

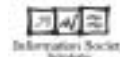


# DigiCULT .Info

Issue 3 A Newsletter on Digital Culture

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## INTRODUCTION

Our third issue of the DigiCULT.info Newsletter continues to reflect growing community participation in the DigiCULT Forum activities. This issue includes information about forthcoming events, reports on emerging standards and tools, examines some approaches to the improved discovery and preservation of digital objects, considers the needs of the heritage sector for top level Internet domain names, introduces the concept of web services and a distributed framework for museum exhibitions, and concludes with a consideration of charging models for digital resources. As in previous issues we have included a selection of events and calls for papers. At the end of 2002 DigiCULT launched

an events service on its website to enable those hosting conferences, exhibitions, or seminars to make information about them available to the DigiCULT community. We will supplement this facility in the near future with DigiCULT Alert, which will notify registered users about new events as they are posted. The events facility was supplemented in February (2003) with DigiCULT Links. This service provides a place for heritage institutions, projects, and standards organisations to list their web services and, thereby, contribute to establishing a comprehensive resource for the heritage community.

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As the note of the EVA held recently in Moscow makes evident this series of conferences continues to deliver a forum to enable the exchange of ideas and to stimulate discussion and collaborative activities. The event, held in the splendid surrounds of the Tretyakov Gallery, brought together 700 participants to examine digital imaging, electronic resources and the visual arts. We briefly record the 18th International CODATA Conference (2002) and look forward to the publication of the papers delivered at it; they were among the highest quality papers we heard at any conference this year.

Since pioneering researchers including Father Roberto Busa, who shortly after World War II convinced Thomas Watson at IBM to supply technological know-how for a concordance of the works of Thomas Aquinas using punch cards and sorting machines, and Spaulding, who demonstrated in 1953 how computers could enable the application of statistical techniques to discover artefact types, the arts and humanities have made increasing use of computers to enable them to ask questions that were not feasible with traditional research tools. David Green (NINCH) has granted us permission to reprint his note of a conference held in Washington DC in January (2003) which reflected on the successful applications of ICT to humanities research and stressed the need for greater collaboration between computing scientists and humanists to ensure the creation of the new generation of methods and tools needed by humanities researchers.

On the 17th of December 2002 the European Commission released the first call for proposals under the Sixth Framework RTD Programme. Of the programme areas included in this call the one which appears to best provide support opportunities for the cultural heritage sector is Technology-enhanced Learning and Access to Cultural Heritage (IST-2002-

2.3.1.12). This action line should lead to 'advanced systems and services that help improve access to Europe's knowledge and educational resources (including cultural and scientific collections) and generate new forms of cultural and learning experiences.' The call for proposals closes on the 24th of April 2003. Andrea Mulrenin (Salzburg Research) summarises the results of a concertation day which Directorate-E of DG INFSO held on the 28th of January to examine the shape of the research agenda for the cultural agenda under the Sixth Framework Programme.

Alice Grant introduces the CIMI XML Schema for SPECTRUM that enables museums to encode descriptive information concerning objects in their care. The Schema has successfully passed through its testing phase and is now available for comment. This development should be as significant for the museum community as earlier work led by Daniel Pitti to establish EAD (Encoded Archival Description) was for the archival community.

Monica Greenan of ERPANET has contributed a review of DSpace, an open source digital repository toolkit developed by MIT and Hewlett-Packard to provide a platform to secure intellectual output of researchers in academic institutions. This preservation toolkit offers a valuable resource for institutions. We hope to follow this article in a future issue with the results of an experiment that Monica is co-ordinating into just how easy it is to setup and configure a DSpace environment.

The proliferation of digital assets in heritage institutions has brought widespread availability of cultural resources in digital form. Search engines alone do not offer a solution to the discovery of these resources and they do not address the problem of interoperability between resources. The Open Archives Initiative (OAI) offers a mechanism to ensure the

interoperability of digital resources. Leona Carpenter and Rachel Heery examine OAI's value to the cultural heritage sector and its likely impact.

The October 2002 issue of this Newsletter included an article by Hans Hofman (Senior Advisor at the National Archives of the Netherlands) on preservation metadata. In this issue Steve Knight, Digital Library Transition Co-ordinator at the National Library of New Zealand, introduces the Metadata Standards Framework. The schema, in Steve Knight's words, aims 'to strike a balance between the principles of preservation metadata, as expressed through the OAI Model, and the practicalities of implementing a working set of preservation metadata'. It makes a fundamental contribution to the construction of preservation metadata strategies. We would be delighted to include articles from others in the community on this topic.

Cary Karp (Swedish Museum of Natural History) examines the new opportunities arising for the heritage community from changes to Internet top level domain names. He charts the development of the museum domain name and wonders whether other ALM sectors should respond to ICANN's forthcoming call and put themselves forward as a candidate for a new top level domain name. Would the International Council of Archives (ICA) or the International Federation of Library Associations (IFLA) wish to press for .archives or .library domains?

Net-based delivery of information and services is still in its infancy and the shape of these future developments remains unclear. We tend to hear a lot these days about the Semantic Web (see forthcoming DigiCULT Thematic Issue no. 3), but there are other emerging technologies which will prove to have a more immediate impact on the functionality and usability of

the web. Paul Miller, UKOLN Interoperability Focus, reviews Web Services and demonstrates their possible uses within the ALM community.

Online digital museum exhibitions offer a platform for institutions to improve public access to and understanding of the cultural heritage, but the fact that their creation remains a 'handicraft' has constrained their broad adoption. Samuel Cruz-Lara of LORIA/INRIA (France) and Jen-Shin Hong of the National Chi Nan University (Taiwan) describe their research to improve the design, development and delivery of digital museum exhibitions. New technologies not only enable museums to reach beyond their walls through virtual exhibitions, but they offer new ways for visitors to access resources and participate in exhibitions. Angela Spinazze (CIMI), describes the Handscape project, which is exploring the use of handheld mobile computing devices in museums.

Simon Tanner brings the Newsletter to a close with a summary of the results of an investigation the Higher Education Digitisation Service (HEDS) conducted for the Andrew W. Mellon Foundation into charging models for digital materials in the cultural heritage sector. The long-term access to digital heritage assets depends on institutions developing and adopting suitable sustainability models.

Since we put this issue together the National Science Foundation's (NSF) Advisory Committee for Cyberinfrastructure has published, on the 3rd of February 2003, 'Revolutionizing Science and Engineering through Cyberinfrastructure'. The report, which focuses on mechanisms that would 'radically empower' the scientific and engineering arenas, has implications for the DigiCULT community. We shall examine these in more detail in the May Newsletter. The

Committee's report stresses that the infrastructure needed to foster new research developments can not be constructed from existing components, but its creation depends upon further fundamental investigations in computing science and engineering. The Cyberinfrastructure report itself can be found at: [http://www.community-technology.org/nsf\\_ci\\_report/](http://www.community-technology.org/nsf_ci_report/)

While the European Commission's Web site provides a rich source for information about the programmes and projects it has supported, readers may find a new CD-ROM: 'Towards a Knowledge Based Society: European Multimedia Research' provides a handy and rich source of material about 400 projects supported under Key Action III (Multimedia Content and Tools) of the IST (Information Society and Technologies) programme of the European Union's Fifth RTD Framework (1999-2002). As the authors of the accompany booklet explain, the CD 'demonstrates a plethora of innovative ideas being turned into multimedia products and services' to enable the new information-rich e-business economy.

Our introduction to this Newsletter provides an opportune place for us to record our thanks to Friso Visser who has now left IBM (one of the three DigiCULT Partners) to take up the post of manager of bibliotheek.nl, the Dutch Virtual Library. Without Friso's vision and resourcefulness the current DigiCULT activity might not have continued after its initial study phase. We thank him for his efforts and wish him the best in his new post.

Finally, keep watch for the publication in March of DigiCULT's first Technology Watch Report, it provides an introduction to six key technologies: Customer Relationship Management Systems, Digital Asset Management Systems, Games, Human Computer



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Interface, Smart Tags and Labels, and Virtual Reality and their role in the ALM sectors.

We hope that as well as reading the Newsletter you will discover that you have information or ideas that you would like to ensure reaches the wider DigiCULT community. If you do, we welcome contributions to future issues of the Newsletter.

Seamus Ross & John Pereira  
Editors, DigiCULT.info

# DIGICULT - ENGAGING THE SECTOR

## DIGICULT FORUM 3 IN DARMSTADT, "XML: TOWARDS AN INTEROPERABLE SEMANTIC WEB FOR HERITAGE RESOURCES"

Gathered on a cold winters day at Fraunhofer IPSI in Darmstadt for the third in a series of seven DigiCULT

Fora, it seemed only appropriate that the invited experts should be asked to deal with a hot topic. A topic that although

increasingly quoted in the development arena remains illusive in substance. The reserved opening greetings to the forum echoed this sense of despair, however it soon gave way to a lively and provocative discussion that was unleashed with the questions what is the Semantic Web, and what will it bring, or not bring to the ALMs?

We invite you to return in March 2003 for the results of how the professionals and experts, representing the diversity of approach within the academia, application and cultural heritage communities dealt with 'XML: Towards an Interoperable Semantic Web for Heritage Resources'.

The DigiCULT Thematic Issue no. 3 covering this topic will be available in March 2003.



DigiCULT Forum, Darmstadt. © Salzburg Research

## Thematic Issue 2 'Digital Asset Management Systems for the Cultural and Scientific Heritage Sector'



DigiCULT Thematic Issue Number 2 is now available for download from the DigiCULT website.

It is a synopsis of the DigiCULT Forum on "Digital Asset Management Systems for the Cultural and Scientific Heritage Sector", held in Essen on September 3rd, 2002.

The Issue highlights the fact that a cultural heritage organisation's ability to harvest, re-use and realise the value of its assets, will only ever be as good as the mechanisms that it can put in place for storing and retrieving assets from the media vault.

## CONTACT THE PEOPLE BEHIND DigiCULT FORUM

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# HIKING UP MOUNT EVEREST

INTERVIEW WITH MARCO MELI, EDW INTERNATIONAL. BY JOOST VAN KASTEREN

‘At the moment there is no clear vision of what the Semantic Web is and what it could mean. Like the top of Mount Everest it is shrouded in clouds. The tools for developing the Semantic Web do not come close yet to what we need. It is like hiking up Mount Everest in a pair of sneakers’. Marco Meli, co-founder and director of EDW International, an Italian company involved in corporate publishing and developing content management applications, is not so much sceptical about the Semantic Web as realistic. A touch of realism is needed, because a lot of people tend to get carried away by the promises of the Semantic Web. Meli: ‘Three years ago no one had heard about the Semantic Web or about XML. Now it seems that even the coffee machine is fitted with XML to pour you your favourite cup of coffee. But I doubt very much that you can get to the top of Mount Everest in a pair of sneakers.’

XML, eXtensible Markup Language, is an important tool for creating the Semantic Web at least in the vision of Tim Berners Lee and other protagonists of a World Wide Web, that lets machines communicate with each other to produce meaningful and relevant data for different kinds of users. Meli: ‘In my view XML as it is used now is no more than a means to exchange commands and visualise objects. It is a major breakthrough, because it allows strong interoperability among different applications from different vendors in different operating systems. That is still a long way from ‘semantics’, i.e. meaningful exchange of information. Some people consider XML to be a form of syntax, an agreement on the grammar. You definitely need syntax but it won’t get you anywhere

near a real Semantic Web. On top of that you have to have an agreement on the meaning of words and concepts, in short an ontology.’ An ontology can be defined as ‘a set of knowledge terms, including vocabulary, semantic interconnections and rules of inference and logic for a particular topic or domain’<sup>1</sup>.

In the short term the Semantic Web will only be a new mechanism for accessing data on the Web, Meli says. This is a very useful target worth pursuing in the short term. ‘Developing a Semantic Web that produces meaningful information is something for the future, because we still have no ideas on how to deal with meaning outside a very constricted domain. It is as I said, a new field of research and it will take some time to develop useful applications.’ Large companies such as IBM and Microsoft have not said which tools and formats should be used. For example, they are not investing very much money and effort in the development of RDF, the Resource Description Framework, supposedly (at least in the W3C community) the basic language for representing semantics on the Web. Only Adobe among the major software publishers seems to be working on it, says Meli.

Meli is nevertheless investing in the Semantic Web: he is actively involved in MESMUSES (<http://cweb.inria.fr/Projects/Mesmuses/>), a European project that definitely has a semantic flavour to it. The aim of the project is to develop tools, such as an active memory manager, to organise, structure and present scientific and technical knowledge offered to the public by science museums. Meli: ‘We try

to formalise domains inside cultural institutions like the Cité de Science et Industrie (<http://www.cite-sciences.fr>) in Paris. They are developing a portal that accesses information sources on the human genome project in a way that is understandable and meaningful for the user, in this case the general public. Another project is the Panopticon Lavoisier, which is aiming to build a virtual museum, accessible via the Internet, containing documents and instruments of the French chemist Lavoisier. The method we are using for representation is based on the C-web data model. Developed in Europe, it is a method that allows you to create knowledge maps, by defining and connecting neighbouring knowledge domains. You could call it a sort of scientific cartography.’

What motivates a commercial organisation to become involved in a cultural project like MESMUSES when the Semantic Web is still far away? Meli: ‘The Semantic Web might be something of the future, but that does not mean there is no use for concepts, methods and tools that enhance the accessibility of data. In that respect there is not much difference between corporate publishing and opening up our cultural heritage. Our cultural heritage can be described as the memory of our society, a very complex memory in fact. Corporations also have a memory of formal and tacit knowledge. They might be a bit smaller and a bit less complex, but to access both types of memory and to retrieve the information they hold in a meaningful way you need the same type of tools. That is why EDW International thinks it is important to be involved in the development of the Semantic Web, far away though it still may be.’

