Metadata for preservation

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Presentation outline

– How can metadata support preservation strategies?
– Current initiatives (brief overview)
– Some key initiatives in more detail:
  • OAIS Reference Model
  • OCLC/RLG Metadata Framework
  • PREMIS working group
– Some issues:
  • Implementation, metadata creation and capture, sustainability, interoperability
Why metadata is useful (1)

• Digital preservation strategies - migration, emulation, technology preservation, etc. - all depend - to some extent - on the creation, capture and maintenance of suitable metadata:
  – "Preserving the right metadata is key to preserving digital objects" (ERPANET Briefing Paper, 2003)
  – "It's all about metadata" (Cedars project manager, ca. 2000)
Why metadata is useful (2)

– Metadata fulfil various roles, e.g.:
  • Within a digital repository, “metadata accompanies and makes reference to each digital object and provides associated descriptive, structural, administrative, rights management, and other kinds of information” (Clifford Lynch, 1999)
Some examples (1)

• Digital libraries
  • National Library of Australia (1999)
  • Cedars project outline specification (2000)
  • NEDLIB project (2000)
  • OCLC/RLG working group metadata framework (2002)
  • National Library of New Zealand (2003)
  • PREMIS working group (2003- )

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Some examples (2)

• Digitisation
  • NISO Technical Metadata for Digital Still Images (draft, 2001)
  • Metadata Encoding & Transmission Standard (METS)
    – XML container for different types of metadata, descriptive, administrative, structural
    – Supported by Library of Congress
Some examples (3)

• Recordkeeping metadata
  • Business Acceptable Communications (BAC) model developed by the Pittsburgh Project
  • Australian Recordkeeping Metadata Schema (RKMS)
  • Standards developed by the UK National Archives, the National Archives of Australia, the Public Record Office Victoria, etc.
Draft categorisation (1)

Conceptual

CEDARS
NEDLIB
NLNZ
OCLC/RLG

Practical

METS
Z39.87
VERS
PRO
RKMS
PITT

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Draft categorisation (2)

• Earliest schemas were largely conceptual in nature:
  – e.g. Pittsburgh BAC model, Cedars outline specification, OCLC/RLG WG
• Gradually moving towards a more practical focus:
  – e.g., VERS, NLNZ, METS, PREMIS
  – Based on XML (DTDs and Schemas)
• But there is an urgent need for this experience to be shared
  – e.g., briefing papers, advice to implementers
The OAIS reference model (1)

The Reference Model for an Open Archival Information System (OAIS):

- ISO 14721:2003
- Establishes a common framework of terms and concepts
- Identifies basic functions of an OAIS:
  » Ingest, Data Management, Archival Storage, Administration, Access, Preservation Planning
- Defines an information model, e.g.:
  » Information Packages
  » Identifies the types of metadata required (but not a schema)
The OAIS reference model (2)

- Information model:
  - Information Object (basic concept)
    - Data Object (bit-stream)
    - Representation Information (permits “the full interpretation of Data Object into meaningful information”)
  - Information Object Classes
    - Content Information
    - Preservation Description Information (PDI)
    - Packaging Information
    - Descriptive Information
The OAIS reference model (3)

• Information model (continued):
  • Information package:
    – Container that encapsulates Content Information and PDI
    – Packages for submission (SIP), archival storage (AIP) and dissemination (DIP)
    – AIP = “... a concise way of referring to a set of information that has, in principle, all of the qualities needed for permanent, or indefinite, Long Term Preservation of a designated Information Object”
The OAIS reference model (4)

• Archival Information Package (AIP):
  • Content Information
    – Original target of preservation
    – Information Object (Data Object & Representation Information)
  • Preservation Description Information (PDI)
    – other information (metadata) “which will allow the understanding of the Content Information over an indefinite period of time”
    – A set of Information Objects
The OAIS reference model (5)

PDI Preservation Description Information (Figure 4-16)

Reference Information  Provenance Information  Context Information  Fixity Information
OCLC/RLG Framework (1)

