Association of Canadian Archivists Institute 2002: Approaches to the Preservation of Electronic Records

Archivists have been aware of the preservation challenges posed by electronic records for a number of years. We have watched the progress of international research teams tackling important theoretical aspects of electronic records management, and, more recently have seen a number of reports beginning to conclude on aspects of preservation. Yet many archivists remain unsure of how to proceed. There is a need for translation between research findings, their theoretical implications and the best practices for working archivists. The archival community represents diverse institutions with diverse circumstances in terms of resources, expertise, infrastructure, and the receptiveness of parent organizations to support solutions for the preservation of electronic records. The 2002 ACA Institute will aim to address the gap between research and practice by introducing participants to the most important and relevant research findings, and equipping participants to address their own circumstances in terms of policy needs and best practices.

Institute participants will gain familiarity, through the perspectives of experts, with the state of the most important international research on electronic records preservation, and will understand the implications of research findings on their own situations. They will come away with the tools to approach electronic records preservation policy-making in their own institutions. The model of the business case study will be adapted to provide archivists with a plausible scenario around which to discuss the perspectives of Institute leaders.

The Institute Leaders

Wendy Duff is an assistant professor at the University of Toronto, Faculty of Information Studies. She received her PhD from the University of Pittsburgh. Her primary research interests are user studies, archival description, and electronic records. She has written numerous articles on the access to archival material, information seeking behaviour of archival users, various aspects of archival description, and electronic records. She has served as a member of the ICA Adhoc Commission on Descriptive Standards, the Encoded Archival Description Working Group, and chair of the Canadian Committee on Descriptive Standards. She is presently a member of the Archiving Metadata Forum and the Encoded Archival Context Working Group. She was co-investigator for a digitization and access project: Usage analysis funded by the Andrew W. Mellon Foundation. She has recently received grants from the Social Sciences Humanities and Research Council of Canada and the Delmas Foundation to investigate the use of archival material by scholars, how scholars evaluate the authenticity of documents, and how archival users find information, and the use of archival description in the scholarly process.

Hans Hofman is currently senior advisor for the government program 'Digital Longevity' concerning information management at the Ministry of the Interior in the Netherlands.

This program, also initiated by the ministry of Education, Culture and Science, has the objective to establish policies for electronic record keeping within government. On the international scene, he has served since 1993 as a member of the Committee on Records in an Electronic Environment (CREE) of the International Council on Archives, member of the DLM-Monitoring Group within the European Union (since 1996), co-investigator and representative of the National Archives of the Netherlands in the InterPARES research project, and co-director of the recently-initiated European project ERPANET (Electronic Resource Preservation and Access Network) on digital preservation. Since 2000, he has represented the Netherlands in the TC46/SC11 for developing the ISO RM standard 15489. He is liaised with the Dutch Archives School in the area of management of electronic records.

Anne Van Camp is currently Manager of Member Initiatives for the Research Libraries Group, Inc. (RLG), an international consortium of over 160 major research institutions. Her primary responsibility includes working with archives, museums and special collections on issues of access, preservation and digitization. Prior to joining RLG, she was director of the Archives of the Hoover Institution at Stanford University for 8 years. Before that she was Vice President for Information Services at the Chase Manhattan Bank in New York. A fellow of the Society of American Archivists, she remains active in archival professional activities both nationally and internationally.

Reading List

Many of the readings on this page are in PDF format. You will require Adobe Acrobat Reader®, which may be downloaded free of charge from the Adobe website by following this link: http://www.adobe.com/products/acrobat/readstep2.html

Links are designed to open a new window in your browser. To return to this page, please close the new window.

Background – describing the Problem

- Maggie Jones and Neil Beagrie, *Preservation Management of Digital Materials: Workbook*. Pre-Publication Draft (October 2000): http://www.jisc.ac.uk/dner/preservation/workbook/workbook.pdf. We are awaiting availability of the final version.

- InterPARES Project. *Draft Final Report*. http://www.interpares.org/documents/ptf_draft_final_report.pdf. Concentrate on pp. 81-117, which explains the problem of digital preservation.

