Federated Search for Learning

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Session Goals

- Describe basic concepts about digital object registries and Content Object Repository Discovery and Registration/Resolution Architecture (CORDRA)

- Understand how the ADL Registry, a digital object registry, implements CORDRA

- See an example of multi-national federated search for learning content
A Registry Is

- A central search point for content objects
- The digital equivalent of a library card catalog
  - Contains all of the cards (registered entries) that contain a standard set of information (metadata) about all of the books (learning-related content) in the library (repository)
ADL and CORDRA
ADL Activities
Key CORDRA Concepts

- **Content Object Repository Discovery and Registration/Resolution Architecture**
  - Register a content object in the *content catalog* for later search and retrieval
  - Search the *content catalog*; return content objects (via their IDs) and metadata
  - Register a content repository in the *repository registry* by specifying descriptive data and rules
  - Query the *repository registry* for the operational, policy, and business rules
CORDRA Architecture

- Content Repository
- Registry
- Community
Digital Object Registries
Digital Object Registry Goals – 1

- Federate (make discoverable) disparate collections (repositories) of digital objects when those repositories
  - Exist in different locations
  - Are operated by different organizations
  - Are governed by varied policies

- Go beyond generic browsing of web harvests
  - Active registration of objects that may not be “crawl-able”
    - Not generally exposed
    - Do not enable indexing
Digital Object Registry Goals – 2

- Enable precise and domain specific description
- Provide a controlled environment for development of reliable applications
- Develop a scalable solution that can grow and evolve
  - Aggregate small metadata records instead of large content objects
  - Allow local repository variations by defining minimal registry interface requirements
  - Design multiple registries that can be aggregated (CORDRA), so any registry is one instance of many
Digital Object Registry Goals – 3

- Develop a scalable solution that can grow and evolve (continued)
  - Introduce persistent identifiers (Handle System) to further stabilize the learning object ecology
  - Design a highly modular architecture adaptable to varied configurations and new technologies
- Encourage a broad community of use that will add tools, services, etc.
  - Open Architecture
  - Make the technology widely available
  - Design a generic registry that can be configured and reused for specific domains
Objects have a unique, persistent identifier
- Objects are registered with metadata
- Metadata is indexed and searchable
- Current downloadable version is oriented towards learning objects
- Open-source downloadable software for use
  - Hardware requirements
  - Roadmap
  - http://www.doregistry.org
ADL’s DOR Implementation
ADL Registry Implementation

- Technological and organizational infrastructure
  - Processes and procedures to register existence and access conditions for objects relevant to DoD
  - Interfaces for users to search registry and obtain objects

- Integrates existing technologies
  - Handle System for identification and access
  - eXtensible Markup Language (XML) for object description and submission
  - Learning Object Metadata (LOM)
  - Repository for metadata object storage and access
  - Lucene search engine

- Initial operational version deployed 12/05
ADL Registry and Repositories

- Content Repository
- Registry
- Community
Locally Managed Content Repository

Repository Manager Functions
Searching the ADL Registry
Internal Architectures in ADL-R
Search

Enter your search criteria, then click search.

description example

Request Receipt

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### Emergency Response Operations (ERO) Course

This course is required for members of the Disaster Response Force and replaces the existing Disaster Control Group course. This course also replaces the interim requirement for completing the FEMA Independent Study courses IS-100, 700, and 800. The course consists of an overview of the Air Force Emergency Management Program, the Air Force Incident Management System, major phases of incident management, roles and responsibilities of First Responders and Emergency Responders, Emergency Support Functions, and incident Command System policies. This course also discusses the interface between the Installation Control Center, Emergency Operations Center, Unit Control Centers, and incident Command. This course is supplemented by instructor led classroom training (local procedures) presented by the CIE Readiness Flight, Air Force Instruction 10-2501, Air Force Emergency Management (EEM) Program Planning and Operations details course requirements to include target audience.

