



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

Part 7: Bindings



AS ISO/IEC 19788.7:2019

This Australian Standard™ was prepared by the Australian members of the Joint Technical Committee IT-019, Information and Documentation, Information Technology — Learning, Education, Training and Research. It was approved on behalf of the Council of Standards Australia on 26 August 2019.

This Standard was published on 13 November 2019.

The following are represented on Committee IT-019:

- Australian Computer Society
- Australian Library and Information Association
- Council of Australian University Librarians
- CSIRO
- Education Services Australia
- Flinders University of South Australia
- Institute for Metadata Management (Australia)
- Macquarie University
- Northern Territory Library
- NSW Department of Education
- Professional Scientists Australia
- University of Southern Queensland

This Standard was issued in draft form for comment as DR AS ISO/IEC 19788.7:2019.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

ISBN 978 1 76072 599 0



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

Part 7: Bindings

First published as AS ISO/IEC 19788.7:2019.

COPYRIGHT

© ISO/IEC 2019 — All rights reserved
© Standards Australia Limited 2019

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee IT-019, Information and Documentation, Information Technology — Learning, Education, Training and Research.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to provide RDF mappings of the different MLR entities introduced in the MLR framework (AS/NZS ISO/IEC 19788-1 and its amendment): data element specifications (DESs), resource classes (RCs), data elements (DEs), application profiles (APs), MLR records and data element group specifications (DEGSs).

This document associates HTTP IRIs (linguistically neutral and linguistic) to conceptual MLR entities denoted by MLR identifiers. This is needed for the management of MLR entities and their versions.

This document provides excerpts of an OWL 2 DL ontology for the resource classes and data element specifications (properties) introduced in the AS ISO/IEC 19788 and AS/NZS ISO/IEC 19783 series.

This Standard is identical with, and has been reproduced from, ISO/IEC 19788-7:2019, *Information technology — Learning, education and training — Metadata for learning resources — Part 7: Bindings*.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviated terms	6
5 IRIs/URIs for ISO/IEC 19788 entities	7
5.1 MLR identifiers	7
5.2 RFC 5141-based identifier for ISO/IEC 19788 standard identifiers	8
5.3 HTTP URIs for MLR entities	9
5.4 Non-linguistic persistent canonical HTTP URIs for MLR entities	10
5.4.1 MLR entities other than vocabulary terms	10
5.4.2 MLR vocabulary terms	11
5.4.3 Prefixes for MLR entities non-linguistic persistent canonical HTTP URIs	11
5.5 Linguistic persistent canonical HTTP URIs for MLR entities	12
5.5.1 General	12
5.5.2 Linguistic identifier for DESs	12
5.5.3 Linguistic identifier for RCs	16
5.5.4 Linguistic identifier for vocabularies	16
5.5.5 Linguistic identifier for vocabulary terms	17
5.5.6 Linguistic identifier for PRSs	17
5.5.7 Linguistic identifier for DEGS	18
5.5.8 Linguistic identifier for APs	18
6 Data elements: From MLR to RDF¹⁾	19
6.1 General	19
6.1.1 Data elements	19
6.1.2 From MLR to RDF: A glance	20
6.1.3 Mapping of MLR literal content	21
6.1.4 Prefixes	21
6.2 Data element with literal content	22
6.2.1 Literal content data elements	22
6.2.2 Linguistic MLR data element	22
6.2.3 Non-linguistic data element	23
6.3 Data element with non-literal content	26
6.3.1 Non-literal content data elements	26
6.3.2 MLR data element	26
6.3.3 RDF 1.1 data model	26
6.3.4 Serialization using Turtle 1.1 concrete syntax	27
7 OWL ontology for the ISO/IEC 19788 series	27
7.1 General	27
7.2 OWL 2 DL ontology for the MLR: MLROnt	28
7.2.1 MLROnt ontology expressed using the Manchester syntax	28
7.2.2 Rendering of the MLROnt ontology	31
7.2.3 MLROnt class diagram	36
7.3 Localized versions of the MLROnt ontology	37
7.3.1 English localized version of the MLR ontology	37
7.3.2 French localized version of the MLR ontology	39
8 MLR record	41

1) The version of RDF used in this document is RDF 1.1 (see <http://www.w3.org/TR/rdf11-concepts/>).