- Margaret Hedstrom, *Digital Preservation: Problems and Prospects* (2001) http://www.si.umich.edu/CAMILEON/camileon%20Presentations/margaretpresentation.pdf

For Browsing

- Gail M. Hodge, "Best practices for digital archiving. An information life cycle approach", *D-Lib Magazine,* January 2000, www.dlib.org/dlib/january00/01hodge.html

- Victorian Electronic Records Strategy [VERS]. *Online Toolkit*. (last updated 19 Mar 2002). http://vers.imagineering.net.au/site-ver2/

- PADI (Preserving Access to Digital Information) website. www.nla.gov.au/padi

- Public Records Office (United Kingdom), "Standards and Guidance". http://www.pro.gov.uk/recordsmanagement/standards/default.htm

- AIIM: Digital Preservation. http://www.digitalpreservation.org/

Sample policies and guidelines

Please read the policies most relevant to your type of archives. Municipal government archivists should note that several U.S. state policies extend to city governments. Sample policies were unavailable for museum and corporate archives.

Federal Government

- Public Records Office, "Corporate policy on electronic records" (September, 2000) http://www.pro.gov.uk/recordsmanagement/eros/RMCorpPol.pdf

- National Archives of Australia, "Electronic Records: Impact of the Digital Age" (2001?). http://www.naa.gov.au/recordkeeping/er/summary.html

- Natural Resources Canada, "NRCan Guidelines on Managing Electronic Mail Messages", http://www.nrcan-rncan.gc.ca/em-ce/email-e.htm

- Public Record Office, Victoria, "Email as Records: Advice to Victorian Government Agencies" Information Sheet 3 (January 2002) http://www.prov.vic.gov.au/publns/PROVRMadvice3.pdf

- United States National Archives Records Administration, "Records Management Guidance for Agencies Implementing Electronic Signature Technologies" (October 18, 2000) http://www.nara.gov/records/policy/gpea.html

State / Provincial Government

- Kansas State Historical Society, "Kansas Electronic Records Management Guidelines" (2001). http://www.kshs.org/archives/ermguide.htm

- Mississippi Department of Archives and History, "Electronic Records Draft Guideline" (n.d.). http://www.mdah.state.ms.us/arlib/erglnav.html

- British Columbia Archives, "Managing Government E-mail." http://www.bcarchives.gov.bc.ca/infomgmt/eimgmt/email.htm

- British Columbia Archives, "Computer System Electronic Backup Records (schedule 112910)" (July 2001). http://www.bcarchives.gov.bc.ca/arcs/special/spec10.htm

- Missouri Records Management Office, "Electronic Records Administration" (September 1998). http://www.system.missouri.edu/uminfo/bpm/911.htm

- Texas State Library and Archives Commission, "Electronic Records Standards and Procedures: State Agency Bulletin Number One" (December 2000). http://www.tsl.state.tx.us/slrm/recordspubs/stbull01.html

- Ohio Department of Administrative Services, "Electronic Records" (May 1999). http://www.state.oh.us/das/dcs/opp/pdfs_policy/ITP%20E.30.pdf

University

- University Archivists Group (UAG), Committee on Institutional Cooperation. "Standards for an Electronic Records Policy." http://www-personal.umich.edu/~deromedi/CIC/cic4.doc

- Queensland University of Technology, "Electronic Records Policy" (n.d.). http://www.qut.edu.au/admin/mopp/F/F_08_02.html

Costing

Essential Reading

- Stewart Granger, Kelly Russell and Ellis Weinberger, "Archive Models, Cost Elements & Strategies for Digital Preservation" (October 2000). http://www.si.umich.edu/CAMILEON/Emulation%20papers%20and%20publications/Cost_Elements.doc

- Kevin Ashley, "Digital Archive Costs: Facts and Fallacies" (1999). http://europa.eu.int/ISPO/dlm/fulltext/full_ashl_en.htm

- Cedars Guide to Digital Collection Management Section 5.0 Costs, Processes and People (March 2002). (http://www.leeds.ac.uk/cedars/guideto/collmanagement/guidetocolman.pdf)

Research

For Browsing

- CAMiLEON project website: http://www.si.umich.edu/CAMILEON/

- InterPARES project website: http://www.interpares.org/

- Dutch Digital Longevity Program:
  http://www.digitaleduurzaamheid.nl/index.cfm?paginakeuze=181&categorie=2

