Requirements:
- Different aspects of a LO in a multi-national educational contexts:
  - Objects might exist in multiple versions – languages
  - Each version in a different format
  - Several copies of a LO version in a given format may be available.
- Critical to distinguish between these different aspects for the discovery and exchange of learning objects
LRE Metadata Application Profile
http://lre.eun.org/node/6
- IEEE LOM standard
  - Provides for describing education specific aspects of digital objects
- IMS LODE Information for Learning Object Exchange (ILOX) specification
  - A metadata container and framework for organizing existing standards such as LOM

FRBR – ILOX Aspects of a Learning Object
Classes of Categories

ILOX is a hierarchy with four main classes of categories:
- Work
- Expression
- Manifestation
- Item

Each class is a construct and each becomes more concrete with every step down in the hierarchy until the “Item” level which is the most concrete (actual retrievable copy of the object).

Each class is described using four types of elements:
- An identifier
- A general description
- Construct-specific information (if needed)
- One or more concrete constructs

ILOX as Metadata Container
ILOX Levels

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

Descriptions

- ILOX descriptions provide a means to attach metadata records to an ILOX
- Descriptions can be used at any level of abstraction (i.e., to describe a Work, an Expression, a Manifestation, or an Item).
- Consist of two elements:
  - Metadata element
    - Schema and an extension point to attach a metadata instance
  - Facet element
    - Allows one to describe the different aspects (or facets) of a learning object using best-suited standards.
- Each level can have multiple metadata descriptions, each with its own facet to differentiate between them.
LRE 4.5.1:
Work, Versions and Formats

- ILOX Work
  - LOM
- ILOX Expression (version)
  - Languages
  - Coverage
  - Accessibility
  - Versions
- ILOX Manifestation (format)
  - Experience (play directly on the web)
  - Packages (Common Cartridge)
  - Landing pages
  - Web feed
- Mechanism to attach metadata in a variety of standards at any level of the ILOX, (LOM, DC, etc)

Mandatory Facets:
‘Main’ and ‘License/Rights’

- main - mandatory
  - The main description of a learning object.
  - This main description at the Work level must consist of an IEEE LOM instance
- license/rights - mandatory if LO has cost and/or rights restrictions (other than Creative Commons)
  - The description of the license and/or rights that applies to the learning object at the Work level.
  - There can be different rights attached at all levels and different schemas attached to describe these rights.
  - If CC then can be found in LOM
Learning Object Metadata (LOM)

- Education specific elements using controlled vocabularies shared by all aspects of a LO
  - All vocabularies managed in the Vocabulary Bank for Education (VBE)
  - Mandatory and Recommended Elements
    - Learning Resource Type
      - "lesson plan", "assessment", etc.
    - Educational context
      - "compulsory education"
    - Age Range
    - Intended End User
      - "teacher", "parent"
  - LRE Thesaurus for subject
  - Rights (reuse, remix, distribute)

Interoperability Issues

- Manifestations
  - Used to capture information specific to the way a given expression of a learning object is encoded and presented such as, for example, the file formats of different aspects of the learning object.
  - ILOX and LOM
    - Provides for ‘format’ – MIME types
    - Provides for resource type – ‘assessment’
  - Provides for packaging information – IMS Common Cartridge
  - Version 1.1
  - Problem for the LRE – how to get this level of specificity when mapping other profiles