

DigiCULT

Integrity and Authenticity of Digital
Cultural Heritage Objects



Thematic Issue 1

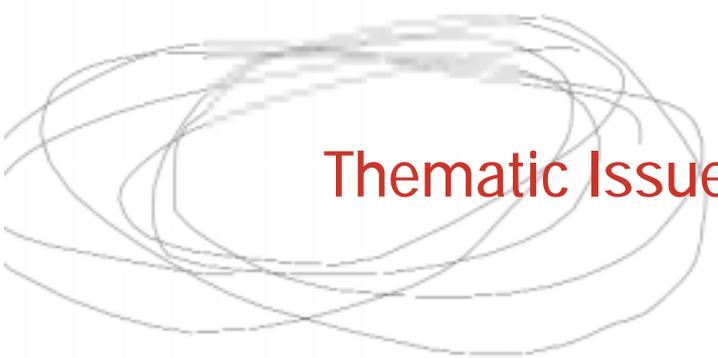
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Integrity and Authenticity of Digital Cultural Heritage Objects



Thematic Issue 1

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INTRODUCTION AND OVERVIEW

By Guntram Geser

FUNCTION AND FOCUS

DigiCULT, as a support measure within the Information Society Technologies Programme (IST), will for a period of thirty months provide a technology watch mechanism for the cultural and scientific heritage sector. Backed by a pool of over fifty experts, the project monitors, discusses and analyses the impact of new technology developments on the sector.

To promote the results and encourage early take up of relevant technologies, DigiCULT will publish its results through a series of seven Thematic Issues, three in-depth Technology Watch Reports (with the first issue available in early 2003), as well as push out the e-journal DigiCULT.Info from a growing database of interested persons and organisations (subscription at www.digicult.info), and manage the project website

The Thematic Issues focus on topics examined at the expert round tables organised by the DigiCULT secretariat. They present and interpret the results of these forums, as well as provide information and opinions in the form of interviews, case studies, short descriptions of related projects, and are rounded off with a selection of relevant literature.

In contrast to the Technology Watch Reports, the Thematic Issues will address more the organisational, policy, and economic aspects of the technologies under the spotlight. Placing special attention on ways of enhancing the adoption of new perspectives and approaches, such as new business models, as well as fostering co-operation between cultural heritage organisations, industry players, researchers and other stakeholders.

Following the first Forum on 'Integrity and Authenticity of Digital Cultural Heritage Objects' (Barcelona, May 6th, 2002), will be the round tables: 'Digital Asset Management Systems' (Essen, September 3rd, 2002, in the context of the AIIM Conference @ DMS EXPO), 'XML Technologies/Resource Discovery' (Darmstadt, January 2003), and 'Learning Objects' (Amsterdam, June 2003). For updates, please consult www.digicult.info.



Photo: Beeld en Geluid



TOPIC AND CHALLENGE

This first Thematic Issue concentrates on a question that is critical to all organisations that archive and provide access to cultural heritage objects: How to preserve and prove the integrity and authenticity of digital objects? The implementation of new technologies have presented organisations with unparalleled opportunities to support administrative, scholarly, educational, as well as commercial uses of 'born-digital' and digitised objects. These opportunities, however, bring with them critical issues relating to the heterogeneity, life cycle, and in particular integrity and authenticity of digital objects.

The challenge is most acute for e-archives that have a highly structured working relationship with public administrations, institutions or businesses. They need to be involved strategically in the management of the life cycle of the digital objects, to implement appropriate policies and working procedures necessary for the preservation and re-use of records, cultural objects, research results and other assets.

For public records archives, preserving authentic records in the digital environment demands the set-up of a system of controls that extends over the entire life cycle of records, from creation to permanent preservation. Which for archives servicing the broadcast industry has also become mission critical as they partner in the production context. Both examples figured prominently in the expert round table held in Barcelona on May 6th, 2002, the basis of this Thematic Issue.

OVERVIEW

Seamus Ross, director of HATII (University of Glasgow) summarises the main issues in the use of procedures and technologies for assuring the integrity and authenticity of digital objects. He contends that the situation of creation, dissemination and preservation is 'uncontrolled', and calls for more consistency of approach, and points to research questions that need to be addressed.

In the interview with the journalist Joost van Kasteren, Hartmut Weber, the President of the German Bundesarchiv, tackles the challenges facing the sector in the shift from paper to e-archives. He argues that this shift has placed enormous pressure on administrations and archival organisations at all

levels. This situation reinforces the need for immediate action in the development and implementation of policies, guidelines, procedures and technical solutions. Mr Weber is convinced that archives 'cannot sit and wait until decisions have been made'.

Michael Steemson from Caldeson Consultancy, who assists DigiCULT as a scientific consultant, describes in detail the many facets, view points, arguments and references of the discussion on the integrity and authenticity of digital objects. The summary reflects the liveliness of the discussion, where consensus was and was not reached, and how much remains to be done.

In particular, Ulrich Kampffmeyer, Project Consult, Germany, in his interview draws attention to the need for highly effective solutions to manage the life cycle of e-records and other digital objects. Highlighting the reality that public administrations and archives do not always receive from ICT suppliers what they need. On the other hand, he continues, archives have also been shown wanting in defining these needs.

Friso Fisser and his colleague Pieter Kop from PricewaterhouseCoopers Consulting round off this Thematic Issue with a case study on the Netherlands Institute for Sound and Vision. The Institute serves the Dutch broadcasters, as well as preserve national audio-visual heritage. The interview with Annemieke de Jong, Head of their Information Policy Sector ICT, provides insights into the tremendous change the digitisation has brought to the Institute. The unprecedented growth in size and complexity of information calls for the implementation of an enhanced infrastructure of technologies, protocols and metadata to ensure that information can be preserved and reused in the future. De Jong thinks that such a goal is only achievable by turning every program maker into a part time archivist. She also highlights that one of the most important aspects here is to motivate all stakeholders to use the same standards and protocols.

Supporting information including short descriptions of related projects and standards, and a selection of literature can be found throughout this issue.

We hope that this issue will inform and stimulate further discussion on how to assure the integrity and authenticity of our digital cultural heritage.

Photo: Beeld en Geluid



POSITION PAPER ON INTEGRITY AND AUTHENTICITY OF DIGITAL CULTURAL HERITAGE OBJECTS

By Seamus Ross

When we work with digital objects we want to know they are what they purport to be and that they are complete and have not been altered or corrupted. These two concepts are encapsulated in the terms Authenticity and Integrity. If the authenticity and integrity of a digital object cannot be established questions arise as to its genuineness and utility. As digital objects are more easily altered and corrupted than say paper documents and records, creators and preservers often find it challenging to demonstrate their authenticity. As digital objects that lack authenticity and integrity have limited value as evidence or as an information resource. If this is the case what are the requirements of authenticity and integrity functionality and what can be done to ensure that they are present in digital objects or in the systems that maintain them?

The Barcelona DigiCULT Forum began its examination of the organisational and technological issues related to authenticity and integrity with consideration of the diverse perceptions of authenticity held by creators, preservers and users of digital information and objects. Underpinning authenticity and integrity and their preservation over time are the concepts of fixity, stabilisation, trust, and the requirements of custodians and users. The discussants were not alone in finding it difficult to determine what needs to be protected in order to maintain authenticity and integrity over time, as other examinations of the issue have reached the same conclusion. As an

authentic digital object is one whose genuineness can be assumed on the basis of one or more of the following: mode, form, state of transmission, and manner of preservation and custody. The question was raised of whether authenticity can be considered from a number of different perspectives such as those of the different categories of user needs. The needs and requirements of different types of users vary and may even be dependent upon types of digital objects they encounter and how they encounter them. The different types of digital objects, including records, online journals, databases, audio-visual materials each appear on the surface to have their own requirements in relation to authenticity. Although there has been much research into the issue of authenticity there remains disagreement as to whether all digital objects and their users could be treated in similar ways or whether object-sensitive and user-contextualised solutions were required.

In this regard problems that required further investigation included:

- Could general characteristics of authenticity be identified that would apply to all digital objects?
- Or do different types of digital objects, record keeping procedures and digital object creation practices, alongside the variety of institutional requirements mean that digital object preservation would require a range of mechanisms for enabling user and preservers to ascertain the authenticity of material.

Attention to questions of authenticity and integrity tend to focus on whether objects have these properties. More research needs to be centred on the creation of digital objects to establish how they might acquire these properties. A central lies in the current idiosyncratic climate of records and object creation. The challenges that remain to be addressed include:

- How in practice can the creators be influenced to produce and create digital objects in ways that can guarantee and provide evidence of authenticity and integrity?
- How can vendors be encouraged to produce products that will allow creators to create records and objects with characteristics that enable authentic digital objects? It is currently impossible to purchase a 'preservation solution' off-the-shelf.

Of course we might tackle this problem by agreeing two sets of requirements for authenticity: one for the creator and the other for the preserver. Authenticity does not vary across the processes but the method for ensuring it, such as provenance and custodial history. The role that appraisal plays in the process has received too little attention in the past.

The communities that create and preserve digital objects forming the backbone of this discussion were public administrations, broadcasters, publishers and libraries. In all four sectors, as in most others, few controls existed on the creation, preservation and dissemination of digital objects. Each sector argued that its requirements, technology needs and cultural environment were just different enough to require specialised approaches to authenticity. On the other hand it is evident that the best solution would be one that could be adopted across all sectors. Of course, even if mechanisms could be found the realities of organisational structures have an impact on approaches to the integrity and authenticity of objects (see the BBC example below). The practicalities of making changes in a large, complex organisation indicate that any major shift in thinking and practice, whether at individual or departmental level, would depend upon internal power struggles as well

as increased resource allocations within organisations. Can there then be one solution that all types of organisations, regardless of size and institutional culture, could adopt that would support the creation and preservation of authentic digital objects? In practical terms it is essential that such a solution be developed.

It is evident from reading the report of the Barcelona Forum that more consistency of approach across the heritage sector would be essential:

- to develop mechanisms to ensure integrity and authenticity of digital objects.
- to improve communication among heritage organisations about the challenges and approaches to integrity and authenticity. This is crucial because there appears to be a lack of motivation to understand other perspectives and approaches.
- to conduct more case studies. They would provide an essential window to improve our understanding of why digital objects are created and how they are managed.
- to investigate the role trust plays in authenticity and integrity of digital objects. In many instances users and preservers establish authenticity on the grounds of trust in the organisation involved or technology used in the preservation of the digital object. The current understanding of the major factors that drive trust decisions in the digital world, as well as the risks involved with having and implementing this sort of trust is limited.
- that in view of the number of independent projects conducting work in the area of digital preservation and especially in the area of integrity and authenticity of digital objects enhanced collaboration between these projects has become essential. A good starting point would be a survey of current research to identify complementarily, overlaps, and gaps in research.
- that emerging guidelines on practices to support the authenticity and integrity of digital objects need to be framed in ways that make them accessible and usable by a variety of communities and encourage suppliers to provide adequate levels of functionality in their products (see Ulrich Kampffmeyer interview page 20).

Photos: Beeld en Geluid



ANALOGUE VERSUS STORAGE OF OUR DIGITAL HISTORY

Photo: Bundesarchiv



A few years ago, Francis Fukuyama declared, that we had reached the end of history in Hegelian terms; that is, history as a confrontation between ideologies. Prof. Dr. Hartmut Weber, president of the Bundesarchiv, the German federal archives, is more afraid that we might lose our history. If we are not careful in archiving electronic records. A major problem in this respect, is the documentary trail. Weber states: 'A good archive contains not only the end document, for instance the text of an agreement, but also documents which allow you to reconstruct the process which led to the agreement. Authenticity demands that this archiving process be transparent, in the sense, that you are able to identify and verify all the elements of the process in reaching a decision.'

The reconstruction of this documentary trail is still mostly based on paper documents, such as letters or notes that are kept in archives, but as the migration of this information from paper to electronic form increases, so does its volatility. 'That, in itself, is nothing new', comments Weber. 'Previously, you had informal meetings of which no minutes were taken. The same goes for telephone conversations. The difference is that the results of informal meetings and telephone conversations were formalised somewhere in written form. Nowadays they tend to remain in the virtual domain without a physical representation.'