- Cedars project website: http://www.leeds.ac.uk/cedars/

Position Papers and Standards

- Thom Shepard and Dave MacCarn, "The Universal Preservation Format: A
  Recommended Process for Archiving Media and Electronic Records" (n.d.).
  http://info.wgbh.org/upf/pdfs/991231_UPF_RP.pdf

- Bendert Feenstra, IBM, *Standards for the Implementation of a Deposit System for
  Electronic Publications (DSEP)*. Den Haag : Koninklijke Bibliotheek, 2000 -
  (NEDLIB Report series ; 4).
  http://www.kb.nl/coop/nedlib/results/dsepstandards.pdf

Skim:

- Public Record Office, Victoria, "PROS 99/007 Standard for the Management of
  Electronic Records" (1999).
  http://www.prov.vic.gov.au/vers/standards/pros9907.htm

Open Archival Information System (OAIS)

- D. Holdsworth & D.M. Sergeant, "A blueprint for representing information in the
  OAIS model", CEDARS project 2001
  http://www.personal.leeds.ac.uk/~ecldh/cedars/ieee00.html

- "NEDLIB Contribution to the Review of OAIS: Applying the OAIS Reference
  Model to the Deposit System for Electronic Publications (DSEP)" (June 2000).
  http://www.kb.nl/coop/nedlib/results/OAISreviewbyNEDLIB.html

Skim:

- Consultative Committee for Space Data Systems, "Draft Recommendation for
  Space Data System Standards. Reference Model for an Open Archival
  Information System (OAIS). CCSDS 650.0-R-2. Red Book" (July 2001).
  http://www.ccsds.org/documents/pdf/CCSDS-650.0-R-2.pdf

Metadata

Essential Reading

- Anne Gilliland-Swetland, "Setting the Stage" in *Introduction to Metadata: Pathways to Digital Information*, (last updated 7/5/2000). Getty Research Institute.
  http://www.getty.edu/research/institute/standards/intrometadata/pdf/swetland.pdf

- The Cedars Project, "Cedars Guide to Preservation Metadata" (March 26, 2002).
  http://www.leeds.ac.uk/cedars/guideto/metadata/guidetometadata.pdf

- RLG Working Group, "Preservation Issues of Metadata" (May 1998).
  http://www.rlg.org/preserv/presmeta.html

Further Reading

- Stewart Granger, "Metadata and digital preservation: a plea for cross-interest collaboration", 2001 http://dspace.dial.pipex.com/stewartg/metpres.html

- Indiana Geographic Information Council, "Metadata Standard" (Approved June 20, 2001).
  http://www.in.gov/ingisi/metadata/Metadata%20Standard_Approved.PDF

- Adrian Cunningham, "Six Degrees of Separation: Australian Metadata Initiatives and Their Relationships with International Standards," *Archival Science* Vol. 1, No 3 (2001). http://www.kluweronline.com/issn/1389-0166/current

- Catherine Lupovici and Julien Masanès, Bibliothèque Nationale de France. "Metadata for Long Term Preservation" - Den Haag : Koninklijke Bibliotheek, 2000. - (NEDLIB Report series ; 2)
  http://www.kb.nl/coop/nedlib/results/preservationmetadata.pdf

For Browsing

- Archiving Metadata Forum. http://www.archiefschool.nl/amf/sem2000.htm

- Library of Congress, "Metadata Encoding and Transmission Standard (METS)."
  http://www.loc.gov/standards/mets/

- Kenneth Thibodeau, Reagan Moore, and Chitanya Baur, "Persistent Object Preservation: Advanced computing Infrastructure for digital preservation," in *European Citizens and Electronic Information: the Memory of the Information Society. Proceedings of the DLM-Forum on Electronic Records*. Brussels, 18-19 October 1999, 113-118. http://europa.eu.int/ISPO/dlm/fulltext/full_thib_en.htm

Strategies

General

- Ross Gibbs and Justine Heazlewood, "Electronic Records – Problem Solved?: the Victorian Electronic Records Strategy and the future of electronic record keeping in Victoria," in *Books and Bytes: Technologies for the Hybrid Library.* VALA 2000, 16-18 February 2000.
  http://www.prov.vic.gov.au/vers/published/vp000218.pdf

- Margaret Hedstrom and Clifford Lampe, "Emulation vs. Migration: Do Users Care?" *RLG DigiNews* 5 (December 2001).
  http://www.rlg.org/preserv/diginews/diginews5-6.html#feature1

