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

Part 1: Framework

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

Partie 1: Cadre de référence

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Foreword

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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).

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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 (DESs 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 it's 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 639-3[1)], *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 3987[2)], *Internationalized Resource Identifiers (IRIs)*

IETF RFC 5646[3)], *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 6838[4], *Media Type Specifications and Registration Procedures*

IETF RFC 8259[5], *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.

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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 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
⟨property⟩ *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 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 **label**s.

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 **name**s.

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	*Pedagogical Document*
Name	*PedagogicalDocument*
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 (*Learning Resource*) ISO_IEC_19788-1::RC0098 (*Document*)
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 **label**s.

[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 **name**s.

[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:

— *linguistic*: the **value**s of the **property** are deemed to be linguistic in nature. They may have multiple linguistic equivalents..

— *non-linguistic*: the **value**s of the **property** are deemed to be non-linguistic in nature. They will not have multiple linguistic equivalents..

— *both*: the **value**s of the **property** may be either linguistic or non-linguistic.

EXAMPLE If we consider the property "normalization body", it could take the following values: "International Organization for Standardization (en) ","ISO".

[R0040] For a **property** with **literal** values from an **MLR vocabulary**, the values are **identifiers** of a term so the value for this **attribute** shall be "*non-linguistic* ".

7.2.9 Attribute "Content value rules"

7.2.9.1 General

When the codomain of a property is a set of literals the value of this attribute is the identifier of a rule set that provides constraints on the possible values of the property.

This rule set is either generic (predefined), global to a (standard) document, or local (that is, specific to a property under consideration).

The content value set template (subclause 7.2.9.3) should be used to describe a content value rule set associated with the attribute "Content value rules" when the rule set is specific to a property under specification (local rule set). When the rule set is either generic (predefined) or global a slightly different template should be used: see for example the template in subclause 15.2 (the only difference is in the header of the template).

In the template, each numbered line represents a rule. Each rule statement is identified by an identifier that conforms to `seqN2` (see Annex B).

The rule statements can be provided in different ways (e.g. formal rules, sentences) and may be completed with examples or notes. If a rule set is made of several rules, each of them shall be satisfied. (i.e. it is an "and" of all the rules in the rule set).

7.2.9.2 Rules for the attribute "Content value rules"

[R0041] The **obligation status** of this **attribute** is **conditional.**

Condition: When (and only when) the **codomain** of the **property** is a set of **literals**, a value shall be provided for this **attribute**.

[R0042] If the **rule set** is generic then the value of the **attribute** "Content value rules" is the **identifier** of a generic (predefined) rule set (use the **MLR canonical identifier** if it exists), else if the **rule set** is global then the value of the **attribute** conforms to the "`RS`"`seqN4` part of the `Rule_set_ID` EBNF rule (see Annex B), otherwise the **rule set** is local and the value of the **attribute** conforms to either the "`RS`"`DES_ID` or "`RS`"`P_ID` part of the `Rule_set_ID` EBNF rule.

[R0043] In order to improve readability, it is possible to add the **label** of the **rule set** after the **identifier** (in italics) between parentheses, if the value is an **identifier** of a generic (predefined) **rule set**.

[R0044] When the values are from a **vocabulary**, the **rule set** contains only one rule of the form: "the possible values are identifiers of terms from a vocabulary `<VOC_Identifier>`" or "the possible values are identifiers of terms from a vocabulary `<VOC_Identifier>` or one of its extensions". In all cases, **MLR canonical identifiers** should be used if they exist.

7.2.9.3 Content value rule set template

Rule_Set_Id	
Rule_ID	Rule statement, Example(s) and Note(s)
01	…
02	…

7.2.10 Attribute "Refines"

7.2.10.1 General

Attribute that serves to indicate if the property described by this specification refines another property.

It is not always known which properties are refined by the property under consideration (for example because they will be specified in a future ISO/IEC 19788 Part or other document). But it is "best practice" to provide the information when known.

7.2.10.2 Rules for the attribute "Refines"

[R0045] The **obligation status** of this **attribute** is **optional**.

[R0046] The value of this **attribute** is an **identifier** of a **property**, canonical identifier should be used if it exists.

[R0047] In order to improve readability, it is possible to add the **label** of the **property** after the **identifier** (in italics) between parentheses.

7.2.11 Attribute "Example(s)"

7.2.11.1 General

Used to provide example(s) of value(s) for the property under consideration.

7.2.11.2 Rules for the attribute "Example(s)"

[R0048] The **obligation status** of this **attribute** is **optional**.

[R0049] If the **values** of the **property** under specification are **literals**, provide a representation of those **literals**, otherwise (case where values are resources) use text of the form "Resource denoted by <URI http://example.org>" or "Resource denoted by <IRI http://example.org>".[a]

[a] It is necessary to make the difference here between a string and its representation. Thus, strings will be between inverted commas ("..."). We could then distinguish between (for example) the string "https://iso.com" and the IRI https://iso.com or between the string "42" and the integer 42.

7.2.12 Attribute "Note(s)"

7.2.12.1 General

Used to provide additional information about a property: comments, explanatory information or remarks.

7.2.12.2 Rules for the attribute "Note(s)"

[R0050] The **obligation status** of this **attribute** is **optional**.

[R0051] The value of this **attribute** is a **string**.

7.2.13 Attribute "Best practice(s)"

7.2.13.1 General

Used to provide examples of best practices for the use of this property.

7.2.13.2 Rules for the attribute "Best practice(s)"

[R0052] The **obligation status** of this **attribute** is **optional**.

[R0053] The value of this **attribute** is a **string**.

7.2.14 Attribute "Status"

7.2.14.1 General

Used to provide information about the status of a property. As MLR is going to evolve, it is necessary to provide backward compatibility for properties. Deprecated will be the status for properties that should be avoided, typically because they have been superseded.

7.2.14.2 Rules for the attribute "Status"

[R0054] The **obligation status** of this **attribute** is **optional**. If not provided, the value "*current*" applies.

[R0055] Possible values for this **attribute** may be the following:

- *current* (default value),
- *deprecated*.

7.3 Essential vs non-essential attributes

The attributes of a property specification are either essential or non-essential. The essential attributes being those that convey the intrinsic nature of the property. Two properties are considered identical when they have the same values for their essential attributes. Minor changes that do not change the meaning are allowed, that is, they do not require the creation of a new property.

[R0056] By their nature, **attributes** "Identifier", "Canonical identifier", "Label" and "Name" are essentials.

[R0057] The following changes require the creation of a new **property**:

- changing the meaning of the value of the **attribute** "Definition" (clarifying the meaning is not changing the meaning),
- changing the value of the **attribute** "Domain",
- changing the value of the **attribute** "Codomain",
- changing value of the **attribute** "Linguistic indicator",
- changing the value of the **attribute** "Content value rules".

[R0058] All other changes do not require the creation of a new **property**.

[R0059] Any ISO/IEC 19788 Part reusing **properties** from other parts can add non-essential property specification **attributes**.

7.4 Property specification template

Property specification	
Essential attributes	
Identifier (mandatory)	
Canonical identifier (conditional)	
Label (mandatory)	
Name (mandatory)	
Definition (mandatory)	
Domain (mandatory)	
Codomain (mandatory)	
Linguistic indicator (mandatory)	
Content value rules (conditional)	
Non-essential attributes	
Refines (optional)	
Example(s) (optional)	
Note(s) (optional)	
Best Practice(s) (optional)	
Status (optional)	

[R0060] If the value of the **attribute** "Content value rules" refer to a local **rule set** (that is, a **rule set** specific to the **property** under specification), the content value rules template (see 7.2.9.2) shall be provided just after the specification of the **property**.

[R0061] The value of the `P_ID` (or `DES_ID`) part for both the **attribute** "Identifier" and the **attribute** "Content value rules" shall be identical.

[R0062] The `Rule_Set_ID` of the template is the value of the **attribute** "Content value rules" of the **property** specification under consideration.

7.5 Aggregation of properties

Sometimes, it would be interesting to be able to specify that a property is an aggregation of other defined (pre-existing) properties. For example, a 'name' can be understood as an aggregation of 'family name' and 'given name'. Therefore, it is essential to offer the possibility to define this if needed.

A property *d* is an "aggregation" of a set of properties *S* if the properties of the set *S*, together, provide a finer description of the resource than the property *d*. For example, "name" would constitute an "aggregation" of the set {"family name", "given name"}.

Thus, "aggregation" would be a relation between a property and a set of properties.

It may be awkward to add an attribute to the specification of properties because the granularity refinement is not very common. Thus, this will be implemented using "aggregation rules".

An aggregation rule may be seen as a rule specifying how to obtain the "aggregated" property by means of the "aggregating" properties. The syntax and the semantics of this kind of rule depend on the codomain and content value rules of properties involved.

At the moment, the only possible aggregations are those where all properties involved ("aggregated" or "aggregating") have as domains "*literal*" and as content value rules the generic content value rule set MLR String (subclause 15.2).

[R0063] The syntax of an aggregation **rule** *r* is as follows:

r: d = d_1 + d_2 + ... + d_n where *d* is a canonical identifier of a **property**, and *S: {d_1, d_2 ... d_n}* is a finite set of canonical identifiers of **properties**.

d is said to be an aggregation of *S.*

[R0064] The semantics of the **rule** *r* is defined as follows:

The **content value** *de* of the **data element**, whose **property** is *d,* is equal to the concatenation of the values de_1, de_2...de_n for the properties d_1, d_2 ... d_n.

EXAMPLE `ISO_IEC_19788-12::P0800 = ISO_IEC_19788-5::DES0400 + ISO_IEC_19788-5::DES0300` (name in Part 12 is a concatenation of "given name" and "family name" from Part 5).

Aggregation rules will be provided just after the template defining the "aggregated" property.

The properties belonging to the set *S* shall have been defined before the aggregated property.

7.6 Example of a property specification

7.6.1 General

This example consists of the specification of a property accompanied by the description of its associated content value rule set.

7.6.2 Property specification

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-3:2010::DES0300
Canonical identifier	ISO_IEC_19788-3::DES0300
Label	format
Name	format
Definition	file format of the learning resource
Domain	ISO_IEC_19788-1::RC0002 *(Learning Resource)*
Codomain	*literal*
Linguistic indicator	non-linguistic
Content value rules	RS_DES0300
Non-essential attributes	
Refines	ISO_IEC_19788-2::DES0900 (*format*)
Example(s)	video/mpeg text/html
Note(s)	-
Best Practice(s)	-
Status	-

7.6.3 Associated content value rule set

Rule_Set_ID: RS_DES0300	
Rule_ID	Rule statement / Example(s) & Note(s)
01	Is a MIME type conforms to IETF RFC 6838
02	The maximum number of characters allowed for any value is 500.

8 MLR Vocabularies

8.1 General

Using the attribute "Content value rules" of the specification of a property, the values of a property can be constrained to a particular set of (identifier of) terms from a vocabulary.

When developing a document based on this document, the way to fully describe a vocabulary (i.e. to provide vocabulary specifications) is by filling up the specific template provided in subclause 8.3, one template per vocabulary.

The MLR vocabulary specification global view is given in Annex F, Figure F.4 .

The role of MLR Vocabularies in the overall vision of the MLR framework is given in Annex F, Figure F.1 .

8.2 Vocabulary specification attributes

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

— **Identifier** (an identifier for the vocabulary)

— **Canonical identifier** (a canonical identifier for the vocabulary)

— **Label** (one or more linguistically equivalent labels for the vocabulary)

— **Name** (one or more linguistically equivalent names for the vocabulary)

— **Open/closed** (information on whether the vocabulary is extensible or not)

— **Extension of** (the vocabulary being extended)

— **Set of terms** (the set of terms belonging to the vocabulary)

8.2.1 Attribute "Identifier"

8.2.1.1 General

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

8.2.1.2 Rules for the attribute "Identifier"

[R0065] The **obligation status** of this **attribute** is **mandatory**.

[R0066] The value for this **attribute** is a `VOC_Identifier` determined in accordance with the EBNF production rules in Annex B, Clause B.2.

[R0067] The value for the **attribute** "Identifier" is unique within each ISO/IEC 19788 Part (without regard to the publication year or type of published document (Standard, Corrigendum, Amendment, etc.).

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).

8.2.2 Attribute "Canonical identifier"

8.2.2.1 General

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

8.2.2.2 Rules for the attribute "Canonical identifier"

[R0068] 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.

[R0069] The value of this **attribute** is the **MLR canonical identifier** associated with the value of the **attribute** "Identifier".

8.2.3 Attribute "Label"

8.2.3.1 General

Vocabulary labels have the following properties:

— a vocabulary 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 vocabulary label, the language of each of them is indicated 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),

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

8.2.3.2 Rules for the attribute "Label"

[R0070] The **obligation status** of this **attribute** is **mandatory.**

[R0071] The value of this **attribute** is one or more linguistically equivalent **label**s.

8.2.4 Attribute "Name"

8.2.4.1 General

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

Vocabulary names have the following properties:

— a vocabulary 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 vocabulary name, the language of each of them is indicated 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 name of a vocabulary is usually constructed from the label of the vocabulary.

