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

**Part 3:
Registry metamodel and basic attributes**

*Technologies de l'information — Registres de métadonnées (MDR) —
Partie 3: Métamodèle de registre et attributs de base*

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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 technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member 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 11179-3 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 11179-3:1994), which has been technically revised.

ISO/IEC 11179 (first edition) consists of the following parts, under the general title *Information technology — Specification and standardization of data elements*:

- *Part 1: Framework for the specification and standardization of data elements*
- *Part 2: Classification for data elements*
- *Part 3: Registry metamodel and basic attributes*
- *Part 4: Rules and guidelines for the formulation of data definitions*
- *Part 5: Naming and identification principles for data elements*
- *Part 6: Registration of data elements*

NOTE ISO/IEC 11179 is currently being revised under the general title *Information technology — Metadata registries (MDR)*. The part titles may also change in the process.

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 provides for the attributes of data elements and associated metadata to be specified and registered as metadata items in a *Metadata Registry*.

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.

When considering data and metadata, it is important to distinguish between types of data/metadata, and instances of these types. Clause 4 of this part of ISO/IEC 11179 specifies the types of metadata objects that form the structure of a *Metadata Registry*. A *Metadata Registry* will be populated with instances of these metadata objects (metadata items), which in turn define types of data, e.g. in an application database. In other words, instances of metadata specify types of application level data. In turn, the application database will be populated by the real world data as instances of those defined data types.

NOTE ISO/IEC 10027:1990 IRDS Framework explains the concepts of different levels of modelling.

This part of ISO/IEC 11179 also describes the basic attributes of metadata items for purposes where a complete *Metadata Registry* is not appropriate.

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

Information technology — Metadata registries (MDR) —

Part 3: Registry metamodel and basic attributes

1 Scope

The primary purpose of ISO/IEC 11179-3 is to specify the structure of a *Metadata Registry* (see 1.1). ISO/IEC 11179-3 also specifies basic attributes which are required to describe metadata items, and which may be used in situations where a complete metadata registry is not appropriate (e.g. in the specification of other International Standards) (see 1.2).

1.3 identifies aspects not currently addressed.

1.4 provides examples of activities where ISO/IEC 11179-3 may be applied.

1.1 Scope – Structure of a Metadata Registry

A comprehensive *Metadata Registry* management function requires a set of rules and procedures. These rules and procedures are set out in the following Clauses and Annexes and are complemented elsewhere in this document as follows:

- a) the definitions of metadata objects are in Clause 3.3 of this part of ISO/IEC 11179;
- b) the structure of the registry in the form of a conceptual data model is in Clause 4 of this part of ISO/IEC 11179;

Aspects of the registry are expanded on in other parts of ISO/IEC 11179, as follows:

- a) the overall framework for this family of International Standards is specified in ISO/IEC 11179-1;
- b) rules and guidelines for classifying metadata are in ISO/IEC 11179-2;
- c) rules and guidelines for the formulation of definitions are in ISO/IEC 11179-4;
- d) naming and identifying principles for metadata are in ISO/IEC 11179-5;
- e) rules and guidelines for registering metadata are in ISO/IEC 11179-6.

While the model diagrams are presented in UML notation, this part of ISO/IEC 11179 does not assume nor endorse any specific system environment, database management system, database design paradigm, system development methodology, data definition language, command language, system interface, user interface, computing platform, or any technology required for implementation. This part of ISO/IEC 11179 does not directly apply to the actual use of data in communications and information processing systems.

1.2 Scope – Basic attributes of metadata items

This part of ISO/IEC 11179 also specifies basic attributes which are required to describe metadata items, and which may be used in situations where a complete *Metadata Registry* is not appropriate (e.g. in the specification of other International Standards). These basic attributes are described in Clause 5.

1.3 Scope – Aspects not currently addressed

This part of ISO/IEC 11179 does not currently support the following requirements;

- a) Complex data structures, encapsulation, stereotyping and inheritance;
- b) Ability to enforce uniqueness of names within a Context;
- c) Specification of Naming Conventions for a Context;
- d) Designations other than names (e.g. icons);
- e) Specification of Time in addition to Date;
- f) Prescribed conceptual domains and value domains for the attributes in the metamodel;
- g) Registration of XML documents or XML schemas;
- h) Application Programming Interfaces (APIs) and associated bindings to access a registry;
- i) Multilingual support, except for names and definitions;
- j) Cultural adaptability.

It is anticipated that some or all of these requirements will be addressed in future editions of this part of ISO/IEC 11179, or in companion standards or technical reports.

1.4 Areas of Applicability

This part of ISO/IEC 11179 applies to activities including:

- a) the definition, specification and contents of metadata registries, including interchanging or referencing among various collections of data elements;
- b) the design and specification of application-oriented data models, databases and message types for data interchange;
- c) the actual use of data in communications and information processing systems;
- d) interchange or reference among various collections of metadata.

2 Normative references

The following referenced documents are indispensable for the application 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 31-0, *Quantities and units — Part 0: General principles*

ISO 639-2:1998, *Codes for the representation of the names of languages — Part 2: Alpha-3 code*

ISO 1087-1:2000, *Terminology work — Vocabulary — Part 1: Theory and application*

ISO/IEC 2382-1:1993, *Information technology — Vocabulary — Part 1: Fundamental terms*

ISO/IEC 2382-17:1999, *Information technology — Vocabulary — Part 17: Databases*

ISO 3166-1:1997, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 5127:2001, *Information and documentation — Vocabulary*

ISO/IEC 6523-1:1998, *Information technology — Structure for the identification of organization and organization parts — Part 1: Identification of organization identification schemes*

ISO/IEC 6523-2:1998, *Information technology — Structure for the identification of organization and organization parts — Part 2: Registration of organization identification schemes*

ISO 8601:2000, *Data elements and interchange formats — Information exchange — Representation of dates and times*

ISO/IEC 11179-1, *Information technology — Specification and standardization of data elements — Part 1: Framework for the specification and standardization of data elements*

ISO/IEC 11179-2, *Information technology — Specification and standardization of data elements — Part 2: Classification for data elements*

ISO/IEC 11179-4, *Information technology — Specification and standardization of data elements — Part 4: Rules and guidelines for the formulation of data definitions*

ISO/IEC 11179-5, *Information technology — Specification and standardization of data elements — Part 5: Naming and identification principles for data elements*

ISO/IEC 11179-6, *Information technology — Specification and standardization of data elements — Part 6: Registration of data elements*

ISO/IEC 11404:1996, *Information technology — Programming languages, their environments and system software interfaces — Language-independent datatypes*

ISO 12620:1999, *Computer applications in terminology — Data categories*

ISO/IEC 19501-1:2002, *Information technology — Unified Modeling Language (UML) — Part 1: Specification*

3 Definitions

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

3.1 defines metamodel constructs, used in specifying the registry metamodel.

3.2 lists broader terms, and their definitions, used in this document that are not included in either 3.1 or 3.3.

3.3 defines metadata objects prescribed by the metamodel itself.

An alphabetical list of terms from all three Clauses is provided in Annex A.

3.1 Definitions of Metamodel Constructs

This subclause defines the metamodel constructs used in specifying the registry metamodel in Clause 4.

3.1.1

association

⟨metamodel⟩ a semantic **relationship** between two **classes**

NOTE An **association** is a type of **relationship**.

[Adapted from ISO/IEC 19501-1:2001, 2.5.2.3]

3.1.2

association class

⟨metamodel⟩ an **association** that is also a **class**

NOTE It not only connects a set of **classes**, but also defines a set of features that belong to the **relationship** itself.

[Adapted from ISO/IEC 19501-1:2001, 2.5.2.4]

3.1.3

attribute

⟨metamodel⟩ a **characteristic** of an **object** or **entity**

3.1.4

class

⟨metamodel⟩ a description of a set of **objects** that share the same **attributes**, operations, methods, **relationships**, and semantics

[ISO/IEC 19501-1:2001, 2.5.2.9]

3.1.5

composite attribute

⟨metamodel⟩ an **attribute** whose **datatype** is non-atomic

3.1.6

composite datatype

⟨metamodel⟩ a **datatype** that is also a **class**

NOTE A **composite datatype** is used as a **datatype** for a **composite attribute**.

3.1.7

generalization

⟨metamodel⟩ a **relationship** between a more general **class** (the parent) and a more specific **class** (the child) that is fully consistent with the first **class** (i.e. it has all of its **attributes** and **relationships**) and that adds additional information.

NOTE A **generalization** is a type of **relationship**.

[Adapted from ISO/IEC 19501-1:2001, 2.5.2.24]

3.1.8

identifier (in Metadata Registry)

⟨metamodel⟩ a sequence of characters, capable of uniquely identifying that with which it is associated, within a specified context

NOTE A name should not be used as an identifier because it is not linguistically neutral.

3.1.9

relationship (in registry metamodel)

⟨metamodel⟩ a connection among model elements

NOTE In ISO/IEC 11179-3, a relationship is either an **association** or a **generalization**.

[ISO/IEC 19501-1:2001, 2.5.2.36]

3.2 Broad Terms used in this part of ISO/IEC 11179

3.2.1

attribute instance

a specific instance of an **attribute**

NOTE Amended from ISO 2382-17:1993 (17.02.13) to distinguish an instance of an attribute from its value.

3.2.2

attribute value

the value associated with an **attribute instance**

NOTE Amended from ISO 2382-17:1993 (17.02.13) to distinguish an instance of an attribute from its value.

3.2.3

basic attribute

an **attribute** of a **metadata item** commonly needed in its specification

3.2.4

binding

a mapping from one framework or specification to another

3.2.5

characteristic

abstraction of a property of an **object** or of a set of objects

NOTE Characteristics are used for describing **concepts**.

[ISO 1087-1:2000, 3.2.4]

3.2.6

common attribute

a **basic attribute** that is applicable to all types of metadata item

3.2.7

common facility (of Metadata Registry)

a facility provided by a **Metadata Registry** that is applicable to all types of **Administered Item** within the registry.

NOTE The common facilities specified in this edition of ISO/IEC 11179-3 are:

- Administration and identification (see 4.8)
- Naming and definition (see 4.9)
- Classification (see 4.10).

3.2.8

conceptual data model

a **data model** that represents an abstract view of the real world

3.2.9

conditional

required under certain specified conditions

NOTE 1 One of three obligation statuses applied to the attributes of metadata items, indicating the conditions under which the attribute is required. See also **mandatory** (3.2.17) and **optional** (3.2.28).

NOTE 2 Obligation statuses apply to metadata items with a Registration Status of "recorded" or higher.

3.2.10

data

a 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 2382-1:1998, 01.01.02]

3.2.11

data model

a graphical and/or lexical representation of data, specifying their properties, structure and inter-relationships

3.2.12

definition

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

[ISO 1087-1:2000, 3.3.1]

NOTE See also **Definition (of Administered Item)** (3.3.58).

3.2.13

designation

representation of a concept by a sign which denotes it

[ISO 1087-1:2000, 3.4.1]

NOTE See also **Designation (of Administered Item)** (3.3.67) and **name** (3.2.27).

3.2.14

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 Please observe that an entity exists whether data about it are available or not.

[ISO/IEC 2382-17:1999, 17.02.05]

3.2.15

extension

<11179-3> a feature not defined by ISO/IEC 11179-3

<registry metamodel> a **class**, an **attribute** or a **relationship** that an implementation of a **Metadata Registry** provides that is not defined by ISO/IEC 11179-3

3.2.16

language

system of signs for communication, usually consisting of a vocabulary and rules

[ISO 5127:2001, 1.1.2.01]

3.2.17

mandatory

always required

NOTE 1 One of three obligation statuses applied to the attributes of metadata items, indicating the conditions under which the attribute is required. See also **conditional** (3.2.9) and **optional** (3.2.28).

NOTE 2 Obligation statuses apply to metadata items with a Registration Status of "recorded" or higher.

3.2.18**metadata**

data that defines and describes other **data**

3.2.19**metadata item**

an 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. 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.

3.2.20**metadata object**

an 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. Examples include Data Elements, Data Element Concepts, Permissible Values etc. See 3.3 for a complete list.

3.2.21**metadata register**

the information store or database maintained by a **Metadata Registry**

3.2.22**Metadata Registry****MDR**

an information system for registering **metadata**

NOTE The associated information store or database is known as a **metadata register**.

3.2.23**metadata set**

any collection of **metadata**

3.2.24**metamodel**

a **data model** that specifies one or more other data models

3.2.25**metamodel construct**

a unit of notation for modelling

NOTE The metamodel constructs used in ISO/IEC 11179-3 are defined in 3.1.

3.2.26**name**

the **designation** of an object by a linguistic expression

NOTE See also **name (of Administered Item)** (3.3.83)

3.2.27**object**

anything perceivable or conceivable

NOTE Objects may also be material (e.g. an engine, a sheet of paper, a diamond), immaterial (e.g. a conversion ratio, a project plan) or imagined (e.g. a unicorn).

[Adapted from ISO 1087-1:2000, 3.1.1]

3.2.28

optional

permitted but not required

NOTE 1 One of three obligation statuses applied to the attributes of metadata items, indicating the conditions under which the attribute is required. See also **conditional** (3.2.9) and **mandatory** (3.2.17).

NOTE 2 Obligation statuses apply to metadata items with a Registration Status of "recorded" or higher.

3.2.29

registry item

a **metadata item** recorded in a **Metadata Registry**

3.2.30

registry metamodel

a **metamodel** specifying a **Metadata Registry**

3.2.31

related metadata reference

a **reference** from one **metadata item** to another

NOTE A **Registration Authority** could choose to use a **Reference Document**, an **administrative note** or an **explanatory comment** to record a **related metadata reference**.

3.2.32

stewardship (of metadata)

the responsibility for the maintenance of **Administration Records** applicable to one or more **Administered Items**

NOTE 1 The responsibility for the registration of metadata may be different from the responsibility for stewardship of metadata.

NOTE 2 See also **Stewardship (of Administered Item)** (3.3.129).

3.3 Alphabetical list of metadata objects in the metamodel

This subclause provides definitions for terms which are the names of metadata objects in the metadata model in Clause 4. Each metadata object is modelled on one of the metamodel constructs from 3.1 (i.e. classes, attributes, composite attributes, relationships or association classes). The metamodel construct applicable to each metadata object is indicated after the definition. For attributes, the associated class is also identified.

This subclause follows the capitalization convention of the model, which is to capitalize the names of classes, association classes and composite datatypes, but not attributes or relationships.

3.3.1

Administered Item

a **registry item** for which administrative information is recorded in an **Administration Record**

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 The types of *Administered Item* specified by ISO/IEC 11179-3 are listed in 4.7.2.

3.3.2

administered item classification

the **relationship** where an **Administered Item** is classified based on a specified **Classification Scheme**

NOTE Metamodel construct is: *Relationship*.

3.3.3**administered item context**

the **relationship** that provides a **Context** for an **Administered Item**

NOTE Metamodel construct is: *Relationship*.

3.3.4**administered item identifier**

an **identifier** for an **administered item**

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.5**Administration Record**

a collection of administrative information for an **Administered Item**

NOTE Metamodel construct is: *Composite datatype*.

3.3.6**administrative note**

any general note about the **Administered Item**

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.7**administrative status**

a **designation** of the status in the administrative process of a **Registration Authority** for handling registration requests

NOTE 1 Metamodel construct is: *Attribute of Administration Record*.

NOTE 2 The values and associated meanings of “administrative status” are determined by each **Registration Authority**. C.f. “**registration status**”.

3.3.8**change description**

the description of what has changed in the **Administered Item** since the prior version of the **Administered Item**

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.9**Classification Scheme**

the descriptive information for an arrangement or division of **objects** into groups based on **characteristics**, which the objects have in common

EXAMPLE Origin, composition, structure, application, function, etc.; See ISO/IEC 11179-2.

NOTE Metamodel construct is: *Class*.

3.3.10**classification scheme administration record**

the **Administration Record** for a **Classification Scheme**

NOTE Metamodel construct is: *Attribute of Classification Scheme*.

3.3.11**Classification Scheme Item****CSI**

an item of content in a **Classification Scheme**.

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 This may be a node in a taxonomy or ontology, a term in a thesaurus, etc.

3.3.12

Classification Scheme Item Relationship
the **relationship** among items in a **Classification Scheme**

NOTE Metamodel construct is: *Association Class*.

3.3.13

classification scheme item relationship type description
a description of the type of **relationship** between a **Classification Scheme Item** and one or more other **Classification Scheme Items** in a **Classification Scheme**

NOTE Metamodel construct is: *Attribute of Classification Scheme Item Relationship*.

3.3.14

classification scheme item type name
the **name** of the type of the **Classification Scheme Item**

NOTE Metamodel construct is: *Attribute of Classification Scheme Item*.

3.3.15

classification scheme item value
an instance of a **Classification Scheme Item**

NOTE Metamodel construct is: *Attribute of Classification Scheme Item*.

3.3.16

classification scheme membership
the **relationship** of a **Classification Scheme** with its items

NOTE Metamodel construct is: *Relationship*.

3.3.17

classification scheme type name
the **name** of the type of **Classification Scheme**

NOTE Metamodel construct is: *Attribute of Classification Scheme*.

3.3.18

Concept
unit of knowledge created by a unique combination of **characteristics**

NOTE Metamodel construct is: *Class*.

[ISO 1087-1:2000, 3.2.1]

3.3.19

Concept Relationship
concept relationship
a semantic link among two or more **Concepts**

NOTE 1 Metamodel construct is: *Association Class*.

NOTE 2 An association class is both an association and a class. The name of the association uses lowercase. The name of the class is capitalized.

3.3.20**concept relationship type description**

a description of the type of **relationship** among two or more **Concepts**

NOTE Metamodel construct is: *Attribute of Concept Relationship*.

3.3.21**Conceptual Domain****CD**

a set of valid **Value Meanings**

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 The **Value Meanings** may either be enumerated or expressed via a description.

3.3.22**conceptual domain administration record**

the **Administration Record** for a **Conceptual Domain**

NOTE Metamodel construct is: *Attribute of Conceptual Domain*.

3.3.23**Conceptual Domain Relationship****conceptual domain relationship**

a **relationship** among two or more **Conceptual Domains**

NOTE 1 Metamodel construct is: *Association Class*.

NOTE 2 An association class is both an association and a class. The name of the association uses lowercase. The name of the class is capitalized.

3.3.24**conceptual domain relationship type description**

A description of the type of **relationship** among two or more **Conceptual Domains**.

NOTE Metamodel construct is: *Attribute of Conceptual Domain Relationship*.

3.3.25**conceptual domain representation**

a **relationship** between a **Conceptual Domain** and a **Value Domain**

NOTE Metamodel construct is: *Relationship*.

