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Information technology — Metamodel framework for interoperability (MFI) —

Part 3: Metamodel for ontology registration

Technologies de l'information — Cadre du métamodèle pour l'interopérabilité (MFI) —

Partie 3: Métamodèle pour l'enregistrement de l'ontologie

Reference number
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Foreword

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

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

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

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

ISO/IEC 19763-3 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 — Metamodel framework for interoperability (MFI)*:

— *Part 1: Reference model*

— *Part 2: Core model*

— *Part 3: Metamodel for ontology registration*

— *Part 4: Metamodel for model mapping*

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Introduction

Today, in E-business (EB) or E-commerce (EC) 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 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 associated with ontology are under way. For example, OMG will publish a specification called ODM, defining the metamodels of ontologies described in several languages and the mappings among them. This part of ISO/IEC 19763 will be expanded to provide for the metadata associated with ontologies to be specified and registered with respect to this part of ISO/IEC 19763. 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 ISO/IEC 19763-2.

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Information technology — Metamodel framework for interoperability (MFI) —

Part 3: Metamodel for ontology registration

1 Scope

ISO/IEC 19763 specifies a metamodel framework for interoperability. This part of ISO/IEC 19763 specifies the metamodel that provides a facility to register administrative information related to ontologies.

The metamodel specified in this part of ISO/IEC 19763 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 the Ontology Definition Metamodel from the Object Management Group (see bibliography item [1]).

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

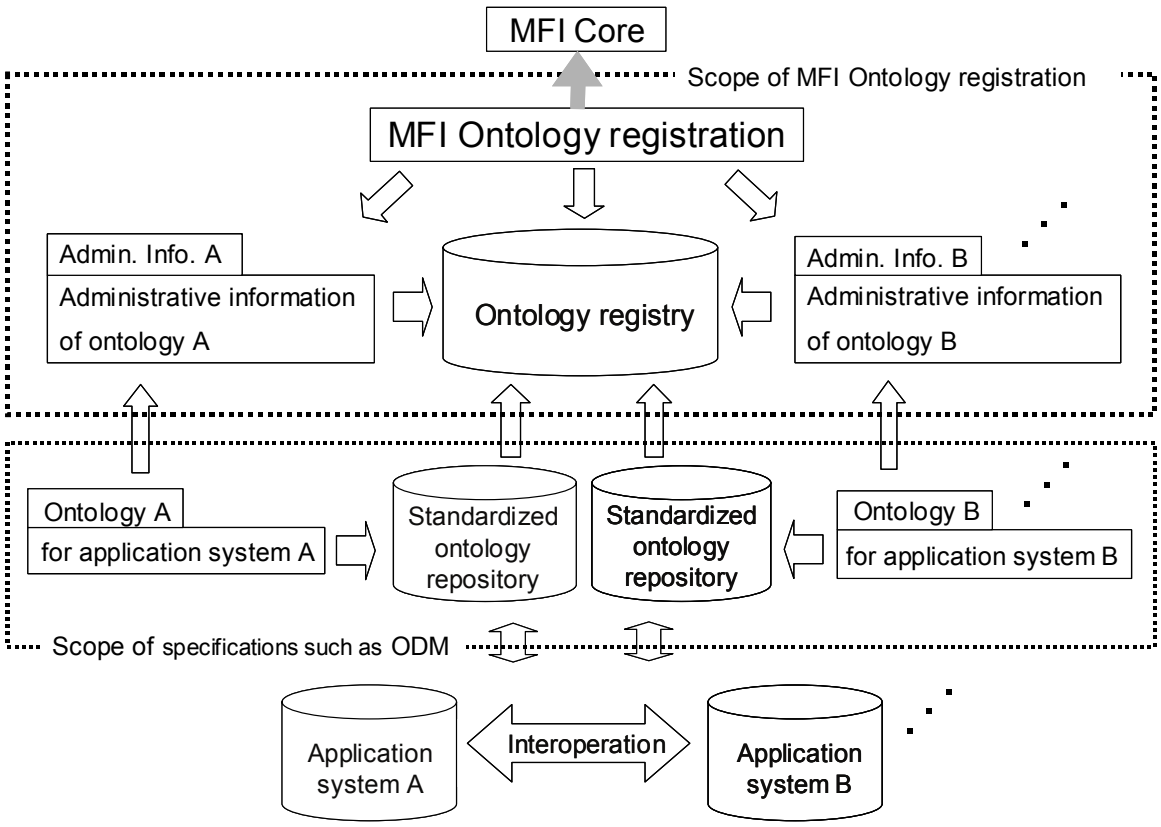

Figure 1 — Scope of MFI Ontology registration

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2 Conformance

2.1 General

An implementation claiming conformance with this part of ISO/IEC 19763 shall support the metamodel specified in 5.3, depending on a degree of conformance as described below.