8.2.4.2 Rules for the attribute "Name"

[R0072] The **obligation status** of this **attribute** is **mandatory**.

[R0073] The value of this **attribute** is a **name**.

8.2.5 Attribute "Open/closed"

8.2.5.1 General

Used to indicate if the vocabulary is closed (it cannot be extended) or open (it can be extended).

8.2.5.2 Rules for the attribute "Open/closed"

[R0074] The **obligation status** of this **attribute** is **mandatory**.

[R0075] Possible values for this **attribute** are the following:

— *closed*: the **vocabulary** is closed and therefore cannot be extended

— *open*: the **vocabulary** is open and therefore can be extended

8.2.6 Attribute "Extension of"

8.2.6.1 General

For specific needs, it is sometimes necessary to add terms to an existing vocabulary. In order to preserve interoperability, instead of defining a new vocabulary, it was decided to offer the possibility of extending an existing vocabulary. If a vocabulary is an extension of another vocabulary this means that it contains all the terms of the vocabulary being extended plus the new terms it defines itself. This attribute is used to indicate if the vocabulary is an extension of another vocabulary. The vocabulary being extended shall have for its attribute "Open/closed" the value "*open*".

8.2.6.2 Rules for the attribute "Extension of"

[R0076] The **obligation status** of this **attribute** is **optional**.

[R0077] The value of this **attribute** is the **identifier** of a **vocabulary,** use **MLR canonical identifier** if available.

[R0078] In order to improve readability, it is possible to add the **label** of the **vocabulary** after the **identifier** (in italics) between parentheses.

8.2.7 Attribute "Set of terms"

8.2.7.1 General

This attribute is used to provide the terms of the vocabulary.

8.2.7.2 Rules for the attribute "Set of terms"

[R0079] The **obligation status** of this **attribute** is **mandatory**.

[R0080] The value of this **attribute** is the set of the **vocabulary** terms. If the current **vocabulary** is an extension of another **vocabulary** (indicated as the value of the attribute "Extension of") then the terms from the base **vocabulary** shall not be repeated here. This set is provided in the form of a table where each row corresponds to a term of the **vocabulary**. The columns of this table are as follows:

- Column 1: a language independent **identifier** per term: `Term_ID` (see Annex B). This local **identifier** is used with the value of the **attribute** "Identifier" of the vocabulary under specification (`VOC_Identifier`) to get a globally unique **identifier** for the term.
- Column 2: a list of **identifiers** of related terms, from the same **vocabulary** or the **vocabulary** being extended if relevant, with their relation to the current term between parenthesis. For terms in the base **vocabulary** (the **vocabulary** being extended), it is **mandatory** to use the globally unique **identifier** of the term, in its canonical form if possible. The possible relations[a] are: *broader*[b], narrower*, related, broaderTransitive* and *narrowerTransitive*

[a] These relations come from SKOS (see Reference [6]).

[b] Be careful with the direction of reading. If one indicates broader (X), it means that the term X is more generic than the current term.

- Column 3: a **label** for the term in the language of the document. Linguistic equivalents in other languages can be given, one label per language. Preferably, the **label** of a term begins with, for languages making this distinction, a lower-case letter. If there are space (s) in the **label** of a term, the letter following a space is a lower-case letter
- Column 4: a **definition** for the term in the language of the document.

8.3 Vocabulary specification template

Vocabulary specification	
Identifier (mandatory)	
Canonical identifier (conditional)	
Label (mandatory)	
Name (mandatory)	
Open/closed (mandatory)	
Extension of (optional)	

Vocabulary specification			
Set of terms (mandatory)			
Term_ID	Related terms	Label	Definition

8.4 User extensions of MLR vocabularies

Within an application profile or otherwise, it may be necessary to extend MLR vocabularies to satisfy the needs of an organization or community.

Consider the specification of a property P where:

a) The value of its attribute "Codomain" is "*literal* ", and

b) The value of its attribute "Content value rules" is the identifier of an MLR vocabulary V

We will consider two cases: (1) closed MLR vocabularies and, (2) open MLR vocabularies.

1) If the MLR vocabulary V is declared to be closed, then only designations from V can be used as a value for the property P.

2) If the MLR vocabulary V is declared to be open then any Vocabulary publisher can choose to (locally) extend the MLR vocabulary, using the vocabulary template above. The extended vocabulary designations should be semantically linked to the designation of the core MLR vocabulary V. To say it differently, the introduced terms shall be related to existing terms of the extended vocabulary using one of the possible relations between terms.

   Any designation from the core vocabulary or from the extended vocabulary can be used as value for the property P.

The extension of a vocabulary can be used under the same conditions as a vocabulary that is not an extension.

The extension of a vocabulary can also be extended under the same conditions as a vocabulary that is not an extension

8.5 Example of vocabulary specifications

8.5.1 General

These vocabularies are given here only as examples and are not intended to be used in practice. The vocabulary http://example.net/vocab/opportunity_types_extended (*Extended opportunity types*) is an extension of the vocabulary ISO_IEC_19788-63:2032::V0023 (*Opportunity types*).

8.5.2 Vocabulary "Opportunity types"

Vocabulary specification			
Identifier	ISO_IEC_19788-63:2032::V0023		
Canonical identifier	ISO_IEC_19788-63::VA0023		
Label	Opportunity types		
Name	Opportunity_types		
Open/closed	*open*		
Extension of	-		
Set of Terms			
TERM_ID	Related terms	Label	Definition

Vocabulary specification			
T010		lecture	An educational talk to an audience, especially students in a university.
T020		program	Coherent set or sequence of educational activities designed and organized to achieve pre-determined learning objectives or accomplish a specific set of educational tasks over a sustained period.
T030		event	A thing that happens or takes place.
T040	(broader) T030	conference	A formal meeting of people with a shared interest, typically one that takes place over several days.
T050	(broader) T030	congress	A formal meeting or series of meetings for discussion between delegates.
T060	(broader) T030	meeting	A planned occasion when people come together.
T080		workshop	A meeting at which a group of people engage in intensive discussion and activity on a particular subject or project.
T090		seminar	A class at university in which a topic is discussed by a teacher and a small group of students.
T100		excursion	A short journey or trip, especially one taken as a leisure activity.
T999		other	

8.5.3 Vocabulary "Extended opportunity types"

Vocabulary **Extended opportunity types**			
Identifier	http://example.net/vocab/opportunity_types_extended		
Canonical identifier	N/A		
Label	Extended opportunity types (eng)		
Name	Extended_opportunity_types (eng)		
Open/closed	*closed*		
Extension of	ISO_IEC_19788::V0023 (*Opportunity types*)		
Set of terms			
TERM_ID	Related terms	Label	Definition
T010	(broader) ISO_IEC_19788-63:2032::V0023:T030	unconference	a loosely structured conference emphasizing the informal exchange of information and ideas between participants, rather than following a conventionally structured programme of events.
T020	(broader) T010	BarCamp	un-invited, open un-conference

9 MLR Data elements

9.1 General

An MLR data element is a data element described by an MLR data element specification.

A data element is documented by filling up the specific template provided in subclause 9.3

The MLR data element global view is given in Annex F, Figure F.5 .

The role of MLR Data elements in the overall vision of the MLR framework is given in Annex F, Figure F.1 .

9.2 Data element specification attributes

The description of an MLR data element is provided by making explicit the values for the following attributes:

— **Property identifier** (a property identifier)

— **Subject** (the subject of the data element)

— **Content value** (the content of the data element)

— **Language code** (the language code for the content value)

The content of the attributes "Subject" and "Content Value" are related by the property denoted by the value of the attribute "Property identifier".

9.2.1 Attribute " Property identifier "

9.2.1.1 General

This attribute is used to provide a property identifier.

9.2.1.2 Rules for the attribute " Property identifier "

[R0081] The **obligation status** of this **attribute** is **mandatory**.

[R0082] The value of this **attribute** is the **identifier** of a **property**, use canonical identifier if available.

9.2.2 Attribute "Subject"

9.2.2.1 General

Used to provide the resource being described.

9.2.2.2 Rules for the attribute "Subject"

[R0083] The **obligation status** of this **attribute** is **mandatory**.

[R0084] The value of this **attribute** is the **identifier** of a **resource**.

[R0085] The **resource** being described shall belong to the **domain** of the **property** with **identifier** "Property identifier".

9.2.3 Attribute "Content value"

9.2.3.1 General

The actual information recorded as the content of the data element (its content value).

9.2.3.2 Rules for the attribute "Content value"

[R0086] The **obligation status** of this **attribute** is **mandatory**.

[R0087] The value of this **attribute** shall belong to the **codomain** of the **property**.

9.2.4 Attribute "Language code"

9.2.4.1 General

This attribute is used to provide the language code if necessary.

9.2.4.2 Rules for the attribute "Language code "

[R0088] The **obligation status** of this **attribute** is **conditional**.

Condition: When (and only when) the linguistic indicator value from the property specification of the **property** with identifier "Property identifier" is "*linguistic*".

[R0089] The value of this **attribute** is a language code from IETF BCP 47 using IETF RFC 5646.

9.3 Data element specification template

Data element	
Property identifier (mandatory)	
Subject (mandatory)	
Content value (mandatory)	
Language code (conditional)	

9.4 Examples of MLR data elements

9.4.1 EXAMPLE 1

Data element	
Property identifier	ISO_IEC_19788-2::DES0100
Subject	urn:isbn:978-1-4000-1952-6
Content value	Fodor's New Zealand 2009
Language code	en

9.4.2 EXAMPLE 2 (content value of the data element from a vocabulary)

Data element	
Property identifier	ISO_IEC_19788-99::P9999
Subject	urn:uuid:0f3e3d60-f5d2-11e1-8717-0002a5d5c51b
Content value	ISO_IEC_19788-63:2032::V0023:T080
Language code	N/A

10 MLR Records

10.1 General

This clause introduces one of the approaches taken in ISO/IEC 19788 (all parts) for the specification of a collection of data elements describing a resource, i.e., as a "MLR Record".

An MLR record may contain MLR data elements based on properties from any part of ISO/IEC 19788 (parts that define properties and parts that specify MLR Application Profiles) or properties specified by other Authorities or Communities (see Clause 11).

The MLR record global view is given in Annex F, Figure F.6 .

The role of MLR Records in the overall vision of the MLR framework is given in Annex F, Figure F.1 .

10.2 MLR record: Components

Each **MLR Record** has the following components:

— **Identifier** (an identifier for the MLR record)

— **Resource** (an identifier for the resource primarily described)

— **Content** (an ordered set of data elements describing the resource and associated resources)

10.2.1 Component "Identifier"

10.2.1.1 General

The value for this component is any identifier for the entity (MLR record) under consideration.

10.2.1.2 Rules for the component "Identifier"

[R0090] The **obligation status** of this component is **mandatory**.

[R0091] The value of this component is the **identifier** of an **MLR record**.

10.2.2 Component "Resource"

10.2.2.1 General

The value for this component is any identifier for the resource being described by the MLR record.

10.2.2.2 Rules for the component "Resource"

[R0092] The **obligation status** of this component is **mandatory**.

[R0093] The value of this component is the **identifier** of a **resource**.

10.2.3 Component "Content"

10.2.3.1 General

The value for this component is a set of MLR data elements describing the resource (and related resources) whose identifier is the content of the attribute "resource".

10.2.3.2 Rules for the component "Content"

[R0094] The **obligation status** of this component is **mandatory.**

[R0095] The value of this component is set of **MLR data elements**.

11 MLR Application profiles

11.1 General

An application profile is a defined structured collection of properties (from the various parts of ISO/IEC 19788 and other sources) chosen to satisfy the particular needs of a community or communities. For example, in a specific application profile, the use of some properties can be forced to be mandatory and

others to be optional. Vocabularies defined in ISO/IEC 19788 (all parts) can be extended or complemented with other community-relevant vocabularies. User extensions can be made this way.

It is possible in an application profile to define "global content value rule sets", i.e content value rule sets that are used for several properties. This, in order to facilitate the specification of an application profile (see Annex G).

The specification of an application profile is provided by completing a specific template (see 11.3).

The MLR application profile specification global view is given in Annex F, Figure F.7 .

The role of MLR Application profiles in the overall vision of the MLR framework is given in Annex F, Figure F.1 .

11.2 Application profile specification attributes

An **application profile** is described by providing values for the following application profile attributes:

— **Identifier** (an identifier for the application profile)

— **Canonical identifier** (a canonical identifier for the application profile)

— **Label** (one or more linguistically equivalent labels for the application profile)

— **Name** (one or more linguistically equivalent names for the application profile)

— **Description** (the purpose of the application profile being specified)

— **Extension of** (the application profile extended by the one under definition)

— **List of identifiers of templates for property constraints** (one template per resource class being a domain considered in the application profile)

11.2.1 Attribute "Identifier"

11.2.1.1 General

An identifier for the application profile.