3.3.26**Contact**

an instance of a role of an individual or an organization (or organization part or organization person) to whom an information item(s), a material object(s) and/or person(s) can be sent to or from in a specified context

NOTE Metamodel construct is: *Composite Datatype*.

3.3.27**contact information**

information to enable a **Contact** to be located or communicated with

NOTE Metamodel construct is: *Attribute of Contact*.

3.3.28**contact name**

the **name** of the **Contact**

NOTE Metamodel construct is: *Attribute of Contact*.

3.3.29

contact title

the **name** of the position held by the **Contact**

NOTE Metamodel construct is: *Attribute of Contact*.

3.3.30

Context (for administered item)

a universe of discourse in which a **name** or **definition** is used

NOTE Metamodel construct is: *Class*.

3.3.31

context administration record

the **Administration Record** for a **Context**

NOTE Metamodel construct is: *Attribute of Context*.

3.3.32

context description

the textual description of the **Context**

NOTE Metamodel construct is: *Attribute of Context*.

3.3.33

context description language identifier

the **identifier** of the **language** used in the **context description**

NOTE Metamodel construct is: *Attribute of Context*.

3.3.34

country identifier

⟨*Language Identification*⟩ a country **identifier** further specifying the geopolitical area associated with the **language**

NOTE 1 Metamodel construct is: *Attribute of Language Identification*.

NOTE 2 Use the three digit numeric codes from ISO 3166-1, with extensions if required.

3.3.35

creation date

the date the **Administered Item** was created

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.36

Data Element

DE

a unit of data for which the **definition**, identification, representation and **Permissible Values** are specified by means of a set of **attributes**

NOTE Metamodel construct is: *Class*.

3.3.37

data element administration record

the **Administration Record** for a **Data Element**

NOTE Metamodel construct is: *Attribute of Data Element*.

3.3.38**Data Element Concept
DEC**

a concept that can be represented in the form of a **Data Element**, described independently of any particular representation

NOTE Metamodel construct is: *Class*.

3.3.39**data element concept administration record**
the **Administration Record** for a **Data Element Concept**

NOTE Metamodel construct is: *Attribute of Data Element Concept*.

3.3.40**data element concept conceptual domain relationship**
the **relationship** between a **Data Element Concept** and its **Conceptual Domain**

NOTE Metamodel construct is: *Relationship*.

3.3.41**data element concept expression**
the **relationship** between a **Data Element** and a **Data Element Concept**

NOTE Metamodel construct is: *Relationship*.

3.3.42**data element concept object class**
the **designation** of an **Object Class** for a **Data Element Concept**

NOTE Metamodel construct is: *Attribute of Data Element Concept*.

3.3.43**data element concept property**
the **designation** of a **Property** for a **Data Element Concept**

NOTE Metamodel construct is: *Attribute of Data Element Concept*.

3.3.44**Data Element Concept Relationship**
data element concept relationship
the **relationship** among two or more **Data Element Concepts**

NOTE 1 Metamodel construct is: *Association Class*.

NOTE 2 An association class is both an association and a class. The name of the association uses lowercase. The name of the class is capitalized.

3.3.45**data element concept relationship type description**
the description of the type of **relationship** among two or more **Data Element Concepts**

NOTE Metamodel construct is: *Attribute of Data Element Concept Relationship*.

3.3.46**Data Element Derivation**
the **relationship** among a **Data Element** which is derived, the rule controlling its derivation, and the **Data Element(s)** from which it is derived

NOTE Metamodel construct is: *Association Class*.

3.3.47

Data Element Example

representative illustration of the **Data Element**

NOTE Metamodel construct is: *Class*.

3.3.48

data element example item

actual illustrative case of the **Data Element**

NOTE Metamodel construct is: *Attribute of Data Element Example*.

3.3.49

data element precision

the degree of specificity for a **Data Element**

NOTE 1 Metamodel construct is: *Attribute of Data Element*.

NOTE 2 Expressed as a number of decimal places to be used in any associated **Data Element** values. If not specified, the default precision may be taken from the **unit of measure precision** on the associated **Value Domain**.

3.3.50

data element representation

the **relationship** between a **Data Element** and its **Value Domain**

NOTE Metamodel construct is: *Relationship*.

3.3.51

data element representation class

the class of representation of a **Data Element**

NOTE Metamodel construct is: *Relationship*.

3.3.52

data identifier

the unique **identifier** for an **Administered Item** within a **Registration Authority**

NOTE Metamodel construct is: *Attribute of Item Identifier*.

3.3.53

Datatype

a set of distinct values, characterized by properties of those values and by operations on those values

NOTE Metamodel construct is: *Composite Datatype*.

[ISO/IEC 11404:1996, 4.11]

3.3.54

datatype annotation

specifying information to further define the **Datatype**

NOTE Metamodel construct is: *Attribute of Datatype*.

3.3.55

datatype description

descriptive information to further clarify the **Datatype**

NOTE Metamodel construct is: *Attribute of Datatype*.

3.3.56**datatype name**

a **designation** for the **Datatype**

NOTE Metamodel construct is: *Attribute of Datatype*.

3.3.57**datatype scheme reference**

a reference identifying the source of the **Datatype** specification

NOTE 1 In this edition of ISO/IEC 11179-3, the manner of reference is specified by the Registration Authority.

NOTE 2 Metamodel construct is: *Attribute of Datatype*.

3.3.58**Definition (of Administered Item)**

the definition of an **Administered Item** within a **Context**

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 See also **definition** (3.2.12).

3.3.59**definition source reference**

a reference to the source from which the **Definition** is taken

NOTE Metamodel construct is: *Attribute of Definition*.

3.3.60**definition text**

the text of the **Definition**

NOTE Metamodel construct is: *Attribute of Definition*.

3.3.61**derivation input**

the **relationship** specifying the source **Data Element(s)** for a **Data Element Derivation**

NOTE Metamodel construct is: *Relationship*.

3.3.62**derivation output**

the **relationship** denoting the result of a **Data Element Derivation**

NOTE Metamodel construct is: *Relationship*.

3.3.63**Derivation Rule**

the logical, mathematical, and/or other operations specifying derivation

NOTE Metamodel construct is: *Class*.

3.3.64**derivation rule administration record**

the **Administration Record** for a **Derivation Rule**

NOTE Metamodel construct is: *Attribute of Derivation Rule*.

3.3.65

derivation rule application

the **relationship** specifying the **Derivation Rule** for a **Data Element Derivation**

NOTE Metamodel construct is: *Relationship*.

3.3.66

derivation rule specification

the text of a specification of **Data Element Derivation**

NOTE Metamodel construct is: *Attribute of Derivation Rule*.

3.3.67

Designation (of Administered Item)

the **designation** of an **Administered Item** within a **Context**

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 See also **designation** (3.2.13).

3.3.68

dimensionality

(Conceptual Domain) an expression of measurement without units

NOTE 1 Metamodel construct is: *Attribute of Conceptual Domain*.

NOTE 2 ISO 31-0 specifies physical dimensions (e.g. length, mass, velocity). ISO/IEC 11179-3 also allows non-physical dimensions (e.g. value dimensions such as: currency, quality indicator)

NOTE 3 See also **Unit of Measure** (3.3.134).

3.3.69

documentation language identifier

the **identifier** of the **language** used for documentation by the **Registration Authority**

NOTE Metamodel construct is: *Attribute of Registration Authority*.

3.3.70

effective date

the date an **administered item** became/becomes available to registry users

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.71

Enumerated Conceptual Domain

a **Conceptual Domain** that is specified by a list of all its **Value Meanings**

NOTE Metamodel construct is: *Class*.

3.3.72

Enumerated Value Domain

a **Value Domain** that is specified by a list of all its **Permissible Values**

NOTE Metamodel construct is: *Class*.

3.3.73

exemplification

a **relationship** between a **Data Element Example** and its **Data Element**

NOTE Metamodel construct is: *Relationship*.

3.3.74**explanatory comment**

descriptive comments about the **Administered Item**

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.75**international code designator**

the **identifier** of an organization identification scheme

NOTE 1 Metamodel construct is: *Attribute of Registration Authority Identifier*.

NOTE 2 Based on ISO/IEC 6523-1:1998, 3.8.

NOTE 3 See also ISO/IEC 11179-6.

3.3.76**Item Identifier**

an **identifier** for an item

NOTE Metamodel construct is: *Composite datatype*.

3.3.77**item registration authority identifier**

the **identifier** of the **Registration Authority** registering the item

NOTE 1 Metamodel construct is: *Attribute of Item Identifier*.

NOTE 2 See also ISO/IEC 11179-6.

3.3.78**Language Identification**

the collection of **identifiers** required to identify a **language** or language variation for a particular purpose

NOTE Metamodel construct is: *Composite datatype*.

3.3.79**language identifier**

information in a **Terminological Entry** which indicates the **name** of a **language**

NOTE 1 Use the three character alphabetic codes and names from ISO 639-2/Terminology, with extensions if required.

NOTE 2 Metamodel construct is: *Attribute of Language Identification*.

3.3.80**Language Section**

the part of a **Terminological Entry** containing information related to one **language**

NOTE Metamodel construct is: *Class*.

3.3.81**language section language identifier**

the **identifier** of the **language** used to group a set of **Designations** and **Definitions**

NOTE Metamodel construct is: *Attribute of Language Section*.

3.3.82**last change date**

the date the **Administered Item** was last changed

NOTE Metamodel construct is: *Attribute of Administration Record*.

**3.3.83
name**

⟨Administered item⟩ a **name** by which an **Administered Item** is designated within a specific **Context**

NOTE 1 Metamodel construct is: *Attribute of Designation*.

NOTE 2 See also **name** (3.2.27).

**3.3.84
Non-enumerated Conceptual Domain**

a **Conceptual Domain** that is not specified by a list of all valid **Value Meanings**

NOTE Metamodel construct is: *Class*.

**3.3.85
non-enumerated conceptual domain description**

a description or specification of a rule, reference, or range for a set of all **Value Meanings** for the **Conceptual Domain**

NOTE Metamodel construct is: *Attribute of Non-enumerated Conceptual Domain*.

**3.3.86
Non-enumerated Value Domain**

a **Value Domain** that is specified by a description rather than a list of all **Permissible Values**

NOTE Metamodel construct is: *Class*.

**3.3.87
non-enumerated value domain description**

a description or specification of a rule, reference, or range for a set of all **Permissible Values** for the **Value Domain**

NOTE Metamodel construct is: *Attribute of Non-enumerated Value Domain*.

**3.3.88
Object Class**

a set of ideas, abstractions, or things in the real world that are identified with explicit boundaries and meaning and whose properties and behaviour follow the same rules

NOTE Metamodel construct is: *Class*.

**3.3.89
object class administration record**
the **Administration Record** for an **Object Class**

NOTE Metamodel construct is: *Attribute of Object Class*.

**3.3.90
object class qualifier**
a qualifier of the **Data Element Concept Object Class**

NOTE Metamodel construct is: *Attribute of Data Element Concept*.

**3.3.91
Organization**

a unique framework of authority within which a person or persons act, or are designated to act, towards some purpose

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 The kinds of organizations covered by ISO/IEC 6523-1 include the following examples:

- a) an organization incorporated under law;
- b) an unincorporated organization or activity providing goods and/or services including:
 - 1) partnerships;
 - 2) social or other non-profit organizations or similar bodies in which ownership or control is vested in a group of individuals;
 - 3) sole proprietorships
 - 4) governmental bodies .
- c) groupings of the above types of organizations where there is a need to identify these in information interchange.

[ISO/IEC 6523-1:1998, 3.1]

3.3.92 organization identifier

the **identifier** assigned to an **Organization** within an organization identification scheme, and unique within that scheme

NOTE Metamodel construct is: *Attribute of Registration Authority Identifier*.

[ISO/IEC 6523-1:1998, 3.10]

3.3.93 organization mail address

the physical, postal or delivery address of the **Organization**

NOTE 1 Metamodel construct is: *Attribute of Organization*.

NOTE 2 Includes civic street address as well as "P.O.Box" types of mailing addresses

3.3.94 organization name a designation for the Organization

NOTE 1 Metamodel construct is: *Attribute of Organization*.

NOTE 2 The **name** by which the **Organization** is known to the **Registration Authority**.

3.3.95 organization part

any department, service or other entity within an organization which needs to be identified for information exchange

[ISO/IEC 6523-1:1998, 3.2]

3.3.96 organization part identifier

opi
an **identifier** allocated to a particular **organization part**

NOTE 1 Metamodel construct is: *Attribute of Registration Authority Identifier*.

NOTE 2 See also ISO/IEC 11179-6.

[ISO/IEC 6523-1:1998, 3.11]

3.3.97

organization part identifier source

the source for the **organization part identifier**

NOTE 1 Metamodel construct is: *Attribute of Registration Authority Identifier.*

NOTE 2 See also ISO/IEC 11179-6.

[Based on ISO/IEC 6523-1:1998, 3.12]

3.3.98

origin

⟨Administered item⟩ the source (document, project, discipline or model) for the **Administered Item**

NOTE Metamodel construct is: *Attribute of Administration Record.*

3.3.99

Permissible Value

an expression of a **Value Meaning** allowed in a specific **Value Domain**

NOTE Metamodel construct is: *Class.*

3.3.100

permissible value begin date

the date this value became/becomes allowed in the **Value Domain**

NOTE 1 Metamodel construct is: *Attribute of Permissible Value.*

NOTE 2 A Registration Authority may determine whether this date is the date the value becomes valid in a registry or the date the value becomes part of the source domain or some other date.

3.3.101

permissible value end date

the date this value became/becomes no longer allowed in the **Value Domain**

NOTE 1 Metamodel construct is: *Attribute of Permissible Value.*

NOTE 2 A Registration Authority may determine whether this date is the date the value becomes no longer valid in a registry or the date the value becomes no longer part of the source domain or some other date.

3.3.102

permissible value meaning

the **relationship** of a **Value Meaning** from an **Enumerated Conceptual Domain** with a **Permissible Value** from an **Enumerated Value Domain**

NOTE Metamodel construct is: *Relationship.*

3.3.103

permissible value set

the set of **Permissible Values** for an **Enumerated Value Domain**

NOTE Metamodel construct is: *Relationship.*

3.3.104

permitted value

the use of a value as a **Permissible Value** in an **Enumerated Value Domain**

NOTE Metamodel construct is: *Relationship*.

3.3.105

preferred definition

an indicator that the **definition text** is a preferred **definition** for an **Administered Item** within a **language**

NOTE Metamodel construct is: *Attribute of Definition*.

3.3.106

preferred designation

an indicator that the **name** is a preferred term for an **Administered Item** within a **language**

NOTE 1 Metamodel construct is: *Attribute of Designation*.

NOTE 2 See “**main entry term**” in ISO 12620:1999.

3.3.107

Property

a **characteristic** common to all members of an **Object Class**

NOTE Metamodel construct is: *Class*.

3.3.108

property administration record

the **Administration Record** for a **Property**

NOTE Metamodel construct is: *Attribute of Property*.

3.3.109

property qualifier

a qualifier of the **Data Element Concept Property**

NOTE Metamodel construct is: *Attribute of Data Element Concept*.

3.3.110

reference

the **relationship** between a **Reference Document** and an **Administered Item**

NOTE Metamodel construct is: *Relationship*.

3.3.111

Reference Document

a document that provides pertinent details for consultation about a subject

NOTE Metamodel construct is: *Class*.

3.3.112

reference document identifier

an **identifier** for the **Reference Document**

NOTE Metamodel construct is: *Attribute of Reference Document*.

3.3.113

reference document language identifier

the **identifier** of the natural or special **language** used in the **Reference Document**

NOTE Metamodel construct is: *Attribute of Reference Document*.

3.3.114

reference document title

the title of the **Reference Document**

NOTE Metamodel construct is: *Attribute of Reference Document*.

3.3.115

reference document type description

a description of the type of **Reference Document**

NOTE Metamodel construct is: *Attribute of Reference Document*.

3.3.116

reference organization

the **relationship** between a **Reference Document** and an **Organization**

NOTE Metamodel construct is: *Relationship*.

3.3.117

Registrar

a representative of a **Registration Authority**

NOTE Metamodel construct is: *Class*.

3.3.118

registrar contact

the contact information associated with a **Registrar**

NOTE Metamodel construct is: *Attribute of Registrar*.

3.3.119

registrar identifier

an **identifier** for the **Registrar**

NOTE Metamodel construct is: *Attribute of Registrar*.

3.3.120

registration

the **relationship** between an **Administered Item** and the **Registration Authority**

NOTE Metamodel construct is: *Relationship*.

3.3.121

Registration Authority

RA

an **Organization** responsible for maintaining a register

NOTE Metamodel construct is: *Class*.

3.3.122

registration authority identifier

an **identifier** assigned to a **Registration Authority**

NOTE 1 Metamodel construct is: *Attribute of Registration Authority*.

NOTE 2 See ISO/IEC 11179-6 and ISO/IEC 6523-2.

3.3.123

Registration Authority Identifier

an **identifier** assigned to a **Registration Authority**

NOTE 1 Metamodel construct is: *Composite datatype*.

NOTE 2 See ISO/IEC 11179-6 and ISO/IEC 6523-2.

3.3.124

registration authority registrar

the **relationship** between a **Registration Authority** and a **Registrar**

NOTE Metamodel construct is: *Relationship*.

3.3.125

registration status

a **designation** of the status in the registration life-cycle of an **Administered Item**

NOTE 1 Metamodel construct is: *Attribute of Administration Record*.

NOTE 2 Designation values are described in ISO/IEC 11179-6.

3.3.126

Representation Class

the classification of types of representations

NOTE Metamodel construct is: *Class*.

3.3.127

representation class administration record

the **Administration Record** for a **Representation Class**

NOTE Metamodel construct is: *Attribute of Representation Class*.

3.3.128

representation class qualifier

a qualifier to the **Representation Class** used in naming **Data Elements** and **Value Domains**

NOTE Metamodel construct is: *Attribute of Data Element*.

3.3.129

Stewardship (of Administered Item)

the **relationship** of an **Administered Item**, a **Contact**, and an **Organization** involved in the **stewardship** of the **metadata**

NOTE 1 Metamodel construct is: *Association Class*.

NOTE 2 See also 3.2.32 **stewardship** (of metadata).

3.3.130

stewardship contact

the contact information associated with a **Stewardship**

NOTE Metamodel construct is: *Attribute of Stewardship*.

3.3.131

Submission (of Administered Item)

the **relationship** of an **Administered Item**, a **Contact**, and an **Organization** involved in a submission of metadata

NOTE Metamodel construct is: *Association Class*.

3.3.132

submission contact

the contact information associated with a **Submission**

NOTE Metamodel construct is: *Attribute of Submission*.