2.2 Degree of conformance

2.2.1 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.

2.2.2 Strictly conforming implementation

A strictly conforming implementation

a) shall support the metamodel specified in 5.3;

b) shall not support any extensions to the metamodel specified in 5.3.

2.2.3 Conforming implementation

A conforming implementation

a) shall support the metamodel specified in 5.3;

b) may support extensions to the metamodel specified in 5.3 that are consistent with the metamodel specified in 5.3.

2.3 Implementation Conformance Statement (ICS)

An implementation claiming conformance with 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 (2.2);

b) what extensions are supported if it is a conforming implementation.

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3 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 and basic attributes*

ISO/IEC 19763-1, *Information technology — Metamodel framework for interoperability (MFI) — Part 1: Reference model*

ISO/IEC 19763-2, *Information technology — Metamodel framework for interoperability (MFI) — Part 2: Core model* [1)]

4 Terms, definitions and abbreviated terms

4.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11179-3:2003, ISO/IEC 19763-1, ISO/IEC 19763-2 and the following apply.

4.1.1
universe of discourse
all those things of interest that are concrete or abstract and that have been, are, or ever might be

4.1.2
ontology
description of a universe of discourse in a language that a computer can process

4.1.3
reference ontology
ontology that is usable and sharable by a community of interest

4.1.4
local ontology
ontology that is specialized for defined applications and based on at least one reference ontology

4.1.5
sentence
statement that has a truth value

4.1.6
symbol
the most primitive lexical construct that composes a part of a sentence

4.1.7
logical symbol
symbol whose meaning is defined by its language

EXAMPLE In KIF, “not” and “or” are logical symbols.

4.1.8
non-logical symbol
symbol that is not a logical symbol

1) To be published.

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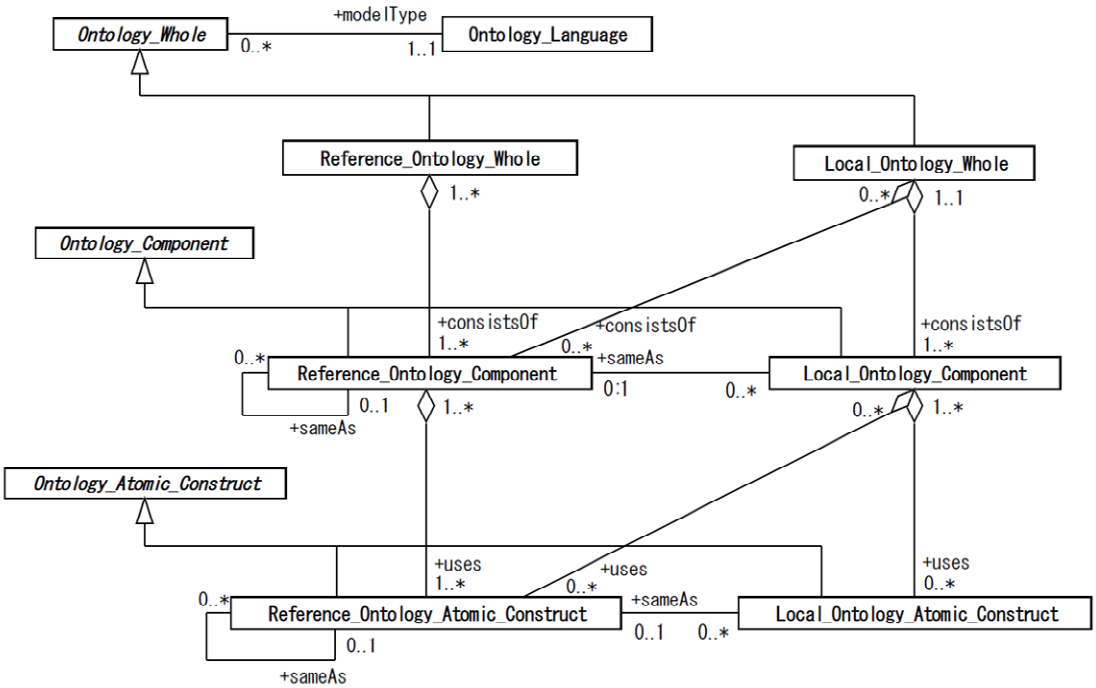
4.2 Abbreviated terms