11.2.1.2 Rules for the attribute "Identifier"

[R0096] The **obligation status** of this **attribute** is **mandatory**.

[R0097] The value for this **attribute** is an `AP_Identifier` determined in accordance with the EBNF production rules in Annex B, Clause B.2.

[R0098] The value for this **attribute** is unique within the ISO/IEC 19788 (all parts) identification scheme.

11.2.2 Attribute "Canonical identifier"

11.2.2.1 General

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

11.2.2.2 Rules for the attribute "Canonical identifier"

[R0099] 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.

[R0100] The value of this **attribute** is the **MLR canonical identifier** associated with the value of the **attribute** "Identifier".

11.2.3 Attribute "Label"

11.2.3.1 General

The label assigned to the application profile. Application profile labels have the following properties:

— an application profile label assigned in the part it belongs to shall be unique,

— an application profile 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 an application profile label, the language of each of them is indicated in parenthesis using a language code from ISO 639-3.

11.2.3.2 Rules for the attribute "Label"

[R0101] The **obligation status** of this **attribute** is **mandatory**.

[R0102] The value of this **attribute** is a **label**.

11.2.4 Attribute "Name"

11.2.4.1 General

An application profile name is a version of the application profile label that is valid as per the production rule for Name in the XML W3C recommendation, in the stated language.

The name assigned to the application profile. Application profile names have the following properties:

— an application profile name assigned in the part it belongs to shall be unique,

— an application profile 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 an application profile name, the language of each of them is indicated in parenthesis using a language code from ISO 639-3.

— the name of an application profile is usually constructed from the label of that application profile.

11.2.4.2 Rules for the attribute "Name"

[R0103] The **obligation status** of this **attribute** is **mandatory**.

[R0104] The value of this **attribute** is a **name**.

11.2.5 Attribute "Description"

11.2.5.1 General

The purpose of the application profile under consideration (in the language of the document).

11.2.5.2 Rules for the attribute "Description"

[R0105] The **obligation status** of this **attribute** is **mandatory**.

[R0106] The value of this **attribute** is a **string**.

11.2.6 Attribute "Extension of"

11.2.6.1 General

The application profile extended by the one under definition. An extension of an application profile can reuse MLR entities (e.g. resource classes, properties, vocabularies) defined in the document specifying the application profile being extended.

11.2.6.2 Rules for the attribute "Extension of"

[R0107] The **obligation status** of this **attribute** is **optional**.

[R0108] The value of this **attribute** is an **identifier** (in canonical form if possible)

11.2.7 Attribute "List of identifiers of templates for property constraints"

11.2.7.1 General

The list is composed of all the identifiers of the resource classes which are the domains of the properties used in this application profile.

11.2.7.2 Rules for the attribute "List of identifiers of templates for property constraints"

[R0109] The **obligation status** of this **attribute** is **mandatory**.

[R0110] The value of this **attribute** shall be a list of **identifiers** of templates for property constraints (`Property_Constraints_ID`), there shall be one template per **resource class** that is the **domain** of one or more **properties** considered in the **application profile**).

11.3 Application profile specification template

Application profile specification	
Identifier (mandatory)	
Canonical identifier (conditional)	
Label (mandatory)	
Name (mandatory)	
Description (mandatory)	
Extension of (optional)	
List of identifiers of templates for property constraints (Property_Constrants_ID), one template per resource class that is the domain of one or more properties considered in the application profile	

An AP consists of a set of properties judiciously chosen for the specific needs of a community. For each property present in an application profile, it is necessary to specify, for a given resource, if its use is mandatory or not and if it can be used once or more. The set of properties present in an AP and the constraints that apply to each of them are declared class by class. For each class, it is necessary to specify the properties whose domain is the class[7)] and which are present in the AP as well as the constraints that they obey.

11.4 Constraint on properties

For each property, it is compulsory to provide the following attributes:

— **Property identifier** (an identifier for the property, in canonical form if possible)

— **Presence type indicator** (indications of the property's obligation to be present)

— **Repeatability indicator** (indications on the possible repetition of the property)

— **Order indicator** (indications on the potential meaning of the order of occurrences)

— **Order semantic** (indications on the meaning of the order of occurrences)

The presence type and repeatability of properties is defined by filling a specific template (see 11.5), one template per class.

11.5 Constraint on properties template

11.5.1 Shape of the constraint on properties template

Property constraints (PC)				
PC identifier (mandatory)	< Property_Constraints_ID >			
Underlying domain (mandatory)	< Resource class identifier >			
Property identifier	**Presence type indicator**	**Repeatability indicator**	**Order indicator**	**Order semantic**

11.5.2 Content of the constraint on properties template

Label	**Description of content**	
Property identifier	The identifier of a property.	
	[R0111]	The **obligation status** of this **attribute** is **mandatory**.
	[R0112]	The value of this **attribute** is an **identifier** of a **property**, the canonical identifier is to be used if there is one available.
	[R0113]	In order to improve readability, it is possible to add the **label** of the **property** after the **identifier** (in italics) between parentheses.
Presence type indicator	This attribute indicates if a data element related to this property shall be present for each resource being described, if the presence of this property is subject to several conditions or if the property may be present or not in the description of the resource.	
	[R0114]	The **obligation status** of this **attribute** is **mandatory**.
	[R0115]	The possible values for this **attribute** are the following:

7) This formulation is a shortcut to "properties for which the attribute domain has as its value the identifier of the class under consideration."

Label	Description of content
	— *mandatory* — *conditional* (`code_ID`) — *optional* **[R0116]** If the value of this **attribute** is *conditional*, then the "Code Id" of conditions should be provided and the conditions should be expressed in a condition table.
Repeatability indicator	This attribute indicates if the property can be used only once or several times. "*Repeatable*" and "*non-repeatable*" is indicated with respect to a given subject (in an MLR data element). If a property is repeatable, when the number of occurrences (of the property) is limited, the maximum number of occurrences allowed shall be stated. **[R0117]** The **obligation status** of this **attribute** is **mandatory**. **[R0118]** The possible values for this **attribute** are the following: — *non-repeatable* — *repeatable* — *min..max* (where min and max are integers, min ≥0 and max -min ≥ 1) **[R0119]** For linguistic properties, the same content value using different languages can always be provided, even if the value of this attribute is "non-repeatable".
Order indicator	If the repeatability indicator has the value "*repeatable*", indication whether the order of the occurrences is meaningful. **[R0120]** The **obligation status** of this **attribute** is **conditional.** Condition: When (and only when) the value of the attribute "Repeatability indicator" is "*repeatable*" or "min..max" with max-min >1, then a value for this attribute shall be provided. **[R0121]** The possible values for that **attribute** are the following: — *ordered* — *unordered*
Order semantic	indications on the meaning of the order of occurrences **[R00122]** The **obligation status** of this **attribute** is **conditional.** Condition: When (and only when) the value of the **attribute** "order indicator" is "*ordered*" then a value for this **attribute** shall be provided. **[R00123]** The value of this **attribute** is an indication of the semantics of the order expressed by any means (sentence in the language of the document, mathematical expression…)

11.6 Example

The filled-up template in subclause 11.6.1 provides an example of a portion of the specification of an application profile, the one in subclause 11.6.2 provides an example of the specification of presence type and repeatability for properties with domain the class Resource and the one in subclause 11.6.3 an example of a conditions table.

11.6.1 Example of the specification of an application profile

Application profile specification	
Identifier	https://afnor.org/nf-z76041
Canonical identifier	-
Label	NoDEfr-1
Name	NoDEfr-1
Description	This document specifies the French description standard for education, part 1: description of resources (NoDEfr-1). This document is defined as an application profile of the international standard ISO/IEC 19788 Information technology - Learning, education and training - Metadata for learning resources. It is based on various parts of this standard (in particular parts 1, 2, 4, 5, 7, 8, 9 and 11). NOTE This is the English translation of the description of this application profile which is originally in French.
Extension of	-
List of identifiers of templates for property constraints	PC0001, PC0002, PC0003, PC0004, PC0005…

11.6.2 Example of the specification of property constraints

Property constraints (PC)				
PC identifier	PC0001			
Underlying domain	ISO_IEC_197881::RC0001*(Resource)*			
Property identifier	**Presence Type indicator**	**Repeatability indicator**	**Order indicator**	**Order semantic**
ISO_IEC_19788-2::DES0100 (*title*)	*mandatory*	*non-repeatable*	-	-
ISO_IEC_19788-2::DES0200 (*creator*)	*conditional* (C0001)	*repeatable*	*ordered*	In order of importance, most important first
ISO_IEC_19788-2::DES0300 (*subject*)	*conditional* (C0002)	*repeatable*	*ordered*	In order of importance, most important topic first
ISO_IEC_19788-3::DES0200 (*description*)	*conditional* (C0002)	*repeatable*	*unordered*	-
ISO_IEC_19788-2::DES0500 (*publisher*)	optional	*repeatable*	*ordered*	In order of importance, most important first
ISO_IEC_19788-2::DES0600 (*contributor*)	*conditional* (C0001)	*repeatable*	*ordered*	In order of importance, most important first
…				

11.6.3 Example of a Conditions Table

Code ID	**Conditions**
C0001	A resource from the underlying domain shall be the subject of property "creator" or of property "contributor".
C0002	A resource from the underlying domain shall be the subject of property "subject" or of property "description".

11.7 Ordered list of items

The present clause considers only the case where the container for the data elements conformant to the application profile is an MLR record obeying the rules of the application profile; other types of containers (e.g. in relation to RDF implementations) are not considered.

When a property has its "Order indicator" set to "ordered", the order relation is the order relation induced by the underlying order of the data elements in the MLR record.

11.8 Global content value rule sets

In the specification of properties appearing in an application profile, it may happen that several of them have the same values for their content value rule sets. In this case, in order to simplify the reading of the AP specification and to share these rules, it is possible to define "global content value rule sets".

11.9 Extension of an application profile

In some cases, the needs of a community are not completely covered by an application profile. Thus, instead of defining a new AP, it is necessary to allow the possibility of extending an existing application profile.

To support interoperability of resource descriptions, a metadata record conforming to an application profile shall also be conforming to its extensions.

Consider the application profile APEx**,** an extension of an application profile APS:

— APEx shall contain all the properties of APS and can add new ones

— APEx can reuse the global content value rule sets defined in APS for the properties it defines

— APEx can extend vocabularies used in APS

— For the value of the attribute "Presence type indicator" of properties from APS

  — If the value is *mandatory* in APS, then the value may be *mandatory* or *optional* in APEx.

  — If the value is *optional* in APS then the value shall be *optional* in APEx.

  — If the value is *conditional* in APS, then the value shall be *conditional* in APEx. The conditions can be changed but the conditions in APEx shall cover those of APS (said otherwise, what is true in APS shall remain true in APEx).

— For the value of the attribute "Repeatability indicator" of properties from APS:

  — If the value is *non-repeatable* in APS then the value may be *repeatable* or *non-repeatable* in APEx

  — If the value is *repeatable* in APS then the value shall be *repeatable* in APEx.

  — If the value is *minS..maxS* in APS then the value in APEx shall but *minEx..maxEx*, with minEx ≤ minS and maxEx ≥maxS.

— For the value of the attribute "order indicator" of properties from APS:

  — If the value is *ordered* in APS, then the value shall be *ordered* or *non-ordered* in APEx.

  — If the value is *non-ordered* in APS, then the value may be *non-ordered* in APEx.

— For the value of the attribute "Order semantic" of properties from APS:

  — If the value for the attribute indicator is *ordered* in APS and *ordered* in APEx, APEx can relax APS's conditions but not restrict them.

— The constraints of the APEx profile have priority over the constraints of the APS profile.

11.10 Documents specifying application profiles

Documents specifying application profiles can be either parts of the ISO/IEC 19788 series (e.g. 19788-3) or other documents (e.g. Normetic, a Quebec application profile or NodeFR-1, a French application profile). The definition of an application profile is done to meet the specific needs of a community or a set of communities. Documents specifying application profiles make it possible to impose additional requirements in order to accommodate community requirements. In a document of this type, it may be necessary to define new MLR entities such as resource classes, properties, vocabularies, etc. and the new MLR entities may reference existing MLR entities.

An MLR entity references another MLR entity when:

— a resource class inherits from another resource class,

— a property refines another property,

— a vocabulary extends another vocabulary.

[R0124] In a document specifying an **application profile**, **MLR entities** referenced in the document should be either an **MLR entity** defined in any type 1 part of ISO/IEC 19788, entities (properties, resource classes, etc.) defined in another document or an **MLR entity** defined in the document.

[R0125] If the **application profile** under development is an extension of another **application profile**, then the **MLR entities** defined in the **application profile** being extended can be referenced.

[R0126] **MLR entities** defined in an **application profile** may only be reused in extensions of the **application profile**.

12 Documents based on this document

12.1 New parts of the ISO/IEC 19788 series

Annex I gives the underlying principles of the ISO/IEC 19788 series.

New parts of the ISO/IEC 19788 series should conform to Annex D and follow the rules set out therein.