- Clifford Lynch, "Canonicalization: A Fundamental Tool to Facilitate Preservation and Management of Digital Information," *DLib Magazine* 5 (September 1999).
  http://www.dlib.org/dlib/september99/09lynch.html

For Browsing

- Public Record Office, Victoria. *Victorian Electronic Records Strategy Final Report.* http://www.prov.vic.gov.au/vers/published/final/finaltoc.htm

Emulation and the Universal Virtual Computer

- David Holdsworth and Paul Wheatley, "Emulation, Preservation, and Abstraction," *RLG DigiNews* 5 (August 2001).
  http://www.ohio.rlg.org/preserv/diginews/diginews5-4.html#feature2

- Jeff Rothenberg, "Using emulation to preserve digital documents, The Hague, Royal Library of the Netherlands", July 2000.
  http://www.kb.nl/kb/pr/fonds/emulation/usingemulation.pdf

- Raymond A. Lorie, "A project on preservation of digital data", *RLG DigiNews* Vol.5, no.3 (June 2001) www.rlg.org/preserv/diginews/diginews5-3.html

Further Reading

- Kees van der Meer et al, "Emulation and conversion: Organisational and Architectural Overview of an Electronic Archive" (2001).
  http://www.library.tudelft.nl/e-archive/Documenten/Resultaten/reportone13.pdf

- *IBM / KB Joint study on Long Term Preservation* (on the website of the Koninklijke Bibliotheek - National Library of the Netherlands)
  http://www.kb.nl/kb/resources/frameset_kb.html?/kb/ict/dea/ltp/jointstudy/intro.html

Migration

- Digital Preservation Testbed, "White Paper, Migration: Context and Current Status" (December 2001). http://www.digitaleduurzaamheid.nl/bibliotheek/Migration.pdf

- David Bearman, **"**Reality and Chimeras in the Preservation of Electronic Records," *D-Lib Magazine*, Vol. 5 No. 4 (April 1999). http://www.dlib.org/dlib/april99/bearman/04bearman.html

XML

- Reagan Moore et al, "Collection-Based Persistent Digital Archives," *D-Lib Magazine* (March 2000 and April 2000).

  Part 1: http://www.dlib.org/dlib/march00/moore/03moore-pt1.html

  Part 2: http://www.dlib.org/dlib/april00/moore/04moore-pt2.html

For Browsing

- The CAMiLEON project website: http://www.si.umich.edu/CAMILEON/index.htm?http://www.si.umich.edu/CAMILEON/about.htm~mainFrame

Authenticity

Essential Reading

- Research Libraries Group, "Trusted Digital Repositories: Attributes and Responsibilities" (May 2002), http://www.rlg.org/longterm/repositories.pdf [*At time of posting, this link was expected to be live very soon. If you experience any difficulties in accessing it, you can still consult the* Draft for Public Comment, August 2001, available at http://www.rlg.org/longterm/attributes01.pdf]

- Kevin Ashley, "I'm me and you're you but is that that?" http://www.rlg.org/events/pres-2000/ashley.html

Further Reading

- Heather MacNeil, "Conceptualizing an Authentic Electronic Record" http://www.interpares.org/documents/hm_saa_2000.pdf

- InterPARES Project, *Authenticity Task Force Final Report* (DRAFT 2001). http://www.interpares.org/documents/atf_draft_final_report.pdf

- Nancy Brodie, "Authenticity, Preservation and Access in Digital Collections" in *Preservation 2000: An International Conference on the Preservation and Long Term Accessibility of Digital Material*s. http://www.rlg.org/events/pres-2000/brodie.html

File Formats

- John Mark Ockerbloom, "Archiving and Preserving PDF Files," *RLG DigiNews* vol. 5, no. 1 (February 15 2001). http://www.rlg.org/preserv/diginews/diginews5-1.html#feature2

- Gregory W. Lawrence, William R. Kehoe, Oya Y. Rieger, William H. Walters, Anne R. Kenney, *Risk management of digital information: a file format investigation*, Washington D.C., June 2000 http://www.clir.org/pubs/reports/pub93/contents.html