3.3.133

Terminological Entry

an entry containing information on terminological units for a specific **Administered Item** within a **Context** (subject field)

NOTE Metamodel construct is: *Class*.

3.3.134

Unit of Measure

⟨Value Domain⟩ the actual units in which the associated values are measured

NOTE 1 Metamodel construct is: *Composite Datatype*.

NOTE 2 ISO 31-0:1982 specifies a system of physical measurement (the International System of Units, SI). Physical measurement is only one type of measurement. Value measurement is another type of measurement. ISO/IEC 11179-3 allows the use of any appropriate system of measurement.

NOTE 3 The **dimensionality** (3.3.68) of the associated **Conceptual Domain** (3.3.21) must be appropriate for the specified **Unit of Measure**.

3.3.135

unit of measure name

the **name** of a **Unit of Measure**

NOTE Metamodel construct is: *Attribute of Unit of Measure*.

3.3.136

unit of measure precision

the degree of specificity for a **Unit of Measure**

NOTE 1 Metamodel construct is: *Attribute of Unit of Measure*.

NOTE 2 Expressed as a number of decimal places to be used in any associated **Data Element** values. To be used as a default if no precision is specified on the **Data Element** itself.

3.3.137

unresolved issue

any problem that remains unresolved regarding proper documentation of the **Administered Item**

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.138

until date

the date an **Administered Item** is no longer effective in the registry

NOTE Metamodel construct is: *Attribute of Administration Record*.

3.3.139

Value

a data value

NOTE Metamodel construct is: *Class*.

3.3.140**Value Domain****VD**

a set of **Permissible Values**

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 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 3 The **Permissible Values** may either be enumerated or expressed via a description.

3.3.141**value domain administration record**

the **Administration Record** for a **Value Domain**

NOTE Metamodel construct is: *Attribute of Value Domain*.

3.3.142**value domain datatype**

the **Datatype** used in a **Value Domain**

NOTE Metamodel construct is: *Attribute of Value Domain*.

3.3.143**value domain format**

a template for the structure of the presentation of the **Value(s)**

EXAMPLE – YYYY-MM-DD for a date.

NOTE Metamodel construct is: *Attribute of Value Domain*.

3.3.144**value domain maximum character quantity**

the maximum number of characters to represent the **Data Element** value

NOTE 1 Metamodel construct is: *Attribute of Value Domain*.

NOTE 2 Applicable only to character datatypes.

3.3.145**Value Domain Relationship****value domain relationship**

a **relationship** among two or more **Value Domains**

NOTE 1 Metamodel construct is: *Association Class*.

NOTE 2 An association class is both an association and a class. The name of the association uses lowercase. The name of the class is capitalized.

3.3.146**value domain relationship type description**

the description of the type of **relationship** among two or more **Value Domains**

NOTE Metamodel construct is: *Attribute of Value Domain Relationship*.

3.3.147**value domain representation class**

the class of representation of a **Value Domain**

NOTE Metamodel construct is: *Relationship*.

3.3.148

value domain unit of measure

the unit of measure used in a **Value Domain**

NOTE Metamodel construct is: *Attribute of Value Domain*.

3.3.149

value item

a representation of a **Value Meaning** in a specific **Value Domain** – the actual **Value**

NOTE Metamodel construct is: *Attribute of Value*.

3.3.150

Value Meaning

the meaning or semantic content of a **Value**

NOTE 1 Metamodel construct is: *Class*.

NOTE 2 The representation of **Value Meanings** in a registry shall be independent of (and shall not constrain) their representation in any corresponding **Value Domain**.

3.3.151

value meaning begin date

the effective date of this **Value Meaning** in the **Conceptual Domain**

NOTE 1 Metamodel construct is: *Attribute of Value Meaning*.

NOTE 2 A Registration Authority may determine whether this date is the date the **Value Meaning** becomes valid in a registry or the date the **Value Meaning** becomes part of the source domain or some other date.

3.3.152

value meaning description

a description of a **Value Meaning**

NOTE Metamodel construct is: *Attribute of Value Meaning*.

3.3.153

value meaning end date

the date this **Value Meaning** became/becomes invalid

NOTE 1 Metamodel construct is: *Attribute of Value Meaning*.

NOTE 2 A Registration Authority may determine whether this date is the date the **Value Meaning** becomes no longer valid in a registry or the date the **Value Meaning** becomes no longer part of the source domain or some other date.

3.3.154

value meaning identifier

the unique **identifier** for a **Value Meaning**

NOTE Metamodel construct is: *Attribute of Value Meaning*.

3.3.155

value meaning set

the **relationship** between a **Conceptual Domain** and a set of **Value Meanings**.

NOTE Metamodel construct is: *Relationship*.

3.3.156**version**

the unique version **identifier** of the **Administered Item**

NOTE Metamodel construct is: *Attribute of Item Identifier*.

3.4 List of Abbreviations

The following abbreviations are defined for use within the subject domain of this document.

3.4.1**CD**

Conceptual Domain

3.4.2**CSI**

Classification Scheme Item

3.4.3**DE**

Data Element

3.4.4**DEC**

Data Element Concept

3.4.5**MDR**

Metadata Registry

3.4.6**opi**

organization part identifier

3.4.7**RA**

Registration Authority

3.4.8**VD**

Value Domain

4 Structure of a Metadata Registry**4.1 Metamodel for a Metadata Registry**

A metamodel is a model that describes other models. A metamodel provides a mechanism for understanding the precise structure and components of the specified models, which are needed for the successful sharing of the models by users and/or software facilities.

This part of ISO/IEC 11179 uses a metamodel to describe the structure of a *Metadata Registry*. The registry in turn will be used to describe and model other data, for example about enterprise, public administration or business applications. The *registry metamodel* is specified as a conceptual data model, i.e. one that describes how relevant information is structured in the natural world. In other words, it is how the human mind is accustomed to thinking of the information.

As a conceptual data model, there need be no one-to-one match between the attributes in the model and fields, columns, objects, et cetera in a database. There may be more than one field per attribute and some entities and relationships may be implemented as fields. There is no intent that an implementation should have a table for each relationship or entity. The metamodel need not be physically implemented as specified.

The structure described by this metamodel may be distributed over several implementations. These implementations may be databases, data repositories, metadata registers, metadata registries, dictionaries, etc.

The model shows constraints on minimum and maximum occurrences of attributes. The constraints on maximum occurrences are to be enforced at all times. The constraints on minimum occurrences are to be enforced when the registration status for the metadata item is "recorded" or higher. In other words, a registration status of "recorded" indicates that all mandatory attributes have been documented.

4.2 Application of the metamodel

Some of the objectives of the metamodel for a *Metadata Registry* are to:

- provide a unified view of concepts, terms, value domains and value meanings;
- promote a common understanding of the data described;
- enable the sharing and reuse of the contents of implementations.

A metamodel is necessary for coordination of data representation between persons and/or systems that store, manipulate and exchange data. The metamodel will assist registrars in maintaining consistency among different registries. The metamodel enables systems tools and information registries to store, manipulate and exchange the metadata for data attribution, classification, definition, naming, identification, and registration. In this manner, consistency of data content supports interoperability among systems tools and information registries.

Using the metamodel, mappings to the schema of each tool set can be developed. The metamodel constructs can be translated into the language of each tool set, preserving the concepts represented in the original model.

It is assumed that an implementer will use this conceptual data model to develop a more specific logical data model of the identical sphere of interest. A logical data model describes the same data, but as structured in an information system. It is often referred to as a Model of the Information System. A logical data model can be directly used for database design.

4.3 Specification of the metamodel

When using a model to specify another model, it is easy for the reader to become confused about which model is being referred to at any particular point. To minimize this confusion, this document deliberately uses different terms in the model being specified from those used to do the specification.

The *registry metamodel* is specified using a subset of the Unified Modelling Language (UML). This document uses the term "metamodel construct" for the model constructs it uses, but "metadata objects" for the model constructs it specifies. The metamodel constructs used are: classes, relationships, association classes, attributes, composite attributes and composite datatypes. These terms are defined in 3.1, and their use is described in Annex B. The specified metadata objects are defined in 3.3, and as the main subject of this Clause.

However, there are certain parallels between the two models. For example, the "Object Class" specified in the model is equivalent to the metamodel construct "class" used to specify the model, and the "Property" specified in the model is equivalent to the metamodel construct "attribute" used to specify the model. The different terms are used to make it clear which model is being referred to, not because they represent different concepts. One term that this document uses at both levels is "datatype", but the level to which it applies should be apparent from the context in which it is used.

4.4 Types, Instances and Values

When considering data and metadata, it is important to distinguish between types of data/metadata, and instances of these types and their associated values. The metamodel specifies types of classes, attributes and relationships. Any particular instance of one of these will be of a specific type, and at any point in time, that instance will have a specific value. As examples, this document defines *attribute instance* and *attribute value*, but the same principle applies to classes, relationships and all other metamodel constructs defined in 3.1.

Clause 4 of this document specifies the types of metadata objects that form the structure of a metadata registry. A metadata registry will be populated with instances of these metadata objects (metadata items), which in turn define types of data, e.g. in an application database. In other words, instances of metadata specify types of application level data. In turn, the application database will be populated by the real world data as instances of those defined data types.

NOTE ISO/IEC 10027:1990 IRDS Framework explains the concepts of different levels of modelling.

4.5 Extensibility

It is not expected that this metamodel will completely accommodate all users. Particular sectors, such as document management, scientific data, statistical data, require metadata attributes not addressed in this standard. Such extensions shall be considered conformant if they do not violate any of the rules inherent in the structure and content as specified by the metamodel in this standard. Classes, relationships, and attributes may be added to this conceptual data model.

Implementers of this standard may include extensions as part of an implementation, and/or they may provide facilities to allow a registry user to define their own extensions.

4.6 Date References

In this standard, dates are important attributes of an Administration Record and of operations of a registry. For the purpose of this standard, "date" refers to Gregorian calendar date {see ISO 8601:2000} and the associated default representation is YYYY-MM-DD (i.e. Year-Month-Day). For example, 12 October, 2001 if referenced in numeric form should be 2001-10-12 and not, for example, as 12-10-2001 (which might be confused with 10 December, 2001).

For the present, the specification of time in addition to date should be consider a user extension to this standard.

4.7 Description of metamodel

For descriptive purposes, the metamodel is organized into six functional regions:

Common facilities applying to all administered items (see Figure 1):

- Administration and Identification (see 4.8)
- Naming and Definition (see 4.9)
- Classification (see 4.10)

Descriptions of specific types of Administered Item:

- Data Element Concepts (see 4.11)
- Conceptual and Value Domains (see 4.12)
- Data Elements (see 4.13).

The division of the model into regions is for descriptive purposes only and has no other significance.

NOTE If any discrepancy exists in Clause 4 between the figures and the text, the text shall take precedence.

4.7.1 Common facilities

Figure 1 illustrates the relationship of the three common facilities to the **Administered Items** in the registry.

The common facilities apply to all administered items as follows:

- Administered Items are identified once only and administered as single items within the registry.
- Administered Items are named and defined in at least one Context, and possibly in multiple Contexts. Within each Context, Names and Definitions may be specified in one or more languages.
- Administered Items may be classified in zero or more Classification Schemes.

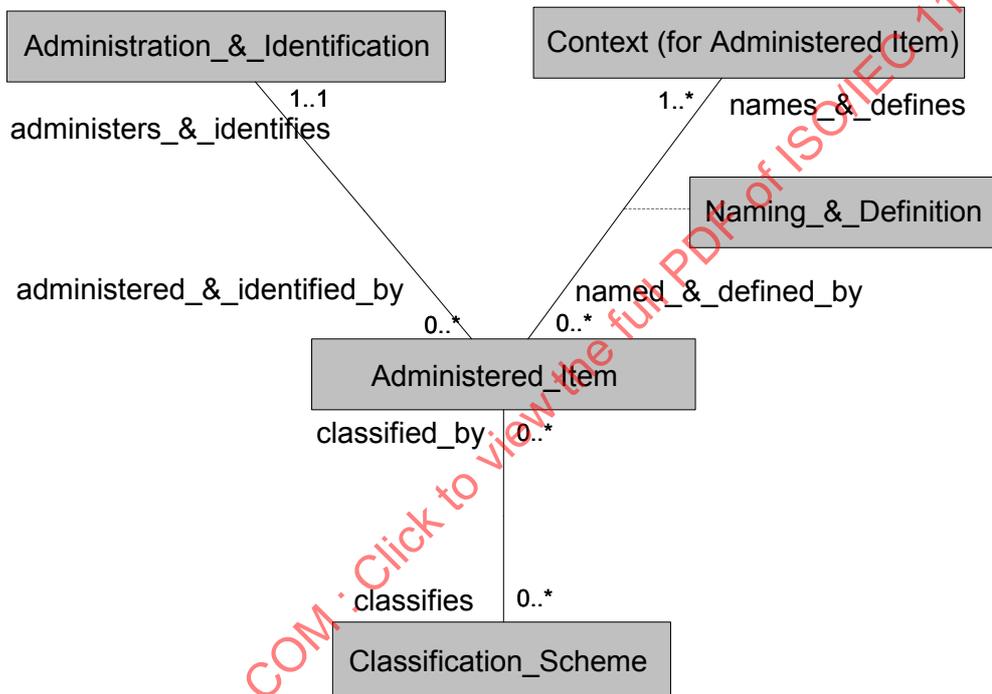


Figure 1 — Common facilities for all Administered Items

4.7.2 Types of Administered Items

This part of ISO/IEC 11179 specifies the following types of Administered Items, as listed in Figure 2. The Administered Items shown in the figure are described in more detail later in this Clause. Additional types of Administered Item may be defined as extensions to this standard.

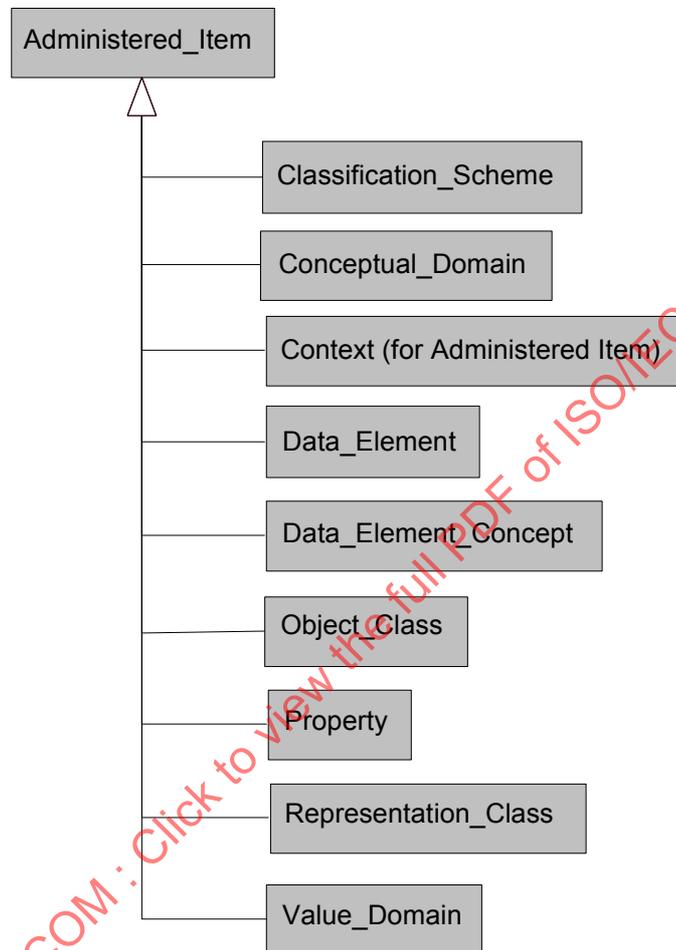


Figure 2 — Types of Administered Items

4.7.3 High-level metamodel overview

Figure 3 shows a high-level overview of the central regions of the metamodel.

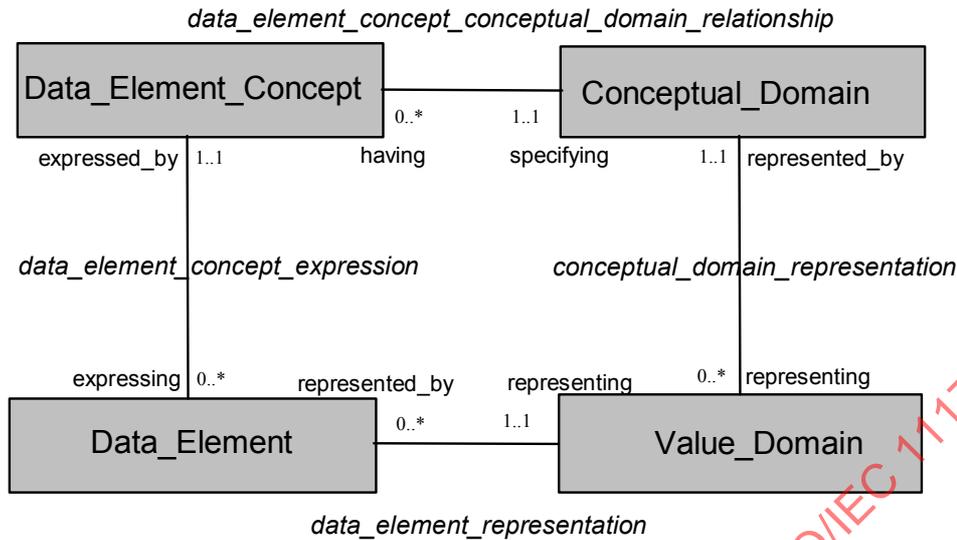


Figure 3 — High-level metamodel

4.8 Administration and Identification region

The Administration and Identification region supports the administrative aspects of Administered Items in a registry. This region addresses:

- the identification and registration of items submitted to the registry
- the organizations that have submitted items to the registry, and/or that are responsible for items within the registry, including Registration Authorities
- contact information for organizations
- supporting documentation
- relationships among administered items.

The registration of Administered Items is described in ISO/IEC 11179-6.

4.8.1 Metadata objects in the Administration and Identification region

Figure 4 shows the classes, relationships, attributes and composite attributes that support Administration and Identification. Figure 5 shows the composite datatypes used on composite attributes.

