Exploring and Charting the Digital Preservation Research Landscape

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Humanities Advanced Technology and Information Institute (HATII)

- HATII - http://www.hatii.arts.gla.ac.uk
- Digital Curation Centre (DCC) - http://www.dcc.ac.uk
- DELOS - http://www.dpc.delos.info
- PLANETS - http://www.planets-project.eu/
- CASPAR - http://www.casparpreserves.eu/
- DPE - http://www.digitalpreservationeurope.eu
- AHDS Performing Arts - http://www.ahds.ac.uk/performingarts/index.htm
Arts and Humanities Data Service (AHDS)

• Founded 1995
• UK organisation to support preservation of the results of digital scholarship.
• Managed by an Executive in London
• Collaboration of 5 centres of expertise: Archaeology, History, Visual Arts, Text, and Performing Arts
• Funded by JISC and AHRC
Rescuing AHDS-PA

• The Visit from Scottish Enterprise
• Celebrating the Domesday Book
• Rescuing the BBC Domesday Book
• Rescuing data is not free, but....
  - Maintaining data costs money as well
Objectives of digital longevity

- Digital preservation aims to ensure that future users will be able to discover, retrieve, render, manipulate, interpret and use digital information in the face of constantly changing technology.
- It involves conservation, renewal, selection, destruction, enhancing, updating, and annotating.
- It is a risk management activity at all stages of the longevity pathway -- translating uncertainties into manageable risks.
- Digital Preservation is an ongoing activity to ensure recurring value of digital objects.
We need to make a radical change

• We need to stop ‘building that agitating buzz’
• We need to deliver actual solutions that work.
• We need solutions that scale.
An Agitating Buzz about Things Digital

• We have successfully socially amplified the perception of risks associated with digital materials

• While there are ‘risk amplifiers’ and ‘risk attenuators’, preceptions of risk arise complex social and cultural processes

• Have we socially constructed our preceptions of preservation risk within a vacuum
Preservation Risk is Actual

• It is technological.
• It is social.
• It is organisational.
• And it is cultural.
• Actual risks can be assessed and measured—actual risks can be managed.
Research Roadmap

• Analysing the state of the art in Digital Preservation research and existing research agendas.
• Redefinition and refocusing of the Preservation research agenda
• Basis for development of research problem basis
• Provides a foundation for communication about research needs.
Reviewed Published Research Agendas from 1991 to 2006

- **I2S** - *Invest to Save* [4] was prepared for the NSF-DELOS working group on digital archiving and preservation in 2003.
- **eScience** - *e-Science Curation Report* [16] by Philip Lord and Alison Mcdonald was published in 2003.
- **Cyber** - *Revolutionizing Science and Engineering Through Cyberinfrastructure* [18] was created by the Blue-Ribbon Advisory Panel on Cyberinfrastructure of the NSF in 2003.
- **Warwick** - *Digital Curation and Preservation: Defining the research agenda for the next decade* [1] reports on the Warwick workshop held in 2005.
Review Conducted Segmented by

• Digital Object Level
• Collection Level
• Repository Level
• Process Level
• Organisational Environment
The Landscape

- lack of common understanding
- loss of focus
- lack of practical experience
- fragmentation
- frictional losses
- lack of training
Refocused Landscape

- Restoration
- Conservation
- Management
- Risk
- Significant Properties of Digital Objects
- Interoperability
- Automation
- Context
- Storage
- Experimentation
Out of Scope, but not out of mind

- Research also needed in areas of
  - policy and procedures,
  - organisational structure and communication,
  - education,
  - business case development, or
  - legal arena.
Preservation of Systems and Technology

- Preservation of Systems & Technology
- Managing Complex and Dynamic Digital Entities
- Automated Metadata Creation
- Long-term Metadata Viability
- Multilingual Entities and Technology
- Acceptable Loss
  - Authenticity
  - Renderability
- Repurposing

Digital Repository Infrastructure, Swiss Federal Archives, Berne, October 2004
Process Planning

• Different formats require different kinds of strategic approaches to ensure that they can be accessed in the future.

• Problems with formats are exacerbated by the fact that archival collections, which need to be managed as a whole, generally contain entities in multiple formats; these formats have different rates of obsolescence.

• E.g. we need predictive measures to enable developers to assess the preservation impact of attributes of formats in advance of their completed development or use.
Automated Metadata Creation

- Preservation metadata is an essential part of the information infrastructure necessary to support all the processes in digital preservation.
- Automatic or semi-automated creation and authoring of the technical, descriptive, structural, and contextual metadata are a crucial issue.
- Need for creation of metadata supporting the discover, use and understandability of digital objects.
**Automation (or semi-automation)**

- Huge quantities of materials to ingest and manage - human effort does not scale
  - selection, validation, description, assigning unique persistent identifiers, data management, migration, and selection and appraisal
- Automation of workflows allow integration of independent services
- Standardized logging/record creation
- Reduce human intervention
  - Cheaper and faster
  - Less error prone
  - Enables higher level of security and reliability
- Enables intensive test and verification mechanisms
- Automated Metadata Extraction

Hans Hofman (Dutch National Archives) and Charles Dollar at ICA2004 Wien.
**binary code translation technologies**

- automatically translating a binary executable program from one machine (M1) running a particular operating system (OS1) and using a particular file format or data representation (R1) (i.e. platform (M1,OS1, R1) to
- another platform (M2) running a different operation system (OS2) and using a different file format or data representation (R2) (i.e. platform (M2,OS2, R2)).
Self-describing & monitoring objects

• Digital objects that know what they are
• Digital objects that know something about their semantics
• Digital objects that can observe the state of other objects (e.g. observe decline in numbers of similar classes of objects)
• Digital objects that know where they are
• Digital objects that know where their metadata are
• Digital objects that can notify their originator/manager if they need to be protected, migrated, secured
Safe-Harbour Seeking Objects

- Embed Trust mechanisms in the objects themselves
- Make objects active
- Exploit grid and peer-to-peer technologies
- Exploit existing know-how and reasoning
- Enable objects to look after themselves
Experimental Testbeds

- integrate, automate, and evaluate a framework for digital entity preservation by integrating and combining the testbed framework and evaluation metrics.
- tools to automate selected steps of the preservation process, such as ingest validation, preservation experiment set-up and control, preservation criteria definition, and verification of formal transformation, to support semi-automatic alternative evaluation.
- to investigate the potential metrics for measuring the effectiveness of different preservation strategies in the context of complex digital objects.
- integration of software tools to support the digital preservation testbed framework.
Thank You

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