8.1	General	41
8.2	RDF dataset encoding of an MLR record	41
8.3	Example: An MLR record and its TriG serialization	42
8.4	Application profile record	47
9	MLR vocabularies — SKOS	49
9.1	MLR vocabularies	49
9.2	SKOS binding	49
9.2.1	IRIs for vocabularies	50
9.2.2	IRIs for concepts in a vocabulary	50
9.3	From MLR vocabularies to SKOS	50
9.3.1	General	50
9.3.2	Example: The MLR vocabulary "ISO_IEC_19788-5:2012:V0200" (Audience role)	51
9.4	Extension of an MLR vocabulary	54
9.5	MLR vocabulary dataset	55
9.5.1	General	55
9.5.2	TriG representation of the MLR vocabulary dataset	56
Annex A	(informative) Globally unique identifiers for resources	58
Annex B	(normative) Canonical MLR identifiers	60
Annex C	(informative) Description of a learning resource: An example	68
Annex D	(informative) MLR identifiers and the Web architecture	87
Annex E	(informative) Bounded description of a learning resource	91
Annex F	(informative) Examples of SPARQL requests against the MLR vocabulary dataset	93
Annex G	(informative) Interrelations of MLR with other metadata standards and within MLR itself	105
Bibliography		111

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.

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) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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

For an explanation of 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 www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training*.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The primary purpose of the ISO/IEC 19788 series is to facilitate: (1) the description of a learning resource by providing a standards-based approach to the identification and specification of the metadata elements required to describe a learning resource, e.g. as a metadata learning resource (MLR) record; and (2) the search, discovery, acquisition, evaluation, and use of learning resources, for instance by learners, instructors or automated software processes.

The ISO/IEC 19788 series is modularly structured with all subsequent parts corresponding to a specified set of user requirements for the identification and specification of metadata elements having a particular focus and intended use in the description of a learning resource. This includes categories of metadata elements focused on technical perspectives, pedagogical aspects, availability and intellectual property aspects, bindings, etc.

This document maps the different ISO/IEC 19788-1 constructs to machine readable/understandable entities. This document also proposes global (non-linguistic) identifiers for MLR entities and localized (linguistic) identifiers for the same MLR entities.

The primary purpose of the ISO/IEC 19788 series is to specify 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.

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

The ISO/IEC 19788 series 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 the ISO/IEC 19788 series.

Australian Standard[®]

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

Part 7: Bindings

IMPORTANT — All links that are in regular font and blue/underlined are true links. Any other links (especially in courier font) should not be considered functional.

1 Scope

This document provides RDF mappings of the different MLR entities introduced in the MLR framework (ISO/IEC 19788-1 and its amendment): data element specifications (DEs), resource classes (RCs), data elements (DEs), application profiles (APs), MLR records and data element group specifications (DEGSs).

This document associates HTTP IRIs (linguistically neutral and linguistic) to **conceptual** MLR entities denoted by MLR identifiers. This is needed for the management of MLR entities and their versions.

Moreover, this document provides excerpts of an OWL 2 DL ontology for the resource classes and data element specifications (properties) introduced in the ISO/IEC 19788-1 series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639-2, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

ISO 639-3,¹⁾ *Codes for the representation of names of languages — Part 3: Alpha-3 code for comprehensive coverage of languages*

ISO 3166-1,²⁾ *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 15924,³⁾ *Information and documentation — Codes for the representation of names of scripts*

ISO/IEC 11404,⁴⁾ *Information technology — General-Purpose Datatypes (GPD)*

ISO/IEC 19788-1:2014,⁵⁾ *Information technology — Learning, education and training — Metadata for learning resources — Part 1: Framework*

ISO/IEC 19788-1:2011/Amd 1:2014, *Information technology — Learning, education and training — Metadata for learning resources — Part 1: Framework/Amendment 1*

ISO/IEC 19788-2, *Information technology — Learning, education and training — Metadata for learning resources — Part 2: Dublin Core elements*

1) The name and contact information of the Registration Authority for this ISO 639-3 can be found at <http://www.iso.org/mara>.

2) Alpha-2 codes available at http://www.iso.org/iso/country_codes/iso_3166_code_lists/country_names_and_code_elements.htm.

3) Codes available at <http://www.unicode.org/iso15924/codelists.html>.

4) Freely available at <http://standards.iso.org/ittf/PubliclyAvailableStandards/index.html>.

5) Freely available at <http://standards.iso.org/ittf/PubliclyAvailableStandards/index.html>.