<sup>1</sup> Hendler, J., 2001. ‘Agents and the Semantic Web,’ IEEE Intelligent Systems, vol. 16, no. 21, (March/April 2001), 30-37.

## DIGICULT TECHNOLOGY WATCH BRIEFINGS OPEN FOR ONLINE COMMENT

DigiCULT aims to engage the cultural heritage community in a dialogue on the effective application of technology, and among the ways that we attempt to do this is through our website.

With the development of an Online Comment System (OCS), users can now comment on drafts of the DigiCULT Technology Watch Briefings, adding

valuable input before they are finally bundled together to form the DigiCULT Technology Watch Report. The interface is a simple easy to use PDF document that presents itself in a split frame allowing users to view simultaneously the PDF document, see the comments that they have already made on the document, and to write and submit additional comments.

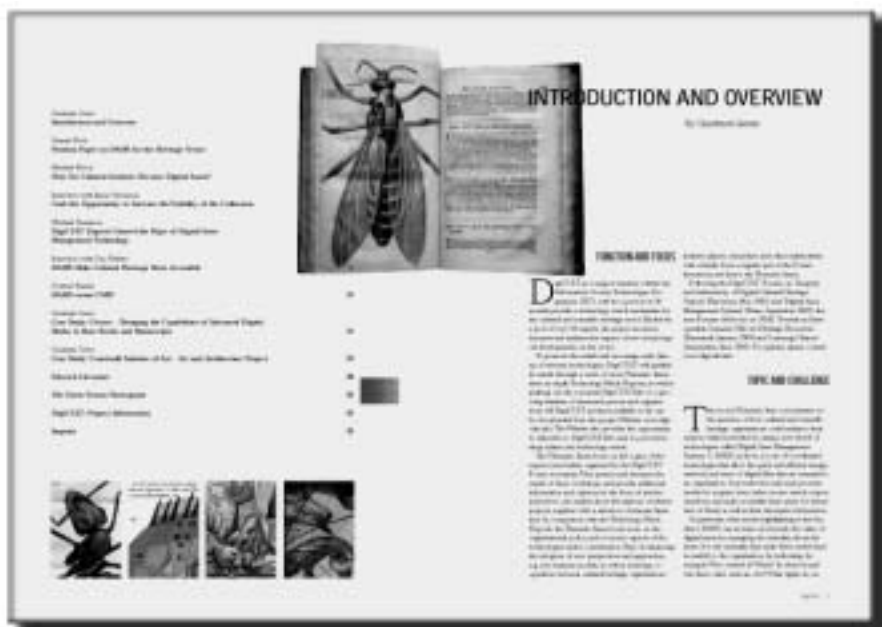
We invite the heritage community to participate in sharing their knowledge and experiences in selecting, implementing and managing technologies, and thereby enriching DigiCULT's Technology Watch Briefings and Reports.

Access DigiCULT Online Comment System at <http://www.digicult.info/pages/twb.php>

## DISTRIBUTION OF PRINTED THEMATIC ISSUES

The print version of the Thematic Issue will be available at selected events. If you are organising an event and wish to distribute this Thematic Issue to your audience, please provide a short e-mail with details. The Thematic Issues will be provided free of charge in minimum amounts of fifty-sixty per box, but please note that due to limited numbers we will prioritise the events based on relevance and most likely to benefit from the material.

For further details please contact John Pereira, [john.pereira@salzburgresearch.at](mailto:john.pereira@salzburgresearch.at)



*DigiCULT Thematic Issue 2 © Salzburg Research*

## DIGICULT EVENTS DATABASE

The DigiCULT events database with automatic updates provides the cultural & technology community with the opportunity to post interesting events directly. We invite organisers to make their events known on the DigiCULT website. The announcements will also be included in the newsletter. All submissions will be filtered to maintain a high level of applicability.

Full details at

<http://www.digicult.info/pages/events.php>

## DIGICULT GOES MULTILINGUAL

In our past three issues we have published articles only in English. In future issues we hope to add articles in other languages including French, German, Italian, and Spanish. These articles will be accompanied by English language abstracts.

To launch this new initiative we would like to invite experts/correspondents to provide articles relevant to the brief of DigiCULT,

in any one of the five European Commission working languages. Our aim is to ensure that an increasingly broad range of cultural heritage and scientific communities are equally empowered to participate in the DigiCULT Initiative.

For further details please contact John Pereira, [john.pereira@salzburgresearch.at](mailto:john.pereira@salzburgresearch.at)

# NEWS IN THE SPOTLIGHT

## RELEASE OF CIMI XML SCHEMA FOR SPECTRUM AND OPEN IMPLEMENTERS CALL FOR ALPHA TEST PERIOD

**By Alice Grant, CIMI XML Project Manager**

The CIMI Consortium (<http://www.cimi.org>) is pleased to announce the public release of Version 1.5 of the CIMI XML Schema for SPECTRUM, and the launch of an Open Implementers call to participate in an Alpha Test Period.

The CIMI Schema will enable museums to encode rich descriptive information relating to museum objects, including associated information about people, places and events surrounding the history of museum objects, as well as information about their management and use within museums. The CIMI Schema will be useful for migrating data, the sharing of information between applications, and as an interchange format for OAI (Open Archives Initiative, <http://www.openarchives.org>) metadata harvesting.

The CIMI Schema is based on SPECTRUM, the data and collections management standard for museum collections. SPECTRUM was developed by mda (<http://www.mda.org.uk>) and has been widely implemented in museums internationally.

The Schema has been tested by CIMI members and data from a variety of museum databases have been successfully encoded. Implementers from across the museum and XML communities are now invited to review and/or use the CIMI Schema in order that it can benefit from real-life use in projects. This Alpha Test Period will encompass the following stages:

Stage 1: Freezing the CIMI Schema for use during the Alpha Test Period until June

2003, in order that implementers can make use of a stable product and CIMI can gather feedback from its use.

Stage 2: After June 2003, CIMI intends to hold at least one Implementers' Forum to evaluate feedback arising from the use of the CIMI Schema during its first release and to address issues regarding how the community can manage the ongoing extension and refinement of the CIMI Schema in the future.

Stage 3: Review of the Schema following the Implementers' Forum and public release

of Version 2 of the Schema in November 2003.

The CIMI Schema and its supporting documentation are available for downloading at: [http://www.cimi.org/wg/xml\\_spectrum/index.html](http://www.cimi.org/wg/xml_spectrum/index.html).

Further information about the CIMI XML Schema for SPECTRUM and its development is available at [http://www.cimi.org/wg/xml\\_spectrum/](http://www.cimi.org/wg/xml_spectrum/) Questions about the CIMI Schema can be addressed to the CIMI XML Project Manager, Alice Grant, [agrant@alicegrant.com](mailto:agrant@alicegrant.com)

## WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT



The European Council and Parliament has adopted a Directive on Waste Electrical and Electronic Equipment (the 'WEEE Directive'). The Directive aims to support environmental conservation by promoting the recovery of electrical and electronic waste. It should result in compulsory recycling of certain materials across Europe. The WEEE Directive will apply to various waste materials including IT and telecoms equipment.

Under the WEEE Directive, manufacturers will be responsible for recovering electrical and electronic waste, either on an individual or collective basis.

The deadline for implementation of the Directive is September 2004 and within two years of this date collection systems must be established so that consumers may return their equipment easily and free of charge to the manufacturer's designated waste collector.



# DSpace

**By Monica Greenan, British Editor, ERPANET<sup>1</sup>**

In response to the demand for storage of the digital research and educational materials of MIT's faculty and researchers, MIT (Massachusetts Institute of Technology) Libraries and the Hewlett-Packard Company have developed the open source system, DSpace<sup>2</sup>. This is a digital repository designed to enable the capture, distribution and preservation of the intellectual output of MIT, with a view to its adoption by, and federation with, other institutions. From the outset, the system was designed to be easily run by institutions other than MIT. More than 1500 organisations have downloaded the system since it became freely available in November 2002.

DSpace provides a way to manage research publications and materials in a professionally maintained repository to give them greater visibility and ensure their accessibility over time, as well as providing simple and remote access to this material through Web-based technologies. The system's information model is built around the concept of 'communities', each with its own distinct information management needs. At MIT, the communities are the departments, schools, and research centres producing articles, reports, papers, books, theses, images, datasets, programmes, teaching materials, and visual simulations and models.

A qualified Dublin Core metadata set is employed by DSpace to describe items, requiring only three fields (title, language, submission date), but capable of

supporting over sixty. To support the discovery and retrieval of deposited items the DSpace development team implemented CNRI (Corporation for National Research Initiatives) handles as persistent identifiers.

DSpace identifies two levels of preservation: bit preservation and functional preservation. Bit preservation involves the preservation of the digital file exactly as it was deposited without any change or future alteration. Functional preservation is considered the preservation of a 'usable' file as technology formats, media and paradigms change. Current research and practice has demonstrated that some formats can be functionally preserved more easily than others, such as TIFF images or XML documents. However, many other formats are proprietary or unsupported, and so are much more difficult to preserve in this manner. The DSpace development team concluded that the formats in which the MIT Faculty creates material can be neither predicted nor controlled. While they aim, at least at bit level, to ensure all material is preserved, the project aims to preserve the functionality of only 'supported' formats using format migration or emulation techniques. The techniques are yet to be decided. Institutions wishing to adopt the DSpace model must have their own preservation policies in place if the system is to be used effectively. To assist other institutions in implementing the DSpace model, the policies adopted by MIT are available, along with information about prospective communities and federators at the DSpace Website.

With the ability to collect and manage the vast amount of grey literature, the DSpace system will provide a framework to enable the academic community to challenge the way research is communicated and distributed. Even after acknowledging that many questions remain unanswered and that DSpace is currently more of a platform for development rather than a solution to the problem of long-term preservation of research materials, it is evident that DSpace will play a valuable role in helping academic libraries and archives develop necessary strategies and technologies. Long-term management plans are not yet in place at MIT (beyond guaranteed preservation of bit streams), but with the obvious demand for this system, and the development of the DSpace federation of institutions in large academic research institutions in the United States, Canada, and the United Kingdom, DSpace should become a valuable tool and resource.

<sup>1</sup> <http://www.erpanet.org>

<sup>2</sup> <http://dspace.org/index.html>

## TRUST & CONFIDENCE

The European Commission consultation on Trust barriers for B2B e-marketplace has found that concerns over the confidentiality of sensitive data and the security of information systems are key barriers to more widespread take-up of e-business opportunities. For the consultation document see: <http://www.europa.eu.int/comm/enterprise/ict/policy/b2b-consultation/b2b-trust-cons-sum.pdf>



# PUBLIC RECORDS OFFICE (UK): DATABASE OF FILE FORMATS AND APPLICATION SOFTWARE

The preservation of digital objects depends on reliable knowledge about file formats, and how these formats are rendered by different software applications. The Public Record Office (PRO), the national archives of England and Wales, has recently completed development of a second version of its web-enabled database that stores and provides information about file formats and the application

software needed to render them. PRONOM 2.0 enables an administrator to store and retrieve detailed information concerning software products, the file formats that they render, and any content variance that may occur as a result of rendering. Using these features, migration pathways can be easily planned.

For further information about the PRONOM project, please see:

<http://www.pro.gov.uk/about/conservation/digital/pronom.htm>

The product is to undergo further development with new features to include internet access, automated file format checking tools, and functionality to 'display multi-step migration routes showing any content variance' in the process.

## UPCOMING EVENTS

For a complete list of events, information and contacts please refer to the events page at <http://www.digicult.info/pages/events.php>

### FEBRUARY

**February 25**

**UK DTIN workshop on 'Technology-enhanced learning and access to cultural heritage' strategic objective.**

UK Department of Trade and Industry  
London, UK

Contact: [bobm@ideo.co.uk](mailto:bobm@ideo.co.uk)

### MARCH

**March 10-11**

**International Symposium on Open Access and the Public Domain in Digital Data and Information for Science.**

UNESCO Headquarters, Paris, France  
Registration at the Symposium is free and open to the public. Register at <http://www.cheryllevey.com/codata/03march-regform-intlsymp.htm>.

The Committee on Data for Science and Technology (CODATA), the National Academies (US), the International Council for Science (ICSU), UNESCO

and the International Council for Scientific and Technical Information (ICSTI) are hosting an international symposium at the UNESCO Headquarters in Paris on Open Access and the Public Domain in Digital Data and Information for Science (10-11 March 2003).

The symposium will focus on (a) describing the role, value and limits that the public domain and open access to digital data and information have in the context of international research, (b) identifying and analysing the various legal, economic, and technological pressures on the public domain in digital data and information, and their potential effects on international research, (c) reviewing the existing and proposed approaches for preserving and promoting the public domain and open access to S&T data and information on a global basis, with particular attention to the needs of developing countries, and (d) defining the issues the ICSU family of organizations should follow up in preparation for the development of an Action Plan for the World Summit on the Information Society (WSIS).

The symposium will bring together leading experts and managers from the government and academic sectors in the developed and developing world, who are

involved in the creation, dissemination, and use of data and information in public research. The symposium program and additional background information are available at <http://www.codata.org>.

