INTERNATIONAL STANDARD

ISO/IEC 11179-1

Fourth edition
2023-01

Information technology — Metadata registries (MDR) —

Part 1: **Framework**

Technologies de l'information — Registres de métadonnées (RM) — Partie 1: Cadre de référence

Reference number
ISO/IEC 11179-1:2023(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

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

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

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

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. 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 32, *Data management and interchange*.

This fourth edition cancels and replaces the third edition (ISO/IEC 11179-1:2015), which has been technically revised.

The main changes are as follows:

— some of the detailed descriptions from the Introduction and Clause 5 have been removed to avoid duplication with other parts;

— Clause 7 has been updated to:

  — revise the description for ISO/IEC 11179-3 to reflect its focus on the core metamodel of a metadata registry, and the creation of separate parts to handle other aspects;

  — add a description for ISO/IEC 11179-30;

  — add a description for ISO/IEC 11179-31;

  — add a description for ISO/IEC 11179-32;

  — add a description for ISO/IEC 11179-33;

  — add a description for ISO/IEC 11179-34;

  — add a description for ISO/IEC 11179-35;

— Clause 8 has been added to describe the relationship of other ISO/IEC JTC 1/SC 32 standards on metadata to the ISO/IEC 11179 series;

— references to other standards have been updated, especially ISO 1087, to the latest edition.

A list of all parts in the ISO/IEC 11179 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

The ISO/IEC 11179 series addresses the semantics of data, the representation of data and the registration of the descriptions of that data. It is through these descriptions that an accurate understanding of the semantics and a useful depiction of the data are found.

The purposes of ISO/IEC 11179 are to promote the following:

— standard description of data;

— common understanding of data across organizational elements and between organizations;

— re-use and standardization of data over time, space, and applications;

— harmonization and standardization of data within an organization and across organizations;

— management of the components of descriptions of data;

— re-use of the components of descriptions of data.

Each part of ISO/IEC 11179 is devoted to addressing a different aspect of these needs, as described in Clause 7.

Generally, descriptive data are known as metadata. Metadata can describe books, phone calls, data, etc. ISO/IEC 11179 focuses upon metadata that describe data.

A metadata registry (MDR) is a system for maintaining a database of metadata. Registration is one possible function of that system. Registration accomplishes three main goals: identification, provenance, and monitoring quality. Identification is accomplished by assigning a unique identifier (within the registry) to each object registered there. Provenance addresses the source of the metadata and the object described. Monitoring quality ensures that the metadata does the job it is designed to do.

An MDR may contain the semantics of data. An understanding of data is fundamental to their design, harmonization, standardization, use, re-use and interchange. The underlying model for an MDR is designed to capture all the basic components of the semantics of data, independent of any application or subject matter area.

MDRs, typically, are organized so that those designing applications can ascertain whether a suitable object described in the MDR already exists. Where it is established that a new object is essential, its derivation from an existing description with appropriate modifications is encouraged, thus avoiding unnecessary variations in the way similar objects are described. Registration will also allow two or more administered items describing identical objects to be identified, and more importantly, it will help to identify situations where similar or identical names are in use for administered items that are significantly different in one or more respects.

The names, definitions, datatype and related attributes that are associated with the description of an object in an MDR give that object meaning. The depth of this meaning is limited, because names and definitions convey limited information about the object. The relationships object descriptions have with semantically related object descriptions in a registry provide additional information, but this additional information is dependent on how many semantically related object descriptions there are.

A metadata registry that conforms to ISO/IEC 11179 can describe a wide variety of data. In fact, the attributes described in ISO/IEC 11179 are data elements, and they can be registered in an ISO/IEC 11179 metadata registry. Moreover, any set of descriptors or metadata attributes may be interpreted as data elements and registered in the metadata registry.

There are two main consequences to this:

— the metadata registry can describe itself;

— metadata layers or levels are not defined in ISO/IEC 11179.

As a result, ISO/IEC 11179 is a general description framework for data of any kind, in any organization and for any purpose. ISO/IEC 11179 does not address other data management needs, such as data models, application specifications, programming code, program plans, business plans and business policies. These need to be addressed elsewhere. ISO/IEC 19763 specifies facilities to extend a metadata registry so that information about models can be registered. Such models include information (or data) models, ontologies, process models, role and goal models, and form designs.

The increased use of data processing and electronic data interchange heavily relies on accurate, reliable, controllable and verifiable data recorded in databases. One of the prerequisites for a correct and proper use and interpretation of data is that both users and owners of data have a common understanding of the meaning and descriptive characteristics (e.g. representation) of that data, guaranteed by the definition of several basic attributes.

The basic attributes specified are applicable for the definition and specification of the contents of data dictionaries and interchanging or referencing among various collections of administered items. The "basic" in basic attributes means that the attributes are commonly needed in specifying administered items completely enough to ensure that they will be applicable for a variety of functions, such as:

— design of information processing systems;

— retrieval of data from databases;

— design of messages for data interchange;

— maintenance of metadata registries;

— data management;

— dictionary design;

— dictionary control;

— use of information processing systems.