12.2 Documents beyond ISO/IEC 19788 based on this standard

12.2.1 Documents specifying application profiles

Application profiles related to LET are intended to be specified based on all parts of the ISO/IEC 19788 series. These community specific application profiles (AP) are not intended to become parts of 19788. However, the community specifying an AP may not find in the ISO/IEC 19788 series the whole sets of MLR entities (resource classes, properties, vocabularies, etc.) it needs. Therefore, it will have to define them in the document specifying the AP. For this kind of document, Annex G can be used.

For application profiles outside LET, Annex G can be used.

12.2.2 Documents specifying MLR entities

This document is intended to be used to specify how to describe resources regardless of their area. For that kind of document, it is recommended to follow the principles contained in Annex H.

13 Generic resource classes and LET related classes

13.1 General

The main goal of this clause is to make available high-level resource classes that may be reused in documents based on this document either directly or through inheritance (subclass of). These classes are defined in accordance with Annex E, Figure E.1.

13.2 Generic resource classes

13.2.1 Class "Resource"

Resource class specification	
Identifier	ISO_IEC_19788-1:2024::RC0001
Canonical identifier	ISO_IEC_19788-1::RC0001
Label	Resource
Name	Resource
Definition	Instances of this class are the entities that can be identified and referenced by an unambiguous and stable identifier in a recognized identification system
Subclass of	-
Note	1. This class is the same as the class ISO_IEC_19788-1:2010::RC001 defined in the document ISO/IEC 19788-1:2011. 2. The attribute "Canonical identifier" has been added. 3. The definition has been reformulated.

13.2.2 Class "Information Resource"

Resource Class Specification	
Identifier	ISO_IEC_19788-1:2024::RC0004
Canonical identifier	ISO_IEC_19788-1::RC0004
Label	Information Resource
Name	InformationResource
Definition	Instances of this class are the resources which have the property that all of their essential characteristics can be conveyed in a message
Subclass of	ISO_IEC_19788-1::RC0001 (*Resource*)
Note	4. This class is the same as the class ISO_IEC_19788-1:0999::RC004 defined in the document ISO/IEC 19788-8:2015 (Annex E). 5. The attribute "Canonical identifier" has been added. 6. The definition has been reformulated.

13.2.3 Class "Web Resource"

Resource class specification	
Identifier	ISO_IEC_19788-1:2024::RC0005
Canonical identifier	ISO_IEC_19788-1::RC0005
Label	Web Resource
Name	WebResource
Definition	Instances of this class are the information resources that "lives on the World Wide Web"
Subclass of	ISO_IEC_19788-1::RC0004 (*Information Resource*) ISO_IEC_19788-1::RC0006 (*Representation*)
Note	1. This class is the same as the class ISO_IEC_19788-1:0999::RC005 defined in the document ISO/IEC 19788-8:2015 (Annex E). 2. The attribute "Canonical identifier" has been added. 3. The definition has been reformulated. 4. A subclass has been added for the attribute "Subclass of"

13.2.4 Class "Representation"

Resource class specification	
Identifier	ISO_IEC_19788-1:2024::RC0006
Canonical identifier	ISO_IEC_19788-1::RC0006
Label	Representation
Name	Representation
Definition	Instances of this class are the resources that encodes information about the state of the resource
Subclass of	ISO_IEC_19788-1::RC0001 (*Resource*)
Note	1. An instance of the resource class Representation is a representation of itself. 2. This class is the same as the class ISO_IEC_19788-1:0999::RC006 defined in the document ISO/IEC 19788-8:2015 (Annex E). 3. The attribute "Canonical identifier" has been added. 4. The definition has been reformulated.

13.3 Other resource classes

13.3.1 Class "Person"

Resource class specification	
Identifier	ISO_IEC_19788-1:2024::RC0003
Canonical identifier	ISO_IEC_19788-1::RC0003
Label	Person
Name	Person
Definition	Instances of this class are the entities which are a natural or legal person
Subclass of	ISO_IEC_19788-1::RC0001 (*Resource*)
Note	1. This class is the same as the class ISO_IEC_19788-1:2010::RC003 defined in the document ISO/IEC 19788-1:2011. 2. The attribute "Canonical identifier" has been added. 3. The definition has been reformulated.

13.3.2 Class "Learning Resource"

Resource class specification	
Identifier	ISO_IEC_19788-1:2024::RC0002
Canonical identifier	ISO_IEC_19788-1::RC0002
Label	Learning Resource
Name	LearningResource
Definition	Instances of this class are the resources that can be used for learning, education and training
Subclass of	ISO_IEC_19788-1::RC0001 (*Resource*)
Note	1. This class is the same as the class ISO_IEC_19788-1:2010::RC002 defined in the document ISO/IEC 19788-1:2011. 2. The attribute "Canonical identifier" has been added. 3. The definition has been reformulated.

14 Generic properties

14.1 General

The main goal of this clause is to make available high-level properties that may be reused in documents based on this document either directly or through property inheritance (refinements). These properties are defined in accordance with Annex E, Figure E.1.

14.2 Properties whose domain is class "Resource"

14.2.1 Property "has Description"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0400
Canonical identifier	ISO_IEC_19788-1::DES0400
Label	has description
Name	hasDescription
Definition	information resource describing the resource
Domain	ISO_IEC_19788-1::RC0001 (*Resource*)
Codomain	ISO_IEC_19788-1::RC0004 (*Information Resource*)
Linguistic indicator	*non-linguistic*
Content value rules	N/A
Non-essential attributes	
Refines	-
Example(s)	-
Note(s)	1. Property ISO_IEC_19788-1::DES0400 (has description) is the inverse of property ISO_IEC_19788-1::DES0500 (describes). 2. The information resource describing the resource constitutes metadata for the resource. 3. This property is the same as the property ISO_IEC_19788-1:0999::DES0400 defined in the document ISO/IEC 19788-8:2015 (Annex E). 4. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.2.2 Property "name"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0100
Canonical identifier	ISO_IEC_19788-1::DES0100
Label	name
Name	name
Definition	IRI denoting the resource
Domain	ISO_IEC_19788-1::RC0001 (*Resource)*
Codomain	*literal*
Linguistic indicator	*non-linguistic*
Content value rules	ISO_IEC_19788-1::PRS0005 (*IRI*)
Non-essential attributes	
Refines	-

Property specification	
Example(s)	1. http://www.example.net/medatata.html 2. urn:iso:std:iso-iec:19788:-3:ed-1:clause:5 3. urn:uuid: 5e185100-bcc4-11e2-8ad7-0002a5d5c51b
Note(s)	1. An HTTP IRI is the preferred form of IRI. 2. This property is the same as the property ISO_IEC_19788-1:0999::DES0100 defined in the document ISO/IEC 19788-8:2015 (Annex E). 3. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.3 Properties whose domain is class "Information Resource"

14.3.1 Property "describes"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0500
Canonical identifier	ISO_IEC_19788-1::DES0500
Label	describes
Name	describes
Definition	resource described by the information resource
Domain	ISO_IEC_19788-1::RC0004 *(Information Resource)*
Codomain	ISO_IEC_19788-1::RC0001 *(Resource)*
Linguistic indicator	*non-linguistic*
Content value rules	N/A
Non-essential attributes	
Refines	-
Example(s)	-
Note(s)	1. Property ISO_IEC_19788-1::DES0500 (describes) is the inverse of property ISO_IEC_19788-1::DES0400 (hasDescription). 2. If the resource name is an HTTP IRI, then a description of the resource may possibly be obtained by dereferencing that IRI if the HTTP response status code is "303 See Other" and then, dereferencing the IRI returned by the server (see Reference [1]). 3. This property is the same as the property ISO_IEC_19788-1:0999::DES0500 defined in the document ISO/IEC 19788-8:2015 (Annex E). 4. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.3.2 Property "has representation"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0200
Canonical identifier	ISO_IEC_19788-1::DES0200
Label	has representation
Name	hasRepresentation
Definition	representation of the information resource
Domain	ISO_IEC_19788-1::RC0004 *(Information Resource)*
Codomain	ISO_IEC_19788-1::RC0006 *(Representation)*
Linguistic indicator	*non-linguistic*
Content value rules	N/A
Non-essential attributes	
Refines	-
Example(s)	-
Note(s)	1. One information resource may have more than one representation. 2. Property ISO_IEC_19788-1::DES0200 (has representation) is the inverse of property ISO_IEC_19788-1::DES0300 (represents). 3. This property is the same as the property ISO_IEC_19788-1:0999::DES0200 defined in the document ISO/IEC 19788-8:2015 (Annex E). 4. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.4 Property whose domain is class "Web Resource"

14.4.1 Property "location"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0700
Canonical identifier	ISO_IEC_19788-1::DES0700
Label	location
Name	location
Definition	address on the World Wide Web where a representation of the Web resource can be retrieved
Domain	ISO_IEC_19788-1::RC0005 *(Web Resource)*
Codomain	*literal*
Linguistic indicator	*non-linguistic*
Content value rules	ISO_IEC_19788-1::PRS0006 *(HTTP IRI)*
Non-essential attributes	
Refines	-
Example(s)	-

Property specification	
Note(s)	1. For a Web resource, the name of the resource and the location of the resource may be different IRIs. 2. If the Web resource name is an HTTP IRI and dereferencing the IRI returns a HTTP response status code of '200 OK', then the IRI is the 'location' value of the Web resource[1]. 3. This property is the same as the property ISO_IEC_19788-1:0999::DES0700 defined in the document ISO/IEC 19788-8:2015 (Annex E). 4. The attribute "Canonical identifier" has been added. 5. The definition has been reformulated.
Best practice(s)	-
Status	-

14.5 Properties whose domain is class "Representation"

14.5.1 Property "character encoding"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0800
Canonical identifier	ISO_IEC_19788-1::DES0800
Label	character encoding
Name	characterEncoding
Definition	mapping of (abstract) characters from a character repertoire (e.g. ISO/IEC 10646 UCS or Unicode) to bytes used
Domain	ISO_IEC_19788-1::RC0006 (*Representation*)
Codomain	*literal*
Linguistic indicator	*non-linguistic*
Content value rules	ISO_IEC_19788-1::PRS0001 (*MLR STRING*)
Non-essential attributes	
Refines	-
Example(s)	1. US-ASCII 2. UTF-8 3. UTF-16 4. ISO/IEC 8859-1
Note(s)	1. This property is the same as the property ISO_IEC_19788-1:0999::DES0800 defined in the document ISO/IEC 19788-8:2015 (Annex E). 2. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.5.2 Property "media type"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0900
Canonical identifier	ISO_IEC_19788-1::DES0900
Label	media type
Name	mediaType
Definition	media type of the representation
Domain	ISO_IEC_19788-1::RC0006 *(Representation)*
Codomain	*literal*
Linguistic indicator	*non-linguistic*
Content value rules	ISO_IEC_19788-1::PRS0007 (*MEDIA TYPE*)
Non-essential attributes	
Refines	-
Example(s)	1. image/jpeg 2. text/html 3. text/turtle 4. application/json 5. application/vnd.ms-powerpoint
Note(s)	1. This property is the same as the property ISO_IEC_19788-1:0999::DES0900 defined in the document ISO/IEC 19788-8:2015 (Annex E). 2. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.5.3 Property "refers to"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0600
Canonical identifier	ISO_IEC_19788-1::DES0600
Label	refers to
Name	refersTo
Definition	resource related to the representation in the following way: there exists an information resource that is a description of the resource and 'has representation' the representation
Domain	ISO_IEC_19788-1::RC0006 (*Representation*)
Codomain	ISO_IEC_19788-1::RC0001 (*Resource*)
Linguistic indicator	*non-linguistic*
Content value rules	N/A
Non-essential attributes	
Refines	-
Example(s)	-

Property specification	
Note(s)	1. Let x ∈ Representation and y ∈ Resource: x "refers to" y if and only if ∃ z ∈ Information Resource such that z "describes" y and z "has representation" x. 2. This property is the same as the property ISO_IEC_19788-1:0999::DES0600 defined in the document ISO/IEC 19788-8:2015 (Annex E). 3. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

14.5.4 Property "represents"

Property specification	
Essential attributes	
Identifier	ISO_IEC_19788-1:2024::DES0300
Canonical identifier	ISO_IEC_19788-1::DES0300
Label	represents
Name	represents
Definition	information resource represented by the representation
Domain	ISO_IEC_19788-1::RC0006 *(Representation)*
Codomain	ISO_IEC_19788-1::RC0004 *(Information Resource)*
Linguistic indicator	*non-linguistic*
Content value rules	N/A
Non-essential attributes	
Refines	-
Example(s)	-
Note(s)	1. Property ISO_IEC_19788-1::DES0300 (represents) is the inverse of property ISO_IEC_19788-1::DES0200 (has representation). 2. This property is the same as the property ISO_IEC_19788-1:0999::DES0300 defined in the document ISO/IEC 19788-8:2015 (Annex E). 3. The attribute "Canonical identifier" has been added.
Best practice(s)	-
Status	-

15 Generic content value rule sets

15.1 General

This clause describes generic content value rule sets that may be reused to alleviate the need to define rule sets in documents based on this document.

