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Information technology — Metadata registries (MDR) —

Part 5: Naming principles

Technologies de l'information — Registres de métadonnées (RM) — Partie 5: Principes de dénomination

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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.

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

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

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 32, *Data Management and Interchange*.

This third edition cancels and replaces the second edition (ISO/IEC 11179-5:2005), which has been technically revised.

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

— *Part 1: Framework*

— *Part 2: Classification*

— *Part 3: Registry metamodel and basic attributes*

— *Part 4: Formulation of data definitions*

— *Part 5: Naming principles*

— *Part 6: Registration*

Introduction

This part of ISO/IEC 11179 contains both principles and rules. Principles establish the premises on which the rules are based. Registry users may enforce rules as an application of this part of ISO/IEC 11179.

A naming convention is a convention (a set of rules) about names. Many naming conventions have much in common, whether it is defining a method of specifying names for common usage across application systems, or developing an organization's internal policy on the choice of XML tags for data interchange. A naming convention may be based on principles. In addition, it may contain formal and informal inputs, such as guidelines, recommendations, company policies, programming conventions, specifications, procedures, and so on. The purpose of this part of ISO/IEC 11179 is to describe and specify these common features of naming conventions. This part of ISO/IEC 11179 is intended to have broad applicability, including areas *outside* of Metadata Registries.

The goal of any naming convention is to allow development of names for items that have maximum clarity and transparency of meaning, combined with concision, demanding minimal effort of interpretation by the end user, subject to the constraints of the system under which the items are processed. A naming convention can be used to form names by which information about the data is expressed, in a simplified but still understandable grammar compared to natural language rules. Ideally, the names resemble summaries of the formal definition of the information being named.

In a metadata registry, one name may be designated as the "registry name," derived by describing the content of a metadata item in a structured way, using a set of rules, i.e. by application of a formalized naming convention. Other names for the same metadata entity may occur in any context. For example, these may be

— software system names,

— programming language names,

— report header names,

— data interchange (e.g. XML) names, and

— names in other natural languages.

Names may have varying levels of rigor applied to their formation and usage. The collection and display of all names used by any single metadata item can be a major benefit of a metadata registry. The process of deriving names from concept systems and arranging semantic components with a naming convention forms a set of consistent, meaningful registry names. Names from other contexts, which may or may not have been formed with naming conventions, and therefore may have little or no semantic content, are collected and related to the registry name, thus, contributing in a valuable way to enterprise data management.

Edition 3 of ISO/IEC 11179-3 uses the term *designation* in reference to most metamodel items except for the classes *Namespace* and *Naming Convention*. The designations for these classes were adopted in deference to commonly accepted usage. This part of ISO/IEC 11179 will continue to use the term *name* for constructs that, for purposes of this part of ISO/IEC 11179, are interchangeable with *designation*.

NOTE Items from the metamodel described in Edition 3 of ISO/IEC 11179-3 are italicized in this part of ISO/IEC 11179. Most multi-word designations also contain underscores between words in ISO/IEC 11179-3; the underscores have been omitted in this part of ISO/IEC 11179 for readability.

The naming principles and rules described in this part of ISO/IEC 11179 apply primarily to names of concepts, data element concepts, conceptual domains, data elements, and value domains, but can be extended to any registry content. Differing naming conventions may be applied to different sets of designatable items. This part of ISO/IEC 11179 should be used in conjunction with those which establish rules and procedures for attributing, classifying, defining, and registering items[1)].

1) Refer to 11179-6 Ed. 3 for a discussion of identification.

This part of ISO/IEC 11179 may be used for applications that are unrelated to ISO/IEC 11179-3, i.e. this part of ISO/IEC 11179 has broad applicability for use in describing naming conventions for almost any need or purpose. The same principles apply.

In Annex A, all of the examples are given with English terminologies. However, there is an intention that those rules be effective in other natural languages, even in those languages that use ideographs such as Japanese, Chinese, or Korean, when the terminologies used in the name are controlled properly. Annex B contains a version of the rules for Asian languages.

It is out of scope of the naming rules to establish semantic equivalence of names among different languages. Naming must be supplemented by other methods such as ontologies or controlled vocabularies in establishing semantic equivalence.

This part of ISO/IEC 11179 may be applied to ISO/IEC 11179-3, i.e. describing naming conventions associated with designations of designatable items and other features of the metamodel. The following are examples of designations in the metamodel: the designation of a data element (class name: Designation; attribute: sign); the designation of classification scheme name; etc. Annex C contains a Concordance Table relating items in this part of ISO/IEC 11179 to items in ISO/IEC 11179-3.

This part of ISO/IEC 11179 does not make requirements on any specific set of conventions, e.g. specific semantic, syntactic, or lexical requirements for names.

Information technology — Metadata registries (MDR) —

Part 5:
Naming principles

1 Scope

This part of ISO/IEC 11179 provides instruction for naming of the following items, as defined in ISO/IEC 11179-3: concept, data element concept, conceptual domain, data element, and value domain. This part of ISO/IEC 11179 describes naming in a metadata registries (MDR); includes principles and rules by which naming conventions can be developed; and provides examples of naming conventions.