The problem is that the media containing the information are not very 'tenable'. To be able to access the information, the records have to be converted ever so often, because either the hardware itself or the software used for access changes. Through these repeated migrations the intrinsic value of the records might get lost, including the context of the record. According to Weber, that is a temporary problem. 'At the moment, the Bundesarchiv is executing some projects with the well known method of data migration. But, there is a need to think about emulation of systems, a process whereby not only the data are transferred from one medium to the other, but also their context and functionality. In this way, we hope to be able to guarantee their identity and integrity.' Until that day, a lot of digital documents will have to be converted to their analogue – paper – form.

More important than the technology itself is the lack of comprehensive procedures for archiving

electronic documents. For instance, letters sent by email or text adjustments in electronic documents. The Bundesarchiv is quickly developing such procedures, for instance in archiving emails, because losing history is not only a loss for historians who want to explore the archives, but also for the government, the organisation itself and the wider community. Weber: 'For its present policies, a government often has to fall back on archived records. If they do, they have to be sure that the information on record is correct and complete in the sense I mentioned before, that is that you can reconstruct the process. The same goes for citizens who have a right to know under our constitution. That means, that you not only have to guarantee the authenticity of documents, but you also have to stabilise the context.'

Hence, it is, according to Weber, of the utmost importance that government organisations develop procedures for archiving electronic documents to prevent a possible loss of information. 'The use of new technologies puts a lot of pressure not only on the national government, but also on regional and local governments and of course on the EU. But, before you can start developing procedures, you have to raise the awareness among government officials and civil servants about the importance of complete and transparent archives. As professional archivists, we cannot sit and wait until decisions have been made. I think we have to make it a co-operative effort to store records in a transparent way, making them accessible by electronic means.'

Weber foresees an archive which stores most of the data in electronic form. Decisive documents, though, will – also – be stored on paper. The task at hand is to design an archiving system that combines the advantages of a traditional paper archive (tenability, identity and integrity) with those of an electronic archive (accessibility, ease of use). 'It will take some time, possibly some decades, before a stable symbiosis has been realised', reinforces Weber. 'But, eventually, it will happen. I am an optimist. Archives have survived 1000 or more years, so I trust we can use digitalisation to our advantage as well.'



An Interview
with
Hartmut Weber,
President
Bundesarchiv,
Germany

by
Joost van Kasteren

DIGICULT EXPERTS SEARCH

SUMMARY OF THE FORUM IN BARCELONA, MAY 6, 2002

By Michael Steemson



Photo: Beeld en Geluid

What's at Risk?

'Virtually every private and public organization which uses information technology to facilitate its recordkeeping functions has experienced the undesirable effects of adopting new technologies without forecasting and planning for the consequences of the proprietary nature of software applications, media and digital obsolescence, and hybrid paper/digital environments.'

InterPARES 1,
[http://www.interpares.org/
background.htm](http://www.interpares.org/background.htm)

FOR E-ARCHIVE PERMANENCE

What size is the risk inherent in the new technologies for cultural heritage preservation? The institutions agree it's huge. Technologies come and go with such shattering rapidity. What can be done about it? That's the task the nine experts – archivists, librarians, technologists and academics – were set at the first DigiCULT Forum, held in May 2002.

They met in round table discussion in sunny Barcelona, Spain, to debate the *Integrity and Authenticity of Digital Objects*. They differed over what these terms actually meant but identified this confusion as one of the problems: Many different kinds of digital objects, countless usages and values, and innumerable users each bringing their own evaluations of the objects, whether they be single documents, books or video recordings.

There was, as yet, little adequate technology to do the job, they decided. Solutions lay in the hands of the object creators and preservers, who were sometimes one and the same but who needed criteria to work to. But, what should those criteria be? They must find out, the Forum experts realised.

But they did discover a future for recordkeepers. One of the Nine told the group: 'We don't call them archivists any more. If we called them archivists, nobody would let them near the place.'

'DEFINE AUTHENTICITY, INTEGRITY'

Provenance Corrupt or Not

'Authenticity in recorded information connotes precise, yet disparate, things in different contexts and communities. It can mean being original but also being faithful to an original; it can mean uncorrupted but also of clear and known provenance, "corrupt" or not.'

Abby Smith, *Authenticity in a Digital Environment*, Council on Library and Information Resources (CLIR). Washington, D.C., May 2000. <http://www.clir.org/pubs/reports/pub92/contents.html>

The agenda called for investigation of the question 'How to implement methods for assuring authenticity and integrity in the long-term'. Forum Moderator, Hans Hofman, archivist with the National Archives of the Netherlands

(*Nationaal Archief*), told the experts: 'What the agenda doesn't say is who are really involved in dealing with authenticity and what do we understand authenticity is. We have people from different backgrounds and they might have different perceptions of what authenticity is.'

Years ago, that would not have been difficult for Sir Hilary Jenkinson, the grand old man of British recordkeeping who took from a dusty academic shelf the Archivists' Art and returned it a Science. In his 1960's *Manual of Archive Administration*, he defined authentic archives as those 'preserved in official custody . . . and free from suspicion of having been tampered with'.¹

But this was about the time the Father of the Internet, New Yorker Leonard Kleinrock, was at the Massachusetts Institute of Technology preparing his PhD thesis, *Information Flow in Large Communication Nets*,² destined to be the first little twinkling light at the far end of the line of communication that transformed into the roaring information superhighway of the 21st Century.

Now, in the new millennium, the problem is more complex. One of the Forum experts, Luciana Duranti, professor at the School of Library, Archival and Information Studies at the University of British Columbia in Vancouver, summed up the problem to the Forum e-journal, *DigiCULT.Info*: 'The fast pace with which technology for creating and recording information is developing threatens the authenticity of records. Archivists, governments and other institutions that rely on these records are losing control. I would not hesitate to call the situation disastrous.'³

As the Barcelona discussion opened, the Forum's search for 'authenticity and integrity' was questioned by another Netherlands expert, Annemieke de Jong, from the Netherlands Audiovisual Archive (*Nederlands Audiovisueel Archief*). She argued that the theme implied that Forum members already knew 'what authenticity is in the digital domain'. She asked: 'Can these traditional concepts of authenticity and integrity still be applied on digital objects in the first place? Can we still think of authenticity in the domain of digital objects?'

Archivschule Marburg archives science lecturer, Nils Brübach, approached it from another angle. He preferred to see the concepts as functional rather than technical. He questioned current opinion that saw authenticity and integrity as absolutes and he

¹ Jenkinson, Hilary: *A Manual of Archive Administration*. London: Percy Lund, Humphries & Co. Ltd., 1965.

² Kleinrock, Leonard: *Information Flow in Large Communication Nets*. Cambridge: Massachusetts Institute of Technology, 1961. <http://www.lk.cs.ucla.edu/LK/Bib/REPORT/PhD/>

³ DigiCULT.Info, Issue 1, July 2002. <http://www.digicult.info/pages/newsletter.html>

proposed that, as functional concepts, they applied to three levels, the content, context and structure of digital objects.

He said: 'The question is about interrelationship and ... how to guarantee authenticity and integrity at all three levels. The question is also do we need to establish a concept of authenticity and integrity on all three levels?' He added: 'I would say the first thinking should be on fixity and stabilising digital objects and then we could think about integrity and authenticity.'

Fixed and Fluid

'If the utility of both the fixed and the fluid is recognized, the Web may develop much of its innovative power from the possibility of producing documents that combine both fixity and fluidity. Already, many documents retain a constant text while their links are continually changed. ... This interplay between fixity and fluidity, formerly possible only on the scale of collections, may now become a central feature of individual documents.'

John Seely Brown and Paul Duguid, *The Social Life of Documents*, Palo Alto, CA., Palo Alto Research Center (PARC), May 1996. <http://www2.parc.com/ops/members/brown/papers/sociallife.html>

Professor Duranti, who is also director of the International Research on Permanent Authentic Records in Electronic Systems, the InterPARES project, had doubts about 'fixity'. She said that the InterPARES project had, at first, presumed fixity to be an essential element of authenticity. She went on: 'But the reason for the InterPARES project 2 is that we are discovering that by stabilising records that, by their nature, are dynamic we, in fact, end up forging them. That is, we are eliminating their authenticity.'

She continued: '... should we have questions that apply to all digital objects or shouldn't we really have separate questions for different kinds of digital objects? Because, certainly, authenticity is not the same thing to music that it is to a legal record and I think that the primary concern should be actually separation not unification. We should set out by thinking of types of digital objects separately, different characteristics, different solutions and different concepts.'

After further lengthy discussion on varying requirements for the integrity of different digital objects, Hans Hofman suggested that from users' perspectives the question was simply one of trust. Professor Duranti agreed but warned against archives' past faith in creators. She said: 'This is no longer true. The person who generates the material may trust it and might be wrong. Because, with digital records, the fluidity of the record is such that if you don't have

very detailed methods of control in place all along, so that you can say that you have a trusted system, it doesn't work.'

InterPARES had decided on two levels of requirements, she said. One was a need to presume the authenticity of the records based on how they were generated and maintained. The other was the requirement to create authentic copies of the records to preserve them over time.

Paul Fiander, Head of Information & Archives, BBC, had an example. The Corporation had almost one and a half million commercial recordings ranging in medium from wax cylinders to CDs. The problem lay with the 78 r.p.m. and LP vinyl records that were too fragile and low quality to issue for use – 'too many clicks, so we clean them up'. They were copied onto CDs and, as a result, were no longer authentic versions.

University of Antwerp (*Bibliotheek Universiteit Antwerpen*) librarian, Julien van Borm, didn't particularly mind that process, so long as he knew what had been done, particularly if the original no longer existed. He considered that: 'In the future, I think we need not only the document in itself but also the history, let's call it a C.V. of the document that has to be documented in the document itself.'

Dr. Brübach agreed completely. An archival object had to include both the digital object and its processing history ... 'what has been changed and maybe what has been lost and both together this could give the user a hint of authenticity, not authenticity itself'.

And he went on: 'When we turn to born-digital objects, does an original really exist in the digital world? Do we have an original there which can be identified independently as an original? I would say no. Any original in the digital world can be defined as an original by somebody using some means, maybe metadata, which would be the instrument to solve the problems you have just outlined.'

Talk around the Forum table began to turn towards the responsibility of creators to contribute towards digital authenticity and integrity. Hans Hofman developed a diagram showing the 'digital object' hemmed in by three entities, the creator, the preserver and the user.

He explained: 'What we are talking about is digital objects in different domains created by different creators and used by all kinds of different users. What authenticity means is, in my perception, what the creator has an intention to convey to a user with the object. So, we are talking about the relationship between the creator, the digital objects he is creating and the user. But the user has to know what the intention was of the creator.'

‘The preserver has to take care that this digital object is carried through time to new users, current users. In different contexts it might be different perceptions of what authenticity is, and what we want to achieve is a certain trust in the user that this is the digital object that was once created with this identity, because the identity is dependent on the creator.’

The Austrian National Library’s Max Kaiser, pointed out three different types of digital object: ‘When we receive the object we have to decide what part of it is to be preserved. Then we have to submit it to our archives and begin recording the changes that have to be made to it – migration and other things. We have to record rights issues and then, based on this complicated information package, we have to decide how we can disseminate it to our users.’



Photo: Beeld en Geluid

Professor Duranti put it: ‘So, in fact, the grave responsibility for future preservation is with the creator. The creator has to make sure the object is identifiable; that it has metadata to ensure its integrity can be proved; that it can be seen, with access privilege; that sort of thing. We therefore should also look at methods that should be used by the creator to generate the objects properly for future preservation.’

She said that the InterPARES project had created two different sets of requirements for authenticity, one for the creator and another for the preserver.

Other members thought perhaps three sets of requirements were needed: ‘ingest’, ‘preservation’ and ‘dissemination’ was Nils Brübach’s model. The group discussed the role of the preserver as mediator between the creator and user. The preserver’s task was to create records, too, it was suggested, records such as protocols describing what had been lost or added in the preserving process, giving authenticity to what was left. Once these had been satisfied and an audit trail tracking process was in place then authenticity could be presumed.