Collaboration

- Hillary Berthon et al, "Safekeeping : A Cooperative Approach to Building a Digital Preservation Resource," *D-Lib Magazine*, vol. 8 no. 1 (January 2002). http://www.dlib.org/dlib/january02/berthon/01berthon.html

- Stewart Granger, "Digital Preservation and Deep Infrastructure," *D-Lib Magazine,* vol. 8 no. 2 (February 2002). http://www.dlib.org/dlib/february02/granger/02granger.html

Requests For Proposals

For Browsing

- B.C. Ministry of Management Services, "Request for Proposal: Enterprise Document and Records" (October 2001). http://www.bcarchives.gov.bc.ca/infomgmt/eimgmt/edmsrfp.pdf

Approaches to the Preservation of Electronic Records
ACA Institute 2002

Introduction
The Association of Canadian Archivist's 2002 Institute addressed the issue of
Approaches to the Preservation of Electronic Records. This topic was of obvious
interest, with 29 participants from a wide range of institutions. Municipal, University,
Corporate, Government and other Archives were all represented in a diverse group
that enabled a good exchange of experiences, while also meaning that individuals
could explore the issues with colleagues working in similar environments.

The three presenters brought a depth of knowledge and range of experiences. Wendy
Duff of the University of Toronto, Hans Hofman of the Netherlands National
Archives, and Anne van Camp of the Research Libraries Group (RLG) provided
complementary insights into the field of digital preservation. Their presentations
covered a range of theoretical and practical projects dealing with the issues. The
influential InterPARES and Open Archival Information System (OAIS) models were
explained in overview and provided a high-level framework for subsequent
discussions. Key strategies of migration and emulation were outlined, along with
emerging thinking around the potential of the Universal Virtual Computer (UVC)
concept. Hans Hofman presented the experiences of the Dutch Testbed project and
other initiatives of the Netherlands' National Archives, and Anne van Camp described
the recent work of the Research Libraries Group, set out in their report *Trusted
Digital Repositories: Attributes and Responsibilities*
<http://www.rlg.org/longterm/repositories.pdf>.

This report on the Institute will not focus on summarising the material presented by
the instructors. Their presentations are available on the ACA website at
<http://www.archivists.ca/institute/2002/index02.htm>, along with the extensive and
up-to-date reading list which was also published in the May 2002 ACA Bulletin.
Rather, the report will concentrate on capturing the discussion and issues raised by
participants, and venture some commentary on areas explored in the Institute.

The Institute began with participants summarising their situations in respect of
electronic recordkeeping, and hence their need for attending. The organisations
ranged geographically from Nunavut to the Cayman Islands, and in size from the
National Archives to sole-charge archives, with a greater concentration of participants
from smaller institutions. This may represent a greater reliance on opportunities such
as the Association's Institutes for archivists in the smaller organisations to engage
with "big" professional issues, where staff of large public archives may be in a
position to explore such debate in-house. Despite the range of backgrounds, it was
clear that the need to be able to respond effectively as archives programmes to the
challenges of electronic records was a real and immediate concern for all institutions.
The preservation of electronic records is no longer a situation that can be put off as
one we will be facing soon, but is a challenge that has arrived in our archives as an
operational reality. Participants from all types of archives spoke of the diverse
electronic systems – Electronic Document Management (EDM), databases, legacy
systems, web applications and many others – which are presently confronting them
with preservation and other archives management issues.

Overall, however, there was a positive tone to the comments. One participant challenged us to see opportunities not problems, and argued that electronic recordkeeping provided a rare chance to re-assert the relevance of archives and records for organisations. The professional skills of the archivist can be applied to address matters that are of pressing concern to both business and government bodies. The presenters shared this enthusiasm, and suggested that this was the best time to be involved in the electronic recordkeeping field, when there is now a good body of existing knowledge, but the conclusions are still very much "work in progress".

Several people noted the large amount of material emerging from research programmes and – increasingly – from implementation projects around the world. The reading list highlighted to many participants the difficulty of keeping abreast of developments. Even those who have a job focus on electronic recordkeeping matters noted that keeping up-to-date is hard. A particular issue is the degree to which we may be unaware of overseas developments, especially those in different language communities. The participation of Hans Hofman was therefore of value in reminding us of work being carried out in Europe. Similarly, the international membership of InterPARES helps us avoid the potential fragmentation of research efforts.

