

---

---

**Information technology — Metadata  
registries (MDR) —**

**Part 31:  
Metamodel for data specification  
registration**

*Technologies de l'information — Registres de métadonnées (RM) —*

*Partie 31: Métamodèle pour l'enregistrement des spécifications de  
données*





**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](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword.....	vii
Introduction.....	viii
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>1</b>
<b>4 Abbreviated terms.....</b>	<b>6</b>
<b>5 Conformance.....</b>	<b>6</b>
5.1 Overview of conformance.....	6
5.2 Degree of conformance.....	6
5.2.1 General.....	6
5.2.2 Strictly conforming implementations.....	7
5.2.3 Conforming implementations.....	7
5.3 Conformance by feature.....	7
5.4 Registry conformance.....	8
5.4.1 Standard profiles for edition 4 registries.....	8
5.4.2 Conformance labels.....	8
5.5 Implementation conformance statement (ICS).....	8
5.6 Obligation.....	8
<b>6 Relationship to ISO/IEC 11179-3.....</b>	<b>9</b>
6.1 Metamodel for a metadata registry.....	9
6.2 Specification of the metamodel.....	9
6.3 Use of UML Class diagrams and textual description.....	9
6.4 Package dependencies.....	10
6.5 Subclassing the Constraint_Set class.....	10
<b>7 Data_Specification package.....</b>	<b>11</b>
7.1 Overview of the Data_Specification package.....	11
7.2 High-level Data Specification metamodel region.....	12
7.2.1 Overview of the high-level metamodel region.....	12
7.2.2 Classes in the High-level Data Specification metamodel region.....	13
7.2.3 Associations of the High-Level Data Specification metamodel region.....	16
7.2.4 Constraints of the High Level metamodel region.....	17
7.3 Data Element Concept metamodel region.....	18
7.3.1 Overview of the Data Element Concept metamodel region.....	18
7.3.2 Classes in the Data Element Concept metamodel region.....	19
7.3.3 Associations in the Data Element Concept metamodel region.....	22
7.4 Conceptual Domain and Value Domain metamodel region.....	22
7.4.1 Overview of the Conceptual Domain and Value Domain metamodel region.....	22
7.4.2 Classes in the Conceptual Domain and Value Domain metamodel region.....	24
7.4.3 Association Classes in the Conceptual Domain and Value Domain metamodel region.....	41
7.4.4 Associations in the Conceptual Domain and Value Domain metamodel region.....	44
7.4.5 Additional Constraints of the Conceptual Domain and Value Domain metamodel region.....	45
7.5 Measurement metamodel region.....	46
7.5.1 Overview of the Measurement metamodel region.....	46
7.5.2 Classes in the Measurement metamodel region.....	47
7.5.3 Associations in the Measurement metamodel region.....	50
7.6 Data Element metamodel region.....	51
7.6.1 Overview of the Data Element metamodel region.....	51
7.6.2 Classes in the Data Element metamodel region.....	52
7.6.3 Associations in the Data Element metamodel region.....	56

7.7	Value Domain Subset metamodel region.....	57
7.7.1	Overview of the Value Domain Subset metamodel region.....	57
7.7.2	Classes in the Value Domain Subset metamodel region.....	57
7.7.3	Association classes in the Value Domain Subset metamodel region.....	61
7.7.4	Associations in the Value Domain Subset metamodel region.....	62
7.7.5	Constraints in the Value Domain Subset metamodel region.....	63
7.8	Conceptual Domain Subset metamodel region.....	63
7.8.1	Overview of the Conceptual Domain Subset metamodel region.....	63
7.8.2	Classes in the Conceptual Domain Subset metamodel region.....	64
7.8.3	Association classes in the Conceptual Domain Subset metamodel region.....	66
7.8.4	Associations in the Conceptual Domain Subset metamodel region.....	67
7.8.5	Constraints in the Conceptual Domain Subset metamodel region.....	68
7.9	Composite Data Elements and Datatypes metamodel region.....	68
7.9.1	Overview of the Composite Data Elements and Datatypes metamodel region.....	68
7.9.2	Classes in the Composite Data Elements and Datatypes metamodel region.....	69
7.9.3	Association Class in the Composite Data Elements and Datatypes metamodel region.....	71
7.9.4	Associations in the Composite Data Elements and Datatypes metamodel region.....	72
<b>Annex A (informative) Consolidated class hierarchy.....</b>		<b>73</b>
<b>Annex B (informative) Example of Address as Composite Data Element and Datatype.....</b>		<b>74</b>
<b>Annex C (informative) Partial consolidated data specification metamodel.....</b>		<b>75</b>
<b>Bibliography.....</b>		<b>76</b>

## List of Figures

Figure 1 — Package dependencies.....	10
Figure 2 — Subclasses of Constraint_Set.....	11
Figure 3 — High-level Data Specification metamodel.....	12
Figure 4 — Data Element Concept metamodel region.....	18
Figure 5 — Conceptual Domain and Value Domain metamodel region .....	23
Figure 6 — Measurement metamodel region.....	46
Figure 7 — Data Element metamodel region.....	51
Figure 8 — Value Domain Subset metamodel region.....	57
Figure 9 — Conceptual Domain Subset metamodel region.....	63
Figure 10 — Composite Data Elements and Datatypes metamodel region.....	69
Figure A.1 — Consolidated Class Hierarchy.....	73
Figure B.1 — Object diagram of Address as Composite Datatype and Data Element.....	74
Figure C.1 — Partial Consolidated Data Specification metamodel.....	75

