Guidelines for Using the IMS LRM to IEEE LOM 1.0 Transform

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1. Introduction

1.1 Overview

This package contains three XSL Transforms for transforming implementations of the IMS Learning Resource Meta-data (LRM) v1.2.1, v1.2.2 and v1.2.4 (henceforth "IMSMD") to IEEE Learning Object Meta-data (LOM) 1.0 (henceforth "LOM"), as well as numerous support files designed to help ensure the transformation suits the needs of any particular user. This guide also illustrates the operation of the transform.

This guide does not address best practices for transforming large numbers of documents, for deciding how and when to transition from IMSMD to LOM, or for archiving old IMSMD instances. It only addresses the transform itself and how users may modify the transform to ensure that it addresses their needs. The files contained with this document are:

- LRMv1p2p1-LOMv1p0-v1p0.xsl – the actual XSL Transform from IMSMD v1.2.1;
- LRMv1p2p2-LOMv1p0-v1p0.xsl – the actual XSL Transform from IMSMD v1.2.2;
- LRMv1p2p4-LOMv1p0-v1p0.xsl – the actual XSL Transform from IMSMD v1.2.4;
- MDv1p2p1/IMS-samples/* – the original samples that shipped with IMS Meta-data v1.2.1;
- MDv1p2p1/LOM-samples/* – the results of applying the transform to the IMS Samples. Result files have the same name as the source files;
- MDv1p2p2/IMS-samples/* – the original samples that shipped with IMS Meta-data v1.2.2;
- MDv1p2p2/LOM-samples/* – the results of applying the transform to the IMS Samples. Result files have the same name as the source files;
- MDv1p2p4/IMS-samples/* – the original samples that shipped with IMS Meta-data v1.2.4;
- MDv1p2p4/LOM-samples/* – the results of applying the transform to the IMS Samples. Result files have the same name as the source files.

1.2 About XSL Transforms

XSL Transform (sometimes referred to as simply XSL) is an XML-based language for transforming XML instances. In order to use any XSL instance, you will need an XSL engine. The three most popular XML editors (Oxygen, Turbo XML, and XML Spy) include an XSL engine; other products are also available.

This guide assumes that you have an XSL engine, that it is properly installed, and that you are comfortable using it. This document also assumes that you are familiar with XML syntax. If you intend to modify the transform, this document assumes that you are comfortable editing an XML file, either in an XML editor or in a text editor.

1.3 Structure of this Document

The structure of the rest of this document is:

2. Using the Transforms	Explains how to the use the transforms as supplied and how to modify them for a specific application.

1.4 Nomenclature

IEEE	Institute of Electronic & Electrical Engineers
IMS/GLC	IMS Global Learning Consortium, Inc.
IMSMD	IMS Meta-data
LOM	Learning Object Meta-data

LRM	Learning Resource Meta-data
XML	Extensible Mark-up Language
XSD	XML Schema Definition
XSL	XML Stylesheet Transform

1.5 References

[IMSMD, 06a] *IMS Meta-data Best Practice Guide for IEEE 1484.12.1-2002 Standard for Learning Object Metadata v1.3*, P.Barker, L.Campbell, A.Roberts, C.Smythe, IMS/GLC, August 2006.

[LOMBind, 05] *1484.12.3-2005 IEEE Standard for Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata*, The Institute of Electrical and Electronics Engineers, Inc., 2005.

[LOMInfo, 02] *1484.12.1-2002 IEEE Standard for Learning Object Metadata*, The Institute of Electrical and Electronics Engineers, Inc., 2002. ISBN:0-7381-3297-7.

2. Using the Transforms

As provided, the transforms attempt to handle the transformation in a way that is generic, yet reasonably comprehensive. It is entirely possible that any given user may have needs that are different from the generic needs. In such cases, users are free to modify the transform to suit their own needs. The instructions that follow are a guide to modifying the transform.

2.1 Comments and Redistribution

IMS maintains a forum at http://www.imsglobal.org/developers/ims/imsforum/categories.cfm?catid=3. Users are invited to post questions, comments, and modified transforms to that forum. Users are free to redistribute their modified transform under the following conditions:

- The original, unmodified transform shall be included in any redistribution of any modified transform;
- All support files (this file, the ReadMe file, the Schemas, and all samples) shall be included in any redistribution of any modified transform;
- The filename of the modified transform shall be changed. This name change should reflect the modifications.
- Additional samples that reflect how the modified transform differs in operation from the original transform should be included in any redistribution. If the modified transform handles the original IMS samples differently, simply including the output of the modified transform on those instances is probably sufficient; if not, the package should include an original source IMSMD file or files, the result of applying the original unmodified transform to that file(s), and the result of applying the modified transform to that file(s);
- Additional ReadMe or Guidelines documentation, as appropriate, should be included in any redistribution of any modified transform.