**March 19-22**

**Museums and the Web 2003**

Charlotte, North Carolina, USA  
<http://www.archimuse.com/mw2003/>  
The seventh annual Museums and the Web conference consists of two plenary sessions, eighteen parallel sessions, 60 museum project demonstrations, dozens of commercial exhibits, seven full-day and 6 half-day pre-conference workshops, and ten one-hour mini-workshops combined with a day-long usability lab, a day-long design "Crit Room", and the Best of the Web awards. All papers presented at MW2003 are peer reviewed. Full session descriptions, abstracts, speaker biographies and lots more details are on-line at <http://www.archimuse.com/mw2003/>  
Join us at the largest international gathering about cultural heritage on-line. Register on-line at <http://www.archimuse.com/mw2003/register/>



**March 24-28**

**EVA FLORENCE II Nuovo  
Rinascimento, Seminar, Conference  
& Workshop**

Palazzo degli Affari, Florence, Italy  
<http://lci.det.unifi.it>  
Main Topics: Case Studies of Leading  
Edge Applications: Galleries, Libraries,  
Education, Archaeological Sites, Museums  
& Historical Tours - Mediterranean  
Initiatives in Technology for Cultural  
Heritage institutions.

**March 24-25**

**Preservation and Conservation Issues  
Related to Digital Printing & Photography**

Heriot-Watt University Edinburgh  
<http://physics.iop.org/iop/congress/2003>  
Second International Conference on:  
Preservation & Conservation Issues  
Related to Digital Printing & Digital  
Photography - A two-day conference for  
conservators of print and textiles.

**March 25-27**

**INTERNET LIBRARIAN  
INTERNATIONAL**

Hall 10, National Exhibition Centre  
(NEC), B40 1NT, Birmingham, UK  
<http://www.internet-librarian.com>  
Be part of the UK's most exciting event  
for librarians and information profession-  
als! At Total Library Solutions you can  
meet up to 70 suppliers showcasing hund-  
reds of the best products and more.

**March 26-30**

**Libraries in the Digital Age (LIDA)  
2003**

Dubrovnik and Mljet, Croatia  
<http://www.pedos.hr/lida>  
The annual conference and course  
Libraries in the Digital Age (LIDA) aims  
to address the changing and challenging  
environment for libraries and information  
systems and services in the digital world.

**March 27-28**

**Culture & ICT conference  
'Eudialogue@culture'**

The Hague, The Netherlands

<http://www.culture-ict.nl/>

The city of The Hague is proud to invite  
you to the Culture & ICT conference  
"Eudialogue@culture" in The Hague. A  
conference for policy and decision makers  
on local, national and European govern-  
ment level involved in the field of Culture  
& ICT. The conference aims to create a  
forum for discussion of policy and research  
in the Culture & ICT area and to promote  
a European network of excellence.

APRIL

**April 05-10**

**CHI 2003 Conference on Human  
Factors in Computing Systems**

Fort Lauderdale, Florida  
<http://sigchi.org/chi2003/theme.html>  
The annual CHI conference is the leading  
international forum for the exchange of  
ideas and information about human-com-  
puter interaction (HCI).

**April 07-09**

**Culture: From Information to  
Knowledge**

Moscow  
<http://www.conf.cultivate.ru/2003/english>  
This international conference aims to  
bring together professionals and policy  
makers from libraries, museums, archives  
and other cultural institutions to debate the  
digital era of culture.

**April 08-10**

**CAL 03: 21st Century Learning**

Queen's University, Belfast, Northern  
Ireland  
<http://www.cal2003.com>  
Contact: a.williams@elsevier.com

**April 08-12**

**International Congress: 'Enter the  
Past - The E-Way into four  
Dimensions of Cultural Heritage'**

City Hall, Vienna, Austria  
[http://www.archaeologie-  
wien.at/caa2003/caa2003.htm](http://www.archaeologie-wien.at/caa2003/caa2003.htm)  
New technologies, especially the use of  
computers, are proving a useful tool in

helping to preserve and research our  
culture heritage. Enter the Past provides a  
forum for presenting and discussing new  
ideas as well as to search for new possibili-  
ties for research and cooperation.

**April 25-26**

**Criticism and Social Action:  
Rhetorical Dimensions of Electronic  
Texts**

University of Washington  
Seattle, Washington, USA  
[http://faculty.washington.edu/  
barbwarn/rhetconf/](http://faculty.washington.edu/barbwarn/rhetconf/)  
Contact: [barbwarn@u.washington.edu](mailto:barbwarn@u.washington.edu)  
The purpose of this conference is to bring  
together senior scholars in the humanities  
who have published critical studies of new  
media texts together with doctoral stu-  
dents and junior faculty who are develo-  
ping work in this area.

MAY

**May 15-17**

**Smart Objects Conference**

Grenoble, France  
<http://www.grenoble-soc.com>  
This conference addresses the new domain  
loosely defined by the inclusive association  
of such catch phrases as 'pervasive/  
ubiquitous computing', 'things that think',  
'smartifacts', 'ambient intelligence', 'disap-  
pearing computers'. This domain is best  
characterised by a stronger and richer  
coupling between the physical world and  
the information/communication world.

## JUNE

**June 25-28**

### **ELPub2003: ICCC/IFIP International Conference on Electronic Publishing**

University of Minho, Guimaraes, Portugal  
<http://www.dsi.uminho.pt/elpub2003>  
ELPUB2003 is the 7th in a series of annual international conferences on Electronic Publishing. The objective of ELPUB2003 is to bring together researchers, managers, developers, and users working on the issues related to electronic publishing for public, scientific and commercial applications.

## AUGUST

**August 06-09**

### **Objects and Ethics: Computers in Historical and Social Science Research**

#### **XVth Conference of the Association for History and Computing**

Norwegian Historical Data Centre,  
University of Tromsø, Tromsø, Norway  
<http://www.rhd.uit.no/ahc>  
Contact: [ahc@sv.uit.no](mailto:ahc@sv.uit.no)

On behalf of the Norwegian Historical Data Centre we are glad to announce that the University of Tromsø has been chosen as the location for the year 2003 conference of the International Association for History and Computing. The AHC with its national and regional branches is the world's leading forum on the use of information technology in historical research and education, and the related methodology is a equal relevance in other social sciences such as demography sociology and economics.

## SEPTEMBER

**September 08-12**

### **ichim 2003**

L'Ecole de Louvre, Paris  
<http://www.archimuse.com/conferences/ichim.html>

The International Conference on Hypermedia and Interactivity in Museums

(ICHIM) explores a full range of interactive multimedia issues, including technological, legal, economic, organisational and design concerns, that are discussed from

the perspective of museums and cultural heritage applications. The best projects worldwide are demonstrated, discussed and critiqued.

# CALL FOR PAPERS

### **DRH 2003: Digital Resources for the Humanities**

**University of Gloucestershire,  
School of Humanities**

**August 31- September 3 2003**

<http://www.drh.org.uk>

The DRH conferences have established themselves firmly in the UK and international calendar as the major forum bringing together scholars, librarians, archivists, curators, information scientists and computing professionals in a unique and positive way, to share ideas and information about the creation, exploitation, management and preservation of digital resources in the arts and humanities.

Proposals for academic papers, themed panel sessions, posters and workshops are invited.

Themes include:

- impact of access to digital resources on teaching and learning;
- digital libraries, archives and museums
- time-based media and multimedia studies in performing arts
- impact of network and televisual technologies on humanities research and education.

The deadline for submission is 31 March 2003.

Please visit the website at <http://www.drh.org.uk> for full details of the conference and how to submit proposals. Email enquiries are also welcome at [drh2003@glos.ac.uk](mailto:drh2003@glos.ac.uk)

### **CIDOC 2003 Conference in**

**St. Petersburg:**

**'World Cultural Heritage: Uniting by Understanding'**

**September 1-5 2003**

St.-Petersburg, Russia

<http://cidoc2003.adit.ru/english/default.asp>

Topic of the Conference: 'The Electronic Potential of a Museum: Incentives and Limitations, Achievements and Problems'.

The Secretariat of the CIDOC Conference and ADIT announces the First Call for Papers for CIDOC 2003. This year's conference theme will be multifaceted, highlighting the most pressing aspects of virtual heritage informatics.

The objective of the conference is to review the results of the application of information technologies in museums: (a) analysis of the main achievements in the field of storage, restoration, conservation and educational work, (b) discussion of the pressing technical, technological, psychological and social problems and restrictions, and (c) outline of prospective areas of development and the further penetration of information technologies into the traditional museum environment.



# REPORTS ON CULTURE & TECHNOLOGY EVENTS

## CONCERTATION MEETING OF THE DG INFSO, DIRECTORATE E, JANUARY 2003



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A REVIEW OF THE  
CONCERTATION MEETING OF  
THE DG INFSO,  
DIRECTORATE E,  
INTERFACES, KNOWLEDGE  
AND CONTENT  
TECHNOLOGIES,  
APPLICATIONS,  
INFORMATION MARKETS,  
HELD ON 28TH JANUARY  
2003 IN LUXEMBOURG

BY ANDREA MULRENIN,  
SALZBURG RESEARCH

**W**hat should be the research agenda for cultural heritage in the upcoming calls of the Sixth Framework Programme? This was the leading question at a concertation meeting that took place on January 28 in Luxembourg at the invitation of the European Commission Directorate E Interfaces, Knowledge and Content Technologies, Applications, Information Market, and brought together over a hundred researchers from all over Europe who were interested to hear the answer.

**A**ccording to Director Horst Forster, at present, there seem to be more questions than answers regarding what the future focus of IST funded research should be. Only within a few areas, which also constitute the mainstay of cultural heritage, is the research agenda relatively clearly plotted: the generation of masses of

digital content, the provision of intelligent heritage, the preservation and long-time archiving of digital heritage content and the involvement of community memory. Sixteen EU projects were invited to present their research agenda within these areas.

**F**or the digital libraries sector, one of the main impediments to development is the fragmented approach that has resulted in the development of many different technical solutions to the same problems. Thus, the greatest challenge in the future will be to get industry interested in this small market, to create off-the-shelf, out-of-the-box solutions that are cheap and self-sustainable and can be easily adapted even by small institutions. Additional topics on the research agenda of digital libraries are the ability to build large-scale collections that also embrace non-traditional

types of digital entities (multilingual and multicultural content, sheet music and medical data all under one roof), and to provide unlimited and enjoyable access to these collections through novel, highly interactive navigation means, personalisation mechanisms, easy-to-use user interfaces and smart and ambient technologies, i.e. those challenges that are today labelled as 'intelligent heritage'.

**F**rom a research perspective, intelligent heritage, according to Prof. David Arnold, University of Brighton, UK, is a mixture of 'hot topics' and the challenge of 'making it stick'. With regards to the hot research topics to make applications more efficient and effective, domain knowledge of the cultural heritage sector is the key as it raises the research challenge. 'It is not language technologies per se, but language technologies for cultural heritage

that are the challenge', concludes Arnold. What is required is a complete change in the mindset, starting with the question why, for example, archaeologists want technologies applied to their domain. Only then will technologists be able to develop efficient techniques applicable to a particular application domain.

With 'making it stick', on the other hand, Prof. Arnold pointed out the threat of getting far ahead with R&D but leaving behind the community we originally seek to serve. Thus, future activities within the Sixth Framework Programme need to provide the opportunities for cultural heritage institutions to (re)connect to the technological development and make the new technologies stick to the community they are intended for.

Seamus Ross, University of Glasgow, UK, presented tomorrow's research agenda for one of the undoubtedly most challenging areas for the cultural heritage sector: preservation of digital content. Over the past months, a working group of European and US preservation and archiving experts brought together by DELOS and the National Science Foundation drafted a paper on future challenges for the archiving sector, recognising that digital entities are the raw materials for the industries of the 21st century. The working group sees three core areas that need work in the future: emerging research domains such as digital repositories (establishment of repositories for testing) and archival media (longevity, ageing, etc), re-engineering the preservation processes, and addressing preservation systems and technology (such as the shift from hand-crafting to automated processes in all steps of digital preservation) that will fundamentally re-engineer the whole preservation and archiving process.

This general research agenda for digital preservation was further expanded by the presenters of the PRESTO project which is concerned with the question of digital restoration and archiving of audio-visual materials. Although PRESTO (as a



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project within the Fifth Framework Programme) was successful in providing technical solutions for large archives, the challenge within the Sixth Framework Programme will be to develop the technologies to offer a cheap and effective preservation and restoration service also for small and medium-sized archives (PRESTO SPACE). The research challenges to reach these goals are numerous and include topics like rich digitisation, diagnosis and quality control, yet unsolved restoration impairment problems, automated metadata and archive management, etc.

The day closed with an area within cultural heritage that has more to do with – to use Prof. Arnold's words – 'making it stick' rather than the hot

research topics. The introduction of 'community memory' as an area that calls for future action acknowledges the value of local and regional cultural heritage as the pillars of our cultural memory. In the future, local and regional cultural heritage institutions will need national and local strategies, programmes and funding, cross domain policy making and partnership as well as general support in training their staff and integrating sustainable technology to be able to maintain their services to the community.

More details of the concertation meeting will soon be available on the Preservation and Enhancement of Cultural Heritage Web site: [http://www.cordis.lu/ist/directorate\\_e/pech.htm](http://www.cordis.lu/ist/directorate_e/pech.htm)

## FRONTIERS OF SCIENTIFIC AND TECHNICAL DATA, 18TH INTERNATIONAL CODATA CONFERENCE

The 18th International CODATA Conference (CODATA 2002) - 'Frontiers of Scientific and Technical Data' -, which took place in Montreal, Canada, from 29 September to 3 October 2002, proved to be one of the most exciting conferences we attended this year. This four-day conference, hosted by the Canadian and US National Committees for CODATA, was sponsored by the National Research Council Canada, the Ministry of Science and Technology (Quebec), and the National Academies (US). The 250 attendees, who came from thirty-seven countries, were treated to papers of exceptional quality. The electronic proceedings from the conference should be available at <http://www.codata.org> by early March 2003.



# NINCH ANNOUNCEMENT

## TRANSFORMING DISCIPLINES: COMPUTER SCIENCES AND THE HUMANITIES CONFERENCE

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### Humanities Scholars, Scientists, and Engineers Explore Common Ground in the New World of Digital Technology.