Current Situation
It was interesting to reflect on how the expectations, experiences, and objectives of participants at the Institute are themselves an indication of the progress that recordkeepers have made in engaging with these issues over recent years.

First, there was not, in general, a need to get recognition in the workplace of the relevance of recordkeepers to questions of electronic preservation and even electronic business. Rather, several were in the position where their IT or IS colleagues were seeking (or even expecting) help from archives and records professionals to address presenting problems. Where participants indicated they were attending in the hope of "getting answers", they may not actually expect simple answers, but perhaps are echoing the questions being asked of them. While it is challenging to be so confronted, this also represents significant progress both in terms of wider recognition of the issues, and of archivists' involvement in the solutions.

Second, it appears that focus of the debate has shifted from technology to policy. Most people spoke of the existence (or lack) of corporate policy for dealing with electronic recordkeeping in their organisations. This development may reflect the rapid pace of technological change, and the recognition that any successful strategy will have to be applicable across multiple technology platforms. It may also reflect an increased level of technical knowledge in the archives and records community – though this remains an issue.

Third, the use of technology was clearly very pervasive in business practice. EDM as a driver for recordkeeping involvement in what would once have been seen as IT matters was a recurrent theme, and in government at all levels the e-government agenda is driving increased use of technology in service delivery. Electronic systems are now part of mainstream business practice, and by implication, electronic records management needs to be part of our mainstream professional practice.

Participants' levels of personal experience with electronic records mirrored the varying levels of institutional experience. Some had been dealing with electronic records in their archives programs for some time. Most had been exposed to the issues through the professional literature, but were limited in their practical experience to involvement with technology as a record-creator. Some were relatively new to the field, and eager to catch up quickly.

The Institute format was well suited to knowledge sharing between participants, as well as learning from the presenters. There were several comments that the war stories of colleagues were particularly valuable in grappling with the practical implementation of electronic preservation programs – as well as providing reassurance that no one is confronting these issues in isolation. One of the benefits of attending an Institute is the building of networks to provide support when dealing with future practical situations.

Institute format
All presenters covered briefly the key challenges of preserving reliable and authentic electronic records, but this was background, introductory material. No longer do our presentations focus on the problem, but on experiences in dealing with it. Indeed, a strength of the Institute was its delivery of material discussing implementation strategies and the implications of different approaches. Both emulation and migration strategies were explained, along with their comparative strengths and weaknesses. A key point made was that all migration involves some loss. A variation on emulation is emerging in thinking around the "Universal Virtual Computer". That new models like this can emerge is a reminder – as one participant pointed out – that as technologists turn their minds to related issues, approaches other than migration and emulation may well emerge.

The presenters aimed to encourage participation and discussion – electronic recordkeeping is not a field in which there is a "right answer" to be taught, but one in which exploration and debate is necessary. There was regular opportunity to question and clarify points from the presentations. Clarification often involved points of language. One of the barriers to effective participation by archivists in electronic systems debates can be the technical jargon used by information technologists, and similarly our own technical terms can prevent others understanding the messages we are trying to convey. Archivists must be prepared to learn the language of IT professionals in order to both understand the situations confronting us, and obtain the support needed to effectively respond to them.

Two group activities were facilitated to provide a chance for participants to apply the ideas being presented to practical situations. Perhaps more importantly, these sessions were structured to encourage discussion between people operating in similar environments. Groups were formed of participants from: large government archives (national and large provincial institutions); small government archives (territories and small provinces); business archives; university archives; municipal archives; and archives affiliated with museums and art galleries. This approach ensured that discussions could be based on common assumptions about the operational conditions. The underlying technical issues are common across all environments (e-mail has the same structure whether used by a single individual or a national government), but the group discussions highlighted the way in which responses will reflect the corporate

culture, scale and focus of the particular organisation. Small collecting archives are confronted with very different electronic records than Government archives or large corporations, and each will have different resources at its disposal to address the issues. A few key characteristics emerged in each group that will determine the appropriate choice of tactics for the particular environment, but equally it was interesting to consider which observations were common across all groups.

Differing environments
Large government archives had typically already been involved in digital archives issues in a concrete way for some time. For these institutions, some of the key questions include the scalability of approaches, and the integration with wider e-government agendas. Public archives have the advantage of a statutory mandate for their activities, although the adequacy of the statutory framework to support electronic recordkeeping needs is variable between jurisdictions.