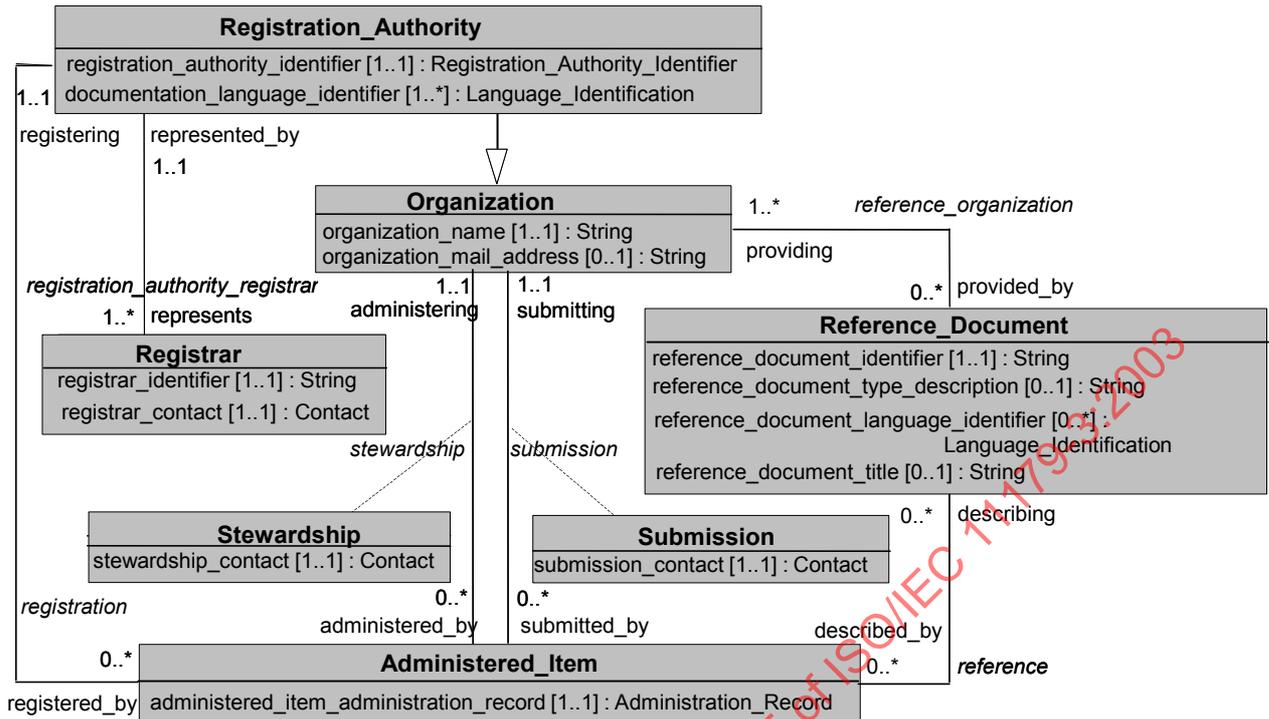


Figure 4 — Administration and identification metamodel region

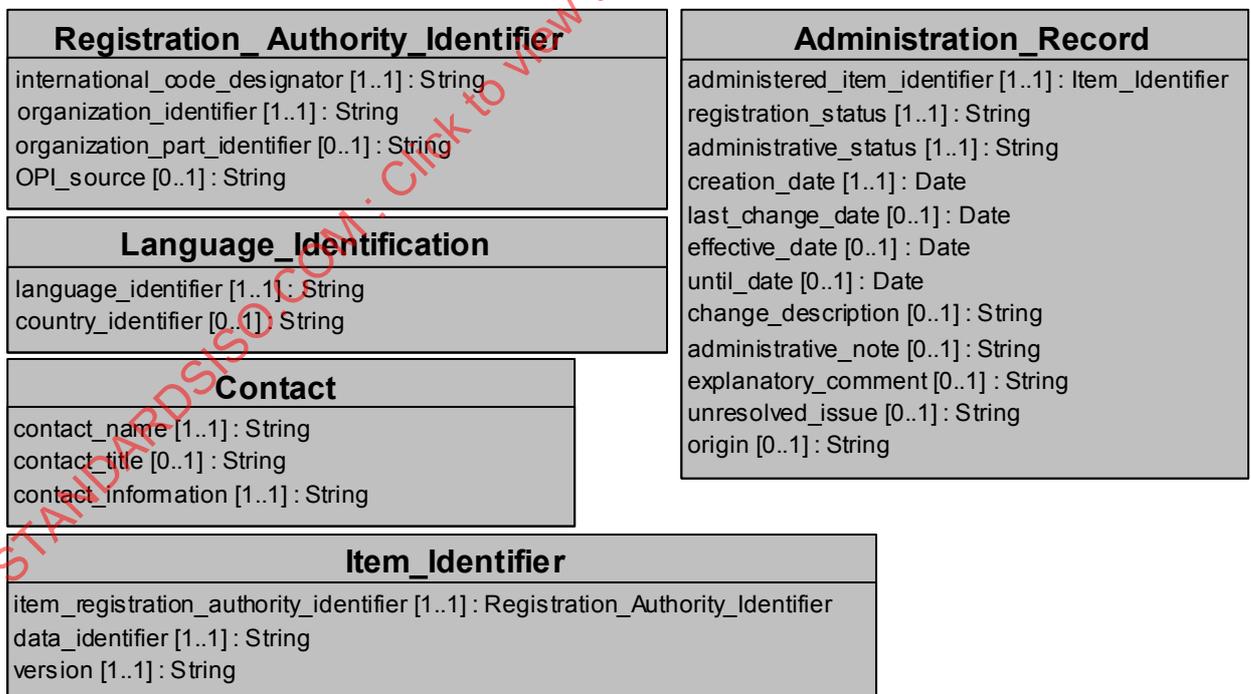


Figure 5 — Administration and identification region – Classes used as Composite Datatypes

4.8.1.1 Administered Item

An *Administered Item* may be any one of those types listed in Figure 2. Each instance of an *Administered Item* encapsulates its own *Administration Record*. An *Administered Item* is submitted by an *Organization* represented by the relationship *submission* in Figure 4. An *Administered Item* is registered by a *Registration Authority* represented by the relationship *registration* in Figure 4. An *Administered Item* is administered by an *Organization* represented by the relationship *stewardship* in Figure 4. An *Administered Item* may be described by zero or more *Reference Documents* as represented by the relationship *reference* in Figure 4.

Each instance of an *Administered Item* through its *Administration Record* shall have a unique *administered item identifier* used to identify it and that distinguishes it from any other *Administered Item*. Each *Administered Item* in the owner's metadata registry shall have (as part of the *Administration Record*):

- a *registration status* indicating the point in a registration life cycle applying to it
- an *administrative status* indicating the point in the *Registration Authority's* registration process.

<u>Attribute name</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>Administered item administration record</i>	One per <i>Administered Item</i> .	<i>Administration Record</i>

4.8.1.2 Administration Record

An instance of an *Administration Record* records information about an *Administered Item* in the registry. The *Administration Record* instance provides a basis for identifying, naming, defining, classifying and recording administrative information about the *Administered Item* in the registry.

When an *Administered Item* is modified, it becomes a new version of the *Administered Item* and it thus requires a new version of its *Administration Record*. The *administration record - creation date*, the reason for change (*administration record - change*), the *contact persons* for the responsible and submitting organizations, *Registration Authority*, and the *Registrar* shall be provided for this new *Administered Item*. The *Registrar* may collect history by retaining the old *Administration Record*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>administered item identifier</i>	One per <i>Administration record</i>	<i>Item_Identifier</i>
<i>administrative note</i>	Zero or one per <i>Administration record</i>	String
<i>administrative status</i>	One per <i>Administration record</i>	String
<i>change description</i>	One per <i>Administration record</i> conditional on presence of last change date	String
<i>creation date</i>	One per <i>Administration record</i>	Date
<i>effective date</i>	Zero or one per <i>Administration record</i>	Date
<i>explanatory comment</i>	Zero or one per <i>Administration record</i>	String
<i>last change date</i>	Zero or one per <i>Administration record</i>	Date
<i>origin</i>	Zero or one per <i>Administration record</i>	String
<i>registration status</i>	One per <i>Administration record</i>	String
<i>unresolved issue</i>	Zero or one per <i>Administration record</i>	String
<i>until date</i>	Zero or one per <i>Administration record</i>	Date

4.8.1.3 Contact

The composite datatype *Contact* is used to specify the contact information for *registrar contact*, *stewardship contact* and *submission contact*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>contact information</i>	One per <i>Contact</i> .	String
<i>contact name</i>	One per <i>Contact</i> .	String
<i>contact title</i>	Zero or one per <i>Contact</i> .	String

4.8.1.4 Item Identifier

The composite datatype *Item Identifier* is used to specify the unique identifier for an *Administered Item*. The *Item Identifier* is composed of three parts as shown in the following attribute list. The *item registration authority identifier* identifies the owning *Registration Authority*. The *data identifier* uniquely identifies an *Administered Item* within a *Registration Authority*. *Data identifiers* shall be unique within a *Registration Authority* for each occurrence of an *Administered Item*. The *version* is used to distinguish multiple instances of the same *Administered Item* as it undergoes changes.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>item registration authority identifier</i>	One per <i>Item identifier</i>	<i>Registration_Authority_Identifier</i>
<i>data identifier</i>	One per <i>Item identifier</i>	String
<i>version</i>	One per <i>Item identifier</i>	String

4.8.1.5 Language Identification

The composite datatype *Language Identification* serves as an identifier for a language. It is used in:

- the *Registration Authority* class to identify the default language(s) of the registration authority
- the *Reference Document* class to identify the language(s) used within the document
- the *Language Section* class of the Naming and Definition region to identify the language used for names and definitions within that section.

The identifier comprises a mandatory *language identifier* and an optional *country identifier*, the latter being used to distinguish variations in language use in different countries.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>language identifier</i>	One per <i>Language identification</i>	String NOTE Use the three character alphabetic codes from ISO 639-2/Terminology, with extensions if required.
<i>country identifier</i>	Zero or one per <i>Language identification</i>	String NOTE Use the three digit numeric codes from ISO 3166-1, with extensions if required.

4.8.1.6 Organization

An *Organization* can play one or more roles with respect to a Metadata Registry. The roles currently recognized in this part of ISO/IEC 11179 are: *Registration Authority*, *reference organization*, *steward* (of an *Administered Item*) – represented by the relationship *stewardship* – and *submitter* (of an *Administered Item*) – represented by the relationship *submission*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>organization name</i>	One per <i>Organization</i>	String
<i>organization mail address</i>	Zero or one per <i>Organization</i>	String

4.8.1.7 Reference Document

An *Administered Item* may be *described* by one or more *Reference Documents* as shown by the relationship *reference* in Figure 4. For each *Reference Document*, the *Organization* that originated the *Reference Document* must be identified, as shown by the relationship *reference organization* in Figure 4.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>reference document identifier</i>	One per <i>Reference Document</i>	String
<i>reference document language identifier</i>	From zero to many per <i>Reference document</i> (absence of a language indicates use of the same language as specified by Registration Authority documentation language identifier)	<i>Language_Identification</i>
<i>reference document title</i>	Zero or one per <i>reference document</i>	String
<i>reference document type description</i>	Zero or one for each <i>reference document</i>	String

4.8.1.8 Registrar

A *Registration Authority* is represented by one or more *Registrars* as shown by the relationship *reference authority registrar* in Figure 4. *Registrars* are the persons who perform the administrative steps to register *Administered Items* in a *Metadata Registry*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>registrar identifier</i>	One for each <i>registrar</i> in a <i>registration authority</i>	String
<i>registrar contact</i>	One for each <i>registrar</i> in a <i>registration authority</i>	<i>Contact</i>

4.8.1.9 Registration Authority

A *Registration Authority* is any *Organization* authorized to register *metadata*. A *Registration Authority* is a subtype of *Organization* and inherits all of its attributes and relationships. An *Administered Item* has a *Registration Authority* that is its owner, shown by the relationship *registration* in Figure 4. A *Registration Authority* may register many *Administered Items*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>registration authority identifier</i>	One per <i>registration authority</i>	<i>Registration_Authority_Identifier</i>
<i>documentation language identifier</i>	From one to many per <i>registration authority</i>	<i>Language_Identification</i>

4.8.1.10 Registration Authority Identifier

The composite datatype *Registration Authority Identifier* is used to uniquely identify a *Registration Authority*. The sources of values for each part of the identifier are specified in ISO/IEC 11179-6.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>international code designator</i>	One per <i>registration authority identifier</i>	String
<i>organization identifier</i>	One per <i>registration authority identifier</i>	String
<i>organization part identifier (OPI)</i>	One per <i>registration authority identifier</i>	String
<i>OPI source</i>	One per <i>registration authority identifier</i>	String

4.8.1.11 Stewardship

An *Organization* shall be identified as the steward responsible for *administering* each *Administered Item*, as represented by the relationship *Stewardship* in Figure 4. This relationship identifies a *stewardship contact* for the *Administered Item*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>stewardship contact</i>	One per <i>Stewardship</i>	<i>Contact</i>

4.8.1.12 Submission

For each *Administered Item*, an *Organization* shall be identified as the submitter as represented by the relationship *Submission* in Figure 4. This relationship identifies a *submission contact* for the *Administered Item*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>submission contact</i>	One per <i>Submission</i>	<i>Contact</i>

4.9 Naming and Definition Region

The Naming and Definition region is used to manage the names and definitions of administered items and the contexts for the names. It is recognized that an administered item may have many names that will vary depending on discipline, locality, technology, etc.

4.9.1 Metadata objects in the Naming and Definition region

Figure 6 represents the Naming and Definition region. This region of the metamodel is based on, and is consistent with, terminological models developed by ISO/TC 37.

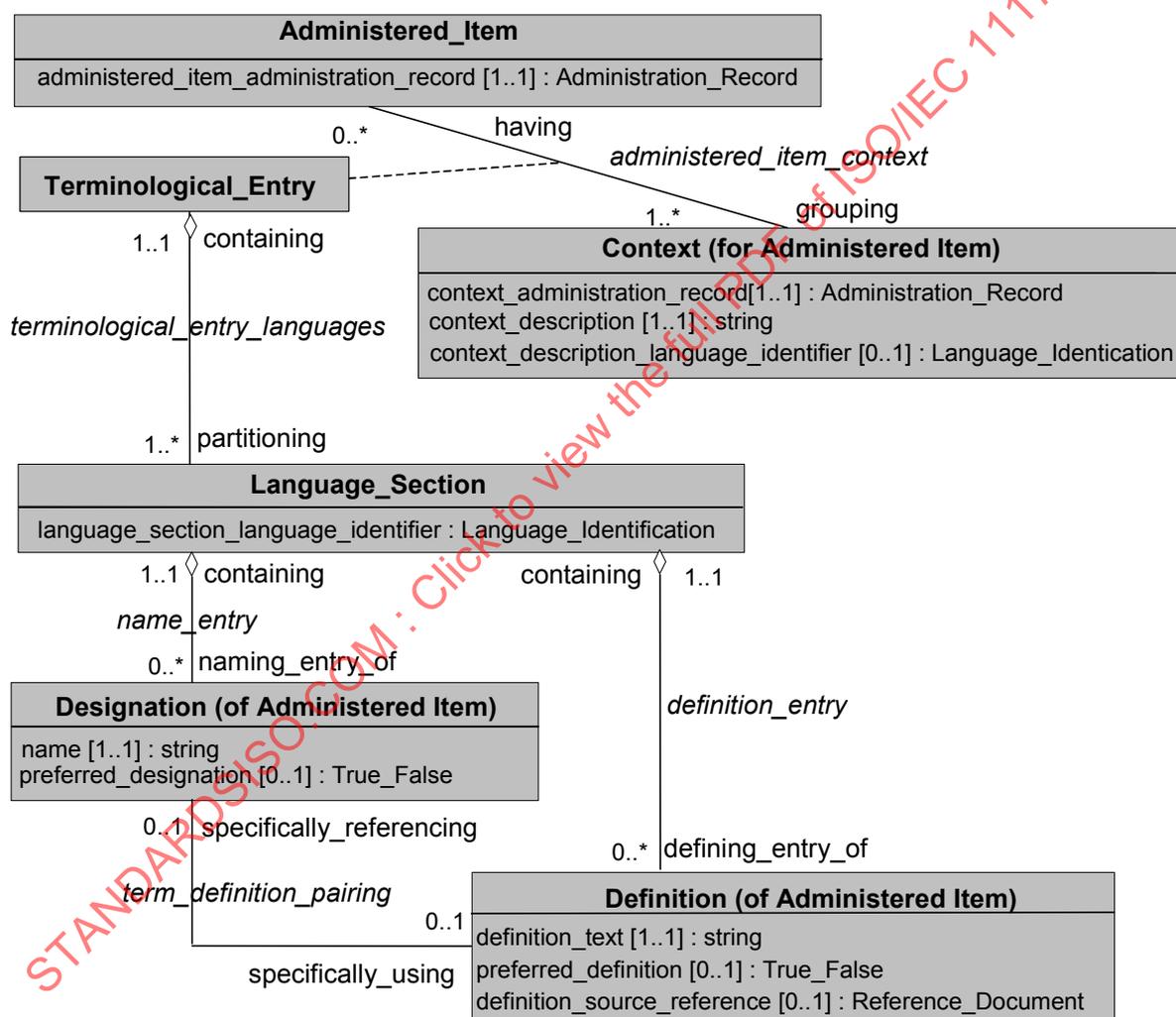


Figure 6 — Naming and Definition metamodel region

ISO/IEC 11179-4 provides rules and guidelines for the formulation of data definitions.

ISO/IEC 11179-5 provides naming and identification principles for Administered Items within a Context.

The classes used as datatypes on composite attributes are described in 4.8.1 and Figure 5, since they are also used in the Administration and Identification region.

4.9.1.1 Administered Item

Administered Item is described in 4.8.1.1.

4.9.1.2 Context (for Administered Item)

Each *Administered Item* is named and defined within one or more *Contexts*. A *Context* defines the scope within which the subject data has meaning. A *Context* may be a business domain, an information subject area, an information system, a database, file, data model, standard document, or any other environment determined by the owner of the registry. Each *Context* is itself managed as an *Administered Item* within the registry and is given a *name* and a *definition*.

NOTE The *Context* within which a *Context* is named and defined will probably be the registry itself, but could be broader, and could simply be specified as being this International Standard.

For each *Context* with which an *Administered Item* is associated through a *Terminological Entry*, the *Administered Item* must have at least one *Designation (name)* and at least one *Definition*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>context administration record</i>	One per <i>Context</i>	<i>Administration Record</i>
<i>context description</i>	One per <i>Context</i>	String
<i>context description language identifier</i>	Zero or one per <i>Context</i>	<i>Language Identification</i>

4.9.1.3 Terminological Entry

A *Terminological Entry* applies to an *Administered Item* in a particular *Context*. It provides a grouping of *Designations* and *Definitions* partitioned into *Language Sections*, allowing the *Administered Item* to be named and defined within the *Context* in multiple languages.

An *Administered Item* may have one or more *Terminological Entries*, each in a particular *Context*. Each *Terminological Entry* contains one or more *Language Sections* as represented by the relationship *terminological entry languages* in Figure 6.

