IEEE 1484.20.1/Draft 3
Draft Standard for Learning Technology—
Standard for Reusable Competency Definitions

Abstract: This Standard defines a data model for describing, referencing, and sharing competency definitions, primarily in the context of online and distributed learning. This Standard provides a way to represent formally the key characteristics of a competency, independently of its use in any particular context. It enables interoperability among learning systems that deal with competency information by providing a means for them to refer to common definitions with common meanings.

Keywords: competency, competency definition, reusable competency definition

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Introduction

This Standard defines a data model for describing, referencing, and sharing competency definitions, primarily in the context of online and distributed learning. This Standard provides a way to represent formally the key characteristics of a competency, independently of its use in any particular context. It enables interoperability among learning systems that deal with competency information by providing a means for them to refer to common definitions with common meanings.

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Acknowledgements

This Standard is based on the “IMS Reusable Definition of Competency or Educational Objective Specification,” Version 1.0, published on October 25, 2002 by the IMS Global Learning Consortium, Inc.

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1. Overview

1.1 Scope

This Standard defines a data model for describing, referencing, and sharing competency definitions, primarily in the context of online and distributed learning. This Standard provides a way to represent formally the key characteristics of a competency, independently of its use in any particular context. It enables interoperability among learning systems that deal with competency information by providing a means for them to refer to common definitions with common meanings.

This standard enables information about competencies to be encoded and shared. It does not define whether a competency is a skill, knowledge, ability, attitude or learning outcome but can be used to capture information about any of these. This Standard does not specify policies regarding RCDs, such as the best practice to look for an existing definition to reuse instead of inventing a new one for the same purpose.

1.2 Purpose

The purpose of this Standard is to publish an IEEE standard based on the existing IMS Global Learning Consortium (IMS) specification for Reusable Definition of Competency or Educational Objective (RDCEO) [B2]. This standard is to be defined in such a way that implementations that conform to the IMS specification will be conformant to this Standard.

2. Normative references

The following referenced documents are indispensable for the application of this Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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1 The numbers in brackets correspond to those of the bibliography in Annex A.
3. Definitions

For purposes of this Standard, the following terms and definitions apply. IEEE 100, *The Authoritative Dictionary of IEEE Standards Terms*, Seventh Edition [B1], should be referenced for terms not defined in this Clause.

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2 IEEE publications are available from the Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08854, USA (http://standards.ieee.org/).


4 ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembé, CH–1211, Genève 20, Switzerland/Suisse (http://www.iso.ch/). ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, USA (http://www ANSI.org/).

5 ISO/IEC publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembé, CH–1211, Genève 20, Switzerland/Suisse (http://www.iso.ch/). ISO/IEC publications are also available in the United States from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, USA (http://global.ihs.com/). Electronic copies are available in the United States from American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, USA (http://www ANSI.org/)

6 W3C publications are available from the World Wide Web Consortium, 32 Vassar Street, Room 32–G515, Cambridge, MA 02139, USA (http://www w3.org/).
competency: In this Standard, any form of knowledge, skill, attitude, ability, or learning objective that can be described in a context of learning, education or training.

competency definition record: In this Standard, an instance of a data structure that represents a reusable competency definition.

NOTE—The term “competency” is to be interpreted in the broadest sense to include learning objectives (those things that are sought) and competency or competencies (those things that are achieved). The term “competency” is also used to include all classes of things that someone, or potentially something, can be competent in, although some communities of practice use the term with nuance, for example limiting its use to skill and excluding knowledge or understanding.

data type: A property of distinct values, indicating common features of those values and operations on those values.

extended data element: An element of a data structure that is defined outside of a standard and is permitted within an instance of the data structure.

LangString: A data type that represents one or more character strings. A LangString value may include multiple semantically equivalent character strings, such as translations or expressions of a description in different languages. See also: data type.

value space: The set of values for a given data type (ISO/IEC 11404:1996).

NOTE—In this Standard, a value space is typically either enumerated outright or defined by reference to another standard or specification.

3.1 Abbreviations and acronyms

IMS: IMS Global Learning Consortium
RCD: reusable competency definition
RDCEO: IMS Reusable Definition of Competency or Educational Objective
SPM: smallest permitted maximum
URI: Uniform Resource Identifier
URN: Uniform Resource Name
XML: Extensible Markup Language
4. Conformance

4.1 Shall and shall not

In this Standard, “shall” is to be interpreted as a requirement on an implementation; “shall not” is to be interpreted as a prohibition.