KIF	Knowledge Interchange Format (see bibliography item [2])
MFI Core	ISO/IEC 19763-2, *Information technology — Metamodel framework for interoperability (MFI) — Part 2: Core model*
MFI Ontology registration	ISO/IEC 19763-3, *Information technology — Metamodel framework for interoperability (MFI) — Part 3: Metamodel for ontology registration*
MDR	Metadata Registry
ODM	Ontology Definition Metamodel (see bibliography item [1])
URI	Uniform Resource Identifiers (see bibliography item [3])

5 Structure of MFI Ontology registration

5.1 Overview of MFI Ontology registration

An ontology consists of several sentences and each sentence uses several non-logical symbols. MFI Ontology registration provides a facility to register administrative information related to ontologies, their sentences and the symbols that they use. Figure 2 shows the metamodel for ontology registration.



NOTE Metaclasses whose names are italicized are abstract metaclasses.

Figure 2 — Metamodel for ontology registration

Ontology_Whole is an abstract metaclass that designates an ontology and contains the associated administrative information. **Ontology_Language** represents a language that describes an ontology that is designated by **Ontology_Whole**. **Ontology_Component** is an abstract metaclass 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 metaclass that designates a non-logical symbol that is used in a sentence and contains the associated administrative information.

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Reference_Ontology_Whole and **Local_Ontology_Whole** are subclasses of **Ontology_Whole**. **Reference_Ontology_Whole** designates a reference ontology. **Local_Ontology_Whole** designates a local ontology based on at least one reference ontology that is designated by **Reference_Ontology_Whole**.

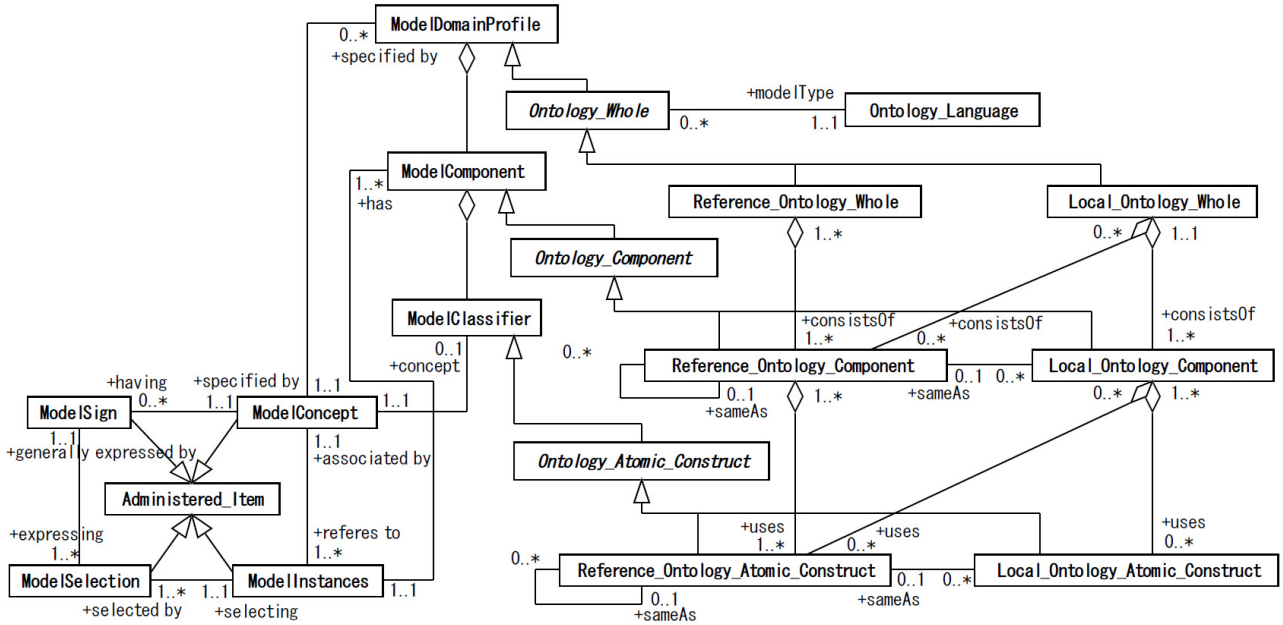
Reference_Ontology_Component and **Local_Ontology_Component** are subclasses of **Ontology_Component**. **Reference_Ontology_Component** designates a sentence contained in ontologies that are designated by **Reference_Ontology_Whole**. A sentence that is designated by **Reference_Ontology_Component** may also be contained in ontologies that are designated by **Local_Ontology_Whole**. **Local_Ontology_Component** designates a sentence contained in one ontology that is designated by **Local_Ontology_Whole**.

