



BSI Standards Publication

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

Part 1: Framework

National foreword

This British Standard is the UK implementation of EN ISO/IEC 19788-1:2025. It is identical to ISO/IEC 19788-1:2024. It supersedes BS EN ISO/IEC 19788-1:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/43, Information technology for learning, education and training.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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© The British Standards Institution 2025
Published by BSI Standards Limited 2025

ISBN 978 0 539 17173 0

ICS 03.100.30; 35.240.90

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2025.

Amendments/corrigenda issued since publication

Date	Text affected
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English Version

Information technology for learning, education and
training - Metadata for learning resources - Part 1:
Framework (ISO/IEC 19788-1:2024)

Technologies de l'information pour l'apprentissage,
l'éducation et la formation - Métadonnées pour
ressources d'apprentissage - Partie 1: Cadre de
référence (ISO/IEC 19788-1:2024)

Informationstechnik für Lernen, Ausbildung und
Weiterbildung - Metadaten für Lernressourcen - Teil 1:
Framework (ISO/IEC 19788-1:2024)

This European Standard was approved by CEN on 22 September 2025.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of ISO/IEC 19788-1:2024 has been prepared by Technical Committee ISO/IEC JTC 1 “Information technology” of the International Organization for Standardization (ISO) and has been taken over as EN ISO/IEC 19788-1:2025 by Technical Committee CEN/TC 353 “Technologies supporting education and learning processes” the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2026, and conflicting national standards shall be withdrawn at the latest by March 2026.

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Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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The text of ISO/IEC 19788-1:2024 has been approved by CEN as EN ISO/IEC 19788-1:2025 without any modification.

Contents

Page

Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviated terms	9
5 Digital access	9
6 MLR Resource classes	10
6.1 General	10
6.2 Resource class specification attributes	10
6.2.1 Attribute "Identifier"	10
6.2.2 Attribute "Canonical identifier"	11
6.2.3 Attribute "Label"	11
6.2.4 Attribute "Name"	12
6.2.5 Attribute "Definition"	12
6.2.6 Attribute "Subclass of"	12
6.2.7 Attribute "Note"	13
6.3 Resource class specification template	13
6.4 Example of a resource class specification	13
7 MLR Properties	14
7.1 General	14
7.2 Property specification attributes	14
7.2.1 Attribute "Identifier"	14
7.2.2 Attribute "Canonical identifier"	15
7.2.3 Attribute "Label"	15
7.2.4 Attribute "Name"	16
7.2.5 Attribute "Definition"	16
7.2.6 Attribute "Domain"	17
7.2.7 Attribute "Codomain"	17
7.2.8 Attribute "Linguistic indicator"	17
7.2.9 Attribute "Content value rules"	18
7.2.10 Attribute "Refines"	19
7.2.11 Attribute "Example(s)"	19
7.2.12 Attribute "Note(s)"	19
7.2.13 Attribute "Best practice(s)"	20
7.2.14 Attribute "Status"	20
7.3 Essential vs non-essential attributes	20
7.4 Property specification template	21
7.5 Aggregation of properties	21
7.6 Example of a property specification	22
7.6.1 General	22
7.6.2 Property specification	22
7.6.3 Associated content value rule set	23
8 MLR Vocabularies	23
8.1 General	23
8.2 Vocabulary specification attributes	23
8.2.1 Attribute "Identifier"	23
8.2.2 Attribute "Canonical identifier"	24
8.2.3 Attribute "Label"	24
8.2.4 Attribute "Name"	25
8.2.5 Attribute "Open/closed"	25
8.2.6 Attribute "Extension of"	25

8.2.7	Attribute "Set of terms"	26
8.3	Vocabulary specification template	26
8.4	User extensions of MLR vocabularies	27
8.5	Example of vocabulary specifications	27
8.5.1	General	27
8.5.2	Vocabulary "Opportunity types"	27
8.5.3	Vocabulary "Extended opportunity types"	28
9	MLR Data elements	28
9.1	General	28
9.2	Data element specification attributes	29
9.2.1	Attribute "Property identifier"	29
9.2.2	Attribute "Subject"	29
9.2.3	Attribute "Content value"	29
9.2.4	Attribute "Language code"	30
9.3	Data element specification template	30
9.4	Examples of MLR data elements	30
9.4.1	EXAMPLE 1	30
9.4.2	EXAMPLE 2 (content value of the data element from a vocabulary)	30
10	MLR Records	30
10.1	General	30
10.2	MLR record: Components	31
10.2.1	Component "Identifier"	31
10.2.2	Component "Resource"	31
10.2.3	Component "Content"	31
11	MLR Application profiles	31
11.1	General	31
11.2	Application profile specification attributes	32
11.2.1	Attribute "Identifier"	32
11.2.2	Attribute "Canonical identifier"	32
11.2.3	Attribute "Label"	33
11.2.4	Attribute "Name"	33
11.2.5	Attribute "Description"	34
11.2.6	Attribute "Extension of"	34
11.2.7	Attribute "List of identifiers of templates for property constraints"	34
11.3	Application profile specification template	34
11.4	Constraint on properties	35
11.5	Constraint on properties template	35
11.5.1	Shape of the constraint on properties template	35
11.5.2	Content of the constraint on properties template	35
11.6	Example	36
11.6.1	Example of the specification of an application profile	37
11.6.2	Example of the specification of property constraints	37
11.6.3	Example of a Conditions Table	37
11.7	Ordered list of items	38
11.8	Global content value rule sets	38
11.9	Extension of an application profile	38
11.10	Documents specifying application profiles	39
12	Documents based on this document	39
12.1	New parts of the ISO/IEC 19788 series	39
12.2	Documents beyond ISO/IEC 19788 based on this standard	39
12.2.1	Documents specifying application profiles	39
12.2.2	Documents specifying MLR entities	39
13	Generic resource classes and LET related classes	40
13.1	General	40
13.2	Generic resource classes	40
13.2.1	Class "Resource"	40