4.2 RCD instances

A conforming RCD instance shall be an instance of the data model as defined in Clause 6.

4.3 Smallest permitted maximum values

For data elements that have smallest permitted maximum (SPM) values, an implementation that conforms to this Standard shall accept and process at least that number of entries or characters specified by the SPM for the element and may accept and process a larger number. SPM values are defined for

- **Items with multiple values**: All applications that process RCD instances shall process at least the SPM number of entries. In other words, an application may impose a maximum on the number of entries it processes for a data element with multiple values, but that maximum shall not be lower than the SPM value.

- **Data elements with type CharacterString or LangString**: All applications that process RCD instances shall process at least the SPM length for the CharacterString value (either directly or contained in the LangString) of that data element. In other words, an application may impose a maximum on the number of characters it processes for the CharacterString value of that data element, but that maximum shall not be lower than the SPM value for the data type of the data element.

**NOTES:**

1.—The intent is for the SPM values to cover most cases.

2.—The meaning of “process” in this subclause depends on the nature of the application.

3.—This Standard does not define any provision for whether or how a system may process more than the SPM value for a particular data element.

5. Conceptual overview (informative)

*This Clause is informative.*
5.1 Objectives

This Standard is intended to satisfy the following objectives:

- Provide a data model for competency definition records that can be shared or reused in one or more compatible systems.
- Reconcile various existing and emerging data models into a widely acceptable model.
- Provide a way to identify the type and precision of a competency definition.
- Provide a unique identifier as the means to unambiguously reference an RCD regardless of the setting in which the competency definition is stored, found, retrieved, or used. For example, metadata that describe learning content may contain references to one or more competency definition records that describe learning objectives for the content.
- Provide a data model for additional information about a competency definition, such as a title, description, and source, compatible with other emerging learning asset metadata standards.
- Recommend metadata as one of the methods that may be used to express how competency definitions are semantically related.

This Standard also addresses the following needs:

- A common data model that allows the building of various competency models, hierarchies, and maps. However, the definitions of such competency models, hierarchies, and maps are outside of the scope of this Standard.
- A standard method that allows persistent, long-lived competency definitions to be created, shared among systems, and maintained.
- A standard method by which competency definitions can be identified as globally unique among conforming systems and repositories.
- A common data model for the metadata that give an RCD its value in a reuse environment, such as the source of the competency definition, validation information, and other meta information useful to locate an RCD in a repository or collection.

5.2 Functional overview

This Standard defines a data model for describing, referencing, and sharing competency definitions, primarily in the context of online and distributed learning. The data model provides a formal representation of the key characteristics of a competency, independently of its use in any particular context. It enables interoperability among learning systems that deal with competency information by providing a means for them to refer to common definitions with common meanings.

The core information in an RCD is an unstructured textual definition of the competency that can be referenced through a globally unique identifier. This definition may be refined using a user-defined model of the structure of a competency.
This Standard provides a means to capture common understandings of competencies that appear as part of learning or career plan, as learning prerequisites, or as learning outcomes. The data model in this Standard can be used to share these definitions between learning systems, human resource systems, learning content, competency or skills repositories, and other relevant systems. This Standard provides unique references to competency definitions for inclusion in other data models, such as personal competency profiles.

RCD instances that conform to this Standard are intended for interchange by machines, but the information they contain is intended for human interpretation.

This Standard does not address the aggregation of smaller competencies into larger competencies (e.g., “throws” plus “catches” equals “plays ball”) nor does it address how competencies are to be assessed, validated, certified, recorded, or used as part of a process, such as instructional design or knowledge management. It also does not specify how records of competencies associated with an individual are structured, stored, or shared. Figure 1 shows how an RCD integrates with competency data.

5.3 Data model overview

The data model is minimalist and extensible. It is neutral with regard to models of and uses of competencies. Competencies are defined and structured in many ways in different communities of practice. This Standard allows communities of practice to share information according to the models they use. Semantics can be “tightened” or “loosened” in the data itself, while conserving the same data model regardless of how strictly a particular organization or institution requires the data to be formulated.