4.9.1.4 Language Section

If a registry supports multiple languages, the language(s) associated with particular names and definitions need to be identified. A *Language Section* partitions a *Terminological Entry* by *Language*, as represented by the relationship *terminological entry languages* in Figure 6. A *language section language identifier* identifies the *Language* associated with a particular *Language Section*. A *Language Section* contains zero or more *Designations* as represented by the relationship *name entry* in Figure 6. A *Language Section* contains zero or more *Definitions* as represented by the relationship *definition entry* in Figure 6.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>language section language identifier</i>	One per <i>Language section</i> .	<i>Language Identification</i>

4.9.1.5 Definition (of Administered Item)

The *Definition* class provides the *defining entry* of a *Language Section* in the *Terminological Entry* for an *Administered Item* in a particular *Context*. In other words, it is where the definition for an *Administered Item* is specified in a particular language for a particular *Context*. Where multiple *Definitions* are provided within the same *Language Section*, one of them may be specified as the *preferred definition*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>definition text</i>	One per <i>definition</i>	String
<i>definition source reference</i>	Zero or one per <i>Definition</i>	<i>Reference Document</i>
<i>preferred definition</i>	Zero or one per <i>Definition</i>	True_False

4.9.1.6 Designation (of Administered Item)

The *Designation* class provides the *naming entry* of a *Language Section* in the *Terminological Entry* for an *Administered Item* in a particular *Context*. In other words, it is where the name for an *Administered Item* is specified in a particular language for a particular *Context*. Where multiple *Designations* are provided within the same *Language Section*, one of them may be specified as the *preferred designation*.

<u>Attribute</u>	<u>Occurrences</u>	<u>Datatype</u>
<i>name</i>	One per <i>Designation</i>	String
<i>preferred designation</i>	Zero or one per <i>Designation</i>	True_False

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4.10 Classification Region

Figure 7 represents the Classification region.

The Classification region provides a facility to register and administer *Classification Schemes* and their constituent *Classification Scheme Items*. Optionally, a *Classification Scheme* may be used to classify *Administered Items* within the registry. Some *Classification Schemes* will be more applicable to classifying objects in the real world than they will be to classifying metadata objects in a registry.

ISO/IEC 11179-2 provides procedures and techniques for associating data with *Classification Schemes*.

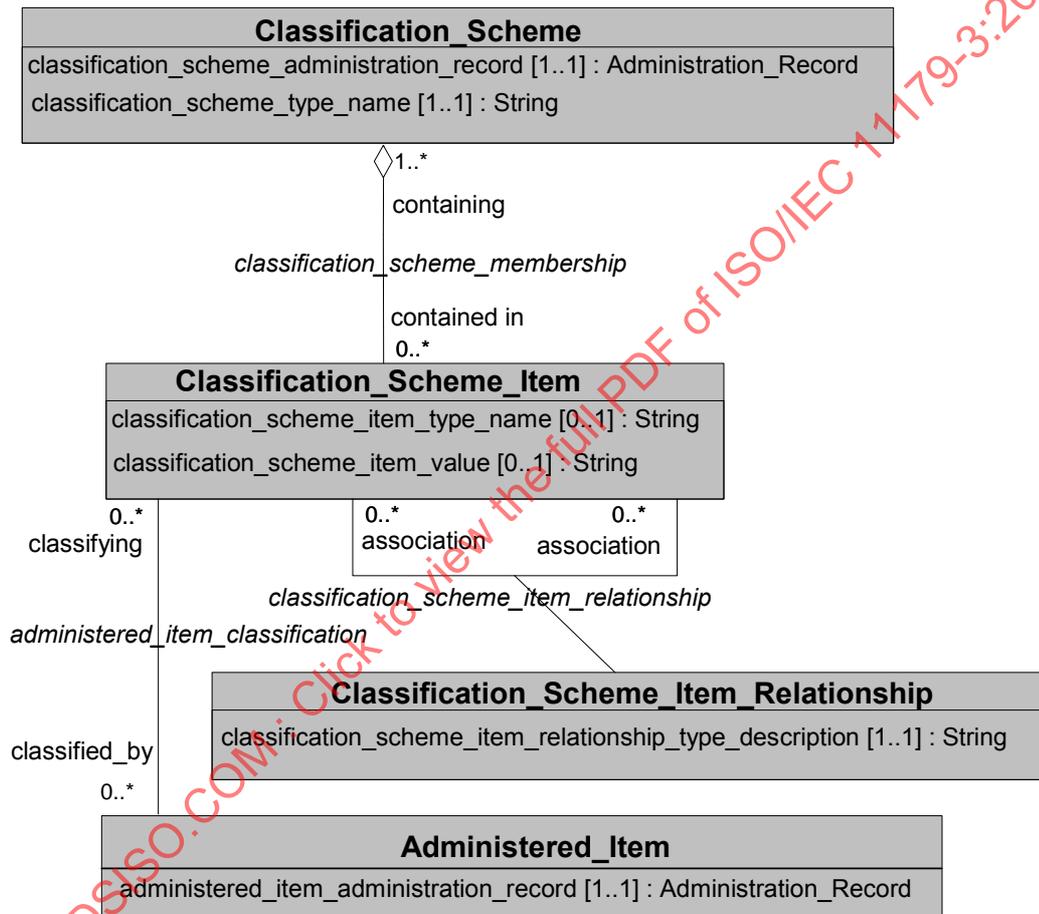


Figure 7 — Classification metamodel region

4.10.1 Metadata Objects in the Classification region

4.10.1.1 Administered Item

Administered Item is described in 4.8.1.1.

An *Administered Item* may be classified in zero or more *Classification Schemes*, by associating it with one or more *Classification Scheme Items* as represented by the relationship *administered item classification* in Figure 7. Such classification is optional.

4.10.1.2 Classification Scheme

A *Classification Scheme* may be a taxonomy, a network, an ontology, or any other terminological system. The classification may also be just a list of controlled vocabulary of property words (or terms). The list might be taken from the "leaf level" of a taxonomy.

A *Classification Scheme* is a sub-type of *Administered Item*, inheriting its attributes and relationships, which allows it to be identified, named, defined and optionally classified.

An *Administered Item* is named within a specific *Context*, and may have different *names* in different *Contexts*. As an *Administered Item* itself, a *Classification Scheme* is also named within one or more *Contexts*. For an *Administered Item* to be considered to have a *name* within a *Classification Scheme*, the *Administered Item* and the *Classification Scheme* must share a common *Context*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>classification scheme administration record</i>	One per <i>Classification Scheme</i>	<i>Administration_Record</i>
<i>classification scheme type name</i>	One per <i>Classification Scheme</i>	String

4.10.1.3 Classification Scheme Item

A *Classification Scheme Item* represents an individual item within a *Classification Scheme*, as represented by the relationship *classification scheme membership* in Figure 7. The *Classification Scheme Item* may have either a *classification scheme item type name*, a *classification scheme item value*, or both.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>classification scheme item type name</i>	Zero or one per <i>Classification Scheme Item</i>	String
<i>classification scheme item value</i>	Zero or one per <i>Classification Scheme Item</i>	String

4.10.1.4 Classification Scheme Item Relationship

A *Classification Scheme Item Relationship* associates two or more *Classification Scheme Items* within a *Classification Scheme*. Such relationships serve to assist navigation through a large number of *Classification Scheme Items*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>classification scheme item relationship type description</i>	One per <i>Classification Scheme Item Relationship</i>	String

4.11 Data Element Concept Region

The data element concept region is illustrated in Figure 8. The purpose of the data element concept region is to maintain the information on the concepts upon which the data elements are developed. The metadata objects in this region concentrate on semantics. The concepts are independent of any internal or external physical representation. The metadata objects in this region are Object Classes (encompassing Concepts and Concept Relationships) and Properties, which may be combined to form Data Element Concepts.

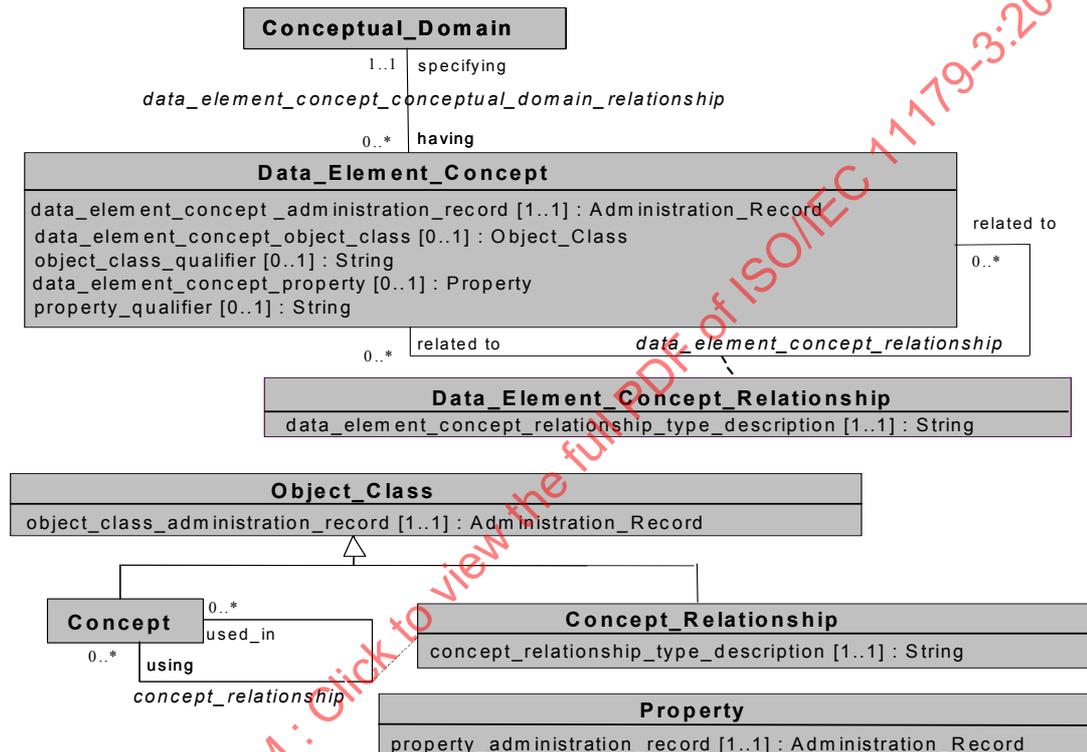


Figure 8 — Data Element Concept metamodel region

4.11.1 Metadata objects in the Data Element Concept region

4.11.1.1 Object Class

An *Object Class* is a set of ideas, abstractions, or things in the real world that can be identified with explicit boundaries and meaning and whose properties and behavior follow the same rules. It may be either a single or a group of associated concepts, abstractions, or things. An *Object Class* may be a single unit of thought (i.e., *Concept*) or a set of *Concepts* in a relationship with each other to form a more complex concept (i.e., *Concept Relationship*). A *Concept* and a *Concept Relationship* are subtypes of an *Object Class*. Each *Concept Relationship* carries a *concept relationship type description* that describes the nature of the relationship.

As an *Administered Item*, an *Object Class* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified within a *Classification Scheme*. An *Object Class* may be

registered as an *Administered Item* without necessarily being associated with a *Data Element Concept* or, through the latter, a *Property*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>object class administration record</i>	One per <i>Object Class</i>	<i>Administration_Record</i>
<i>concept relationship type description</i>	One per <i>Concept Relationship</i>	String

4.11.1.2 Property

A *Property* is a characteristic common to all members of an *Object Class*. It may be any feature that humans naturally use to distinguish one individual object from another. It is the human perception of a single characteristic of an *Object Class* in the real world. It is conceptual and thus has no particular associated means of representation by which the *Property* can be communicated.

As an *Administered Item*, a *Property* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified within a *Classification Scheme*. A *Property* may be registered as an *Administered Item* without necessarily being associated with a *Data Element Concept* or, through the latter, an *Object Class*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>property administration record</i>	One per <i>Property</i>	<i>Administration_Record</i>

4.11.1.3 Data Element Concept

A *Data Element Concept* is a concept that can be represented in the form of a data element, described independently of any particular representation. A *Data Element Concept* may have zero or one *Object Class* and zero or one *Property*. The union of a *Property* and an *Object Class* provides significance beyond either that of the *Property* or the *Object Class*. A *Data Element Concept* thus has a *Definition* independent from the *Definition* of the *Object Class* or the *Property*.

As an *Administered Item*, a *Data Element Concept* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified within a *Classification Scheme*. A *Data Element Concept* may be associated with other *Data Element Concepts*, via the *Data Element Concept Relationship*. The nature of the relationship is described using the *data element concept relationship type description*.

A *Data Element Concept* may be registered as an *Administered Item* without necessarily being associated with any *Data Element*, but a *Data Element Concept* shall be associated with exactly one *Conceptual Domain*, as represented by the "*data element concept-conceptual domain relationship*" in Figure 8. The *Conceptual Domain* specifies all valid *Value Meanings* of a *Data Element Concept*. The *Conceptual Domain* is described in 4.12.1.1.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>data element concept administration record</i>	One per <i>Data Element Concept</i>	<i>Administration_Record</i>
<i>data element concept object class</i>	Zero or one per <i>Data Element Concept</i>	<i>Object_Class</i>
<i>data element concept property</i>	Zero or one per <i>Data Element Concept</i>	<i>Property</i>
<i>object class qualifier</i>	Zero or one per <i>Data Element Concept</i>	String
<i>property qualifier</i>	Zero or one per <i>Data Element Concept</i>	String

4.12 Conceptual and Value Domain Region

This region of the metamodel addresses the administration of *Conceptual Domains* and *Value Domains*. These domains can be viewed as logical code sets and physical code sets. *Conceptual Domains* support *Data Element Concepts* and *Value Domains* support *Data Elements*. The region is illustrated in Figure 9.

4.12.1 Metadata objects in the Conceptual and Value Domain region

4.12.1.1 Conceptual Domain

A *Conceptual Domain* is a set of *Value Meanings*, which may either be enumerated or expressed via a description.

As an *Administered Item*, a *Conceptual Domain* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified within a *Classification Scheme*.

A *Conceptual Domain* may be associated with other *Conceptual Domains*, via the *Conceptual Domain Relationship* in Figure 9. The nature of the relationship is described using the *conceptual domain relationship type description*. Through the *Conceptual Domain Relationship*, a *Conceptual Domain* may be composed of other *Conceptual Domains* or may be a member (component) of a larger *Conceptual Domain*.

A *Conceptual Domain* may specify a constraint such as "linear measure" as its *dimensionality*. When a *dimensionality* is specified, any *Value Domain* that is based on this *Conceptual Domain* shall specify a *Unit of Measure* that is consistent with this *dimensionality*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>conceptual domain administration record</i>	One per <i>Conceptual Domain</i>	<i>Administration_Record</i>
<i>dimensionality</i>	Zero or one per <i>Conceptual Domain</i>	String

4.12.1.2 Enumerated Conceptual Domain

A *Conceptual Domain* sometimes contains a finite allowed inventory of notions that can be enumerated. Such a *Conceptual Domain* is referred to as an *Enumerated Conceptual Domain*. An example of an *Enumerated Conceptual Domain* is the notion of countries that is specified in ISO 3166, Codes for the representation of names of countries. As a sub-type of *Conceptual Domain*, an *Enumerated Conceptual Domain* inherits the attributes and relationships of the former.

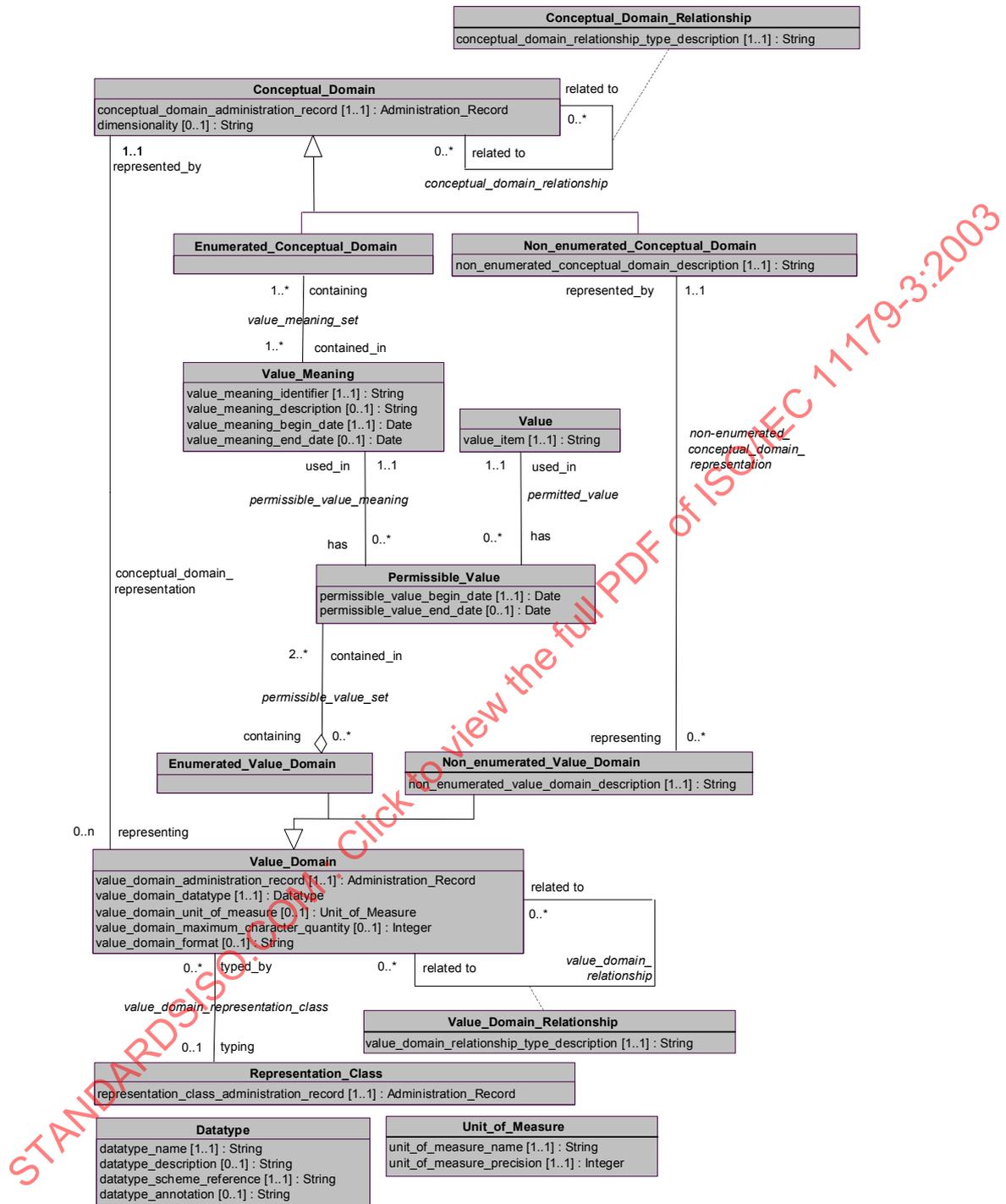


Figure 9 — Conceptual and value domain metamodel region

4.12.1.3 Value Meanings

Each member of an *Enumerated Conceptual Domain* has a *Value Meaning* that provides its distinction from other members. In the example of ISO 3166, the notion of each country as specified would be the *Value Meanings*. The representation of *Value Meanings* in a registry shall be independent of (and shall not constrain) their representation in any corresponding *Value Domain*. A particular *Value Meaning* may have more than one means of representation by *Permissible Values* — each from a distinct *Enumerated Value Domain*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>value meaning identifier</i>	One per <i>Value Meaning</i>	String
<i>value meaning begin date</i>	One per <i>Value Meaning</i>	Date
<i>value meaning description</i>	Zero or one per <i>Value Meaning</i>	String
<i>value meaning end date</i>	Zero or one per <i>Value Meaning</i>	Date

4.12.1.4 Non-enumerated Conceptual Domain

A *Conceptual Domain* that cannot be expressed as a finite set of *Value Meanings* is called a *Non-enumerated Conceptual Domain*. It may be expressed via a description or specification, such as a rule, a procedure, or a range (i.e., interval). As a sub-type of *Conceptual Domain*, a *Non-enumerated Conceptual Domain* inherits the attributes and relationships of the former.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>non-enumerated conceptual domain description</i>	One per <i>Non-enumerated Conceptual Domain</i>	String

4.12.1.5 Value Domain

One of the key components of a representation is the *Value Domain*. A *Value Domain* provides representation, but has no implication as to what *Data Element Concept* the values are associated nor what the values mean.

