IMS Learning Object Discovery & Exchange

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Learning Objects, Metadata, and Repositories
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Learning Object Discovery Service
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Metadata

http://www.dlib.indiana.edu/~jenlrile/metadatamap/
Learning Object Discovery & Exchange (LODE) specification

- Aims to facilitate the discovery and retrieval of learning objects stored across more than one collection
- Is a glue specification that profiles existing general-purpose protocols to take into account requirements specific to the educational domain, rather than creating new protocols
- Proposes three main data models
  1. Learning Object Repository Registry Data Model
  2. Information for Learning Object eXchange (ILOX)
  3. LODE Context Set for the Contextual Query Language (CQL)
LODE Overview

1st Data Model: LODE Registry
LODE Registry Data Model

Property Data Type

• Allows for relative strengths of properties in a collection
• Has a **Source** and **Value**, with the same meaning as for VocabularyTerm
• Has a **Strength** quantifier that
  – can take one of the values “some”, “most”, and “all” (i.e., the property applies to some, most, or all of the items in the collection)
  – is optional, and the assumed default value is “some”.

Value as for VocabularyTerm
Profiling LODE Registry

Selecting an Identifier Type

Selecting Mandatory Attributes

Selecting controlled vocabularies for the different property attributes

Agreeing on XSD bindings for the different protocol descriptions

*A priori, all attributes are optional

Example: The Ariadne Registry

The ILOX Container

FRBR: Work (Learning Object), Expression (version), Manifestation (format), Item (copy)
Describing an ILOX Level: General Principles

ILOX WORK
- Level Specific Identifier
- Level Specific Metadata
- Level Specific Attributes

ILOX EXPRESSION
- Level Specific Identifier
- Level Specific Metadata
- Level Specific Attributes (version)

ILOX MANIFESTATION
- Level Specific Identifier
- Level Specific Metadata
- Level Specific Attributes (format)

ILOX ITEM
- Level Specific Identifier
- Level Specific Metadata
- Level Specific Attributes

Describing a Manifestation

The Manifestation complexType is the container for the...
Organizing Multiple Specifications in One Container

- Level-specific metadata can be attached at each ILOX level using the ‘description’ mechanism
- The aspects being described by the attached metadata are expressed by facet names: main, license/rights, accessibility, etc.
- Example of metadata attached at the Expression level

Profiling LODE ILOX

- Work
- Expression
- Manifestation
- Item

Selecting the ILOX root element

Making mandatory one or more optional ILOX elements

- Level Specific Identifiers
- Level Specific Metadata
- Expression Dimension
- Manifestation Names
- Item Location URI

Selecting Controlled Vocabularies

- Facet Names
- Dimension Names and Parameters
- Manifestation Names and Parameters

Selecting metadata schemas at extension points

- IEEE LOM
- IMS Access For All Digital Resource Description
Learning Resource Exchange
Metadata Application Profile 4.5.1

• ILOX in combination with IEEE LOM
  – LOM for describing the main pedagogical commonalities of a learning object
  – ILOX levels and mechanisms for attaching metadata
    • Allow for customization to meet requirements of a multi-lingual federation of learning object repositories
    • Offer options for further customization as requirements are identified
    • Allow for integration of current and newly emerging standards without compromising interoperability
      – http://lre.eun.org/node/6
  • Relies on controlled vocabularies managed in the Vocabulary Bank for Education
    – http://aspect.vocman.com

Customization for Level Specific Information:
Expression Dimension

• Expression (version)
  – Language
    • The same Learning Object is often available in multiple languages
  – Coverage
    • The same Learning Object may be available in versions tailored to meet different regional or educational systems
  – Accessibility
    • Versions of a Learning Object differ because they are tailored to meet specific accessibility needs of different user groups
Description Facets for Metadata

- Mandatory at top level and optional lower:
  - Main
  - Rights/license
- Optional and attached at any level when appropriate:
  - Reputation
  - Paradata
  - Transaction
  - Learning Objectives
  - Meta
  - Accessibility (only at Expression level)

Reputation Facet

- Refers to any type of user-generated assessments of a LO (ratings, annotations, bookmarks):
  - Aids in the object’s retrieval and rankings
  - Can work with recommendation systems and/or support social navigation tools.
- No schema is specified for this facet
  - Schema development is in progress
    https://sites.google.com/site/censocialdata/home
Paradata Facet

- Any data that records meaningful actions and processes users initiate to locate and access learning objects (e.g., web server logs).
  - Such data includes number of visits, number of downloads, etc.
  - This data is initially collected at the item level and then can be aggregated at different upper ILOX levels using the ‘paradata’ facet.
  - Such aggregation will track the number of times different formats of different versions of an object were accessed starting from the number of downloads of individual copies at the item level.
- No schema is specified for this facet

Vocabulary Bank for Education

- Provides
  - Identifiers for vocabularies and terms
  - Translations for vocabulary terms
  - Crosswalks between vocabularies
  - Browsable and searchable web application for users to locate, view and download terminology
  - Standards-based, machine-to-machine interfaces
    - REST
- Can be used by validation services
- Stores vocabularies from other organizations
3rd Data Model: LODE Context Set

- Uses certain attributes of the objects as search terms
- Defines modifiers that allow more specific queries
- Defines sort criteria that can be used to indicate how to sort the result set generated by the search

- Search Term - Competency
- Search Term - Learning Resource Type
- Modifier - Language
- Modifier -
- Sort Criteria - Rating
- Sort Criteria - Relevance

Profiling LODE Context Set

- While the semantics of the access points are mostly derived from LOM, there is no requirement that the metadata of learning objects actually be coded in LOM: any metadata schema that can be transformed so as to match the access point semantics is permissible
- The data model is intended for use through CQL and its access points and modifiers correspond to CQL indexes and relation modifiers, through a default CQL binding. Other bindings are permissible (e.g., PLQL)
- The metadata underlying the access points can be profiled so as to constrain values to particular vocabularies
ILOX at Work
http://portal.aspect-project.org

Vocabulary Bank for Education
http://aspect.vocman.com
Appendix

- FRBR and LOM
- LRE use of the ILOX Facet

FRBR and LOM
ILOX Facets