In his summing up, Hans Hofman said the group had agreed that authenticity was not a static thing but had to be approached from the contextual point of view. He added: ‘We did not come up with a lot of criteria, but at least one is that an authentic object is what it purports to be, and there are different players: the creators, the preservers and the users, and all have their own views that influence the way we deal with authenticity.’

RELATED PROJECTS AND A (SMALL) SELECTION

InterPARES - International Research on Permanent Authentic Records in Electronic Systems

InterPARES 1:

The first phase of the project began in 1999 and was concluded in 2001. It built on an earlier project at the Vancouver, Canada, University of British Columbia (UBC), 'The Preservation of the Integrity of Electronic Records' (1996), which addressed issues surrounding the creation and maintenance of authentic and reliable electronic records in their active, pre-archival state. See: <http://www.interpares.org/UBCProject/index.htm>

InterPARES 1 focused on the preservation of the authenticity of records that are no longer needed by the creating body to fulfill its own mission or purposes. Results from InterPARES 1 included guidance on conceptual requirements for authenticity, models of the processes of selection and preservation of authentic electronic records, a glossary, and several other documents are available on the project website.

The final text of the InterPARES 1 findings will be electronically published on its website by September 2002 and published in book form by the Italian Ministry for Cultural Properties and Activities in the winter 2002-2003.

InterPARES 2:

The key aspects distinguishing the second phase of the InterPARES project from the first are described on the project website as 'dramatically innovative'. InterPARES 2 will not only address issues of authenticity but also reliability and accuracy. It will study them throughout the records' life-cycle from creation to permanent preservation, unlike phase 1 that was concerned only with non-current records destined for permanent preservation. Importantly, InterPARES 2 will focus on records produced in new digital environments, experiential, dynamic, and interactive whereas phase 1 was concerned only with records generated in databases and document management systems. The focus of InterPARES 2 will not be just on records resulting from administrative and legal activities, but those resulting from artistic, scientific and government activities.

The InterPARES studies began in January 2002 and will continue until December 2006.

<http://www.interpares.org/>

Reference Model for an Open Archival Information System (OAIS)

The Reference Model for an Open Archival Information System provides a common framework for describing and comparing architectures and operations of digital archives. It was developed by the U.S. Consultative Committee on Space Data, and has been adopted as ISO 14721:2002.

A useful short presentation and review of the reference model is provided in the Research Libraries Group and Online Computer Library Center (RLG/OCLC) report 'Trusted Digital Repositories' (2002) highlighting the necessary functions of a long-term digital repository. The RLG proposes compliance with this model as the defining attribute of a trusted digital repository.

The OAIS reference model was used, for example, by the Leeds University, England, Consortium of University Libraries' (CURL) Exemplars in Digital Archives (Cedars) project (<http://www.leeds.ac.uk/cedars/>), whose participants discovered 'the benefit of adopting a shared vocabulary and set of concepts to allow implementation across a number of different local situations'. In fact, Cedars has provided one important demonstrator project based on this model. (cf. Russell, 2000; see: Literature)

Another major project using the OAIS reference model is the new digital library system of the British Library that is designed to provide long-term access to digital collections.

Sources:

NASA: ISO Archiving Standards: Overview (this site contains links and background information to the reference model and other archival standardization efforts) <http://ssdoo.gsfc.nasa.gov/nost/isoas/overview.html>

Blue Book of the Reference Model: CCSDS 650.0-B-1: Reference Model for an Open Archival Information System (OAIS). Blue Book. Issue 1. January 2002.

http://ssdoo.gsfc.nasa.gov/nost/isoas/ref_model.html

Research Libraries Group: Open Archival Information System (OAIS) Resources, <http://www.rlg.org/longterm/oais.html>

Helen Shenton: From Talking to Doing: Digital Preservation at the British Library. In: Preservation 2000, <http://www.rlg.org/events/pres-2000/shenton.html>

STANDARDS



Photos: Beeld en Geluid

Project Prism - Preservation, Reliability, Interoperability, Security and Metadata

Project Prism at Cornell University, (U.S.A.), is an interdisciplinary research project started in 1999 and funded by the U.S. National Science Foundation. A collaborative effort between Cornell's University Library and its Computer Science Department, it investigates and develops policies and mechanisms to ensure information integrity in digital libraries.

Prism focuses on five key areas, Preservation, Reliability, Interoperability, Security and Metadata, in the context of component-based digital library architecture with special attention to distributed collections and web content. The preservation component of the research is examining longevity issues for web resources using risk management methods.

Sources:

<http://www.prism.cornell.edu/>

<http://www.library.cornell.edu/iris/research/prism/>

Kenney, Anne R, et al.: Preservation Risk Management for Web Resources. In: *D-Lib Magazine*, January 2002, <http://www.dlib.org/dlib/january02/kenney/01kenney.html>

David among the Digital Goliaths

The Belgian Foundation for Scientific Research project, Digital Archiving in Flemish Institutions and Administrations (Digitale Archivering in Vlaamse Instellingen en Diensten – DAVID), aims to produce a manual of guidelines for archiving digital records by the end of 2003, supported by Antwerp City Archives and the Leuven University's Interdisciplinary Centre for Law. The group has created a simple, stable e-mail archiving protocol with set data fields that must be completed by originators and recipients before archiving as microfilm or imaged hard copy.

<http://www.dma.be/david/eng/index.htm>

Australia and Victoria State Metadata Standards: the VERS Metadata Scheme

National Archives of Australia sees the VERS (Victoria Electronic Recordkeeping System) scheme as a reference tool for government agency, corporate managers, IT personnel and software vendors involved in the design, selection and implementation of electronic recordkeeping and related information management systems. But, for Victoria's State Public Record Office (PROVic), the VERS designer, its purpose is to represent information required for preserving records over a long period.

The national system (<http://www.naa.gov.au/recordkeeping/control/rkms/summary.htm>) defines a basic set of twenty metadata elements (eight of which constitute a core set of mandatory metadata) and sixty-five sub-elements that may be incorporated within such systems, and explains how they should be applied within the Australian sphere.

The PROVic method differs (see: <http://www.prov.vic.gov.au/vers/standards/pros9907/99-7-2s2.htm>).

In its Standard for Electronic Records Management (PROS 99/007) the Office says: 'The VERS approach is to fix records at (or close to) the time of creation using digital signatures. Although the VERS approach has many advantages over migration, it has one significant disadvantage; metadata that changes or accretes (e.g. use histories) over time is not well supported. Although it is possible to "layer" metadata to support changing or accreting metadata, this is not efficient for elements that are continually modified.'

The Victorian State Government earlier this year authorised expenditure of more than Au\$8 million (c. 4.5 million EUR) to begin a VERS implementation programme across State agencies that will eventually cost Au\$50 million.

'IDENTIFY METHODS, TECHNOLOGIES'

'The volume of information is growing at an unprecedented pace. We already produce more information per year than we did in the whole period since we descended from the trees. A lot of information is digital only and an XML document, for instance, is created while you view it. So, how do you keep it?'

Ulrich Kampffmeyer, President of Project Consult, Germany

Forum Moderator, Hans Hofman, set the direction in the experts' search for technologies and methods to ensure authenticity. 'Are the current information technologies able to achieve it? If not, how should it be done and is there something that should be done with standardisation?' he asked.

The BBC's Paul Fiander dropped in yet another pressing concern ... costs. He detailed the broadcasting Corporation's holdings of radio and television material, a collection growing exponentially as interactive television comes on stream. MPEG compression compromised digital authenticity, he said, and resource constraint was 'forcing us to change our selection and retention policy'.

So, another word entered the Forum debate ... appraisal. Director of U.S. National Archives and Records Administration (NARA) Electronic Records Archives (ERA) Program, Kenneth Thibodeau, said it was still the top criteria. Harking back to their earlier discussion, he reminded the experts: 'Once you say that authenticity is contextual you cannot validly pose the question "can technology save everything in an authentic way?"'

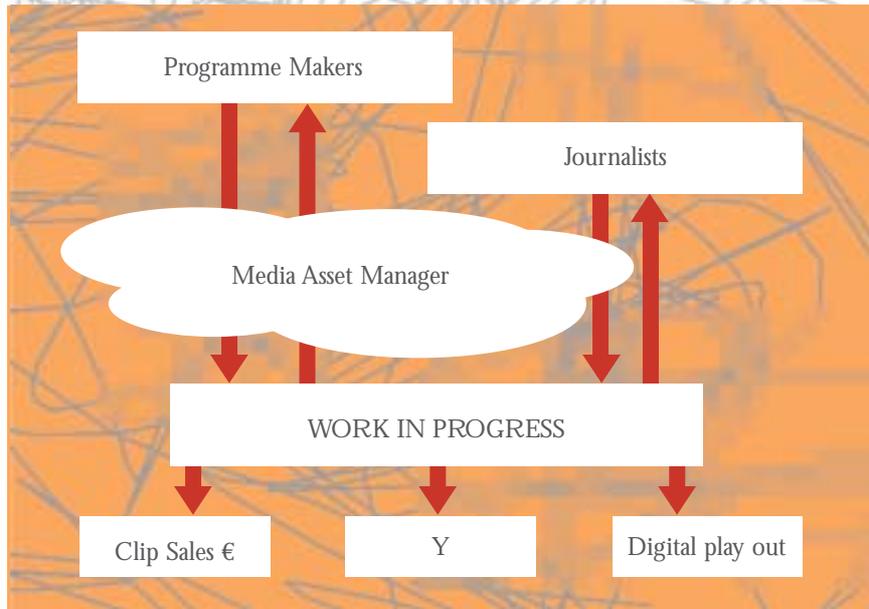
Luciana Duranti believed the problem really lay with creators who continued to 'generate (records) in an inappropriate way'. She complained: 'Each record generator creates records in an idiosyncratic way not respecting the many of rules. They make things very difficult for the preserver.' She wondered whether the creator 'is doing it because he is not interested in permanent preservation or because he doesn't know what he is supposed to do'.

The BBC's Paul Fiander demonstrated how the Corporation solved the problem. In so doing, gave a happy glimpse of the future for recordkeepers ... not a place in the retirement sun but in the white heat of the technologies mediating between creators and users, just where the Forum thought they should be.

Paul Fiander drew a diagram of the BBC's production process – programme managers and journalists making and using archivable material, fulfilling the

roles of both creators and users in the production of their work. He categorised the process as 'work in progress'.

He said: 'The programme maker adds input, the journalist puts stuff in and they take it back out again. I call that, because I come from an industrial background, work in progress. Stuff also goes out there to what we call clip sales so people are generating money out of this work in progress.'



It goes many times because of the number of channels we have. We have people taking material out to recreate new stuff and they put it back in. Finally, it goes out to playout. Where is the role of the archivist in this?'

All over the place?

'Exactly!' said the Man from the BBC. Stabbing the diagram's *Media Asset Manager* 'cloud', he emphasised: 'The role of the archivist is there, except we don't call them archivists anymore, because if you called them archivists nobody would let them near the place. We call them media managers. The skill of the archivist is to work in this cloud over here, because if they didn't do their job properly here, we would never find the material again.'

An incredulous delegate asked: 'Is this your day to day reality or the future?'

Mr Fiander was firm. 'That is what we are doing today, we are putting people with library qualifications into that cloud there, calling them media asset managers. I am talking about the archivist as the creator, being involved in part of the creation process. That is where the argument about changing – making the creator do something different – is being taken care of.'

Paul Fiander's 'Work in Progress' workflow model

Hans Hofman wondered how the archivists were coping with this change of culture.

Paul Fiander said they had to be able to work with journalists and programme makers. They did not simply write new rules for the creators, though. 'You have to work with them. You have to be immersed with them if you want them to change.'

Netherlands' archivist Annemieke de Jong saw how archives could aid the integration of asset management systems in an organisation. 'In the BBC model, you could see that programme makers and journalists use the same procedures, structures and metadata for copyright that is being developed in the archiving world. So, it is not just the system. You should make the rules in the archive and then distribute them to the creators and producers.'

This would function working directly with the creators, she said, but she wanted to know: 'If you want to preserve material that is being produced outside of your organisational model how do you maintain this form of control?'

The consensus was that market pressure could have a positive effect although systems vendors were often

hard to influence. The Forum discussed technological solutions, migration, emulation and 'persistent object preservation'⁴, a process being researched by Dr Thibodeau's NARA project at University of California' San Diego Supercomputing Centre.