13.2.2	Class "Information Resource"	40
13.2.3	Class "Web Resource"	41
13.2.4	Class "Representation"	41
13.3	Other resource classes	42
13.3.1	Class "Person"	42
13.3.2	Class "Learning Resource"	42
14	Generic properties	42
14.1	General	42
14.2	Properties whose domain is class "Resource"	43
14.2.1	Property "has Description"	43
14.2.2	Property "name"	43
14.3	Properties whose domain is class "Information Resource"	44
14.3.1	Property "describes"	44
14.3.2	Property "has representation"	45
14.4	Property whose domain is class "Web Resource"	45
14.4.1	Property "location"	45
14.5	Properties whose domain is class "Representation"	46
14.5.1	Property "character encoding"	46
14.5.2	Property "media type"	47
14.5.3	Property "refers to"	47
14.5.4	Property "represents"	48
15	Generic content value rule sets	48
15.1	General	48
15.2	MLR String	49
15.3	BCP 47	49
15.4	Boolean	49
15.5	Date	49
15.6	Date & Time	50
15.7	Duration	50
15.8	HTTP IRI	50
15.9	IRI	50
15.10	MEDIA TYPE	51
15.11	Time interval	51
15.12	JSON string	52
Annex A	(normative) Language equivalents for names and labels	53
Annex B	(normative) MLR identifiers	54
Annex C	(normative) MLR canonical identifiers and additional constraints on MLR specifications	58
Annex D	(normative) Rules for all parts of ISO/IEC 19788	65
Annex E	(normative) UML class diagram of generic and other resource classes and related properties	69
Annex F	(informative) UML class diagrams for this document	70
Annex G	(informative) Contents of documents specifying application profiles	73
Annex H	(informative) Contents for documents beyond ISO/IEC 19788 specifying MLR entities	75
Annex I	(informative) Principles governing the development of ISO/IEC 19788	77
Bibliography		79

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 or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and <https://patents.iec.ch>. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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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. In the IEC, see www.iec.ch/understanding-standards.

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

This second edition cancels and replaces the first edition (ISO/IEC 19788-1:2011), which has been technically revised. It also incorporates amendment 1 (ISO/IEC 19788-1:2011/AMD 1:2014).

The main changes are as follows:

- Generic terms and definitions, previously in ISO/IEC 19788-8:2015 (Annex E) have been added to [Clause 3](#);
- An attribute "label" has been added to MLR specification templates for resource classes, properties (DEs in ISO/IEC 19788-1:2011), application profiles, generic content rule sets, vocabularies, and vocabulary terms;
- "Data element specification" has been renamed to "property specification";
- Redefining what an application profile is and deleting data element groups (DEGs);
- [Clause 8](#) about MLR Vocabularies has been added. This clause solves a long-standing problem with the MLR Standard: The non-existence of a normalized way to specify/describe MLR vocabulary in a technology independent way;
- the entire content of the document has been reviewed and modified where necessary.

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

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 and www.iec.ch/national-committees.

Introduction

0.1 Purpose and overview

This document was originally designed as a framework for the specification of metadata describing learning resources (hence its title MLR: Metadata for Learning Resources). Its use in SC36 to specify metadata about competences or accessibility has shown that its scope is broader than originally intended.

This document is about providing a metadata framework relevant to several committees and sectors and is of crucial importance to ensure coherence across standardization deliverables. The framework provides specification of generic entities and rules governing their use. This would then be used to define the semantic (meaning) of any type of information in a predictable way. This framework is information-technology-neutral and defines a set of common approaches, i.e. methodologies and constructs. The key principles are informed by a user requirements-driven context with the aim of supporting multilingual and cultural adaptability requirements from a global perspective, providing a way to link semantics to content.

This document includes rules for the assignment and management of identifiers and the development of subsequent documents fulfilling specific user needs.

Additionally, this document specifies how to define application profiles.

Some generic resource classes and properties are included in this document but there are few of them. Excluded from this document are the specification of bindings for properties (e.g. XML or RDF/OWL bindings) and the description of particular application profiles. These will be considered in subsequent documents. Nevertheless, code may be used in an informal way in examples.

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 properties required to describe a learning resource, for example, 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 interoperability of these functions can be achieved through harvesting or federated search processes, among other technologies and solutions. ISO/IEC 19788 (all parts) is based on identified user requirements.

At the same time, ISO/IEC 19788 (all parts) takes into account the diversity of cultural and linguistic contexts in which learning resources and their metadata are likely to be created and exploited. ISO/IEC 19788 (all parts) also facilitates the sharing and reuse of learning resource descriptions.

ISO/IEC 19788 (all parts) aims to specify properties relating to learning resources to be expressed in a range of established formats, providing some compatibility with IEEE 1484.12.1-2002,^[2] ISO 15836-1:2017^[4] and ISO 15836-2:2019^[5] (as exemplified by ISO/IEC 19788-2 and amendment), while also addressing user-driven requirements and uses not explicitly addressed in those two standards. These properties are used to form the description of a learning resource.

In addition to having this document, ISO/IEC 19788 (all parts) is modularly structured with all subsequent parts having a distinct scope. Some of these parts represent a specified set of user requirements for the identification and specification of properties having a particular focus and intended use in the description of a learning resource. This includes collections of properties focused on technical perspectives, educational (pedagogical) aspects, etc.

0.2 About the description of resources

Properties are the basis of the resource description. However, not all properties are relevant to describe all resources. Indeed, a person is not described like a book. So, when specifying a property, a type of resources containing all the entities the property may be applied to, a domain for the property is provided.

An important aspect of MLR is the notion of classes of resources, i.e., sets of resources sharing common characteristics (e.g. books, people). Classes can be linked together by an inheritance relationship. This notion is to be understood as close to the notion of subset. If class A inherits from class B then all instances of A are also instances of B and instances of all classes from which B inherits.

