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-)

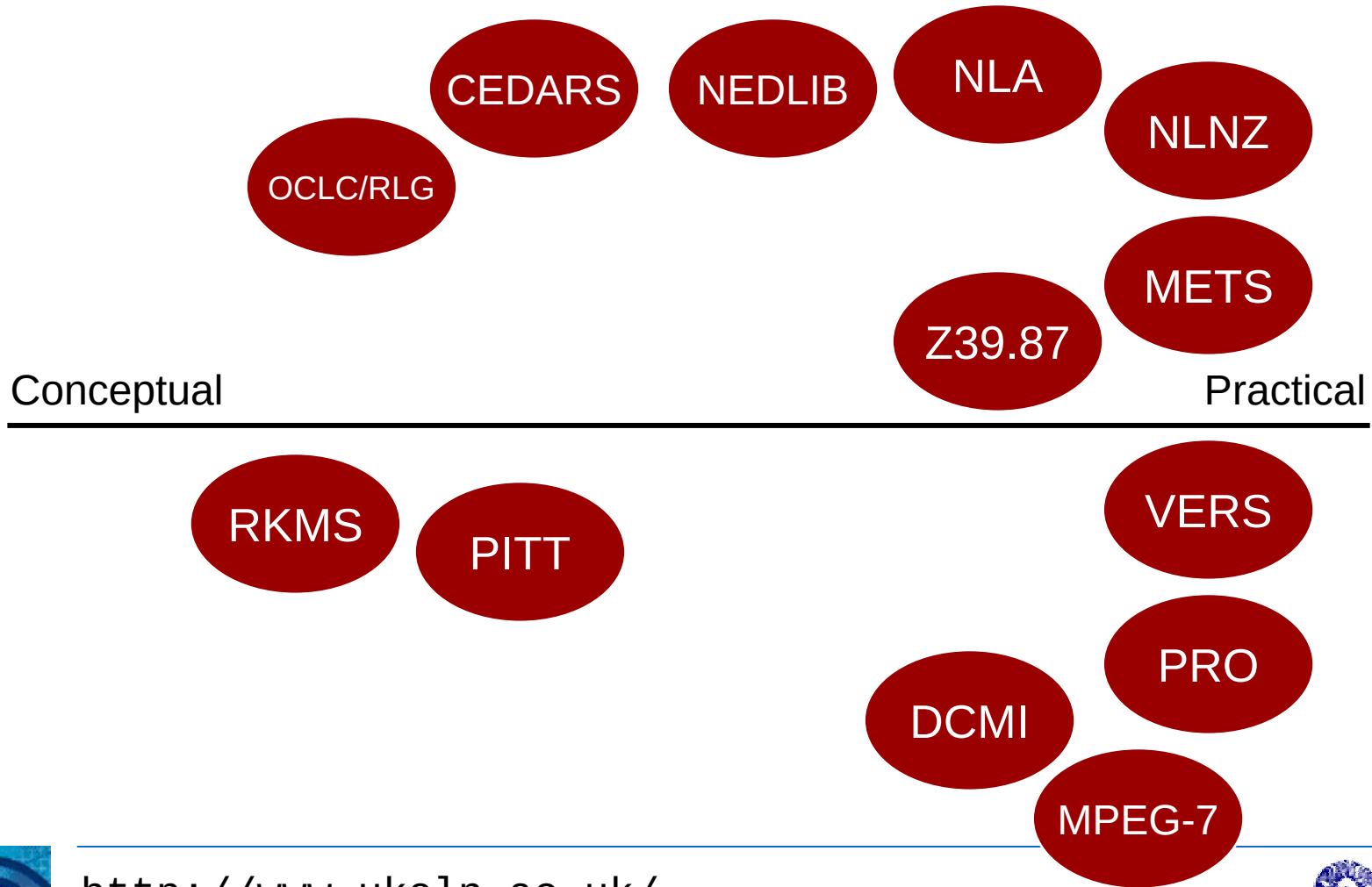
Some examples (2)

