

Requirements for ISO MLR interoperability

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Our aim with this presentation

Address MLR from a semantic web perspective, to ensure the metadata standard will meet our future requirements

This intervention is a result of a Swedish Norwegian analysis of the MLR project, considering our investments in semantic technologies (RDF in Sweden; TopicMaps in Norway).

Outline

- Identified challenges with the current MLR project
- MLR backwards interoperability claim
- Roadmap for harmonization
- Requirement for MLR elements and vocabulary definitions
- Implications for further MLR work

Challenges

- To support Semantic Technologies and Web Architecture
 - Semantic technologies could give "added value" to search / discovery / browsing / federation / intelligent agents / "knowledge" building, etc.
- To capture meaningful information on 'learning' as well as 'objects'
- To align with other communities
 - Harmonising with existing Digital Library communities
 - Search / Browsing / Discovery / Federation / Harvesting
 - e-Learning have additional issues to Digital Libraries
 - LET - specific issues (i.e. outcome / prerequisites / pedagogical principles / curriculum / learning process / user groups)

Challenges - the polemic version

- LOM is based on approaches that were used in the 20th century (sic!)
- MLR is inheriting some of the LOM problems due to promised backward compability
- LOM is not based on existing web principles
 - SOA - modularity - separation of concepts
- MLR has the opportunity to take advantage of and exploit the fact that the web exists and create new opportunities for metadata interoperability

MLR's "backward interoperability claim"

WG4 resolution #12 - Paris 2003-06 (36WG4N0036)

MLR Interoperability with IEEE LTSC LOM

...In support of interoperability with IEEE LOM, the MLR will be a "harmonized standard" with respect to IEEE LOM in areas where the two overlap...

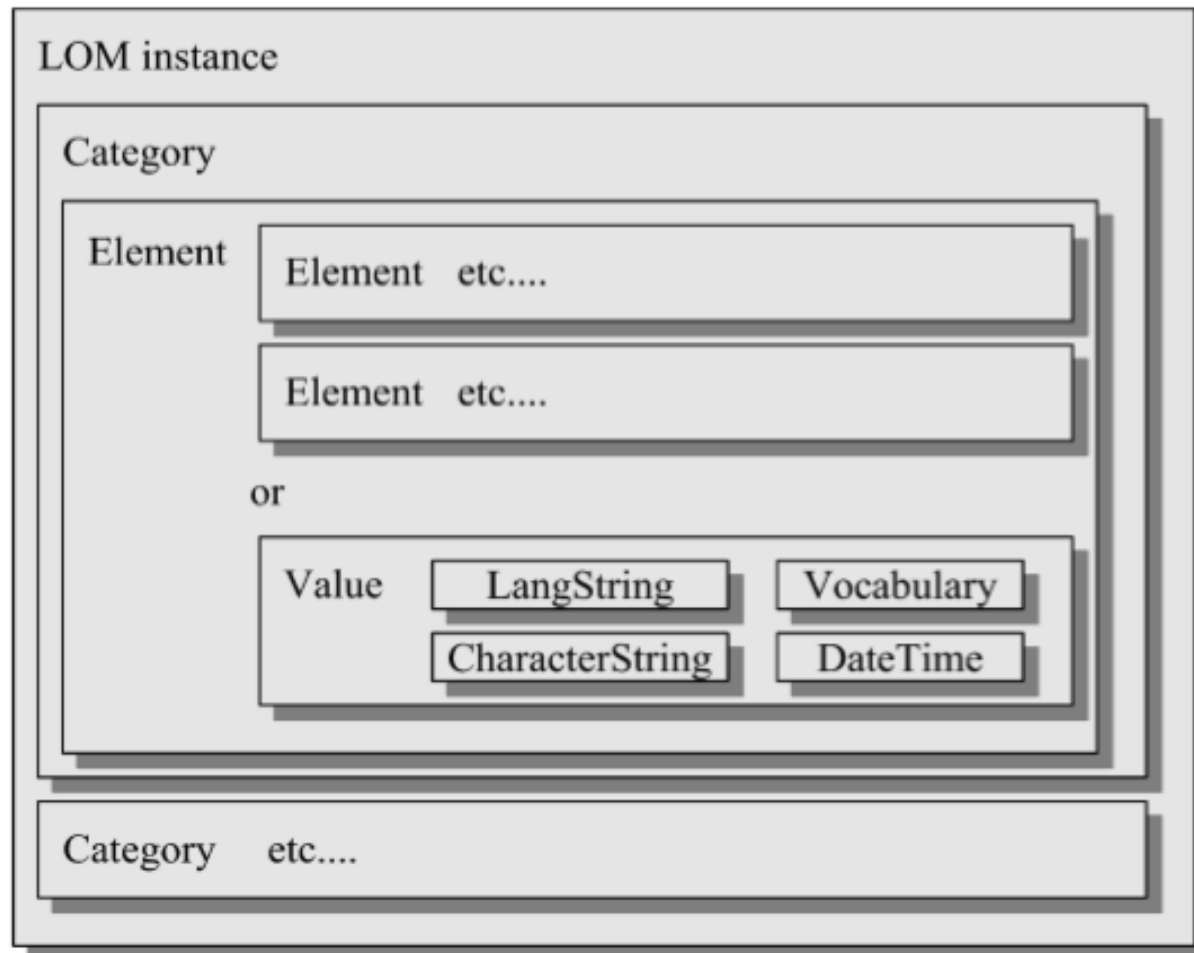
WG4 Resolution #4 – Paris 2003-03 (36N0454)