Basic also implies that they are independent of any:

— application environment;

— function of an object described by an administered item;

— level of abstraction;

— grouping of administered items;

— method for designing information processing systems or data interchange messages;

— MDR system.

Basic does not imply that all attributes specified in ISO/IEC 11179 are required in all cases. Distinction is made between those attributes that are mandatory, conditional, or optional.

Information technology — Metadata registries (MDR) —

Part 1: Framework

1 Scope

This document provides the means for understanding and associating the individual parts of ISO/IEC 11179 and is the foundation for a conceptual understanding of metadata and metadata registries. This document also describes the relationship of ISO/IEC 11179 to other JTC 1/SC 32 standards, technical specifications and technical reports on metadata.

In all parts of ISO/IEC 11179, metadata refers to descriptions of data. It does not contain a general treatment of metadata.

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 704, *Terminology work — Principles and methods*

ISO 1087, *Terminology work and terminology science — Vocabulary*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO 704, ISO 1087 and the following apply.

ISO and IEC maintain terminological 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 Terms related to modelling constructs

3.1.1
attribute
characteristic (3.2.6) of an *object* (3.2.4) or set of objects

[SOURCE: ISO/IEC 11179-3:2023, 3.1.11]

3.1.2
class
description of a set of *objects* (3.2.4) that share the same *attributes* (3.1.1), operations, methods, *relationships* (3.1.4) and semantics

Note 1 to entry: Adapted from ISO/IEC 19505-2:2012, 7.3.7.

3.1.3
identifier
<metadata registry> sequence of characters, capable of uniquely identifying that with which it is associated, within a specified *context* (3.3.3)

Note 1 to entry: Unlike a *name* (3.2.17), an identifier is linguistically neutral.

Note 2 to entry: It is possible to define an identifier from the point of view of terminology as defined in ISO 1087 and described in ISO 704, as follows: representation of an object by a sign which denotes it, and is intended for dereferencing that object. Note the parallel with the definition of *designation* (3.2.16), except this applies to any object rather than just for concepts.

[SOURCE: ISO/IEC 11179-3:2023, 3.1.16, modified — Note 2 to entry has been added.]

3.1.4
relationship
<UML> semantic connection among model elements

[SOURCE: ISO 19103:2015, 4.30]

3.2 General terms

3.2.1
subject
area of interest or expertise

[SOURCE: ISO 1087:2019, 3.1.5]

3.2.2
domain
subject field
field of special knowledge

Note 1 to entry: The borderlines and the granularity of a domain are determined from a purpose-related point of view. If a domain is sub-divided, the result is again a domain.

[SOURCE: ISO 1087:2019, 3.1.4]

3.2.3
entity
any concrete or abstract thing that exists, did exist, or might exist, including associations among these things

EXAMPLE A 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, 2121433, modified — some Notes to entry have been deleted.]

3.2.4
object
anything perceivable or conceivable

Note 1 to entry: Objects can be material (e.g. 'engine', 'sheet of paper', 'diamond'), immaterial (e.g. 'conversion ratio', 'project plan') or imagined (e.g. 'unicorn', 'scientific hypothesis').

[SOURCE: ISO 1087:2019, 3.1.1]

3.2.5
property
<terminology> feature of an *object* (3.2.4)

EXAMPLE 1 'Being made of wood' as a property of a given 'table'.

EXAMPLE 2 'Belonging to person A' as a property of a given 'pet'.

EXAMPLE 3 'Having been formulated by Einstein' as a property of the equation 'E = mc^2'.

EXAMPLE 4 'Being compassionate' as a property of a given 'person'.

EXAMPLE 5 'Having a given cable' as a property of a given 'computer mouse'.

Note 1 to entry: One or more objects can have the same property.

Note 2 to entry: See also 3.3.2.

[SOURCE: ISO 1087:2019, 3.1.3, modified — Note 2 to entry added.]

3.2.6
characteristic
abstraction of a *property* (3.2.5)

EXAMPLE 'Having a cable for connecting with a computer' as a characteristic of the concept 'cord mouse'.

Note 1 to entry: Characteristics are used for describing *concepts* (3.2.8).

[SOURCE: ISO 1087:2019, 3.2.1]

3.2.7
essential characteristic
characteristic (3.2.6) of a *concept* (3.2.8) which is indispensable to understanding that concept

[SOURCE: ISO 1087:2019, 3.2.3]

3.2.8
concept
unit of knowledge created by a unique combination of *characteristics* (3.2.6)

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.

Note 2 to entry: A concept is independent of its representation.

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

3.2.9
general concept
concept (3.2.8) that corresponds to a potentially unlimited number of *objects* (3.2.4), which form a group by reason of shared *properties* (3.2.5)

EXAMPLE 'planet', 'tower', 'Nobel Prize in Physics', 'moon'.