2 Conformance

2.1 Conformity for registries

2.1.1 Rules for a conforming registry

A registry containing a namespace associated with a set of designatable items which conform to naming conventions so that:

— each item shall be named in accordance with a naming convention,

— each naming convention shall have its scope documented,

— each naming convention shall have its authority documented,

— each naming convention should have its semantic rules documented,

— each naming convention should have its syntactic rules documented,

— each naming convention should have its lexical rules documented, and

— each naming convention should have its uniqueness rules documented,

then that namespace is in conformance with this part of 11179.

A registry in which every namespace conforms to this part of 11179 is a conforming registry.

2.1.2 Rules for a strictly conforming registry

A registry containing a namespace associated with a set of designatable items which conform to naming conventions so that:

— each item shall be named in accordance with a naming convention,

— each naming convention shall have its scope documented,

— each naming convention shall have its authority documented,

— each naming convention shall have its semantic rules documented,

— each naming convention shall have its syntactic rules documented,

— each naming convention shall have its lexical rules documented, and

— each naming convention shall have its uniqueness rules documented,

then that namespace is in strict conformance with this part of 11179.

A registry in which every namespace strictly conforms to this part of 11179 is a strictly conforming registry.

2.2 Conformity for systems

2.2.1 Rules for a conforming system

A system containing a namespace associated with a set of objects which conform to naming conventions so that:

— each item shall be named in accordance with a naming convention,

— each naming convention shall have its scope documented,

— each naming convention shall have its authority documented,

— each naming convention should have its semantic rules documented,

— each naming convention should have its syntactic rules documented,

— each naming convention should have its lexical rules documented, and

— each naming convention should have its uniqueness rules documented,

then that namespace is in conformance with this part of 11179.

A system in which every namespace conforms to this part of 11179 shall be a conforming system.

2.2.2 Rules for a strictly conforming system

A system containing a namespace associated with a set of objects which conform to naming conventions so that:

— each item shall be named in accordance with a naming convention,

— each naming convention shall have its scope documented,

— each naming convention shall have its authority documented,

— each naming convention shall have its semantic rules documented,

— each naming convention shall have its syntactic rules documented,

— each naming convention shall have its lexical rules documented, and

— each naming convention shall have its uniqueness rules documented,

then that namespace is in strict conformance with this part of 11179.

A system in which every namespace strictly conforms to this part of 11179 shall be a strictly conforming system.

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11179-3, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

4 Terms and definitions

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

4.1
administered item
registered item (4.22) for which administrative information is recorded

[SOURCE: ISO/IEC 11179-3:2013]

4.2
characteristic
abstraction of a *property* (4.19) of an *object* (4.15) or of a set of objects

Note 1 to entry: Characteristics are used for describing *concepts* (4.3).

[SOURCE: ISO 1087-1:2000]

4.3
concept
unit of knowledge created by a unique combination of *characteristics* (4.2)

Note 1 to entry: Concepts are not necessarily bound to particular languages. They are, however, influenced by the social or cultural background which often leads to different categorizations.

[SOURCE: ISO 1087-1:2000]

4.4
context
setting in which a *designation* (4.6) or definition is used

[SOURCE: ISO/IEC 11179-3:2013]

4.5
designatable item
identified item which can have *designations* (4.5) and/or definitions

[SOURCE: ISO/IEC 11179-3:2013]

4.6
designation
representation of a *concept* (4.3) by a *sign* (4.29) which denotes it

[SOURCE: ISO/IEC 11179-3:2013]

4.7
general concept
concept (4.3) which corresponds to two or more *objects* (4.15) which form a group by reason of common properties

Note 1 to entry: Examples of general concepts are “planet”, “tower”.

[SOURCE: ISO 1087-1:2000]

4.8
lexical
pertaining to words or the vocabulary of a language as distinguished from its grammar and construction

4.9
metadata item
instance of a metadata object

[SOURCE: ISO/IEC 11179-3:2013]

4.10
metadata registry
information system for registering metadata

[SOURCE: ISO/IEC 11179-3:2013]

4.11
name
designation (4.6) of an *object* (4.15) by a linguistic expression

[SOURCE: ISO/IEC 11179-3:2013]

4.12
name part
part of name
discrete term that is used as part of a *name* (4.11) of a *designatable item* (4.5)

4.13
namespace
set of *designations* (4.6) and/or *scoped identifiers* (4.26) for a particular business need

Note 1 to entry: The term namespace is used in this International Standard because it is in common use, even though the concept is being applied to identifiers as well as names.

[SOURCE: ISO/IEC 11179-3:2013]

4.14
naming convention
specification of how *signs* (4.29) of *designations* (4.6) and/or *scoped identifiers* (4.26) are formulated

Note 1 to entry: A naming convention can apply to scoped identifiers when they are included in the associated namespace.

