BS ISO/IEC 19763-10:2014

BSI Standards Publication

Information technology — Metamodel framework for interoperability (MFI)

Part 10: Core model and basic mapping

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee IST/40, Data management and interchange.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Information technology — Metamodel framework for interoperability (MFI) —

Part 10: Core model and basic mapping

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

Partie 10: Modèle de base et de cartographie de base

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Foreword

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

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

The main task of 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 19763-10 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: Framework*

— *Part 3: Metamodel for ontology registration*

— *Part 5: Metamodel for process model registration*

— *Part 6: Registry Summary*

— *Part 10: MFI Core model and basic mapping*

— *Part 12: Metamodel for information model registration*

The following parts are under preparation:

— *Part 7: Metamodel for service registration*

— *Part 8: Metamodel for role and goal registration*

— *Part 9: On demand model selection*

— *Part 13: Metamodel for forms registration*

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Introduction

Industrial consortia have engaged in the standardization of domain-specific business objects including business process models and software components using common modelling facilities and interchange facilities such as UML and XML. They are very active in standardizing domain-specific business process models and standard modelling constructs such as data elements, entity profiles, and value domains.

However, to promote interoperability across business domains, a generic framework for registering a variety of models and the mapping between them is required. This part of ISO/IEC 19763 provides a core metamodel as the basis for the other parts of ISO/IEC 19763 and a metamodel for registering the mappings between models registered in those other parts of ISO/IEC 19763.

NOTE UML is a trademark of the Object Management Group.

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Information technology — Metamodel framework for interoperability (MFI) —

Part 10: Core model and basic mapping

1 Scope

The primary purpose of this International Standard is to specify a metamodel framework for interoperability. This part of ISO/IEC 19763 specifies the metamodel that provides a facility to register administrative information and common semantics of models and mapping between two models.

This part of ISO/IEC 19763 does not specify the metamodel of models in a specific language, but provides a common core metamodel for the other parts of ISO/IEC 19763, each of which specifies a metamodel for a registry that can register models of a specific type, such as ontologies, process models or information models, in a number of different languages.

This part of ISO/IEC 19763 also provides a metamodel for registering the mappings between two models registered in those other parts of ISO/IEC 19763.

This part of ISO/IEC 19763 utilises the common facilities specified in ISO/IEC 11179-3. ISO/IEC 11179 (all parts) specifies a metadata registry (MDR). These common facilities provide the ability to identify and register models and their associated model elements and modelling languages within a metadata registry used to register models.

Figure 1 shows the relationship between this part of ISO/IEC 19763 and other parts of ISO/IEC 19763.

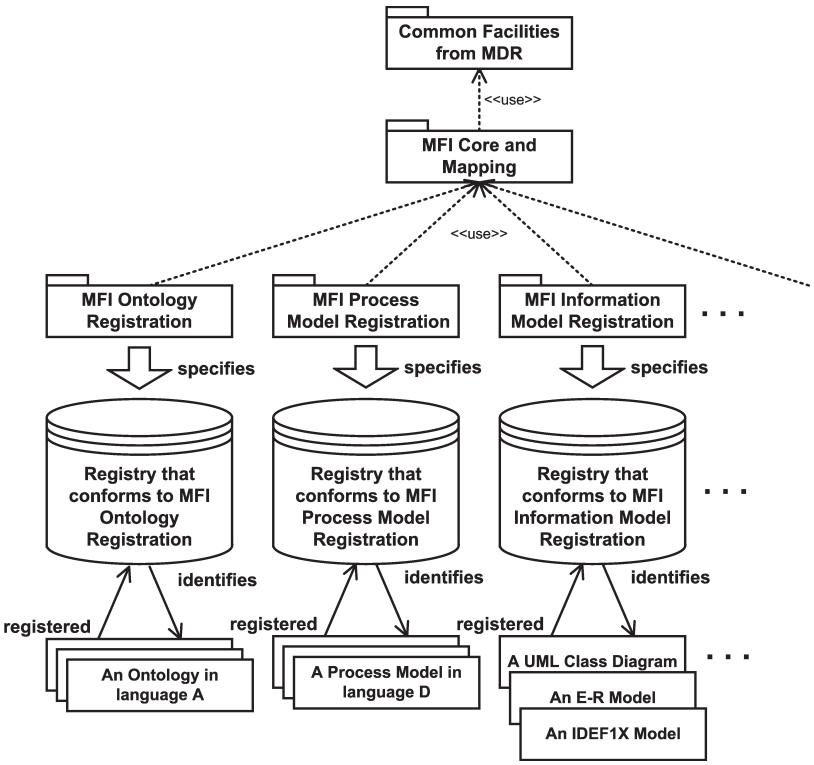

Figure 1 — Relationships between MFI Core and mapping and other parts

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2 Normative references

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

ISO/IEC 11179-3:2013, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

ISO/IEC 11179-6, *Information technology — Metadata registries (MDR) — Part 6: Registration*