MLR supports multiple inheritance. In addition, a resource can belong to two classes that are not in a hierarchy. Moreover, it is not necessary before describing a resource to declare a class it is an instance of. If a property applies to a resource, then the resource in question is an instance of the class that is declared as the domain of the property.

The description of a resource is done by making explicit the characteristics of the resource in consideration. Each characteristic is made explicit by specifying the property involved, the resource described and the value of the property for that resource. This is the purpose of MLR data elements.

The values of properties can be either data like a specific date (a date of birth for example) or references to other resources (the author of a book being itself a resource with its own characteristics that can itself linked to other resources and so on).

0.3 About neutral identifiers

A base principle of the approach of this document is that it is linguistically and culturally neutral, even if its text is in English. This is achieved by using language and culture-neutral identifiers. Thus, a designation in the desired language can be associated with a given identifier (e.g. of a property, of a vocabulary term), meaning the same identifier can have as many different names as languages.

Identifiers for MLR entities (properties, resource classes, generic content value rule sets, application profiles, vocabularies and vocabulary terms) are unique reference and permanent tags.

Those identifiers are:

- language-neutral,
- unambiguous in the identification of a particular MLR entity in ISO/IEC 19788 (all parts), related standards or any other type of document based on this document,
- be used to reference and cross-reference MLR entities,
- be information technology independent,
- be as self-explanatory as possible.

The design of MLR identifiers is explained in [Annex B](#).

Canonical identifiers for MLR entities provide a way to denote the common "essence" of entities that are essentially the same. Usually, the description associated with such an identifier is the latest version of the specification/description of the entity. Canonical identifiers are preferentially used if they exist. The design of MLR canonical identifiers is explained in [Annex C](#).

Non-canonical identifiers are only used by persons writing normative documents based on this document. Using non-canonical identifiers allows to keep the history of modifications to the definitions.

In ISO/IEC 19788 (all parts), URI/IRI are used as identifiers for resources (they denote resources). A URI/IRI denoting a resource based on HTTP uses the 'http' scheme, not the 'https' scheme. Any URI/IRI identifier using the 'https' scheme will be deemed to be the identifier obtained by replacing 'https' by 'http'.

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

Part 1: Framework

1 Scope

This document provides a framework that applies to all resources and specifies how to describe resources. It includes rules governing the way in which descriptions are made.

This document provides principles, rules and structures for specifying the description of any type of resource; it identifies and establishes attributes for specifying properties, resources classes, vocabularies and application profiles and the rules governing their use. The key principles set out in this document are framed in a user-centric context and aim to meet the requirements of multilingual and cultural adaptability from a global perspective.

This document can be used for the specification of metadata describing any type of resource (not only learning resources). This document is information-technology-neutral and defines a set of common approaches.

This document specifies generic properties, generic resource classes and predefined rule sets for content value rules. These generic elements are proposed in such a way that they can be widely reused, thereby promoting interoperability.

This document is applicable to the development of:

- application profiles based on the ISO/IEC 19788 series but not part of it or any other document based on it,
- standards consisting of the description of resources (in a broad sense), whether they belong to the domain of education or to any other domain.

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 639-3¹⁾, *Codes for the representation of names of languages — Part 3: Alpha-3 code for comprehensive coverage of languages*

ISO 8601-1:2019, *Date and time — Representations for information interchange — Part 1: Basic rules*

ISO/IEC 10646, *Information technology — Universal coded character set (UCS)*

IETF RFC 3987²⁾, *Internationalized Resource Identifiers (IRIs)*

IETF RFC 5646³⁾, *Tags for Identifying Languages*

1) Cancelled and replaced by ISO 639. ISO 639-3 is available at: https://iso639-3.sil.org/code_tables/639/data

2) Available at: <https://tools.ietf.org/html/rfc3987>

3) Available at: <https://tools.ietf.org/html/rfc5646>

IETF RFC 6838⁴⁾, *Media Type Specifications and Registration Procedures*

IETF RFC 8259⁵⁾, *The JavaScript Object Notation (JSON) Data Interchange Format*

W3C Recommendation,⁶⁾ *Extensible Markup Language (XML) 1.1*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 application profile

defined structured collection of *properties* (3.49) chosen to satisfy the particular needs of a community, or communities

Note 1 to entry: The properties are from the various parts of ISO/IEC 19788 and from other sources.

Note 2 to entry: This collection of properties is accompanied by constraints about their presence and repeatability.

3.2 attribute

field that represents information in a template

3.3 attribute value

information recorded as the content of an *attribute* (3.2) in an *MLR specification* (3.40)

Note 1 to entry: It is good practice to indicate by the string "N/A" that no value should be provided for this attribute.

Note 2 to entry: It is good practice to indicate by the string "-" that no values are provided but could have been.

3.4 characteristic

abstraction of a feature of an *object* (3.46)

Note 1 to entry: Characteristics are used for describing *concepts* (3.6)

3.5 codomain

<property> set containing the possible values for the *property* (3.49) under consideration, this set is either a *resource class* (3.54) or a set of *literals* (3.22)

Note 1 to entry: The information concerning the codomain of a *property* (3.49) is provided as the values of the *attribute* (3.2) "Codomain" of its specification.

3.6 concept

unit of knowledge created by a unique combination of *characteristics* (3.4)

Note 1 to entry: Concepts are not necessarily bound to particular natural languages. They are, however, influenced by the social or cultural background which often leads to different categorizations.

4) Available at: <https://tools.ietf.org/html/rfc6838>

5) Available at: <https://www.rfc-editor.org/rfc/rfc8259>

6) Available at: <https://www.w3.org/TR/xml11/>

[SOURCE: ISO 1087:2019, 3.2.7, modified — Note 2 to entry removed.]

3.7

conditional

required under certain specified conditions

Note 1 to entry: One of the three *obligation statuses* (3.47) applied to the *attributes* (3.2) of an *MLR specification* (3.40) indicating the circumstances under which an *attribute value* (3.3) is required. See also *mandatory* (3.24) and *optional* (3.48).