[SOURCE: ISO/IEC 11179-3:2013]

4.15
object
anything perceivable or conceivable

Note 1 to entry: Objects may be material (e.g. an engine, a sheet of paper, a diamond), immaterial (e.g. conversion ratio, a project plan), or imagined (e.g. a unicorn).

[SOURCE: ISO 1087-1:2000, 3.1.1, modified]

4.16
object class
set of ideas, abstractions or things in the real world that are identified with explicit boundaries and meaning and whose *properties* (4.19) and behaviour follow the same rules

[SOURCE: ISO/IEC 11179-3:2013]

4.17
object class term
part of the *name* (4.11) of a *designatable item* (4.5) which represents the *object class* (4.16) to which it belongs, for those designatable items containing object classes

4.18
principle
fundamental, primary assertion which constitutes a source of action determining particular objectives or results

Note 1 to entry: A principle is usually supported through one or more rules.

4.19
property
quality common to all members of an *object class* (4.16)

[SOURCE: ISO/IEC 11179-3:2013]

4.20
property term
part of the name of a *designatable item* (4.5) that expresses a *property* (4.19) of an *object class* (4.16), for those designatable items containing property classes

4.21
qualifier term
word or words that help define and differentiate a *concept* (4.3)

4.22
registered item
metadata item (4.9) that is recorded and managed in a *metadata registry* (4.10)

[SOURCE: ISO/IEC 11179-3:2013]

4.23
representation class
classification of a type of representation

[SOURCE: ISO/IEC/TR 20943-1:2003]

Note 1 to entry: Examples of representation include name, identifier, code, and quantity.

4.24
representation term
designation (4.6) of an instance of a *representation class* (4.23)

4.25
rule
statement governing conduct, procedure, conditions, and/or relations

4.26
scoped identifier
identifier of an identified item within a specified *namespace* (4.13)

Note 1 to entry: A namespace provides the scope within which the scoped identifier uniquely identifies the identified item.

[SOURCE: ISO/IEC 11179-3:2013]

4.27
semantics
branch of linguistic science that deals with the meanings of words

4.28
separator
symbol or space enclosing or separating a part within a *name* (4.11); a delimiter

4.29
sign (noun)
textual string or symbol that can be used to denote a *concept* (4.3)

[SOURCE: ISO/IEC 11179-3:2013]

4.30
subject field
domain
field of special knowledge

Note 1 to entry: The borderlines of a subject field are defined from a purpose-related point of view.

[SOURCE: ISO 1087-1:2000]

4.31
structure set
concepts (4.3) in an area of discourse, with their relationships to other concepts

Note 1 to entry: Examples include data models, information models, taxonomies, and ontologies.

4.32
syntax
relationships among characters or groups of characters, independent of their meanings or the manner of their interpretation and use

Note 1 to entry: More specifically, the structure of expressions in a language, and the rules governing the structure of a language

4.33
term
verbal *designation* (4.6) of a *general concept* (4.7) in a specific subject field

Note 1 to entry: A term may contain symbols and can have variants, e.g. different forms of spelling.

[SOURCE: ISO 1087-1:2000]

5 The relationship of names and identifiers within a registry

Any metadata item in a registry may be one or more of the following types [ISO/IEC 11179-3:2013]:

— *identified item*: an item that is to be retrieved directly, and therefore needs to be referenced

— *designatable item*: an identified item that is to be designated (named) and/or defined

— *classifiable item*: an item that is to be classified in a classification scheme

At least one identifier is assigned for each identified item in the registry. Concurrently, or thereafter, the item may be specified, classified, named, and registered according to the relevant part of ISO/IEC 11179.

6 Names

In Edition 3 of ISO/IEC 11179-3, *sign* has replaced name as the attribute of the class *Designation* that is used to designate an object or concept. A *sign* may be a string denoting a word or phrase in a natural language, a string denoting a term in a special language, or an icon or other symbol. A name is considered to be language-dependent; that is, a linguistic expression. The output of a naming convention is a set of names and (possibly) symbols, such as dollar signs.

As this Part of ISO/IEC 11179 discusses the classes *Namespace* and *Naming Convention* in Edition 3 of ISO/IEC 11179-3, this Part will refer to the product of a naming convention as a ***name***.

7 Naming conventions

A naming convention describes what is known about how names are formulated. A naming convention may be simply descriptive; e.g. where the Registration Authority has no control over the formulation of names for a specific context and merely registers names that already exist. Alternatively, a naming convention may be prescriptive, specifying how names shall be formulated, with the Registration Authority (or an equivalent authority) expected to enforce compliance with the naming convention. The objectives of a prescriptive naming convention may include name consistency, name appearance, and name semantics. An effective naming convention can also enforce the exclusion of irrelevant facts about the designatable item from the name. Though there are no facts that are irrelevant in every case, the input source of a data element or its field position in a file might be if names are designed to convey meaning.

