

Fourth edition
2023-01

Information technology — Metadata registries (MDR) —

Part 3: Metamodel for registry common facilities



Reference number
ISO/IEC 11179-3:2023(E)

© ISO/IEC 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	x
Introduction	xii
1 Scope	1
1.1 Structure of a metadata registry.....	1
1.2 Model extensions.....	1
2 Normative references	1
3 Terms, definitions and abbreviated terms	2
3.1 Terms related to metamodel constructs.....	2
3.2 Terms related to concepts.....	5
3.3 Abbreviated terms.....	17
4 Conformance	17
4.1 Overview of conformance.....	17
4.2 Degree of conformance.....	18
4.2.1 General.....	18
4.2.2 Strictly conforming implementations.....	18
4.2.3 Conforming implementations.....	18
4.3 Conformance by feature.....	19
4.4 Registry conformance.....	19
4.4.1 Overview.....	19
4.4.2 Standard profiles for registries.....	19
4.4.3 Conformance labels.....	19
4.5 Obligation.....	20
4.6 Implementation conformance statement (ICS).....	20
4.7 Roles and responsibilities for registration.....	20
5 Approach to modelling a metadata registry	20
5.1 Metamodel for a metadata registry.....	20
5.2 Application of the metamodel.....	21
5.3 Specification of the metamodel.....	21
5.3.1 Terminology used in specifying the metamodel.....	21
5.3.2 Choice of fonts.....	22
5.3.3 Use of UML Packages.....	22
5.3.4 Package dependencies.....	23
5.3.5 Use of UML Class diagrams and textual description.....	23
5.3.6 Use of dot notation.....	24
5.4 Types, instances and values.....	24
5.5 Extensibility.....	24
5.6 Date references.....	24
6 Basic_and_Core package	25
6.1 Overview of Basic_and_Core package.....	25
6.2 Predefined types metamodel region.....	25
6.2.1 Overview of predefined types.....	25
6.2.2 Boolean.....	25
6.2.3 Datetime.....	25
6.2.4 Date.....	25
6.2.5 Integer.....	26
6.2.6 Natural_Range.....	26
6.2.7 Notation.....	26
6.2.8 Phone_Number.....	26
6.2.9 Postal_Address.....	26
6.2.10 Sign.....	26
6.2.11 String.....	26
6.2.12 Text.....	27

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

6.2.13	Value	27
6.3	Basic classes metamodel region.....	27
6.3.1	Overview of basic classes	27
6.3.2	Individual class.....	28
6.3.3	Organization class.....	28
6.3.4	Role class.....	28
6.3.5	Contact class.....	29
6.3.6	Document_Type class.....	29
6.3.7	Language_Identification class.....	30
6.3.8	Reference_Document class.....	32
6.3.9	Registration_Authority_Identifier class.....	32
6.3.10	Datetime_Period class.....	33
6.4	Core metamodel region.....	33
6.4.1	Overview of Core metamodel region.....	33
6.4.2	Classes in the Core metamodel region.....	34
6.4.3	Associations in the Core metamodel region.....	36
7	Identification package	37
7.1	Overview of Identification metamodel region.....	37
7.2	Classes referenced from the Basic_and_Core package.....	37
7.2.1	Item class.....	37
7.3	Classes in the Identification metamodel region.....	38
7.3.1	Identified_Item class.....	38
7.3.2	Scoped_Identifier class.....	38
7.3.3	Namespace class.....	39
7.4	Associations in the Identification metamodel region.....	41
7.4.1	item_identification association.....	41
7.4.2	identification association.....	42
7.4.3	identifier_scope association.....	42
8	Designation_and_Definition package.....	42
8.1	Overview of Designation and Definition metamodel region.....	42
8.2	Classes referenced from the Basic_and_Core package.....	43
8.2.1	Item class.....	43
8.2.2	Context class.....	43
8.3	Classes referenced from the Identification package.....	44
8.3.1	Namespace class.....	44
8.4	Classes in the Designation and Definition metamodel region.....	46
8.4.1	Designation class.....	46
8.4.2	Definition class.....	47
8.4.3	Designation_Definition_Pairing class.....	48
8.4.4	Naming_Convention class.....	49
8.5	Association classes in the Designation and Definition metamodel region.....	50
8.5.1	Definition_Context association class.....	50
8.5.2	Designation_Context association class.....	51
8.6	Associations in the Designation and Definition metamodel region.....	51
8.6.1	context_for_pairing association.....	51
8.6.2	designation_namespace association.....	51
8.6.3	item_definition association.....	51
8.6.4	item_designation association.....	52
8.6.5	naming_convention_conformance association.....	52
8.6.6	naming_convention_utilization association.....	52
8.6.7	paired_definition association.....	52
8.6.8	paired_designation association.....	52
8.7	Datatypes in the Designation and Definition metamodel region.....	52
8.7.1	Acceptability enumeration.....	52
9	Registration package	53
9.1	Overview of Registration metamodel region.....	53
9.2	Classes referenced from the Basic and core package.....	54