Note 2 to entry: One of the three possible values for the presence type indicator of a property in the specification of constraints on properties in an application profile.

3.8

content value

information recorded as the content of the *attribute* (3.2) "Content value" of an *MLR data element* (3.31), in compliance with the specification of its underlying *property* (3.49)

3.9

content negotiation

<web architecture> practice of providing multiple representations available via the same *IRI* (3.19)

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

3.10

data

reinterpretable representation of information in a formalized manner suitable for communication, interpretation or processing

[SOURCE: ISO/IEC 2382:2015, modified — Notes to entry deleted.]

3.11

data element

unit of *data* (3.10) expressing a *characteristic* (3.4) of a resource

3.12

definition

representation of a *concept* (3.6) by an expression that describes it and differentiates it from related concepts

[SOURCE: ISO 1087:2019, 3.3.1]

3.13

designation

representation of a *concept* (3.6) by a sign which denotes it

3.14

domain

<property> *resource class* (3.54) any *entity* (3.15) *subject* (3.59) of the property under consideration belongs to (is an instance of)

Note 1 to entry: The information concerning the domain of a *property* (3.49) is provided as the values of the attribute "Domain" of its specification.

Note 2 to entry: Some resources in the stated domain may very well not be a *subject* (3.59) of the property.

Note 3 to entry: If $x \text{ P } y$ (see 3.49, note 1) then x belongs to the domain of P .

3.15

entity

any concrete or abstract thing that exists, did exist, or might exist, including associations among these things

EXAMPLE Person, object, event, idea, process, etc.

Note 1 to entry: An entity exists whether data about it are available or not.

[SOURCE: ISO/IEC 2382:2015, 3.9.5]

3.16 identifier

sequence of characters, capable of uniquely identifying an *entity* (3.15)

Note 1 to entry: An identifier is linguistically neutral, with no translation provided.

Note 2 to entry: An identifier may be of the nature of a composite identifier, i.e. a unique identifier consisting of two or more identifiers and/or other elements, whose inter-workings are rule-based and which together serve as a "single" identifier.

3.17 information resource

resource (3.53) which is such that all of its essential *characteristics* (3.4) can be conveyed in a message

EXAMPLE The book "Turtle, Termites, and Traffic Jams" (considered from the point of view of the information it contains) by Mitchel Resnick (MIT Press, 1994, ISBN 0-262-18162-2) is an information resource. However, the physical object "Turtle, Termites, and Traffic Jams" book owned by Jon Doe is not an information resource.

3.18 instance

individual *object* (3.46) of a certain *entity* (3.15) or class

[SOURCE: ISO/TS 21308-4:2007, 3.5]

3.19 Internationalized Resource Identifier IRI

sequence of characters from the Universal Character Set (ISO/IEC 10646) that conforms to the syntax and semantics defined in IETF RFC 3987

Note 1 to entry: IRIs are a generalization of URIs. While URIs are a sequence of characters chosen from a limited subset of US-ASCII, IRIs may contain characters from the Universal Character Set, such as Chinese, Japanese, Korean or Cyrillic characters.

Note 2 to entry: A mapping from IRIs to URIs is defined in IETF RFC 3987, making it possible to use IRIs instead of URIs, where appropriate, to identify resources.

Note 3 to entry: An IRI can be written by hand, spoken, or represented by a sequence of octets.

Note 4 to entry: An HTTP IRI is an IRI whose scheme is HTTP.

Note 5 to entry: IRIs are distinct entity from their underlying character string, in the same way an integer is distinct from the character string representing it. For example, `http://example.org/` as a string literal is not equal to `http://example.org` as an IRI

3.20 label

descriptive text for human consumption

3.21 learning resource

resource (3.53) used for learning, education or training

3.22 literal

datatype value

Note 1 to entry: Primitive datatypes from W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes (section 3.3)^[7] and other datatypes are used in this document.

EXAMPLE strings, integers, IRIs, language-tagged strings.

3.23**literal data element**

MLR data element (3.31) whose *content value* (3.8) is a *literal* (3.22)

3.24**mandatory**

always required

Note 1 to entry: One of the three *obligation statuses* (3.47) applied to the *attributes* (3.2) of an *MLR specification* (3.40) indicating the circumstances under which an *attribute value* (3.3) is required. See also *conditional* (3.7) and *optional* (3.48).

Note 2 to entry: One of the three possible values for the presence type indicator of a property in the specification of constraints on properties in an application profile.

3.25**media type**

metadata for a *representation* (3.52), using IETF RFC 6838, that provides format specification and preferred interpretation for the representation

EXAMPLE image/jpeg, image/svg+xml, text/plain, text/html, text/turtle, video/H264, application/xhtml+xml.

Note 1 to entry: Media types, also called Internet media types, were previously called MIME types when used essentially for email sent through the SMTP protocol.

Note 2 to entry: Registry of Internet media types is available at: <https://www.iana.org/assignments/media-types>.

3.26**metadata**

data (3.10) that defines and describes other data

[SOURCE: ISO/IEC 11179-1:2023, 3.2.16]

3.27**metadata record**

record (3.50) containing a description of a resource or of a set of resources

Note 1 to entry: A metadata record for a set of resources may be a combination of the content of MLR records of the resources.

3.28**MLR application profile**

application profile (3.1) described by an *MLR application profile specification* (3.29)

3.29**MLR application profile specification**

description of an *application profile* (3.1) by informing the *attributes* (3.2) of 11.2

3.30**MLR canonical identifier**

identifier (3.16) obtained from an *MLR identifier* (3.34) by replacing its `Standard_ID` part by the related `Standard_Canonical_ID` part.

Note 1 to entry: See [Annex B](#) for the syntax of `Standard_ID` and `Standard_Canonical_ID`.

Note 2 to entry: An MLR canonical identifier is not an *MLR identifier* (3.34).

3.31**MLR data element**

data element (3.11) described by an *MLR data element specification* (3.32)

Note 1 to entry: MLR data elements are *data elements* (3.11).