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

ISO/IEC 19763-3:2010, *Information technology — Metamodel framework for interoperability (MFI) — Part 3: Metamodel for ontology registration*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11179-3, ISO/IEC 11179-6, ISO/IEC 19763-1, and the following apply.

3.1.1
modelling language
language or notation that is used to model some aspect of a domain of interest

3.1.2
model
representation of some aspect of a domain of interest using a normative modelling facility and modelling constructs

Note 1 to entry: Models can be used to express a set of information requirements, processes, services, roles, goals, or some other aspect of a domain of interest.

[SOURCE: ISO/IEC 19763-1:2007, 4.1.7, modified]

3.1.3
model element
element or component in a model

Note 1 to entry: Examples of model elements are a representation of an entity type in an information model, a representation of an event in a process model, a representation of a service operation in a service model, or a representation of an actor in a role and goal model.

3.1.4
model element set
means by which a set of model elements are grouped together for the purposes of mapping, with each set forming one half of a model element set mapping

3.1.5
model mapping
collection of model element set mappings

Note 1 to entry: A model mapping is a statement that the domains represented by two models intersect and there is a need to register details of the correspondence between the structures in the models that semantically represent this overlap to achieve interoperability.

1) This standard is under revision.

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3.1.6
model element set mapping
part of a model mapping, comprising two sets of model elements, one from each of the models being mapped, that model similar real-world requirements.

3.1.7
model element set mapping type
classification for a set of model element set mappings

3.2 Abbreviated terms

MFI

metamodel framework for interoperability

MFI Core and mapping

ISO/IEC 19763-10, *Information technology — Metamodel framework for interoperability (MFI) — Part 10: Core model and basic mapping*

MFI Ontology registration

ISO/IEC 19763-3, *Information technology — Metamodel framework for interoperability (MFI) — Part 3: Metamodel for ontology registration*

MDR

metadata registry

4 Conformance

4.1 General

An implementation claiming conformance to this part of ISO/IEC 19763 shall conform as further described in this Clause.

4.2 Conformance Levels

4.2.1 Conformance Level 1

The metamodel specified in Clause 7 (The Core_Model package) is supported.

4.2.2 Conformance Level 2

The metamodels specified in Clause 7 (The Core_Model package) and Clause 8 (The Basic_Mapping_Model package) are supported.

4.3 Implementation Conformance Statement (ICS)

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

a) which conformance level it claims (4.2);

b) for each of the ISO/IEC 19763 metaclasses supported in the implementation, what types specified in ISO/IEC 11179-3:2013, 5.5 are used to extend that metaclass.

NOTE 1 The use of the types specified in ISO/IEC 11179-3:2013, 5.5 is explained in Clause 9.

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NOTE 2 Other parts of ISO/IEC 19763 will require a conformance to this part of ISO/IEC 19763 as a part of its conformance claim. It will follow 4.3.

5 Overview of MFI Core and mapping

5.1 Basic Structure

MFI Core and mapping consists of two packages: **Core_Model** package and **Basic_Mapping_Model** package. Figure 2 shows the package structure of MFI Core and mapping.

The **Core_Model** package specifies a core model that is inherited by other parts of ISO/IEC 19763 to register administrative information and common semantics of models. The **Basic_Mapping_Model** package specifies a basic mapping model that allows the registration of information about mappings between models.