Archivists operating in business environments noted a focus on the bottom line in their organisations, and the challenge of operating with a limited mandate, compared to the statutory basis of government archival programmes. Indeed, one gained the impression that the existence of corporate archives was being constantly questioned. More than in any other group, the preservation of records after their immediate business use ceased was seen here as a cost on the corporation to be justified.

Archivists in museum contexts noted a lack of support and of resources. They also observed confusion in roles as curators grappled with the challenges of managing electronic art within gallery collections.

The environmental influence on the choice of strategy emerged most strongly in the discussion of policy (see below).

E-mail
A first group exercise considered preservation of e-mail. This was designed to help participants understand the InterPARES and Open Archival Information System (OAIS) models by seeking to apply the concepts to a real situation. Authenticity requirements specify the evidence needed to support an assumption of authenticity. A sample e-mail was provided (in hard copy) and groups were asked to consider the authenticity requirements, and related metadata elements.

The choice of e-mail had the benefit of being realistic for all environments, as e-mail is such a widespread format. The exercise may have been even more useful if it had been carried out online, using a real digital e-mail to allow hands-on exploration of the ease (or difficulty) of accessing components of an e-mail other than those typically found in a print-out, of relevant details elsewhere in the environment, and better consideration of the structure of the e-mail message format. Nevertheless, it provided a good catalyst for discussion about the elements of an e-mail which need to be preserved (eg date/time, sender/recipient), and elements which are important but which are not found within the e-mail object (and which therefore need to be added, either manually or automatically). The focus on an individual e-mail message tended to concentrate discussion on the intrinsic aspects of the message that need to be preserved, rather than exploring the external aspects of the technical and administrative systems within which the message is created and managed. One

realisation was the almos t endless range of possible characteristics, and the corresponding debate about which of these were critical. It was also noted that the consideration of a single e-mail may lead to ideas that are not scalable – a true "solution" for e-mail archiving will need to be able to deal with an e-mail system handling huge quantities of e-mail messages. The ability to automate recordkeeping metadata collection will be essential. One of the more complex aspects of dealing with extensive systems is the management of the archival bonds, the links between individual e-mails. Unfortunately, the focus on a single e-mail meant this dimension of the preservation question went largely unexplored.

Electronic Records Policy
The second exercise supported the general interest in policy as a tool for engaging with electronic recordkeeping, involved the development by each group of a model electronic records policy for an organisation of their type. Hans Hofman provided a brief presentation on policy development, in particular the experiences of the Netherlands National Archives. The discussions highlighted both issues common to all sectors, and those peculiar to certain types of archives.

All groups found they confronted almost immediately the relationship of a specific electronic records policy to overall organisational recordkeeping policy. Many of the core principles which groups articulated were of equal importance to recordkeeping in any medium. A widespread view was that an electronic records policy should therefore be developed in conjunction with an overarching policy statement on recordkeeping.

Several groups explored the relationship between the archives and the records management functions. Similarly, questions were raised about the extent to which the archives should be "doing" electronic records itself, or should be working along with business units, and IT units. What role can – and should – the Archives be taking on itself? There was broad agreement that a key role of policy is to formally allocate responsibilities, even though the way these are distributed will depend on the environment and the mandate of the archives. This also raised questions of the authority for the policy. Does the Archives have the appropriate level of authority for the sort of obligations being imposed by the policy? Will policy be effective if it is seen as a tool of the Archives' or should it be issued by the parent organisation (eg the Government, Corporation, or University)?

While policies can be useful tools, it was pointed out that merely issuing a policy does not of itself change behaviour. A key consideration for an effective policy statement is therefore how to make people follow its requirements. A policy should be an instructional and sales document, articulating benefits as well as the actions to be taken. Similalry, consideration should be given to the funding and resourcing of poicy. A policy without adequate resourcing can easily end up as no more than a document on the shelf. The importance placed on policy tools by all participants reflects a change in our professional approaches from an expectation that archivists must directly manage records, to a willingness to work with others towards effective control of records.

