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Information technology — Metadata registries (MDR) — Part 5: Naming and identification principles

Élément introductif — Élément central — Partie 5 : Titre de la partie

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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.

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In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 11179 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 11179-5 was prepared by Joint Technical Committee ISO/IEC JTC , , Subcommittee SC 32, *Data management and interfaces*.

This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

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

11179-1 - Framework for the Specification and Standardization of Data Elements

11179-2 - Classification of Concepts for the Identification of Domains

11179-3 – Registry Metamodel

11179-4 - Rules and Guidelines for the Formulation of Data Definitions

11179-5 - Naming and Identification Principles for Data Elements

11179-6 - Registration of Data Elements

Introduction

This part of ISO/IEC 11179 contains principles, rules and guidelines. Principles establish the premises on which the rules are based. Normative rules are mandatory and testable for compliance; registry users may enforce informative rules as an application of this standard. Guidelines are derived from principles and are used to formulate rules.

Information technology — Metadata registries (MDR) — Part 5: Naming and identification principles

1 Scope

This part of ISO/IEC 11179 provides rules and guidelines for naming and identification of the administered items data element concept, conceptual domain, data element, and data value domain. It describes the parts and structure of identification. Identification is narrowly defined to encompass only the means to establish unique identification of these administered items within a register. It defines the naming and identifying attributes; describes the relationship of the attributes to each other; includes principles by which naming conventions can be developed; and describes example naming conventions. The naming guidelines described herein apply to names of data element concepts, conceptual domains, data elements, and data value domains. When "administered item" is used in this part of ISO/IEC 11179, it is understood to refer specifically to these four 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 administered items.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 11179. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 11179 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 11179 (all parts), Information technology - Metadata registries (MDR).

3 Terms and definitions

For the purposes of this part of ISO/IEC 11179, the terms and definitions given in ISO 11179 and the following apply.

3.1 lexical: Pertaining to words or the vocabulary of a language as distinguished from its grammar and construction.

3.2 object class term: A part of the name of a data element concept, conceptual domain, data element, or data value domain which represents the logical data grouping (in a logical data model) to which it belongs; e.g., "employee."

3.3 property term: A part of the name of a data element concept, conceptual domain, data element, or data value domain which expresses the category to which the administered item belongs.

3.4 qualifier term: A word or words which help define and differentiate a name within the database.

3.5 representation term: The form of the set of valid values for a data element or data value domain, e.g., "amount," "name."

3.6 semantics: The branch of linguistic science which deals with the meanings of words (Webster).

3.7 separator: A symbol or space enclosing or separating a part within a name; a delimiter.

3.8 structure set: A method of placing objects in context, revealing relationships to other objects. Examples include Entity-Relationship Models, taxonomies, and ontologies.

3.9 syntax: The relationships among characters or groups of characters, independent of their meanings or the manner of their interpretation and use. The structure of expressions in a language, and the rules governing the structure of a language.

4 Naming and identification structure

ISO/IEC 11179-5:1995 listed five attributes which served to name and identify each administered item. The version of ISO/IEC 11179-3 that will replace 11179-3:1994 contains and amplifies these attributes. The following excerpt from the draft revision of 11179-3 describes the relevant model objects.

4.1 MDR Metamodel

The *Administration and identification* and *Naming and definition* regions are used to manage the identification and names of administered items and the contexts that provide the sphere for the names. Figure 1 represents the model objects describing naming and identification.

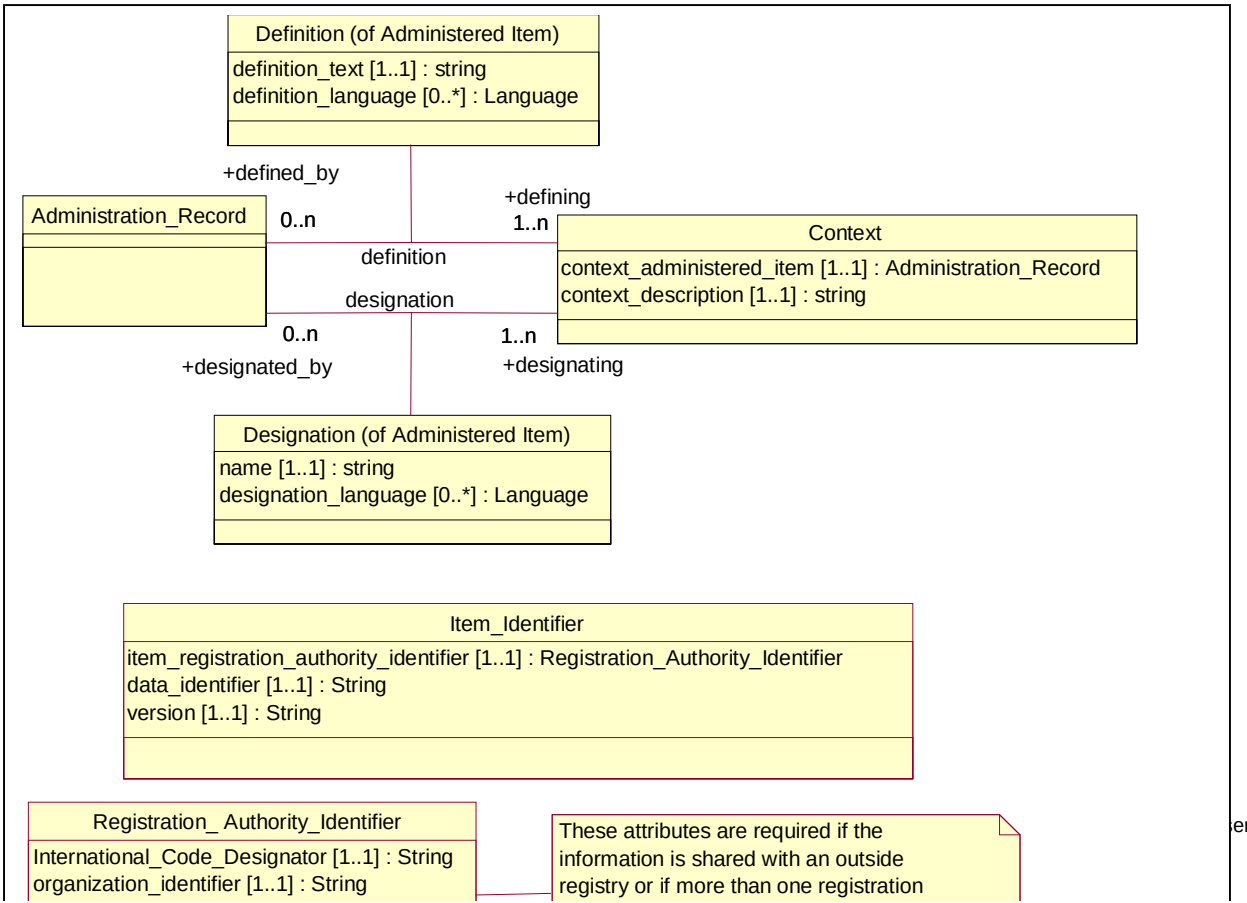

Figure 1 — Metamodel naming and identification objects

4.2 Metamodel naming and identification attributes

The attributes in the Naming and Identification metamodel region shall be as follows:

Attribute	Occurrences
Designation name	One per *context*
Designation – designation language	Zero or more per *designation*
Context – administration record	One per *context*
Context – context description	One per *context*
Definition – definition language	Zero or more per *definition*
Definition – definition source reference	Zero or one per *definition*
Definition – definition text	One per *definition*
Item identifier - registration authority identifier	One per *item identifier*
Item identifier – data identifier	One per *item identifier*
Item identifier - version	One per *item identifier*
Registration authority – registration authority identifier	One per *registration authority*
Registration authority identifier – international code designator	One per *registration authority identifier*
Registration authority identifier – organization identifier	One per *registration authority identifier*
Registration authority identifier – organization part identifier	One per *registration authority identifier*
Registration authority identifier – OPI source	One per *registration authority identifier*

4.3 Naming conventions

An administered item shall have at least one name within a register of a Registration Authority. Some organizations may establish a preferred, or standardized, name to be used across all systems. This name can then be mapped by means of registry entries to other names in other contexts. Names are established by use of a naming convention. The goal of using a naming convention is name consistency, by which users can infer facts about the definition, usage and relationships of the administered item. An effective naming convention can also enforce the exclusion of irrelevant facts about the administered item from the name, such as the input source of a data element or its field position in a file.

A naming convention shall cover all relevant aspects. This includes, as applicable:

a. The scope of the naming convention, e.g., established industry name

b. The authority that establishes names

c. Semantic rules governing the source and content of the words used in a name, e.g., words derived from data models, words commonly used in the discipline, etc.

d. Syntactic rules covering required word order

e. Lexical rules covering controlled word lists, name length, character set, language

f. A rule establishing whether or not names within this context must be unique.

Aspects of a naming convention are discussed in Clause 6, which provides principles and guidelines for developing a rigorously structured naming convention.

4.4 Context

Names may be assigned depending on the context in which the administered item is used. Each name has special utility within a particular context. For instance, for data elements, rigorously structured names may be created for data management, another name may be specified by users, while shortened names may be generated for particular software environments such as a particular programming language or database management system. A naming convention is established for each context to specify how names are formulated within that context

4.5 International registration data identifier

The attributes registration authority identifier (RAI), data identifier (DI), and version identifier (VI) constitute the international registration data identifier (IRDI). At least one IRDI is required for an administered item. Data identifiers are assigned by a Registration Authority; data identifiers shall be unique within a domain of a Registration Authority.

As each Registration Authority may determine its own assignment scheme, there is no guarantee that the DI by itself will uniquely identify an administered item. For example, if two authorities both use sequential 6-digit numbers, there may be two administered items with the same DI's; however, the administered items will almost certainly not be the same. Conversely, if one administered item appears in two registers, it will have two DI's. Therefore, both the DI and the RAI are necessary for identification of an administered item.

If particular attributes of an administered item change, then a new version of the administered item shall be created and registered. In such a case, a VI is required to complete the unique identification of an administered item. For further guidance, see Part 6 of ISO/IEC 11179.

An IRDI can serve as a key when exchanging data among information systems, organizations, or other parties who wish to share a specific administered item, but may not utilize the same names or contexts. An IRDI is also useful for language translation when the IRDI is associated with contexts established for more than one natural language and referencing among sets of administered items controlled by different Registration Authorities.

ISO/IEC 11179 does not specify the format or content of a unique DI.

Requirements for a Registration Authority, and a discussion of the IRDI, appear in ISO/IEC 11179-6.

5 Rules for registration identification of data

1. Each administered item shall have a unique data identifier within the register of a Registration Authority.

2. The combination of registration authority identifier, data identifier, and version identifier shall constitute a unique identification of an administered item.

3. To be assigned a data identifier, an administered item shall be:

- Classified according to Part 2,
- Modelled according to Part 3,
- Defined according to Part 4,
- Named according to Part 5, and
- Registered according to Part 6.

4. An administered item shall have at least one name within a context.

6 Guidelines for structured naming conventions

The following are guidelines used to develop a naming convention to produce rigorously structured names for a particular context. Annex A contains examples of specific naming conventions that are consistent with the guidelines presented in this Clause.

The guidelines are described in general terms with examples furnished. Rules are derived from the principles by which names are developed; these rules form a naming convention. Names formed according to these rules can be easily translated into languages other than the original because of the simplified syntax. 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.

As discussed below, each of the administered items: data element concept, conceptual domain, data element, and data value domain, is formed from a set of items selected from the structure sets within its context. The names of these items can be formed from the names of the administered items from which they are composed, each assigned meaning (semantics) and relative or absolute position (syntax) within a name. They may be subject to lexical rules. They may, but need not, be delimited by a separator symbol. An authority, e.g., a data manager within a corporation or an approving committee for an international business sector naming standard, should rigorously control the set or range of values of each item.

- 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.

6.1 Principles governing semantic content of names

Semantics concerns the meanings of name parts and possibly separators that delimit them.

6.1.1 Semantics of name parts

Name parts consist of discrete terms. The terms in this Clause are derived from the administered items in the MDR metamodel described in ISO/IEC 11179. These are: object class terms, property terms, representation terms, and qualifier terms.

6.1.1.1 Object class term

An object class term is a part of the name of the administered item data element concept, conceptual domain, data element, or data value domain, which represents an activity or object in a context. Using a modelling methodology, as for instance an Entity Relationship Diagram (ERD) or object model, is a way to locate and discretely place administered items in relation to their higher-level model entities. The attributes of entity-relationship model entities equate to administered items that are related to each other through further application of the methodology. In an object model, data elements are expressed as object attributes.

Models provide one kind of classification scheme for administered items. Administered items which contain object classes may be identified with their related modelling entities by mapping the object class term to the model entity name. Part 1 of ISO/IEC 11179 provides examples of the mapping between object class terms and ERD and object model entities. Of the administered item names considered by this standard, data element concepts, conceptual domains, and data elements contain object class terms. Data value domains may or may not contain object class terms (as determined by the registry designer).

For example, in the data elements:

Employee Last Name

Cost Budget Period Total Amount

Tree Height Measure

Member Last Name

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

6.1.1.2 Property term

A set of property terms is composed from a set of name parts in a property taxonomy. This set must 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 administered items which use properties; i.e., conceptual domains, data value domains, and data elements).

For example, in the data elements:

Employee Last Name

Cost Budget Period Total Amount

Member Last Name

Tree Height Measure

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

The property term will occur naturally in the definition of a conceptual domain, data element, or data value domain.

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

6.1.1.3 Representation term

A representation term is a part of an administered item name which describes the form of representation of an administered item which includes representation: data elements and data value domains. Each term is developed from a controlled word list or taxonomy. 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 an administered 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. See Annex A for an application of this procedure. Data value domains and data elements contain representation terms.

For example, in the data elements:

Tree Height Measure

Employee Last Name

the items Measure and Name are representation terms. Note that Last Name is a property term. One occurrence of the redundant word Name is removed to promote clarity.

6.1.1.4 Qualifier term

Qualifier terms may be attached to object class terms, property terms, and representation terms if necessary to uniquely identify a data element concept, conceptual domain, data element, or data value domain. 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:

Cost Budget Period Total Amount

the item Budget Period is a qualifier term.

Note: 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.

6.1.2 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:

Cost-Budget_Period-Total-Amount

the separator between words in the qualifier term is an underscore; other name parts are separated by hyphens.

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.

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.

6.2 Principles governing format of names

6.2.1 Syntactic principles

Syntactic principles specify the arrangement of parts within a name. This arrangement may be specified as relative or absolute, or some combination of the two.

1. Relative arrangement specifies parts in terms of other parts, e.g., a rule within a convention might require that a qualifier must always appear before the part being qualified appears.

2. Absolute arrangement specifies a fixed occurrence of the part, e.g., a rule might require that the property is always the last part of a name.

6.2.2 Lexical principles

These principles concern preferred and non-preferred terms, synonyms, abbreviations, part length, spelling, permissible character set, case sensitivity, etc.

Annex A
(informative)

Example Naming Conventions

These rules are derived from the guidelines described in Clause 6. Examples are included. They show the formation of registry names, and may be applied to the development of context names at the discretion of the subject area authority. The complete process produces a data element name; other administered item names are developed during the process.

These examples are written as American English. Users of other languages may specify different or additional 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.

A.1 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 the category of the data.

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 and conceptual domains.

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 data 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 data value domain names.

A.2 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

A.3 Lexical rules

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

b. Name items 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.

d. Abbreviations, acronyms, and initialisms are allowed.

Example: Cost Budget Period Total Amount

A.4 Uniqueness rule

All names shall be unique within this context.

The table below presents a fully-attributed example of a data element with all administered 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.

Two names are provided for this data element example: the registry name, Country Mailing Address Name, and a name which appears in an application system, the convention for which requires separators with semantic meaning: Country.Mailing_Address.Name.

	Metadata Attribute Name	**Application System**	
1	**Data Element Definition**		
	Data Element (DE) Definition Context	Registry	Facility Data System
	DE Definition	The name of the country where a mail piece is delivered.	The name of a country where the addressee is located.
2	**Permissible Values and Value Domain**		

	Metadata Attribute Name	Application System	
	Permissible 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	
	Datatype	CHARACTER VARYING	
	Datatype Schema/Source	ANSI ISO SQL	
	Maximum Characters	44	
	Format	(Not applicable)	
	Unit of Measure	(Not applicable)	
	Precision	(Not applicable)	
	VD Origin	ISO 3166-1:1997	
	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 Attributes**		
	Representation Class	Name	
	Representation Class Qualifier	Short	
4	**Data Element Name and Identifier**		
	DE Name Context	Registry	Facility Data System
	DE Name	Country Mailing Address Name	Country.Mailing_Address.Name
	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	
	Object Class Qualifier	Mailing Address	
	Property	Identifier	
	Property Qualifier	(None)	
	DEC Entry Identifier	{RAI}12468:1	
	Conceptual Domain (CD) Context	Registry	

Metadata Attribute Name		Application System
	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	**Classification Type Examples**	**Classification Values for Classification Type**
	Keyword	Country, Address, Mailing
	Group	Mailing Address
	Object	Address, Country
	Layer of Abstraction Type	Specialization
8	**Registration and Administrative Status**	
	DE Registration Status	Recorded
	DE Administrative Status	In Quality Review
	VD Registration Status	Standard
	VD Administrative Status	Final
	DEC Registration Status	Recorded
	DEC Administrative Status	In Quality Review
	CD Registration Status	Standard
	CD Administrative Status	Final

Example naming convention for data element names within XML tags

These rules are derived from the guidelines described in Clause 6. Examples are included. They differ from the rules described above only in the application of XML-specific lexical restrictions.

A.5 Semantic rules

a. Object classes represent things of interest in a universe of discourse which 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 the category of the data.

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

A.6 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

A.7 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 a dot and a following space character. Words in multi-word terms are separated by the space character.

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: Cost. Budget Period. Total. Amount

A.8 Uniqueness rule

All names shall be unique within a DTD.

A.9 Usage Example

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

< !ELEMENT Cost. Budget Period. Total. Amount (#PCDATA) >