The data model contains the following mandatory elements:

- **Identifier**: A globally unique label that identifies the RCD. This identifier uses the same data elements as the identifier element defined in IEEE 1484.12.1–2002, “Standard for Learning Object Metadata,” and consists of

![Figure 1—RCDs cover only a part of the competency data](image)

Competency data may include
- Reusable (generic) definition of the competency
- Evidence of competency
- Context within which the competency is defined, or that defines the competency
- Dimensions such as proficiency on a scale, or time

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7 For information on normative references, see Clause 2.
two subelements, Catalog and Entry. The identifier is sufficient to reference the competency in any other system.

- **Title:** A text label for the RCD. This is a short, human-readable name. While the identifier provides the definitive reference to the RCD, it is typically unintelligible. The title provides a convenient, readable alternative. The title may be repeated in multiple languages.

The data model contains the following optional elements:

- **Description:** A human-readable description of the RCD. This is an unstructured character string meant to be interpretable by humans, only. The description may be repeated in multiple languages.

- **Definition:** A structured description that provides a more complete definition of the RCD than the free-form description expressed in the title and description, usually using attributes taken from a specific model of how a competency should be structured or defined. Typically, such models define a competency in terms of “statement, conditions, criteria,” “proficiency, criteria, indicators,” “standards, performance indicators, outcomes,” “abilities, basic skills, content, process,” and similar sets of statements.

- **Metadata:** Embedded metadata that further describe the RCD by, for example, identifying the author and publication date of the RCD or by specifying known relations to other RCDs.

Extensibility can be achieved by defining a specific model structure within the Definition element (6.2.4) or by including elements defined by IEEE 1484.12.1–2002, Clause 6 in the Metadata element (6.2.5). In addition, implementers may create additional data models that include or reference the RCD data model or RCD instances. Such implementation-specific data models may be used to augment the data model in this Standard to support different applications and communities of practice.

**NOTE—**The identifier, not the title, is used to distinguish between RCDs, because different communities of practice may coincidentally define the same title.

### 5.4 Taxonomies of reusable competency definitions

This Standard is intended to meet the simple need of referencing and cataloguing a competency, not classifying it. Nonetheless, an implementation might want to include relation and classification information, which can be done by embedding additional metadata as specified in 6.2.5.3. Instances of RCDs also can be referenced by the nodes in a tree or other graph representing a taxonomy or ontology of competencies.
6. Data model

6.1 General information

This Clause defines the data elements of an RCD. Unless otherwise noted, all components of records are optional in an RCD instance.

NOTES:

1—The use of ISO/IEC 11404 notation in the synopses in 6.2 and 6.3 is for descriptive purposes only. A complete implementation of the operations defined in ISO/IEC 11404 is not required for conformance.

2—The ISO/IEC 11404 notation describes the semantics of the language-independent data types across all bindings (e.g., implementation of a data type as itself, its subtypes, its subclasses, and its specializations). For example, an ISO/IEC 11404 record may be implemented as an SQL table row, or as an Extensible Markup Language (XML) complexType; an ISO/IEC 11404 characterstring may be implemented in an encoding (ISO 646, ASCII, ISO 8859-1, UTF-8, UTF-16, UTF-32, etc.) that supports the repertoire specified in the parameter to characterstring data type.

3—All examples in 6.2 and 6.3 are informative and do not endorse any particular binding.

4—The following language-independent data types used in this Standard are defined in ISO/IEC 11404: bag, characterstring, and record.

5—The labels for data elements and data types in the synopses in 6.2 and 6.3 are for reference, only. An implementation is not required to use the same labels, as long as the data elements and data types are semantically equivalent.

6—This Standard does not define a specific extension mechanism for the data model. Implementers may define bindings that allow additional elements, or create additional data models for competency data. Such models may be used to augment this model to support different communities of practice.

6.2 Reusable competency definition

Synopsis

```plaintext
reusable_competency_definition :
record
(identifier : long_identifier_type,
title : bag of langstring_type(1000),
// SPM: 20 instances of langstring_type in the bag
// the parameter value is the SPM for the langstring
```
Description

The components of reusable_competency_definition are defined in 6.2.1 – 6.2.5. Identifier and Title are mandatory and shall be included in RCD instances. Depending on the implementation, an instance of reusable_competency_definition shall include zero or more of the other defined components.

All elements in this data model are intrinsically unordered. The order of the elements in the data model synopses and the order of the values in a list of values are not significant. For example, if the model includes three statements, their order is not significant. They may appear in any order without loss of information.

