4th Plenary Session Principal Paper, XIII International Conference on Archives: Beijing 1996*, p. 8. (The more immediate source is Prof. E. Califano, 'L'Introduction et L'Adaptation des Moyens Mécanographiques aux Archives', Actes Du V Congrès International Des Archives, Bruxelles, 1–5 Septembre, 1964, in *Archivum*, vol. xiv, 1968, pp. 147–156.)

26. Frank Upward, 'Institutionalising the Archival Document', in *Archival Documents: Providing Accountability Through Recordkeeping*, eds Sue McKemmish and Frank Upward, Ancora Press, Melbourne, 1993, p. 43.

27. For example see Ian Maclean, 'Australian Experience in Records and Archives Management', *American Archivists*, vol. 22, no. 4, October 1959, pp. 387–418.

28. Upward, op. cit., pp. 44–45.

29. See in particular, Frank Upward and Sue McKemmish, 'Somewhere Beyond Custody', *Archives and Manuscripts*, vol. 22, no. 1, 1994, pp. 136–149 and McKemmish, Upward and Bearman, 'A Simple Shared Goal for Post-custodial Archivists and Records Managers', Section iv in McKemmish and Upward, op. cit., pp. 213–29.

30. The States, by and large, more strictly followed the institutional model and practice of the PRO London, whereas the Commonwealth drew inspiration from the North American practice.

31. See Frank Upward, 'In Search of the Continuum: Ian Maclean's "Australian Experience" Essays on Recordkeeping', in *The Records Continuum: Ian Maclean and Australian Archives first Fifty Years*, eds Sue McKemmish and Michael Piggott, Ancora Press, Melbourne, 1994, pp. 110–30.

32. Commonwealth Public Service Board, *Handbook for Departmental Registrars*, Canberra Australia, c. 1964, p. 2. While no author is identified, the Handbook gives particular acknowledgment to Ian Maclean (Chief Archivist, Commonwealth Archives Office) and R. Saunderson (Departmental Registrar, Department of Labour and National Service) for their contributions.

33. For details of the development of the disposal function see Greg O'Shea, 'The Medium is not the Message: appraisal of electronic records by Australian Archives', *Archives and Manuscripts*, vol. 22, no. 1, pp. 68–93.

34. See Mark Wagland and Russell Kelly, 'The Series System a Revolution in Archival Control', in *The Records Continuum*, p. 147.

35. P. J. Scott, 'The Record Group Concept: a Case for Abandonment', *American Archivist*, vol. 29, October 1966, pp. 493–504. In practice this also extended to many series which straddled agency and archival custody.

36. There is no truly national archives in Australia in the sense of the National Archives of Canada. From its inception as the Archives Division of the National Library in the late 1940s, the Australian Archives has not been the sole final custodian for Commonwealth Government records. The Australian War Memorial (established after the First World War) has responsibility for records generated by Defence forces in wars and warlike operations. Other institutions within the Commonwealth sector, such as the Reserve Bank and the CSIRO, have maintained archival collections. In addition archival legislation at the Commonwealth and State levels allows for records to be housed by institutions other than the archives in question (e.g. see s. 63 and 64 *Archives Act 1983*).

37. Upward and McKemmish, 'Somewhere Beyond Custody', p. 138.

38. The ICA Electronic Records Committee, *Survey of Archival Institutions*, 1995 leads us to this inescapable conclusion. On a more positive note *Corporate Memory in the Electronic Age: a Statement of a Common Position on Electronic Recordkeeping* produced by the Australian Council of Archives in October 1995 and released in May 1996, with the involvement of a wide representation of Australian institutions and industry representatives, provides us with some hope that this will not continue to be the case.

39. These arguments abound in recent archival literature. Two relevant citations are: David Bearman, 'An Indefensible Bastion: Archives as a Repository in the Electronic Age', and Margaret Hedstrom, 'Archives: To Be Or Not To Be: A Commentary' in *Archives and Museum Informatics Technical Report*, no.13, 1991. For a detailed look at the regime in the US prior to 1993 see Richard Cox, *The First Generation of Electronic Records Archivists in the United States: a study in professionalization*, Howarth Press, New York, 1994.

40. The Special Media Project Unit, *A Strategic Plan for Managing and Preserving Electronic Records in New York State Government*, New York State Government, NY, 1988, pp. vi–vii.