A naming convention may be specified in a reference document. A naming convention shall cover all relevant documentation aspects. This includes, as applicable,

— the scope of the naming convention, e.g. established industry name;

— authority information, including the authority that establishes names, namespace membership, sources such as term list or glossary;

— semantic rules governing the source and content of the terms used in a name, e.g. terms derived from data models, terms commonly used in the discipline, etc.;

— syntactic rules covering required term order;

— lexical rules covering controlled term lists, name length, character set, language;

— a rule establishing whether or not names must be unique.

8 Classes in the metamodel

8.1 Namespace class

8.1.1 Relationship of scoped identifiers and names

In addition to the identifier assigned to identified items (Clause 5), the *scoped identifier* specified in Edition 3 of ISO/IEC 11179-3 is assigned to items within the scope of a *Namespace* class. It serves to unambiguously identify items within that namespace. This scoped identifier may have a *shorthand prefix*, which can be attached to a name to identify a namespace. Examples of this usage are provided in A.4.

8.1.2 Uniqueness

There are two aspects to uniqueness that may be expressed using the metamodel constructs - the two attributes in *Namespace* class: *one name per item indicator* and *one item per name indicator*.

The *one name per item indicator* denotes whether more than one *Designation* and/or *Scoped Identifier* within the *Namespace* may be associated with any single item (*Designatable Item* and/or *Identified Item*). If the indicator is *true*, then at most one *Designation* and/or *Scoped Identifier* within the *Namespace* may be associated with any single item [ISO/IEC 11179-3:2013]. This effectively disallows the use of synonyms.

The *one item per name indicator* denotes whether the *Namespace* may contain more than one *Designation* and/or *Scoped Identifier* having the same sign and/or identifier. If the indicator is *true*, then at most one *Designation* and/or *Scoped Identifier* having the same sign and/or identifier is permitted within the *Namespace* [ISO/IEC 11179-3:2013]. This effectively disallows the use of homonyms.

8.2 Naming convention class

The *Naming Convention* class in Edition 3 of ISO/IEC 11179-3 provides a location in the metamodel for recording most of the rules for any particular naming convention. The rules contained in the *Naming Convention* class are:

— scope rule

— authority rule

— semantic rule

— syntactic rule

— lexical rule

These are all of the type *Text* and are meant to allow as much complexity in description as needed to describe each rule. See 9.7 for a discussion of the uniqueness principle and a discussion of the rules that might follow.

9 Development of naming conventions

9.1 Introduction

This clause lists principles used to develop a naming convention. Rules are derived from the principles; these rules form a naming convention. Syntactic, semantic and lexical rules vary by organizations such as corporations or standards-setting bodies for business sectors; each can establish rules for name formation within its context(s). Annexes A and B contain examples of rules for naming conventions that are consistent with the principles presented in this clause.

Descriptive naming conventions may be applied to designatable items that are not under the control of the Registration Authority for the registry, or other authority previous to entry in the registry. At a minimum, the rules for scope and authority shall be documented. As appropriate, the semantic, syntactic, lexical, and uniqueness rules should be recorded.

Attached items, which are items that are administered in the registry as part of a group of items, may not have enough information to describe using all naming rules. These items may have been imported from another source. Descriptive naming conventions apply to them.

In addition to the scope and authority rules needed to document descriptive naming conventions, prescriptive conventions shall be documented by semantic, syntactic, lexical, and uniqueness rules.

— Semantic rules enable meaning to be conveyed.

— Syntactic rules relate items in a consistent, specified order.

— Lexical (word form and vocabulary) rules reduce redundancy and increase precision.

— A uniqueness rule documents how to prevent homonyms occurring within the scope of the naming convention.

The examples in annexes A and B show how the names of each of the designatable items can be formed from a set of items selected from sets of available terms for the naming convention. (The names of other designatable items may be formed by rules based on those described in this part of ISO/IEC 11179.) The names of these items can be developed from the names of the items from which they are composed, each assigned meaning (semantics) and relative or absolute position (syntax) within a name. They may, but need not, be delimited by a separator symbol. The names may be subject to lexical rules. An authority, e.g. a data manager within a corporation or an approving committee for an international business sector naming standard, should control the set or range of values of each item.

9.2 Scope principle

The scope of a naming convention specifies the range within which it is in effect. In terms of the MDR, the scope of a naming convention may be as broad or narrow as the Registration Authority, or other authority, determines is appropriate. The scope should document whether the naming convention is descriptive or prescriptive.

The scope of each naming convention represented in the MDR shall be documented.

9.3 Authority principle

Identification of the authority that assigns names or enforces the naming convention is necessary for full documentation of the naming convention. This may include the ownership of the namespace, reference to terminology information such as an external glossary or thesaurus, or other source.

The Authority of each naming convention represented in the MDR shall be documented.

9.4 Semantic principle

Semantics concerns the meanings of name parts and possibly separators that delimit them. The set of semantic rules documents whether or not names convey meaning, and if so, how. Name parts may be derived from structure sets that identify relationships among (classify) members. See annexes A and B for examples of semantic rule sets.