## List of Tables

Table 1 — Attributes of Data_Element_Concept_Constraint_Set class .....	21
Table 2 — Attributes of Conceptual_Domain class .....	24
Table 3 — Attributes of Enumerated_Conceptual_Domain class .....	26
Table 4 — Attributes of Enumerated_Conceptual_Domain_Definition class .....	29
Table 5 — Attributes of Value_Domain class .....	30
Table 6 — Attributes of Permissible_Value class .....	33
Table 7 — Attributes of Reference_Enumerated_Value_Domain class .....	34
Table 8 — Attributes of Datatype class .....	35
Table 9 — Example 1 of Datatype class .....	35
Table 10 — Example 2 of Datatype class .....	35
Table 11 — Attributes of Datatype_Scheme class .....	36
Table 12 — Attributes of Reference_Enumerated_CD_Constraint_Set class .....	37
Table 13 — Attributes of Local_Enumerated_CD_Constraint_Set class .....	38
Table 14 — Attributes of Value_Domain_Constraint_Set class .....	38
Table 15 — Attributes of Described_Value_Domain_Constraint_Set class .....	39
Table 16 — Attributes of Reference_Enumerated_VD_Constraint_Set class .....	40
Table 17 — Attributes of Local_Enumerated_VD_Constraint_Set class .....	40
Table 18 — Attributes of Permissible_Value_Constraint_Set class .....	41
Table 19 — Attributes of Value_Meaning_Set association class .....	42
Table 20 — Attributes of Permissible_Value_Meaning association class .....	43
Table 21 — Attributes of Permissible_Value_Set association class .....	44
Table 22 — Attributes of Dimensionality class .....	50
Table 23 — Attributes of Data_Element class .....	52
Table 24 — Attributes of Data_Element_Example class .....	53
Table 25 — Attributes of Data_Element_Derivation_Rule class .....	54
Table 26 — Attributes of Data_Element_Constraint_Set class .....	55
Table 27 — Attributes of Local_Enumerated_Value_Domain_Subset class .....	60
Table 28 — Attributes of Local_Enumerated_VD_Subset_Constraint_Set class .....	61
Table 29 — Attributes of Subset_Values association class .....	62
Table 30 — Attributes of Local_Enumerated_Conceptual_Domain_Subset class .....	65
Table 31 — Attributes of Local_Enumerated_CD_Subset_Constraint_Set class .....	66
Table 32 — Attributes of Subset_Value_Meanings association class .....	67
Table 33 — Attributes of Data_Element_Collection class .....	70
Table 34 — Attributes of Data_Element_Sequence association class .....	71

## 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](http://www.iso.org/directives) or [www.iec.ch/members\\_experts/refdocs](http://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](http://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](http://www.iso.org/iso/foreword.html). In the IEC, see [www.iec.ch/understanding-standards](http://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*.

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](http://www.iso.org/members.html) and [www.iec.ch/national-committees](http://www.iec.ch/national-committees).

## Introduction

In ISO/IEC 11179-3, the structure of a Metadata Registry is specified in the form of a conceptual data model. ISO/IEC 11179-3 specifies a metamodel for “registry common facilities”, which is intended to be extended by other parts of ISO/IEC 11179 for specific purposes.

This document provides a specification of the extensions to the registry metamodel specified in ISO/IEC 11179-3 to enable the registration of metadata about data elements and associated concepts, such as “data element concepts”, “conceptual domains” and “value domains”. Generically, these are all referred to as “metadata items”. Such metadata are necessary to clearly describe, record, analyse, classify and administer data.

This document is part of the 4<sup>th</sup> edition modularization of the ISO/IEC 11179 series. It extracts the Data Description package from ISO/IEC 11179-3:2013 to make it more accessible and renames it “Metamodel for data specification registration”. At the same time, some enhancements have been made as follows:

- support for externally defined “reference enumerated conceptual domains” ([7.4.2.6](#)) and “reference enumerated value domains” ([7.4.2.13](#));
- support for sub-setting of value domains ([7.7](#)) and conceptual domains ([7.8](#)) within a specified context;
- support for composite data elements and data types ([7.9](#));
- finer-grained conformance options (see [5.3](#));
- relaxation of some constraints in the standard, while giving registration authorities the ability to enforce them if they wish (see [6.5](#)).

From [Clause 5](#) onwards, 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     **Conceptual\_Domain** ([7.2.2.2](#)) is a class each instance of which models a conceptual domain.



# Information technology — Metadata registries (MDR) —

## Part 31:

# Metamodel for data specification registration

## 1 Scope

This document provides a specification for an extension to a Metadata Registry (MDR), as specified in ISO/IEC 11179-3, in which metadata that describes data elements and associated concepts, such as “data element concepts”, “conceptual domains” and “value domains” can be registered.

The specification in this document, together with the relevant clauses of the specification in ISO/IEC 11179-3, provides the ability to record metadata about:

- a) data elements, units of measure and derivation rules;
- b) data element concepts and associated object classes and properties;
- c) conceptual domains, conceptual domain subsets and value meanings;
- d) value domains, value domain subsets, datatypes and permissible values.

This document is applicable to the formulation of data representations, concepts, meanings and relationships to be shared among people and machines, independent of the organization that produces the data. It is not applicable to the physical representation of data as bits and bytes at the machine level.

## 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/IEC 11179-3:2023, *Information technology — Metadata registries (MDR) — Part 3: Metamodel for registry common facilities*