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

**Part 4:
Formulation of data definitions**

*Technologies de l'information — Registres de métadonnées (RM) —
Partie 4: Formulation des définitions de données*

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ISO/IEC 11179-4:2004

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 11179-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This second edition cancels and replaces the first edition (ISO/IEC 11179-4:1995), which has been technically revised.

ISO/IEC 11179 consists of the following parts, under the general title *Information technology — Metadata registries (MDR)*:

- *Part 1: Framework*
- *Part 3: Registry metamodel and basic attributes*
- *Part 4: Formulation of data definitions*
- *Part 5: Naming and identification principles*
- *Part 6: Registration*

The following part is under preparation:

- *Part 2: Classification*

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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”. This part of ISO/IEC 11179 specifies requirements and recommendations on the formulation of data definitions that are specified in Metadata Registries. The purpose of these definitions is to specify, describe, explain, and clarify the meaning of data, to promote the standardization or reuse of data elements, and to promote data sharing and integration of information systems.

The structure of a *Metadata Registry* is specified in the form of a conceptual data model. The *Metadata Registry* is used to keep information 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.

The definitional requirements and recommendations specified in this part of ISO/IEC 11179 do not always apply to terminological definitions found in glossaries and language dictionaries. Differences exist between the requirements that apply in a language dictionary, and the requirements that apply in a metadata registry. The requirements for ISO/IEC 11179 are more restrictive than those for a natural language dictionary. For example, a language dictionary may have multiple definitions covering multiple senses of a term or word, whereas data definitions are developed for particular contexts and should not have multiple senses within any context. Data definitions are intended to explicate the concept or concepts, which are represented by a collection of data, a data value, a data element, or other metadata item. A single definition may be established as the reference definition, with other definitions asserted to be equivalent (e.g., a definition in one language may be established as a reference definition, with definitions in other languages asserted to be equivalent). Metadata items may have a single preferred definition within a particular context, with other deprecated definitions.

Many data definitions include terms that themselves need to be defined (e.g., “charge”, “allowance”, “delivery”). Some of these terms may have different definitions in different industrial sectors. Therefore, there is a need for most metadata registries to establish an associated *glossary or terminology reference* of terms used in the definitions.

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Information technology — Metadata registries (MDR) —

Part 4: Formulation of data definitions

1 Scope

This part of ISO/IEC 11179 specifies requirements and recommendations for constructing definitions for data and metadata. Only semantic aspects of definitions are addressed; specifications for formatting the definitions are deemed unnecessary for the purposes of ISO/IEC 11179. While especially applicable to the content of metadata registries as specified in ISO/IEC 11179-3, this part of ISO/IEC 11179 is useful broadly for developing definitions for data and metadata.

These definitional requirements and recommendations pertain to formulating definitions for data elements and other types of data constructs such as entity types, entities, relationships, attributes, object types (or classes), objects, composites, code entries, metadata items, and the data referred to by XML tags.

2 Conformance

This part of ISO/IEC 11179 may be used independently, e.g., for defining data elements outside the context of a metadata registry. In such cases, compliance may be claimed if the requirements and recommendations have been followed in developing the definitions.

Where used in the context of an ISO/IEC 11179 metadata registry, this part of ISO/IEC 11179 shall constitute the criteria for definitions when establishing the registration status as specified in ISO/IEC 11179-6.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

Conceptual Domain

set of valid value meanings

NOTE The value meanings may either be enumerated or expressed via a description.

[ISO/IEC 11179-3:2003, 3.3.21]

3.2

Concept

unit of knowledge created by a unique combination of characteristics

[ISO 1087-1:2000, 3.2.1]

3.3

data

re-interpretable representation of information in a formalized manner suitable for communication, interpretation or processing

NOTE Data can be processed by human or automatic means.

[ISO/IEC 2382-1:1993, 01.01.02]

3.4 data element
unit of **data** for which the definition, identification, representation and permissible values are specified by means of a set of attributes

[ISO/IEC 11179-3:2003, 3.3.36]

3.5 Data Element Concept
concept that can be represented in the form of a data element, described independently of any particular representation

[ISO/IEC 11179-3:2003, 3.3.38]

3.6 definition
representation of a concept by a descriptive statement which serves to differentiate it from related concepts

[ISO 1087-1:2000, 3.3.1]

3.7 metadata
data that defines and describes other data

[ISO 1087-1:2000, 3.2.18]

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3.8 Metadata Registry
information system for registering metadata

[ISO/IEC 11179-3:2003, 3.2.22]
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3.9 metadata item
instance of a **metadata object**

NOTE 1 In all parts of ISO/IEC 11179, this term is applied only to instances of metadata objects described by the metamodel in Clause 4 of ISO/IEC 11179-3:2003. Examples include instances of data elements, data element concepts, permissible values, etc.

NOTE 2 A metadata item has associated attributes, as appropriate for the metadata object it instantiates.

[ISO/IEC 11179-3:2003, 3.2.19]

3.10 metadata object
object type defined by a metamodel

NOTE In all parts of ISO/IEC 11179, this term is applied only to metadata objects described by the metamodel in Clause 4 of ISO/IEC 11179-3:2003. Examples include data elements, data element concepts, permissible values etc. See Clause 3.3 of ISO/IEC 11179-3:2003 for a complete list.

[ISO/IEC 11179-3:2003, 3.2.20]

3.11 name
designation of an object by a linguistic expression

[ISO/IEC 11179-3:2003, 3.2.26]

3.12**Value Domain**

set of permissible values

NOTE 1 The value domain provides representation, but has no implication as to what data element concept the values may be associated with nor what the values mean.

NOTE 2 The permissible values may either be enumerated or expressed via a description.

[ISO/IEC 11179-3:2003, 3.3.140]

4 Summary of data definition requirements and recommendations

A listing of the requirements and recommendations without explanations is provided in this clause for convenience of the user. The intent is to facilitate ease of use of this document once an understanding of the requirements and recommendations is achieved. Clause 5 describes each requirement and recommendation with an explanation and examples to ensure their exact meaning is understood.

4.1 Requirements**A data definition shall:**

- a) be stated in the singular
- b) state what the concept is, not only what it is not
- c) be stated as a descriptive phrase or sentence(s)
- d) contain only commonly understood abbreviations
- e) be expressed without embedding definitions of other data or underlying concepts

4.2 Recommendations**A data definition should:**

- a) state the essential meaning of the concept
- b) be precise and unambiguous
- c) be concise
- d) be able to stand alone
- e) be expressed without embedding rationale, functional usage, or procedural information
- f) avoid circular reasoning
- g) use the same terminology and consistent logical structure for related definitions
- h) be appropriate for the type of metadata item being defined