The semantic rules of each naming convention represented in the MDR should be documented.

9.5 Syntactic principle

Syntax specifies the arrangement of parts within a name. The arrangement may be specified as relative or absolute, or some combination of the two. Relative arrangement specifies parts in terms of other parts, e.g. a rule within a convention might require that a qualifier term must always appear before the part being qualified appears. Absolute arrangement specifies a fixed occurrence of the part, e.g. a rule might require that the property term is always the last part of a name.

The syntactic rules of each naming convention represented in the MDR should be documented.

See annexes A and B for examples of syntactic rule sets.

9.6 Lexical principle

Lexical issues concern the appearance of names: preferred and non-preferred terms, synonyms, abbreviations, part length, spelling, permissible character set, case sensitivity, etc. The result of applying lexical rules should be that all names governed by a specific naming convention have a consistent appearance.

The lexical rules of each naming convention represented in the MDR should be documented.

See annexes A and B for examples of lexical rule sets.

9.7 Uniqueness principle

There may or may not be requirements for names to be unique within their scope. The uniqueness rules for names represented in the MDR should be documented.

Uniqueness rules for names within naming conventions should be documented as well as rules for uniqueness within namespaces. If two names emerge as identical as a result of the application of the other rules, a rule for the differentiation of those names should be included. Examples include affixing prefixes or suffixes, differing abbreviation conventions, etc.

10 Concept system relationship to names

10.1 Concepts as higher-level classes

In the ISO/IEC 11179-3 registry metamodel, the *Concept class* is a supertype to many designatable items that can function as components of designated items and as templates for name parts. Annexes A and B describe these relationships more fully. As subtypes of concepts, *object class, property, value meaning*, and *conceptual domain* may all be one or more items in a *Concept system*, which are members of a Concept class.

10.2 Concepts as classification system

Annex F of ISO/IEC 11179-3 describes the use of a Concept system to implement a classification scheme for Representation Class. This model may be broadened to encompass the derivation of other name parts in a naming convention.

A Concept system is registered with the designation appropriate for each individual part of a naming convention. Within the Concept system, individual concepts are registered with designations that correspond to each of the desired name terms. Relationships (associations) among concepts may be used to assist in forming rules for relationships among name parts. Annex E of ISO/IEC 11179-3 describes examples of correspondences among the ISO/IEC 11179-3 metamodel and concepts from other notations.

The *Classifiable Item* class is used to classify the data elements or other registry entities by associating them with the appropriate concept in the Concept system. Naming convention conformance is achieved by associating the designation with the rules residing in the Naming Convention and Namespace classes.

Annex A
(informative)

Example naming conventions for names within an MDR registry

A.1 General

The rules are derived from the principles described in Clause 9. Examples are included. They show the formation of names within registries, and may be applied to the development of names within contexts at the discretion of the subject area authority. The complete process produces a data element name; other designatable item names are developed during the process.

These examples are written as American English. Users of other languages may specify different or additional semantic, syntactic and lexical rules as needed to customize naming conventions to their languages. For example, a rule citing an authority for spelling words within terms might be added to the lexical rules. Annex B shows examples in Asian languages.

A.2 Semantics of name parts

Name parts consist of discrete terms. The terms in this annex are derived from designatable items and other items in the MDR metamodel described in ISO/IEC 11179-3. They may be derived from concept system items as described in Clause 10. Name parts are designated by names ending with "term" to differentiate them from the entities in Part 3 from which they are derived. These are: object class terms, property terms, and representation terms. These terms are presented as examples of the application of semantic principles to name formation. Qualifier terms are used to further differentiate terms as necessary.

Object class term

In the MDR metamodel, an object class is 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. Each object class has a name. The registration of object classes in a registry is optional, but if used, the set of actual and potential object class names provides a taxonomy of object class terms.

An object class term may be a part of the name of the designatable items concept, conceptual domain, data element concept and data element, and represents an activity or object in a context. Use of a modelling methodology, as for instance a model described using OWL and documented as a Concept System in the MDR, is a way to locate and discretely place designatable items in relation to their higher-level model entities.

Models provide one kind of classification scheme for designatable items. Designatable items that contain object classes may be identified with their related modelling entities by mapping the object class term to the model entity name.

In the data element names

Employee Last Name

Cost Budget Period Total Amount

Tree Height Measure

Member Last Name

the terms Employee, Cost, Tree, and Member are object class terms.

Object class terms may be used by themselves as concept and conceptual domain names.

Property term

In the MDR metamodel, a property is a quality common to all members of an object class. Each property has a name. The registration of properties in a registry is optional, but if used, the set of actual and potential property names provides a taxonomy of property terms.

A set of property terms may be composed from a set of name parts in a property taxonomy. This set should consist of terms that are discrete (the definition of each does not overlap the definition of any other), and complete (taken together, the set represents all information concepts required for the specification of designatable items which use properties, such as data elements, data element concepts and value domains). These terms may be taken from the same Concept system as the object class terms or may be derived from a separate structure set.