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

9.2.1	Contact class.....	54
9.2.2	Organization class.....	54
9.2.3	Reference_Document class.....	55
9.3	Classes referenced from the Identification package.....	55
9.3.1	Identified_Item.....	55
9.3.2	Namespace class.....	55
9.4	Classes in the Registration region.....	55
9.4.1	Registered_Item class.....	55
9.4.2	Administered_Item class.....	56
9.4.3	Attached_Item class.....	57
9.4.4	Registration_State class.....	58
9.4.5	Constraint_Set class.....	59
9.4.6	Registration_Authority class.....	60
9.4.7	Registrar class.....	61
9.4.8	Stewardship_Record class.....	61
9.4.9	Submission_Record class.....	62
9.4.10	Registry_Specification class.....	63
9.5	Associations in the Registration region.....	66
9.5.1	attachment association.....	66
9.5.2	reference association.....	66
9.5.3	registered_item_constraint_set association.....	66
9.5.4	registration association.....	66
9.5.5	registration_authority_namespace association.....	67
9.5.6	registration_authority_registrar association.....	67
9.5.7	stewardship association.....	67
9.5.8	submission association.....	67
9.6	Datatypes in the Registration metamodel region.....	67
9.6.1	Degree_of_Conformance enumeration.....	67
9.6.2	Registration_Status enumeration.....	68
10	Classification package.....	69
10.1	Overview of Classification metamodel region.....	69
10.2	Classes referenced from the Basic and core package.....	70
10.2.1	Item class.....	70
10.3	Classes in the Classification metamodel region.....	70
10.3.1	Classification_Scheme class.....	70
10.3.2	Classification_Scheme_Item class.....	71
10.3.3	Classification_Scheme_Item_Relationship class.....	72
10.3.4	Classification_Scheme_Item_Relationship_Type class.....	72
10.4	Associations in the Classification metamodel region.....	73
10.4.1	item_classification association.....	73
10.4.2	classification_scheme_membership association.....	73
10.4.3	subject_classification_scheme_item association.....	73
10.4.4	object_classification_scheme_item association.....	73
10.4.5	classification_scheme_item_relationship_categorization association.....	73
11	Item_Mapping package.....	74
11.1	Overview of the Item_Mapping metamodel region.....	74
11.2	Classes referenced from the Basic and core package.....	74
11.2.1	Item class.....	74
11.3	Classes in the Mapping metamodel region.....	75
11.3.1	Item_Mapping class.....	75
11.4	Association Classes in the Mapping metamodel region.....	76
11.4.1	Subject_Mapping association class.....	76
11.4.2	Object_Mapping association class.....	76
11.5	Associations in the Item Mapping metamodel region.....	77
11.5.1	mapping_hierarchy association.....	77
11.6	Datatypes in the Mapping metamodel region.....	77
11.6.1	Item_Mapping_Degree enumeration.....	77

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

Annex A (informative) Consolidated class hierarchy	79
Annex B (informative) Illustrations of Item_Mapping	80
Annex C (informative) Example of Registering a simple Conceptual Domain	91
Bibliography	96

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

List of Figures

Figure 1 — Package dependencies.....	23
Figure 2 — Predefined types metamodel region	25
Figure 3 — Basic classes metamodel region	27
Figure 4 — Core metamodel region.....	34
Figure 5 — Identification metamodel region.....	37
Figure 6 — Designation and Definition metamodel region	42
Figure 7 — Registration metamodel region.....	54
Figure 8 — Classification metamodel region.....	69
Figure 9 — Item mapping.....	74
Figure A.1 — Consolidated class hierarchy.....	79
Figure B.1 — Object Diagram for the ‘same as’ mapping example.....	81
Figure B.2 — Object Diagram for the ‘derived from’ mapping example.....	82
Figure B.3 — Example UML Class Diagram for the Product Supplier concept (as used by System A).....	84
Figure B.4 — Example IDEF1X Model for the Product Supplier concept (as used by System B).....	84
Figure B.5 — Object Diagram for the ‘semantically equivalent’ mapping example.....	85
Figure B.6 — Object Diagram for the ‘semantically similar’ mapping example	89
Figure C.1 — Example object model of Conceptual Domain registration.....	92