2.1.1 Identifiers and Catalog Entries

The new LOM information model takes the two elements previously used to identify resources (identifier and catalogentry) and turns them into a single element (identifier, with catalog and entry children). This makes the appropriate transform logic a question for some debate. The logic used in this transform is:

- If there is an identifier element in the source, create a catalogentry element in the target, where the entry is the value of the identifier element from the source and the catalog is blank. Any catalogentry elements in the source are copied into comments in the target;
- If there is no identifier element, copy catalogentry elements unchanged from the source meta-data to the target.

There is a comment in the transform with the text “##CatalogEntry” that indicates where this logic exists in the transform. The transform does not contain any logic for handling these values any other way; however, users are free to revise the logic as they see fit.

2.2 Meta-data Schema Values

The value of the metaDataSchema element in files produced by the transform is fixed at “IEEE LOM 1.0”. If you would rather simply copy the meta-data schema from the source files, find the global variable “metaDataSchemaHandling” (indicated in the transform with the text “##MetaDataSchema” in a comment), and change the value from “fixed” to “copy”.

2.3 Requirements and orComposite Elements

The information model for requirements has changed from IMSMD to LOM. The changes are summarized as:

- In IMSMD, multiple requirement elements are connected with AND. Each requirement element directly contains the requirement in question.

- In LOM, multiple requirement elements are still connected with AND. However, each requirement element now contains multiple orComposite elements that are connected with OR. Each orComposite element directly contains the requirement in question.

In practice, users using IMSMD have often abused the semantics of duplicate requirement elements. Strictly speaking, it makes no sense to have multiple requirement elements of the same type (requiring Windows XP and Mac OS X, for example). In practice, however, this has been used to indicate an OR relationship in IMSMD.

The transform contains two versions of the 'requirement' template: one that makes no assumptions about the semantics of repeated requirements, and one that assumes that the semantics of repeated requirements are as described above. In the transform as it ships, the version that makes the assumptions is active (marked with the text "##Requirement" in a comment), and the other is commented out. If you desire the version that does not make any assumptions, and merely copies individual requirements, switch the commenting. Detailed instructions are in the comment.

2.4 Error Handling in the Transforms

The transform attempts to handle some errors in the source meta-data. One error handled by the transform is if there is a requirement type with a declared source of 'LOMv1p0' that does not in fact exist in LOM. (The MERLOT examples distributed with IMSMD demonstrate this error.) The transform changes the source to 'unknown'; if you would like a different value, change the value of the "unknownSource" global variable (marked with the text "##UnknownSource" in a comment).

Another error handled in the transform (although incompletely) is date/time data that does not conform to the LOM datatype. Currently, when a date is incorrectly represented as an eight-digit number (for example, "20030916"), it will be translated into the LOM hyphen-separated format (for example, "2003-09-16"). This is the only format that the transform will translate. The location in the transform where this translation occurs is marked with the "##DateTimeConversion" in a comment; users are free to add or remove translation mechanisms.

2.5 Vocabulary Handling in the Transforms

The transform converts vocabulary terms from the old binding's vocabulary to the new binding's vocabulary. Note that the bulk of the conversion is used to handle the change in vocabulary for element 5.6 Context from the IMS Information Model to the LOM information model. Users may want to check to see that the choice of token translation agrees with their use; the tokens that are translated are indicated in the table below. Users may also want to add tokens to be translated; instructions are in the XSL, at the location marked with "##VocabularyTokenReplacement".

Old Vocabulary	**New Vocabulary**
errorCode	Identifies the error state of the function invocation
Microsoft Internet Explorer	ms-internet explorer
MS Windows	ms-windows
Primary Education	school
Secondary Education	school
University First Cycle	higher education
University Second Cycle	higher education
University Postgraduate	higher education
Technical School First Cycle	higher education
Technical School Second Cycle	higher education
Professional Formation	training
Continuous Formation	other
Vocational Training	training

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Send comments or questions about this specification to IMSspeccomments@imsglobal.org or visit:
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