Delegates were dubious about system emulation ('It remains an ethical question,' said Professor Duranti) and migration ('You are entirely controlled by the software industry,' said Dr Thibodeau).

'So there is no technology actually that can really deal with what we require, is that the conclusion at this moment?' asked Moderator Hofman. 'Shouldn't we then move in earlier in the creation process in order to influence the way things are created for example open source, creating standards, etc.' That was the way the BBC had done it and not just for the archives.

Dr Brübach was all for telling the software industry 'Hey, folks. Build in an interface which we can use to export stuff to one of our archiving formats. Make the process as easy as possible with metadata collected clandestinely so the user does not even know what is happening in the background'. Others were doubtful if the industry would comply but agreed that archivists could achieve some success clandestinely.

Summing up, Hans Hofman told the Forum: 'The aspects we have been discussing are mainly the requirements. We have also the technological issues because technology is the reason why we are now suddenly facing all these issues around authenticity in preserving digital objects. There are cultural aspects as well. How do we convince people that they have to have a different attitude towards what they are creating and preserving?'

'But what I also hear is that there are different communities and may be different perceptions in authenticity although there still might be a more generic idea of authenticity. This may lead to different solutions because the requirements are not always the same.'

⁴San Diego Supercomputer Center: Collection Based Persistent Archives, <http://www.sdsc.edu/NARA/Publications/collections.html>

Persistent Object Preservation

'Question: How are the government's electronic records going to be preserved over multiple generations of technology so that future archivists and historians can access them? Answer: Nobody knows yet.

But Kenneth Thibodeau, director of the National Archives and Records Administration's Electronic Records Archives (ERA) program in College Park, Md. thinks he's on the trail of a solution. It's called persistent object preservation'.

'State it simply

In the persistent object method, the structure of a record and of aggregates of records is described in plain language—simple tags and schemas—so that any future technologies, and people, will recognize the essential properties of the record and be able to access it, he said.

That gives managers the ability to change hardware and software over time with no significant impact on the records that are being managed and preserved.

"What San Diego is telling us is that records in this format should be good for 300 to 400 years," Thibodeau said.'

From: 'For the record, NARA techie aims to preserve', by Richard W. Walker. In: *GCN* magazine, July 30, 2001; http://www.gcn.com/vol20_no21/news/4752-1.html.

For a description of NARA's Electronic Records Archives Program see Thibodeau, Kenneth (2001): Building the Archives of the Future: Advances in Preserving Electronic Records at the National Archives and Records Administration. In: *D-Lib Magazine*, No. 2, Vol. 7, February 2001, <http://www.dlib.org/dlib/february01/thibodeau/02thibodeau.html>.

'MAKE CONCLUSIONS, RECOMMENDATIONS'

Address the Challenges Cooperatively

'The importance of maintaining the viability and accessibility of digital objects over the long term underscores the need to develop infrastructure in support of these objectives. Given the many shared challenges associated with digital preservation, preservation metadata among them, there is tremendous scope to address these challenges co-operatively ... to advance the imperative of preserving digital objects over the long term.'

Preservation Metadata and the OAIS Information Model: A Metadata Framework to Support the Preservation of Digital Objects.

OCLC/RLG Working Group on Preservation Metadata, June 2002.

http://www.oclc.org/research/pmwg/pm_framework.pdf

The DigiCULT Forum discussions preceded the OCLC/RLG Working Group by a month, but the two gatherings reached the same conclusion ... co-operation is needed between study groups. OCLC/RLG published their report in June⁵ acknowledging the 'tremendous scope' to addressing co-operatively challenges of digital preservation, especially development of metadata protocols.

The DigiCULT experts discussed the RLG's earlier report on *Trusted Digital Repositories*⁶, the Australian Victorian Electronic Recordkeeping System (VERS)⁷, InterPARES⁸, and the project Prism at Cornell University.⁹

The group wanted a survey of these and other reports and initiatives with which the Forum could collaborate. Members considered they should be better informed on existing study infrastructures like the European Commission-backed digital libraries network DELOS¹⁰, the ERPANET project¹¹ and MoReq specifications¹², and the German state Nordrhein-Westphalia's VERA Project¹³, an Internet-based archives administration project.

Group members asked also for the inclusion of projects implementing long-term access to digital collections based on the U.S. Reference Model for an Open Archival Information System (OAIS) that has been adopted as an international standard ISO 14721:2002.

Hans Hofman suggested that such a collaborative effort should 'make available knowledge of what is happening in all these institutions'. He said: 'Everybody who is doing something in the area of digital preservation and authenticity should be involved and should be connected to that network to help identify research issues and solutions, as we have today. We have shown how difficult it is to identify those issues.'

He said the Forum had identified a need for greater archival influence at the moment of the creation of

Short Time Horizons on Authenticity

'A great deal of technology and infrastructure now being deployed will be useful in managing integrity and authenticity over time. However, these developments are being driven by commercial requirements with short time horizons in areas such as authentication, electronic commerce, electronic contracting, and management and control of digital intellectual property.'

Clifford A. Lynch, *Authenticity and Integrity in the Digital Environment: An Exploratory Analysis of the Central Role of Trust*. Washington, DC:

Council on Library and Information Resources, 2000.

<http://www.clir.org/pubs/reports/pub92/lynch.html>

digital objects. Now the group had to identify where it would work.

Luciana Duranti agreed it would work in public environments. 'People I have spoken to in the library field who are publishers etc, do want guidelines on how to do the things right. You cannot impose them on them, but they would be very glad if you gave them criteria because they do have a problem at the source, at the creation of the digital works.'

Other delegates thought some of this guidance was already available from standards, notably the International Standards Organization's Records Management work, ISO15489.

⁵Preservation Metadata and the OAIS Information Model: A Metadata Framework to Support the Preservation of Digital Objects. OCLC/RLG Working Group on Preservation Metadata, June 2002
http://www.oclc.org/research/pmwg/pm_framework.pdf.

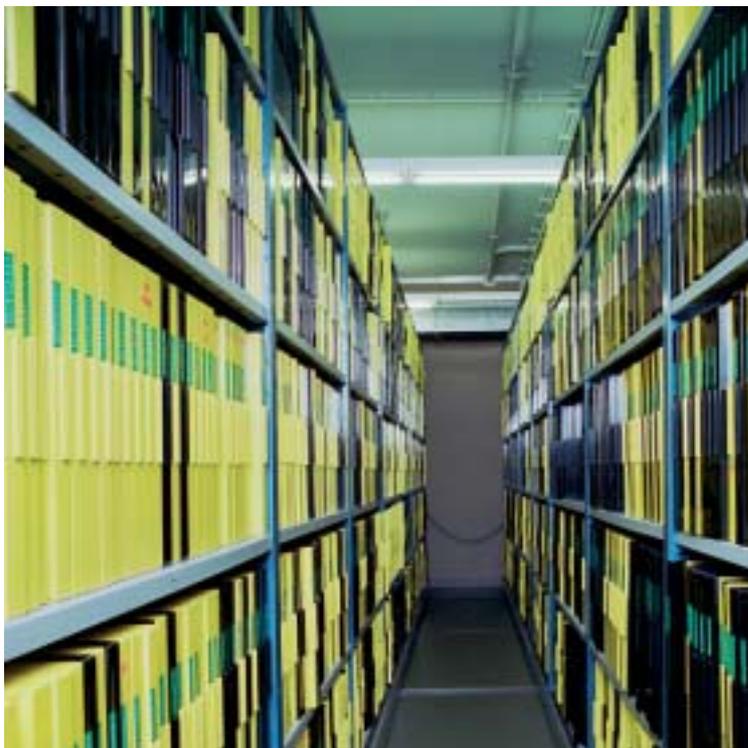
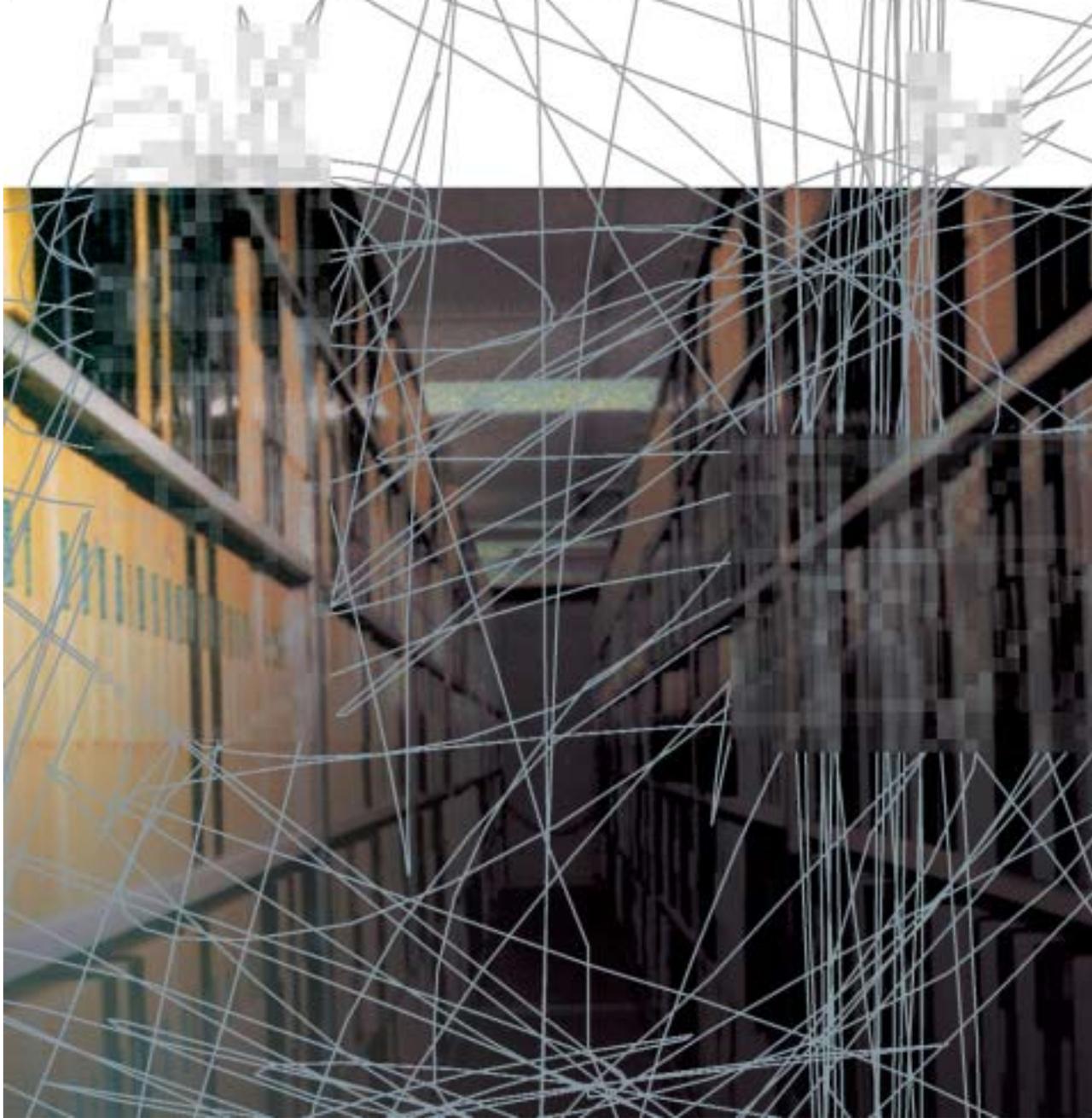


Photo: Beeld en Geluid

The group requested a survey by the DigiCULT Secretariat of research projects and case studies over the last three years. Annemieke de Jong suggested the survey should concentrate on subjects she had looked for in the past and rarely found, things like interactivity, multi-



⁶Trusted Digital Repositories: Attributes and Responsibilities. Mountain View, CA: RLG and OCLC, May 2002. <http://www.rlg.org/longterm/repositories.pdf>.

⁷Victorian Electronic Recordkeeping System. Melbourne: Public Record Office, Victoria, Australia, 1999. <http://www.prov.vic.gov.au/vers/standards/pros9907/99-7-2s2.htm>.