A *Value Domain* is associated with a *Conceptual Domain*. A *Value Domain* provides a representation for the *Conceptual Domain*. An example of a *Conceptual Domain* and a set of *Value Domains* is ISO 3166, Codes for the representation of names of countries. For instance, ISO 3166 describes the set of seven *Value Domains*: short name in English, official name in English, short name in French, official name in French, alpha-2 code, alpha-3 code, and numeric code.

As an *Administered Item*, a *Value Domain* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified in a *Classification Scheme*.

A *Value Domain* may be associated with other *Value Domains*, via the *Value Domain Relationship*. The nature of the relationship is described using the *value domain relationship type description*. Through the *Value Domain Relationship*, a *Value Domain* may be composed of other *Value Domains* or may be a member (component) of a larger *Value Domain*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>value domain administration record</i>	One per <i>Value Domain</i>	<i>Administration_Record</i>
<i>value domain datatype</i>	One per <i>Value domain</i>	<i>Datatype</i>
<i>value domain format</i>	Zero or one per <i>Value Domain</i>	String
<i>value domain maximum character quantity</i>	Zero or one per <i>Value Domain</i>	Integer
<i>value domain unit of measure</i>	Zero or one per <i>Value Domain</i>	<i>Unit_of_Measure</i>

4.12.1.6 Enumerated Value Domain

An *Enumerated Value Domain* is one where the *Value Domain* is expressed as an explicit set of two or more *Permissible Values*. As a sub-type of *Value Domain*, an *Enumerated Value Domain* inherits the attributes and relationships of the former.

4.12.1.7 Permissible Value

A *Permissible Value* is an expression of a *Value Meaning* within an *Enumerated Value Domain*. It is one of a set of such values that comprises an *Enumerated Value Domain*. Each *Permissible Value* is associated with a *Value Meaning*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>permissible value begin date</i>	One per <i>Permissible Value</i>	Date
<i>permissible value end date</i>	Zero or one per <i>Permissible Value</i>	Date

4.12.1.8 Value

This is the actual value associated with a *Permissible Value* in an *Enumerated Value Domain*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>value item</i>	One per <i>Value</i>	String

4.12.1.9 Non-enumerated Value Domain

A *Value Domain* may be expressed via a description or specification, such as a rule, a procedure, or a range (i.e., interval), rather than as an explicit set of *Permissible Values*. Such a *Value Domain* is call a *Non-enumerated Value Domain*. As a sub-type of *Value Domain*, a *Non-enumerated Value Domain* inherits the attributes and relationships of the former.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>non-enumerated value domain description</i>	One per <i>Non-enumerated Value Domain</i>	String

4.12.1.10 Datatype

A *Value Domain* is associated with a *Datatype* — a set of distinct values, characterized by properties of those values and by operations on those values, for example the category used for the collection of letters, digits,

and/or symbols to depict values of a *Data Element* determined by the operations that may be performed on the *Data Element*.

A *Datatype* is designated by a *data type name*, and described by a *datatype description*. The *datatype name* is usually drawn from some external source, which is designated by a *datatype scheme reference*. Additional information may optionally be provided using the *datatype annotation*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>datatype name</i>	One per <i>Datatype</i>	String
<i>datatype description</i>	One per <i>Datatype</i>	String
<i>datatype scheme reference</i>	One per <i>Datatype</i>	String
<i>datatype annotation</i>	Zero or one per <i>Datatype</i>	String

4.12.1.11 Unit of Measure

If meaningful, a *Value Domain* may be associated with a *Unit of Measure* — the unit in which any associated *Data Element* values are specified. The unit is designated by a *unit of measure name*. When specified, the unit must be consistent with the *dimensionality* specified in the corresponding *Conceptual Domain*. Optionally, a *unit of measure precision* may be specified, as the number of decimal places to be supported in the associated *Data Element* values. This precision shall be considered a default that may be overridden for any particular *Data Element*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>unit of measure name</i>	One per <i>Unit of Measure</i>	String
<i>unit of measure precision</i>	Zero or one per <i>Unit of measure</i>	Integer

4.13 Data Element Region

The Data Element metamodel region, illustrated in Figure 10, is used to address the administration of *Data Elements*. *Data Elements* provide the formal representations for some information (such as a fact, a proposition, an observation, etc.) about some concrete or abstract thing. *Data Elements* are reusable and shareable representations of *Data Element Concepts*.

4.13.1 Metadata Objects in the Data Element Region

4.13.1.1 Data Element

A *Data Element* is considered to be a basic unit of data of interest to an organization. It is a unit of data for which the definition, identification, representation, and permissible values are specified by means of a set of attributes.

NOTE In general usage, the term *data element* and *data element type* are used interchangeably. In this document, the shorter term *data element* is used.

As an *Administered Item*, a *Data Element* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified in a *Classification Scheme*.

A *Data Element* is formed when a *Data Element Concept* is assigned a representation. One of the key components of a representation is the *Value Domain*, i.e., restricted valid values.

A *Data Element* is the association among a *Data Element Concept*, a *Value Domain* and optionally a *Representation Class*. The association of a *Data Element* with a *Representation Class* may be either direct (as shown by the relationship *data element representation class* in Figure 10), or via the *Value Domain* (as shown by the relationship *value domain representation class* in Figure 10). A *Data Element* cannot be registered as an *Administered Item* without being associated with a *Data Element Concept* and a *Value Domain*.

A *representation class qualifier* may be specified, that is used to qualify the name of the data element.

A *data element precision* may be used to specify the number of decimal places permitted in any associated data element values. If not specified, the *unit of measure precision* from the associated *Value Domain* shall apply.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>data element administration record</i>	One per <i>Data Element</i>	<i>Administration_Record</i>
<i>representation class qualifier</i>	Zero or one per <i>Data Element</i>	String
<i>data element precision</i>	Zero or one per <i>Data Element</i>	Integer

4.13.1.2 Data Element Concept

Data Element Concept is described under the *Data Element Concept* region in 4.11.1.3. A *Data Element Concept* may be associated with several *Value Domains* resulting in a different *Data Element* for each association.

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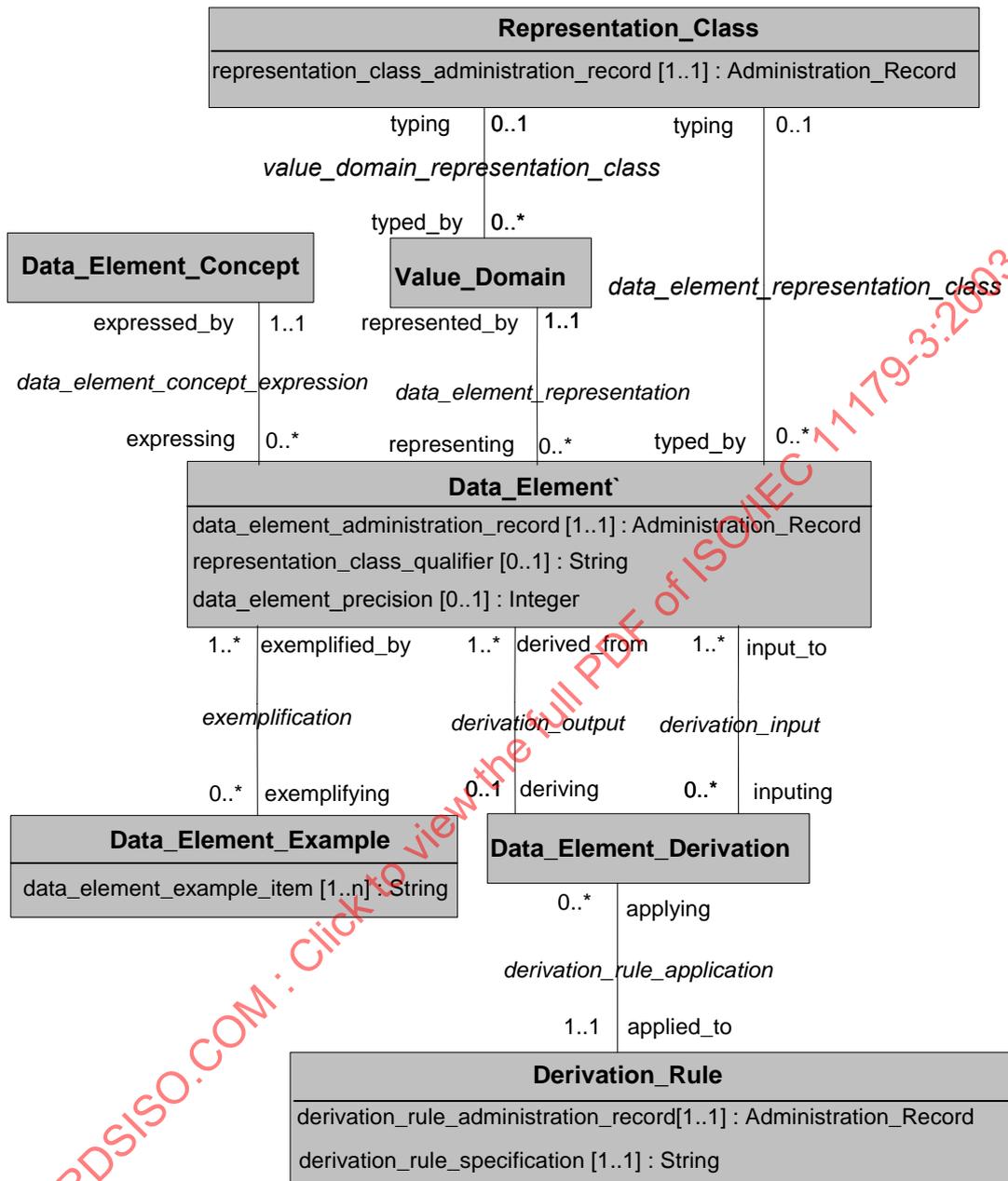


Figure 10 — Data Element metamodel region

4.13.1.3 Value Domain

Value Domain is described under the Conceptual Domain and Value Domain region in 4.12.1.5. A *Value Domain* provides representation, but has no implication as to what *Data Element Concept* the values are associated with, nor what the values mean. A *Value Domain* may be associated with multiple *Data Elements*.

4.13.1.4 Representation Class

Representation Class is the *Classification Scheme* for representation. The set of classes make it easy to distinguish among the elements in the registry. For instance, a data element categorized with the representation class 'amount' is different from an element categorized as 'number'. It probably won't make sense to compare the contents of these elements, or perform calculations using them together.

As an *Administered Item*, a *Representation Class* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified in a *Classification Scheme*.

The major intent of *Representation class* is to provide a discrete and complete set of high-level (coarse granularity) definitions for data element/value domain categorization. This is an aid to the user in terms of application of business rules.

Representation Class is a mechanism by which the functional and/or presentational category of an item may be conveyed to a user.

An informational list of representation class terms is provided in ISO/IEC 11179-5. The list below has been expanded to provide a more comprehensive list of examples.

Code — A system of valid symbols that substitute for specified values e.g. alpha, numeric, symbols and/or combinations.

Count — Non-monetary numeric value arrived at by counting.

Currency — Monetary representation

Date — Calendar representation e.g. YYYY-MM-DD

Graphic — Diagrams, graphs, mathematical curves, or the like – usually a vector image.

Icon — A sign or representation that stands for its object by virtue of a resemblance or analogy to it

Picture — A visual representation of a person, object, or scene – usually a raster image.

Quantity — A continuous number such as the linear dimensions, capacity/amount (non-monetary) of an object

Text – A text field that is usually unformatted.

Time — Time of day or duration eg HH:MM:SS.SSSS.

None of the terms in this list is required in any specific implementation of representation class.

By using representation class, enhanced semantic control over the contents of value domains can be maintained. Rules can be drawn against representation classes that allow enforcement of content within and among value domains. For example:

“A number-class data element cannot be used in a calculation.”

“A date-class data element must be in the format YYYY-MM-DD.”

“A relationship must exist between a code representation and the specific form of the value meanings which the code represents.”

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>representation class</i> <i>administration record</i>	One per <i>Representation Class</i>	<i>Administration_Record</i>

4.13.1.5 Data Element Example

A *Data Element* may have *Data Element Examples* that are used to provide representative samples of the *Data Element*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>data element example item</i>	One or more per <i>Data Element Example</i>	String

4.13.1.6 Derivation Rule

A *Data Element* may have a *Derivation Rule* that is a specification of derivation for the *data element*. The *derivation rule* may range from a simple operation such as subtraction to a very complex set of derivations (derivation being defined as a relationship between a *derivation rule* and an input set upon which it acts). *Derivation rules* are not limited to arithmetic and logical operations.

As an *Administered Item*, a *Derivation Rule* carries its own *Administration Record* information, allowing it to be identified, named, defined and optionally classified in a *Classification Scheme*.

A *Derivation Rule* may be registered as an *Administered Item* without necessarily being associated with any *Data Element Derivation*.

<u>Attribute</u>	<u>Allowed Occurrences</u>	<u>Datatype</u>
<i>derivation rule administration record</i>	One per <i>Derivation Rule</i>	<i>Administration_Record</i>
<i>derivation rule specification</i>	One per <i>Derivation Rule</i>	String

4.13.1.7 Data Element Derivation

A *Data Element Derivation* is the application of a *Derivation Rule* to one or more input *Data Elements*, to derive one or more output *Data Elements*.

4.14 Consolidated Metamodel

A consolidated metamodel is shown in Figure 11. This combines the Data Element Concept, Data Element, and Conceptual and Value Domain regions of the model.

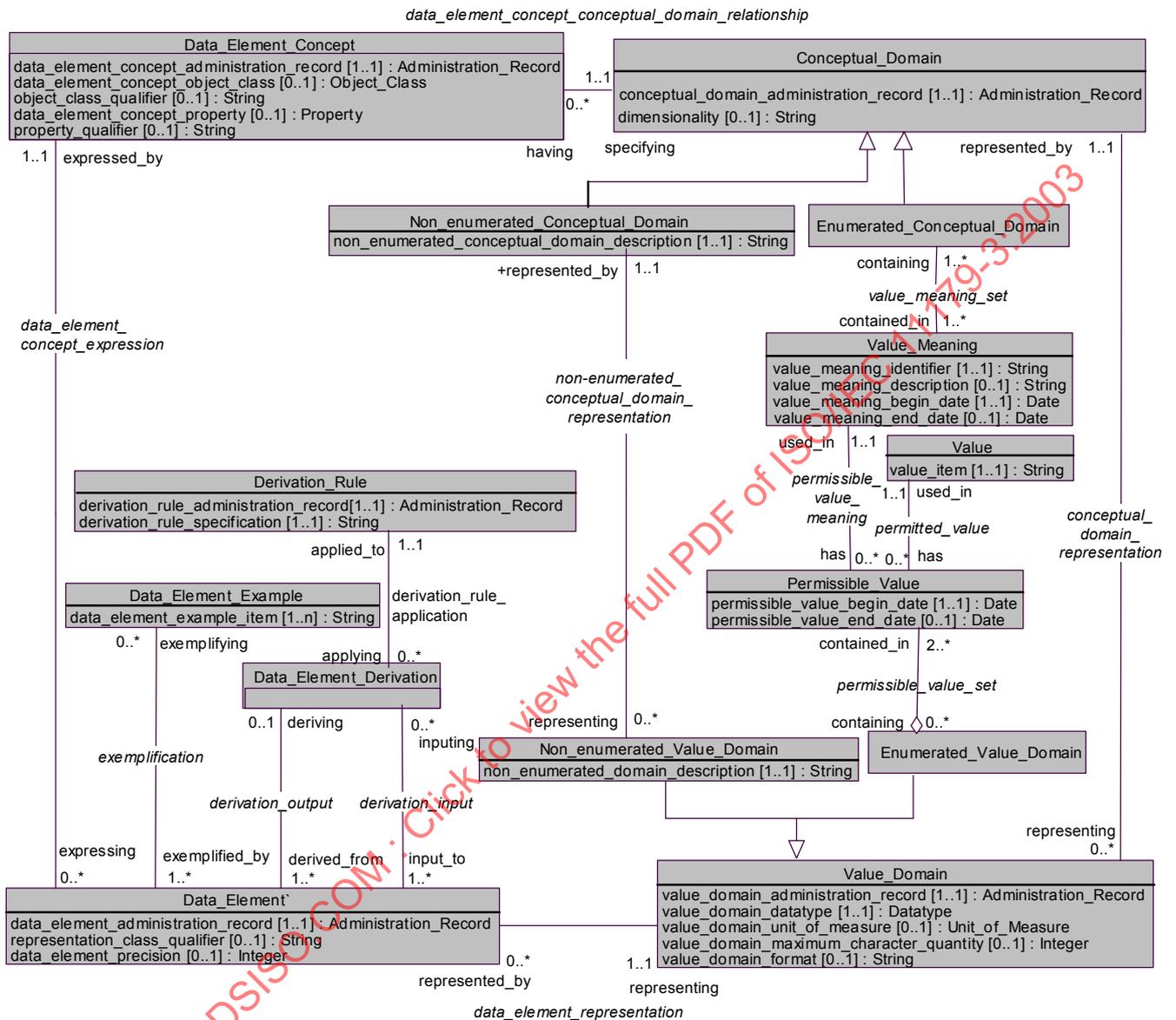


Figure 11 — Consolidated metamodel

5 Basic attributes

5.1 Use of basic attributes

Clause 4 describes a model for specifying metadata in a registry. However, sometimes the requirement for metadata specification exists outside the context of a registry, for example as part of an International Standard.