Note 2 to entry: MLR data elements are described independently of any implementation language.

3.32**MLR data element specification**

description of a *data element* (3.11) by informing the *attributes* (3.2) of 9.2

3.33**MLR entity**

entity (3.15) that is defined using MLR standard specification mechanisms

Note 1 to entry: MLR entities include among others *MLR resource classes* (3.38), *MLR properties* (3.35), *MLR vocabularies* (3.41).

3.34**MLR identifier**

identifier (3.16) of an *MLR entity* (3.33) that conforms to the following syntax:

```
MLR_Identifier ::= Standard_ID ":" MLR_ID
```

Note 1 to entry: See Annex B for the syntax of *Standard_ID* and *MLR_ID*.

3.35**MLR property**

property (3.49) described by an *MLR property specification* (3.36)

3.36**MLR property specification**

description of an *MLR property* (3.35) by informing the essential *attributes* (3.2) of 7.2

3.37**MLR record**

ordered set of *MLR data elements* (3.31) describing a *resource* (3.53) and resources directly related to that resource

Note 1 to entry: If the MLR data elements are stored as XML elements in a file (XML document), for example, the MLR record consists of the whole XML document.

Note 2 to entry: An MLR record is inherently non-mutable. Addition or deletion of *MLR data elements* (3.31) to the MLR data element set, or modification of any MLR data element belonging to the MLR data element set make it a different MLR record.

Note 3 to entry: An MLR record is a *metadata record* (3.27).

3.38**MLR resource class**

resource class (3.54) described by an *MLR resource class specification* (3.39)

3.39**MLR resource class specification**

description of an *MLR resource class* (3.38) by informing the *attributes* (3.2) of 6.2

3.40**MLR specification**

generic term for an *MLR resource class specification* (3.39), an *MLR property specification* (3.36), an *MLR vocabulary specification* (3.42), an *MLR data element specification* (3.32), or an *MLR application profile specification* (3.29)

Note 1 to entry: In this document MLR specifications are provided using templates.

3.41**MLR vocabulary**

vocabulary (3.61) described by an *MLR vocabulary specification* (3.42)

3.42**MLR vocabulary specification**

description of an *MLR vocabulary* (3.41) by informing the *attributes* (3.2) of 8.2

3.43**mutable MLR record**

container for an *MLR record* (3.37)

Note 1 to entry: Unlike the situation for an MLR record, the state (content) of a mutable MLR record can change over time, while still describing a given learning resource and resources related to it.

3.44**name**

string (3.57) that is a valid name as per the production rule for Name in the Extensible Markup Language (XML) 1.1 Recommendation

Note 1 to entry: A name for an MLR entity (e.g. property, resource class...) is usually constructed from the label of this *entity* (3.15).

Note 2 to entry: Names are tokens used in constructing unique identifiers for MLR entities (e.g. properties, resource classes) used in machine processing (see ISO/IEC 19788-7 for more information).

3.45**non-literal data element**

data element (3.11) whose *content value* (3.8) is an *IRI* (3.19) denoting a *resource* (3.53)

Note 1 to entry: The value of a non-literal data element is what is denoted by the IRI, not the IRI itself.

3.46**object**

anything perceivable or conceivable

3.47**obligation status**

{attribute} indication of whether a value for the *attribute* (3.2) is to be provided

Note 1 to entry: The obligation status is *mandatory* (3.24), *conditional* (3.7) or *optional* (3.48).

3.48**optional**

permitted but not required

Note 1 to entry: One of the three *obligation statuses* (3.47) applied to the *attributes* (3.2) of an *MLR specification* (3.40) indicating the circumstances under which an *attribute value* (3.3) is required. See also *mandatory* (3.24) and *conditional* (3.7).

Note 2 to entry: One of the three possible values for the presence type indicator of a property in the specification of constraints on properties in an application profile.

3.49**property**

relation between *resources* (3.53) or between resources and *literals* (3.22)

Note 1 to entry: The fact that P is a property that relates entity x and entity y is noted x P y.

Note 2 to entry: The concept of property is a primitive notion in this document. It is not defined in terms of set theory concepts, but is motivated informally.

Note 3 to entry: If a property P is described by an *MLR property specification* (3.36), then the set of pairs of entities (x, y) such that x P y is contained in the Cartesian product of the domain of P with the codomain of P.

Note 4 to entry: Two properties can be related with the two equivalent relations: *refine* (3.51) or *sub-property* (3.58)

3.50

record

structured information that can be read by software services

[SOURCE: ISO 24622-1:2015]

3.51

refine

$\langle \text{property} \rangle$ *property* (3.49) P1 refines property P2 if (and only if) x P1 y implies x P2 y

EXAMPLE 1 Property "is son of" refines property "is child of".

EXAMPLE 2 Property "has mother" refines property "has parent".

Note 1 to entry: "P1 refines P2" means "P1 is a *sub-property* (3.58) of P2".

3.52

representation

data (3.10) that encodes information about resource state

Note 1 to entry: A resource may have more than one representation: The intellectual content of the book [an *information resource* (3.17)] "Turtle, Termites, and Traffic Jams" by Mitchel Resnick (MIT Press, 1994, ISBN 0-262-18162-2) could have textual representations (e.g. plain text, html, epub, portable document format (pdf), Braille), representations in various languages (e.g. English, French), audio representations, etc.

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

3.53

resource

thing in the world, other than a literal, under consideration

EXAMPLE Physical entities (such as books and human beings), digital entities (such as images, videos, services) or conceptual entities (such as unicorns, collection of resources) constitute examples of resources.

Note 1 to entry: In this document, resources are denoted (named, identified, referenced) by *IRIs* (3.19).

3.54

resource class

set of *resources* (3.53) that can be identified with explicit boundaries and meaning and whose *characteristics* (3.4) and behaviour follow the same *rules* (3.55)

EXAMPLE *Learning Resource* (set of all learning resources), *Person* (set of all persons), *Right* (set of all rights objects), and *Document* (set of all documents).