⁸InterPARES: International Research on Permanent Authentic Records in Electronic Systems, <http://www.interpares.org>.

⁹Prism, <http://www.library.cornell.edu/iris/research/prism/>

¹⁰DELOS Network of Excellence on Digital Libraries, <http://delos-noe.iei.pi.cnr.it/>.

¹¹ERPANET, European Resource Preservation and Access Network, <http://www.erpanet.org/>.

¹²MoReq, Model Requirements for the management of electronic documents and records management systems, <http://www.cornwell.co.uk/moreq.pdf>.

¹³Frank M. Bischoff: Staatsarchiv Münster, Das Projekt VERA in Nordrhein-Westfalen: Nutzung der Internettechnologie für die Erschließung und archivübergreifende Verwaltung der Bestände. Münster, NRW. <http://www.uni-marburg.de/archivschule/bischoff.pdf>

¹⁴Clifford A. Lynch: Authenticity and Integrity in the Digital Environment: An Exploratory Analysis of the Central Role of Trust. Washington, DC: Council on Library and Information Resources, 2000. <http://www.clir.org/pubs/reports/pub92/lynch.html>.

media, audio-visual objects and 'complete digital resources'. Case studies should be selected according to the types of digital objects the archives preserved 'so that the object is the criteria, not the institution itself'.

Dr Thibodeau described a 'very strongly argued' paper by Coalition for Networked Information (CNI) Executive Director Clifford A. Lynch¹⁴ asserting that digital authenticity depended on trust. The DigiCULT survey should include 'two aspects of the trust issue'. He identified these as: 'What are the major factors that drive trust decisions, a willingness to place faith in person or institution or solution, that apply in the digital world. And secondly what are the risks entailed with that, those acts of faith.'

It all added up to a lot of work for Forum Secretary, John Pereira, and his Salzburg Research colleagues before the second DigiCULT Forum in Essen, Germany, in September 2002. But at the end of the long, long day, he was still smiling and continuing to ask delegates: 'Is this something we should add to the list?'

Moderator Hans Hofman, reviewing the forum

debate, commented afterwards: 'The discussion showed that the notion of authenticity is still a difficult subject that is being interpreted differently by people with different backgrounds and different perceptions. There was some agreement, however, that the creator, the preserver and the user each play important roles in identifying and maintaining the authenticity of digital objects be they records, publications or audiovisual material. It was also clear that ensuring authenticity starts at the creation of the digital object itself.'

He thought that the concept of authenticity was still seen as confusing. He said: 'It is difficult to get hold of, let alone to approach or deal with it. The Forum asked for a survey of existing initiatives that try to deal with the preservation of digital objects to discover how they approach the notion of authenticity. It was emphasised that closer collaboration between different disciplines or communities is necessary, with a more prominent role for the archival community and its perception of authenticity. So the final word has not yet been spoken on this issue.'

Only co-operation can prevent us from drowning

Undercurrents at some stretches of the Atlantic coast are so strong that people only venture into the water while holding hands with each other. That image springs to mind when you hear Dr Ulrich Kampffmeyer talk about the digital flood that threatens to drown us. 'Unless', he says, 'the ICT industry and the public sector are able to co-operate in developing solutions for document life cycle management. A life cycle, that not only comprises the generation and use, but also the long-term availability, and the guaranteed authenticity of documents.'

Dr Kampffmeyer is director of PROJECT CONSULT, a consulting company for both industry and the public sector, in the area of document related technology. He is also member of the board of AIIM, the Association for Image and Information Management, and chairs the ICT-committee of DLM, an abbreviation that used to stand for 'Donnees lisible par machine' (machine readable data), but has been changed to 'Document Lifecycle Management', representing the wider scope of the subject. DLM-forum is a network initiated by the European Commission, to stimulate co-operation and technology development in archiving.

According to Kampffmeyer, the traditional problems of archiving, are the kilometres of paper documents, whose integrity is threatened by their fragility and a fading consistency. 'These problems seem small when compared to the archiving problems created by the use of new technology', he says. 'The volume of information is growing at an unprecedented pace. We already produce more information per year than we did in the whole period since we descended from the trees. A lot of this information is digital only, meaning it has no physical representation. That makes it much more volatile. An XML-document for instance is created while you view it. So how do you keep it?'

Although generating volatile information, governments want to use these technologies to make their policies more transparent. Everyone must have access to our books, comments Romano Prodi, the president of the European Commission. He is not alone; even the authorities of the smallest village want to be accessible to its citizens via Internet and email. Kampffmeyer: 'A lot of projects are put into gear on all levels of government, and most of them will fail, I'm afraid. Firstly, because the new transparency cannot be created by technology alone; a fundamental change in the administrative organisation is needed. Secondly, because there is not enough money provi-

ded. Ill-defined projects are tendered and awarded to companies offering the lowest price. Which, is of course no guarantee for success.'

'Thirdly', Kampffmeyer continues, 'the technology is not ripe yet, in the sense that it cannot live up to the demands of good governance. You can create electronic documents and you can keep them in an electronic archive. But, for example, an electronic signature to authenticate a document is invalid after three years; the migration of data and the accompanying loss is still an unsolved problem, and the history of electronic records can be tampered with quite easily. People from the industry can show you a nice graphic or run a nice project, but that is not the point. The point is, that technology has to be embedded in organisations and procedures, and that is certainly not the case yet.'

According to Kampffmeyer, the technology is still in its infancy, or, as he puts it, 'at the beginning of its life cycle'. 'Archives of physical documents have been in existence for over 6000 years, whereas, electronic documents have only been around for the last twenty years, or so. The people who develop the technologies, haven't made the mental transition yet, from creating and using a document to the long term availability of that same document.'

To mature, the technology has to be fostered, not only by companies but also by the public sector. 'The industrial approach is always one-dimensional', he says. 'When there is a demand, they look for technical ways to fulfil that. If the public sector goes on issuing ill-defined projects it becomes a downward spiral of failure and frustration. The sensible thing to do is to try and develop standards, predefined structures, metadata and interchangeable formats, through co-operation between the public sector and industry. Not on a local or national level, but on an European and international level. Only through co-operation and co-ordination, can we realise the goal that "electronic archives are the memory of the information society", as Commissioner Erkki Liikanen has put it.'

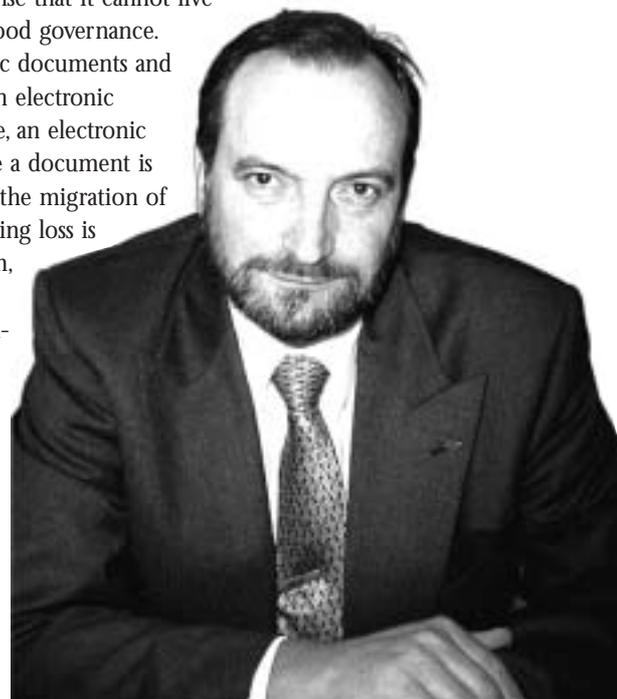


Photo: Project Consult



Interview
with Ulrich
Kampffmeyer,
PROJECT
CONSULT,
Germany

by
Joost van Kasteren



Photo: Beeld en Geluid

ARCHIVING IN THE AUDIOVISUAL PRODUCTION CONTEXT

A CASE STUDY ON THE NETHERLANDS INSTITUTE FOR SOUND AND VISION

By Friso Visser and Pieter Kop

EVERY PROGRAM MAKER HAS TO BECOME A PART TIME ARCHIVIST. AN INTERVIEW WITH ANNEMIEKE DE JONG, NETHERLANDS INSTITUTE FOR SOUND AND VISION

‘In a production environment that becomes more digital by the day, like the broadcasting organisations, everyone has to become a part time archivist. At least if you want to be able to make the programs you want.’ Raising the awareness of the managers of the twenty-eight public broadcasting organisations in the Netherlands and of the producers, directors and other people involved in making television, radio and internet programs is an important task of Annemieke de Jong, head of the Information Policy Sector ICT of the Netherlands Institute for Sound and Vision (former Netherlands Audiovisual Archive).

‘At the moment, a program after broadcasting is archived and made available for reuse and/or research’, she says. ‘A batch process with steps that are only

loosely linked. In the digital environment, the process of information production, broadcasting, archiving and reuse is almost a continuum. A digital workflow consisting of bits and bytes from countless internal and external sources which can be tapped by anyone with the right credentials.’

The Netherlands Institute for Sound and Vision (Sound and Vision) was founded in 1997 (under the name of NAA) out of a fusion between several organisations. It contains 600,000 hours of television, radio and film, 2 million photo’s and half a million musical recordings. Every year it grows by 5000 hours of TV and film-images and about 15,000 hours of audio. That is not all that is broadcasted. Sound and Vision selects the material according to criteria laid down in a handbook. Selection is based on historical importance, national interest, and customer demands. The material is recorded and made available for reuse by the public broadcasting organisations and other professionals as well as for research.



Photo: Beeld en Geluid

Every year Sound and Vision handles 100,000 applications, most of them for reuse of material.

De Jong believes that the ongoing digitisation of the production, distribution, broadcasting and archiving of radio, television and (more and more) web programs will lead to an unprecedented growth of both size and complexity of information. 'To control the flow of information you have to have an infrastructure. You could compare it with the infrastructure of dykes, sluices and other works to control the flow and level of our rivers and streams. So, at the moment we are developing standards and protocols to lay down format and content of digital data. In the near future these standards will help to make and keep the data accessible during all stages of production. From the first idea of a program maker to the storage and possible reuse in twenty-five or fifty or a 100 years.'

The standards and protocols will differ enormously from current practice. De Jong: 'Traditionally we are at the end of the chain. Everything that is broadcasted is itemised and described by our specialised archivists. Not only the content of the program, but also the underlying documents and the footage that has not been used. Quite a cumbersome work that in the light of the growing information flow has to be automated. Replacing a person by a robot will not suffice though. What we aim for is a way of archiving whereby metadata for storage and reuse are generated during the whole process from idea to broadcast and are linked to the content. This content, including related material like documents, will have to be described and categorised in such a way that it can be stored in a database and made available to our clients in a format that suits them.'

When asked, De Jong says that the information will not be stored in one single archive database, but in several databases for television, radio, photographs, musical recordings, catalogue descriptions, and props, such as material items that have been used in programs, like a clowns suit or the hat of a police inspector in a popular series. For easy access it is essential though that these databases are linked through a single interface and that the metadata are compatible. Sound and Vision is in the process of developing a standard for metadata, which is suitable for the audiovisual archive domain.

These metadata differ from metadata of text in the sense that audiovisual content carries more implicit information (colour, shape) and by nature is more temporal (time-dependent). Furthermore, the metadata contain information on technical aspects like format and resolution. That is why Sound and Vision is heavily involved in developing standards for audiovisual metadata both internally and in co-operation with other organisations in EBU (P/Meta project).

De Jong: 'Developing of international standards is a slow process. On the other hand technology development is driving you forward. So we develop our own standards but that process is closely linked to the development of international standards.'

Browser: P/Meta - Metadata Exchange Scheme

P/Meta website, http://www.ebu.ch/pmc_home.html (Task forces) SCHEMAS activity report on P/Meta by A. de Jong (Review date: 2002-01-31), <http://www.schemasforum.org/registry/desire/activityreports.php3>

Richard Hopper: EBU Project Group P/Meta. In: EBU Technical Review, April 2002, http://www.ebu.ch/trev_290-hopper.pdf

A virtual archive can only function if it is strictly managed. At the Netherlands Institute for Sound and Vision De Jong is involved in developing a digital media archive management system that controls the databases, servers and the network, and the actual processing of data. De Jong: 'You could say that it manages the life cycle of the media objects, be it shots, items, summaries, key words or the object as such.' A system like that has to be rather versatile. It has to be able to register and index any media object (image, sound, text) in such a way that it can be identified; to support any existing and future media type; be able to migrate the content between media types; and to be accessible in different ways either via content or metadata. It also must contain the necessary information on copyrights and authorisations. That is quite important because for most of the content Sound and Vision does not own the copyright.