A specification of metadata consists of a set of attributes, and relationships among those attributes. This Clause specifies a set of *basic* attributes to be used in contexts other than a metadata registry. *Basic* means that they are frequently needed to specify a metadata item. The attributes specified in this Clause are also considered *basic* in the sense that additional attributes may be required when the metadata items are used in a particular context.

Basic does not imply that all standardized attributes presented in this Clause are required in all cases. Distinction is made between those basic attributes that are:

- mandatory: always required;
- conditional: required to be present under certain specified conditions;
- optional: permitted but not required.

NOTE The obligations specified for some basic attributes (especially identifiers) in contexts other than a registry are different from those specified for metadata items in a registry, as defined in Clause 4.

This Clause is intended to provide continuity from ISO/IEC 11179-3:1994, which edition focused on basic attributes of data elements. However, the scope of this Clause extends beyond just data elements, to include: data element concepts, conceptual domains, value domains, permissible values and value meanings. A mapping among the 1994 basic attributes, the 2002 basic attributes and the 2002 metamodel can be found in Annex C.

5.2 Common attributes

The attributes listed in this subclause are common to all types of Administered Item. These attributes are further categorized as: Identifying, Definitional, Administrative, and Relational.

5.2.1 Identifying

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>name</i>	One or more per metadata item (<i>see note 1</i>).
<i>context name</i>	Zero or more per metadata item. Required if more than one <i>name</i> attribute exists.
<i>context identifier</i>	Zero or one per metadata item. Required if <i>context name</i> is not unique within its usage context (e.g. a standard).
<i>context description</i>	One per <i>context name</i> .
<i>item identifier</i>	Zero or one per metadata item. Required if <i>name</i> is not unique within a given <i>context</i> (<i>see note 2</i>).
<i>item identifier – data identifier</i>	One per <i>item identifier</i> . (The mandatory portion of an <i>item identifier</i> .)
<i>item identifier – item registration authority identifier</i>	Zero or one per <i>item identifier</i> . (The optional portion of an <i>item identifier</i> - <i>see note 3</i> .)
<i>version</i>	Zero or one per metadata item (<i>see note 4</i>).

NOTE 1 If more than one *name* is specified within a given *context*, it is usual nominate one name as "preferred", and the others as "synonyms".

NOTE 2 While *item identifier* is mandatory within a registry (see 4.8.1.4), it is only conditional in non-registry usages. The requirement for an *item identifier* can be eliminated by qualifying *name* and/or *context name* to ensure that the combination is unique.

NOTE 3 While *item registration authority identifier* is mandatory within a registry (see 4.8.1.4), it is optional in non-registry settings.

NOTE 4 Within a registry, *version* is part of an *item identifier*. In non-registry settings, *version* may be used independently of *item identifier*.

5.2.2 Definitional

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>definition</i>	One for each <i>context</i> in which the metadata item is used (see note 1).
<i>definition language identifier</i>	Zero or one per <i>definition</i> .
<i>definition source reference</i>	Zero or one per <i>definition</i> .

NOTE Where multiple *definitions* are assigned to the same metadata item, the semantics of the *definition* should be the same across all *contexts*. (If the semantics are different, separate metadata items should be specified.) However, the terminology used to express the semantics may need to be different in different *contexts*, and thus separate *definitions* are permitted for each *context*.

5.2.3 Administrative

Administrative attributes are primarily associated with recording metadata items in a registry. They are therefore optional in non-registry settings.

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>comments</i>	Zero or one per metadata item.
<i>registration status</i>	Zero or one per metadata item.
<i>responsible organization name</i>	Zero or one per metadata item.
<i>submitting organization name</i>	Zero or one per metadata item.

5.2.4 Relational

Attribute

classification scheme name

classification scheme identifier

classification scheme type name

classification scheme item type name

classification scheme item value

related metadata reference

type of relationship

Allowed Occurrences

One for each *classification scheme* in which a metadata item is classified.

Zero or one per *classification scheme name*. Required if *classification scheme name* is not unique within a *context*.

One for each *classification scheme* in which a metadata item is classified.

Zero or one for each *classification scheme* in which a metadata item is classified (see note 1).

One for each *classification scheme item* by which a metadata item is classified.

Zero or more per metadata item (see note 2).

One per *related metadata reference*.

NOTE 1 The metamodel in 4.10.1 treats *keywords* as a type of *classification scheme*.

NOTE 2 A *Registration Authority* could choose to use a *Reference Document*, an *administrative note* or an *explanatory comment* to record a *related metadata reference*.

5.3 Attributes specific to Data Element Concepts

The attributes listed in this subclause are specific to Data Element Concepts.

Attribute

object class name

object class identifier

property name

property identifier

Allowed Occurrences

One per *data element concept*.

Zero or one per *object class name*.

One per *data element concept*.

Zero or one per *property name*.

5.4 Attributes specific to Data Elements

The attributes listed in this subclause are specific to Data Elements.

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>Value domain name</i>	Zero or one per <i>data element</i> .
<i>Value domain identifier</i>	Zero or one per <i>data element</i> .
<i>Datatype name</i>	Zero or one per <i>data element</i> . Required if neither <i>value domain name</i> nor <i>value domain identifier</i> is not specified.
<i>Datatype scheme reference</i>	Zero or one per <i>datatype name</i> .
<i>Layout of representation</i>	Zero or one per <i>data element</i> .
<i>Representation class</i>	Zero or one per <i>data element</i> .
<i>Maximum size</i>	Zero or one per <i>data element</i> .
<i>Minimum size</i>	Zero or one per <i>data element</i> .

5.5 Attributes specific to Conceptual Domains

The attributes listed in this subclause are specific to Conceptual Domains.

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>dimensionality</i>	Zero or one per <i>conceptual domain</i> .

5.6 Attributes specific to Value Domains

The attributes listed in this subclause are specific to Value Domains.

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>datatype name</i>	One per <i>value domain</i> .
<i>datatype scheme reference</i>	Zero or one per <i>datatype name</i> .
<i>unit of measure name</i>	Zero or one per <i>value domain</i> .

5.7 Attributes specific to Permissible Values

The attributes listed in this subclause are specific to Permissible Values.

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>value</i>	One per <i>permissible value</i> .
<i>permissible value begin date</i>	Zero or one per <i>permissible value</i> .
<i>permissible value end date</i>	Zero or one per <i>permissible value</i> .

5.8 Attributes specific to Value Meanings

The attributes listed in this subclause are specific to Value Meanings.

<u>Attribute</u>	<u>Allowed Occurrences</u>
<i>value meaning description</i>	One per <i>value meaning</i> .
<i>value meaning identifier</i>	Zero or one per <i>value meaning</i> .
<i>value meaning begin date</i>	Zero or one per <i>value meaning</i> .
<i>value meaning end date</i>	Zero or one per <i>value meaning</i> .

6 Conformance

This part of ISO/IEC 11179 prescribes a conceptual model, not a physical implementation. Therefore, the metamodel need not be physically implemented exactly as specified. However, it must be possible to unambiguously map between the implementation and the metamodel in both directions.

This part of ISO/IEC 11179 also prescribes a list of basic attributes for situation where a full conceptual model is not required or not appropriate.

Conformance may be claimed to either the conceptual model, or the basic attributes or both; see 5.2. Conformance claims shall specify a Degree and a Level of Conformance, as described below.

6.1 Degree of Conformance

The distinction between “strictly conforming” and “conforming” implementations is necessary to address the simultaneous needs for interoperability and extensions. This part of ISO/IEC 11179 describes specifications that promote interoperability. Extensions are motivated by needs of users, vendors, institutions, and industries, and:

- a) are not directly specified by this part of ISO/IEC 11179,
- b) are specified and agreed to outside this part of ISO/IEC 11179, and
- c) may serve as trial usage for future editions of this part of ISO/IEC 11179.

A strictly conforming implementation may be limited in usefulness but is maximally interoperable with respect to this part of ISO/IEC 11179. A conforming implementation may be more useful, but may be less interoperable with respect to this part of ISO/IEC 11179.

6.1.1 Strictly conforming implementations

A strictly conforming implementation:

- a) shall support all mandatory, optional and conditional data element attributes and relationships;
- b) shall not use, test, access, or probe for any extension features nor extensions to data element attributes;
- c) shall not recognize, nor act on, nor allow the production of data element attributes that are dependent on any unspecified, undefined, or implementation-defined behavior.

NOTE The use of extensions to the metamodel or the basic attributes may cause undefined behavior.

6.1.2 Conforming implementations

A conforming implementation:

- a) shall support all mandatory, optional and conditional data element attributes and relationships;
- b) as permitted by the implementation, may use, test, access, or probe for extension features or extensions to data element attributes;
- c) may recognize, act on, or allow the production of data element attributes that are dependent on implementation-defined behavior.

NOTE 1 All strictly conforming implementations are also conforming implementations.

NOTE 2 The use of extensions to the metamodel or the basic attributes may cause undefined behavior.

6.2 Levels of Conformance

An implementation may conform to either of two levels of conformance to this standard:

6.2.1 Conformance Level 1

Only those metadata elements, relationships and properties specified in Clause 5 are supported and used;

6.2.2 Conformance Level 2

All metadata elements, relationships and properties specified in Clause 4 are supported and may be used.

6.3 Obligation

Properties and relationships specified in this part of ISO/IEC 11179 are stated to be Mandatory, Conditional or Optional.

For the purpose of conformance:

- a) Mandatory properties and relationships shall exist, and shall conform to the provisions of this part of ISO/IEC 11179.
- b) Anything specified as Conditional within this part of ISO/IEC 11179 shall be treated as Mandatory if the associated condition is satisfied, and shall otherwise be not present.
- c) Optional properties and relationships are not required to exist, but if they do exist they shall conform to the provisions of this part of ISO/IEC 11179.

Such obligation is enforced if and only if the Registration Status of the associated metadata items is Recorded or higher.

6.4 Conformance to prior editions of this Standard

The following are the registry items and their obligation attributes in ISO/IEC 11179-3:1994, and whether each item is now considered obsolete:

- **Identifying:** Name (mandatory), Identifier (conditional), Version (conditional), Registration Authority (conditional), Synonymous Name (optional, *obsolete*), Context (conditional)
- **Definitional:** Definition (mandatory)

- **Relational:** Classification Scheme (optional), Keywords (optional, *obsolete*), Related Data Reference (optional, *obsolete*), Type of Relationship (conditional)
- **Representational:** Representation Category (mandatory, *obsolete*), Form of Representation (mandatory, *obsolete*), Datatype of Data Element Values (mandatory), Maximum Size of Data Element Values (mandatory), Minimum Size of Data Element Values (mandatory, *obsolete*), Layout of Representation (conditional, *obsolete*), Permissible Data Element Values (mandatory, *obsolete*)
- **Administrative:** Responsible Organization (optional), Registration Status (conditional), Submitting Organization (optional), Comments (optional)

Annex C relates the attributes of the 1994 attributes to the new metamodel.

6.5 Implementation Conformance Statement (ICS)

An implementation claiming conformance to this part of ISO/IEC 11179 shall include an Implementation Conformance Statement stating:

- a) whether it conforms or strictly conforms (6.1);
- b) whether conformance is to Level 1, Level 2 (6.2) or both;
- c) what extensions are supported or used.

6.6 Roles and Responsibilities for Registration

Conformance needs to be considered in the context of the roles and responsibilities of registration authorities, as covered by ISO/IEC 11179-6: Registration of data elements.

Extended conformance of systems requires formalisation of procedures, agreement of roles and responsibilities between parties, and guidelines addressing use of software products and conversions from other systems. The formalisation of these aspects must be consistent with the conformance requirements in the above Clauses, and roles of registration authorities as set out in ISO/IEC 11179-6.

Annex A (informative)

Alphabetical List of Terms

Term	Defined in
Administered Item	3.3.1
administered item classification	3.3.2
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Annex B (informative)

Modelling Notation

NOTE In this part of ISO/IEC 11179, the metamodel in Clause 4 is expressed using the Unified Modeling Language (UML). This annex introduces the UML syntax.

B.1 Modelling symbols

The Unified Modeling Language (UML) is used to describe this metamodel. This notation is particularly suited to documenting a conceptual data schema. The structure used in the description (the metamodel) is compatible and is partially described by the metamodel described. Since this is a *conceptual data model*, only the *data element concept* information is used. A more complete description of UML may be found in ISO/IEC 19501-1.

The object model provides for four basic types of Modeling objects: *classes* (shown as rectangles in a diagram), *associations* among these classes (shown as lines), *operations*, and *attributes* that are associated with these classes. For example, the attributes describing employees and the cars they own could be modelled as follows:

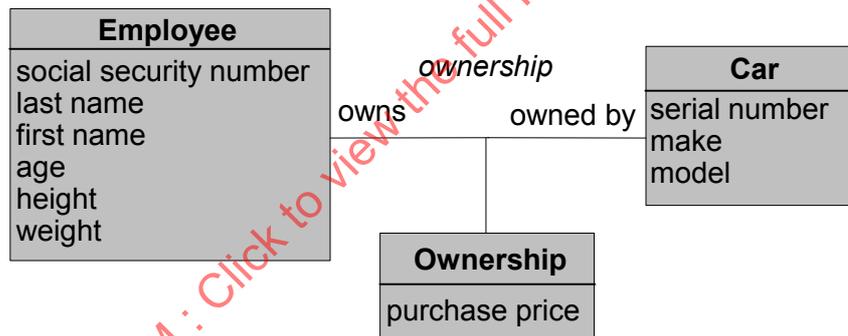


Figure B.1 — Sample modelling diagram

At the current time operations are not shown.

B.1.1 Classes

Classes (Entities) are represented by rectangles and are the things about which the business processes information. A class is something that has distinctiveness and typically, properties of its own. Classes may be persons, places, concepts, events, or other fundamental things. For example, employee and car are both classes. The name of the class appears in the top area of the class rectangle.

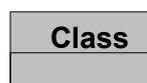


Figure B.2 — Notation for “Class”

As described below, entities may have attributes.

B.1.2 Associations

Classes have business-based *associations (relationships)* with one or more other classes. These associations are bi-directional. For example, an employee owns a car. Conversely the car is owned by the employee. This association between car and employee may be called ownership. In the UML diagram these links between classes are represented by lines.

Figure B.3 — Notation for “Association”

Lines are drawn between the rectangles to identify the classes participating in an association. The role of each class in the association is specified at the corresponding end of the association line. The name of the *association* is shown near the centre of the association line.

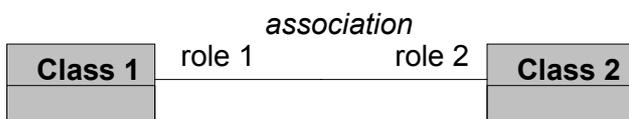


Figure B.4 — Notation for relationship between Classes

The statement of the number of class instances that may participate at each end of an association is its *cardinality*. It is expressed as a minimum and a maximum, separated by a “..”.



Figure B.5 — Notation for relationship with Cardinality

This example states that class 1 may be associated with a minimum of one and a maximum of many occurrences of class 2. Class 2 may be associated with a minimum of zero (i.e., the association is optional) and a maximum of one occurrence of class 1.

As described below, like classes, association classes may also have attributes.

B.1.3 Association class

There are situations where a particular business object fits the criteria for both a class and an association. This usually occurs when an association itself is found to have a business association with a class. Thus, an *association class* is defined as an association that acts like a class. It is represented as a class that is connected to an association with a dashed line.

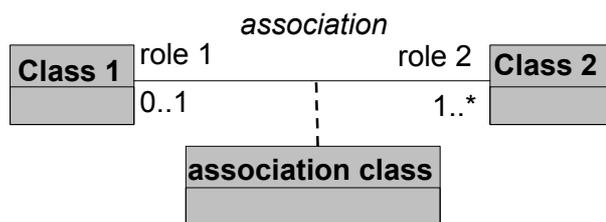


Figure B.6 — Notation for “Association Class”

B.1.4 Subtypes

Classes may be decomposed into a hierarchy with increasing level of details. Each *supertype* class may have *subtypes*. This is a generalization/specialization association.

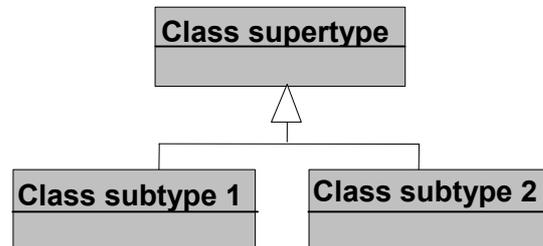


Figure B.7 — Notation for Supertype / Subtypes

Subtypes inherit all the attributes of their supertype. In addition to the attributes that are inherited, each subtype may have unique attributes of its own. In addition, subtypes participate in all the associations in which their supertype participates.

B.1.5 Aggregation

A class sometimes consists of component classes. When a class consists of assemblies of “parts”, there is a special relationship between the component parts and the class representing the assembly of these parts. An aggregation is represented by a hollow diamond at the end of the association line. The tip of the diamond points toward the assembly class.

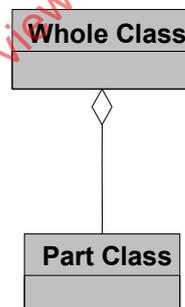


Figure B.8 — Notation for Aggregation

B.1.6 Composite Aggregation

A class sometimes consists of component classes where the part classes cannot exist without the whole class. When a class consists of assemblies of “parts”, there is a special relationship between the component parts and the class representing the assembly of these parts. A composite aggregation is represented by a solid diamond at the end of the association line. The tip of the diamond points toward the assembly class.

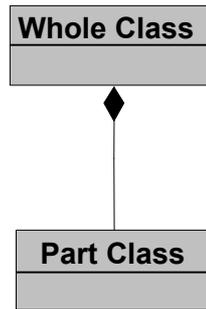


Figure B.9 — Notation for Composite Aggregation

B.1.7 Attribute

The *properties* (or characteristics) of a class or an association class are described as *attributes*. Each attribute represents one *fact*. Alone among the other information modeling objects, attributes have actual *permissible values*. In this document, we display attribute names in the area beneath the class name. The obligation of the attribute is indicated using [1..1] for required attributes, and [0..1] for optional attributes. An attribute may have a datatype that is shown separated from the attribute name (and optional obligation) by a colon.