Note 1 to entry: For a general concept it is essential that a number of corresponding objects greater than 1 can be perceived or conceived of. For example 'spaceship' has been a general concept before such a material object existed, at the time when there existed only 1 such object, and later when there existed several such objects.

[SOURCE: ISO 1087:2019, 3.2.9]

3.2.10
individual concept
concept (3.2.8) which corresponds to only one *object* (3.2.4)

EXAMPLE ‘Saturn’, ‘Eiffel Tower’, 'Moon', 'serial number FRHR603928', '2016 Nobel Prize in Physics'.

Note 1 to entry: Individual concepts are represented by *proper names* (3.2.18).

[SOURCE: ISO 1087:2019, 3.2.8]

3.2.11
definition
representation of a *concept* (3.2.8) by an expression that describes it and differentiates it from related concepts

[SOURCE: ISO 1087:2019, 3.3.1]

3.2.12
extension
<terminology> set of all of the *objects* (3.2.4) to which a *concept* (3.2.8) corresponds

Note 1 to entry: This term has a different meaning in ISO/IEC 11179-3.

[SOURCE: ISO 1087:2019, 3.1.2, modified — Note 1 to entry added.]

3.2.13
intension
set of *characteristics* (3.2.6) that make up a *concept* (3.2.8)

[SOURCE: ISO 1087:2019, 3.2.6]

3.2.14
concept relation
relation between two *concepts* (3.2.8)

[SOURCE: ISO 1087:2019, 3.2.11]

3.2.15
concept system
set of *concepts* (3.2.8) structured in one or more related *domains* (3.2.2) according to the *concept relations* (3.2.14) among its concepts

[SOURCE: ISO 1087:2019, 3.2.28]

3.2.16
designation
designator
representation of a *concept* (3.2.8) by a sign which denotes it in a *domain* (3.2.2) or *subject* (3.2.1)

Note 1 to entry: A designation can be linguistic or non-linguistic. It can consist of various types of characters, but also punctuation marks such as hyphens or parentheses, governed by domain-, subject-, or language specific conventions.

Note 2 to entry: A designation can be a *term* (3.2.19) including *appellations* (3.2.20), a *proper name* (3.2.18) or a *symbol* (3.2.21).

[SOURCE: ISO 1087:2019, 3.4.1]

3.2.17
name
designation (3.2.16) of an *object* (3.2.4) by a linguistic expression

[SOURCE: ISO/IEC 15944-1:2011, 3.35]

3.2.18
proper name
designation (3.2.16) that represents an *individual concept* (3.2.10)

[SOURCE: ISO 1087:2019, 3.4.4]

3.2.19
term
designation (3.2.16) that represents a *general concept* (3.2.9) by linguistics means

EXAMPLE "laser printer", "planet", "pacemaker", "chemical compound", "¾ time", "Influenza A virus", "oil painting".

Note 1 to entry: Terms may be partly or wholly verbal.

[SOURCE: ISO 1087:2019, 3.4.2, modified — EXAMPLE changed to EXAMPLES.]

3.2.20
appellation
term (3.2.19) that is applied to a group of *objects* (3.2.4) whose relevant *properties* (3.2.5) are identical

EXAMPLE "Nokia 7 Plus®" (mobile phone), “Adobe® Acrobat® X Pro” (software), “Road King®” (motorcycle)[1)]

[SOURCE: ISO 1087:2019, 3.4.3]

3.2.21
symbol
designation (3.2.16) that represents a *concept* (3.2.8) by non-linguistic means

Note 1 to entry: There are several types of symbols such as graphical symbols [see ISO 3864 (all parts)] and letter symbols [see ISO 80000[35] (all parts)].

[SOURCE: ISO 1087:2019, 3.4.5]

3.2.22
terminological system
concept system (3.2.15) with *designations* (3.2.16) for each *concept* (3.2.8)

3.2.23
data
reinterpretable representation of information in a formalized manner suitable for communication, interpretation or processing

Note 1 to entry: Data can be processed by humans or by automatic means.

Note 2 to entry: Data can also be described using the terminological notions defined in ISO 1087 and the computational notions defined in ISO/IEC 11404. A datum is a designation of a concept with a notion of equality defined for that concept.

[SOURCE: ISO/IEC 2382:2015, 2121272 — Notes to entry have been modified.]

3.2.24
data model
graphical, lexical or combined representation of *data* (3.2.23), specifying their *properties* (3.2.5), structure, and interrelationships

3.2.25
conceptual model
conceptual data model
data model (3.2.24) that represents an abstract view of the real world

Note 1 to entry: A conceptual model represents the human understanding of a system, which can be anywhere from a paper-based system to a complex database in an IT system.

1) Nokia 7 Plus® is a trademark of Nokia Corporation, Adobe® Acrobat® X Pro is a trademark of Adobe Systems, Road King® is a trademark of Harley-Davidson. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the products named.