- 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)



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

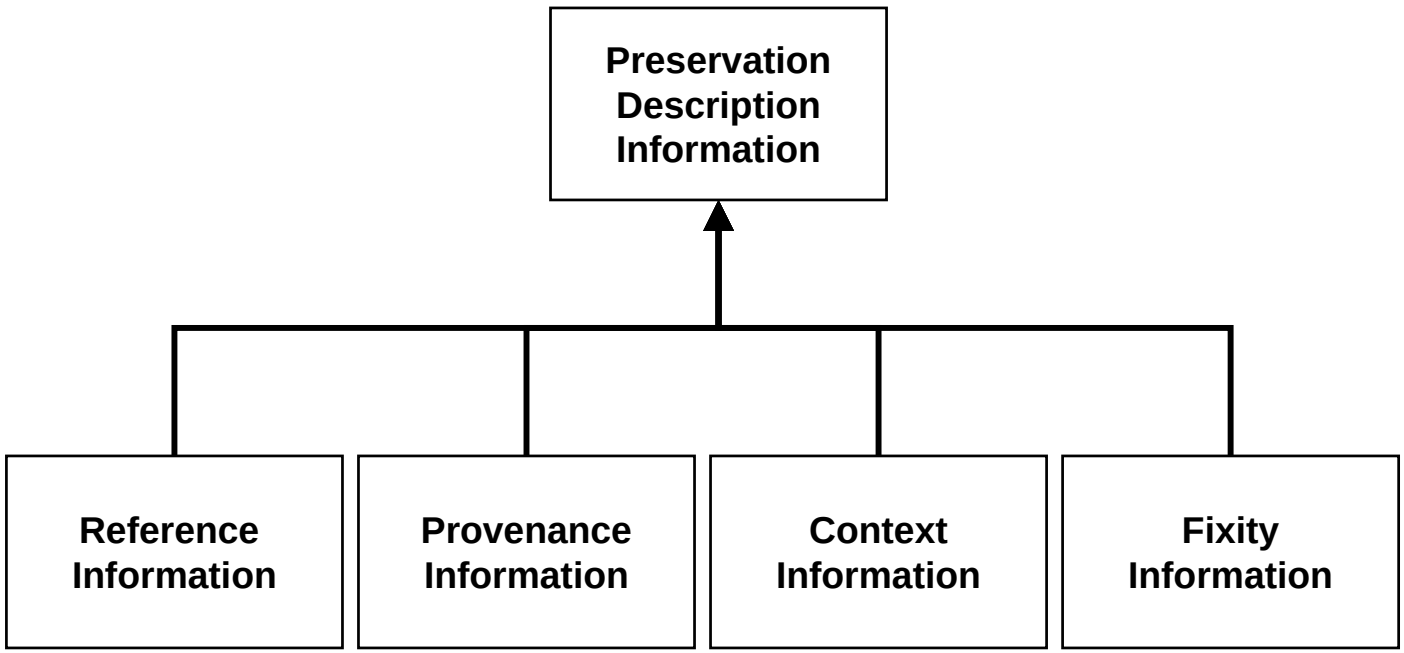
The OAIS reference model (3)

- 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
    - Based on categories discussed in CPA/RLG report: *Preserving Digital Information* (1996)

The OAIS reference model (5)



PDI Preservation Description Information (Figure 4-16)

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

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 I (2000-2002) produced state of the art report and metadata framework
    - 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:

- OAIS Reference Model: http://www.ccsds.org/documents/650x0b1.pdf
- PREMIS WG: http://www.oclc.org/research/projects/pmwg/
- ERPANET Training Seminar on "Metadata in Digital Preservation" (Marburg, 2003): http://www.erpanet.org/
- Digital Curation Centre: http://www.dcc.ac.uk/
- Digital Preservation Coalition: http://www.dpconline.org/

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