Generic rule sets MLR STRING (see 15.2), DATE (see 15.5), DATE & TIME (see 15.6) are updated versions (canonical identifiers have been added) of those defined in ISO/IEC 19788-1:2011.

The rule set DURATION (ISO_IEC_19788-1:2011::PRS0004) is obsoleted, it has been replaced by DURATION (see 15.7) and TIME INTERVAL (see 15.11).

Generic rule sets IRI (see 15.9), HTTP IRI (see 15.8) and MEDIA TYPE (see 15.10) are updated versions of those defined in ISO/IEC 19788-5:2015.

The other generic rule sets are new with this edition.

15.2 MLR String

Identifier: ISO_IEC_19788-1: 2024::PRS0001 Canonical Identifier: ISO_IEC_19788-1::PRS0001 Label: MLR STRING Name: MLR_STRING	
Rule_ID	Rule statement, Example(s) and Note(s)
01	Sequence of characters that are members of the set of elements of ISO/IEC 10646 and are used as graphic characters including digits (numbers), letters, ideograms, glyphs, signs, special characters, etc., (but not control characters).
02	An MLR string does not include characters in ISO/IEC 10646 with code points from U+D800 through U+DFFF, i.e., control characters.
03	If one or more control characters are required for use in a part of ISO/IEC 19788 this shall be specified in that Part.

15.3 BCP 47

Identifier: ISO_IEC_19788-1: 2024::PRS0010 Canonical Identifier: ISO_IEC_19788-1::PRS0010 Label: BC P47 Name: BCP47	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string conforms to IETF BCP 47 "Tags for Identifying Languages" using IETF RFC 5646.

15.4 Boolean

Identifier: ISO_IEC_19788-1:2024::PRS0009 Canonical Identifier: ISO_IEC_19788-1::PRS0009 Label: BOOLEAN Name: BOOLEAN	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string of the form "0" or "1" excluding any other possible value.

15.5 Date

Identifier: ISO_IEC_19788-1:2024::PRS0002 Canonical Identifier: ISO_IEC_19788-1::PRS0002 Label: DATE Name: DATE	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed using ISO 8601-1:2019, subclause 5.2 Date.
02	Both the basic format and the extended format can be used.
03	Meaning is provided by ISO 8601-1:2019.
	Note: the examples below are from ISO 8601-1:2019. EXAMPLE 1 1985-04-12 EXAMPLE 2 1985-102 EXAMPLE 3 1985-W15-5

15.6 Date & Time

Identifier: ISO_IEC_19788-1: 2024::PRS0003 Canonical Identifier: ISO_IEC_19788-1::PRS0003 Label: DATE & TIME Name: DATE_TIME	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed using ISO 8601-1:2019, subclause 5.4 Date and Time of day.
02	Both the basic format and the extended format can be used.
	Note: the examples below are from ISO 8601-1:2019. EXAMPLE 1 1985-04-12T10:15 EXAMPLE 2 1985-W15-5T10:15+04 EXAMPLE 3 1985W155T1015+0400

15.7 Duration

Identifier: ISO_IEC_19788-1: 2024::PRS0011 Canonical Identifier: ISO_IEC_19788-1::PRS0011 Label: DURATION Name: DURATION	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed using ISO 8601-1:2019, subclause 5.5.2. The examples below are from ISO 8601-1:2019.
02	Both the basic format and the extended format can be used.
	Note: The example below are from ISO 8601-1:2019. EXAMPLE P2Y5M3DT12H30M5S represents a duration of "two years, five months, three days, twelve hours, thirty minutes, and five seconds"

15.8 HTTP IRI

Identifier: ISO_IEC_19788-1:2024::PRS0006 Canonical Identifier: ISO_IEC_19788-1::PRS0006 Label: HTTP IRI Name: HTTP_IRI	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed using IETF RFC 3987 and using the HTTP scheme.
	Note: This rule set is the same as the rule set ISO_IEC_19788-1:0999:: PRS0006 defined in the document ISO/IEC 19788-8:2015, Annex E.

15.9 IRI

Rules for the representation of Internationalized Resource Identifiers (IRI).

Identifier: ISO_IEC_19788-1:2024::PRS0005 Canonical Identifier: ISO_IEC_19788-1::PRS0005 Label: IRI Name: IRI	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed using IETF RFC 3987.
	NOTE: This rule set is the same as the rule set ISO_IEC_19788-1:0999:: PRS0005 defined in the document ISO/IEC 19788-8:2015, Annex E.

15.10 MEDIA TYPE

Identifier: ISO_IEC_19788-1:2024::PRS0007 Canonical Identifier: ISO_IEC_19788-1::PRS0007 Label: MEDIA TYPE Name: MEDIA_TYPE	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string of the form "type/subtype" as registered by IANA and conform to IETF RFC 6838.
	NOTE: This rule set is the same as the rule set ISO_IEC_19788-1:0999:: PRS0007 defined in the document ISO/IEC 19788-8:2015, Annex E.

15.11 Time interval

Identifier: ISO_IEC_19788-1:2024::PRS0008 Canonical Identifier: ISO_IEC_19788-1::PRS0008 Label: TIME INTERVAL Name: TIME_INTERVAL	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed using ISO 8601-1:2019, Part 1, subclause 5.5.3.1 and subclause 5.5.3.2.
02	Both the basic format and the extended format can be used.
03	Meaning provided by ISO 8601-1:2019.
	Note: The examples below are from ISO 8601-1:2019. EXAMPLE1 19850412T232050/P1Y2M15DT12H30M0S EXAMPLE2 1985-04-12T23:20:50/P1Y2M15DT12H30M0S The two previous examples represent a time interval of 1 year, 2 months, 15 days, 12 hours and 30 minutes, beginning on 12 April 1985 at 20 minutes and 50 seconds past 23 hours local time. (from ISO 8601-1:2019) EXAMPLE3 2007-03-01T13:00:00Z/2008-05-11T15:30:00Z This example represents a time interval for which the beginning and the end of the interval are given (UTC time of day).

15.12 JSON string.

Identifier: ISO_IEC_19788-1:2024::PRS0012 Canonical Identifier: ISO_IEC_19788-1::PRS0012 Label: JSON STRING Name: JSON_STRING	
Rule_ID	Rule statement, Example(s) and Note(s)
01	A string constructed according to the JSON Grammar using IETF RFC 8259, section 2 and following sections.

	EXAMPLE 1:
	`{"ISO_IEC_19788-1::RC0001": {`
	`  "label": {`
	`  "en": "Resource",`
	`  "fr": "Ressource",`
	`  "ru": "Ресурс"`
	`  },`
	`  "name": {`
	`  "en": "Resource",`
	`  "fr": "Ressource",`
	`  "ru": "Ресурс"`
	`  }`
	`  }`
	`}`
	EXAMPLE 2:
	`{`
	`  "technical": [`
	`  {`
	`  "orComposite": {`
	`  "type": {"source": "LOMv1.0", "value": "operating system"},`
	`  "name": {"source": "LOMv1.0", "value": "unix"},`
	`  "minimumValue": 2.7182,`
	`  "maximumValue": 3.1415`
	`  }`
	`  },`
	`  {`
	`  "orComposite": {`
	`  "type": {"source": "LOMv1.0", "value": "operating system"},`
	`  "name": {"source": "LOMv1.0", "value": "multi-os"},`
	`  "minimumValue": 17,`
	`  "maximumValue": null`
	`  }`
	`  }`
	`  ]`
	`}`

Annex A
(normative)

Language equivalents for names and labels

Language equivalents for names and labels of generic resource classes, generic properties and generic content value rule sets are available at https://standards.iso.org/iso-iec/19788/-1/ed-2/en in JSON.

Annex B
(normative)

MLR identifiers

B.1 General

The syntax of identifiers used in ISO/IEC 19788 is expressed using production rules. Each rule in the grammar defines one symbol, in the form

symbol ::= expression

The expressions on the right-hand side of each production rule are written using a simple EBNF notation.

B.2 Extended Backus-Naur Form notation

This grammar makes use of the following notations:

(*expression*)	The content of the parenthesis is treated as a unit. This unit may carry a suffix operator: ?, + or *.
#xNNNN	NNNN is a hexadecimal integer, and the expression represents the character at the indicated hexadecimal integer position in the Universal Multiple-Octet Coded Character Set as specified in ISO/IEC 10646.
"string"	Represents a literal string matching that given inside the double quotes.
'string'	Represents a literal string matching that given inside the single quotes.
A?	A or nothing.
A+	One or more occurrences of A.
A*	Zero or more occurrences of A.
A B	A followed by B.
A | B	A or B.
A – B	Represents any string that matches A but does not match B.
[a-zA-Z]	Represents any character in the range(s) indicated (inclusive)
[#xNNNN-#xNNN]	Represents any character with a code value in the range indicated (inclusive)
/* text */	The text between (and including the /* and */) is a comment

B.3 Production rules for ISO/IEC 19788 identifiers

[1] `Standard_ID ::= ("ISO" | "IEC" | "ISO_IEC") "_" DocNumber`
`("-" PartNumber)? ":" Year`
`(": AMD." DecNumber ":" Year)?`
`(": COR." DecNumber ":" Year)?`
`/* Examples: ISO_IEC_19788-1:2011`
`ISO_9999:2099:COR.37:2102`
`ISO_IEC_4932:2021` (AfA core terms)
`ISO_IEC_19788-2:2011:AMD.1:2014 */`

[2] `Standard_Canonical_ID ::= ("ISO" | "IEC" | "ISO_IEC") "_"`
`DocNumber ("-" PartNumber)?`
`/* Examples: ISO_IEC_19788-1`
`ISO_9999`
`ISO_IEC_4932` (AfA core terms)
`ISO_IEC_19788-2 */`

[3] `PartNumber ::= [1-999]` /* Part of the standard */

[4] `DocNumber ::= decNumber` /* Reference number assigned to the document by ISO, or IEC */

[5] `Year ::= [2010-2100]` /* Year of publication of the standard */

[6] `MLR_Identifier ::= Standard_ID "::" MLR_ID`

[7] `MLR_ID ::= DES_ID` (deprecated) `| P_ID | RC_ID | PRS_ID |`
`AP_ID | Vocabulary_ID | Vocabulary_Term_ID`
/* Local identifier, within a document or part of standard */
/* Use of `DES_ID` is deprecated, use `P_ID` instead */

[8] `DES_Identifier ::= Standard_ID "::" DES_ID |`
`EXTERNAL_ID "::" DES_ID`
/* Use of `DES_Identifer` is deprecated, use `P_Identifier` instead */

[9] `DES_ID ::= "DES" seqN4`
/* DES stands for "Data_Element_Specification" */

[10] `P_Identifier ::= Standard_ID "::" P_ID |`
`EXTERNAL_ID "::" P_ID`

[11] `P_ID ::= "P" seqN4`

/* P_ID stands for "Property_ID" */

[12] RC_Identifier ::= Standard_ID "::" RC_ID |
EXTERNAL_ID "::" RC_ID

[13] RC_ID ::= "RC" seqN4

/* RC_ID stands for "Resource_class__ID" */

[14] PRS_Identifier ::= Standard_ID "::" PRS_ID |
EXTERNAL_ID "::" PRS_ID

[15] PRS_ID ::= "PRS" seqN4

/* PRS_ID stands for "Predefined_rule_set__ID" */

[16] AP_Identifier ::= Standard_ID "::" AP_ID |
EXTERNAL_ID "::" AP_ID

[17] AP_ID ::= "AP" seqN4

/* AP_ID stands for "Application_profile__ID" */

[18] Property_Constraints_ID ::= "PC" seqN4

[19] Code_ID ::= "C"seqN4

[20] VOC_Identifier ::= Standard_ID "::" Vocabulary_ID |
EXTERNAL_ID "::" Vocabulary_ID

[21] Vocabulary_ID ::= "V" seqN4

[22] VOC_TERM_Identifier ::= Standard_ID "::" Vocabulary_Term_ID |
EXTERNAL_ID "::" Vocabulary_Term_ID

[23] Vocabulary_Term_ID ::= Vocabulary_ID "#" Term_ID |
Vocabulary_ID ":" Term_ID

[24] Term_ID ::= "T" seqN3

/* In increasing order, start from "000" or "001". "999" is
reserved for "Not Applicable (N/A)" when used. */

[25] EXTERNAL_ID ::= < A string not containing the substring "::" >

/* Examples: NoDEfr-1, GTN-Québec:Normetic */

[26] IRI ::= < A string constructed according to
IETF RFC 3987 >

[27] Rule_ID ::= "R" seqN4 | seqN2

/* Within a document or part of a standard, rules should be

numbered in increasing order starting with "0001" */

/* Numbers between "9000" and "9999" reserved for examples */

/* The form seqN2 shall be used only for predefined rule sets and for

rules from a rule set specifying admissible content values */

[28] `Rule_Set_ID ::= "RS" seqN4 | "RS_" DES_ID | "RS_" P_ID`

/* Within a Part of the ISO/IEC 19788 series, rule sets – other than the ones used for specifying content value rules

/* -- should be numbered (if numbered) in increasing order starting with "0001"*/

/* The form "RS_" DES_ID or "RS_" P_ID is reserved for the rule sets specifying lexical

spaces and then the smallest containing subclause shall contain only one such rule set */

[29] `decNumber ::= [1-9] ([0-9])*`

[30] `seqN4 ::= [0-9] [0-9] [0-9] [0-9]`

[31] `seqN3 ::= [0-9] [0-9] [0-9]`

[32] `seqN2 ::= [0-9] [0-9]`

Annex C
(normative)

MLR canonical identifiers and additional constraints on MLR specifications

C.1 General

Canonical identifiers for MLR entities (properties, resource classes, predefined rule sets, application profiles, vocabularies and vocabulary terms) 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, that is its latest version.