Implementing standards and protocols for archiving is not easy. Partly because of the way the Dutch broadcasting is organised, with twenty-eight independent broadcasting organisations, which all have to be persuaded to use the same standards and protocols. Partly also because programs are made by creative people who lack the discipline for archiving. De Jong: 'If it would be only for archiving in the traditional sense, people would not be motivated to store the content they produce in a formalised way and add the necessary metadata. But, because they experience more and more the difficulties in retrieving digital information, they recognise the need of standards and protocols for storing data. I think if we can give them easy-to-use tools they will be very eager to co-operate, because it makes their work much easier.'

rely on the services provided by Sound and Vision's 160 employees for their publications and research. To do so, Sound and Vision keeps an impressive collection of audiovisual material of which most is kept at the Mediapark in Hilversum, where the Dutch broadcasting industry operates.²

The combined collections of Sound and Vision include over 600,000 hours of footage and sounds, which date back to the very beginning of cinema. Dutch television and radio programs were collected from the first rise of these media until today. Apart from the objects in the Museum of Broadcast, there are 300,000 movies, 125,000 videotapes, 2 million photographs, 17,000 hours of radio-broadcast, 60,000 recordings of concerts and festivals, 100,000 compact disks, 250,000 LP's and 35,000 recordings about the history of broadcasting. Today, one of the largest music collections in the world, the collection is updated on a daily base with new material. Preservation of the old material is an important issue. Better conservation techniques are being implemented to safeguard the collection against decay. An increasing part of the collection is being digitised. The Dutch radio broadcastings are completely recorded and archived, with the exception of the broadcastings of the two music stations. There is no need to record music, which is already present in the archives. The institute acknowledges, however, that the way music is being presented on the radio is in fact part of cultural heritage. Therefore, twice a year, an entire week of broadcasting is recorded.

ABOUT SOUND AND VISION

The Netherlands Institute for Sound and Vision (Sound and Vision)¹, until very recently known as the Netherlands Audiovisual Archive, was founded in 1997 after a merger between four organisations. These organisations – the Archives of Public Broadcast, the Netherlands Government Film Service, the Museum of Broadcast and the Film Research Foundation – all joined forces to preserve and exploit the Dutch audiovisual heritage. Responsibilities vary from those of a cultural heritage institution to a source of information and material for the broadcasting industry. Amongst Sound and Vision's main customers are public and commercial broadcasters, producers, journalists, schools and universities. These customers

¹Sound and Vision website: <http://www.beeldengeluid.nl>

²Within a so-called 'Digital Platform', Sound and Vision cooperates with Dutch public broadcasters (<http://www.nos.nl>) as well as producers (<http://www.nob.nl>) on issues such as metadata standards.



SERVICES

The various departments within Sound and Vision still use different cataloguing systems. In the future, those different systems have to be more closely related, sharing at least the same metadata schemes and thesauri. Implementing these changes have to be done incrementally. The catalogue needs to be accessible to clients seven days a week, from early in the morning to late at night. Material for news items sometimes have to be delivered within minutes, so an 'under construction' sign is unacceptable. An advantage of incremental alternation is the possibility to implement temporarily the agreements made in the discussions on international standardisation issues. Possibilities to test new theories are provided in this process. A clear disadvantage, more on the organisational level, is the psychological impact on employees who have to work with frequently changing systems. The workflow basically consists of acquisition, conservation/preservation and access.

Various publications on audiovisual research are issued in the form of annual reports, press releases, books and guides. Students and researchers have the possibility to access part of the archive with help of digital catalogues. This still has to be done within the premises of the institute and copying of the material requires permission of the holder of copyrights. The study centre provides opportunities to find information about various aspects of the history of media. It holds readings on AV archiving and the use of AV media for purposes of historical research, magazines, guides, catalogues and various other documentations. Recent educational developments consist of online applications of parts of the archives at schools and universities.

Most of the audio materials are held in the Phonotheque. Of each newly released album, the phonotheque acquires two copies, one of which is for borrowing purposes. Each year, 11,000 disks are added to the collection. The general public, as well as broadcasters, have access to the vast collection with the possibility to borrow almost any kind of song, stock-music or sound-effect. The phonotheque also intermediates in copyright issues between creators and users.

Originating from the Museum of Broadcast, Sound and Vision has a permanent exhibition with about 20,000 objects displayed for the general public. An important part is formed by artefacts that are related to the history of radio and television in the Netherlands. The focus, however, is shifting to a

more interactive environment, where AV-materials create an atmosphere of nostalgia. At the moment, a building is being constructed at the Mediapark to house both the museum and the professional services. This new home for Dutch audiovisual heritage will be opened in 2005 (see model on page 23).

INTERNATIONAL

Activities of Sound and Vision are not limited to the country's borders. The institute is presently a board member of the International Federation of Television Archives (FIAT-IFTA) and chairs its Committee on Documentation. International cooperation occurs mostly with European public broadcasters like the BBC, RAI, ORF, SVT and SWT. It also takes part in two workgroups of the European Broadcast Union (EBU), where new digitisation standards for production, broadcasting and archiving processes of radio and television are being developed. Multi Media Content Description Interface, or MPEG-7, is one of the recent projects on standardisation and expectations are high. Other international projects in which Sound and Vision operates are AMICITIA³, ECHO⁴ and PRESTO⁵. Most of the cooperation is focused on development of metadata standards, automated archiving systems and forms of digital preservation.⁶

Participation in ECHO

ECHO is an acronym for European Chronicles On Line. The project started in 2000 as part of the European Commission's 'Fifth Framework' series of projects. The goal of ECHO is to develop a universal software infrastructure for support of digital AV-archives. Four national AV archives, as well as technical and academic organisations, participate in the project. The archives are from Switzerland (Memoriav), France (Institut National de l'Audiovisuel), Italy (Istituto di Luce) and The Netherlands (Sound and Vision). Enhancing access to non-english archive materials is the focus of the project. Access to such materials is often difficult, although the conserved and disclosed materials are no less of importance than the english ones. ECHO provides a forum for cooperation between AV archives through standardised retrieval protocols. Selected material will be accessible via a web interface. Images are easier identified with advanced search methods and multi-lingual access. Automatic extraction of annotations from the context uses a combination of speech indexing, language interpretation and image recognition, which requires the content to be digitised for analysis. Before finishing the project in August 2002, the tasks of Sound and Vision involve formulation of user-demands, designing a suitable corpus, assisting in the development of metadata standards and coordination of the evaluations.



Storage, and subsequent retrieval of thousands of images, sounds and films, requests an orderly data management system. For this, metadata are vital. The merger of the four organisations posed problems for the exchange of information. Systems were obsolete, incompatible and have to be standardised. To accomplish this, metadata standards are being introduced to the cataloguing systems.

Metadata could be defined as 'data about data'. They describe sources of information and classify them. The type of metadata used, depends on the domain it describes and its purpose, such as identification or retrieval of data. Ideas about the grasp of metadata differ from purely data on content to description of the entire process of creation, organisation and software architecture

Exchange of digital information requires the use of standards to allow interoperability of systems and data contained in them. In the first place, standardisation within an organisation is essential. Secondly, as globalisation continues, metadata have to be standardised on a national and even international level to guarantee permanent sustainability. Organisations, who develop standards for AV-metadata, come from the world of broadcasters, AV-producers and archivists. Their operations can vary from a local level within specific fields, to all-including and global standardisation of metadata.

Recent developments regarding standards are:

- Development of metadata taxonomy to facilitate communication about metadata.
- Development of ontologies, linked to metadata features and description of data-elements like fieldnames, types, classification and semantics.
- Defining a central structure of registration in order to facilitate the mapping between different metadata schemas.
- Defining a set of tools with generic functionalities to develop and exploit metadata.

INTEGRITY AND AUTHENTICITY

Integrity and authenticity are abstract concepts, but preserving them is imperative in every stage of the workflow. Criteria for authenticity are based on the components of a digital object, the kind of object (such as text, audio) and the type of usage such as scholarly use or entertainment. In preserving a digital object's authenticity, there is a need for two different sets of requirements, for both creator and preserver. This has been acknowledged by Sound and

Vision, as the metadata, which is added by the broadcasters (creators), is increasingly tuned to the metadata standards designed by Sound and Vision. Although the creator has no direct advantage in using the same metadata standards, in the long run this cooperation facilitates reuse of the material, preserving its authenticity at the same time. Working with the same metadata standards, the character of the metadata differs. The creator should generate metadata, which has to identify the record, whereas the preserver needs to add its own metadata that describes the processes of migration and dissemination of the record.

The concepts of authenticity and integrity of data in relation to AV materials are not very strictly defined. The original data are kept in their raw form as much as possible. However, it is a matter of fact that the materials are often edited. The news, for instance, might be recorded including the footage of a TV comment or also including those items not broadcast at all. Integrity is something that was tampered with in the past. Being a corporate archive, when materials were used, they would be often returned (or not at all) in its edited version. Nowadays, the original is always kept in store, while viewing or lending copies are made available.

The following example indicates how Sound and Vision tries to preserve authenticity of its non-digital collection. When the program 'Big Brother' appeared on Dutch television, the public opinion was divided about its consequences. Psychologists and sociologists condemned the program, pointing at potential dangers for both viewers and participants, while the general public embraced this new way of making television. Millions of people would watch the show every day and the ones that did not, found it increasingly difficult to strike up a conversation with one of the viewers. This controversial program began to look at the relationship between privacy and television in a new way. For this contribution to the cultural heritage alone it was worth preserving the concepts, programmes and related material. The project leader of Sound and Vision's museum, exploring the possibilities of an exhibition dedicated to Big Brother, came up with the idea of showcasing one of the camera's that was actually used in the program. In his attempts to find the authentic cameras, he experienced some difficulties in explaining the concept of authenticity to the employees of the technical service, which exploits the equipment. They did not understand why this one specific camera, out of hundreds of identical cameras, had to be identified and displayed in a museum.

³AMICITIA website:
<http://www.amicitia-project.de>

⁴ECHO website:
<http://pcerato2.iei.pi.cnr.it/echo/>

⁵PRESTO website:
<http://presto.joanneum.ac.at>

⁶An impressive guide on metadata and standards is a publication of Annemieke de Jong, who works for SOUND AND VISION. Unfortunately this is only available in Dutch. Jong, A. de (2000): Metadata in de audiovisuele productieomgeving. Hilversum, The Netherlands.

THE DIGITAL



Photo: Beald en Gebuid

The BBC has one of the biggest audio-visual archives in the world, analogue mountains of archival material to which on an increasing scale of digital material is added, because for about four years, everything created in the BBC has been on a digital format.

As Paul Fiander, Head of BBC Information & Archives, described the situation in the Forum in Barcelona: 'If you look at the BBC, we started seventy-five years ago collecting material. In the modern era the BBC has traditionally transmitted from two television channels and five radio channels. The BBC now has seven television channels and will soon have over twenty radio channels, in addition to a new media site that creates thousands of new pages every month. We are also just about to start permanently broadcasting in interactive where for every traditional stream of linear content, lets take a sport, we now have six streams, such as camera position, information, etc. So, whatever principles we agree on retention and archiving, suddenly our job is expanded by factors of ten, twenty or even 100. We employ at the moment within the BBC 250 people solely related to the archive. If you multiply the content without finding some automatic way of doing it, you can see that the number of people we require will get beyond any number reasonable to employ. Think for a minute, we are just talking about new content being created today. I have not even mentioned or proposed a method to deal with the analogue mountains created in the past.'

According to Fiander, they have spent about 35 million Euro so far in preserving analogue material. The BBC will probably spend up to 90 million euro on the whole preservation process, and a lot more than that in managing these assets.