NOTE—A binding may impose a particular ordering on RCD instances that conform to that binding.

6.2.1 Identifier

Synopsis

identifier :
  long_identifier_type,
Description

This data element is a globally unique label that identifies the RCD. This data element is sufficient to reference the RCD in any conforming system.

Subclause 6.3.3 defines `long_identifier_type`.

NOTE—This data element uses the same subelements as the identifier element defined in IEEE 1484.12.1–2002 and consists of two subelements, Catalogue and Entry.

6.2.2 Title

Synopsis

title : bag of langstring_type(1000),
     // SPM: 20 instances of langstring_type in the bag
     // the parameter value is the SPM for the langstring

Description

This data element is a single, mandatory, text label for the RCD. The label is a short, human-readable name for the RCD. Because different communities of practice may coincidentally define the same title, the identifier, not the title, shall be used to distinguish among RCDs.

Subclause 6.3.2 defines `langstring_type`.

NOTES:

1—This data element may be repeated in multiple languages.

2—While the Identifier element (see 6.2.1) provides the definitive reference to the definition, it is typically unintelligible. The Title element provides a convenient, alternative, readable form. Examples: “English proficiency”, “Schmiblick failure diagnostic level 4”, “Demonstrates conflict resolution skills”.

6.2.3 Description

Synopsis

description : bag of langstring_type(2000),
     // SPM: 20 instances of langstring_type in the bag
     // the parameter value is the SPM for the langstring

Description

This data element is a human-readable description of the competency. It is an optional, unstructured, character string meant to be interpretable only by humans.

Subclause 6.3.2 defines `langstring_type`. 
NOTES:

1—This data element may be repeated in multiple languages.

2—This data element is typically more explicative than the Title element (see 6.2.2). Examples:
   “Proficiency in written and spoken English and use of English for meaningful oral or written
   expression”, “Performance of level 4 diagnostic as specified in IETM #SCMBLK007”.

6.2.4 Definition

Synopsis

definition :
    record
        (
            model_source :
                characterstring(iso-10646-1),
                // SPM: 1000 characters
            statements :
                bag of statement_type,
                // SPM: 10 statement records in the bag
        ),

Description

This data element is an optional, structured description that provides a more complete defini-
tion of the competency, usually using attributes taken from a specific model of how a compe-
tency should be structured or defined. This data element shall contain zero or more model
sources and at least one statement. It may contain multiple statements.

NOTES:

1—Typically, the models that underlie this data element define competencies in terms of
   “statement, conditions, criteria”, “proficiency, criteria, indicators”, “standards, performance
   indicators, outcomes”, “abilities, basic skills, content, process”, and similar sets of statements.

2—This data element provides a structure for including an arbitrary collection of statements that
determine a competency. The author of an RCD is free to use this data element in any way that
best describes the competency.
6.2.4.1 Model source

Synopsis

model_source :
  characterstring(iso-10646-1),
  // SPM: 1000 characters

Description

This data element is the source of the model used for the competency definition. The characters in the string shall belong to the repertoire of ISO/IEC 10646–1:2000, as allowed by IETF RFC 2396.

NOTE—The value of this data element should be specific enough to avoid conflict with other source names; therefore, it is recommended that the value be a uniform resource identifier (URI). If the value of this data element is a URI, it may point to an actual document that defines the source formally. However, this is not required. Examples: “3-part-learning-objective”, “http://foo.edu/ref/los.xml”.

6.2.4.2 Statements

Synopsis

statements :
  bag of statement_type,
  // SPM: 10 statement records in the bag
  statement_type = record
  // SPM: 10 statement records in the bag
  ( statement_id :
    long_identifier_type,
    statement_name :
      characterstring(1000),
    statement_text : bag of langstring_type(1000),
    // SPM: 20 instances of langstring_type in the bag
    // the parameter value is the SPM for the langstring
    statement_token :
      vocabulary_type,
    ),

Description

Each record in this data element is a description of a single characteristic of a Definition element (see 6.2.4). A record of type statement_type shall contain one or more elements.

Although no specific component of a statements element is required, the element shall contain at least one of these components. For example, a particular learning-objective model might require a list of specific statement strings, each of which has a specific name, such as
“Condition”, “Performance” and “Standard”. A statement element matching this model would use the components Statement name and Statement text (see 6.2.4.2.2 and 6.2.4.2.3).

