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SI 640 Digital Libraries and Archives

Week 5 – Interface and Infrastructure
Themes of the Week

- Underlying technical infrastructure is a critical DL component
- Multiple infrastructure models
- Interface is representation of infrastructure
- Two-way communication between user and system
- Metadata schemas are increasingly complex and standardized
Harvard Library Digital Initiative Model
Systems Integration

Integrated Library System

Middleware

CMS + Courseware

Standards

Open Source

Digital Archival Repository
Open Archival Information System

Open
- Reference Model standard(s) are developed using a public process and are freely available

Information
- Any type of knowledge that can be exchanged
- Independent of the forms (i.e., physical or digital) used to represent the information
- Data are the representation forms of information

Archival Information System
- Hardware, software, and people who are responsible for the acquisition, preservation and dissemination of the information
- Additional OAIS responsibilities are identified later and are more fully defined in the Reference Model document
Information is defined as any type of knowledge that can be exchanged, and this information is always expressed (i.e., represented) by some type of data.

In general, it can be said that “Data interpreted using its Representation Information yields Information.”

In order for this Information Object to be successfully preserved, it is critical for an archive to clearly identify and understand the Data Object and its associated Representation Information.
On a abstract level a PLM roughly identifies 4 abstraction levels

- **Data format** identifies the structuring and meaning of raw bit stream, i.e. the intangible digital object.
- The structuring and meaning of the raw bit stream are defined within the application logic of specific **viewer applications**. These applications are used to create, modify, and present the information in its intended format.
- The **operating system** provides the shared functionality needed by all viewer applications like peripheral access and basic file management.
- The **reference platform** represents the hardware on which the intangible digital objects are rendered into real world physical objects, like for instance a print out or the screen representation.
External Data Flow Diagram

Producer

Submission Information Packages

OAIS

Archival Information Packages

Dissemination Information Packages

Consumer

Legend

<table>
<thead>
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<th>Icon</th>
<th>Description</th>
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<tr>
<td></td>
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<td>= Package</td>
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<td></td>
<td>= Data Object</td>
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<tr>
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</table>

queries

query response

orders
Base Processes Within the OAIS Model

- Ingest
- Data Management
- Archival Storage
- Delivery & Capture
- Packaging & Delivery
- Administration
- Monitoring & Logging

Processes:
- SIP
- DIP
- AIP

Flow:
- Data
- Query
Types of Information Used in OAIS
Preservation Description Information

- Provenance Information
  - Describes the source of Content Information, who has had custody of it, what is its history

- Context Information
  - Describes how the Content Information relates to other information outside the Information Package

- Reference Information
  - Provides one or more identifiers, or systems of identifiers, by which the Content Information may be uniquely identified

- Fixity Information
  - Protects the Content Information from undocumented alteration
## Example of Preservation Description Information

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<tr>
<th>Content Information Type</th>
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<td>Calibration history</td>
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<td>- Journal Reference</td>
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<td>Processing History</td>
<td>Related data sets</td>
<td>Checksum</td>
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Proposed OAIS-based E-Journal Archive Mapped to Harvard’s LDI Infrastructure
Categories of Archive Interactions

- Independent: no knowledge by one OAIS of Standards implemented at another
- Cooperating: Potentially common submission standards, and common dissemination standards, but no common access. One archive may make subscription requests for key data at the cooperating archive
- Federated: Access to all federated OAIS is provided through a common set of access aids that provide visibility into all participating OAISs. Global dissemination and Ingest are options
- Shared resources: An OAIS in which Management has entered into agreements with other OAISs is to share resources to reduce cost. This requires various standards internal to the archive (such as ingest-storage and access-storage interface standards), but does not alter the community’s view of the archive
The first set of cooperating OAIS merely have an agreement to share at least on common SIP and DIP format to enable the transfer of holdings.

The second set of cooperating OAIS have standardized their DIP and SIP formats for use by producers and consumers.
Federated Archives

[Diagram of federated archives with nodes labeled 'Producer', 'Local Consumer', 'OAIS 1', 'OAIS 2', 'Common Catalog', and 'Global Consumer'].

Dissemination Information Package (Optional)
Establishing a User Context

From: Internet2 (http://www.internet2.edu/)

- Joe surfs the web
- HTTP Server
- SHAR
- Handle Service
- Authentication System
- Attribute Authority
- WAYF
- SHIRE

Diagram:

1. Resource Provider
2. SHIRE
3. WayF
4. Handle Service
The AA provides ARP management tools/interfaces.

Different ARPs for different targets
Each ARP Specifies which attributes and which values to release
Institutional ARPs (default)
- administrative default policies and default attributes
- Site can force include and exclude
User ARPs managed via “MyAA” web interface
Release set determined by “combining” Default and User ARP for the specified resource
Authorization Attributes

Typical Attributes in the Higher Ed Community

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<td>Affiliation</td>
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<tr>
<td></td>
<td>Physics 201</td>
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</table>

From: Internet2 (http://www.internet2.edu/)
http://www.dli2.nsf.gov/internationalprojects/working_group_reports/digital_imagery.html

From: Internet2 (http://www.internet2.edu/)
Thank you!

Paul Conway
Associate Professor
School of Information
University of Michigan
www.si.umich.edu