Humanities scholars, museum administrators, librarians, publishers, computer and information scientists, technologists, and engineers met at the National Academies in Washington, DC, January 17-18, 2003, to celebrate pioneering models of scholarship that employ digital technology and to address the considerable challenges to further progress.

As the conference, 'Transforming Disciplines: Computer Science and the Humanities,' convened, William Wulf (National Academy of Engineering) suggested that humanists and engineers shared the problem of creating 'macro scale' systems out of billions of minuscule components - with unpredictable results. If humanists could resolve this problem for themselves and for engineers, they would usher in a revolution comparable to the development of Einstein's theories and quantum mechanics at the beginning of the twentieth century. The necessity - and revolutionary potential - of cooperative working relationships between humanists and computer scientists and engineers, and the notion that they might be able to help answer essential questions in each other's disciplines, became an important theme of the conference.

Presenters included historians, classicists, art historians, engineers, media studies professors, computer scientists, and representatives of cultural and educational institutions. Will Thomas (University of Virginia) discussed his work with the American

Historical Review to create a new genre of scholarship, playfully titled 'a work formerly known as an article.'

In the related arenas of teaching and textbook publishing, Richard Baraniuk (Rice University) offered an ambitious vision of the cooperative development of a 'commons of free teaching materials,' based on the collaborative model of Linux software development.

Taking advantage of the computer as a visual medium, art historian Stephen Murray (Columbia University) presented a graphic simulation of the construction of Amiens Cathedral, and Douglas Greenberg (Survivors of the Shoah Visual History Foundation) gave conference participants a glimpse of the complexities of indexing and making accessible the videotaped testimonies of more than 52,000 survivors of the Holocaust.

All of the projects examined during the conference demonstrated both the rich possibilities and the limits of current technology and led to speculation about new tools, training, and shifts in disciplinary thinking that might allow more fruitful relationships between the humanities and computer science. Participants frequently returned to the problem of inertia within disciplines particularly in expectations for promotion and tenure, minimal training in technology for graduate students, and the lack of adequate cooperation with university libraries and librarians.

Resisting the general tide of multi- and cross-disciplinarity, Michael Joyce (Vassar College) sounded a call in favour of the traditional disciplines and the need to explore all that is not known within those disciplinary bounds to

'husband doubt, rather than suffocating in knowingness.' Janet Murray (Georgia Institute of Technology) argued that perhaps lack of total understanding between computer specialists and humanists is useful, creating a space of play and adaptation in which both are able to formulate overly ambitious and creatively valuable projects.

By the time the meeting adjourned, participants had developed a wish list of new tools, training, and cooperation, but recognised that they must balance the desire to experiment creatively with the constraints of existing tools and models, limited departmental support, and looming cuts in federal, state, university, and foundation budgets.

'Transforming Disciplines: Computer Science and the Humanities' evolved from the 1997 Computer Science and Humanities Initiative and a subsequent September 2000 workshop that began exploring cross-disciplinary cooperation. The Initiative is supported by the American Council of Learned Societies (ACLS), the Coalition for Networked Information (CNI), the National Initiative for a Networked Cultural Heritage (NINCH), the National Academies, and Princeton and Rice Universities and is funded by generous grants from the Carnegie Corporation.

More information about the Computing and Humanities Initiative is available on the NINCH Web site:  
<http://www.ninch.org/programs/science>.

# REPORT ON THE FIFTH INTERNATIONAL CONFERENCE EVA 2002

MOSCOW 2 – 7 DECEMBER 2002

BY PIETER KOP, IBM BUSINESS CONSULTING SERVICES



© Centre PIC, Moscow 2002, Tretyakov Gallery

VASARI<sup>1</sup> and the Centre of Information in the Sphere of Culture of the Ministry of Culture of the Russian Federation (Centre PIC<sup>2</sup>) brought to Moscow the foremost European electronic imaging event in the visual arts. The main supporters were the EC's EVAN Project, the Open Society Institute (Soros Foundation - Russia) and the Russian Foundation for Basic Research. The 700 participants had the opportunity to sample 168 presentations over the course of the five-day event. As in previous years, the Tretyakov Gallery, the home to paintings by such exceptional Russian artists as Vladimir Borovikovskiy (1757-1825), Vasily Tropinin (1776-1857), Pavel Fedotov (1815-1852), Kuzma Petrov-Vodkin (1878-1939) and Kasimir Malevich (1878-1935) proved an intellectually stimulating venue. The presentations were accompanied by an exhibition of new software and mul-

timedia CD-ROMs. The conference opened with papers charting the issues that would be addressed during the coming five days as well as international developments. Among the papers Professor M. Morbey's (York University, Canada) on 'Cybercolonialism in the State Hermitage Museum, St Petersburg, Russia: Does it Matter?' struck a genuine chord with the audience. In the course of the middle two days, speakers examined a range of issues, from improving access to cultural heritage using information technologies including the Internet to the development of audio, video and photo archives and collections. A number of authors examined the collaborative opportunities between the cultural heritage sector and business and the role that information resources of this kind played in the development of the information society. The focus of Thursday's sessions on presenting

information resources from the regions was a welcome antidote to the prevalence of Russia's leading centres Moscow and St. Petersburg in presentations and discussions. These and other presentations demonstrated how cultural institutions can collaborate with vendors, universities and local authorities to use technology to preserve and improve access to and understanding of cultural heritage. On the final day of the conference, projects on international cooperation, such as the Cultivate project, were

brought into the spotlight. One of the most inspiring sessions of the conference, on contemporary art and the Internet, followed. Participants examined such questions as: How do you define the ethical boundaries of contemporary art?

In addition to addressing challenging questions, the conference, in the good former Soviet tradition, was richly supplemented by the opportunity for visitors to take part in a variety of cultural visits. By combining discussions of culture and technology with visits to the cultural institutions themselves, the hosts reminded us that technology must still take pride of place from the heritage assets themselves, even if in some cases contemporary art is blurring the distinction between technology and art.

<sup>1</sup> <http://www.vasari.co.uk/>

<sup>2</sup> [http://www.cpic.ru/Index\\_e.htm](http://www.cpic.ru/Index_e.htm)

# OAI AND ITS VALUE TO THE CULTURAL HERITAGE SECTOR

BY LEONA CARPENTER<sup>1</sup>, UKOLN AND RACHEL HEERY<sup>2</sup>, UKOLN

The growing wealth of digital artefacts in the repositories of the world's cultural institutions can, in theory, be made available to anyone, anywhere, anytime. Through digital finding aids and digital curation, resources can be discovered and digital exhibitions can be mounted, regardless of where the original material is housed. In practice, enabling interworking between diverse collections of material, diverse systems for the description of material, and diverse resource discovery systems remains a fundamental issue for those working in the digital library and cultural heritage fields. The Open Archives Initiative (OAI) promises a low-cost technical solution to interoperability. The open archives approach enables access to resources through interoperable digital repositories for metadata sharing, publishing and archiving. It arose out of the e-print community, where a growing need for a low-barrier solution to access across heterogeneous repositories led to the establishment of the Open Archives Initiative (OAI). (<http://www.oai.org>)

OAI develops and promotes a low-barrier interoperability framework and associated standards, originally to enhance access to e-print archives, but now taking into account access to other digital materials. These efforts were initially aimed at enabling authors to make resources available direct to their potential users, in order to improve the scholarly communication process, both in terms of speed in making research widely available, and in terms of reducing journal purchase costs to readers and libraries. The key interoperability solution provided by the OAI is a harvesting protocol, now known as the Open Archives Initiative Protocol for

Metadata Harvesting, or OAI-PMH.

The OAI-PMH specifies harvesting of metadata, not the content that the metadata describes, although data and service providers may optionally decide to enable the resources themselves to be 'harvested' using standard Web technologies. The need for a metadata format that would support both metadata creation by authors and interoperability across heterogeneous repositories led to the choice of unqualified Dublin Core (<http://dublincore.org>) as the mandated metadata standard for OAI compliance. Metadata in qualified Dublin Core or in other formats, as developed or selected by particular communities, may be made available in addition to unqualified Dublin Core.

It is important to note that within the OAI the term 'open archives' has a particular meaning: 'archives' refers to data repositories; 'open' refers to the availability for harvesting of collections of metadata relating to data repositories. In OAI terms, 'data providers' make metadata available for harvesting via OAI-PMH, and 'service providers' harvest metadata from a number of appropriate data providers and provide services based upon this harvested metadata. Data providers may also be service providers. Metadata made available for harvesting by one data provider may itself have been aggregated by harvesting from other data providers.


Open archive metadata ordinarily describes resources held in a digital repository, such as e-prints, images, learning objects, multimedia, and Web sites. However, library catalogues describing physical as well as digital resources are

represented in some OAI trials. Resources may be the products of original authors (for example, a research paper), or of intermediary organisations (for example, the results of a digitisation project in a museum). Examples of types of data providers include repositories of e-prints, learning objects, cultural heritage resources, and even union catalogues. Examples of services that could be provided include learning resource services, cultural heritage services, and e-print services. Service providers may harvest metadata from different types of data providers; for example, a provider of a learning resource service may harvest metadata relating to learning objects, cultural heritage items, and e-prints, and some of it may come from library union catalogues. Users may be end-users of the service providers' services, or may be organisations providing, for example, subject-based gateways or institutional portals.

For the e-print community, OAI has been seen as an important element in the technical underpinning for the improvement of communication among researchers, and even for implementing a dramatic change in the academic publishing paradigm. For other communities, the importance of OAI lies in the relative ease with which it can be implemented in support of collaborative service provision. Improved and novel access across repositories and organisations is not feasible without interoperability. Claims for OAI as a 'low barrier' solution rest on the technical simplicity of OAI-PMH. Setting up and maintaining an OAI-compliant server or harvesting process is easy compared

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with interoperability alternatives such as building discovery services on the Z39.50 distributed search and retrieval protocol. In addition, unqualified Dublin Core provides a common denominator, a cut-down switching language for which mappings from a number of metadata formats already exist. (For example, see Day 1996-2002.)

Even given the simplicity for the data provider of implementing OAI, the complexity of providing enhanced high-quality services remains and must be addressed by the service provider. Among projects that are exploring provision of value-added services layered onto the metadata harvested by the OAI service provider, the ePrints UK project (<http://www.rdn.ac.uk/projects/eprints-uk/>) is working with the OCLC Office of Research (<http://www.oclc.org/research>) to enhance metadata with authority control and Dewey subject classification; and with the OpCit Project at the University of Southampton (<http://opcit.eprints.org>) to include OpenURLs for citations. For COINE (Cultural Objects In Networked Environments Project) (<http://www.uoc.edu/in3/coine>), OAI implementation is one piece in the puzzle of the possible architecture for providing truly innovative ways of involving users with cultural objects.

Artiste (<http://www.artisteweb.org>) a collaboration among four major European galleries and other specialist partners – sees OAI as part of a new management system for visual information (Addis et al. 2002).

The other chief attraction of the open archives approach to the cultural heritage sector is its potential to provide or improve access to material in what is sometimes called the 'Hidden Web'. The Hidden Web refers to material that is potentially accessible via the Web because it is in digital format and held on organisations' servers, but could not ordinarily be located through publicly available

Internet search facilities or subject gateways, or even through organisations' own public Web sites. This includes, for instance, the output of digitisation projects and unpublished reports produced within organisations. The OAI Metadata Harvesting Project at the University of Illinois (<http://oai.granger.uiuc.edu>) is an example of this kind of access provision. It provides a search service built on metadata describing manuscript archives and digitised cultural heritage information resources harvested from more than two-dozen institutions.

Widespread take-up of the OAI framework will be needed in order to realise the potential of OAI-based interoperability. It is crucial at this stage of trials and pilot services incorporating OAI that many players in the field of cultural heritage work to common standards and develop best practice guidelines in their application. When representatives of around forty

cultural content creation programmes in Europe and the Americas met in March 2002, they found that a number were already exploring OAI within their programmes (Miller et al. 2002). The Open Archives Forum (OA-Forum) (<http://www.oaforum.org>) is an IST-funded (<http://www.cordis.lu/ist>) focus for dissemination of information about European activity related to open archives. OA-Forum workshops in May and December 2002 attracted participants from the heritage sector, including invited speakers. There is some evidence that take-up is likely to reach the critical mass required in at least some communities, as perhaps it has already done within the e-prints community. In the cultural heritage sector, projects and initiatives such as those mentioned above indicate at least a lively and growing interest in applying this solution to service problems involving interoperability.

### More information about OAI is available in and through:

The Open Archives Initiative: <http://www.oai.org>

Open Archives Forum: <http://www.oaforum.org/>

UKOLN links to Open Archives Initiatives resources:

<http://www.ukoln.ac.uk/distributed-systems/oai/>

Deutsche Initiative für Netzwerkinformation (DINI): <http://www.dini.de/>

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# PRESERVATION METADATA AND DIGITAL CONTINUITY

BY STEVE KNIGHT, DIGITAL LIBRARY TRANSITION CO-ORDINATOR, NATIONAL LIBRARY OF NEW ZEALAND



© Steve Knight

The National Library Act 1965 provides the legislative framework for the National Library of New Zealand '... to collect, preserve, and make available recorded knowledge, particularly that relating to New Zealand, to supplement and further the work of other libraries in New Zealand, and to enrich

the cultural and economic life of New Zealand and its cultural interchanges with other nations'.

Legislation currently before Parliament, if enacted, will give the National Library the mandate to collect digital resources for preservation purposes.

The Library's mid-term strategic plan-

ning document, the 21st Century<sup>1</sup>, reflects the need for the Library to take account of new developments relating to the collection and accessibility of digital material. The Library is currently addressing these requirements through a series of projects related to;

- collection and management of electronic material
- development of a Digital Library
- enhanced access to its collections via digitisation.