6.2.4.2.1 Statement ID

Synopsis

statement_id :
    long_identifier_type,

Description

This data element is a label for the statement. This label shall be unique at least within the scope of the definition.

Subclause 6.3.3 defines long_identifier_type.

NOTE—This Standard does not specify how IDs are created, assigned, or resolved.

6.2.4.2.2 Statement name

Synopsis

statement_name :
    characterstring,

Description

This data element is a name for the statement. This name shall be unique at least within the scope of the definition. Examples: “Condition”, “Action”, “Standard”, “Outcome”, “Criteria”.

NOTE—This Standard does not specify how names are created, assigned, or resolved.

6.2.4.2.3 Statement text

Synopsis

statement_text : bag of langstring_type(1000),
    // SPM: 20 instances of langstring_type in the bag
    // the parameter value is the SPM for the langstring

Description

This data element is an unstructured, textual description of those aspects of the RCD referred to by the statement name element. Example: “Given a set of integer numbers in the range 1 to 49.”.

NOTE—This data element may be repeated in multiple languages.
6.2.4.2.4 Statement token

Synopsis

```
statement_token :
  vocabulary_type,

vocabulary_type = record
  ( source :
    characterstring(iso-10646-1),
    // SPM: 1000 characters
    value :
      characterstring(iso-10646-1),
      // SPM: 1000 characters
  ),
```

Description

This data element consists of a vocabulary token, along with an identifier of its source. This allows the use of controlled terms (vocabularies) instead of, or along with, free-form statement text (see 6.2.4.2.3).

The source element indicates the source of the token value. The source element may be a URI that identifies a formal vocabulary definition. Example: “http://www.vocabularies.org/OSList”.

The value element is the actual token value from a list of tokens defined in the source. For example, the token might be MRS_15.

NOTES:

1—This approach to controlled terms (vocabularies) follows that used in metadata standards such as IEEE 1484.12.1–2002. In this Standard, the token is just a string; it does not have to be a human-language word and does not have to be meaningful. The source typically defines the meaning of the token, either by reference to a standard or by the fact that the data in the source element is a URL to a human- or machine-readable description of the vocabulary tokens.

2—This Standard does not define what a source is, only that the source has an identifier. For example, a source may be another standard, a policy document, or a formal vocabulary.

3—This Standard does not specify how vocabularies are created, assigned, or resolved.

6.2.5 Metadata

Synopsis

```
metadata :
  record
  ( rcd_schema :
```

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characterstring(iso-10646-1),
   // SPM: 1000 characters
rcd_schema_version :
   characterstring(iso-10646-1),
   // SPM: 1000 characters
additional_metadata :
   bag of any_type,
   // SPM: 10 of any type in the bag
),

Description

This data element consists of embedded metadata about the RCD. This data element does not preclude the use of external metadata about the RCD. Such external metadata are not defined by this Standard.

Subclause 6.3.1 defines any_type.

NOTE—Application profiles may specify additional metadata requirements.

6.2.5.1 RCD schema

Synopsis

rcd_schema :
   characterstring(iso-10646-1),
   // SPM: 1000 characters

Description

This data element is a label for the schema that defines and controls the RCD instance.

NOTES:

1—If this data element is omitted then a value of “ieee.org/1484.20.1/2006” should be assumed. Different values may be used to signal application profiles but should not be used to replicate the purpose of other elements such as model source (see 6.2.4.1).

2—This data element is not a label for the schema of the embedded metadata defined in 6.2.5.3. Every instance of embedded metadata, if any, should include its own schema description or identifier.

6.2.5.2 RCD schema version

Synopsis

rcd_schema_version :
   characterstring(iso-10646-1),
   // SPM: 1000 characters
Description

This data element describes the version of the schema described by the Rcd schema element (see 6.2.5.1).

NOTE—If this element is omitted then a value of “1.0” should be assumed.

6.2.5.3 Additional metadata

Synopsis

additional_metadata : bag of any_type,
                      // SPM: 10 of any type in the bag

Description

This data element contains optional, additional, embedded metadata describing the RCD. If additional metadata are present, the actual type shall be defined by an application profile.

If an additional metadata record is included, the record should conform to IEEE 1484.12.1–2002.

More than one additional metadata record is allowed in the bag, but if the bag contains more than one record, each record should conform to a different metadata specification. An implementa-
tion shall accept any metadata record that it cannot interpret, but it is not required to inter-
pret such metadata records.