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_Whole.**

The exact specification of each metaclass is given in 5.3.

5.2 Relationship between MFI Core and MFI Ontology registration

MFI Ontology registration inherits the basic structure from MFI Core. Figure 3 shows the relationship between MFI Core and MFI Ontology registration.



NOTE Metaclasses whose names are italicized are abstract metaclasses.

Figure 3 — Relationship between MFI Core and MFI Ontology registration

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5.3 Metamodel for ontology registration

5.3.1 Ontology_Whole

Ontology_Whole is an abstract metaclass that is a SuperClass of Reference_Ontology_Whole and Local_Ontology_Whole.

SuperClass

Administered_Item

Attribute	DataType	Multiplicity	Description
URI	String	1..1	URI that identifies the corresponding ontology
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.

5.3.2 Reference_Ontology_Whole

Reference_Ontology_Whole is a metaclass designating a reference ontology.

SuperClass

Ontology_Whole

Attribute	DataType	Multiplicity	Description
consistsOf	Reference_Ontology_Component	1..*	Reference_Ontology_Component designating the sentence contained in the ontology designated by this Reference_Ontology_Whole

5.3.3 Local_Ontology_Whole

Local_Ontology_Whole is a metaclass designating a local ontology based on at least one reference ontology that is designated by Reference_Ontology_Whole.

SuperClass

Ontology_Whole

Attribute	DataType	Multiplicity	Description
consistsOf	Ontology_Component	1..*	Ontology_Component designating the sentence contained in the ontology designated by this Local _Ontology_Whole

Constraints

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.

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5.3.4 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 should 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.

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

5.3.6 Reference_Ontology_Component

Reference_Ontology_Component is a metaclass designating a sentence contained in an ontology that is designated by Reference_Ontology_Whole. The granularity of the sentence is not specified in this part of ISO/IEC 19763.

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_Whole whose “consistsOf” is this Reference_Ontology_Component.

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5.3.7 Local_Ontology_Component

Local_Ontology_Component is a metaclass designating a sentence contained in an ontology that is designated by Local_Ontology_Whole. The granularity of the sentence is not specified in this part of ISO/IEC 19763.

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_Whole whose “consistsOf” is this Local_Ontology_Component.

5.3.8 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.

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5.3.9 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.

5.3.10 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_Whole whose “cosistsOf” is the Local_Ontology_Component whose “uses” is this Local_Ontology_Atomic_Construct.

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Annex A
(informative)

Example of MFI 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 A.1 shows three examples of them. Suppose that these sentences are named “RC1”, “RC2”, and “RC3” as shown in Figure A.1.

RC1

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

RC2

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

RC3

```
<KernelUnit rdf:ID="metre">
  <dimensionality>
    <Dimensionality rdf:ID="length"/>
  </dimensionality>
</KernelUnit>
```

Figure A.1 — Three examples of the sentences in RO1

Then, “RC1” means “Dimensionality is a property of a unit.”, “RC2” means “A kernel unit is a unit.”, and “RC3” means “Metre is a kernel unit whose dimensionality is length.”.

Figure A.2 shows how “RO1” is registered as a reference ontology in accordance with MFI Ontology registration.

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< Reference_Ontology_Whole>

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	"dimensionality"

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	"Dimensionality"

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 A.2 — Registration of RO1

NOTE 1 For simplicity, the sentences other than “RC1”, “RC2”, and “RC3” are ignored.

NOTE 2 Except “administered_item_administration_record”, the attributes and references that are inherited from the other standards are not shown for simplicity.

NOTE 3 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 ISO/IEC 19763.

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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 “kilometre”. In this ontology, there are many sentences about prefixed units. Figure A.3 shows two examples of them. Suppose that these sentences are named “RC4” and “RC5” as shown in Figure A.3.

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 A.3 — Two examples of the sentences in RO2

Then, “RC4” means “A prefixed unit is a unit, has exactly one prefix, and has 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 A.4 shows how “RO2” is registered as a reference ontology in accordance with MFI Ontology registration.

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< Reference_Ontology_Whole>

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 A.4 — Registration of RO2

NOTE 1 For simplicity, the sentences other than “RC4” and “RC5” are ignored.

NOTE 2 Except “administered_item_administration_record”, the attributes and references that are inherited from the other standards are not shown for simplicity.

NOTE 3 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.

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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 A.5 shows three examples of them. Suppose that these sentences are named “LC1”, “LC2”, and “LC3” as shown in Figure A.5.