Cooperation With IEEE LTSC

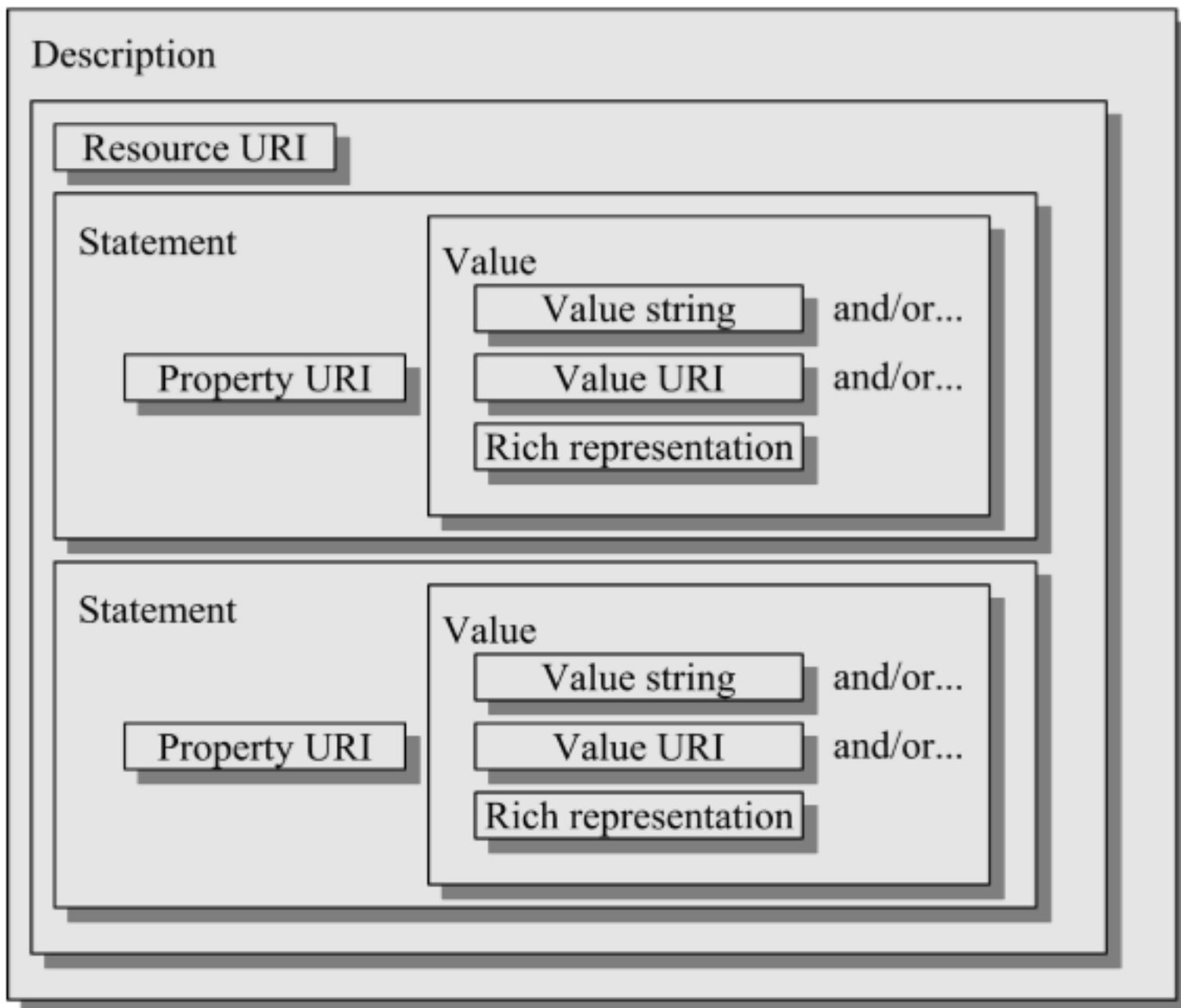
...SC36/WG4 also as part of its resolution of ballot comments, commits itself to maintain compatibility with the implementation of IEEE 1484.12.1:2002 where practicable...