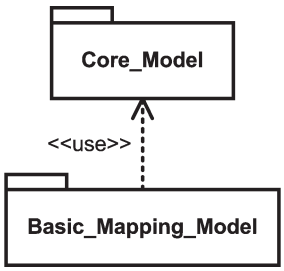
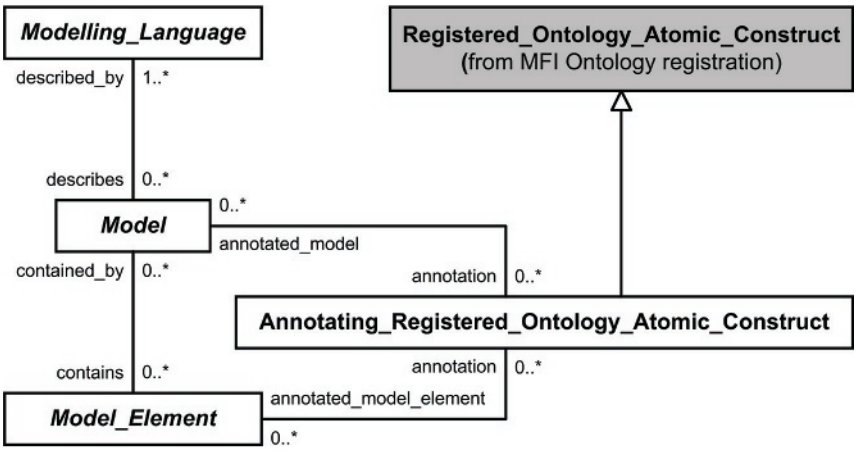


Figure 2 — Package structure of MFI Core and Mapping

5.2 Overview of the Core_Model package

Figure 3 shows the metamodel in the **Core_Model** package.



NOTE 1 Metaclasses whose names are italicized are abstract metaclasses.

NOTE 2 Metaclasses grey shaded are metaclasses that are defined in the other parts of ISO/IEC 19763.

Figure 3 — The Metamodel in the Core_Model package

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It comprises the following metaclasses:

— **Modelling_Language**;

— **Model**;

— **Model_Element**;

— **Annotating_Registered_Ontology_Atomic_Construct**.

The metaclasses that represent models in other parts of ISO/IEC 19763 will be subclasses of **Model** and the metaclasses representing the content of these models will be subclasses of **Model_Element**. Some of the metaclasses in other parts of ISO/IEC 19763 inherited from **Model** or **Model_Element** may override some attributes and/or references of the metaclasses defined in this part. The metaclasses that represent the language in which these models are expressed will be subclasses of **Modelling_Language**.

Each modelling language is a language or notation that is used to model concepts found in the other parts of the ISO/IEC 19763 family of standards.

NOTE 1 Examples are languages used to express ontologies and/or to model information requirements, processes, services, forms, roles, goals, or some other set of concepts that can be modelled.

Each model is a representation of concepts found in the other parts of the ISO/IEC 19763 family of standards.

NOTE 2 Examples are an ontology or a model used to represent a set of information requirements, processes, services, forms roles, goals, or some other set of concepts that can be represented in a model.

Each model element is an element or component in a model, such as a non-logical symbol in an ontology, an entity type in an information model, an event in a process model, a service operation in a service model, or an actor in a role and goal model.

Each model element is an element or component in a model, such as those found in the other parts of the ISO/IEC 19763 family of standards.

NOTE 3 Examples are non-logical symbol in an ontology, an entity type in an information model, an event in a process model, a service operation in a service model, a section or question on a form, or an actor in a role and goal model or other types found in ISO/IEC 19763 family of standards.

Each model shall be expressed in one or more modelling language. Each modelling language is used to describe zero, one, or more models.

Each model contains zero, one, or more model elements. Each model element is part of zero, one, or more models.

Each annotating registered ontology atomic construct annotates zero, one, or more models. Each model is annotated by zero, one, or more annotating registered ontology atomic constructs.

Each annotating registered ontology atomic construct annotates zero, one, or more model elements. Each model element is annotated by zero, one, or more annotating registered ontology atomic constructs.

The exact specification of each metaclass in the **Core_Model** package is given in Clause 7.

5.3 Overview of the Basic_Mapping_Model package

Figure 4 shows the metamodel in the **Basic_Mapping_Model** package.

It comprises the following metaclasses:

— **Model_Mapping**;

— **Model_Element_Set_Mapping**;

— **Model_Element_Set_Mapping_Type**;

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— **Model_Element_Set**.

Each model mapping is a mapping from one model to another model, one of which is the subject model and the other is the object model.

Each model element set is the means by which a set of model elements are grouped together for the purposes of mapping, with each set forming one half of a model element set mapping.

