TECHNICAL REPORT

ISO/IEC TR 19788-11

First edition
2017-04

Information technology — Learning, education and training — Metadata for learning resources —

Part 11: Migration from LOM to MLR

Technologies de l'information — Apprentissage, éducation et formation — Métadonnées pour ressources d'apprentissage —

Partie 11: Migration du LOM vers le MLR

Reference number
ISO/IEC TR 19788-11:2017(E)

© ISO/IEC 2017



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword ... **v**

Introduction ... **vi**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Abbreviated terms ... **2**

5 Naming resources in MLR ... **2**

6 From Learning Object Metadata to MLR data elements (informative) ... **3**
6.1 General category ... 3
6.1.1 LOM data element ***general*** ... ***3***
6.1.2 LOM to MLR mapping example ... 3
6.2 Lifecycle category ... 7
6.2.1 LOM data element ***lifeCycle*** ... ***7***
6.2.2 LOM to MLR mapping example ... 7
6.3 Meta-metadata category ... 11
6.3.1 LOM data element ***metaMetadata*** ... ***11***
6.3.2 LOM to MLR mapping example ... 11
6.4 Technical category ... 15
6.4.1 LOM data element ***technical*** ... ***15***
6.4.2 LOM to MLR mapping example ... 15
6.5 Educational category ... 19
6.5.1 LOM data element ***educational*** ... ***19***
6.5.2 LOM to MLR mapping example ... 19
6.6 Rights category ... 23
6.6.1 LOM data element ***rights*** ... ***23***
6.6.2 LOM to MLR mapping example ... 23
6.7 Relation category ... 25
6.7.1 LOM data element ***relation*** ... ***25***
6.7.2 LOM to MLR mapping example ... 25
6.8 Annotation category ... 27
6.8.1 LOM data element ***annotation*** ... ***27***
6.8.2 LOM to MLR mapping example ... 28
6.9 Classification category ... 31
6.9.1 LOM data element ***classification*** ... ***31***
6.9.2 LOM to MLR mapping example ... 32

7 Consideration of LOM data element with list of values (informative) ... **33**
7.1 Data elements: Trees vs. Graphs ... 33
7.2 Representing LOM ordered list of items (values or resources) in the MLR ... 34
7.3 Ordered LOM data element to MLR mapping example ... 35
7.3.1 LOM instance excerpt ... 35
7.3.2 MLR data elements (Turtle syntax) ... 37

8 MLR records and mutable MLR records (informative) ... **38**
8.1 Encoding of MLR Records ... 38
8.2 Representation of MLR records and mutable MLR records ... 38
8.3 Examples of representations ... 39
8.3.1 Explicit use of property “has representation” ... 39
8.3.2 Web architecture and implicit use of property “has representation” ... 40
8.4 Resources denoted by HTTP IRIs and Web architecture ... 40

Annex A (informative) **Globally unique identifiers for resources** ... **41**

Annex B (informative) **LOM instance examples** ... **43**

© ISO/IEC 2017 – All rights reserved

Annex C (informative) **An MLR record for LOM instance "Example 3"** **54**
Annex D (informative) **Representation of some LOM entities as structured literals** **58**
Bibliography **68**

 © ISO/IEC 2017 – All rights reserved

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/IEC JTC 1, *Information technology*, Subcommittee SC36, *Information technology for learning, education and training.*

A list of parts in the ISO/IEC 19788 series can be found on the ISO website.

© ISO/IEC 2017 – All rights reserved

Introduction

The primary purpose of ISO/IEC 19788 series is to facilitate

— the description of a learning resource by providing a standards-based approach to the identification and specification of data elements required to describe a learning resource, and

— the search, discovery, acquisition, evaluation, and use of learning resources, for instance by learners, instructors or automated software processes.

The primary purpose of ISO/IEC 19788 series is to specify metadata elements and their attributes for the description of learning resources. This includes the rules governing the identification of data elements and the specification of their attributes.

ISO/IEC 19788 provides data elements for the description of learning resources and resources directly related to learning resources.

ISO/IEC 19788 provides principles, rules and structures for the specification of the description of a learning resource; it identifies and specifies the attributes of a data element as well as the rules governing their use. The key principles stated in ISO/IEC 19788-1 are informed by a user requirements-driven context with the aim of supporting multilingual and cultural adaptability requirements from a global perspective.

ISO/IEC 19788-1 is information technology neutral and defines a set of common approaches, i.e. methodologies and constructs, which apply to the development of the subsequent Parts of ISO/IEC 19788

The introduction to ISO/IEC 19788-1 (MLR Framework) states “ISO/IEC 19788 aims to specify data elements relating to learning resources to be expressed in a range of established formats, providing optimal compatibility with IEEE 1484.12.1-2002 […]”.

This document aims at setting best practices for a (partial) migration path from the IEEE 1484.12.1-2002 (LOM) to the ISO/IEC 19788 series.

This document does not provide a MLR application profile, but rules and heuristics for a crosswalk from the LOM to MLR. As MLR provides many other features, including the use of resource classes as domain and codomain, organizations that want to develop their own MLR application profile should instead review all published Type 1 parts (specifying data elements) in order to fully benefit from all MLR particularities. The MLR approach can be used independently of any MLR application profile.

This work is partly based on the LOM to MLR crosswalk tables appearing in ISO/IEC 19788 Type 1 parts (specifying data elements) that are already published or in preparation. As new parts of ISO/IEC 19788 are developed, this document will be updated to reflect the new data element specifications made available, such as a possible part “Data elements for Classifications”.