BBC Information & Archives is a business unit that not only has to demonstrate to UK licence fee payers and professional archivists the quality and standards of how it looks after the BBC's broadcast material. It also has to demonstrate to the management and stakeholders that it is supportive in providing value for money in the arena of public service TV. In doing so, bringing analogue archival material into the digital world is essentially about facilitating better accessibility, reuse, and valorisation.

In the light of volumes of digital material that are nearly on an exponential scale of growth, Fiander calls for clarification of principles and pragmatic solutions.

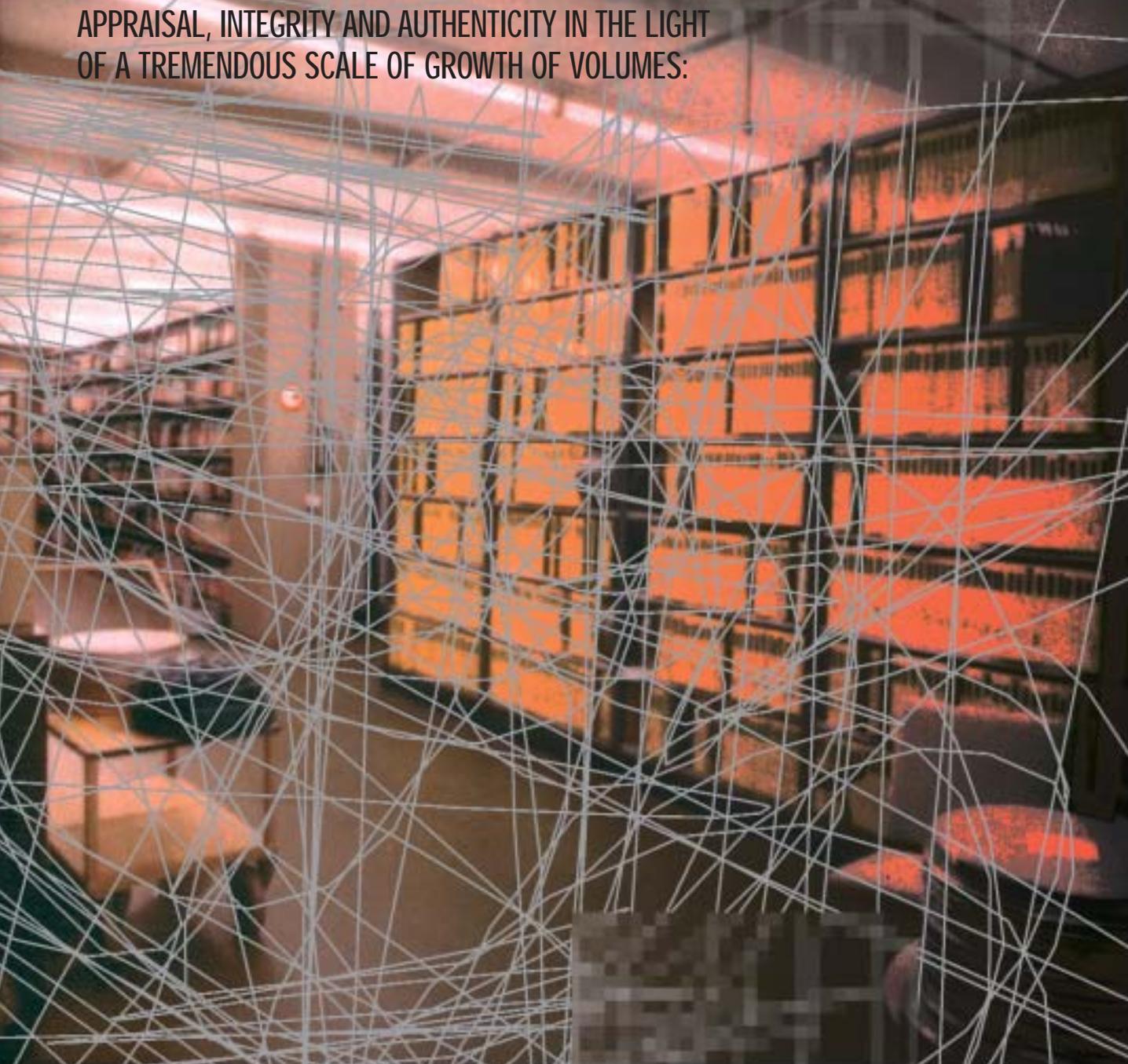
For example, 'authenticity in an audio-visual world, does that say we should not compress, what do we lose by MPEG-1-2-21?' Some national archives do not accept material that has been compressed (because they cannot guarantee that it can be rendered to its original state). But, if you are the BBC and facing such an enormous growth of material, how do you accommodate to that? Can you still keep everything that is deemed valuable, or do you have to adapt your selection and retention policy, to match your funding?

Actually, the BBC does not keep everything, because 'lack of space, lack of funds whatever criteria you want to apply, is forcing us to change our selection and retention policy. If I give you an example from television, we will keep all of the landmark series, all the good programmes, but , we won't keep all the cookery programmes, and we certainty will not keep all the quiz shows, we will keep examples of those. The content volumes are rising, so we will inevitably be more selective unless we can find technological solutions that enables us to reduce the unit cost of selection, retention and storage. Without these technological solutions you may be tempted to leave it to the market alone, such as those items that have the highest short term re-use value in which case we will focus highly on sports, the wealthiest user group.'

In the Forum discussion, Nils Brübach stated that 'the appraisal policy should not be simply based on economic matters', but be defined beforehand instead of 'seeing it as a budgetary reflex'. Ken Thibodeau added, that the digital environment might well lead to the beneficial situation that players like, for example, the Universal Studios 'keep a lot more material than they ever did before, because they can slightly repurpose it and create new markets. So the archives become a revenue generator.' Fiander affirmed, that representatives of such companies see 'a new exploitation track, but who wins again, I am sorry but we are back with sport again.' (-gg)

BROADCASTER EXAMPLE: BBC

APPRAISAL, INTEGRITY AND AUTHENTICITY IN THE LIGHT
OF A TREMENDOUS SCALE OF GROWTH OF VOLUMES:



LESSONS LEARNED

The mission statement of Sound and Vision can be divided into two parts. On the one hand, it is the central archive of Dutch public broadcast, managing a broad selection of television and radio programs, music and requisites. On the other hand, Sound and Vision has set itself the difficult task to preserve AV-material and secure the permanent access to the collection for the general public. This hybrid system posed some problems and misunderstandings in the past. For instance, a journalist wanted to have one of the recently broadcast news items removed from the archive and changed, because he had made a mistake and was not satisfied with the results of his creation. To his surprise, this request was not granted.

In the 1960's, a popular serial for children was broadcast on Dutch television. The tapes, on which the material was stored, were expensive and the decision was made to reuse the tapes for new productions. The serial was lost forever. A decade later, this amnesia of memory institutions returned at the expense of the popular serial 'Dr. Who', which mysteriously disappeared from the BBC archives.

Also because original materials were borrowed and never returned, information from the archives have been lost. The only recordings of Queen Beatrix's coronation went missing from the archives for half a year, but were fortunately recovered. Some material that was borrowed and never returned is now probably part of someone's private archive. These incidents made Sound and Vision change its policy towards borrowing and, with the exception of material of the phonotheque, original sources are first copied before being borrowed.

FUTURE SCENARIO

Integration is the magic word for the future of Sound and Vision. Integration of standards, methods, technologies and services will absorb a lot of time. iMMix is an asset management system which supports management of rights, metadata and essence. It will enhance acquisition, conservation, indexing, retrieval, borrowing and Customer Relationship Management (CRM). Even the financial administration will be integrated in the system. The project 'Store-it' deals with the creation of an infrastructure for digital storage and distribution of essence. The results will also be implemented in iMMix. The information system will be implemented during the

next few years. Some of its elements are considered essential and urgent enough to realise within two years in a basic system. This pilot will consist of a catalogue module with an interface to a new automated thesaurus. Avail is the name of the present cataloguing system of radio and television, which runs under UNIX. Both, Sound and Vision and the public broadcasting industry use this system, so the new catalogue in iMMix has to be developed in cooperation with the broadcasters.

A current development in the AV environment is so-called tape less production. In the ideal situation, the production, broadcasting, archiving, retrieval and reuse, should be fully digitised. The barriers between this future situation and the present one are notably technological. Digital storage is only feasible for a small part of the AV collection. There is simply too little capacity. Given the contemporary technologies, digitisation would mean replacing tapes by disks, or better, expanding the existing collection with disks, since the original will never be discarded. Furthermore, this material cannot be accessed online continuously, which makes additional human intervention necessary.

The ever-increasing pace of change in computer hardware and software is not the only thing threatening the collection. Also the players of AV-material have been evolving. For some old tapes, there is only one player left in The Netherlands, with the only source for spare parts being East-German tape recorders. It is clear that Sound and Vision is an organisation, which will always be confronted with changing situations. The Institute is gradually playing a more important role as an intermediary, increasingly setting itself proactive tasks in production and exploitation of new AV material. Fighting for preservation of a rapidly growing collection, Sound and Vision will have to develop a way to sustain and handle the workflow within a highly dynamic environment.

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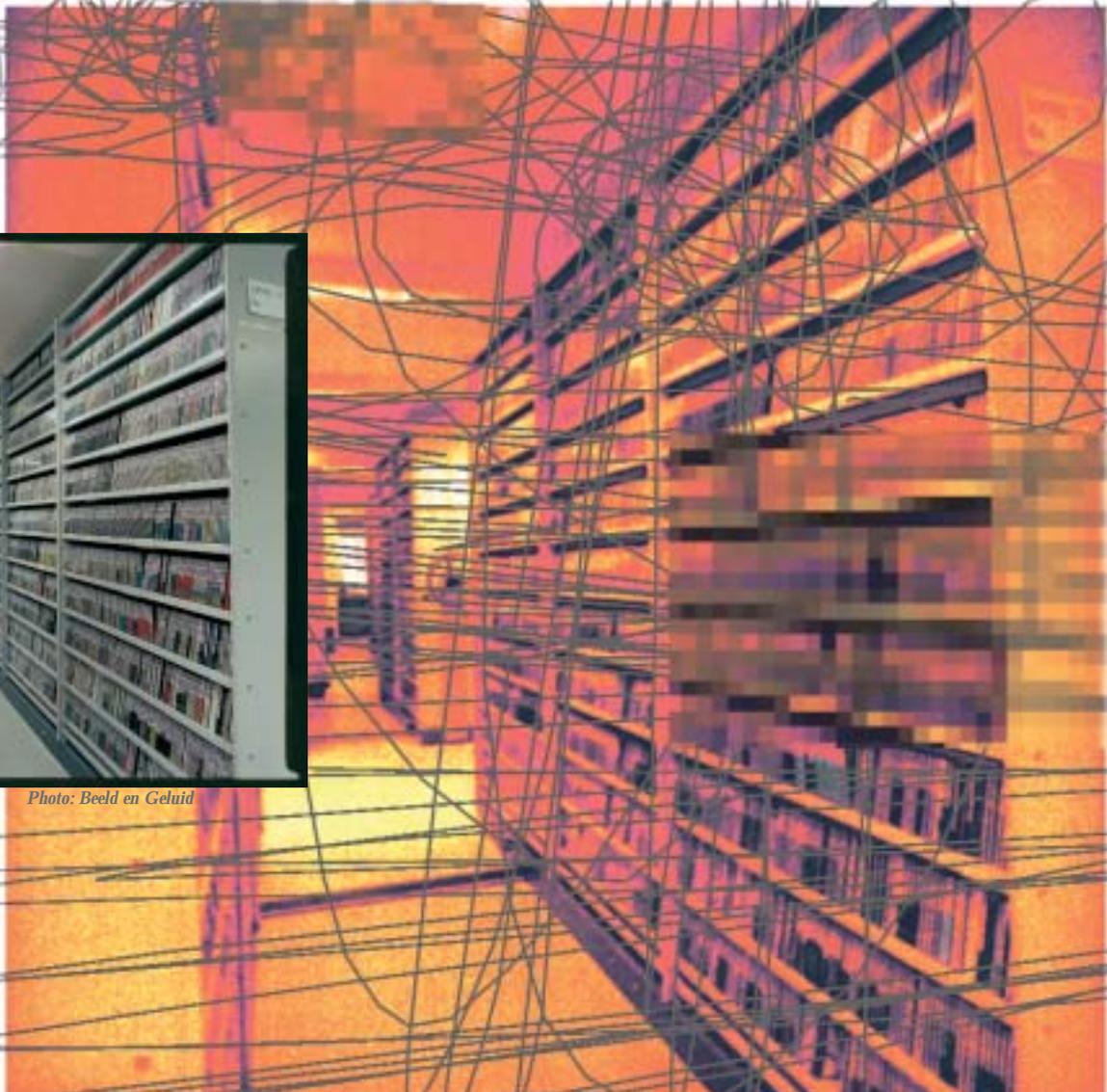
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Photo: Beeld en Geluid



LITERATURE

Reading Lists on Authenticity & Integrity:

Association of Canadian Archivists, ACA Institute 2002: Approaches to the Preservation of Electronic Records. Reading list, <http://archivists.ca/institute/2002/readings.htm>

PADI (Preserving Access to Digital Information) website: Authenticity, <http://www.nla.gov.au/padi/topics/4.html>

Readings:

Authenticity in a Digital Environment,

Council on Library and Information Resources, May 2000. <http://www.clir.org/pubs/reports/pub92/pub92.pdf>. This report is based on a workshop organised by CLIR in January 2000. The workshop aimed to clarify the meaning of 'authenticity' when related to digital information. Papers by five authors - Charles Cullen, Peter Hirtle, David Levy, Clifford Lynch, and Jeff Rothenberg - address questions asked by CLIR about what authenticity means.