3.55

rule

statement that specifies a constraint

Note 1 to entry: Rules specify conditions that shall be complied with. These may include relations among objects and their attributes.

Note 2 to entry: Rules are of either a mandatory or a conditional nature.

Note 3 to entry: In MLR, rules formally specify and are applied to the conditions governing the content, i.e., in ensuring the precision of the semantics of the data.

Note 4 to entry: Rules shall be explicit and clear enough to be understood by all.

3.56

rule set

defined and pre-established set of *rules* (3.55) that are used together

3.57**string**

sequence of zero or more ISO/IEC 10646 characters

3.58**sub-property**

property (3.49) that is related to another property such that all resources related by the former property are also related by the latter property

3.59**subject**

<property> entity x is a subject of a *property* (3.49) P if x P y for some entity y

3.60**value**

<property> entity y is a value of a *property* (3.49) P if x P y for some entity x

3.61**vocabulary**

terminological dictionary which contains *designations* (3.13) and *definitions* (3.12) from one or more subject fields

Note 1 to entry: The vocabulary may be monolingual, bilingual or multilingual.

[SOURCE: adapted from ISO 11616:2017, 3.1.40, note added]

3.62**Web resource**

information resource (3.17) that resides on the World Wide Web

Note 1 to entry: A Web resource can be denoted by an HTTP IRI and under normal conditions (e.g. server not down) a representation of the resource (the exact representation retrieved might depend on content negotiation) can be retrieved using that IRI and the HTTP protocol.

4 Abbreviated terms

AP	Application profile
EBNF	Extended Backus-Naur Form
ID	Identifier
IEEE	Institute of Electrical and Electronics Engineers
IRI	Internationalized Resource Identifier
JSON	JavaScript Object Notation
LOM	Learning Object Metadata
MLR	Metadata for Learning Resources
XML	eXtensible Markup Language
W3C	World Wide Web Consortium

5 Digital access

In order to promote the dissemination of this document and not overload it with the ontology, classes and properties defined in this document are available at <https://standards.iso.org/iso-iec/19788/-1/ed-2/en>.

The files contain the ontology corresponding to this document, as well as JSON files containing the linguistic equivalents of labels and names. Language equivalents for names and labels of generic resource classes, generic properties and generic content value rule sets should be used in conformance with [Annex A](#).

A README.md file containing the list of available files and the choices made is available at <https://standards.iso.org/iso-iec/19788/-1/ed-2/en>.

6 MLR Resource classes

6.1 General

A resource class is a set of resources that can be identified with explicit boundaries and meaning and whose characteristics and behaviours follow the same rules.

Examples of resource classes are the set of all learning resources (*Learning Resource*), the set of all persons (*Person*), the set of all documents (*Document*).

There is one point to be aware of: this notion of class is close to the notion of set and is not to be confused with the notion of class in a programming language.

When developing a document based on this document, the way to fully describe a resource class (i.e. to provide the specification of a resource class) is by filling up the specific template provided in [subclause 6.3](#), one template per resource class.

The MLR resource class specification global view is given in [Annex F, Figure F.2](#).

The role of MLR Resource classes in the overall vision of the MLR framework is given in [Annex F, Figure F.1](#).

6.2 Resource class specification attributes

The specification of a resource class is done by making explicit the values of a set of attributes. Each resource class specification has the following attributes:

- **Identifier** (an identifier for the class)
- **Canonical identifier** (a canonical identifier for the class)
- **Label** (one or more linguistically equivalent labels for the class)
- **Name** (one or more linguistically equivalent names for the class)
- **Definition** (a definition for the class)
- **Subclass of** [multiple inheritance] (a superclass or a list of superclasses for the class under specification.)
- **Note** (any additional information)

6.2.1 Attribute "Identifier"

6.2.1.1 General

This attribute is used to provide the identifier of the resource class.

6.2.1.2 Rules for the attribute "Identifier"

[R0001] The **obligation status** of this **attribute** is **mandatory**.

[R0002] The value for this **attribute** is an `RC_Identifier` determined in accordance with the EBNF production rules in [Annex B, Clause B.2](#).

EXAMPLE Examples of such resource class specification identifiers include:
ISO_IEC_19788-1:2011::RC0003, NoDefr-1:RC0002

[R0003] The value for the **attribute** "Identifier" is unique within each part of ISO/IEC 19788.

NOTE For bindings those identifiers will map to IRIs as defined by IETF RFC 5141^[3] (A Uniform Resource Name (URN) Namespace for the International Organization for Standardisation (ISO)). Namespace related to this document will be based on IETF RFC 5141^[3] and its proposed process for identifier resolution (subclause 2.8). For example, this document (edition 2) document with identifier urn:iso:std:iso-iec:19788:-1:ed-2:en corresponds to the HTTP IRI <https://standards.iso.org/iso-iec/19788/-1/ed-2/en/> (using urn:iso:std:iso-iec:19788:-1:ed-2:en would also be possible).

6.2.2 Attribute "Canonical identifier"

6.2.2.1 General

This attribute is used to provide the canonical identifier of the resource class if it exists.

6.2.2.2 Rules for the attribute "Canonical identifier"

[R0004] The **obligation status** of this **attribute** is **conditional**.

Condition: When (and only when) the value of the **attribute** "Identifier" is an **MLR identifier** a value shall be provided for this attribute and this value shall follow the rules of [Annex C](#).

[R0005] The value for this **attribute** is the **MLR canonical identifier** associated with the value of the **attribute** "Identifier".

6.2.3 Attribute "Label"

6.2.3.1 General

Resource class labels have the following properties:

- a resource class is a set of resources, but it is recommended to use a singular form for its label (e.g. Person, Learning Resource),
- a resource class label may have multiple linguistic equivalents in different languages, one label per language, preferably one of them should be in the language of the document,
- in the case of several linguistic equivalents for a resource class label, the language of each of them is indicated after the label in parenthesis using a language code from ISO 639-3 (the ISO 639-3 code is not required when the label is in the language of the document),
- the label of a resource class begins with, generally and for languages making this distinction, an upper-case letter. If the label of a resource class consists of more than one word, then all the words start with an upper-case letter.