In the data element names

Employee Last Name

Cost Budget Period Total Amount

Member Last Name

Tree Height Measure

the terms Last Name, Total Amount, and Height are properties.

Using terms from two structure sets provides a complementary way of categorization. Both object class and property terms of data element concepts and data elements are utilized to form a name that contains vital information about these designatable items, and also excludes extraneous or irrational elements that may be introduced when no conventions are employed. Data element concept names may be composed by combining object class terms and property terms.

Representation term

A representation term may be a part of an designatable item name that describes the form of representation of an designatable item that includes representation: data elements and value domains. Each term may be developed from a controlled word list or taxonomy. In the MDR metamodel, a Representation Class is the classification of types of representation. Each representation class has a name. The registration of representation classes in a registry is optional, but if used, the set of actual and potential representation class names provides a taxonomy of representation class terms. Annex F of ISO/IEC 11179-3 discusses using a Representation Class classification scheme as a concept system.

Representation terms categorize forms of representation such as

— Name — Amount

— Measure — Number ...

— Quantity — Text

This term describes the form of the set of valid values of a designatable item which includes representation. Often, the representation term may be redundant with part of the property term. When this occurs, one term or part of one term may be eliminated in a structured name. This can be established as a rule in a naming convention.

Using the above rules, a data element describing a measurement of the height of a tree would have the data element name Tree Height Measure. The word Measure is the data element's representation term. However, a data element that describes the last name of a person would have the data element name of Person Last Name Name. The second word Name is the data element's representation term. However, to promote clarity, one occurrence of the redundant word is removed.

Qualifier term

Qualifier terms may be attached to object class terms, property terms, and representation terms if necessary to distinguish one data element concept, conceptual domain, data element, or data value domain from another. These qualifier terms may be derived from structure sets specific to a context. In the rules for a naming convention, a restriction in the number of qualifier terms is recommended.

For example, in the data element name

Cost Budget Period Total Amount

the term Budget Period is a qualifier term.

NOTE 1 Limitations in the form of permitted terms of qualifiers help reduce redundancy and increase incidence of data reuse by eliminating synonyms. This applies also to object class terms, property terms, and representation terms. A mechanism such as a thesaurus of terms facilitates this effort.

NOTE 2 Because of a change to the cardinality of the relationship between Data Element Concept and Conceptual Domain in 11179 Part 3 Edition 3, the qualifier term construct is now of enhanced importance.

Semantics of separators

Various kinds of punctuation connect name parts, including separators such as spaces and hyphens, and grouping symbols such as parentheses. These may have:

a) No semantic meaning. A naming rule may state that separators will consist of one blank space or exactly one special character (for example a hyphen or underscore) regardless of semantic relationships of parts. Such a rule simplifies name formation.

b) Semantic meaning. Separators can convey semantic meaning by, for example, assigning a different separator between words in the qualifier term from the separator that separates words in the other part terms. In this way, the separator identifies the qualifier term clearly as different from the rest of the name.

   For example, in the data element name

   Cost_Budget-Period_Total_Amount

   the separator between words in the qualifier term is a hyphen; other name parts are separated by underscores.

Some languages, such as German and Dutch, commonly join grammatical constructs together in a single word (resulting in one word which in English or French might be a phrase consisting of nouns and adjectives). These languages could use a separator that is not a break between words, such as a hyphen, space or underscore, but instead capitalize the first letter of each name part within a single word (sometimes called CamelCase). This naming convention is also commonly used in programming languages such as C++ and Java.

Asian languages often form words using two characters which, separately, have different meanings, but when joined together have a third meaning unrelated to its parts. This may pose a problem in the interpretation of a name because ambiguity may be created by the juxtaposition of characters. A possible solution is to use one separator to distinguish when two characters form a single word, and another when they are individual words.

The following table indicates which name parts are combined to form administrative item names. See A.5 for examples of designatable items with related names.

Table A.1 — Relationship of name parts to designatable item names

	Conceptual Domains	Data Element Concepts	Data Elements	Value Domains
Object Class Terms	X	X	X	
Property Terms		X	X	

Table A.1 *(continued)*

	Conceptual Domains	Data Element Concepts	Data Elements	Value Domains
Representation Terms			X	X
Qualifier Terms	X	X	X	X

A.3 Example of complete rule sets for naming conventions

These rules implement the semantics described above and combine them with other rules based on principles from Clause 9. They may be documented in the Naming Convention and Namespace classes of the metamodel.

Example rule sets for registry names

Name: MDR Registry Name

Context: Registry preferred name

Scope: MDR Example Registry

Authority: ISO/IEC SC 32/WG 2; XYZ Namespace Abbreviation List

Semantic rules:

a) Object classes represent things of interest in a universe of discourse that may, for instance, be found in a model of that universe.