The standard canonical identifier (`Standard_Canonical_ID`) is obtained from the `Standard_ID` part of the MLR identifier by dropping the portion of the identifier after the optional part number (`PartNumber`).

The production rule for an MLR canonical identifier is:

```
Standard_Canonical_ID ::= ("ISO" | "IEC" | "ISO_IEC") "_"
                          DocNumber ("-" PartNumber)?
```

where the values for the right part of the rule are taken from those of the MLR identifier.

Examples: the standard canonical identifier part of all the following MLR identifiers

`ISO_IEC_19788-2:2011::DES0100` (title),

`ISO_IEC_19788-2:2011:AMD.1:2016::DES1600` (creator),

`ISO_IEC_19788-2:2011:AMD.1:2016::RC0001` (Rights Statement)

is `ISO_IEC_19788-2`.

C.2 Canonical identifiers for properties (Ps)

C.2.1 General

An MLR identifier for a property (P) from a Standard is composed of two parts: A first part identifying the Standard document and the second part providing a local identifier for the property in the context of the document, that is of the form:

`Standard_ID "::" P_ID` (a `P_Identifier`, MLR identifier case)

EXAMPLE `ISO_IEC_4932:2024::P0001` (accessibility summary)

The property identifiers (`P_Identifier`) are globally unique, but the local property identifiers (`P_ID`) are not.

Consider the property identifier "`ISO_IEC_4932:2024::P0001`" as an example: if in the second edition of ISO/IEC 4932 or in an amendment or corrigendum to ISO/IEC 4932:2024 we provide a property with the same essential attributes, we get two properties with different global identifiers (`P_Identifier`) but with the same "essence" than `ISO_IEC_4932:2024::P0001`. Each of the identifiers (with same essential attributes)

provide a description, representation or version of the conceptual Ps that captures the "essence" common to all those Ps.

Before we provide (canonical) identifiers for such a property, we need to state constraints that need to hold for the choice of local identifiers for properties.

C.2.2 Rules for property local identifiers (P_ID) and names

[R0127] Two properties that come from instances of a part of ISO/IEC 19788 (first edition, new edition to an existing edition, amendment to an existing edition, corrigendum to an existing edition) have the same local identifier (`P_ID`) if and only if they share all of their essential attributes.

[R0128] For any parts of ISO/IEC 19788, property local identifiers (`P_ID`) of obsoleted properties are never reused.

[R0129] In any given language, for any property the triple (name, name of domain, name of codomain) associated with the property shall constitute a global appellation (within ISO/IEC 19788, all parts) of the property (the primary global identifier being provided by the property specification attribute "identifier").

C.2.3 Global identifier for conceptual Ps

To get the canonical identifier for any MLR property, first the canonical standard identifier is extracted from its identifier, then "`::`" and its local property (`P_ID`) identifier are concatenated.

EXAMPLE `ISO_IEC_19788-99::P0100` is the canonical identifier of all the following Ps:

`ISO_IEC_19788-99:2081::P0100` (first edition of the ISO/IEC 19788-99)

`ISO_IEC_19788-99:2085::P0100` (second edition of the ISO/IEC 19788-99)

`ISO_IEC_19788-99:2085:COR.1:2086::P0100` (corrigendum to the second edition)

`ISO_IEC_19788-99:2085:AMD.1:2087::P0100` (amendment to the second edition)

`ISO_IEC_19788-99:2085:AMD.1:2087:COR.1:2089::P0100` (corrigendum to an amendment to the second edition)

C.3 Canonical identifiers for resource classes (RCs)

C.3.1 General

An MLR identifier for a resource class (RC) from an ISO/IEC 19788 Part is composed of two parts: A first part identifying the Standard document and the second part providing a local identifier for the resource class in the context of the document, that is of the form:

`Standard_ID "::" RC_ID` (an `RC_Identifier`, MLR identifier case)

EXAMPLES `ISO_IEC_19788-1:2011::RC0002` (Learning Resource)

`ISO_IEC_19788-2:2011:AMD.1:2016::RC0001` (Rights Statement)

The RC identifiers (`RC_Identifier`) are globally unique, but the local RC identifiers (RC_ID) are not.

C.3.2 Rules for resource class local identifier (RC_ID) and names

[R0130] Two resource classes that come from instances of a part of ISO/IEC 19788 (first edition, new edition to an existing edition, amendment to an existing edition, corrigendum to an existing edition) have the same local identifier (`RC_ID`) if and only if they are essentially the same (that is, are versions of a same "abstract" resource class). The name (in any given language) and the definition are essential attributes of resource classes.

[R0131] For any parts of ISO/IEC 19788, resource class local identifiers (`RC_ID`) of obsoleted resource classes are never reused.

[R0132] In any given language, for any resource class the name associated with the resource class shall constitute a global appellation (within ISO/IEC 19788, all parts) of the resource class (the primary global identifier being provided by the resource class specification attribute "identifier").

[R0133] In any given language, the names associated with the RCs, PRSs, APs, and VOCs shall be distinct overall.

C.3.3 Global identifier for conceptual RCs

To get the canonical identifier for any RC, first the canonical standard identifier is extracted from its identifier, then "`::`" and its local RC identifier are concatenated.

EXAMPLE `ISO_IEC_19788-99::RC0003` is the canonical identifier of all the following RCs:

`ISO_IEC_19788-99:2081::RC0003` (first edition of the ISO/IEC 19788-99)

`ISO_IEC_19788-99:2081:COR.1:2086::RC0003` (corrigendum to the first edition)

C.4 Canonical identifiers for generic content value rule sets (PRSs)

C.4.1 General

An MLR identifier for a generic content value rule set (PRS[8)]) from an ISO/IEC 19788 Part is composed of two parts: A first part identifying the Standard document and the second part providing a local identifier for the predefined rule set in the context of the document, that is of the form:

`Standard_ID "::" PRS_ID` (a PRS_identifier, MLR identifier case)

EXAMPLES `ISO_IEC_19788-1:2011::PRS0001` (MLR STRING)

`ISO_IEC_19788-1:2011::PRS0002` (DATE)

The PRS identifiers (`PRS_Identifier`) are globally unique, but the local PRS identifiers (`PRS_ID`) are not.

8) Generic content value rule sets were called predefined rule sets (PRSs) in the first edition.

C.4.2 Rules for generic content value rule sets local identifier (PRS_ID) and names

[R0134] Two generic rule sets that come from instances of a part of ISO/IEC 19788 (first edition, new edition to an existing edition, amendment to an existing edition, corrigendum to an existing edition) have the same local identifier (`PRS_ID`) if and only if they are essentially the same (that is, are versions of a same "abstract" predefined rule set). The name (in any given language) and the rule statements are essential attributes of predefined rule sets.

[R0135] For any parts of ISO/IEC 19788, predefined rule set local identifiers (`PRS_ID`) of obsoleted predefined rule sets are never reused.

[R0136] In any given language, for any predefined rule set the name associated with the predefined rule set shall constitute a global appellation (within ISO/IEC 19788, all parts) of the predefined rule set (the primary global identifier being provided by the predefined rule set specification attribute "identifier").

[R0137] In any given language, the names associated with the RCs, PRSs, APs, and VOCs shall be distinct overall.

C.4.3 Global identifier for conceptual PRSs

To get the canonical identifier for any PRS, first the canonical standard identifier is extracted from its identifier, then "::" and its local PRS identifier are concatenated.

EXAMPLE `ISO_IEC_19788-1::PRS0002` is the canonical identifier of all the following PRSs:

`ISO_IEC_19788-1:2011::PRS0002` (first edition of the this document)

`ISO_IEC_19788-1:2081::PRS0002` (14th edition of this document)

C.5 Canonical identifiers for application profiles (APs)

C.5.1 General

An MLR identifier for an application profile (AP) from an ISO/IEC 19788 Part is composed of two parts: A first part identifying the Standard document and the second part providing a local identifier for the application profile in the context of the document, that is of the form:

```
Standard_ID "::" AP_ID                    (an AP_identifier, MLR identifier case)
```

EXAMPLE `ISO_IEC_19788-3:2011::AP0001` (MLR Basic Application Profile)

The AP identifiers (`AP_Identifier`) are globally unique, but the local AP identifiers (`AP_ID`) are not.

C.5.2 Rules for application profile local identifiers (AP_ID) and names

[R0138] Two application profiles that come from instances of a part of ISO/IEC 19788 (first edition, new edition to an existing edition, amendment to an existing edition, corrigendum to an existing edition) have the same local identifier (`AP_ID`) if and only if they are essentially the same (that is, are versions of a same "abstract" application profile). The name (in any given language), the description and the content are essential attributes of application profiles.

[R0139] For any parts of ISO/IEC 19788, application profile local identifiers (AP_ID) of obsoleted application profiles are never reused.

[R0140] In any given language, for any application profile the name associated with the application profile shall constitute a global appellation (within ISO/IEC 19788, all parts) of the application profile (the primary global identifier being provided by the application profile specification attribute "identifier").

[R0141] In any given language, the names associated with the RCs, PRSs, APs, and VOCs shall be distinct overall.

C.5.3 Global identifier for conceptual APs

To get the canonical identifier for any AP, first the canonical standard identifier is extracted from its identifier, then "::" and its local AP identifier are concatenated.

EXAMPLE `ISO_IEC_19788-3::AP0001` is the canonical identifier of all the following Aps:

`ISO_IEC_19788-3:2011::AP0001` (first edition of the ISO/IEC 19788-3)

`ISO_IEC_19788-3:2015::AP0001` (second edition of ISO/IEC 19788-3)

C.6 Canonical identifiers for vocabularies (VOCs)

C.6.1 General

An MLR identifier for a vocabulary from an ISO/IEC 19788 Part is composed of two parts: A first part identifying the standard document and the second part providing a local identifier for the vocabulary in the context of the document, that is of the form:

```
Standard_ID "::" Vocabulary_ID                    (a VOC_identifier, MLR identifier case)

Vocabulary_ID ::= "V" seqN4
```

EXAMPLE `ISO_IEC_19788-5:2012::V0100` (Agent role)

The vocabulary identifiers (`VOC_Identifier`) are globally unique, but the local vocabulary identifiers (`Vocabulary_ID`) are not.

C.6.2 Rules for vocabulary local identifiers (Vocabulary_ID) and names

[R0142] Two vocabularies that come from instances of a part of ISO/IEC 19788 (first edition, new edition to an existing edition, amendment to an existing edition, corrigendum to an existing edition) have the same local identifier (`Vocabulary_ID`) if and only if they are essentially the same (that is, are versions of a same "abstract" vocabulary). The name (in any given language) of the vocabulary and the linguistic version (in any language) of any of its vocabulary terms identifiers (`Vocabulary_Term_ID`) are essential attributes of vocabularies.

[R0143] For any parts of ISO/IEC 19788, vocabulary local identifiers (`Vocabulary_ID`) of obsoleted vocabularies are never reused.

[R0144] In any given language, for any vocabulary the name associated with the vocabulary shall constitute a global appellation (within ISO/IEC 19788, all parts) of the vocabulary (the primary global identifier being provided by the vocabulary specification attribute "identifier").

[R0145] In any given language, the names associated with the RCs, PRSs, APs, and VOCs shall be distinct overall.

C.6.3 Global identifier for conceptual VOCs

To get the canonical identifier for any vocabulary, first the canonical standard identifier is extracted from its identifier, then "::" and its local vocabulary identifier are concatenated.

EXAMPLE `ISO_IEC_19788-5::V0100` is the canonical identifier of all the following vocabularies:

`ISO_IEC_19788-5:2012::V0100` (first edition of the ISO/IEC 19788-5)

`ISO_IEC_19788-5:2015::V0100` (second edition of ISO/IEC 19788-5)

C.7 Canonical identifiers for vocabulary terms (VOC_TERMs)

C.7.1 General

An MLR identifier for a vocabulary term from a vocabulary defined in an ISO/IEC 19788 part is composed of two parts: A first part identifying the Standard document and the second part providing a local identifier for the vocabulary term in the context of the document, that is of the form:

```
Standard_ID "::" Vocabulary_Term_ID
```

(a `VOC_Term_Identifier`, MLR identifier case)

```
Vocabulary_Term_ID ::= Vocabulary_ID ("#"|":") Term_ID

Term_ID ::= "T" seqN3
```

EXAMPLE `ISO_IEC_19788-5:2012::V0100:T020` (validator)

The vocabulary term identifiers (`VOC_TERM_Identifier`) are globally unique, but the local vocabulary term identifiers (`Vocabulary_Term_ID`) are not.