List of Tables

Table 1 — Attributes of Individual class.....	28
Table 2 — Attributes of Organization class.....	28
Table 3 — Attributes of Role class.....	29
Table 4 — Attributes of Contact class.....	29
Table 5 — Attributes of Document_Type class.....	30
Table 6 — Attributes of Language_Identification class.....	30
Table 7 — Attributes of Reference_Document class.....	32
Table 8 — Attributes of Registration_Authority_Identifier class.....	33
Table 9 — Attributes of Datetime_Period class.....	33
Table 10 — Attributes of Concept class.....	35
Table 11 — Attributes of Slot class.....	36
Table 12 — Attributes of Scoped_Identifier class.....	38
Table 13 — Attributes of Namespace class.....	40
Table 14 — Attributes of Designation class.....	46
Table 15 — Attributes of Definition class.....	48
Table 16 — Attributes of <i>Designation_Definition_Pairing</i> class.....	49
Table 17 — Attributes of Naming_Convention class.....	49
Table 18 — Attributes of Definition_Context association class.....	51
Table 19 — Attributes of Designation_Context association class.....	51
Table 20 — Enumeration of Acceptability ratings.....	53
Table 21 — Attributes of Administered_Item class.....	56
Table 22 — Attributes of Registration_State class.....	58
Table 23 — Attributes of Constraint_Set class.....	60
Table 24 — Attributes of Registration_Authority class.....	61
Table 25 — Attributes of Registrar class.....	61
Table 26 — Attributes of Stewardship_Record class.....	62
Table 27 — Attributes of Submission_Record class.....	63
Table 28 — Attributes of Registry_Specification class.....	63
Table 29 — Enumeration of Degree_of_Conformance.....	68
Table 30 — Enumeration of Registration Statuses.....	68
Table 31 — Attributes of Classification_Scheme_Item class.....	71
Table 32 — Attributes of <i>Item_Mapping</i> class.....	75
Table 33 — Attributes of Subject_Mapping association class.....	76
Table 34 — Attributes of Object_Mapping association class.....	77
Table 35 — Enumeration of Item_Mapping_Degree values.....	77
Table B.1 — Examples of Mapping Degree usage.....	80
Table B.2 — Table of Items used in 'same as' example.....	81
Table B.3 — Item_Mapping for 'Birth Date_Mapping'.....	81

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

Table B.4 — Table of Items used in 'derived_from' example	81
Table B.5 — Item_Mapping class 'isodate_mapping1'	82
Table B.6 — Table of Subject_Mappings for isodate_mapping1	83
Table B.7 — Table of Object_Mappings for isodate_mapping1	83
Table B.8 — Item_Mapping class 'isodate_mapping2'	83
Table B.9 — Table of Subject_Mappings for isodate_mapping2	83
Table B.10 — Table of Object_Mappings for isodate_mapping2	83
Table B.11 — Table of Items used in this example	84
Table B.12 — Table of Item_Mappings for this example	86
Table B.13 — Table of Mapping_Hierarchy associations	86
Table B.14 — Table of Items used in this example	87
Table B.15 — Table of Item_Mappings for this example	90
Table B.16 — Table of Mapping_Hierarchy association	90

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 11179-3:2013), which has been technically revised. It also incorporates the Amendment ISO/IEC 11179-3:2013/Amd.1:2020.

The main changes are as follows:

- this fourth edition presents a metamodel for the Common Facilities of a Basic Registry which has potential use for more than just metadata;
- the previous edition has been split into multiple parts to make it more manageable;
 - the Basic Attributes (formerly Clause 12) have been moved to ISO/IEC 11179-30: Basic attributes of metadata;
 - the Data Description region (formerly Clause 11) has been moved to ISO/IEC 11179-31: Metamodel for data specification registration;
 - the Concepts region (formerly Clause 9) and the Binary Relations region (formerly Clause 10) have been moved to ISO/IEC 11179-32: Metamodel for concept system registration;
- simplification of the UML used to describe the metamodels, such as:
 - elimination of use of stereotypes;
 - addition of an explicit 'Item' class as the superclass of all types of registry items;
 - removal of role names on associations;

This is a preview of "ISO/IEC 11179-3:2023". Click here to purchase the full version from the ANSI store.