LOM abstract model

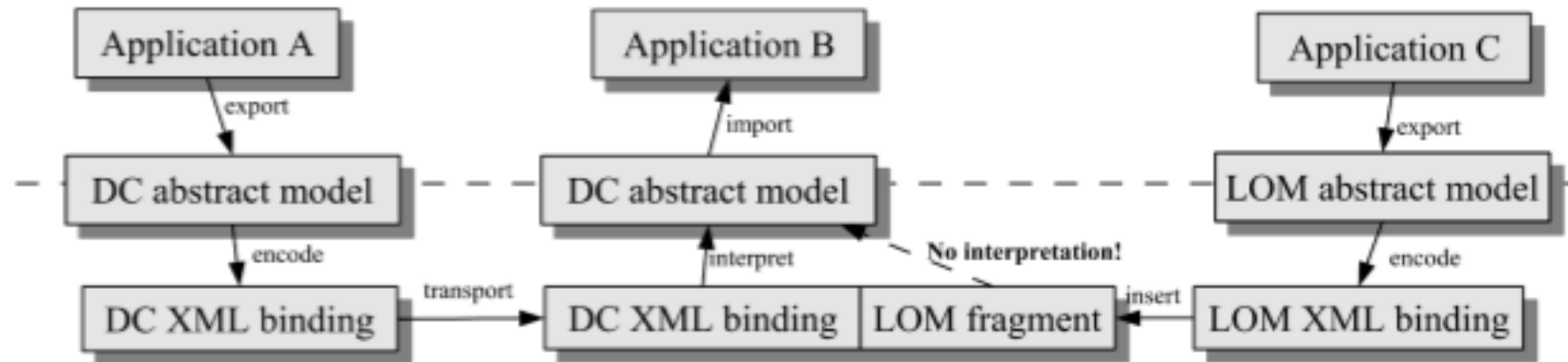
Complete interoperability between LOM and DC cannot be reached, due to differences in the abstract model



DC Abstract Model



Combining XML languages of LOM & DC – an example



Example:

- The application will try to interpret "lom:educational" as a property
- The child-element "lom:description" does not make sense as a value of that property

The interpretation fails

Roadmap for harmonization

Aligning the underlying abstract models of metadata specifications with that of the Resource Description Framework (RDF) and thus semantic technologies

Goal:

- Full interoperability with the abstracts models of Dublin Core
- Retaining *a practicable level of* backwards compatibility with LOM

Benchmark for harmonization

Can "elements" from one specification be easily reused in the context of a different specification?