LC1

```
(and (KernelUnit metre) (Dimensionality length) (dimensionality metre length))
```

LC2

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

LC3

```
((forall ?Unit1 ?Unit2 ?Dimensionality1 ?Dimensionality2)
(implies (and (PrefixedUnit ?Unit1) (kernel ?Unit1 ?Unit2)
(dimensionality ?Unit1 ?Dimensionality1) (dimensionality ?Unit2 ?Dimensionality2))
(equal ?Dimensionality1 ?Dimensionality2)))
```

Figure A.5 — 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” or in “RO2”. “LC3” means “Dimensionality of a kernel unit measures and the dimensionality of the prefixed unit whose kernel is the kernel unit are equal.”.

Figure A.6 shows how “LO1” is registered as a local ontology in accordance with MFI Ontology registration.

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<Local_Ontology_Whole>

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 A.6 — Registration of LO1

NOTE 1 For simplicity, the sentences other than “LC1”, “LC2”, and “LC3” are ignored.

NOTE 2 Except “administered_item_administration_record”, the attributes and references that are inherited from the other standards are not shown for simplicity.

NOTE 3 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 ISO/IEC 19763.

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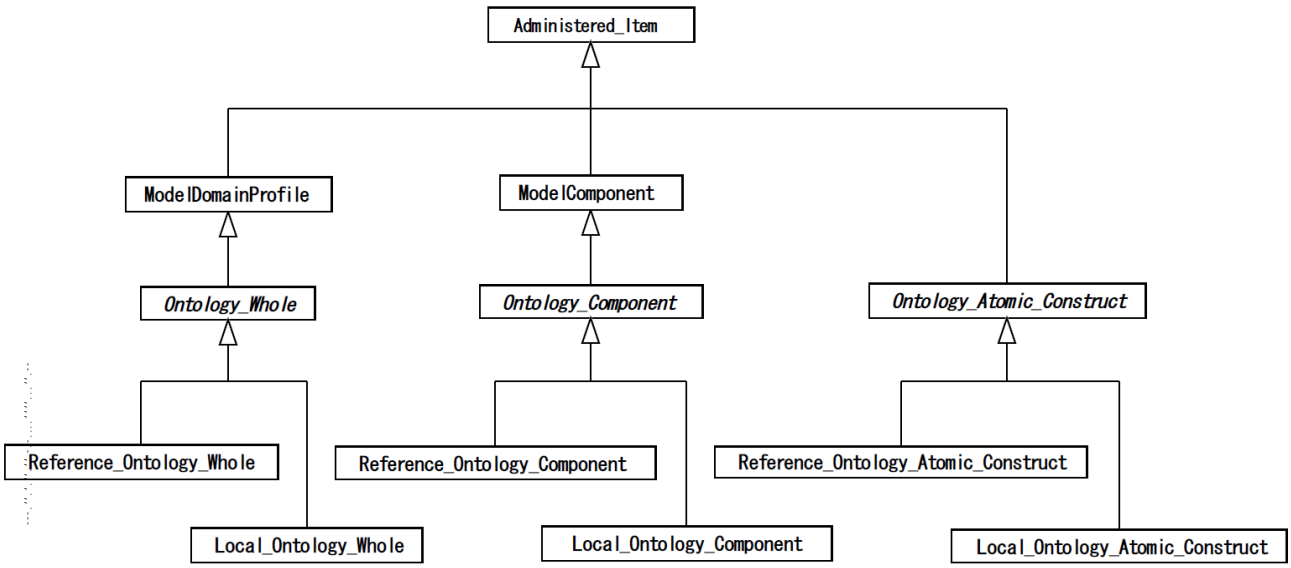
Annex B
(informative)

All metaclasses that inherit from Administered_Item

Figure B.1 shows all metaclasses that inherit from Administered_Item.



NOTE Metaclasses whose names are italicized are abstract metaclasses.

Figure B.1 — All metaclasses that inherit from Administered_Item

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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 Table C.1.

Table C.1 — List of Ontology_Language

name	Description
CGIF	The 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
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
CLIF	The 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
DL	A description logic other than OWL
E/R	An Entity-Relationship modeling language
KIF	Knowledge Interchange Format
OWL	Any of the sublanguages specified by "OWL Web Ontology Language Semantics and Abstract Syntax", 2004-02-10, W3C Recommendation
RDFS	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
TM	A language that conforms to ISO/IEC 13250 Topic Maps Information Technology Document Description and Processing Languages
UML	ISO/IEC 19501 Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2
XCL	The 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
Other	

NOTE UML is a trademark of the Object Management Group.

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