6.2.3.2 Rules for the attribute "Label"

[R0006] The **obligation status** of this **attribute** is **mandatory**.

[R0007] The value of this **attribute** is one or more linguistically equivalent **labels**.

6.2.4 Attribute "Name"

6.2.4.1 General

A resource class name is a version of the resource class label of the resource class that is a valid name as per the production rule for Name in the XML W3C Recommendation, in the stated language.

Resource class names have the following properties:

- a resource class name may have multiple linguistic equivalents in different languages, one name per language, preferably one of them should be in the language of the document,
- in the case of several linguistic equivalents for a resource class name, the language of each of them is indicated in parenthesis after the name using a language code from ISO 639-3 (the ISO 639-3 code is not required when the name is in the language of the document),
- the name of a resource class begins with, generally and for languages making this distinction, an upper-case letter and has no spaces. To show where a space would be, the letter following the space is capitalised (this is commonly known as camelCase),
- the name of a resource class is usually constructed from the label of the class.

6.2.4.2 Rules for the attribute "Name"

[R0008] The **obligation status** of this **attribute** is **mandatory**.

[R0009] The value of this **attribute** is one or more linguistically equivalent **names**.

6.2.5 Attribute "Definition"

6.2.5.1 General

Used to provide a definition of the resource class (in the language of the document).

6.2.5.2 Rules for the attribute "Definition"

[R0010] The **obligation status** of this **attribute** is **mandatory**.

[R0011] The value of this **attribute** is a **definition**.

[R0012] The **definition** shall begin with "Instances of this class are ...".

6.2.6 Attribute "Subclass of"

6.2.6.1 General

Classes are organized together by mean of the attribute "Subclass of". For a class, being a subclass of another class means that all instances of the former are also instances of the latter.

6.2.6.2 Rules for the attribute "Subclass of"

- [R0013] The **obligation status** of this **attribute** is **optional**.
- [R0014] The value of this **attribute** is a set of **identifiers** of **resource classes**. Use canonical identifiers if they exist.
- [R0015] To improve readability, it is possible to add the **label** (in italics) of each **resource class** between parentheses after the **identifier**.

6.2.7 Attribute "Note"

6.2.7.1 General

This attribute is used to provide additional information about a resource class: comments, explanatory information or remarks.

6.2.7.2 Rules for the attribute "Note"

- [R0016] The **obligation status** of this **attribute** is **optional**.
- [R0017] The value of this **attribute** is a **string**.

6.3 Resource class specification template

Resource class specification	
Identifier (mandatory)	
Canonical Identifier (conditional)	
Label (mandatory)	
Name (mandatory)	
Definition (mandatory)	
Subclass of (optional)	
Note (optional)	

6.4 Example of a resource class specification

Resource class specification	
Identifier	ISO_IEC_19788-99:2099::RC0099
Canonical Identifier	ISO_IEC_19788-99::RC0099
Label	<i>Pedagogical Document</i>
Name	<i>PedagogicalDocument</i>
Definition	Instances of this class are documents (in either physical or electronic format) used in an educational activity
Subclass of	ISO_IEC_19788-1::RC0002 (<i>Learning Resource</i>) ISO_IEC_19788-1::RC0098 (<i>Document</i>)
Note	-

7 MLR Properties

7.1 General

A primary principle of this document is that a common set of attributes specifies the essential characteristics of the property used to describe resources. This Cause [7](#), MLR properties, defines the attributes of property specifications and rules for the values of those attributes.

The linguistic content for the values of the attributes shall be given in English (to be more precise, in the language of the document in which they are given), but for the values of the attributes "Label" and "Name" which may have multiple linguistic equivalents other than English.

When developing a document based on this document, the way to fully describe a property (i.e. to provide property specifications) is by filling up the specific template provided in [subclause 7.4](#), one template per property.

The MLR property specification global view is given in [Annex F, Figure F.3](#).

The role of MLR Properties in the overall vision of the MLR framework is given in [Annex F, Figure F.1](#).

7.2 Property specification attributes

A property specification consists of a (defined) list of attributes with rules for the values of those attributes.

Each MLR property specification has the following attributes [essential attributes (see [subclause 7.3](#)) are set in bold]:

- **Identifier** (an identifier for the property)
- **Canonical identifier** (a canonical identifier for the property)
- **Label** (one or more linguistically equivalent labels for the property)
- **Name** (one or more linguistically equivalent names for the property)
- **Definition** (a definition for the property)
- **Domain** (a domain for the property)
- **Codomain** (a codomain for the property)
- **Linguistic indicator** (property linguistic indicator)
- **Content value rules** (rules governing the possible values for the property)
- Refines (a super-property for the property)
- Example(s) (some examples of use of the property)
- Note(s) (any additional information)
- Best practice(s) (some good practices for using the property)
- Status (an information on the fact that the property is still in use)

7.2.1 Attribute "Identifier"

7.2.1.1 General

This attribute is used to provide the identifier of the property.

7.2.1.2 Rules for the attribute "Identifier"

[R0018] The **obligation status** of this **attribute** is **mandatory**

[R0019] The value for this **attribute** is a `P_Identifier`^a, or a `DES_Identifier` (deprecated) determined in accordance with the EBNF production rules in [Annex B, Clause B.2](#).

^a In this edition of 19788-1, "data element property" has been replaced by "property". As a logical consequence, the beginning of the property identifiers starts with P and no longer with DES. However, changing the identifiers of existing properties would not make sense. The use of DES remains possible but is deprecated.

EXAMPLE Examples of such identifiers include:

```
"ISO_IEC_19788-2:2011::DES0200", "ISO_IEC_19788-12:2027::P1300",  
"GTN-Québec:Normetic::DES0050"
```

[R0020] The value for the **attribute** "Identifier" is unique (see [Annex B](#)) within each part of ISO/IEC 19788.