Bearman, D. and Trant, J. (1998): Authenticity of Digital Resources: Towards a Statement of Requirements in the Research Process, *D-Lib magazine*, June 1998, <http://www.dlib.org/dlib/june98/06bearman.html>

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Day, M. (1999): Metadata for digital preservation: an update (12/1999). *Ariadne* 22, <http://www.ariadne.ac.uk/issue22/metadata/intro.html>

InterPARES Authenticity Task Force, Authenticity Task Force Final Report, <http://www.interpares.org/>

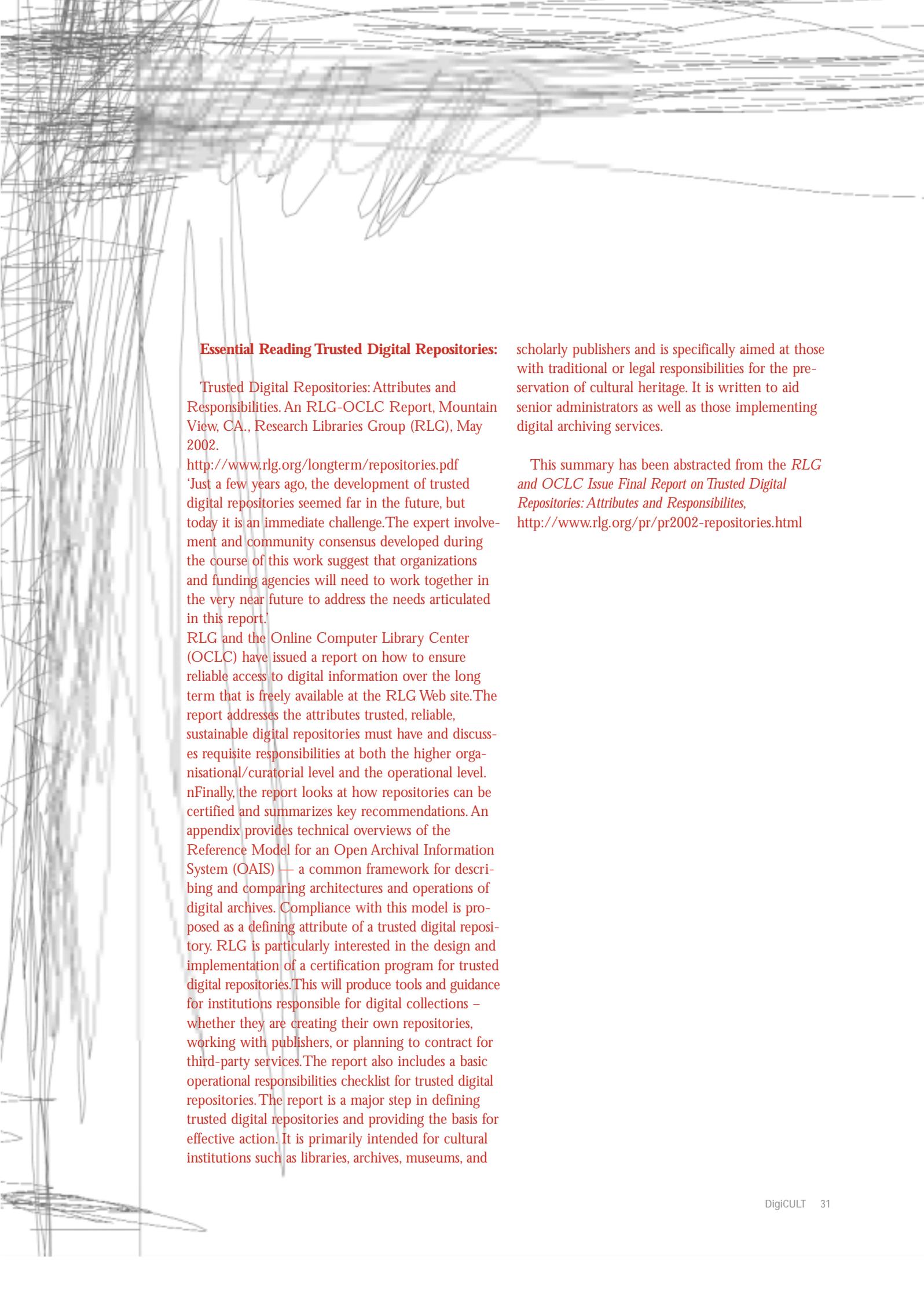
OCLC/RLG Working Group on Preservation Metadata (2002): *Preservation Metadata and the OAIS Information Model: A Metadata Framework to Support the Preservation of Digital Objects*. June 2002. http://www.oclc.org/research/pmwg/pm_framework.pdf. The report is a comprehensive guide to preservation metadata that is applicable to a broad range of digital preservation activities. It is intended for use by organisations and institutions managing, or planning to manage, the long-term retention of digital resources.

Russell, Kelly (2000): Digital Preservation and the Cedars Project Experience. In: *Preservation 2000. Conference Papers*, <http://www.rlg.org/events/pres-2000/russell.html>

Waters, D. and Garret, J. (1996): *Preserving Digital Information. Report of the Task Force on Archiving of Digital Information*, commissioned by the Commission on Preservation and Access and the Research Libraries Group. Washington, D.C.: Commission on Preservation and Access.

<http://www.rlg.org/ArchTF/>
This report arose from a decision at the end of 1994 by the Commission on Preservation and Access (CPA) and the Research Libraries Group (RLG) to create a Task Force charged with investigating and recommending means to ensure 'continued access indefinitely into the future of records stored in digital electronic form.' This was a watershed exercise which generated thoughtful discussion on this topic worldwide.





Essential Reading Trusted Digital Repositories:

Trusted Digital Repositories: Attributes and Responsibilities. An RLG-OCLC Report, Mountain View, CA., Research Libraries Group (RLG), May 2002.

<http://www.rlg.org/longterm/repositories.pdf>

'Just a few years ago, the development of trusted digital repositories seemed far in the future, but today it is an immediate challenge. The expert involvement and community consensus developed during the course of this work suggest that organizations and funding agencies will need to work together in the very near future to address the needs articulated in this report.'

RLG and the Online Computer Library Center (OCLC) have issued a report on how to ensure reliable access to digital information over the long term that is freely available at the RLG Web site. The report addresses the attributes trusted, reliable, sustainable digital repositories must have and discusses requisite responsibilities at both the higher organisational/curatorial level and the operational level. Finally, the report looks at how repositories can be certified and summarizes key recommendations. An appendix provides technical overviews of the Reference Model for an Open Archival Information System (OAIS) — a common framework for describing and comparing architectures and operations of digital archives. Compliance with this model is proposed as a defining attribute of a trusted digital repository. RLG is particularly interested in the design and implementation of a certification program for trusted digital repositories. This will produce tools and guidance for institutions responsible for digital collections — whether they are creating their own repositories, working with publishers, or planning to contract for third-party services. The report also includes a basic operational responsibilities checklist for trusted digital repositories. The report is a major step in defining trusted digital repositories and providing the basis for effective action. It is primarily intended for cultural institutions such as libraries, archives, museums, and

scholarly publishers and is specifically aimed at those with traditional or legal responsibilities for the preservation of cultural heritage. It is written to aid senior administrators as well as those implementing digital archiving services.

This summary has been abstracted from the *RLG and OCLC Issue Final Report on Trusted Digital Repositories: Attributes and Responsibilities*,

<http://www.rlg.org/pr/pr2002-repositories.html>

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Dr. Julien van Borm has been Director of UIA Library University of Antwerp since 1989, and acts as managing director of Anet, the library automation center of the University of Antwerp, Belgium. Other duties include for example: President of the Council of Flemish Public Libraries, Member of the Flemish Cultural Council, Member of the Belgian Conference of University Libraries and the Royal Library, Member of Sabido, the libraries workgroup of the Dutch-Flemish Language Union. Dr. Borm has worked on EU level in the framework of the IST-program and for the Belgian Focal Point for the EC IST program.

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Paul Fiander

Paul Fiander is Head of Information and Archives, BBC, United Kingdom. He first joined BBC Worldwide in 1992. In June 1998, he was given the task of positioning the business unit Information & Archives (I&A) for the digital age and stabilising its losses which were running at approximately £2m per year. His main responsibilities are to give I&A financial stability, to take a keen interest in operational issues of the department, and to demonstrate to the outside world, both licence fee payers and professional archivists, the quality and standards of how I&A looks after the BBC's broadcast material. One of his main functions with the management team is to formulate the strategy for I&A's future. To ensure it builds the skills, systems and technology to put I&A in the best position to help its customers, stakeholders and staff.

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Annemieke de Jong is Head of Information Policy at the Netherlands Institute for Sound and Vision (until July 2002: National Audiovisual Archive). In this function she designs strategies for positioning AV archives in the digital era and develops policies for preservation and reproduction of digital audiovisual media. Before, she worked as senior archivist at the Central Archive of the Public Broadcasting Companies (FBA), 1982-1990, and manager of its Television Archives, 1990-1997; she also served as Head of Catalogue of the National Audiovisual Archive, 1995-1998. Her international activities include: Member of the Executive Council and Chairperson of the Documentation Commission of the International Federation of Television Archives (FIAT/IFTA), 1994-2001; Member of the Media Management Commission of the FIAT/IFTA, 2001-; project manager of the National Audiovisual Archive (NAA) for the IST-Project ECHO, 1999-; Member of the P-Meta project group of the EBU, 2000.

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DIGICULT: PROJECT INFORMATION

DigiCULT is an IST Support Measure (IST-2001-34898) to establish a regular technology watch that monitors and analyses technological developments relevant to and in the cultural and scientific heritage sector over the period of thirty months (03/2002-08/2004).

In order to encourage early take up, DigiCULT produces seven Thematic Issues, three Technology Watch Reports, along with the newsletter DigiCULT.Info.

DigiCULT draws on the results of the strategic study 'Technological Landscapes for Tomorrow's Cultural Economy (DigiCULT)', that was initiated by the European Commission, DG Information Society (Unit D2: Cultural Heritage Applications) in 2000 and completed in 2001.

Copies of the DigiCULT Full Report and Executive Summary can be downloaded or ordered at <http://www.digicult.info>.

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DigiCULT Thematic Issue 1 builds on the first DigiCULT Forum roundtable that discussed the subject of Integrity and Authenticity of Digital Objects. This expert roundtable was held in Barcelona on May 6th, 2002, in the context of the DLM-Conference 2002.

DigiCULT Thematic Issue 2 will follow the expert roundtable on Digital Asset Management for Cultural Heritage Institutions, that will take place in Essen, Germany, on September 3rd, 2002, in the context of the AIIM Conference @ DMS EXPO.



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