Preservation and access

An undercurrent to the entire Institute was the relationship between preservation and access. An effective preservation strategy needs to ensure continued access. A noted above, two broad strategies were explored: migration and emulation. The focus of both of these has shifted from media management to infrastructure management. Media management is now essentially a second-order problem, as practices for the refreshing of media are proven and cost-effective. The more complex issues which remain relate to ensuring the continued accessibility of the record, not just the continued existence of the bit-stream.

Several key concepts were discussed which will shape the further development of strategy and practice. One of these was the idea of significant properties, those properties of a digital object that influence the interpretation, or the authenticity evaluation of it. In other words, what attributes of an object are we trying to preserve: how significant are, for example, the font, page layout, colour, or even the screen resolution or processor speed to the understanding of the record? These considerations shape our preservation strategies, but are also essentially appraisal questions. Significant properties are thus related to authenticity requirements, but include attributes required for purposes other than the inference of authenticity. The e-mail analysis exercise noted that e-mail will be rendered differently to the user in different e-mail applications, an observation that has significant implications for the selection of significant properties to be preserved.

The concept of trusted third parties, as explored in the RLG report *Trusted Digital Repositories: Attributes and Responsibilities,* was also the subject of much discussion. In particular, there was exploration of the need for collaboration, and the different roles which may be played by different institutions. Authenticity is essentially about trust – does the user trust the record to be what it purports to be? Preservation then is about maintaining those attributes needed for that trust. But trust is also about the parties managing the records. Especially in an environment where not every archival programme can have all the capability required for a diverse (and capital intensive) electronic preservation infrastructure, institutions may have to rely on partners to provide aspects of their digital preservation work. How then can trust in these partners be assured? It was further noted that this is not an abdication of custodial responsibility – or at least, no more than is already the case through the use of off-site storage providers or third-party microfilm services etc. Some Archives may seek partners to provide specialised services, while other, larger institutions may be in the position to offer these services.

An interesting discussion at the end of the Institute explored the question of the skills needed by archivists to be effective in dealing with the preservation of electronic records. Are these different from our traditional skill sets? The overall feeling was "yes and no". First, it was suggested, we need to be clear about our areas of expertise. Our profession knows about records, and we need to be confident in that knowledge and the value of our contribution to wider discussions. To deal with electronic records will require collaboration of a number of professional disciplines. To that end we need new skills in the areas of relationship management, network building, brokering, and communications in general. We should not assume that we have to become information technology specialists, but we do need to know enough about technology and the language of IT to articulate requirements, and engage

technologists on the issues. Other partners will be found in audit (especially internal audit units) where, similarly, archivists should not seek to duplicate the skills of another discipline, but to effectively collaborate with that group. It was generally agreed that our profession will change as a result, but that it is still too early to confidently predict how this evolution will play out.

Another area raised by several participants was the question of legacy data and systems. This is important given the reality facing institutions, as described by participants, where electronic business systems that have been designed without any regard for recent formal recordkeeping models are being presented to Archives. It was noted that digital archaeology is possible, but labour intensive. Information about the data, such as system documentation, is therefore critical in evaluating and developing ways of dealing with such systems. We should remember the importance of appraisal – many legacy systems may not merit the investment of the considerable resources necessary to ensure their preservation. Finally, the need to deal with legacy systems highlights the benefits of collaboration on issues such as maintenance of obsolete technology. On occasion, old devices (such as tape or disc drives) or processors using out-dated operating systems will be needed to access data. Such machines will be rare, and should be available to the wider professional community as required.

Several participants noted the use of 'print and file' approaches – if not in their own programmes, then among agencies with which they deal. It was suggested that this may be better than nothing in supporting the preservation of some electronic records. This approach has major problems, however. It is unsuitable for all electronic records, and much information of value is lost in printing. The prevalence of this strategy – even on an interim basis – is a salutary reminder of the gap between theory and practice in this area.

Conclusion
The Institute provided a valuable opportunity for archivists – especially those in smaller institutions – to discuss the issues of electronic records preservation, and to update their knowledge of a rapidly moving field. Evaluations suggest that participants found the Institute worthwhile, with almost all being positive about the presenters and the content of the three days. The presenters did a wonderful job of making the sometimes intimidating world of electronic recordkeeping accessible to all.

The thanks of all participants are also due to Amy Marshall of the ACA Education Committee for her work in the organisation and administration of the Institute. Without Amy's commitment of time and energy, the Institute simply would not have happened.

John Roberts
Archives New Zealand