So, the Library has an organisational commitment and may soon have the legislative environment to support the collection, management and preservation of digital objects. These provide the backbone for a preservation programme. The next issue is what needs to be done to ensure that a viable preservation programme can actually be put in place.

As with most agencies struggling to come to grips with an information environment increasingly characterised by digital resources, it quickly became clear to the Library that preservation of digital materials is a significant new business requirement for NLNZ. This requires a comprehensive look at how digital materials will be incorporated into the Library's business processes.

As the Library had already begun systematising its approach to resource discovery metadata<sup>2</sup>, development of a preservation metadata schema for use within the Library was a logical next step. The results

<sup>1</sup>National Library of New Zealand. 2001. The 21st century: The strategic direction of the National Library of New Zealand Te Puna Mātauranga o Aotearoa: A revised framework for planning. <http://www.natlib.govt.nz/files/framework.pdf>

<sup>2</sup>National Library of New Zealand. 2000. Metadata Standards Framework for National Library of New Zealand. <http://www.natlib.govt.nz/en/whatsnew/4initiatives.html#meta>



of the Library's work are now available<sup>3</sup> following a process of peer review by a number of international organisations engaged in similar activities.

Work on the schema was initially informed by other international endeavours relating to preservation metadata, particularly that undertaken by the National Library of Australia<sup>4</sup>. Initiatives through the CEDARS programme<sup>5</sup>, OCLC/RLG activities<sup>6</sup> and the emerging consensus regarding the role of the OAIS Reference Model<sup>7</sup> (which was given an interesting critique from an archival perspective by Hans Hofman of the National Archives of the Netherlands in Issue 2 of the DigiCULT Newsletter)<sup>8</sup>, were also taken into account.

In these initiatives there is a constant tension between discussions of principles relating to the conceptual nature of preservation in the context of a Digital Archive and the practicalities of ensuring that the information necessary to describe the digital objects contained in the Digital Archive is captured. This is reflected in a recent OCLC/RLG document which emphasises 'that these elements are not necessarily atomic; it is easy to imagine cases where the needs and characteristics of particular digital archiving systems may require deconstruction of these elements into still more precise components'.<sup>9</sup>

The Library's Preservation Metadata schema is designed to strike a balance between the principles of preservation metadata, as expressed through the OAIS Information Model, and the practicalities of implementing a working set of preservation metadata. The same incentive informs a recent OCLC/RLG report on the OAIS model<sup>10</sup>.

The schema proposed is not meant to be comprehensive. Indeed, it is unlikely that anything resembling a comprehensive schema will become available in the short term. However, the need is pressing. Conservative estimates suggest that by 2005 there could be 12 Terabytes of unique, digital original material available

online in New Zealand, with a growth rate upwards of 1 Terabyte annually.<sup>11</sup> Coupled with the increasing quantity of offline digital material coming into the Library, the urgency becomes even greater.

Within the schema, preservation metadata applies to a single 'logical object'. This is an arbitrary construct allowing the Library to differentiate between:

- simple objects - one file intended to be viewed as one logical object (e.g. a Word document comprising one essay);
- complex objects - a group of dependent files intended to be viewed as a single logical object (e.g. a Website or a database that is created as more than one file);
- object groups - a group of files not dependent on each other in the manner of a complex file, e.g. a floppy disk containing 100 letters. This object may be broken up into (described as) 100 single objects or four discrete objects containing 25 letters each or it may be kept together as a single logical object (Joe Bloggs's Letters).

This logical object is the Preservation Master. Preservation metadata is held against the Preservation Master. In practice, this means that various other manifestations, e.g. dissemination formats, are not considered preservation objects and will not have preservation metadata retained about them. Similarly, the schema acknowledges that not all data key to preservation processes will necessarily be held as preservation metadata, e.g. data relating to rights management and archiving permissions will be recorded within a collection management system and drawn on from that source as and when required.

Preservation Masters themselves will be subject to further preservation processes, e.g. migration from an obsolete to a current format. This creates a life cycle of creation, use and eventual replacement of Preservation Masters. At any point in time there can only be one Preservation Master and any object carrying that status will be subject to the maximum preservation effort

while it has that status. A history of changes made to the preservation metadata is also retained. This acknowledges that the record is itself an important body of data and processes about the object that requires management over time.

The development of the preservation metadata schema is one component of an ongoing programme of activities needed to ensure the incorporation of digital material into the Library's core business processes with a view to the long-term accessibility of those resources. The goal of the programme is to develop holistic end-to-end processes for the handling of digital material within the Library. The Library's approach to this is predicated on the belief that dealing with digital material will be essentially a 'business as usual' exercise notwithstanding the extra complexities that arise from these objects.

<sup>3</sup>National Library of New Zealand. 2000. Metadata Standards Framework for National Library of New Zealand. <http://www.natlib.govt.nz/en/whatsnew/4initiatives.html#meta>

<sup>4</sup>National Library of Australia. 1999. Preservation Metadata for Digital Collections - Discussion Draft. <http://www.nla.gov.au/preserve/pmeta.html>. Accessed 11 May 2002.

<sup>5</sup>Cedars: CURL exemplars in digital archives. 2002. Cedars guide to: Preservation metadata. <http://www.leeds.ac.uk/cedars/guideto/metadata/guidetometadata.pdf>. Accessed 11 May 2002.

<sup>6</sup>OCLC/RLG Preservation Metadata Working Group. <http://www.oclc.org/research/pmwg/>.

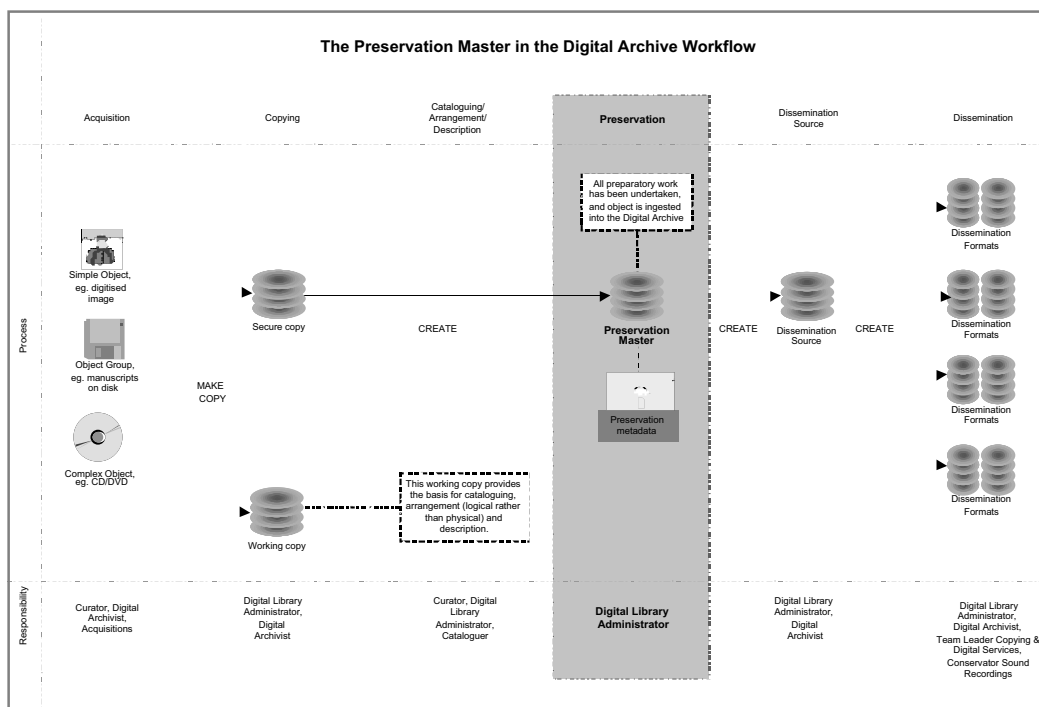
<sup>7</sup>Consultative Committee for Space Data Systems. 2001. Reference model for an Open Archival Information System (OAIS). <http://www.ccsds.org/documents/pdf/CCSDS-650.0-R-2.pdf>

<sup>8</sup>Hofman, Hans. Review: Some comments on preservation metadata and the OAIS model. DigiCULT.Info: A Newsletter on Digital Culture, Issue 2, October 2002, p 15-20. <http://www.digicult.info/pages/publications.php>

<sup>9</sup>OCLC/RLG Working Group on Preservation Metadata. 2002. A Recommendation for Preservation Description Information. [http://www.oclc.org/research/pmwg/pres\\_desc\\_info.pdf](http://www.oclc.org/research/pmwg/pres_desc_info.pdf). Accessed 11 May 2002.

<sup>10</sup>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. [http://www.oclc.org/research/pmwg/pm\\_framework.pdf](http://www.oclc.org/research/pmwg/pm_framework.pdf)

<sup>11</sup>Extrapolations from: Lyman, P. & Varian, H. 2000. How much information? Berkeley, CA: University of California, Berkeley. <http://www.sims.berkeley.edu/research/projects/how-much-info/>. Last accessed 17 October 2002.



*This diagram shows a simplified Digital Archive workflow and the place of the Preservation Master and preservation metadata within it.*

The programme currently under way includes the following activities:

- development and implementation of business process workflows, e.g. selection, acquisition, care and handling, transformation of physical originals;
- development of infrastructure for digital material, e.g. upload process, storage, access, authentication;
- purchase and implementation of a metadata repository for provision of portal services to the Library's applications;
- creation of a testbed application for researching and implementing a range of digital library activities, resource discovery metadata, preservation metadata (schema, extraction, storage), persistent identifiers;
- piloting Web harvesting for the capture and preservation of New Zealand based and related Web sites;
- implementation of production processes for bulk digitisation of textual materials and piloting full text search and retrieval.

The aim of the above activities is for the Library to be acknowledged as a 'trusted repository'<sup>12</sup> for digital material which ensures the viability and authenticity of digital objects over time. While the current work of the Library may enable it to resolve issues relating to the integration of digital resources into its normal business practices, it is clear that this does not automatically ensure that the Library fulfils the requirements of a 'trusted repository'. The Library will also have to develop relationships with other organisations that might wish to achieve 'trusted repository' status in a country with a small population base and few agencies of appropriate size, funding and willingness to take on the role.

There are still a number of important issues to be resolved before the Library's preservation programme can be deemed a success, including the need for:

- higher level of awareness of the need for digital preservation within the community of 'memory institutions' and more widely;

- metrics regarding the size and scope of the problem;
- finance to research and implement digital preservation;
- new skill sets for implementing digital preservation, e.g. running the multiplicity of hardware/software involved, digital conservation/archaeology;
- agreed international approaches to digital preservation
- practical models to match the high level conceptual work already undertaken internationally
- co-operation/collaboration between the wider range of agents potentially able to assist in

developing digital preservation solutions, e.g. the computing industry;

- and, last but not least, clarity around intellectual property, copyright, privacy and moral rights.

The next step for the Library is an external review of its activities to date to gauge whether these activities are consistent with mainstream thinking and whether current initiatives are capable of being extended through to a successful conclusion for the Library. The review will hopefully validate current progress or highlight areas of deficiency. It will also provide a benchmark for ongoing development and consequently strengthen the eventual outcomes for digital library development within the National Library of New Zealand.

<sup>12</sup>Research Libraries Group. 2002. Trusted digital repositories: Attributes and responsibilities. Mountain View, CA: Research Libraries Group. <http://www.rlg.org/longterm/repositories.pdf>. Last accessed 15 October 2002.

# AN INTRODUCTION TO WEB SERVICES FOR CULTURAL HERITAGE PROFESSIONALS

BY PAUL MILLER, INTEROPERABILITY FOCUS, UKOLN, UK

According to a recent survey conducted by SWR Worldwide among 320 senior IT managers in eight European countries, some 50% of European businesses have adopted a Web Services Strategy, and expect the enabling technologies to be their highest spending priority for 2003. The majority of those questioned expect their businesses to have adopted Web Services by 2005<sup>1</sup>. Despite statistics such as these, and increasingly high-profile posturing around the Web Services approach by usual suspects such as IBM, Sun Microsystems, Microsoft and others, the cultural sector seems largely unaware of what Web Services are, and what they might offer us. This article introduces Web Services, and offers pointers to some of their potential uses in our memory institutions.

## A DEFINITION

According to IBM<sup>2</sup>, Web Services are a new breed of Web application. They are self-contained, self-describing, modular applications that can be published, located and invoked across the Web. Web services perform functions, which can be anything from simple requests to complicated business processes.

Web Services are an important part of the continuing evolution of the Web, as it moves further from its roots as a means of



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sharing static textual documents and embraces a richer set of means by which 'users' (whether human or machine) might be allowed to interact with a wide range of possible applications.

We have had access to a reasonably interactive Web for some years now, with server-based technologies such as the Common Gateway Interface (CGI) or Microsoft's Active Server Pages (ASP) sitting behind many of the forms, query screens and product ordering systems with which we interact on the Web. These implementations tend not to be based upon open standards, and where it has been possible to interact with them by any means other than visiting the Web site upon which they sit, it has tended to require a degree of programming and development work tailored to the specific design of one service, rather than anything that might be more generally applicable.

Imagine, instead, a set of standards intended to allow different components from across the Web to join in an apparently seamless whole, independent of computer hardware, operating system, programming language or physical location. This is the vision behind Web Services, and we are already beginning to see emergence of the necessary standards and exemplar applications demonstrating some of what will become possible.

## POSSIBLE USES

Under the Web Services model, it will be possible to build an application by joining together a set of existing components, choosing those parts which best meet the needs of your organisation or customers/visitors/patrons. The individual components will normally be small and relatively simple; often designed to fulfil a single well-scoped task, such as converting a number from one currency to another, finding available flights between two named locations, or querying compliant museum collection management systems for any paintings by a given artist available for use in an upcoming exhibition.