EXAMPLE Cost

b) One and only one object class term shall be present.

c) Property terms shall be derived from the property system structure set and represent a quality of the object class.

EXAMPLE Total Amount

d) One and only one property term shall be present.

NOTE The combination of object class term and property term forms the names for data element concepts.

e) Qualifiers may be derived as determined by the subject area authority and will be added as needed to make the name unique within a specified context. The order of the qualifier terms is not significant. Qualifier terms are optional.

EXAMPLE Budget Period

f) The representation of the valid value set of a data element or value domain is described by the representation term.

g) One and only one representation term shall be present.

EXAMPLE Amount

NOTE Representation terms, usually with added qualifiers, form value domain names.

Syntactic rules:

a) The object class term shall occupy the first (leftmost) position in the name.

b) Qualifier terms shall precede the part qualified. The order of qualifiers shall not be used to differentiate names.

c) The property term shall occupy the next position.

d) The representation term shall occupy the last position. If any word in the representation term is redundant with any word in the property term, one occurrence will be deleted.

EXAMPLE Cost Budget Period Total Amount

Lexical rules:

a) Nouns are used in singular form only. Verbs (if any) are in the present tense.

b) Name parts and words in multi-word terms are separated by spaces. No special characters are allowed.

c) All words in the name are in mixed case. The rules of "mixed case" are defined by the RA. These rules may by different for different parts of the designatable item name (object class, property, representation class).

d) Abbreviations, acronyms, and initialisms are allowed. Use the abbreviations in the XYZ Namespace Abbreviation List.

EXAMPLE Cost Budget Period Total Amount

NOTE These rules may not apply to all languages. See the notes in Annex B for specific exceptions to Chinese.

Uniqueness rule:

All names in each language shall be unique within this context.

A.4 Example rule sets for data element names within XML tags

"XML namespaces provide a simple method for qualifying element and attribute names used in Extensible Markup Language documents by associating them with namespaces identified by IRI references." [*Namespaces in XML 1.1*, W3C Recommendation 16 August 2006] This is done by assigning a *prefix* to the element and attribute names. The following example shows how this rule may be applied within a naming convention.

These rules are derived from the principles described in Clause 9. The first example differs from the rules described above only in the application of XML-specific lexical restrictions.

Name: XML tag name

Context: XML schema for reports

Scope: All element and attribute names in XML DTD's

Authority: XML data administrator

Semantic rules:

a) Object classes represent things of interest in a universe of discourse that may, for instance, be found in a model of that universe.

EXAMPLE Cost

b) One and only one object class term shall be present.

c) Property terms shall be derived from the property system structure set and represent a quality of the object class.

EXAMPLE Total Amount

d) One and only one property term shall be present.

e) Qualifiers may be derived as determined by the subject area authority and will be added as needed to make the name unique within a specified context. The order of the qualifier terms is not significant. Qualifier terms are optional.

EXAMPLE Budget Period

f) The representation of the valid value set of the data element is described by the representation term.

g) One and only one representation term shall be present.

EXAMPLE Amount

Syntactic rules:

a) The object class term shall occupy the first (leftmost) position in the name.

b) Qualifier terms shall precede the part qualified. The order of qualifiers shall not be used to differentiate data element names.

c) The property term shall occupy the next position.

d) The representation term shall occupy the last position. If any word in the representation term is redundant with any word in the property term, one occurrence will be deleted.

EXAMPLE Cost Budget Period Total Amount

Lexical rules:

a) Nouns are used in singular form only, unless the concept itself is plural. Verbs (if any) are in the present tense.

b) Name parts are separated by capitalizing the first character of the second thru nth word.

c) All words in the name are in mixed case.

d) Abbreviations, acronyms, and initialisms are allowed only when used normally within business terms.

e) Words contain letters and numbers only.

EXAMPLE CostBudgetPeriodTotalAmount

Uniqueness rule:

All names shall be unique within a DTD.

Usage Examples

In this example, a data element name is used in an XML element tag

< !ELEMENT CostBudgetPeriodTotalAmount (#PCDATA) >

An additional example can be developed to show the use of prefixes to identify the namespace to which an XML schema element or attribute is assigned.

An additional semantic rule is defined:

h) Not more than one namespace indicator shall be present.

An additional syntactic rule is defined:

e) If a namespace indicator is used, it shall precede all other terms.

And an additional lexical rule is defined:

f) A namespace indicator is in lowercase and is separated from the other terms by a colon.

Example of an XML name using a namespace indicator:

< !ELEMENT acct:CostBudgetPeriodTotalAmount >

The prefix can also serve as a scoped identifier to differentiate items within a DTD, to enforce the uniqueness rule.

A.5 Attributed example of a data element

The table below presents an attributed example of a data element with all designatable item derivations named. Specifically, this data element is derived from:

data element concept: **Country Identifier**

composed of occurrences of the

conceptual domain: **Country**

and its

value domain: **ISO English-Language Country Short Name**.