C.7.2 Rules for vocabulary term local identifiers (Vocabulary_Term_ID) and name

[R0146] For any Parts, local identifiers (`Vocabulary_Term_ID`) of obsoleted vocabulary terms are never reused.

C.7.3 Global identifier for conceptual VOC_TERMs

To get the canonical identifier for any vocabulary term, first the canonical standard identifier is extracted from its identifier, then "::" and its local vocabulary term identifier are concatenated.

EXAMPLE `ISO_IEC_19788-5::V0100:T020` is the canonical identifier of all the following vocabulary terms:

`ISO_IEC_19788-5:2012::V0100:T020` (first edition of the ISO/IEC 19788-5)

`ISO_IEC_19788-5:2024::V0100:` (second edition of ISO/IEC 19788-5)

Annex D
(normative)

Rules for all parts of ISO/IEC 19788

D.1 General

This document presents how MLR entities shall be specified: MLR resource classes, MLR properties, MLR vocabularies, MLR application profile, etc. These specifications are provided in the various Parts of ISO/IEC 19788.

Currently, ISO/IEC 19788 consists of different parts that are distinct in their purpose.

D.2 Categorization of ISO/IEC 19788 parts

— **Parts specifying resource classes and properties (type 1)**

— **Parts specifying MLR application profiles (type 2)**

— **Other Parts (type 3)**

D.3 Content of parts specifying resource classes and properties

D.3.1 General

The parts of the ISO/IEC 19788 series that specify only resource classes or properties should respect the following rules.

[R0147] Regarding the terms and definition clause, do not repeat Clause 3 of this document. As per the ISO/IEC Directives, use phrases such as:

— For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 apply.

— For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 and the following apply.

It may be useful to list the labels of the terms defined in this document (without their definition).

[R0148] This type of document shall contain several clauses: one concerning resource classes, one concerning properties, one concerning generic content value rule sets, one concerning vocabularies and an annex containing a UML diagram of all the defined resource classes and properties.

D.3.2 Resource classes

[R0149] The clause regarding resource classes shall contain all the classes needed to specify properties, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The resource classes are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility but it is not the only one.

It is recommended to provide a complete specification for the resource classes locally defined, and a short description (identifier, label) for the resource classes from other parts of ISO/IEC 19788 and used in the current document.

D.3.3 Properties

[R0150] The clause regarding properties shall contain all the properties required for the aim of the part, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The properties are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the properties locally defined and a short description (identifier, label) for the properties from other parts of ISO/IEC 19788 that are used in the current document.

D.3.4 Generic content value rule sets

[R0151] The clause regarding generic content value rule sets shall contain all the generic content value rule sets used by properties, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The generic content value rule sets are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the generic content value rule sets locally defined, and a short description (identifier, label) for the generic content value rule sets from other parts of ISO/IEC 19788 and used in the current document.

D.3.5 Vocabularies

[R0152] The clause regarding vocabularies shall contain all the vocabularies used by properties, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The vocabularies are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the vocabularies locally defined, and a short description (identifier, label) for the vocabularies from other parts of ISO/IEC 19788 and used in the current document.

D.4 Content of parts specifying ISO/IEC 19788 application profiles

D.4.1 General

A document specifying an MLR application profile can be either an ISO/IEC 19788 part (in this case, its number is "N") or a document which is not an ISO/IEC 19788 part but still specifies an application profile (for example a country-specific application profile). New parts of the ISO/IEC 19788 series should respect the following principles. For other documents specifying application profiles, see Annex F.

The parts of 19788 that specify application profiles should respect the following rules.

[R0153] Regarding the terms and definition clause, do not repeat Clause 3 of this document. As per the ISO/IEC Directives, use phrases such as:

- For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 apply.
- For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 and the following apply.

It may be useful to list the labels of the terms defined in this document (without their definition).

[R0154] This type of document shall contain several clauses: one concerning resource classes, one concerning properties, one concerning generic content value rule sets, one concerning vocabularies and an annex containing a UML diagram of all the defined resource classes and properties.

D.4.2 Resource classes

[R0155] The clause regarding resource classes shall contain all the classes needed to specify properties, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The resource classes are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility but it is not the only one.

Note It is recommended to provide a complete specification for the resource classes locally defined, and a short description (identifier, label) for the resource classes from other parts of ISO/IEC 19788 and used in the current document.

D.4.3 Properties

[R0156] The clause regarding properties shall contain all the properties required for the aim of the part, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The properties are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the properties locally defined and a short description (identifier, label) for the properties from other parts of ISO/IEC 19788 that are used in the current document.

D.4.4 Generic content value rule sets

[R0157] The clause regarding generic content value rule sets shall contain all the generic content value rule sets used by properties, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The generic content value rule sets are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the generic content value rule sets locally defined, and a short description (identifier, label) for the generic content value rule sets from other parts of ISO/IEC 19788 and used in the current document.

D.4.5 Vocabularies

[R0158] The clause regarding vocabularies shall contain all the vocabularies used by properties, whether coming from another part of ISO/IEC 19788 (as a reference) or defined in the current document.

The vocabularies are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the vocabularies locally defined, and a short description (identifier, label) for the vocabularies from other parts of ISO/IEC 19788 and used in the current document.

D.4.6 Application profile

[R0159] The clause regarding the application profile itself shall contain the template for the application profile and the specification of presence type and repeatability for the properties appertaining to the application profile.

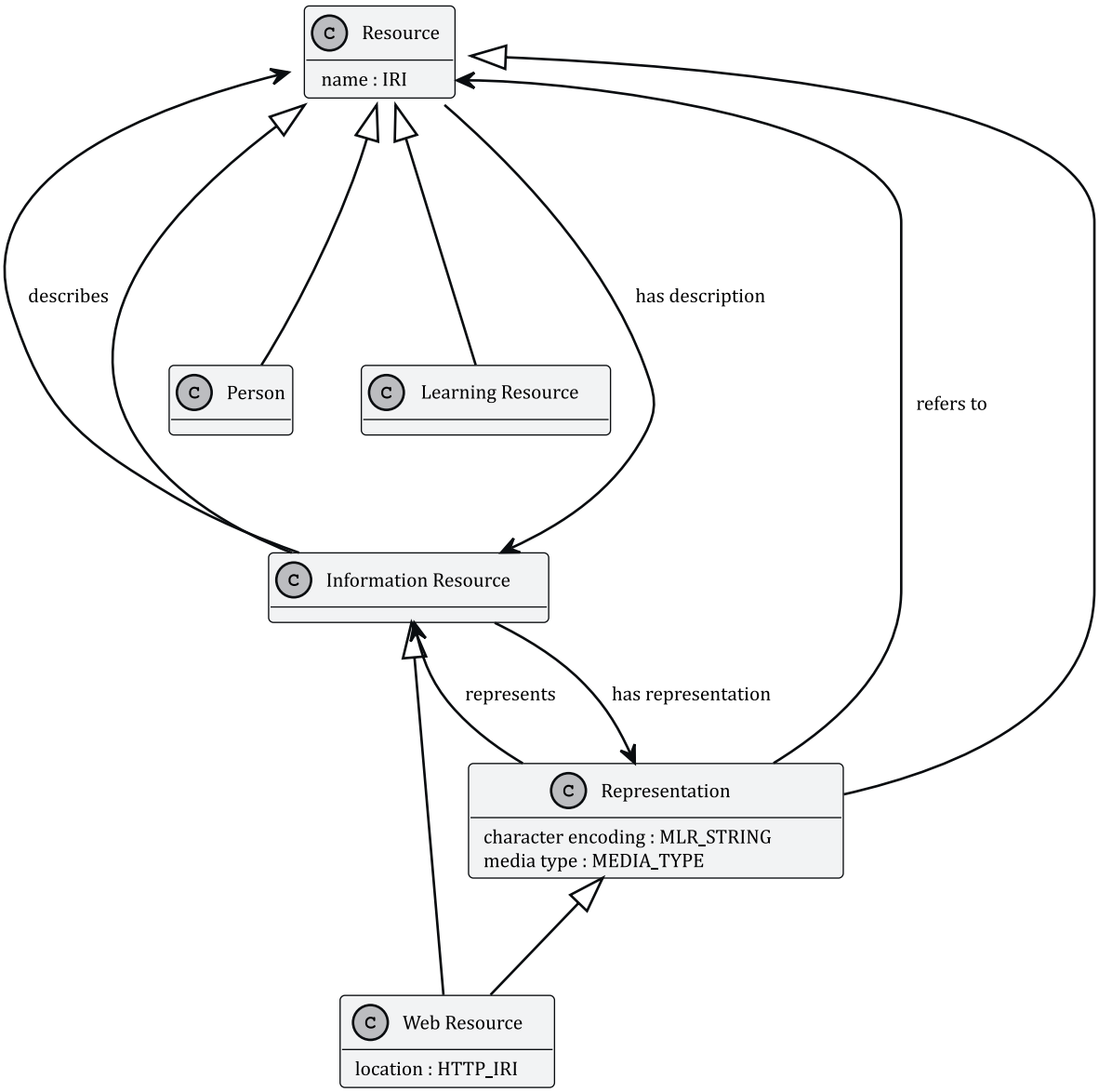
D.5 Other rules

[R0160] Each part of ISO/IEC 19788 shall apply the principles, rules and related specifications of this document.

[R0161] Each part of ISO/IEC 19788 shall maximize (re-) use of MLR entities - MLR resources classes, MLR properties, MLR vocabularies, content value rule sets - already identified and specified in parts of ISO/IEC 19788 specifying resource classes and properties.

Annex E
(normative)

UML class diagram of generic and other resource classes and related properties



Key

This type of arrow denotes a property whose domain is the origin of the arrow and whose codomain is the destination of the arrow

This type of arrow represents the fact that the class at the origin of this arrow is a subclass of the class at destination of the arrow

Figure E.1 — UML class diagrams of generic and other resource classes and related properties

Annex F
(informative)