It is difficult to grasp the full potential of a Web Services approach without reference to some real examples. Unfortunately, the nature of developments in this area means that much of the capability of these specifications is hidden from the casual observer, enabling effective and

<sup>1</sup><http://zdnet.com.com/2100-1106-960985.html>

<sup>2</sup><http://www105.ibm.com/developerworks/education.nsf/webservices-onlinecourse-bytitle/BA84142372686CFB862569A400601C18?OpenDocument>





to translate the content of each metadata element separately.

Figure 2 – DC-dot looking at the English-



Figure 3 – DC-dot, having translated the UKOLN homepage's metadata into German

## TASTING ACRONYM SOUP

Web Services are not delivered by a single, all encompassing, new standard. Rather, they are an enabling technology, building upon existing systems and processes in a predictable and standards or specification conformant fashion.

XML, eXtensible Markup Language<sup>10</sup>, is the glue underlying the whole Web Services approach. Much of the content is marked up, or tagged, as XML, and many of the more complex aspects of the Web Services approach, below, are expressed in XML. The evolution and increasingly widespread adoption of XML makes it possible for the Web

Services vision to become a cross-platform, product-independent reality.

SOAP, the Simple Object Access Protocol<sup>11</sup>, is a lightweight communications protocol, used to transfer Web Service requests, responses and results between one system and another. To quote the current specification, 'it is an XML based protocol that consists of three parts: an envelope that defines a framework for describing what is in a message and how to process it, a set of encoding rules for expressing instances of application-defined data types, and a convention for representing remote procedure calls and responses.'

WSDL, the Web Services Description Language<sup>12</sup>, describes the services themselves, telling other systems how to communicate with them, and what sorts of operations they are capable of undertaking.

UDDI, Universal Description, Discovery and Integration (of Web Services)<sup>13</sup>, is a protocol for building directories of Web Services. You (or a machine acting on your behalf) might search a UDDI directory in order to select the most appropriate currency conversion Web Service to integrate with your own application, for example.

These four are normally seen as the basic building blocks for any Web Services implementation. On their own, they are not sufficient to allow construction of the rich and flexible services that there is interest in creating, and there is a growing set of related standards that will sit on top of this core. Of these, three are worth mentioning here.

WSFL, the Web Services Flow Language<sup>14</sup>, describes the manner in which data and interactions pass from one Web Service to another, and will be fundamental for those who seek to build

complex aggregations of Services into a single application.

WSRP/ WSIA, Web Services for Remote Portals /Web Services for Interactive Applications<sup>15,16</sup>. Two separate working groups initially, these two appear to be coming together in a single specification that will describe the manner in which individual Web Services are made available for calling from within portals of various types.

The growing family of related Web Services specifications is seen, in business at least, as an important step forward in enabling a truly interactive, transactional experience on the Web. Crucially, these new specifications layer on top of well-established existing standards and protocols, such as the TCP/IP communications protocols, meaning that we lose none of the existing options as we add these new ones.

How much Web Services offer, directly, to the cultural heritage sector is an area for us to explore, but to ignore what is happening in this area is no longer a viable option.

## ACKNOWLEDGEMENTS

This paper was informed by Ian Dolphin's internal document on Web Services for the University of Hull's Digital University Project (<http://digital.hull.ac.uk/>), as well as discussions with

<sup>10</sup><http://www.w3.org/XML/>

<sup>11</sup><http://www.w3.org/TR/SOAP>

<sup>12</sup><http://www.w3.org/TR/wsdl>

<sup>13</sup><http://www.uddi.org>

<sup>14</sup><http://www-4.ibm.com/software/solutions/webservices/pdf/WSFL.pdf>

<sup>15</sup><http://www.oasis-open.org/committees/wsrp>

<sup>16</sup><http://www.oasis-open.org/committees/wsia/>



# TLD'S EMERGING DOMAIN NAME OPPORTUNITIES

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DIRECTOR OF INTERNET STRATEGY AND TECHNOLOGY INTERNATIONAL COUNCIL OF MUSEUMS

The everyday situation for Internet users has changed significantly during the course of its existence. Anyone who has been using the Internet for more than a few years will remember a time when there was no reason to wonder if an incoming e-mail message dealt with the subject with which it was headed, whether its indicated origin was legitimate, or if it could be opened without risk of unleashing a destructive virus. Similarly, although a URL might easily lead to an outdated document or an error message, there was no need to fear that it might unexpectedly go to a site that you wouldn't want your mother to see you visiting.

If there was any reason to keep the contents of an e-mail communication from being read by unauthorised individuals or to provide it with a verifiable signature, encryption applications were available. Information in an e-mail header was, however, routinely trusted without need for further concern. Indeed, one of the reasons for the Internet having assumed the dominant position among comparable technologies was that it did nothing other than move packets of data from one node on the network to another, and verify the correct delivery of data between the client and server. No accountancy data beyond what was needed for these immediate purposes were included in the data stream.

For a long time, the users and administrators of the Internet shared a common interest in ensuring its reliable operation. Although the members of this community needed to trust each other, this trust was implicit in the basic phenomenon. Notions of such things as spam did not exist. There was thus no basis for even dreaming that it would someday become a pandemic malady, and no mechanisms were devised for combating it or any of the other threats to the secure operation of the Internet that sadly now abound.

There is no way that more explicit support for security and trust can be retrofitted to the Internet's basic transport protocols. The security of a variety of adjunct protocols such as the DNS (Domain Name System) and HTTP (Hypertext Transfer Protocol) is currently being improved by extensions to previous versions of those protocols. This is largely intended to protect client-server transactions. The pervasive aspect of trust that characterised the early Internet community is probably lost forever and may have become so not solely because of security issues. No community can grow continually without the interests of its members at some point diverging. If it becomes large enough, it may no longer be appropriate even to attempt to see it as a single community. The Internet has now become large beyond any ability of its creators to have imagined, and the initial single user community has been replaced by an all

but countless number of separate communities.

Many of these are large and have clear sectoral identities independent of the Internet. In many cases, the activity that they conduct on it could benefit from an equally clear shared identity on the Internet. During the course of the development sketched above, however, the concept of network identity focused ever less on groups. Emphasis shifted toward individual organisations 'branding' themselves with domain names. To the extent that such an organisation needed to provide a basis of trust in its dealings with Net users, the brand served that purpose.

Further impetus to this trend was provided by changing perceptions of the commercial value of the Internet. This led to the dot-com phenomenon and its ultimate collapse, which caused inestimable collateral damage. When it became apparent that domain names were being used in manners that had potential for leading in an undesirable if not outright harmful direction, it was proposed that this might be offset by the creation of a larger number of top-level domains (TLDs). Further similar benefit might be had if the semantic value of domain names were brought into clearer focus. A 'proof of concept' of the latter approach was foreseen in the creation of a number of restricted TLDs, each established for a clearly named and well-defined 'target community'. Without any



need for extending or redesigning the DNS, it would thereby become possible for communities to establish collective identities on the Internet.

**O**ne Big Question required a convincing answer before this was actually implemented. What would a community be able to do with its own TLD that it could not do on a lower level in one of the pre-existing TLDs? The obvious alternative device was something along the lines of SECTOR.ORG. There was, however, a simple and compelling case to be made against this. Assuming that, as a second-level domain it received the full consensual support of the community for which it was created, it would still be vulnerable to the individual whim of its operator. This could be offset if the domain were operated by some broader corporate entity established by the envisaged TLD's target community, but it was still necessary to prevent the operator from being able to redefine the purpose of the domain.

**T**his issue was ultimately resolved by entrusting the operation of each community-based TLD to a 'sponsoring organisation' (SO) on the basis of a charter established jointly by the prospective SO and the agency responsible for the management of the top-level of the DNS, the Internet Corporation for Assigned Names and Numbers (ICANN). The SO could not then unilaterally alter the terms of the charter and ICANN was empowered to redelegate authority over the TLD to a new sponsor if the initial SO failed to maintain the policies established in the charter.

**T**his was finally put into practice with the creation of three sponsored generic TLDs (sTLDs) in October 2000. Given their innovative nature, it was not possible to anticipate where their

establishment action might ultimately lead. Much depended on the value that individual members of the target communities ascribed to being identifiable as a member of that community by means of a name in the new TLDs. There were, after all, other means by which institutions could indicate the sectors to which they belonged.

**T**he pivotal issue became one of trust. If the Website WWW.BIG-BESTMUSEUM.COM claims that it is operated by a museum, the user is left to verify its origin either on the basis of the site, itself, or through deliberate research elsewhere. If the same site were to appear as BIG.BEST.MUSEUM, the validation effort would require nothing more than reference to description of the domain's purpose in the .museum charter. This is, in fact, based on the definition of 'museum' contained in the Statutes of the International Council of Museums (ICOM). Although erudite users might argue the details of that definition, from the perspective of the average user, the assurance that a .museum resource conforms to ICOM's notion of what constitutes a bona fide museum is probably sufficient.

**I**t may be suggested that a non-specialist user has little need for concern with verifying the organisational status of a Website that is otherwise found useful, elucidating, attractive, or entertaining. However that might be, it can be countered that it is in the museum community's own interests to provide a clearly identified and easily accessible area on the ever so vast Internet that contains material guaranteed to reflect the museum profession's expertise and values. It is, in any case, the sector's mandate to make such material publicly available. Since the identifiers assigned to all

resources on the Internet contain a domain name designation, the value of the bounded community of trust provided by a dedicated TLD should be apparent.

**T**he scope of this trust may be extended by controlling further aspects of the .museum namespace. As a further proof of concept, the second level in .museum is reserved for generic and geopolitical designations. (This is more easily demonstrated than described and the reader is encouraged to visit <http://index.museum/>). This provides a basis for cohesively named coordinated action within subsegments of the museum community. Examples might be the deployment of cataloguing or metadata schemes, with specific disciplinary focus.

**I**CANN is now preparing to open a second call for proposals for further sTLDs. The selection of .museum from among the responses to the first call was, in part, motivated by the expectation that it was going to be the first of what would subsequently become a larger number of sTLDs within the broader heritage management sector. Attention is currently being focused on the other two communities in the ALM sector – archives and libraries. Additional members of the envisaged sTLD cluster may also be found in the fixed cultural property management community – monuments and sites. The scope of further expansion is potentially as wide as that of culture although it is currently totally unclear how many new TLDs will ultimately be established. Present action is focused on the 'approval of a limited number of new sponsored gTLDs'. Who within the DigiCULT sphere of concern will be next?



# A DISTRIBUTED FRAMEWORK FOR DIGITAL MUSEUM EXHIBITIONS

BY SAMUEL CRUZ-LARA<sup>1</sup>, LORIA / INRIA LORAINÉ, FRANCE, JEN-SHIN HONG<sup>2</sup> / NATIONAL CHI NAN UNIVERSITY, TAIWAN

## INTRODUCTION

A digital museum designer implements virtual exhibitions using digital images, Web pages, animation, video clips, and other multimedia devices. Although there are no space and related limitations in the cyberworld, there are other factors that a digital designer needs to consider. For instance, the bandwidth that is available to different users can vary tremendously. Attention span is another factor. While an adult may be willing to go through long explanations in text, a child may prefer graphic-intensive slideshows. Furthermore, the sophistication of users should also be considered. An expert and a novice will clearly expect different experiences when browsing through a digital museum. With the flexibility allowed to the digital form of media presentation, a digital museum should try to accommodate as many different user needs as possible. And a user, when browsing through an exhibition, can simply click and choose the style most suitable.

While most people might agree that such a multi-style exhibition scheme for different users is desirable, there are not many such exhibitions on the Web today. The reason is that, using current techniques, each style of the same exhibition needs to be constructed separately. For online exhibitions involving video, animation or SMIL<sup>3</sup>-based shows, the realisation of an exhibition scenario usually requires tedious multimedia composing, and is thereby very time-consuming. It is also quite cumbersome to

modify the information content at a later stage. If an online exhibition uses mainly HTML-based Web pages, the resulting pages are relatively easy to compose, but they are also tied up with the visual art design and are thus difficult for the content provider alone to modify. Furthermore, once the information content grows to a significant amount, the 'hyperlinks' between associated exhibitions' Web pages are difficult to track and maintain.

The second problem with the hand-crafted online exhibition approach is that the content can only be presented to the user in a fixed presentation style. Since Web users may have different multimedia and bandwidth capacities, it is difficult to design a one-size-fits-all exhibition. In the literature, while large and coordinated efforts have focused on standardising media formats, providing shared access to museum databases, and developing search mechanisms for data retrieval, little emphasis is placed on designing mechanisms for turning the digitised museum collection into educational experiences for users. Our goal is to design an optimal solution for building online digital museum exhibitions.

## A DISTRIBUTED CONTENT MANAGEMENT FRAMEWORK FOR DIGITAL MUSEUMS

The digital museum management system supports the efficient execution of the essential activities related to the administrative and documents organisation/pre-

sentation related activities, and is characterised by the following features<sup>4</sup>:

- Input of multimedia digital objects, including text, images, audio, video.
- Organising, composing, and integration of the XML-based multimedia exhibition element documents.
- Management of the XSL documents for presentation.
- Definition and management of user profiles.
- Management of the document presentations according to user needs and profiles.

Our main objective is to define a general distributed software architecture through which it might be possible to access and share multimedia resources, which would be spread among different servers.

From the user's point of view, there should not be much change in the way in which the resources are to be accessed, which means that whether there are one or several servers should be transparent to the user.

As will become evident, adopting a distributed framework, as opposed to the classical view of a centralised database, induces several specific problems for which we are trying to provide some plausible answers. Among these, it is necessary to deal specifically with the problem of broadcasting queries to different servers and conversely combining

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<sup>3</sup><http://www.w3.org/AudioVideo>

<sup>4</sup>The effectiveness of such a system has been amply demonstrated in the "Lanyu Digital Museum" project (National Chi Nan University).