Three names are provided for this data element example:

a) **Country Mailing Address Name**, the registry name:

b) **Country.Mailing_Address.Name**, a name that appears in an application system, the convention for which requires separators with semantic meaning,

c) **addr:CountryMailingAddressName**, an XML Schema name, which employs a prefix identifying the namespace in which the name is included.

Semantic, syntactic and lexical rules are documented using the Naming Convention class of the metamodel.

Metadata Attribute Name		Attribute Value
1	**Data Element Definition**	
a	**Data Element (DE) Definition Context**	Registry
	DE Definition	The name of the country where a mail piece is delivered.
b	**DE Definition Context**	Facility Data System
	DE Definition	The name of a country where the addressee is located.
c	**DE Definition Context**	XML Address Schema
	DE Definition	The name of the country in an address.
2	**Permissible Values and Value Domain**	
	Permitted Values (each PV)	All English-language short country names from ISO 3166, matched with value meanings. (recorded as: Afghanistan, Albania,....., Zimbabwe)
	PV Begin Date (each PV)	19970110
	PV End Date (each PV)	(Not applicable)
	Value Domain (VD) Context	Registry
	VD Entry Name	ISO English-Language Country Short Name
	VD Definition	All short, ISO-recognized English-language names of all countries.
	VD Description	(Not applicable)
	VD Entry Identifier	{RAI} 5678:1

Metadata Attribute Name		Attribute Value
	Datatype	CHARACTER VARYING
	Datatype Scheme Reference	ANSI ISO SQL
	Maximum Characters	44
	Format	(Not applicable)
	Unit of Measure	(Not applicable)
	Precision	(Not applicable)
	VD Origin	ISO 3166-1:2006
	VD Explanatory Comment	The value domain includes only the subset of names that designate countries; it does not include names of territories.
3	**Representation Class (RC) Classification System Attributes**	
	RC Classification System Name	ISO/IEC 11179-3, Annex F Specification
	Representation Class Term	Name
	Representation Class Qualifier	Short
4	**Data Element Name (Designation) and Identifier**	
a	**DE Name**	Country Mailing Address Name
	DE Name Context	Registry
	Naming Convention (NC) Name	Registry Preferred Naming Convention
	NC Rules	< Rule set, excluding uniqueness rules >
	Namespace (NS) Authority	Registry Administrator
	NS Uniqueness (one name per item)	One name per item is **true**
	NS Uniqueness (one item per name)	One item per name is **true**
	NS NC Obligation	All names in this NS must conform to this NC.
b	**DE Name**	Country.Mailing_Address.Name
	DE Name Context	Facility Data System
	NC Name	Facility Data System Naming Convention
	NC Rules	< Rule set, excluding uniqueness rules >
	Namespace (NS) Authority	Facility Data System Administrator
	NS Uniqueness (one name per item)	One name per item is **true**
	NS Uniqueness (one item per name)	One item per name is **true**
	NS NC Obligation	All names in this NS must conform to this NC.
c	**DE Name**	addr:CountryAddressMailingName
	DE Name Context	XML Address Schema
	NC Name	XML Schema Naming Convention
	NC Rules	< Rule set, excluding uniqueness rules >

Metadata Attribute Name		Attribute Value
	Namespace (NS) Authority	System XYZ Administrator
	NS Uniqueness (one name per item)	One name per item is **true**
	NS Uniqueness (one item per name)	One item per name is **true**
	NS NC Obligation	All names in this NS must conform to this NC.
	NS Prefix	addr:
	NS Scheme Reference	http://www.w3.org/TR/1999/REC-xml-names-19990114/
	DE Entry Identifier	{RAI} 5394:1
5	**Other Data Element Attributes**	
	DE Example	Denmark
	DE Origin	Application system
	DE Comment	This data element is required for delivery of mail outside the country of origin.
	Submitting organization	Office of Enforcement and Compliance Assurance
	Stewardship Contact	Facility Data Systems Administrator
6	**Data Element Concept and Conceptual Domain**	
	Data Element Concept (DEC) Context	Registry
	DEC Name	Country Identifier
	DEC Definition	An identifier for a primary geopolitical entity of the world.
	Object Class	Country
	Property	Identifier
	DEC Entry Identifier	{RAI}12468:1
	Conceptual Domain (CD) Context	Registry
	CD Name	Country
	CD Definition	The primary geopolitical entities of the world.
	CD Entry Identifier	{RAI} 2468:1
	CD Origin	ISO 3166-1
	Value Meaning (for each VM)	The primary geopolitical entity known as < China >
	VM Begin Date (for each VM)	19970110
	VM End Date (for each VM)	(Not applicable)
	VM Identifier (for each VM)	< Assigned by system as 1001...1230: one to each VM >
7	**Concept Scheme Examples**	Classification Values for Concept Type
	Keyword	Country, Address, Mailing
	Group	Mailing Address
	Object	Address, Country
	Concept Scheme Membership Level	Specialization
8	**Registration and Administrative Status**	