UML class diagrams for this document

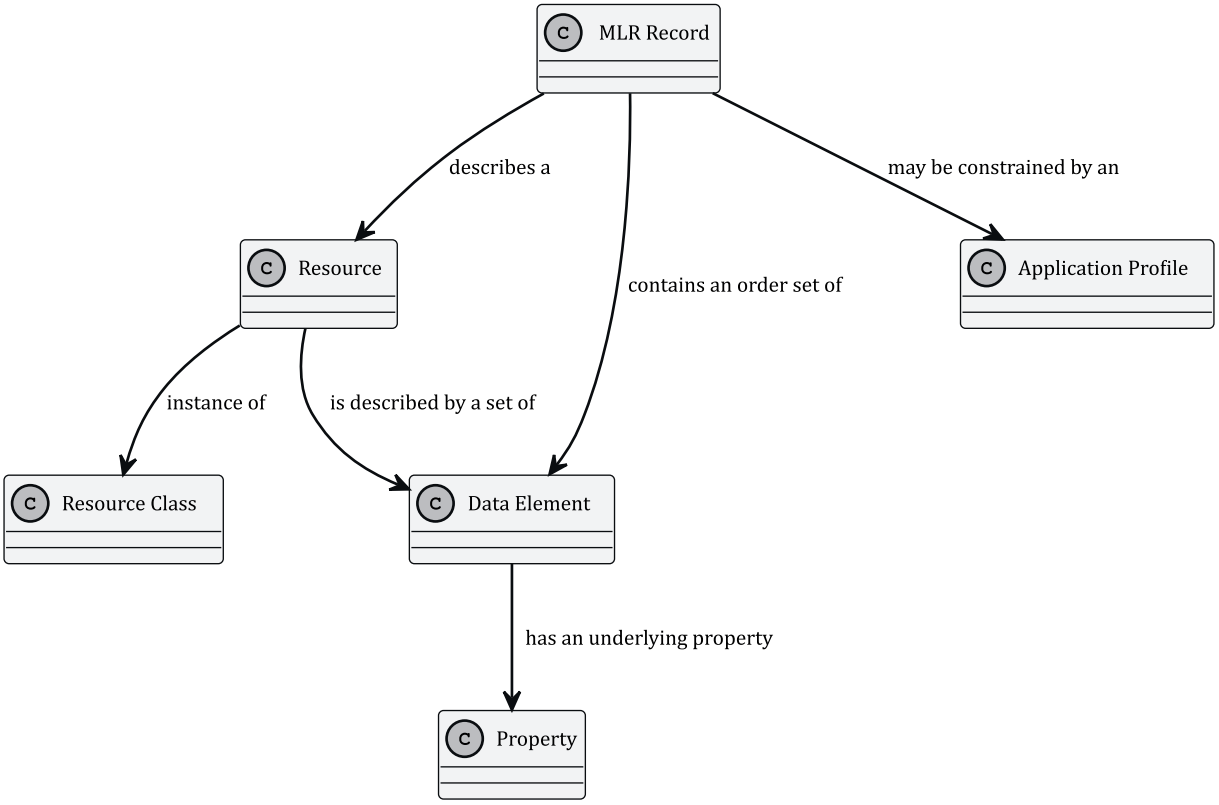


Figure F.1 — Framework global view

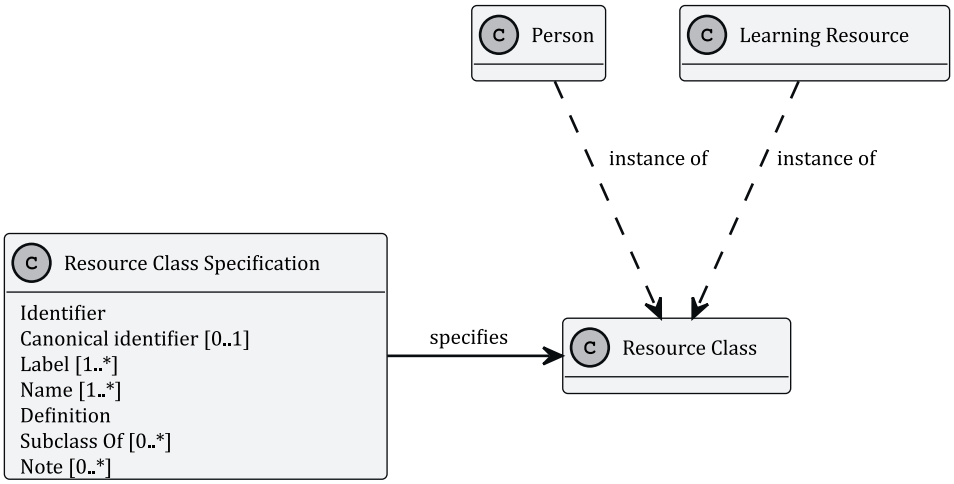


Figure F.2 — Resource class specification global view

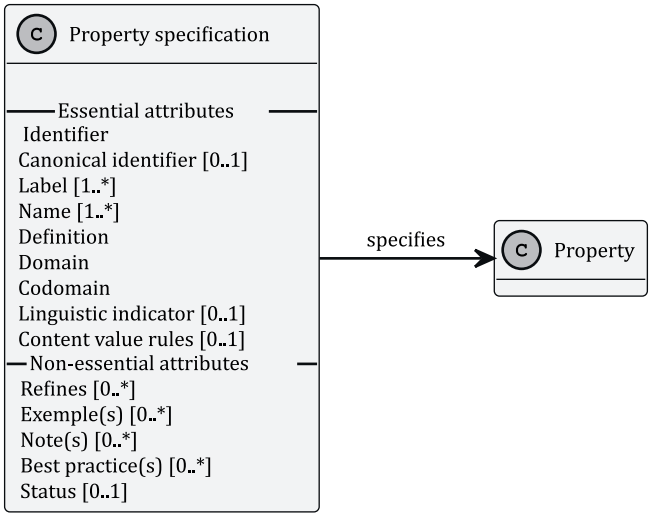


Figure F.3 — Property specification global view

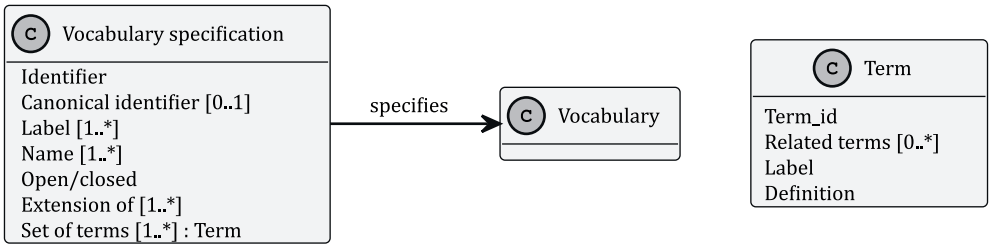


Figure F.4 — Vocabulary specification global view

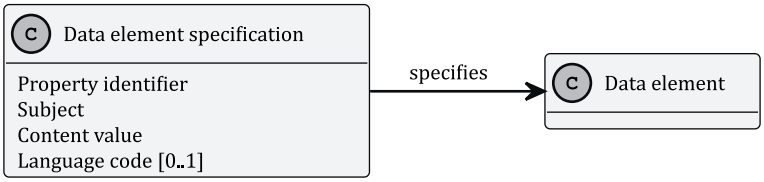


Figure F.5 — Data element global view

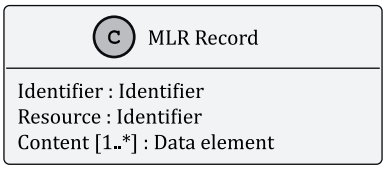


Figure F.6 — MLR Record global view

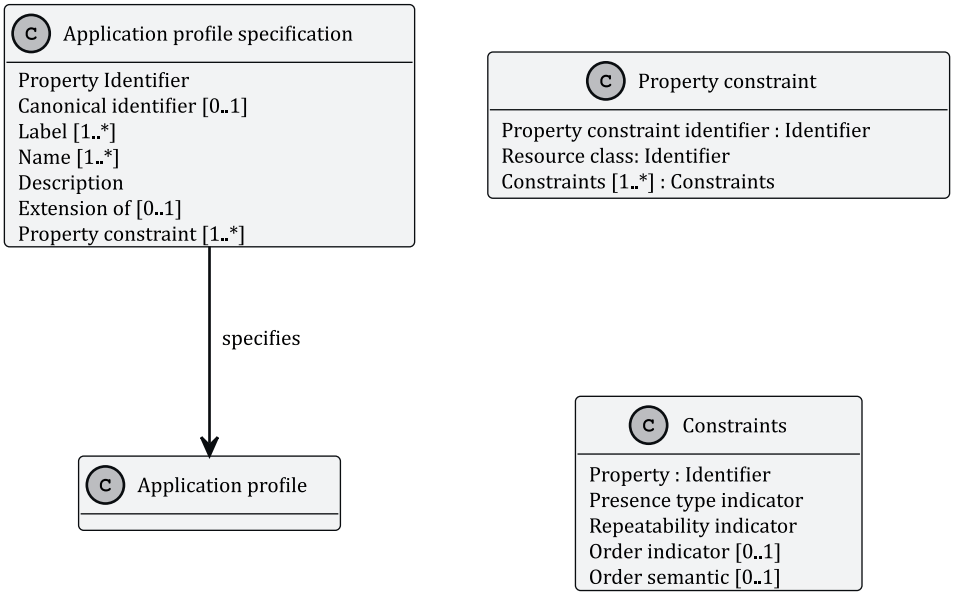


Figure F.7 — Application profile specification global view

Annex G
(informative)

Contents of documents specifying application profiles

G.1 General

A document specifying an MLR application profile outside the ISO/IEC 19788-1 series shall respect the following principles.

Regarding the clause defining the terms used, do not repeat Clause 3 of this document. Use phrases from ISO/IEC Directives Part 2, 16.5.3, such as:

— For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 apply.

— For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 and the following apply.

It may be useful to list the labels of the terms defined in this document (without their definition).

This type of document shall contain several clauses: one concerning resource classes, one concerning properties, one concerning generic content value rule sets, one concerning vocabularies and an annex containing a UML diagram of all the defined resource classes and properties.

G.2 Resource classes

The clause regarding resource classes shall contain all the classes needed to specify properties, whether coming from some standards (as a reference) or defined in the current document.

The resource classes are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the resource classes locally defined and a short description (identifier, label) for the resource classes from some standards and used in the current document.

G.3 Properties

The clause regarding properties shall contain all the properties required for the aim of the part, whether coming from some standards (as a reference) or defined in the current document.

The properties are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the properties locally defined and a short description (identifier, label) for the properties from some standards that are used in the current document.

G.4 Generic content value rule sets

The clause regarding generic content value rule sets shall contain all the generic content value rule sets used by properties, whether coming from some standards (as a reference) or defined in the current document.

The generic content value rule sets are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the generic content value rule sets locally defined, and a short description (identifier, label) for the generic content value rule sets from some standards and used in the current document.

G.5 Vocabularies

The clause regarding vocabularies shall contain all the vocabularies used by properties, whether coming from some standards (as a reference) or defined in the current document.

The vocabularies are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the vocabularies locally defined, and a short description (identifier, label) for the vocabularies from some standards and used in the current document.

G.6 Application profile

The clause regarding the application profile itself shall contain the template for the application profile and the specification of presence type and repeatability for the properties appertaining to the application profile.

Annex H
(informative)

Contents for documents beyond ISO/IEC 19788 specifying MLR entities

H.1 General

A document specifying MLR entities outside the ISO/IEC 19788-1 series shall respect the following principles.

Regarding the clause defining the terms used, do not repeat Clause 3 of this document. As per ISO/IEC Directives Part 2, 16.5.3, use phrases such as:

— For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 apply.

— For the purposes of this document, the terms and definitions given in Clause 3 of ISO/IEC 19788-1 and the following apply.

It may be useful to list the labels of the terms defined in this document (without their definition).

This type of document shall contain several clauses: one concerning resource classes, one concerning properties, one concerning generic content value rule sets, one concerning vocabularies and an annex containing a UML diagram of all the defined resource classes and properties.

H.2 Resource classes

The clause about resource classes shall contain all the classes needed to specify properties, whether coming from some standards (as a reference) or defined in the current document.

The resource classes are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the resource classes locally defined and a short description (identifier, label) for the resource classes from some standards and used in the current document.

H.3 Properties

The clause about properties shall contain all the properties required for the aim of the part, whether coming from some standards (as a reference) or defined in the current document.

The properties are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the properties locally defined and a short description (identifier, label) for the properties from some standards that are used in the current document.

H.4 Generic content value rule sets

The clause about generic content value rule sets shall contain all the generic content value rule sets used by properties, whether coming from some standards (as a reference) or defined in the current document.

The generic content value rule sets are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the generic content value rule sets locally defined, and a short description (identifier, label) for the generic content value rule sets from some standards and used in the current document.

H.5 Vocabularies

The clause about vocabularies shall contain all the vocabularies used by properties, whether coming from some standards (as a reference) or defined in the current document.

The vocabularies are ordered in a way that helps the reading of the document; using the alphabetical order of the attribute label in the document's language is a possibility, but it is not the only one.

It is recommended to provide a complete specification for the vocabularies locally defined, and a short description (identifier, label) for the vocabularies from some standards and used in the current document.

Annex I
(informative)

Principles governing the development of ISO/IEC 19788

I.1 General

The key principles stated in ISO/IEC 19788-1 are placed in a context driven by user requirements and support multilingual and cultural adaptability requirements from a global perspective.

I.2 A multipart standard

A multipart standard ensures both an integrated approach and a modular approach. Each part has its own scope and purpose and is self-contained. This facilitates use and maintenance of specific parts and thus of the whole standard. In addition, it simplifies further development with new parts to resolve new issues over time.

I.3 Development driven by user requirements

All development of ISO/IEC 19788 is informed by clearly stated and agreed user requirements in the areas of learning, education and training. An important source of user requirements is the public sector, a significant participant in the learning, education and training market.

User requirements are determined by countries participating in the development of the standard and are demonstrated by "use cases" including some related to cultural diversity, the needs of people with disabilities and priorities from a world-wide perspective.

I.4 Multilingual equivalencies and multicultural requirement support

ISO/IEC 19788 aims to enable multilingual equivalence and cultural adaptability. This means incorporating and supporting both (1) a top-down requirements approach, i.e., that of jurisdictional domains; and, (2) a bottom-up approach of the requirements of the individual, i.e., human being, as the (final) user, doing so in a global context. To achieve this, ISO/IEC 19788 shall support both global interoperability and local specificity, including as examples natural and special languages and associated multilingual requirements.

I.5 Re-use of international standards and specifications

Many aspects of ISO/IEC 19788 are not unique to the field of learning, education and training. Therefore, a key strategy in the development and maintenance of ISO/IEC 19788 is utilizing relevant existing international standards and specifications (or applicable parts thereof) to the greatest degree possible.

I.6 User extensions

Standards capture the common user requirements. In the implementation of one (or more) Part(s) of ISO/IEC 19788, however, it is possible that a user may have additional or more precise requirements to be implemented as user extensions or constraints in an Application Profile.

This document shall enable the introduction of "user extensions" by those implementing one or more parts (or combination of parts). The identification of such user extensions and their specification is supported by the overall architecture and structure of ISO/IEC 19788.

Types of user extensions include:

— the addition of a properties (3.52) (of local value required in addition to those specified in ISO/IEC 19788;

— the extension of a vocabulary

A "user extension" that attracts widespread and common use may become a candidate for inclusion and incorporation into ISO/IEC 19788, (e.g. in a new part or later edition).

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