NOTES:

1—Useful metadata defined in IEEE 1484.12.1–2002 include additional identification as an entry in one or more catalogues, information about the author, the creation date, and so on. The IEEE 1484.12.1–2002 Relation element may be used to relate a definition to a prior version of the defi-
nition, and one or more IEEE 1484.12.1–2002 Classification elements may be used to indicate where this particular definition fits in a taxonomy of competencies.

2—A particular binding specification or application profile may impose additional restrictions or requirements.

3—Each additional metadata record should contain information about the name and version of its schema. For example, in IEEE 1484.12.1–2002 metadata records, this is specified in the meta-
metadata element of the metadata record.

6.3 Auxiliary data types

The data types described in 6.3.1 – 6.3.3 are used in conjunction with the data elements de-
scribed in 6.2.
6.3.1 Any type

Synopsis

```plaintext
type any_type = (unspecified);
```

Description

This data type represents any type not specified in this Standard. This Standard does not require an implementation to process data elements of this type when encountered in an RCD instance.

NOTE—If implementations specify or require data elements for which the type is defined in this Standard as `any_type`, the implementations should provide the means to interpret and validate the implementation-specific data. For example, an implementation that uses an XML binding should include a valid XML schema that can be referenced in RCD instances bound in XML documents, and the schema should be documented.

6.3.2 LangString type

Synopsis

```plaintext
type langstring_type(length) =
  record
  (language : language_type,
   string : characterstring(iso-10646-1),
   // SPM: the length parameter
  );
```

Description

This data type consists of a language specification for a localized string and the string itself.

Examples

The following are three examples of localized strings: "Information Technology" in French, "localization" in British English, and "xxx" in Japanese hiragana.

```
"fr", "Technologies de l'information"
"en-GB", "localisation"
"jp-JP-jisx208", "xxx"
```
6.3.2.1 Language

Synopsis

language :
  characterstring(iso-646),
// SPM: 250 characters

Description

The language data element shall be a character string consisting of a required language code followed by multiple, optional, hyphen-prefixed subcodes.

The following constraints apply to the language code part of the character string:

- Two-letter codes are defined by ISO 639–1.
- Three-letter codes are defined by ISO 639–2.
- The value prefix "i" is reserved for registrations defined by the Internet Assigned Numbers Authority (IANA).
- The value prefix "x" is reserved for private use.

The following constraints apply to the first subcode part of the character string:

- Two-letter subcodes are ISO 3166–1 alpha-2 country codes.
- Subcodes of from three to eight letters are registered with IANA.

Constraints for additional subcodes are unspecified.

The value held by the character string shall be a valid language code as defined by the XML Schema derived data type language (see XML Schema, Part 2).

ISO 639-2 specifies two code sets, one for bibliographic applications (ISO 639-2/B) and one for terminology applications (ISO 639-2/T). Either code set may be used.

NOTES:

1—The language code is normally given in lower case and the subcodes (if any) in upper case. However, the values are case insensitive.

2—The XML Schema derived data type language does not enforce all constraints on this language code.

Examples

"en-GB"
"de"
"fr-CA"
"it"
"i-bnn" (IANA Bunun)
6.3.2.2 String

Synopsis

```
string : characterstring(iso-10646-1),
    // SPM: The length parameter
```

Description

This data element contains the text of the localized string.

6.3.3 Long identifier type

Synopsis

```
type long_identifier_type =
    record
        catalg: characterstring(iso-10646-1),
            // SPM: 4000 characters
        entry: characterstring(iso-10646-1),
            // SPM: 4000 characters
    );
```

Description

This data type is an identifier (a label) that is intended to be unique within the context of the RCD. The catalog element is the name or designator of the identification or cataloging scheme for this entry, in other words, a namespace-scheme. The entry element is the value of the identifier within the identification or cataloging scheme that designates or identifies this RCD, in other words, a namespace-specific string.

Values for this data type shall conform to the syntax for URIs as defined by IETF RFC 2396. The catalog and entry values may be concatenated as a single character string in an application profile or binding. If the catalog and entry values are concatenated, the resulting character string shall conform to the syntax for URIs as defined by IETF RFC 2396.

NOTES

1—This Standard recommends that if an application profile or binding specifies a concatenated format for the identifier, the result be in the form of a globally unique identifier in the form of a Uniform Resource Name (URN) (see IETF RFC 2141 [B3]).