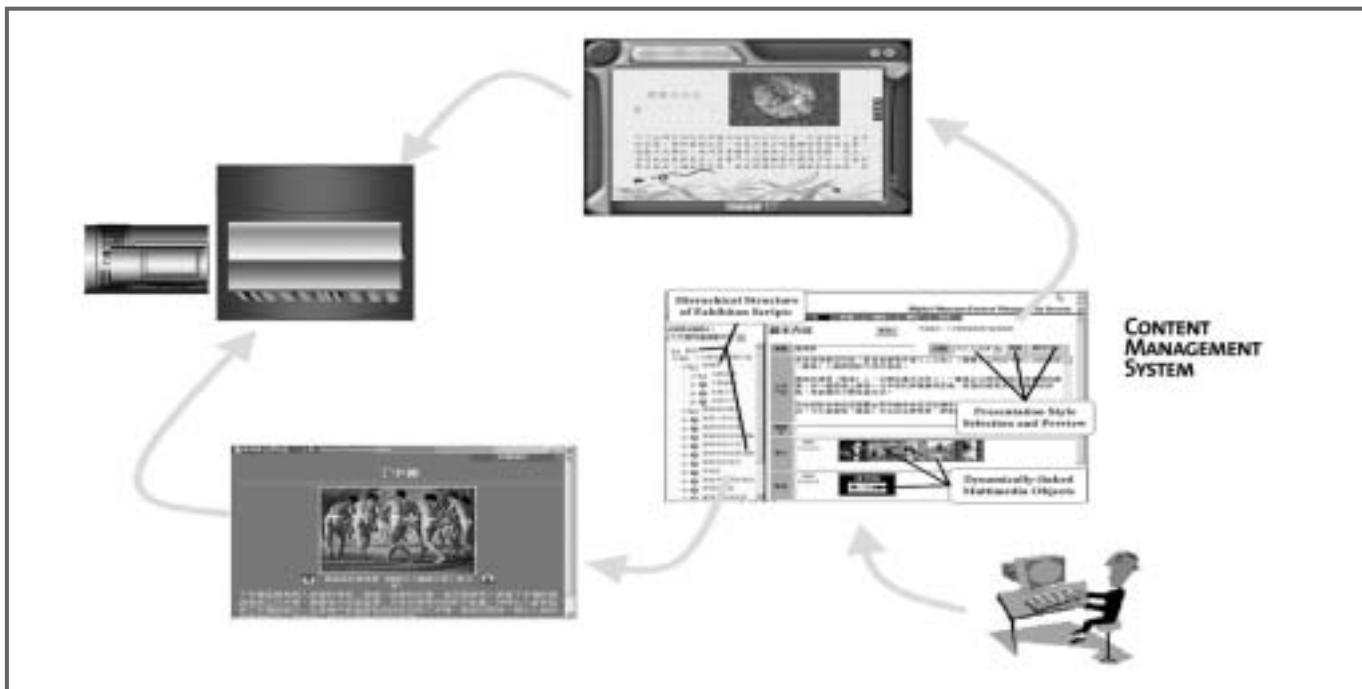


Figure 1. An administrator manages locally multimedia resources on a server.

the corresponding result sets. As an example, statistics can only be dealt with in our distributed architecture if part of the computation is kept on the remote servers' and part is carried out locally (on the access server).

All tasks dealing with the user interface should be concentrated on the client side, while the server should carry out searching, and other computationally intensive operations.

Most of these ideas have been applied in LORIA's MLIS-ELAN<sup>3</sup> project. The MLIS-ELAN project developed a general XML-based distributed software architecture for accessing and sharing natural language resources in an open client/server environment. Natural language resources were XML-encoded (using the XML form of the 'Text Encoding Initiative'<sup>4</sup>) and CORBA<sup>5</sup> was used to allow, in particular, communication between servers.

Based on our experience with MLIS-ELAN, we think that the multimedia resources network may have the following characteristics:

- Each server is an autonomous unit containing its own data. For instance, all resources should be XML-encoded.
- Each server acts as a 'broker' and, if necessary, transmits the request to other servers in the network which are known to it. All messages and requests flowing between servers should also be XML-encoded.
- One server is accessible to registered users through a general-purpose Java-compatible Web browser. It would also be interesting to have an XSLT capable browser.

#### A HIERARCHY OF USERS

We should consider that there are several categories of users in the network:

- Administrators: who organise LOCAL media on servers.
- Designers: who design multimedia exhibitions.
- End-users: who access exhibitions that have been built by designers.

#### ADMINISTRATORS

Administrators are directly concerned with maintaining local servers. Thus each server in the network has an administrator who uses the Content Management System for:

- Multimedia Resources Database Management
- Multimedia Resources Integration
- Digitisation Process
- Multimedia Resources Composition.

Obviously, each server in the network may have several administrators. The important aspect to keep in mind is that there is a need for the resources belonging to each server in the network to be created and, above all, maintained at a location where there is adequate competence available to do so. An administrator can not manage any resource that may not be accessed locally on a server.

<sup>3</sup>Multi Lingual Information Society – European Languages Activity Network

<sup>4</sup><http://www.tei-c.org>

<sup>5</sup><http://www.corba.org>

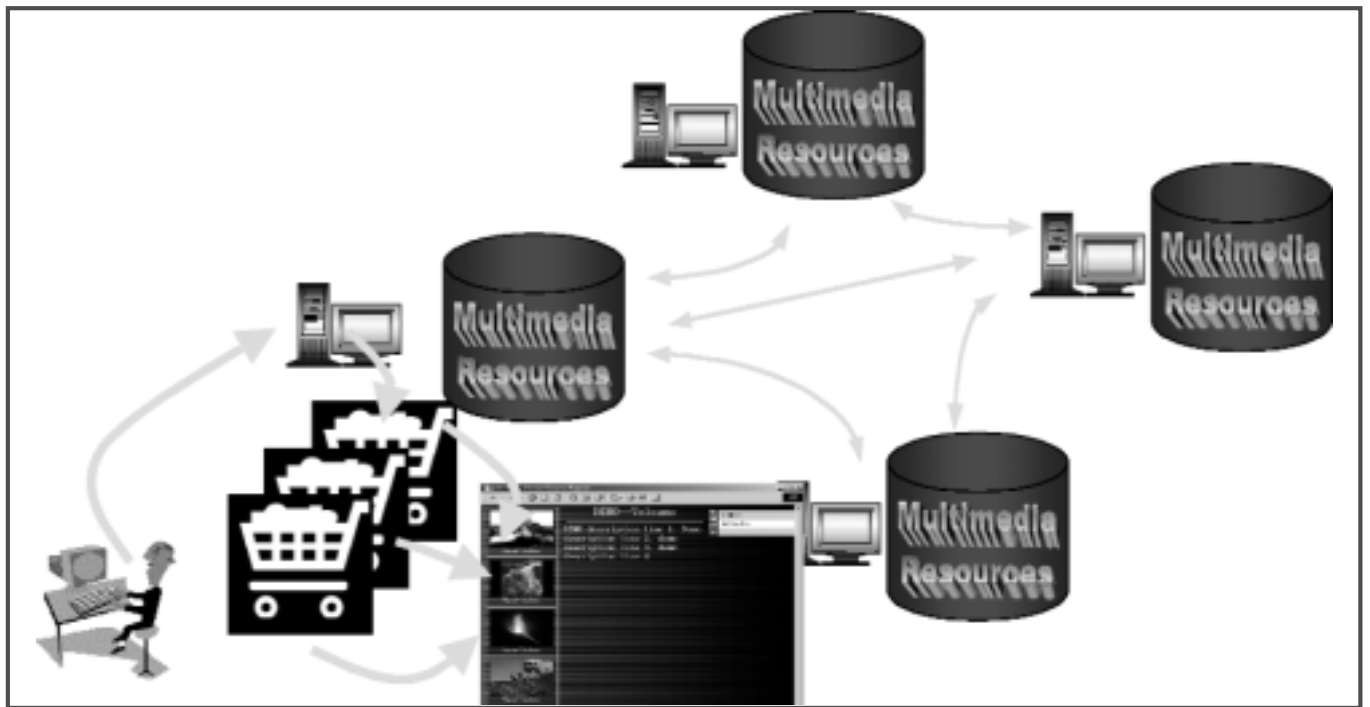


Figure 2. A designer builds an exhibition from multimedia resources located throughout the network.

### DESIGNERS

Designers are involved with all servers in the network. They are obviously able to access all resources stored on the server that they have used to connect into the network, but they can also access any resource stored on any server belonging to the network.

Given the list of available servers - accessible through the local server - in the network, together with their respective server profiles, the designer will select those servers that will provide the proper resources or the proper services (tools) he wants to access or use.

Through an iterative process of requests to the selected servers, the user will build up a virtual subset (i.e. by way of pointers to individual resources) upon which he will actually work. The construction of this virtual subset of resources is achieved by means of the 'shopping cart paradigm', that is, while the designer chooses all the multimedia resources he wants to work with, he stores these

resources in a 'shopping cart'.

Thus, designers are involved in:

- building exhibitions by collecting multimedia resources throughout the network;
- selecting working servers;
- selecting multimedia resources ('Shopping Cart Paradigm');
- manipulating the selected resources;
- 'local' access to all multimedia resources.

### END-USERS

Finally, the end-users directly access the exhibitions that have been constructed by the designers.

### Acknowledgements

This work is sponsored by the National Science Council of the Republic of China (Taiwan), NSC-89-2750-P-260-001. This work is also supported by INRIA, France.

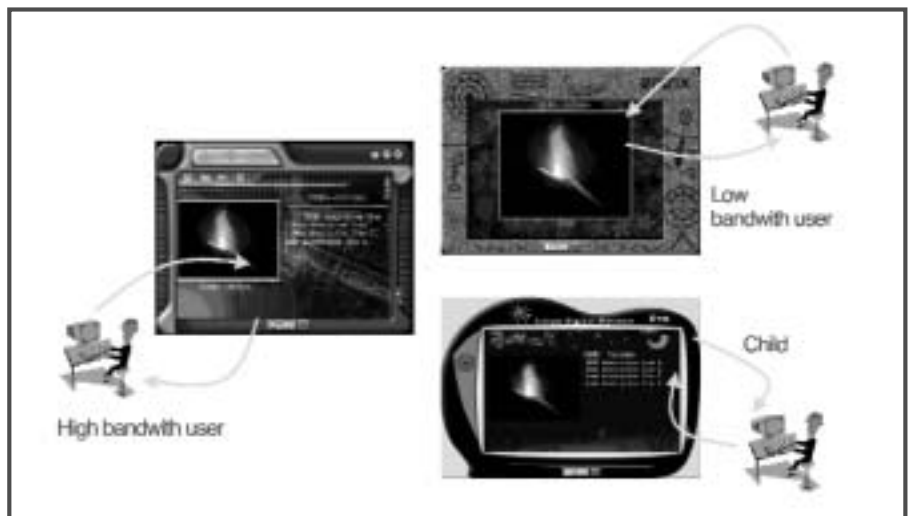


Figure 3. End-users directly access an exhibition constructed by designers.

# HANDSCAPE: INVESTIGATING MOBILE COMPUTING IN MUSEUMS

BY ANGELA SPINAZZE, ATSPIN CONSULTING

**H**andscape is a research project concerned with exploring potential use scenarios for mobile (hand held) computing in museum environments. The project is funded by a grant from Intel Corporation. Managed by Angela Spinazze, the grant is administered by the CIMI consortium, with research led by Professor Geri Gay, Director of the Human Computer Interaction Group (HCI) at Cornell University. The project is in its second year.

**S**ix themes have emerged from initial investigations into user, designer and administrator expectations of mobile computing experiences in museums (for further information about Year One research, please consult the project pages on the CIMI Web site). The themes include:

- context awareness;
- social recommendation;
- overlay of tangible media;
- augmentation of experience through use of multiple media;
- filtering/organising;
- extending the experience (pre- and post-museum visit).

**I**n order to explore these themes in greater detail, the project team will work in several different areas in the course of 2003-2004, with deliverables that include scenario testing, assessment tool development, and the continued observation of related community take-up activities.

## SCENARIO TESTING

**T**he project team is currently working with the Smithsonian American Art Museum and the Royal Botanic Gardens, Kew, on site-specific projects to test scenarios against visitor experience issues. Working with the key project themes

(as noted above), specific application scenarios will be developed, tested and evaluated for their effectiveness in integrating handheld technology into the visitor experience and its success in meeting visitor expectations.

**T**he Smithsonian American Art Museum (SAAM) project focuses on the issues of context awareness, overlay of tangible media, augmentation of experience, and filtering/organising. The SAAM handheld application is being developed for use in the contemporary craft galleries at the Renwick Gallery in Washington, DC, and includes educational components dealing with materials, process, technique, encounters with artists, and secrets of the objects, a unique approach to connecting visitors with facets of the objects hidden from view.

**T**he Kew project will take place out-of-doors, and will focus



on the trees that have been collected and planted in the Garden throughout its history. The Kew experience will also address the issues of context awareness and overlay of media. The application will utilise GPS technology, scientific data from the Garden's tree database, and interviews with scientists, and will explore some new ways of extending the experience through a post-Garden visit scenario.

## ASSESSMENT TOOL

**U**sing a variety of media, exercises, data collection techniques, and analysis, the project team will produce a self-assessment tool for the community. The tool will emphasise the iterative design and evaluation process, and it will attempt to demonstrate how a clear understanding of the relationship between expectations, experiences, and physical environments are fundamental to the



*The author would like to thank Claire Larkin, Senior Designer, Exhibitions Department, Smithsonian American Art Museum, and the project team at SAAM, for the use of these images.*

process of integrating wireless technologies into the social fabric of museum environments. The tool is being designed to assist museums with making informed decisions about how and when to use mobile technologies. An alpha version of the tool will be released during the third quarter of 2003 with testing taking place at conferences and through an on-line experience.