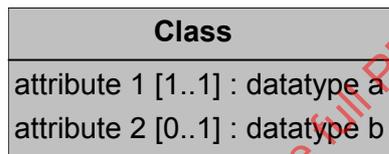


Figure B.10 — Notation for Class with Attributes

B.1.8 Composite attributes and Composite datatypes

A datatype may itself be a class. In this document, the term *composite attribute* is used to refer to an attribute that has a class as its datatype. The term *composite datatype* is used to refer to the class that is used as the datatype.

NOTE Neither *composite attribute* nor *composite datatype* is specified as a term in ISO/IEC 19501-1.

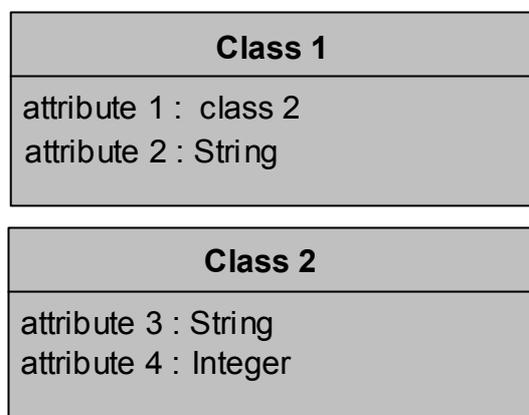


Figure B.11 — Notation for Composite attributes

Annex C (informative)

Mapping the ISO/IEC 11179-3:1994 basic attributes to the ISO/IEC 11179-3:2002 metamodel and basic attributes

C.1 Introduction

ISO/IEC 11179-3:1994 lists 23 basic attributes of data elements, as shown in Figure C.1.

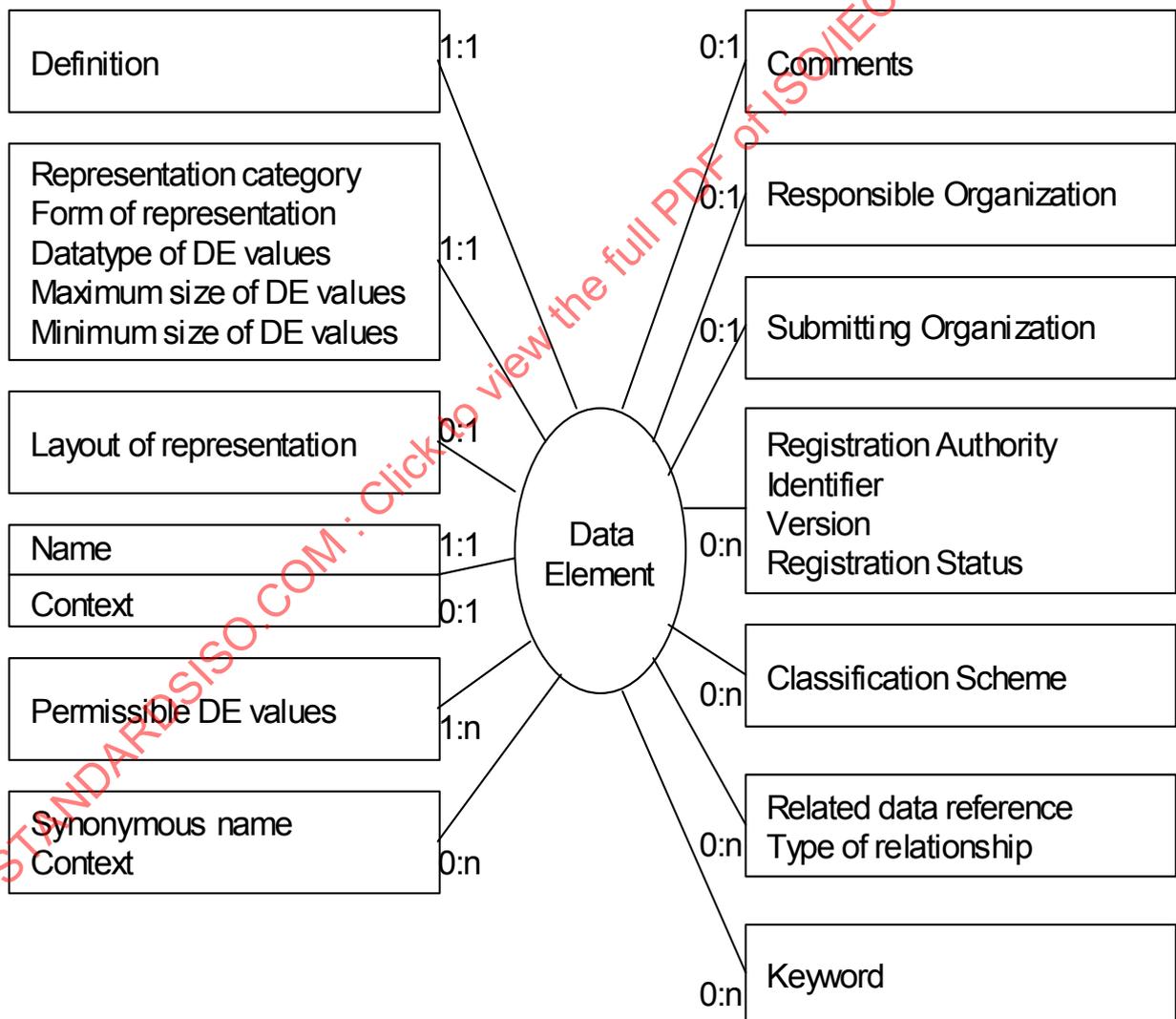


Figure C.1 — Basic Attributes of Data elements

This edition of the standard supports not only data elements, but also other metadata items associated with them, such as data element concepts, conceptual domains and value domains.

This annex maps the 1994 basic attributes to the metamodel in Clause 4, and the new basic attributes in Clause 5.

C.1.1 Description of Table Structures in this Annex

The tables in this Annex are structured as follows:

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:			
Definition:			
Obligation:			
Condition:			
Datatype:			
Comment:			

Path from Administered Item:

C.1.1.1 Description of the Columns

The columns in the table are used as follows:

- Column 1: Label for the row
- Column 2: What was specified in ISO/IEC 11179-3:1994 Clause 6
- Column 3: What is specified in ISO/IEC 11179-3:2002 Clause 4
- Column 4: What is specified in ISO/IEC 11179-3:2002 Clause 5

C.1.1.2 Description of the Rows

The rows in the table are used as follows, with the value in a particular cell coming from the Clause identified by the column (see above).

NOTE For the purposes of reference in the following text, the rows are numbered beginning at 1, and ignoring the column headings.

- Row 1: Attribute name - Contains the name of the attribute. For column 3, this is specified as: "Class name" "attribute name", where "Class name" designates the Class in the metamodel that contains the attribute.
- Row 2: Definition – Contains the definition of the attribute.
- Row 3: Obligation – Contains the obligation of the attribute. (One of: Mandatory, Optional or Conditional.)
- Row 4: Condition – If the Obligation is "Conditional", this row contains the condition that applies. (The entire row is omitted if it is not relevant for any column.)
- Row 5: Datatype – Contains the datatype of the attribute.
- Row 6: Comment – Contains any explanatory comment. (The entire row is omitted if it is not relevant for any column.)

The notation "N/A" indicates that a row is "Not Applicable" for a particular column.

C.1.1.3 Specification of attribute name in row 1 column 3

For the old and new basic attributes (columns 2 and 4 respectively) the attribute name is straightforward. The equivalent attributes in the metamodel (column 3), need to be designated in the context of a particular class. The class that provides the context is named first, and then the attribute, using the "dot" notation:

"Class Name" . "attribute name"

e.g. "Item Identifier" . "version"

C.1.1.4 Specification of Path from Administered Item to the named attribute

This information shows how the named attributed is related to an Administered Item, and applies to column 3 only. It has been placed after the table to save space, and make the path easier to read. It specifies the path that needs to be navigated in the metamodel to reach the named attribute for any particular Administered Item. (See below for an explanation of the notation.) Whenever the attribute is on the Administered Item class, no navigation is necessary and this row is omitted.

In addition to designating the metamodel attribute in the context of a class (row 1 column 3), the "Path to Administered Item" shows how the class is related an Administered Item. It is necessary to navigate relationships and/or composite attributes within the model from one class to another. For common attributes (i.e. those that apply to any Administered Item), the starting point for navigation is the supertype class "Administered Item". For attributes specific to a particular sub-type of Administered Item, the starting point for navigation is that sub-type class (e.g. Data Element). The "dot" notation is used as described below.

NOTE 1 The following notational convention is used:

- the names of classes and composite datatypes are capitalized e.g. "Item Identifier"
- the names of attributes are all lower case e.g. "version"
- the names of relationships are lower case and italicised e.g. "*name entry*"

NOTE 2 The use of *italics* to indicate a relationship applies only to the specification of the navigation path. In row 2 of the table (Definition), *italics* are used to distinguish the term from the definition.

Example 1: Attribute "version"

In this example, the attribute is a Common Attribute (i.e. it can apply to any type of Administered Item), so the navigation starts from the super-type class "Administered Item".

"Administered Item". "administered item administration record" .

"Administration Record". "administered item identifier" .

"Item Identifier". "version"

specifies to follow the path in the model:

- from the class "Administered Item" via its attribute "administered item administration record" to the composite datatype "Administration Record", then
- from the class "Administration Record" via its attribute "administered item identifier" to the composite datatype "Item Identifier" and its attribute "version".

Example 2: Attribute "datatype name"

In this example, the attribute is specific to a Data Element, so the navigation starts from the "Data Element" sub-type class of Administered Item.

"Data Element". "*data element representation*".
 "Value Domain". "value domain datatype".
 "Datatype". "datatype name"

specifies to follow the path in the model:

- from the class "Data Element" via its relationship "*data element representation*" to the related class "Value Domain", then
- from the class "Value Domain" via its attribute "value domain datatype" to the composite datatype "Datatype" and its attribute "datatype name".

C.2 Mapping the Basic Attributes

The attributes are ordered in this Annex as in Clause 5 of this document.

C.2.1 Common Identifying attributes

C.2.1.1 Name

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Name	"Designation (of Administered Item)" "name"	name
Definition:	Single or multi word designation assigned to a data element.	A name by which an Administered Item is known within a specific Context.	A name by which a metadata item is known within a specific context.
Obligation:	Mandatory	Mandatory	Mandatory
Data type:	Character string	String	String
Comment:		The attribute "preferred designation" may be used to specify the primary name if synonyms also exist in a particular context.	

C.2.1.1.1 Path from Administered Item:

"Administered Item". "*administered item context*". "Terminological Entry". "*terminological entry languages*". "Language Section". "*name entry*".

C.2.1.2 Synonymous name

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Synonymous name	“Designation (of Administered Item)”. “name”	name
Definition:	Single word or multi word designation that differs from the given name, but represents the same data element concept.	A name by which an Administered Item is known within a specific Context.	A name by which a metadata item is known within a specific context.
Obligation:	Optional	Optional	Optional
Data type:	Character string	String	String
Comment:	Synonymous names are often familiar names in a certain application environment. If this is the case use attribute 'Context' (6.1.6) to specify the context. If more synonymous names occur the attributes 'Synonymous name' and 'Context' shall be specified as a pair.	An Administered Item may have multiple names in the same or different contexts. The distinction between “name” and “synonymous name” in a particular context may be specified by the attribute “preferred designation”, which should be set to “True” for the preferred name, and “False” for all synonyms.	A metadata item may have multiple names in the same or different contexts. The distinction between “name” and “synonymous name” in a particular context may be specified by the attribute “preferred designation”, which should be set to “True” for the preferred name, and “False” for all synonyms.

C.2.1.2.1 Path from Administered Item:

“Administered Item”. “*administered item context*”. “Terminological Entry”. “*terminological entry languages*”. “Language Section”. “*name entry*”.

C.2.1.3 Context name

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Context	“Designation (of Administered Item)” . “name” NOTE The “Administered Item” referred to here is the Context itself, not the Administered Item to which context is being provided.	context name
Definition:	A designation or description of the application environment or discipline in which a name and/or synonymous name is applied or originates from. Note: The latest edition of the standard differentiates designations from descriptions.	<i>Context</i> : A universe of discourse in which a name or definition is used. <i>name</i> : A name by which an Administered Item (in this case the Context) is known within a specific context (where the context for a Context is probably the registry).	<i>Context</i> : A universe of discourse in which a name or definition is used. <i>name</i> : A name by which a metadata item (in this case the Context) is known within a specific context (where the context for a context is the setting in which it is used).
Obligation:	Conditional	Mandatory	Conditional
Condition:	This attribute is mandatory for each occurrence of the attribute ‘Synonymous name’ (6.1.5). This attribute is mandatory when the attribute ‘Name’ (6.1.1) occurs in an information exchange.	N/A	Required if more than one <i>name</i> attribute exists for a particular metadata item.
Data type:	Character string	String	String
Comment:	Assignment of the attribute ‘Context’ to the attribute ‘Name’ may be made mandatory as part of the procedures of any Registration Authority.	As an Administered Item itself, any Context used within a registry must be given both a <i>name</i> and <i>definition</i> . A Context must itself exist within a Context, which for most will probably be the registry. (A Context may provide Context to itself.)	

C.2.1.3.1 Path from Administered Item:

“Administered Item”⁽¹⁾. “*administered item context*”. “Context”. “context administration record”. “Administration Record” . “Administered Item”⁽²⁾. “*administered item context*”. “Terminological Entry”. “*terminological entry languages*”. “Language Section”. “name entry”.

NOTES ⁽¹⁾⁽²⁾ The first “Administered Item” is the one to which context is being provided. The second “Administered Item” is the Context itself.

C.2.1.4 Context identifier

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Not supported.	"Context". "context administration record". "Administration Record". "administered item identifier"	context identifier
Definition:	N/A	<i>Context</i> : A universe of discourse in which a name or definition is used. <i>administered item identifier</i> : The unique identifier for an Administered Item (in this case the Context).	<i>Context</i> : A universe of discourse in which a name or definition is used. <i>context identifier</i> : A unique identifier for the <i>Context</i> within its usage context.
Obligation:	N/A	Mandatory	Conditional
Condition:	N/A	N/A	Required if <i>context name</i> is not unique with its usage context.
Data type:	N/A	String	String
Comment:		As an Administered Item itself, any Context used within a registry must be given an <i>administered item identifier</i> .	

C.2.1.4.1 Path from Administered Item:

"Administered Item". "*administered item context*"

C.2.1.5 Context description

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Context	“Context”. “context description”	context description
Definition:	A designation or description of the application environment or discipline in which a name and/or synonymous name is applied or originates from. Note: The new metamodel differentiates designations from descriptions.	<i>Context</i> : A universe of discourse in which a name or definition is used. <i>context description</i> : The textual description of the context.	<i>Context</i> : A universe of discourse in which a name or definition is used. <i>context description</i> : The textual description of the context.
Obligation:	Conditional	Mandatory	Conditional
Condition:	This attribute is mandatory for each occurrence of the attribute 'Synonymous name'. This attribute is mandatory when the attribute 'Name' occurs in an information exchange.	N/A	Required if <i>context name</i> is used.
Data type:	Character string	String	String
Comment:	Assignment of the attribute 'Context' to the attribute 'Name' may be made mandatory as part of the procedures of any Registration Authority.	In this edition of this part of ISO/IEC 11179, <i>context description</i> and <i>context name</i> exist as two separate attributes.	In this edition of this part of ISO/IEC 11179, <i>context description</i> and <i>context name</i> exist as two separate attributes.

C.2.1.5.1 Path from Administered Item:

“Administered Item”. “*administered item context*”.

C.2.1.6 Item identifier – data identifier

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Identifier	"Item Identifier" . "data identifier"	item identifier – data identifier
Definition:	A language independent unique identifier of a data element within a Registration Authority.	The unique identifier for an Administered Item within a Registration Authority.	The unique identifier for a metadata item within a specific context.
Obligation:	Conditional	Mandatory	Conditional
Condition:	If the attribute 'Name of data element' is not unique within a Registration Authority this attribute is mandatory.	N/A	If the attribute, <i>name</i> is not unique within a <i>context</i> , this attribute is mandatory.
Data type:	Character	String	String
Comment:	Assignment of a unique identifier may be made mandatory as part of the registration procedure of any Registration Authority.		The requirement for an <i>item identifier</i> can be eliminated by qualifying <i>name</i> and/or <i>context name</i> to ensure that the combination is unique.

C.2.1.6.1 Path from Administered Item:

"Administered Item". "administered item administration record". "Administration Record". "administered item identifier".

C.2.1.7 Item registration authority identifier

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Registration Authority	"Item Identifier". "item registration authority identifier"	item identifier – item registration authority identifier
Definition:	Any organization authorized to register data elements.	An identifier (described in ISO/IEC 11179 Part 6) assigned to the Registration Authority registering the item.	An identifier (described in ISO/IEC 11179 Part 6) assigned to the registration authority registering the item.
Obligation:	Conditional	Mandatory	Conditional
Condition:	One Registration Authority shall be specified for each Identifier present.	N/A	Required if <i>item identifier – data identifier</i> is not unique within the usage context.
Data type:	Character string	String	String

C.2.1.7.1 Path from Administered Item:

"Administered Item". "administered item administration record". "Administration Record". "administered item identifier".

C.2.1.8 Version

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Version	"Item identifier". "version"	Version
Definition:	Identification of an issue of a data element specification in a series of evolving data element specifications within a Registration Authority.	The unique version identifier of the Administered Item.	The unique version identifier of the metadata item.
Obligation:	Conditional	Mandatory	Optional
Condition:	This attribute is mandatory if updates on attributes occur which meet the maintenance rules for allocating new versions as set by the Registration	N/A	N/A
Data type:	Character	String	String

C.2.1.8.1 Path from Administered Item:

"Administered Item". "administered item administration record". "Administration Record". "administered item identifier".

C.2.2 Common Definitional attributes

C.2.2.1 Definition

	<u>1994 Clause 6</u>	<u>2002 Clause 4</u>	<u>2002 Clause 5</u>
Attribute name:	Definition	"Definition (of Administered Item)". "definition text"	definition
Definition:	Statement that expresses the essential nature of a data element and permits its differentiation from all other data elements.	<i>Definition:</i> The definition of an Administered Item within a Context. <i>Definition text:</i> The text of the definition.	The definition of an metadata item within a context.
Obligation:	Mandatory	Mandatory	Mandatory
Data type:	Character string	String	String
Comment:		Where more than one Definition is provided within a particular context, one of them may be specified as preferred by setting the attribute "preferred definition" to "True".	