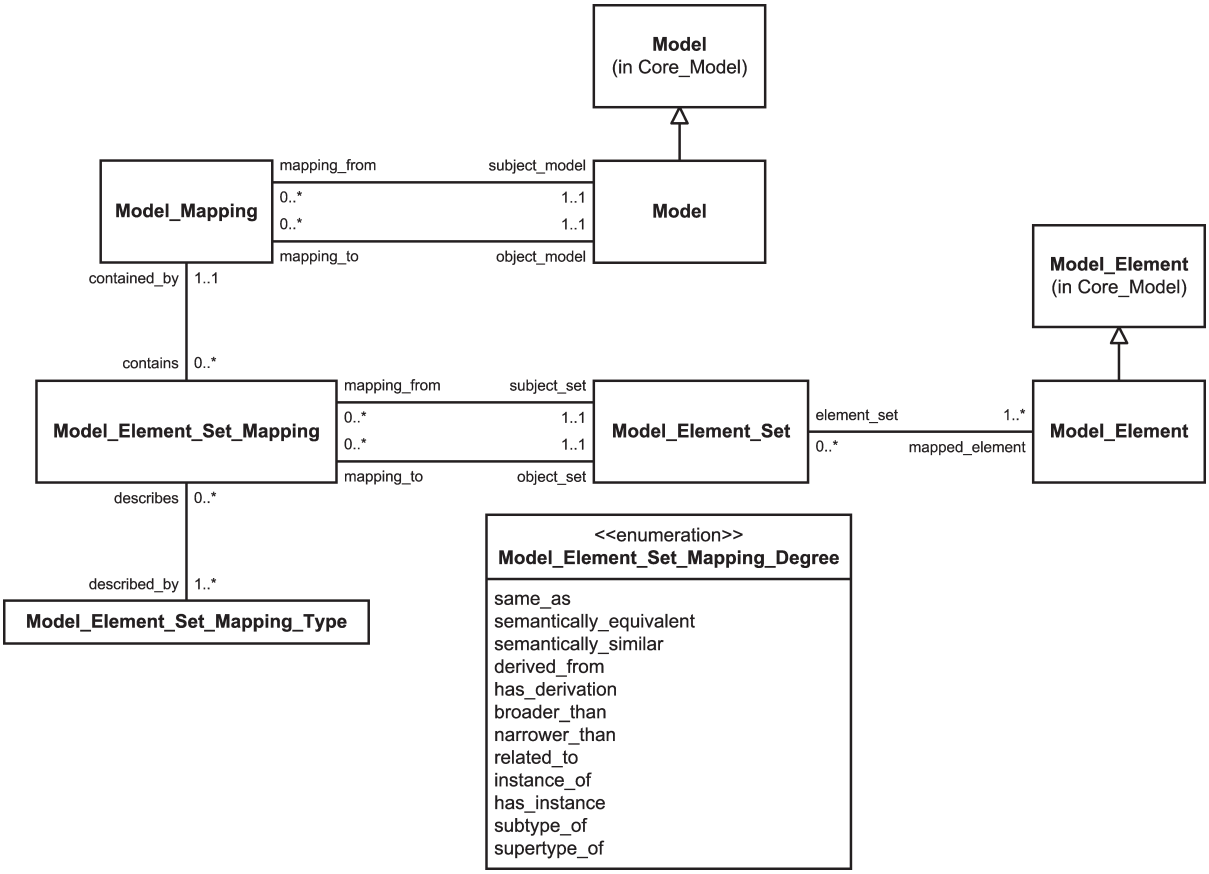

Figure 4 — The Metamodel in the Basic_Mapping_Model package

Each model element set mapping is part of a model mapping. Each model element set mapping comprises a set of model elements from the subject model and a set of elements from the object model that model similar real-world requirements. Each model element set mapping is subject to a model element set mapping degree.

Each model element set mapping type is a classification for a set of model element mappings.

Each model mapping shall be from one and only one model, which is the subject model. Each model is the subject of zero, one, or more model mappings.

Each model mapping shall be to one and only one model, which is the object model. Each model is the object of zero, one, or more model mappings.

Each model element set mapping shall be described by one and only one model element set mapping type. Each model element set mapping type is the description of zero, one, or more model element set mappings.

Each model element set mapping shall be from one and only one model element set, which is the subject model element set. Each model element set is the subject of zero, one, or more model element set mappings.

Each model element set mapping shall be to one and only one model element set, which is the object model element set. Each model element set is the object of zero, one, or more model element set mappings.

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