### COMMUNITY INVOLVEMENT

In order to keep up-to-date with what is happening with hand held computing in the community, Handscape will continue to operate a list serve as a means to communicate progress and to solicit community feedback, it will maintain a community calendar of hand held application launches and provide periodic updates to the White Site, and team members will be making site visits to see applications in action.

If your institution is planning to deploy a mobile computing application and you would like others to know

about it, we would be pleased to include the event in this new calendar. Send requests to join the list serve, or post application launch dates on the calendar, to the author at the address below.

### PARTICIPATE

The Handscape project team aims to provide museums with a tool that emphasizes a better understanding of the range of viewpoints and needs that should be addressed when developing a hand held, mobile application for museum use. Towards that end, and throughout 2003, the project team will be engaging museum professionals through surveys and conversations, about their experiences developing, deploying, and evaluating these types of applications in various museum environments. The range of perspectives amongst the stakeholders charged with producing mobile computing applications is broad, and represents an important component of the ultimate success of the experience for all concerned.

Project updates and invitations to share your experiences will be posted to the Handscape home page in the coming months.

### RELATED LINKS

- CIMI Consoritum  
<http://www.cimi.org/>
- Handscape Project Home Page  
<http://www.cimi.org/wg/handscape/index.html>
- Human Computer Interaction Group, Cornell University  
[http://www.hci.cornell.edu/White Site](http://www.hci.cornell.edu/WhiteSite)
- <http://www.cimi.org/whitesite/index.html>
- Mobile Computing Survey  
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# EXPLORING CHARGING MODELS FOR DIGITAL CULTURAL HERITAGE IN EUROPE

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## INTRODUCTION

During 2002 HEDS examined the new market realities and opportunities that cultural institutions face due to the transition to digitised collections. The project explored the cost and policy models adopted in arriving at pricing structures for delivering surrogates of unique or rare items as digital objects. HEDS<sup>1</sup> was invited to carry out the research study on behalf of the Andrew W. Mellon Foundation<sup>2</sup>.

The study focused upon libraries, archives, museums and galleries. Cultural heritage institutions in the UK were investigated, with some other European institutions included - in total, fifty-one institutions were surveyed and fifteen were interviewed. As far as the author is aware, this is the only study to explore and report upon the pricing practice and policy for the transition to digital for a wide range of cultural and heritage organisations.

Cultural institutions which hold valuable and unique/rare artefacts have been creating surrogate representations of these for centuries. Since the development of photo-reproduction methods, these institutions have made available a whole range of secondary images for many purposes: for scholarship, teaching, public enjoyment, publication, etc. Most large libraries, museums and galleries promote reproductions of their own images as mass

consumer goods such as postcards or posters. Many institutions also offer on-demand services to create and supply very high quality photographs for scholarship and publication. With the development of top-of-the-range digital cameras and scanners, digital reproductions which rival in quality even the best of photographic images can now be supplied. As a result many cultural and heritage institutions are now turning to digital capture for some or all of their services. Throughout this article, the photographic reproductions are referred to as 'analogue' and are compared with the newer 'digital' formats. As the study also dealt only with cultural and heritage artefacts with significant image content, contemporary text based formats (such as printed books and journals) were excluded from the focus of the work.

The study drew a number of wide-ranging conclusions. Primary among these are:

- The most powerful deciding factor for price was the perceived market value of the item (as defined by what similar organisations are charging) rather than the actual cost of creation and provision.
- Digital is considered a cheaper product to create and distribute than analogue.
- None of the interviewed institutions were fully recovering the cost of creation, management, storage and service provision solely from the sale of the digital item itself.
- Only those institutions that accounted for the revenue raised from the sale of commercial rights to use the materials as a part of their operation showed an

actual surplus or profit.

- All organisations surveyed placed their duty to provide low-cost access to materials to the public above the need to make a profit from those materials.
- The provision of services is driven by the public's desire to have access to the unique, rare and valuable collections available in European cultural and heritage institutions.
- No institution was able to quantify accurately the cost of digital preservation.

## COST STUDY FINDINGS

The results are indicative of the maturity of the market for the sale of analogue and digital items in the heritage sector. It also shows the state of the technical provision and integration of the business process with wider institutional goals. Obviously many services offer multiple methods of payment.

### Payment options explored

	Number of institutions	Percentage
Payment in advance	36	71%
Payment on delivery	8	16%
E-commerce	5	10%
Credit card	16	31%
Cheque/bank transfer	24	47%
Invoice	18	35%
Cash	15	29%
Other	2	4%

<sup>1</sup><http://heds.herts.ac.uk>

<sup>2</sup><http://www.mellon.org>

## COST INFORMATION

- The average price of an analogue item = €28.24 (from 48 responses)
- The average price of a digital item = €25.99 (from 42 responses)
- The average price differential = €10.51% (from 40 direct comparisons possible digital is cheaper than analogue)
- Digital is ~10% cheaper than the comparable analogue item, based on the price offered the consumer. The ranging of the prices for digital and analogue are shown in the figure.

It is worth noting that fifteen of the forty responses show a 0% difference in price. Therefore, in 37.5% of comparable cases, the consumer was offered a choice of delivery medium without having to consider the economic ramifications of that choice.

Figure 2 shows the range of price differentials between analogue and digital. In 82.5% of cases digital is either the same price or cheaper for the consumer than the analogue equivalent.

## CONCLUSIONS AND IMPLICATIONS

### The Business Case

Many institutions felt that they were being pushed into massive changes without the systems to support them being properly considered. Very few institutions seemed to have a full appreciation of overall institutional strategies for the move to digital, with less than 30% of the institutions appearing to have carried out detailed planning or implemented the significant organisational change required for

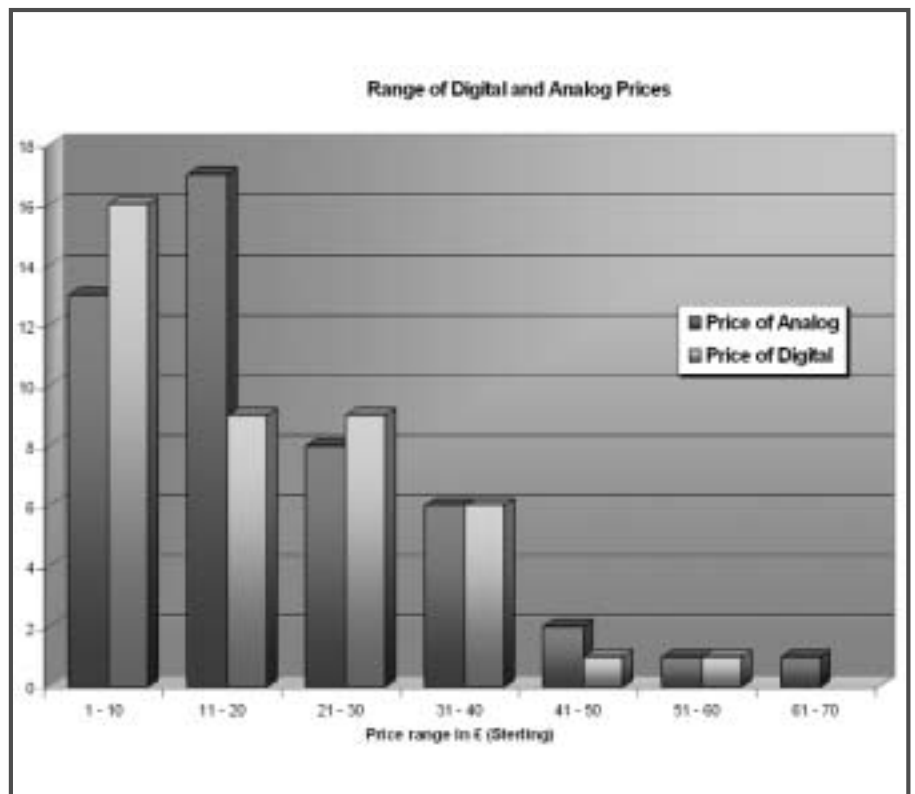


Figure 1: Range of digital and analog prices

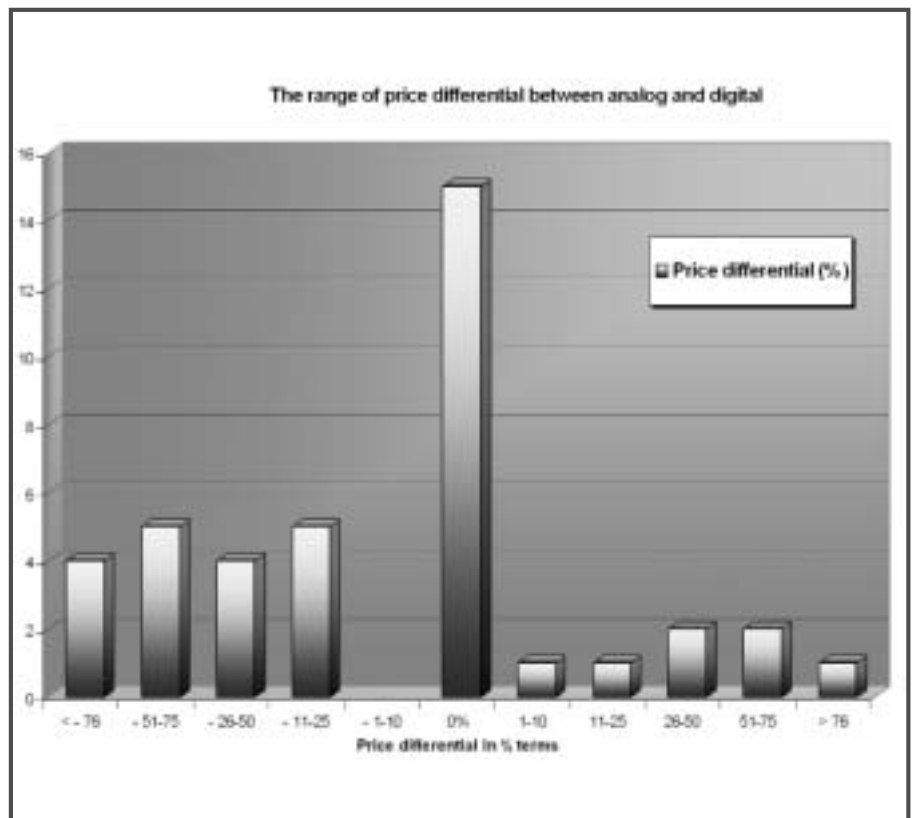


Figure 2: The range of price differential between analog and digital



the move to digital delivery and access.

The maturity of business practice in the interviewed institutions seemed to divide neatly along the lines of the national libraries, museums and galleries having the clear lead, with public libraries and university libraries just starting to develop their practices significantly in this area. There is, however, a marked lack of clear commercially led business planning and control in most institutions surveyed. This is not to suggest that they are badly managed, but that the financial exploitation of the medium is not the foremost priority.

The statistical results of the survey indicate a definite pricing trend, which suggests that digital items will continue to become cheaper for the consumer to purchase than the analogue equivalent. There are a number of reasons suggested by this study to explain this phenomenon:

- The institutions are deliberately trying to encourage the consumer to purchase digital rather than analogue.
- may be because the cost of creation (although not necessarily quantified) is perceived as being cheaper for digital than for analogue.
- The cost of making a copy for delivery of a digital item is distinctly cheaper for the institution than the consumable costs involved in delivering analogue items.
- Smaller institutions are entering the market for the first time because the option to create surrogates via digital means has become viable due to reducing equipment costs at the entry level. They can respond to consumer demand for the first time at lower cost.
- Digitisation projects and external funding for digitisation are leading to a body of digital images being available

for the first time, which can then be exploited with almost no additional outlay. For analogue items every copy means a consumable outlay.

- The institutions are not yet passing on the cost of data storage or digital preservation as these are not yet understood well enough to become part of the financial accounting chain.

### The Web Case

The fact that 72.5% of the surveyed institutions had a Website offering the service in some manner, and that 25.5% are showing thumbnail views to aid consumer selection, is an indication of the growing confidence in the Internet and digital means of delivering services. This seems bound to expand and to mature with better information for the consumer available online to aid their purchase decisions and possibly more e-commerce to speed the sale of items. Indeed, the provision of images on the Web does not seem to reduce the potential income of those interviewed, but has been beneficial to the sale of rights to use and to the user base in promoting the cultural collections of the institution.

The results clearly suggest that digital provides a better platform to promote the collection to a wider national and international audience than analogue. Most institutions interviewed planned to increase the number of thumbnail or screen-sized images available at no cost to the user. Co-operative strategies between institutions were also promoted as a way forward. All were concerned to retain the rights to the high-quality, high-resolution images and to assert their rights in any items available on the Internet.

Among the clearest conclusions it is possible to draw from this study is

that, for a service unit to operate at a surplus, they have to account for the sale of rights as part of their operation. Very few of the institutions interviewed made more money from the sale of the medium, whether analogue or digital, than it cost in creation, management or service provision. The only apparently profitable part of the transaction was the sale of the right to use the material in a commercial publication. All institutions sold rights, but only a few allowed that revenue to be directly linked to the actual service provision of creating, managing and delivering the media to the consumer. This suggests that, at least in financial terms, the message is more valuable than the medium.

Here we have only been able to summarise some of the basic findings of our research. The full report of this study is available at [http://heds.herts.ac.uk/mellon/charging\\_models.html](http://heds.herts.ac.uk/mellon/charging_models.html)