41. See United Nations Advisory Committee for the Coordination of Information Systems, *Management of Electronic Records: Issues and Guidelines*, NY, 1990.

42. See H. A. Naugler, 'The Machine-Readable Archives Program at the Public Archives of Canada: the First Five Years' in *Archivists and Machine-Readable Records; proceedings of the Conference on Archival Management of Machine-Readable Records, February 7–10 1979*, eds Carolyn Geda et. al., Society of American Archivists, Chicago, 1980.

43. The NAC learned valuable lessons prior to this point during the Information Management and Office Systems Advancement (IMOSA) Project beginning in 1989. The significance of the project from the viewpoint of this article is that it was conducted in a 'live' information management environment. The team reached two interesting conclusions which are worth repeating here. The first that 'archival considerations can be addressed successfully only if they are considered in tandem with the information management considerations of creating organisations...the successful archival program will be the one that incorporates its appraisal, acquisition, and preservation requirements into the corporate memory management of the organisation'. Secondly, they concluded that a re-examination of existing approaches

was necessary as traditional approaches were no longer adequate in an office systems environment. John McDonald writing in commentary on the project underlines this when he suggests that, 'in fact , the distinction between archival and corporate memory requirements is difficult, if not impossible to identify'. See John McDonald, 'Managing Information in an office Systems Environment: the IMOSA Project', *American Archivist*, vol. 58, no. 2, Spring 1995, pp. 142–53.

44.   Terry Cook, 'Leaving Archival Electronic Records in Institutions: policy and monitoring arrangements at the National Archives of Canada', in *Archives and Museum Informatics*, vol. 9, no. 2, 1995, pp. 141–49.

45.   For example, see Richard Cox, op. cit., pp. 36–38.

46.   Of course this was only after external pressure was brought to bear to ensure the records were preserved in the first place. Far from being the bastions of democracy the PROFS case provides striking proof that archival institutions are no more immune to political interference than any other. For an excellent read see Tom Blanton, *White House e-mail*, The National Security Archive, The New Press, New York, 1995.

47.   National Archives and Records Administration, *Ready Access to Essential Evidence: The Strategic Plan of the National Archives and Records Administration, 1997–2007*. See http://www.nara.gov/nara/vision/naraplan.html.

48.   PIVOT/Rijkarchiefdienst, *Van de vernietiging van archiefbescheiden naar de selectie van handelingen*, Den Hagg, 1992.

49.   Rijksarchiefdienst, *Documenten uit de tijd (Documents out of time). Behoud en beheer van digitale informatie*, Den Haag, 1993, and T. K. Bikson and E. J. Frinking, *Preserving the Present: toward viable Electronic Records*, The Hague, 1993.

50.   Rijksarchiefdienst, *Het papieren tijdperk voorbij (Beyond the paper era): beleid voor een digitaal geheugen van onze samenleving*, Sdu Uitgeverij Plantijnstraat, Den Haag, 1995.

51.   S. J. Stuckey, 'The Good Oil for Australia' in *Keeping Data: papers from a workshop on Appraising Computer-based records, 10–12 October 1990*, eds B. Reed and D. Roberts, ACA/ASA Inc, 1991, pp. 95–104.

52.   It is interesting to note that these conclusions were reached before the Internet revolution. At the time many questions were raised about how it all might work and what form this distributed networked access might take. Early this year the Australian Archives launched its public electronic finding aid onto the Internet. What a difference a few years makes.

53.   Australian Archives, *Preserve Your Valuable Electronic Records: A Paper on Electronic Records Management in Commonwealth Agencies* (Internal report), Canberra, November 1994, p. 65.

54.   The Archives has the technological capability to actively manage relatively modest volumes of electronic records in custody. As part of the current upgrade and re-engineering of the Archives' functional applications and technological platforms, the organisation will have an enhanced ability to manage this process. In addition, the new platform is being designed to interact with agency electronic systems.

55.   Australian Archives, *Managing Electronic Records: a shared responsibility*, Canberra March, 1995 and *Keeping Electronic Records: policy for electronic recordkeeping in the Commonwealth Government*, Canberra, September, 1995.

56.   The Archives Authority of NSW, *Documenting the Future: Policy and Strategies for Electronic Recordkeeping in the New South Wales Public Sector*, Sydney, July 1995.

57.   ibid, p. 50.