This document illustrates how a significant number of aggregate and simple LOM data elements can be expressed in MLR.

There are many differences between the ISO/IEC 19788 series and the IEEE 1484.12.1-2002 (LOM). Whereas the MLR approach is based on a flat data model based on resource classes and properties, the LOM uses a hierarchical data model (categories, aggregate and simple data elements).

The MLR data elements corresponding to LOM aggregate or simple data elements are expressed using the MLR *abstract syntax* (see ISO/IEC 19788-1:2011, 7.1) and using the Turtle *concrete syntax* for the RDF representation of the MLR data elements as per ISO/IEC 19788-7 (Bindings).

For this LOM to MLR crosswalk, for both the MLR *abstract syntax* and the Turtle *concrete syntax*, there is a need to associate a MLR literal value to some LOM aggregate data elements and to LOM Vocabulary datatype items. Those literals are constructed as (linguistic) structured MLR strings.

 © ISO/IEC 2017 – All rights reserved

Some examples are as follows.

— Related to the “1.1 Identifier” (with “1.1.1 Catalog” and “1.1.2 Entry” sub-elements), “3.1 Identifier” (with “3.1.1 Catalog” and “3.1.2 Entry” sub-elements) and “7.2.1 Identifier” (with “7.2.1.1 Catalog” and “7.2.1.2 Entry” sub-elements) aggregate LOM data elements one may use structured **MLR strings** such as:

  — `(catalog: URI, entry: urn:isbn:84-7432-834-9)`

  — `(catalog: ISBN-10, entry: 0-262-68093-9)`

— Related to LOM Vocabulary datatype items, one may use structured MLR strings such as:

  — `(source: LOMv1.0, value: creator)`

  — `(source: LOMFRv1.0, valeur: niveau de compétence)`

  — `(source:http://www.normetic.org/vdex/typeressourcev1_2.xml, value: scénario pédagogique)`

For LOM instance examples, see Annex B and Annex C. For a detailed presentation of structured MLR strings as used in this document, see Annex D.

© ISO/IEC 2017 – All rights reserved

Information technology — Learning, education and training — Metadata for learning resources —

Part 11: Migration from LOM to MLR

1 Scope

This document provides guidance in the form of rules and heuristics for the development of a conversion script from an IEEE 1484.12.1-2002 (LOM) record to an MLR data element set.

Not all of LOM can be mapped to the MLR. As more parts are added to the ISO/IEC 19788 series, future version of this document is expected to provide a better coverage of the LOM metadata.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

For the purposes of this document, the terms and definitions given in ISO/IEC 19788-1:2011, ISO/IEC 19788-1/Amd 1:2014 and the following apply.

3.1
MLR dataset
set of data elements

Note 1 to entry: The data elements in an MLR dataset need not be related to a single learning resource.

Note 2 to entry: Data elements is as defined in ISO/IEC 19788-1:2011, 3.11.

3.2
RDF dataset
<rdf> collection of RDF graphs, and comprises

— exactly one *default graph*, being an RDF graph: the default graph does not have a name and MAY be empty, and

— zero or more *named graphs*: each named graph is a pair consisting of an IRI or a blank node (the *graph name*), and an RDF graph. Graph names are unique within an RDF dataset.

[SOURCE: Bibliography [28]]

© ISO/IEC 2017 – All rights reserved

3.3
content negotiation
<web architecture> practice of providing multiple representations available via the same URI

Note 1 to entry: Which representation is served depends on negotiation between the requesting agent and the agent serving the representations.

[SOURCE: ISO/IEC 19788-8:2015, E.2.1]

3.4
information resource
<web architecture> resource which has the property that all of its essential characteristics can be conveyed in a message

EXAMPLE The information content of the book "Turtle, Termites, and Traffic Jams" by Mitchel Resnick (ISBN 0-262-18162-2) is an information resource. However, the physical object "Turtle, Termites, and Traffic Jams" book owned by Gilles Gauthier is not an information resource.

[SOURCE: ISO/IEC 19788-8:2015, E.2.2]

3.5
representation
<web architecture> data that encodes information about resource state

Note 1 to entry: A resource may have more than one representation: The *information resource* (3.4) "Turtle, Termites, and Traffic Jams" by Mitchel Resnick (ISBN 0-262-18162-2) could have textual representations [plain text, html, epub, portable document format (pdf), Microsoft Word, Braille, etc.], representations in various languages (English, French, etc.), audio representations, etc.

Note 2 to entry: Metadata such as character encoding (e.g. UTF-8, UTF-16, US-ASCII, ISO-8859-1) or content encoding (e.g. XML, HTML, JPEG video, JSON file) may be provided.

Note 3 to entry: Data is as defined in ISO/IEC 11179-1.

[SOURCE: ISO/IEC 19788-8:2015, E.2.4, modified]

4 Abbreviated terms

DES	data element specification
IRI	internationalized resource identifier
RC	resource class
MLR	metadata for learning resource
URI	uniform resource identifier

5 Naming resources in MLR

In the ISO/IEC 19788 series, all resources shall be denoted/named by IRIs. When a learning resource (or a related resource) under description is not denoted by an IRI, one needs to provide an IRI to name the learning resource or related resources.

For more information about how one can provide such a globally unique identifier, see Annex A.

© ISO/IEC 2017 – All rights reserved