**Search Receipt:** 3333448498b9981dd15c0a8e1583b95a999

**Request Receipt for this Search**
Used to verify a Front-End Analysis (FEA) in accordance with DoDI 1322.26
Looking Ahead

- **Short Term (early 2009)**
  - Released Version 1.7 on 04/09/2009
    - Typed uniform resource locators (URLs)
    - Improved user registration facilities
    - Business validation to address new LOM elements
  - Move to .mil address
  - Increased registrations

- **Longer Term (2009 +)**
  - ADL Registry (ADL-R) as a configuration option on Generic Registry
  - Generic Registries used in additional projects
  - Deploy Registry of Registries
Multinational Federated ADL Search and Retrieval
Introduction

- **Participants**
  - ADL Co-Lab of US DoD
  - Norwegian Defence Education Command (NoDEC)
  - Canadian Defence Academy (CDA)
  - USJFCOM

- **Purpose**
  - To develop an infrastructure to allow multiple NATO nations to search, discover, view, and share technical and instructional content.
The architecture adheres to the principles of the Content Object Repository Discovery and Registration/Resolution Architecture (CORDRA)
The basic design principle is the federation of heterogeneous repositories through a system of registries.
Search and Retrieval
MFASR Demonstration Video
When selecting a repository or a content management system, consider

- Metadata. Must meet the LOM requirements (ADL-Registry version 1.7).
- Versioning. Capable of tracking changes.
- Complex content object types.
- Web interface. For content access and distribution.
- User roles and privileges.
- Automated registration.
M-FASR Benefits

- Every content object is uniquely identified.
- Content objects can be discovered across various types of repository systems.
- Managers maintain total control over the content objects.
- All types of content objects are discoverable.
- The architecture is highly scalable.
- The federation of registries is scalable.
- Searches for content objects are highly scalable.
- The user interface is easy to use and integrate.
Future Considerations

- Most repository systems do not have the ability to automatically register a content object in a registry when the object is put into the repository system.
- Repository managers must register content with correct, meaningful, and consistent metadata to produce usable search results.
- Without automated registration, any change to any already registered content object requires a manual update in the registry.
Conclusion

- Demonstrated a technical solution that enables content sharing and reuse across heterogeneous repository systems.
- Architecture provides a flexible, scalable, and efficient platform.
- This architecture can serve as the foundation for developing a content sharing and reuse infrastructure throughout NATO.
References and Resources
References

- ADL Guide to Creating Reusable Content with SCORM 2004
  - www.ADLNet.gov

- The ADL Registry and CORDRA, Volume 2: ADL Registry Overview and User Guide
  - http://adlregistry.ADLNet.gov/

- DOD Instruction 1322.26, Development, Management, and Delivery of Distributed Learning, June 2006
Learning Opportunities

- Webinars: 1-hour sessions each week
  - Current topics
    - Introduction to SCORM
    - SCORM 2004 4th Edition Overview
    - Creating Reusable Content with SCORM 2004
    - Sequencing SCORM 2004 Content (2-part series)
    - Contributing to the ADL Registry Version 1.7
    - Federated Registry Architectures
    - Choosing Authoring Tools
    - Visual Design Principles for Reusable Learning Content
  - For details, visit www.ADLNet.gov
Learning Opportunities

- **Online Office Hours**
  - Every Thursday from 1:00 - 3:00 PM Eastern
  - Instructional Systems Designer (ISD) and technical expert support
  - For details, visit www.ADLNet.gov
Communications

- Bookmark ADLNet.gov
- Topic sections with new feature stories each month
- More resources for designers and developers
- **ADL Insights Monthly Newsletter**
  - Subscribe at [www.ADLNet.gov](http://www.ADLNet.gov)
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Learning Technology Lab

- Vendor-neutral Evaluation Environment
  - Hosted at ADL Co-Lab Hub in Alexandria, VA
  - Expert support to help resolve interoperability concerns
  - Unbiased facilitation for dispute resolution

- Will host a variety of LMS, LCMS, and authoring tools
  - Support test and evaluation of content across platforms
  - Showcase exemplar content and tools
  - Enable rapid troubleshooting to quickly identify problem areas
Questions or Comments?

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