2—This Standard recommends that the catalog and entry lengths be limited so that the total length of a concatenated identifier is never longer than 4000 characters.
Annex A

(informative)

Bibliography


Annex B

(informative)

Sample XML binding schema

This Standard does not define any specific binding for the data model. However, related standards may reference this Standard and define bindings.

The example in Figure B.1 illustrates existing practice using an XML schema defined by the IMS Global Learning Consortium [B2].

NOTE—The sample schema uses “rcdeo, n” as the label for the root data element. It is not required that an implementation of this Standard use the same labels for data-element or type labels as those used in the example below, as long as the elements and types themselves are semantically equivalent.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
targetNamespace="http://www.imsglobal.org/xsd/imsrdceo_rootv1p0"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns="http://www.imsglobal.org/xsd/imsrdceo_rootv1p0"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:group name="extelement">
    <xs:annotation>
      <xs:documentation>extension mechanism for elements</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:any namespace="##other" processContents="strict" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:group>
  <xs:element name="rdceo">
    <xs:annotation>
      <xs:documentation>A single definition of a competence, educational objective etc</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="identifier" minOccurs="1" maxOccurs="1"/>
        <xs:element ref="title"/>
        <xs:element ref="description" minOccurs="0"/>
        <xs:element ref="definition" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="metadata" minOccurs="0"/>
        <xs:sequence minOccurs="0"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```
<xs:sequence>
  <xs:element ref="langstring" maxOccurs="unbounded"/>
</xs:sequence>
<xs:anyAttribute namespace="##other" processContents="strict"/>
</xs:complexType>
</xs:element>
<xs:element name="identifier">
  <xs:annotation>
    <xs:documentation>Catenated form of the identifier of an RDCEO</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="xs:anyURI">
        <xs:anyAttribute namespace="##other" processContents="strict"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>
<xs:element name="description">
  <xs:annotation>
    <xs:documentation>A description for the definition</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="langstring" maxOccurs="unbounded"/>
      <xs:group ref="extelement"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="strict"/>
  </xs:complexType>
</xs:element>
<xs:sequence minOccurs="0">
  <xs:group ref="extelement"/>
</xs:sequence>

<xs:element name="definition">
  <xs:annotation>
    <xs:documentation>A structured form of the definition</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="model" minOccurs="0"/>
      <xs:element ref="statement" maxOccurs="unbounded"/>
      <xs:sequence minOccurs="0">
        <xs:group ref="extelement"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="strict"/>
  </xs:complexType>
</xs:element>

<xs:element name="model">
  <xs:annotation>
    <xs:documentation>The model identification for the structured definition</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="xs:string">
        <xs:anyAttribute namespace="##other" processContents="strict"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>

<xs:element name="statement">
  <xs:annotation>
    <xs:documentation>A component part of a structured definition</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence minOccurs="0">
      <xs:group ref="extelement"/>
    </xs:sequence>
    <xs:attribute name="statementid" type="xs:ID"/>
    <xs:attribute name="statementname" type="xs:string"/>
  </xs:complexType>
</xs:element>
<xs:complexType>
  <xs:sequence>
    <xs:element ref="langstring" maxOccurs="unbounded"/>
    <xs:sequence minOccurs="0">
      <xs:group ref="extelement"/>
    </xs:sequence>
  </xs:sequence>
</xs:complexType>

<xsl:element name="statementtext">
  <xs:annotation>
    <xs:documentation>Used for statements with free-form text</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="langstring" maxOccurs="unbounded"/>
      <xs:sequence minOccurs="0">
        <xs:group ref="extelement"/>
      </xs:sequence>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xsl:element name="source">
  <xs:annotation>
    <xs:documentation>Source identification for a vocabulary token</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="xs:string">
        <xs:anyAttribute namespace="##other" processContents="strict"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>

<xsl:element name="value">
  <xs:annotation>
    <xs:documentation>A vocabulary token</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="xs:string">
        <xs:anyAttribute namespace="##other" processContents="strict"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>

<xsl:element name="metadata">
  <xs:annotation>
    <xs:documentation>A container for metadata</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="rdceoschema" minOccurs="0"/>
      <xs:element ref="rdceoschemaversion" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:group ref="extelement"/>
      </xs:sequence>
    </xs:sequence>
  </xs:complexType>
</xs:element>
Figure B.1—An example schema