- Content Information recommendation:
  - The content and all information required to render it
  - OAIS Representation Information - permits “the full interpretation of Data Object into meaningful information”
  - Content Data Object Description, e.g.:
    - Underlying abstract form description
    - Structural type (e.g. MIME type)
    - Technical infrastructure (internal structure)
OCLC/RLG Framework (2)

– Content Information (continued)

• Content Data Object Description, e.g.:
  – File description (technical specifications)
  – Size
  – Significant properties

• Environment description
  – Describes the hardware and software environment
  – Operating systems and rendering programs
  – Storage, computational resources and peripherals
  – Available documentation
OCLC/RLG Framework (3)

– Preservation Description Information recommendation:

  • PDI = other information (metadata) “which will allow the understanding of the Content Information over an indefinite period of time” (OAIS Reference Model), e.g.:

    – Reference: identifiers (internal and external), basic resource description, existing descriptive metadata
    – Context: context of creation, relationships with other data objects
OCLC/RLG Framework (4)

– PDI Recommendation (continued)
  – Provenance: event based model, documents an object's origin (creation), existence before ingest, processes enacted at ingest and for maintenance (e.g. migration); also records rights management information
  – Fixity: records authenticity procedures

• Framework is a set of recommendations, not a specification for implementation

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PREMIS working group (1)

• Working Group on Preservation Metadata - Implementation Strategies
  • Background:
    – Sponsored by OCLC Online Computer Library Center and Research Libraries Group (RLG)
    – WG II (PREMIS) focused on implementation
PREMIS working group (2)

• Before WG I
  – Little consensus in digital library world (various projects and initiatives)
  – Awareness of importance of OAIS model, but less understanding of how this should be used

• The PREMIS working group:
  – 2003 - 2004
  – Chairs: Priscilla Caplan and Rebecca Guenther
  – International group from the US, the UK, the Netherlands, Germany, Australia and New Zealand
PREMIS working group (3)

• Aims:
  – Define 'core' set of metadata elements (data dictionary)
  – Evaluate strategies for encoding, storing, managing, and exchanging metadata

• Activities
  – Review WG I framework element by element
  – Focus on high-level, e.g. detailed format-specific metadata out of scope
  – Relationships between digital objects (complex)
  – Survey on metadata requirements of repositories
Issues - implementation

- Focus on implementation is becoming increasingly important:
  - Metadata advocates need to prove the practical value of metadata frameworks and 'outline specifications'
  - We need to move from the conceptual to the practical, need to move beyond proof-of-concept
  - Positive signs:
    - METS/NISO Z39.87
    - PREMIS WG
Issues - sustainability

• Balance risks with costs:
  – There is a perception that metadata creation and maintenance will be expensive
  – But costs associated with data recovery are not trivial

• Avoid imposing unnecessary costs:
  – Avoid large schemas
  – Need to identify the *right* metadata ('core metadata'?)
Issues - creation and capture

- Metadata creation/capture:
  - Human agency vs. automatic capture
  - How much metadata already exists?
  - The need for automatic (or semi-automatic) capture or conversion of metadata
  - Need for metadata to be captured at creation, ingest, migration, and at other appropriate points in object life-cycle
Issues - interoperability (1)

• Interoperability is important:
  • To support the reuse of existing metadata
  • To support the exchange of digital objects between repositories

• Problems:
  • The need to cope with a wide (and growing) range of metadata standards, object types, formats, etc.
  • Growing number of repositories
Issues - interoperability (2)

- Metadata registries?
  - Provide support for the ingest process
  - May also provide support for the access function
    - The export of objects to users
    - The exchange of objects with other repositories; conversion to exchange standards
  - Help manage schema evolution
  - Possible relationship with format registries, e.g., the proposed Global File Format Registry
Summing up

- Metadata is perceived to be useful (or essential) for the long-term management of digital objects
- There is some consensus on what metadata might be required (e.g., OAIS model, specific requirements for recordkeeping, etc.)
- Less agreement on how this should be properly implemented, but there has been progress through initiatives like PREMIS and METS
Key links:

- PREMIS WG: http://www.oclc.org/research/projects/pmwg/
- Digital Curation Centre: http://www.dcc.ac.uk/
- Digital Preservation Coalition: http://www.dpconline.org/
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