The OAI and OAI-PMH: where to go from here?

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OAI3 - CERN - February 12, 2004
Building on the base

• New infrastructure
• Protocol extensions
• Non-traditional uses
• Research contexts
New Infrastructure

Building blocks for cross-repository federation
Experimental OAI Registry at UIUC

Grainger Engineering Library Information Center at University of Illinois at Urbana-Champaign

Information About This Registry

Search for repositories containing these words in their Identify or ListSets responses or sample records.

Words [ ] Search

OAI Protocol Version: ☑ Any ☑ 2.0 ☑ 1.1 ☑ 1.0

Miscellaneous Reports

- All Repositories = 518
- Repositories Responding = 424
- Repositories Not Responding = 94

- 2.0+ Repositories = 285
- Pre-2.0 Repositories = 136

- Distinct Metadata Schemas

http://gita.grainger.uiuc.edu/registry/searchform.asp
Extensible Repository Resource Locators (ERRoLs) for OAI Identifiers

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1. Introduction
An ERRoL is a "Cool URL" to metadata, content, and services related to registered Open Archive Initiative (OAI) repositories. Following the examples below, anyone can create/use a Cool URL to any metadata record or web resource related to supported OAI repositories.

2. Supported OAI Repositories
Any OAI repository can use the ERRoL service by registering a unique repository identifier with the OAI Registry at UIUC.

http://www.oclc.org/research/projects/oairesolver/default.htm
Protocol Extensions

New functionality on a stable base
OAI Static Repository

- OAI-PMH is low-barrier protocol
- nevertheless, implementation is sometimes not trivial:
  - size of collection does not justify the investment
  - ISP does not allow 3rd party software
  - security considerations
OAI Static Repository

- research on lowering barrier even further
  - make metadata available in XML files (not databases)
  - put XML file on web-server
  - make XML file OAI-PMH harvestable
- 2 tracks:
  - autonomous data provider
  - dependent data provider
OAI Static Repository

- **autonomous data provider:**
  - XML file on web-server
  - XSL style sheet to respond to OAI-PMH requests on web-server
- requires:
  - native XSLT support in web server
  - XSL v.2 functionality

=> Not (yet) low barrier
OAI Static Repository

- dependent data provider:
  - XML file on web-server
  - depend on Gateway to respond to OAI-PMH requests
- requires:
  - registration with Gateway
  - Gateway implementation(s)
static repository 1

http://an.oai.org/ma/mini.xml

static repository n

http://site1.org/mini/file1
http://an.oai.org/ma/mini.xml

http://gateway.institution.org/oai/an.oai.org/ma/mini.xml

http://gateway.institution.org/oai/site1.org/mini/file1

http://site1.org/mini/file1
LANL Static Repository Gateway

- Sourceforge download site - [https://sourceforge.net/projects/srepod/](https://sourceforge.net/projects/srepod/)
OAI Rights

• Motivations
  - Distinction between data and metadata fuzzy, especially regarding intellectual property
  - XML content already fits into protocol
  - Consumers of metadata are almost always interested in access to underlying resource

• Scope
  - No new definition of a rights expression language
  - Avoid restriction to any rights language
    • Initial prototypes with Creative Commons licenses
OAI rights issues

- **Entity Association**
  - Focus on rights expressions for metadata and associated resources

- **Aggregation association**
  - OAI-PMH entities: repository, resource, item, record, set

- **Binding**
  - Use about container for metadata rights exp.
  - Designated metadata prefix to contain resource rights exp.
Non-traditional usage

Beyond metadata for resource discovery
OAI-PMH-based access to DL usage logs

http://www.dlib.org/dlib/july03/young/07young.html
OAI-PMH access to DL usage logs

• usage logs filtered and stored in MySQL db

• accessible as 2 OAI-PMH repositories:
  • document oriented
  • agent oriented (user-proxy)
  • interlinked

• recommender system:
  • harvests logs
  • interpretes logs
  • exposes relationships (OpenURL access)
Phase 2: On-the-fly look-up

- **OpenURL**
- **Spreading Activation Matrix**
- **PubMed bibliographic**
- **Biosis bibliographic**
- **Inspec bibliographic**
- **ISI citations**

Flow:
1. **OpenURL** → **relate** → **id** → **biblio or citation**
2. **biblio or citation** → **recommended identifiers**
3. **recommended identifiers** → **remote**
4. **remote** → **local**
LANL Repository Architecture

• Problem: provide multiple service access to variety of locally hosted assets

• Assets include secondary assets (ISI, BIOSIS, Inspec, etc.) and primary feeds (Elsevier, Wiley, IOP, APS, etc.)

• Common representation of assets using MPEG-21 DIDL
  - Facility for multiple disseminations

• Components of architecture federated through OAI-PMH
LANL Repository Architecture

Components

• *Asset repositories* - one per data feed with assets stored as DIDLs, harvestable by OAI-PMH

• *Repository index* - keeps track of creation and location of data repositories, harvestable by OAI-PMH

• *Identifier resolver* - single point resolution to get repository location of DIDL object.

• *OAI-PMH federator* - single point OAI access for service clients
LANL Repository Architecture
LANL Repository Architecture

- D-Lib nov 2003: http://dx.doi.org/10.1045/november2003-bekaert (MPEG-21 DIDL use)
- D-Lib fed 2004: http://dx.doi.org/10.1045/february2004-bekaert (MPEG-21 and OpenURL based dissemination architecture)
- Submission to JCDL 2004
Experimentation

Exploration of new contexts
OAI and P2P

Enabling a metadata refinement network that enables the creation of document value chains
Original OAI-PMH Model

Service Providers

- Search Service
  - OAI-PMH Harvester

- Browse Service
  - OAI-PMH Harvester

- Linking Service
  - OAI-PMH Harvester

Data Providers

- OAI-PMH Server
  - Repository

- OAI-PMH Server
  - Repository

- OAI-PMH Server
  - Repository

- OAI-PMH Server
  - Repository
Hybrid Model with Aggregator
Metadata Exchange Graph
Implementation Questions

• Underlying framework
  - JXTA

• Metadata item/record location
  - Broadcast search
  - Distributed Hash Tables

• Provenance chains
  - Exploit provenance information in OAI-PMH
  - Logical joins based on provenance information

• Network Harvesting
  - Efficient range queries using P-trees
OAI and RDF

Expressing relationships among metadata records
NSDL Metadata Repository (1)

Is “A” equivalent to “B”?
What resources fit standard “C”?

Relationship Metadata
<hasItems>
i1
i2
i3
</hasItems>
Issues:
- push/pull model?
- schema validation