(A number of use cases are presented in the position document. *[WG4N0238]*)

Requirements for MLR elements

Compatibility with and semantic technologies, and thus the DCMI Abstract Model

Each MLR element

- is defined as a relation between two entities
- specifies which class of resources the element applies to (Domain), and values (Range)
- specifies whether a value is a string or a thing/entity (e.g. Person, Concept, Status)

Requirements for Vocabulary Definitions

Two types of vocabularies

- String literals (Datatype in RDF terminology)
- Entities of a certain type, which in turn can have descriptions

Compound elements

To rely on the use of compound elements hampers semantic interoperability.

Consequently,

The notion of a compound element should not be part of element definitions, but be an artifact of application profiles and design decisions.

Separation of semantics and structure does not mean a loss in detail and complexity. It allows for arbitrarily complex and detailed application profiles without losing interoperability

MLR Application Profiles

Creating an Application Profiles should **start with defining a Domain Model**, describing the basic entities that relate to the MLR elements, (i.e. primary entities described by MLR, and secondary entities that are only referenced).

Revisiting the MLR principles (in Part 1)

Principle #1 - Multiple standard

A single multipart standard ensures an integrated approach, on the one hand, and, on the other, allows for a **modular approach**. (...) Such a “building block” approach not only facilitates the update or revision of a specific Part without having to “open up” the whole standard. Taking a multipart standard approach with **many discrete parts** ensures that each is **“self-contained”** (...) at anytime can start the development of a new Part with a very specific scope to **address and resolve new issues** raised resulting from the development and use of an existing part and/or identification of (new) user requirements.

Principle #4 – Framework model integrates **complementary views**

Principle #9 – Development of the parts of the multipart standard to be based on **common construction principles**

Changing Standards Paradigm

(Bruce Peoples, Open Forum, Seoul 2008-03-14)

- Monolithic to **Small Modular Standards**
 - Shorter Development Time
 - Use Across Multiple Domains
 - Reduction of Redundancy/More Available Resources
 - Increased Liaison Relationships Across Domains
 - Enables "Thinking in multiple Boxes"
 - Easier Interpretation of Standards
 - Enables Creation of "Profile" Standards
 - Helps Eliminate "Stovepipe" Mentality
 - Reflects "Modular System of Systems" Approach
- Key is **understanding Micro and Macro Views**
 - How Pieces of the Interoperability Puzzle Fit together
 - How to Create the Pieces of the Interoperability Puzzle

Implications for current MLR texts (1)

Part 1

- Each element needs to be defined using the additional Domain and Range specifications.
- In addition, **no definition of compounds** can be part of the element definitions.
- Therefore, data types can only be given for elements with literal values.

Implications for current MLR texts (2)

Part 2 ff.

- The list of elements needs to be made flat -> no composites
- Each element must be given a Domain and Range.
- Vocabulary terms that are entities should be given URIs, and their type declared.
- Vocabularies that are data types need to have their syntax and value spaces declared.

Part 5 – Educational element proposal

- We should focus on the **concepts** we need for discussing learning theory aspects of learning resources
- The concepts are *modeled* in the application profiles
- Define the properties in the application profile(s), e.g. "semantic density" (if we need that property)

How to move forward?

- Develop existing parts into defined concepts
- Identify properties for these concepts
- Provide examples of mapping
 - Dublin Core to TopicMap (SC34 ongoing project)
 - Dublin Core to RDF (DCMI project)
- New timeline
 - MLR-parts to be developed in parallel - identifying concepts
 - WD by 2008-09
 - MLR - concepts and properties defined
 - CD by 2009-03
 - FCD by 2009-09
 - FDIS-IS by 2010-Q1

Conclusions

MLR should *optimise interoperability* with

- Semantic Web and Web Architecture
- Library standards

and still ensure *a practical level of interoperability* with

- IEEE LOM

We should keep the world flat, small and modular and exploit the new affordances of ICT to the best of the LET users

We have the obligation and the mandate to move MLR forward according to the path outlined in WG4 N0238, the position paper