NOTE For bindings those identifiers will map to IRI as defined by IETF RFC 5141.^[3] Namespace related to this document will be based on IETF RFC 5141^[3] and its proposed process for identifier resolution (subclause 2.8). For example, this document with identifier `urn:iso:std:iso-iec:19788:-1:ed-2:en` corresponds to the HTTP IRI <https://standards.iso.org/iso-iec/19788/-1/ed-2/en/> (using `urn:iso:std:iso-iec:19788:-1:ed-2:en` would also be possible).

7.2.2 Attribute "Canonical identifier"

7.2.2.1 General

This attribute is used to provide the canonical identifier of the property if it exists.

7.2.2.2 Rules for the attribute "Canonical identifier"

[R0021] The **obligation status** of this **attribute** is **conditional**.

Condition: When (and only when) the value of the **attribute** "Identifier" is an **MLR identifier** a value shall be provided for this attribute and this value shall follow the rules of [Annex C](#).

[R0022] The value of this **attribute** is the **MLR canonical identifier** associated with the value of the **attribute** "Identifier".

7.2.3 Attribute "Label"

7.2.3.1 General

Property labels have the following properties:

- a property label may have multiple linguistic equivalents in different languages, one label per language, preferably one of them should be in the language of the document,
- in the case of several linguistic equivalents for a property label, the language of each of them is indicated, just after, in parenthesis using a language code from ISO 639-3 (the ISO 639-3 code is not required when the label is in the language of the document),
- for a property label do not use a redundant prefix (for example if the domain is the class Annotation, use "date" for the label instead of "annotation date"), for a non-literal data element do not use the name of the codomain (for example if the codomain is the class Annotation, use "has annotation" for the property label instead of "annotation"),

- preferably, the label of a property begins with, for languages making this distinction, a lower-case letter. If there are spaces in the label of a property, the letter following a space is a lower-case letter.

7.2.3.2 Rules for the attribute "Label"

- [R0023] The **obligation status** of this **attribute** is **mandatory**.
- [R0024] The value of the **attribute** is one or more linguistically equivalent **labels**.
- [R0025] In any language, for all **properties** the values of the **attribute** "label" shall be unique across all **properties** (from all parts of ISO/IEC 19788, all editions) with the same values for the **attributes** "Domain" and "Codomain".
- [R0026] In any given language, for any property the triple (label, domain, codomain) associated with the property constitutes a global [within ISO/IEC 19788 (all parts)] appellation of the property (the primary global identifier being provided by the property identifier).

7.2.4 Attribute "Name"

7.2.4.1 General

A property name is a version of the property label that is a valid name as per the production rule for Name in the XML W3C Recommendation, in the stated language.

Property names have the following properties:

- a property name may have multiple linguistic equivalents in different languages, one property name per language, preferably one of them should be in the language of the document,
- in the case of several linguistic equivalents for a property name, the language of each of them is indicated, just after, in parenthesis using a language code from ISO 639-3 (the ISO 639-3 code is not required when the name is in the language of the document),
- preferably, the name of a property begins with, for languages making this distinction, a lower-case letter and has no spaces. To show where a space would be, the next letter is capitalised (what is commonly known as camelCase),
- the name of a property is usually constructed from the label of that property.

7.2.4.2 Rules for the attribute "Name"

- [R0027] The **obligation status** of this **attribute** is **mandatory**.
- [R0028] The value of the **attribute** is one or more linguistically equivalent **names**.
- [R0029] In any language, for all **properties** the values of the **attribute** "name" shall be unique across all **properties** (from all parts of ISO/IEC 19788, all editions) with the same values for the **attributes** "Domain" and "Codomain".

NOTE In any given language, for any property the triple (name, domain, codomain) associated with the property constitutes a global [within ISO/IEC 19788 (all parts)] appellation of the property (the primary global identifier being provided by the property identifier).

7.2.5 Attribute "Definition"

7.2.5.1 General

Used to provide a definition of the property (in the language of the document).

7.2.5.2 Rules for the attribute "Definition"

[R0030] The **obligation status** of this **attribute** is **mandatory**.

[R0031] The value of the **attribute** is a **definition**.

7.2.6 Attribute "Domain"

7.2.6.1 General

The value of this attribute, an identifier, indicates a resource class that contains all the subjects of the property. For some resources instances of the domain, the property may very well not apply.

7.2.6.2 Rules for the attribute "Domain"

[R0032] The **obligation status** of this **attribute** is **mandatory**.

[R0033] The value of this **attribute** is the **identifier** of a **resource class**, the **MLR canonical identifier** is to be used if there is one available.

[R0034] In order to improve readability, it is possible to add the **label** of the **resource class** after the **identifier** (in italics) between parentheses.

7.2.7 Attribute "Codomain"

7.2.7.1 General

Attribute that serves to specify the codomain of the property obeying this specification. The value of this attribute is either the identifier of a resource class, use the canonical identifier if it exists, or a set of literals.

7.2.7.2 Rules for the attribute "Codomain"

[R0035] The **obligation status** of this **attribute** is **mandatory**.

[R0036] The value of this **attribute** is either the **identifier** of a **resource class**, the canonical identifier is to be used if there is one available, or "*literal*" (if the value is a set of **literals**)

[R0037] In order to improve readability, it is possible to add the **label** of the **resource class** after the **identifier** (in italics) between parentheses, if the value is an **identifier** of a **resource class**.

7.2.8 Attribute "Linguistic indicator"

7.2.8.1 General

Attribute that serves to specify if the content value of the data element is deemed to be linguistically neutral or not.

7.2.8.2 Rules for the attribute "Linguistic indicator"

[R0038] The **obligation status** of this **attribute** is **conditional**.

Condition: When (and only when) the **codomain** of a **property** is a set of **literals** the value of this **attribute** is **mandatory**.

[R0039] Possible values for this **attribute** may be the following: