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Information technology – Framework for metamodel interoperability –

Part 3: Metamodel for ontology registration

Technologies de l'information – Cadre pour l'interopérabilité du métamodèle –
Partie 3: Métamodèle pour l'enregistrement ontologieque

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Contents

Figures and tables

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 19763 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 19763 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information Technology*, Subcommittee SC 32, *Data Management and Interchange*.

ISO/IEC 19763 consists of the following parts, under the general title *Information technology* — **Framework for metamodel interoperability**:

— Part 1: Reference model

— Part 2: Core model

— Part 3: Metamodel for ontology registration

— Part 4: Metamodel for model mapping

Introduction

Today, in EB(E-Business) or EC(E-Commerce) through the Internet, the effective interchange of business transactions or other related information across countries and cultures is an important concern for people in both the IT industry and other non-IT industries.

To follow the current trends of EB or EC, industrial consortia have been engaged in the standardization of domain -specific business objects including business process models and software components using common modeling facilities and interchange facilities such as UML and XML. They are very active in standardizing domain-specific business process models and standard modeling constructs such as data elements, entity profiles, and value domains.

Moreover, interoperation among autonomous web based applications, such as Web services, is becoming important. For that purpose, ontology is a key issue. Ontology is a description of a universe of discourse. A lexicon, a taxonomy, a thesaurus, and a familiar conceptual model such as a business process model in UML are all examples of ontology. In addition ontology includes a more complex axiomatic theory.

Several efforts to establish standards acccociated with ontology are underway. For example, OMG will publish a specification called ODM, defining the metamodels of ontologies described in several languages and the mappings among them. ISO/IEC 19763-3 will be expanded to provide for the metadata associated with ontologies to be specified and registered with respect to ISO/IEC 19763-3. In addition, to promote ontology-based interoperation, a generic framework for registering administrative information related to ontologies is necessary.

This part of ISO/IEC 19763 intends to provide a generic framework for registering administrative information related to ontologies, based on the ISO/IEC 19763-2 Framework for metamodel interoperability Part-2: Core model .

Information Technology–Framework for metamodel interoperability –Part 3: Metamodel for ontology registration

1 Scope

The primary purpose of the multipart standard ISO/IEC 19763 is to specify a framework for metamodel interoperability. This part of ISO/IEC 19763 specifies the metamodel that provides a facility to register administrative information related to ontologies.

The metamodel that this part specifies is intended to promote interoperation among application systems.

It does not specify the metamodels of ontologies described in specific languages and the mappings among them. They are specified in other specifications such as ODM.

Figure 1 shows the scope of this part of ISO/IEC 19763.

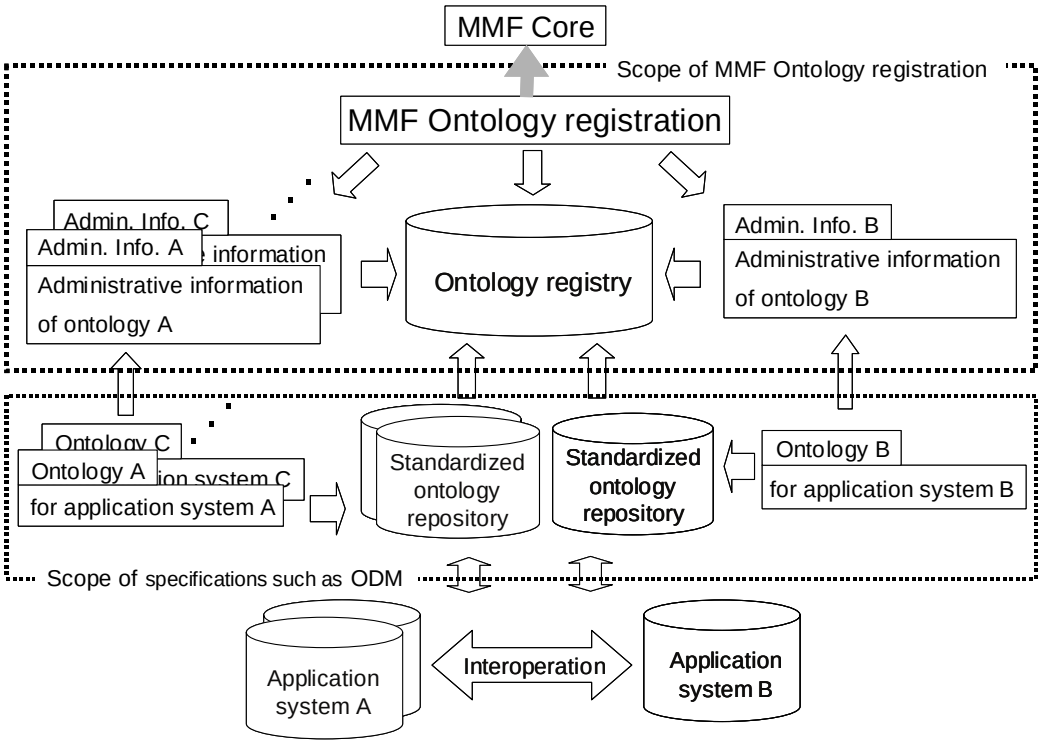

Figure 1 – Scope of MMF Ontology registration

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/IEC 11179-3:2003, Information technology – Metadata registries (MDR) – Part 3: Registry metamodel
ISO/IEC 19763-1, Information technology – Framework for metamodel interoperability – Part 1: Reference model
ISO/IEC 19763-2, Information technology – Framework for metamodel interoperability – Part 2: Core model
ISO/IEC 19501:2005, Information technology – Open Distributed Processing – Unified Modeling Language (UML) Version 1.4.2
ISO/IEC 19502:2005, Information technology – Meta Object Facility (MOF) Specification

3 Definitions and abbreviated terms

3.1 Definitions

The definitions provided in ISO/IEC 11179-3, ISO/IEC 19763-1 and ISO/IEC 19763-2 shall apply to this part of ISO/IEC 19763.

3.2 Broad terms

3.2.1 Ontology
Collective description of a universe of discourse

3.2.2 Reference ontology
A formalized ontology that is valid and used by a community of interest

3.2.3 Local ontology
A localized ontology for one specific application based on at least one reference ontology

3.2.4 Sentence
A piece of description in an ontology that is supposed to be true

3.2.5 Non-logical symbol
The most primitive construct in an ontology designating something in a universe of discourse.

3.3 Abbreviated terms

3.3.1 MMF Core
ISO/IEC 19763-2, Information technology – Framework for metamodel interoperability – Part 2: Core model

3.3.2 MMF Ontology registration
ISO/IEC 19763-3, Information technology – Framework for metamodel interoperability – Part 3: Metamodel for ontology registration

3.3.3 ODM
Ontology Definition Metamodel

3.3.4 URI
Uniform Resource Identifiers

4 Structure of MMF Ontology registration

4.1 Overview of MMF Ontology registration

An ontology consists of several sentences and each sentence uses several non-logical symbols. MMF Ontology registration, concerning ontology registration, provides a facility to register the administrative information related to ontologies, their sentences and the symbols that they use. Figure2 shows the metamodel for ontology registration.

Ontology is an abstract class that designates an ontology and contains the associate administrative information. **Ontology_Language** represents a language that describes an ontology that is designated by **Ontology**. **Ontology_Component** is an abstract class that designates a sentence contained in an ontology and contains the associate administrative information. The granularity of a sentence is not specified but is a user's choice. **Ontology_Atomic_Construct** is an abstract class that designates a non-logical symbol that is used in a sentence and contains the associate administrative information.
Reference_Ontology and **Local_Ontology** are subclasses of **Ontology**. **Reference_Ontology** designates a formalized ontology that is used by a community of interest. **Local_Ontology** designates the localized ontology for one specific application based on at least one ontology that is designated by **Reference_Ontology**.
Reference_Ontology_Component and **Local_Ontology_Component** are subclasses of **Ontology_Component**. **Reference_Ontology_Component** designates a sentence contained in ontologies that are designated by **Reference_Ontology**. A sentence that is designated by **Reference_Ontology_Component** may also be contained in ontologies that are designated by **Local_Ontology**. **Local_Ontology_Component** designates a sentence contained in one ontology that is designated by **Local_Ontology**.
Reference_Ontology_Atomic_Construct and **Local_Ontology_Atomic_Construct** are subclasses of **Ontology _Atomic_Construct**. **Reference_Ontology_Atomic_Construct** designates a non-logical symbol that is used in sentences that are designated by **Reference_Ontology_Component**. A non-logical symbol that is designated by **Reference_Ontology_Atomic_Construct** may also be used in sentences that are designated by **Local_Ontology_ Component**. **Local_Ontology_Atomic_Construct** designates a non-logical symbol that is used in sentences that are designated by **Local_Ontology_Component**. A non-logical symbol that is designated by **Local_Ontology_Atomic _Construct** can be used in only one ontology that is designated by **Local_Ontology.**

The exact specification of each metaclass is given in 4.3.

4.2 Relationship between MMF Core and MMF Ontology registration

Some part of MMF Ontology registration inherits the basic structure from MMF Core. Figure 3 shows the relationship between MMF Core and MMF Ontology registration.

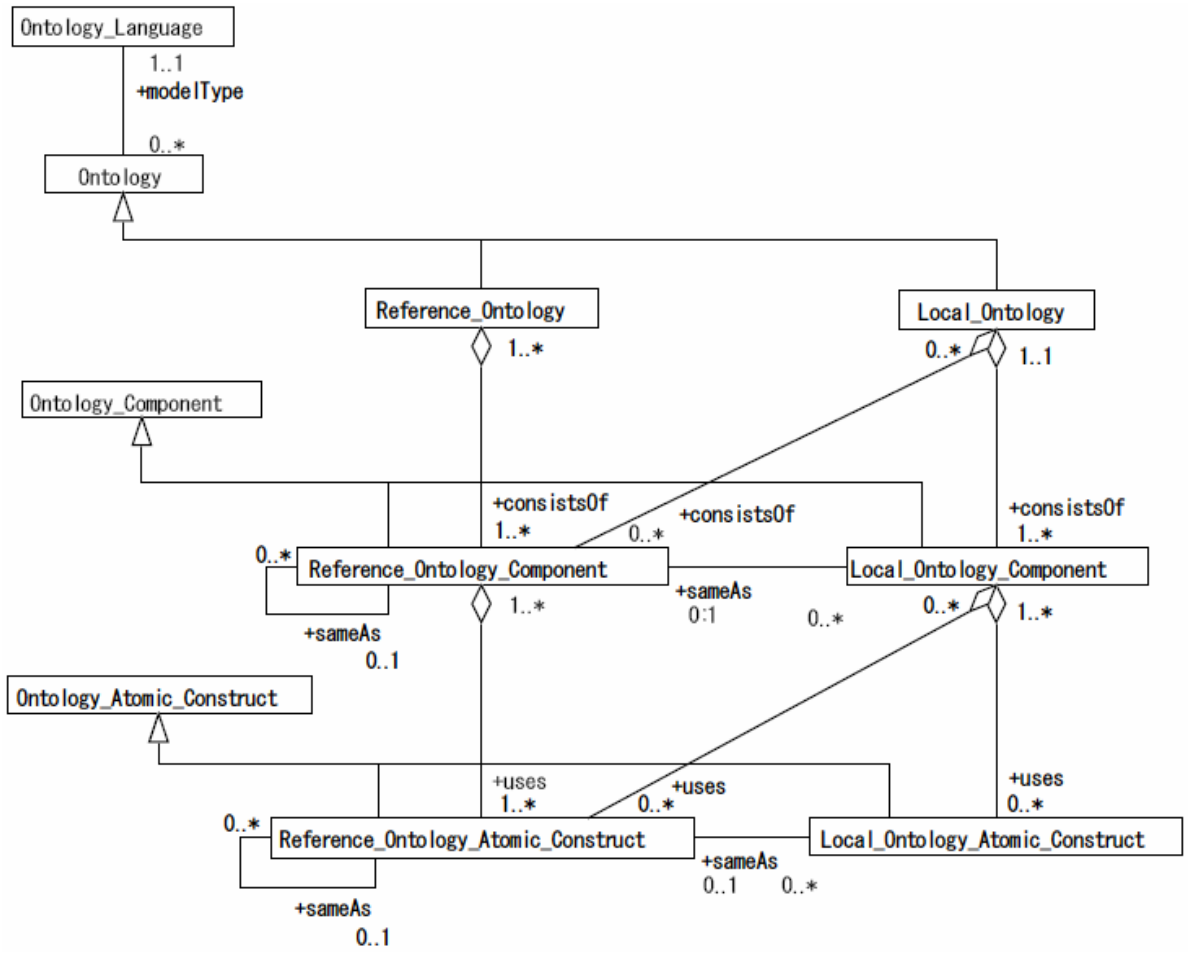

Figure 2 – Metamodel for ontology registration

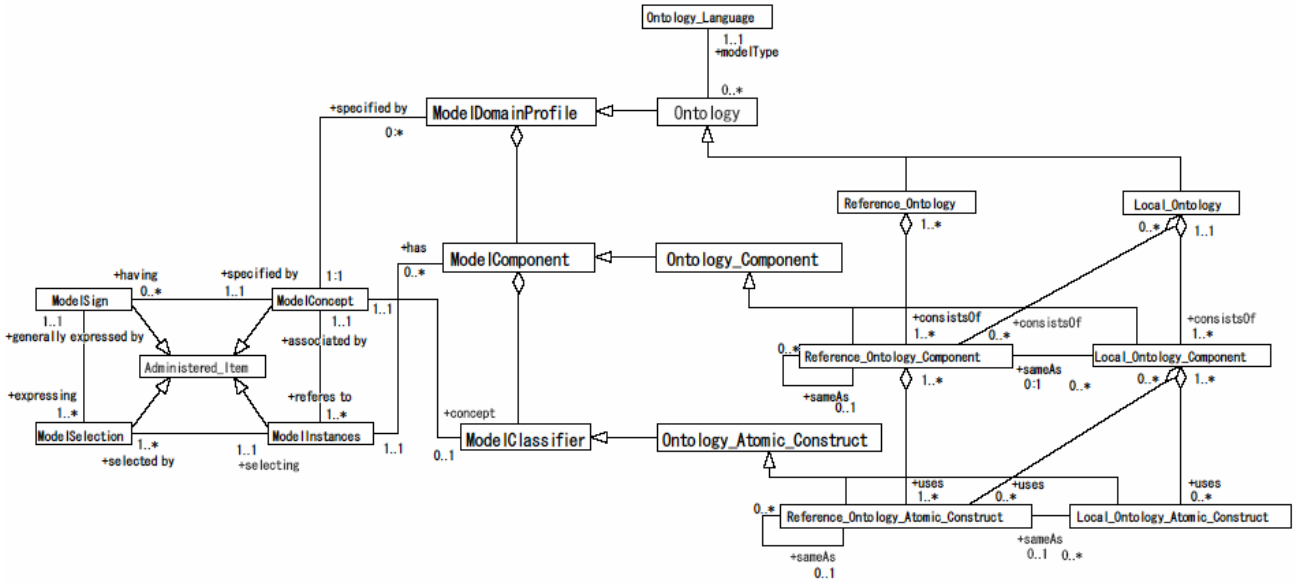

Figure 3 – Relationship between MMF Core and MMF Ontology registration

4.3 Metamodel for ontology registration

4.3.1 Ontology

Ontology is an abstract metaclass that is a SuperClass of Reference_Ontology and Local_Ontology.

SuperClass
ModelDomainProfile

Attribute	DataType	Multiplicity	Description
URI	String	1..1	URI where the corresponding ontology exists
ontologyName	String	1..1	Name of the corresponding ontology

Reference	Class	Multiplicity	Description
modelType	Ontology_Language	1..1	Ontology_Language that describes this Ontology

Constraints
The value of attribute “URI” has to be unique in this metaclass.

4.3.2 Reference_Ontology

Reference_Ontology is a metaclass designating a formalized ontology that is used by a community of interest.

SuperClass
Ontology

Reference	Class	Multiplicity	Description
consistsOf	Reference_Ontology_Component	1..*	Reference_Ontology_Component designating the sentence contained in the ontology designated by this Reference_Ontology

4.3.3 Local_Ontology

Local_Ontology is a metaclass designating the localized ontology for one specific application based on at least one ontology that is designated by Reference_Ontology.

SuperClass
Ontology

Reference	Class	Multiplicity	Description
consistsOf	Ontology_Component	1..*	Ontology_Component designating the sentence contained in the ontology designated by this Local_Ontology

Constraints

At least one value of attribute “consistsOf” has to be a Local_Ontology_Component.

At least one value of attribute “consistsOf” has to be a Reference_Ontology_Component or a Local_Ontology_Component whose “sameAs” is a Reference_Ontology_Component.

4.3.4 Ontology_Language

Ontology_Language is a metaclass that represents an ontology descriptive language.

Attribute	DataType	Multiplicity	Description
name	String	1..1	Name of the ontology descriptive language. It is advisable that its value be one of the values in column “name” of Table1 at Annex C.

Constraints

The value of attribute “name” has to be unique in this metaclass.

4.3.5 Ontology_Component

Ontology_Component is an abstract metaclass that is a SuperClass of Reference_Ontology_Component and Local_Ontology_Component.

SuperClass

ModelComponent

Attribute	DataType	Multiplicity	Description
namespace	String	1..1	URI where the value of the sentenceIdentifier is uniquely identified
sentenceIdentifier	String	1..1	Identifier of the corresponding sentence within the namespace

Constraints

The value of attribute “sentenceIdentifirer” prefixed by the value of attribute “namespace” has to be unique in this metaclass and to identify the corresponding sentence.

4.3.6 Reference_Ontology_Component

Reference_Ontology_Component is a metaclass designating a sentence contained in an ontology that is designated by Reference_Ontology. The granularity of the sentence is not specified in this part of the standard.

SuperClass
Ontology_Component

Reference	Class	Multiplicity	Description
uses	Reference_Ontology_Atomic_Construct	1..*	Reference_Ontology_Atomic_Construct designating the non-logical symbol that is used in the sentence designated by this Reference_Ontology_Component
sameAs	Reference_Ontology_Component	0..1	Reference_Ontology_Component designating the senetnce that is interpreted exactly the same as the sentence designated by this Reference_Ontology_Component

Constraints
Exists at least one Reference_Ontology whose “consistsOf” is this Reference_Ontology_Component.

4.3.7 Local_Ontology_Component

Local_Ontology_Component is a metaclass designating a sentence contained in an ontology that is designated by Local_Ontology. The granularity of the sentence is not specified in this part of the standard.

SuperClass
Ontology_Component

Reference	Class	Multiplicity	Description
uses	Ontology_Atomic_Construct	1..*	Ontology_Atomic_Construct designating the non-logical symbol that is used in the sentence designated by this Local_Ontology_Component
sameAs	Reference_Ontology_Component	0..1	Reference_Ontology_Component designating the sentence that is interpreted exactly the same as the sentence designated by this Local_Ontology_Component

Constraints
Exists exactly one Local_Ontology whose “consistsOf” is this Local_Ontology_Component.

4.3.8 Ontology_Atomic_Construct

Ontology_Atomic_Construct is an abstract metaclass that is a SuperClass of Reference_Ontology_Atomic_Construct and Local_Ontology_Atomic_Construct.

SuperClass
ModelClassifier, Administered_Item

Attribute	DataType	Multiplicity	Description
namespace	String	1..1	URI where the corresponding non-logical symbol is uniquely identified
nonLogicalSymbol	String	1..1	The corresponding non-logical symbol

Constraints
The value of attribute “nonLogicalSymbol” prefixed by the value of attribute “namespace” has to be unique in this metaclass.

4.3.9 Reference_Ontology_Atomic_Construct

Reference_Ontology_Atomic_Construct is a metaclass designating a non-logical symbol that is used in a sentence that is designated by Reference_Ontology_Component.

SuperClass
Ontology_Atomic_Construct

Reference	Class	Multiplicity	Description
sameAs	Reference_Ontology _Atomic_Construct	0..1	Reference_Ontology_Atomic_Construct designating the non-logical symbol that is interpreted exactly the same as the non-logical symbol designated by this Reference _Ontology_Atomic _Construct

Constraints
Exists at least one Reference_Ontology_Component whose “uses” is this Reference_Ontology_Atomic_Construct.

4.3.10 Local_Ontology_Atomic_Construct

Local_Ontology_Atomic_Construct is a metaclass designating a non-logical symbol that is used in a sentence that is designated by Local_Ontology_Component.

SuperClass
Ontology_Atomic_Construct

Reference	Class	Multiplicity	Description
sameAs	Reference_Ontology _Atomic_Construct	0..1	Reference_Ontology_ Atomic_Construct designating the symbol that is interpreted exactly the same as the sentence designated by this Local_Ontology_Atomic_ Construct

Constraints

Exists at least one Local_Ontology_Component whose “uses” is this Local_Ontology_Atomic_Construct.

Exists exactly one Local_Ontology whose “cosistsOf” is the Local_Ontology_Component whose “uses” is this Local_Ontology_Atomic_Construct.

5 Conformance

5.1 General

An implementation claiming conformance to this part of ISO/IEC 19763 shall support the metamodel specified in 4.3, depending on a degree of conformance as described below.

5.2 Degree of conformance

5.2.1 General

The distinction between “strictly conforming” and “conforming” implementations is necessary to address the simultaneous needs for interoperability and extensions. This part of ISO/IEC 19763 describes specifications that promote interoperability. Extensions are motivated by needs of users, vendors, institutions, and industries, but are not specified by this part of ISO/IEC 19763.

A strictly conforming implementation may be limited in usefulness but is maximally interoperable with respect to this part of ISO/IEC 19763. A conforming implementation may be more useful, but may be less interoperable with respect to this part of ISO/IEC 19763.

5.2.2 Strictly conforming implementation

A strictly conforming implementation:

a) shall support the metamodel specified in 4.3;
b) shall not support any extentions to the metamodel specified in 4.3.

5.2.3 Conforming implementation

A conforming implementation:

a) shall support the metamodel specified in 4.3;
b) may support extentions to the metamodel specified in 4.3 that are consistent with the metamodel specified in 4.3.

5.3 Implementation Conformance Statement (ICS)

An implementation claiming conformance to this part of ISO/IEC 19763 shall include an Implementation Conformance Statement stating:

a) whether it is a strictly conforming implementation or a conforming implementation (5.2);
b) what extensions are supported if it is a conforming implementation.

Annex A
(informative)
Example of MMF Ontology registration

A.1 Example of a Reference_Ontology

Suppose that some organization establishes a formalized ontology called “RO1” about kernel units in OWL. A kernel unit is a unit with its own name without prefix, such as “metre”. In “RO1”, there are many sentences about kernel units. Figure 4 shows three examples of them. Suppose that these sentences are named “RC1”, “RC2”, and “RC3” as shown in Figure 4.

RC1

```
<owl:ObjectProperty rdf:ID="measure">
  <rdfs:domain rdf:resource="#Unit" />
  <rdfs:range rdf:resource="#Dimension" />
</owl:ObjectProperty>
```

RC2

```
<owl:Class rdf:ID="KernelUnit">
  <rdfs:subClassOf rdf:resource="#Unit"/>
</owl:Class>
```

RC3

```
<KernelUnit rdf:ID="metre">
  <measure>
    <Dimension rdf:ID="length"/>
  </measure>
</KernelUnit>
```

Figure 4 – Three examples of the sentences in RO1

Then, “RC1” means “A unit measures a dimension.”, “RC2” means “A kernel unit is a unit.”, and “RC3” means “Metre is a kernel unit that measures length as a dimension.”.

Figure 5 shows how “RO1” is registered as a reference ontology in accordance with MMF Ontology registration.

< Reference_Ontology>

Object01

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record01
URI	http://ref1.org/kernel-unit
ontologyName	"RO1"
modelType	"OWL"
consistsOf	Object02
	Object03
	Object04
	…

<Reference_Ontology_Component>

Object02

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record02
namespace	http://ref1.org/kernel-unit
sentenceIdentifier	"RC1"
uses	Object05
	Object06
	Object07

Object03

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record03
namespace	http://ref1.org/kernel-unit
sentenceIdentifier	"RC2"
uses	Object06
	Object08

Object04

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record04
namespace	http://ref1.org/kernel-unit
sentenceIdentifier	"RC3"
uses	Object05
	Object07
	Object08
	Object09
	Object10

<Reference_Ontology_Atomic_Construct>

Object05

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record05
namespace	http://ref1.org/kernel-unit
nonLogicalSymbol	"measure"

Object06

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record06
namespace	http://ref1.org/kernel-unit
nonLogicalSymbol	"Unit"

Object07

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record07
namespace	http://ref1.org/kernel-unit
nonLogicalSymbol	"Dimension"

Object08

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record08
namespace	http://ref1.org/kernel-unit
nonLogicalSymbol	"KernelUnit"

Object09

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record09
namespace	http://ref1.org/kernel-unit
nonLogicalSymbol	"metre"

Object10

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record10
namespace	http://ref1.org/kernel-unit
nonLogicalSymbol	"length"

Figure 5 – Registration of RO1

Note:

- For simplicity, the sentences other than “RC1”, “RC2”, and “RC3” are ignored.
- Except “administered_item_administration_record”, the attributes and references that are inherited from the other standards are not shown for simplicity.
- Objectxx (xx= 01 to 10) are object identifiers introduced only for the descriptive purpose of this example. The detailed specifications of them are beyond the scope of this part of the standard.

A.2 Example of another Reference_Ontology

Suppose that another organization establishes a formalized ontology called “RO2” about prefixed units in OWL. A prefixed unit is a unit with prefix, such as “kilometer”. In this ontology, there are many sentences about prefixed units. Figure 6 shows two examples of them. Suppose that these sentences are named “RC4” and “RC5” as shown in Figure 6.

RC4

```
<owl:Class rdf:ID="PrefixedUnit">
  <rdfs:subClassOf rdf:resource="&ref1;Unit"/>
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:about="#prefix"/>
      <owl:cardinality rdf:datatype="&xsd;int">1</owl:cardinality>
    </owl:Restriction>
  </rdfs:subClassOf>
  <rdfs:subClassOf>
   <owl:Restriction>
     <owl:onProperty rdf:about="#kernel"/>
     <owl:cardinality rdf:datatype="&xsd;int">1</owl:cardinality>
   </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>
```

RC5

```
<PrefixedUnit rdf:ID="micrometre">
  <prefix>
    <MetricPrefix rdf:ID="micro"/>
  </prefix>
  <kernel>
    <ref1:KernelUnit rdf:resource="&ref1;metre"/>
  </kernel>
</PrefixedUnit>
```

Figure 6 – Two examples of the sentences in RO2

Then, “RC4” means “A prefixed unit is a unit that has exactly one prefix and exactly one kernel.” and “RC5” means “Micrometre is a prefixed unit whose prefix is micro as a metric prefix and whose kernel is metre as a kernel unit.”.

Figure 7 shows how “RO2” is registered as a reference ontology in accordance with MMF Ontology registration.

< Reference_Ontology>

Object11

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record11
URI	http://ref2.org/prefixed-unit
ontologyName	"RO2"
modelType	"OWL"
consistsOf	Object12
	Object13
	…

<Reference_Ontology_Component>

Object12

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record12
namespace	http://ref2.org/prefixed-unit
sentenceIdentifier	"RC4"
uses	Object06
	Object14
	Object15
	Object16

Object13

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record13
namespace	http://ref2.org/prefixed-unit
sentenceIdentifier	"RC5"
uses	Object08
	Object09
	Object14
	Object15
	Object16
	Object17
	Object18
	Object19

<Reference_Ontology_Atomic_Construct>

Object14

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record14
namespace	http://ref2.org/prefixed-unit
nonLogicalSymbol	"PrefixedUnit"

Object15

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record15
namespace	http://ref2.org/prefixed-unit
nonLogicalSymbol	"prefix"

Object16

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record16
namespace	http://ref2.org/prefixed-unit
nonLogicalSymbol	"kernel"

Object17

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record17
namespace	http://ref2.org/prefixed-unit
nonLogicalSymbol	"micrometre"

Object18

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record18
namespace	http://ref2.org/prefixed-unit
nonLogicalSymbol	"MetricPrefix"

Object19

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record19
namespace	http://ref2.org/prefixed-unit
nonLogicalSymbol	"micro"

Figure 7 – Registration of RO2

Note:

- For simplicity, the sentences other than “RC4” and “RC5” are ignored.
- Except “administered_item_administration_record”, the attributes and references inherited from the other standards are not shown for simplicity.
- Objectxx (xx= 06 to 19) are object identifiers introduced only for the descriptive purpose of this example. The detailed specifications of them are beyond the scope of this part of the standard.

A.3 Example of a Local_Ontology

Suppose that some application system establishes its own ontology called “LO1” about units based on “RO1” and “RO2”. “LO1” is described in KIF and not in OWL and has many sentences about units for this application system. Figure 8 shows three examples of them. Suppose that these sentences are named “LC1”, “LC2”, and “LC3” as shown in Figure 8.

LC1

```
(and (KernelUnit metre) (Dimention length) (measure metre length))
```

LC2

```
(and (PrefixedlUnit micron) (MetricPrefix micro) (KernelUnit metre)
(prefix micron micro) (kernel micron metre))
```

LC3

```
((forall ?unit1 ?unit2 ?dimension1 ?dimension2) (implies (and (PrefixedUnit ?unit1)
(kernel ?unit1 ?unit2) (measure ?unit1 ?dimension1) (measure ?unit2 ?dimension2))
(equal ?dimension1 ?dimension2)))
```

Figure 8 – Three examples of the sentences in LO1

Then, “LC1” has the same meaning as “RC3” in “RO1” and uses the same non-logical symbols as “RC3” in “RO1”.
“LC2” has the same meaning as “RC5” in “RO2” and uses the same non-logical symbols as “RC5” in “RO2”, except that “micron” is used instead of “micrometer” for this application system.
“LC3” is a new sentence that is not in “RO1” nor in “RO2”. “LC3” means “A dimension that a kernel unit measures and the dimension that the prefixed unit whose kernel is the kernel unit are equal.”.

Figure 9 shows how “LO1” is registered as a local ontology in accordance with MMF Ontology registration.

<Local_Ontology>

Object20

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record20
URI	http://local1.org/unit
ontologyName	"LO1"
modelType	"KIF"
consistsOf	Object21
	Object22
	Object23
	…

<Local_Ontology_Component>

Object21

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record21
namespace	http://local1.org/unit
sentenceIdentifier	"LC1"
uses	Object05
	Object07
	Object08
	Object09
	Object10
sameAs	Object04

Object22

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record22
namespace	http://local1.org/unit
sentenceIdentifier	"LC2"
uses	Object08
	Object09
	Object14
	Object15
	Object16
	Object18
	Object19
	Object24
sameAs	Object13

Object23

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record23
namespace	http://local1.org/unit
sentenceIdentifier	"LC3"
uses	Object05
	Object14
	Object16

<Local_Ontology_Atomic_Construct>

Object24

Attribute/Reference	Literal/Instance
administered_item_administration_record	Administration_Record24
namespace	http://local1.org/unit
nonLogicalSymbol	"micron"
sameAs	Object17

Figure 9 – Registration of LO1

Note:

- For simplicity, the sentences other than “LC1”, “LC2”, and “LC3” are ignored.
- Except “administered_item_administration_record”, the attributes and references inherited from the other standards are not shown for simplicity.
- Objectxx (xx= 04 to 24) are object identifiers introduced only for the descriptive purpose of this example. The detailed specifications of them are beyond the scope of this part of the standard.

Annex B
(informative)
All metaclasses that inherit from Administered_Item

Figure10 shows all metaclasses that inherit from Administered_Item.

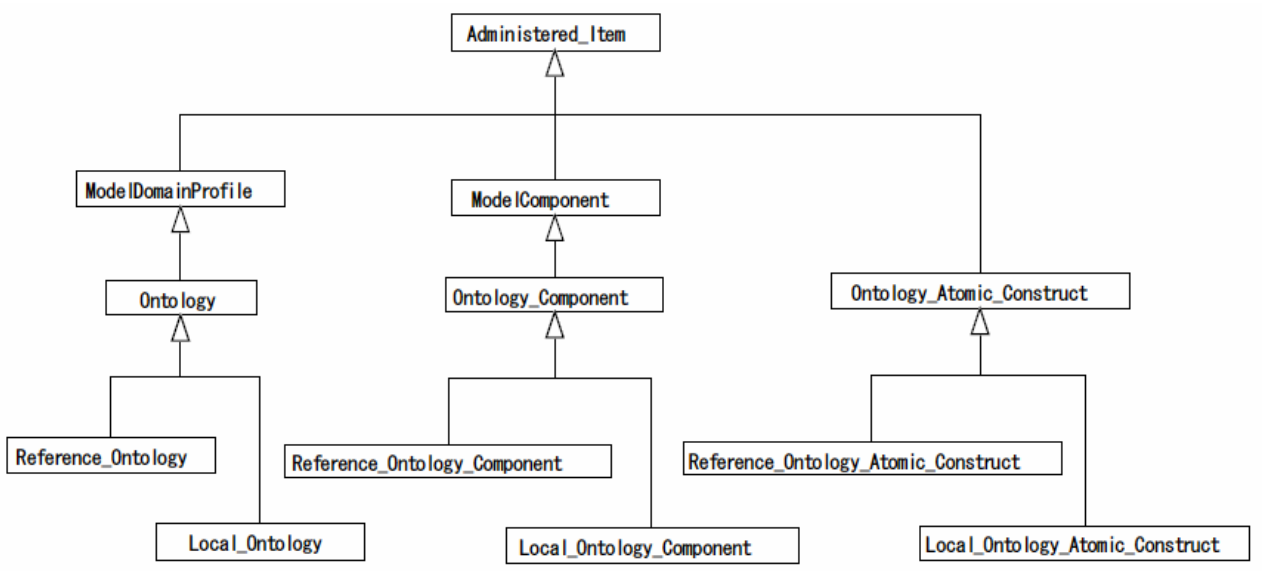

Figure 10 – All metaclasses that inherit from Administered_Item

Annex C
(informative)
List of Ontology_Languages

It is advisable that the value of attribute “name” of “Ontology_Language” should be one of the values in column “name” of Table1.

Table1 – List of Ontology_Languages

name	Description
OWL	A language that conforms to "OWL Web Ontology Language Semantics and Abstract Syntax", 2004-02-10, W3C Recommendation
RDF	A language that conforms to "Resourse Description Framework (RDF): Concepts and Abstract Syntax" and "RDF Vocabulary Description Language 1.0: RDF Schema", 2004-02-10, W3C Recommendation
DL	A description logic other than OWL or RDF
CLIF	A conformant dialect of Common Logic specified in Annex A (normative) Common Logic Interchange Format (CLIF), ISO/IEC 24707 Information technology - Common Logic(CL) - A framework for a family of logic-based languages
CGIF	A conformant dialect of Common Logic specified in Annex B (normative) Conceptual Graph Interchange Format(CGIF), ISO/IEC 24707 Information technology - Common Logic(CL) - A framework for a family of logic-based languages
XCL	A conformant dialect of Common Logic specified in Annex C (normative) eXtended Common Logic Markup Language (XCL), ISO/IEC 24707 Information technology - Common Logic(CL) - A framework for a family of logic-based languages
CL	A language other than CLIF, CGIF or XCL that conforms to ISO/IEC 24707 Information technology - Common Logic(CL) - A framework for a family of logic-based languages
TM	A language that conforms to ISO/IEC 13250 Topic Maps Information Technology Document Description and Processing Languages
UML	A language that conforms to ISO/IEC 19501 Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2
KIF	Knowledge Interchange Format
E/R	Entity-Relashionship model
Other	

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