- removal of redundant specification of attributes and associations in the text;
- refactoring of some of the packages to reduce dependencies, including:
 - moving the Concept class to the Basic and Core package where it is referenced from multiple metamodel regions, including: the Data Specification package in ISO/IEC 11179-31, the Concept System package in ISO/IEC 11179-32, the Data Set package in ISO/IEC 11179-33 and the Model package in ISO/IEC 11179-35;
 - moving the Context class to the Basic and Core package where it is referenced from the Designation and Definition package in this document, the Data Specification package in ISO/IEC 11179-31 and the Data Set package in ISO/IEC 11179-33;
 - moving the Slot class to the Basic and Core package, a more appropriate location than the Identification package;
 - a Classification region has been restored, based on the style of ISO/IEC 11179-3:2003^[12], to remove dependency on the Concept System region for classification;
- adding a generic mapping facility among registry items;
- a change to the formatting of the text in [Clauses 5](#) through [11](#) and [Annexes B](#) and [C](#), to better align with ISO Directives and ISO House Style, see [5.3.2](#).

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

Data processing and electronic data interchange rely heavily on accurate, reliable, controllable and verifiable data recorded in databases. A prerequisite for correct and proper use and interpretation of data is that both users and owners of data have a common understanding of the meaning and representation of the data. To facilitate this common understanding, a number of characteristics, or attributes, of the data have to be defined. These characteristics of data are known as “metadata”, that is, “data that describes data”.

The attributes of data elements and associated metadata can be specified and recorded as registry items in a metadata registry (MDR). The metadata registry is used to keep information about data elements and associated concepts, such as “data element concepts”, “conceptual domains” and “value domains” (see ISO/IEC 11179-31). Generically, these are all referred to as “metadata items”. Such metadata are necessary to clearly describe, record, analyse, classify and administer data.

ISO/IEC 11179 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 the ISO/IEC 11179 series 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 ISO/IEC 11179-1:2023, Clause 7. This document specifies the information to be recorded in a metadata registry in the form of a conceptual data model. It also specifies common facilities for dealing with identification, designation, definition and registration of any type of registry item. Thus, this document applies to registries other than metadata registries. Other parts of ISO/IEC 11179 extend this model to support specific types of metadata items, such as: data elements, data element concepts, data set specifications, concept systems, etc. (See [1.2](#).)

NOTE ISO/IEC 11179-30^[16] describes the basic attributes of registry items for purposes where a complete metadata registry is not appropriate.

This document is of interest to information developers, information managers, data administrators, standards developers, application developers, business modellers and others who are responsible for making data understandable and shareable. ISO/IEC 11179 has broad applicability across subject areas and information technologies.

ISO/IEC 11179 applies to activities including:

- a) the definition, specification and registration of contents of metadata registries, including interchanging or referencing among various collections of data elements^[17], including data sets^[19] and models^{[21][29]};
- b) interchange or reference among various collections of metadata, including models^{[21][29]};
- c) the registration and management of semantic artifacts that are useful for data management, data administration and data analysis;

This is a preview of "ISO/IEC 11179-3:2023". [Click here to purchase the full version from the ANSI store.](#)

- d) the interrelation of concept systems with data held in relational databases, XML databases, knowledgebases, text, and possibly graph databases deriving from natural language text understanding systems;
- e) the provision of services for semantic computing: Semantics Service Oriented Architecture, Semantic Grids, semantics-based workflows, Semantic Web, etc;
- f) support for addressing semantic web considerations such as AAA (anyone can say anything about anything), non-unique names and open world assumption.

In [Clauses 5](#) through [11](#) and [Annexes B](#) and [C](#), this document uses:

- **bold** font to highlight terms which represent metadata objects specified by the metamodel;
- normal font for terms which represent concepts defined in [Clause 3](#).

EXAMPLE **Concept** ([6.4.2.2](#)) is a class each instance of which models a concept.