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Information technology — Metamodel framework for interoperability (MFI) —

Part 16: Metamodel for document model registration

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Foreword

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

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

A list of all parts in the ISO/IEC 19763 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

There is an increasing demand for systems to interoperate by exchanging information and data. These exchanges are sometimes performed using 'documents' such as XML documents and JSON documents. The business information requirements conveyed by these documents are often specified in supporting document models, for example, in XML schemas for XML documents and in JSON schemas for JSON documents.

The information contained in these models – the metadata – can be registered using the facilities specified by this document. Most of the metaclasses specified in this document are subclasses of the metaclasses specified in ISO/IEC 19763-10:2014, 7.1, 7.2 and 7.3.

Where there is an overlap of the universe of discourse of the business information requirements specified in the registered models, the mappings between registered models can then be registered using the facilities specified in ISO/IEC 19763-10:2014, Clause 8, thus enabling further interoperation.

A model registry, as specified using any of the metamodels described in ISO/IEC 19763, uses the common facilities specified in ISO/IEC 11179-3:2013, Clauses 6, 7 and 8. A model registry is, therefore, a part of a metadata registry.

Information technology — Metamodel framework for interoperability (MFI) —

Part 16: Metamodel for document model registration

1 Scope

The primary purpose of the ISO/IEC 19763 series is to specify a metamodel framework for interoperability. This document specifies a metamodel for registering document models (or schemata). Examples of such document models include:

— specifications for XML documents (using XML schema[3]);

— specifications for JSON documents (using JSON schema[2]).

This metamodel was developed taking into account the requirements for both XML schema and JSON schema, but is applicable to all current specifications for document models.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 19763-10:2014, *Information technology — Metamodel framework for interoperability (MFI) — Part 10: Core model and basic mapping*

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

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
document
unit of data that is well-formed according to some agreed specification

Note 1 to entry: In this document, examples of a unit of data that is referred to as a document include, but are not restricted to, XML documents and JSON documents.

[SOURCE: ISO/IEC TR 24716:2007, 4.4, modified — Note 1 has been added.]

3.1.2
document schema
formal specification of the structure of a *document* (3.1.1)

Note 1 to entry: The same schema can be used for multiple documents.

3.1.3
document schema language
language used to specify document schemata

3.1.4
namespace
set of character strings available for naming entities of specific classes within a specific scope

3.1.5
node
elements, comments, processing instructions, and text in a document

[SOURCE: ISO 24531:2013, 4.35 modified — The definition in the source document specifically referred to XML documents but is applicable to all documents; the references to XML and Note 1 have been removed.]

3.1.6
node enumeration
list of named values used as the range of a particular *node* (3.1.5)

3.2 Abbreviated terms

Abbreviated terms	Definition
JSON	JavaScript Object Notation
MFI Core and mapping	Metamodel Framework for Interoperability Core and mapping
MFI Document model registration [a]	Metamodel Framework for Interoperability document model registration
MDR Metamodel	Metadata registries metamodel
URL	Uniform Resource Locator
XML	eXtensible Markup Language

[a] Whenever this abbreviation is used, this document is referring to itself.

4 Conformance

4.1 General

Any claim of conformance to this document shall support the metamodel specified in Clause 5, depending on a degree of conformance as described below.

4.2 Degree of conformance

4.2.1 General

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

A strictly conforming implementation may be limited in usefulness but is maximally interoperable with respect to this document. A conforming implementation may be more useful but may be less interoperable with respect to this document.

4.2.2 Strictly conforming implementation

A strictly conforming implementation:

a) shall support the metamodel specified in Clause 5;

b) shall not use, test, access, or probe for any extension features nor extensions to the metamodel specified in Clause 5.

4.2.3 Conforming implementation

A conforming implementation:

a) shall support the metamodel specified in Clause 5;

b) as permitted by the implementation, may use, test, access, or probe for any extension features or extensions to the metamodel specified in Clause 5.

NOTE 1 All strictly conforming implementations are also conforming implementations.

NOTE 2 The use of extensions to the metamodel can cause undefined behaviour.

4.3 Implementation conformance statement (ICS)

Any claim of conformance to this document shall include an implementation conformance statement stating:

a) whether it is a strictly conforming implementation (4.2.2) or a conforming implementation (4.2.3);

b) what extensions, if any, are supported or used if it is a conforming implementation.

5 Structure of MFI Document model registration

5.1 Overview of MFI Document model registration

Figure 1 shows the metamodel for the registration of document models such as XML schemas and JSON schemas.

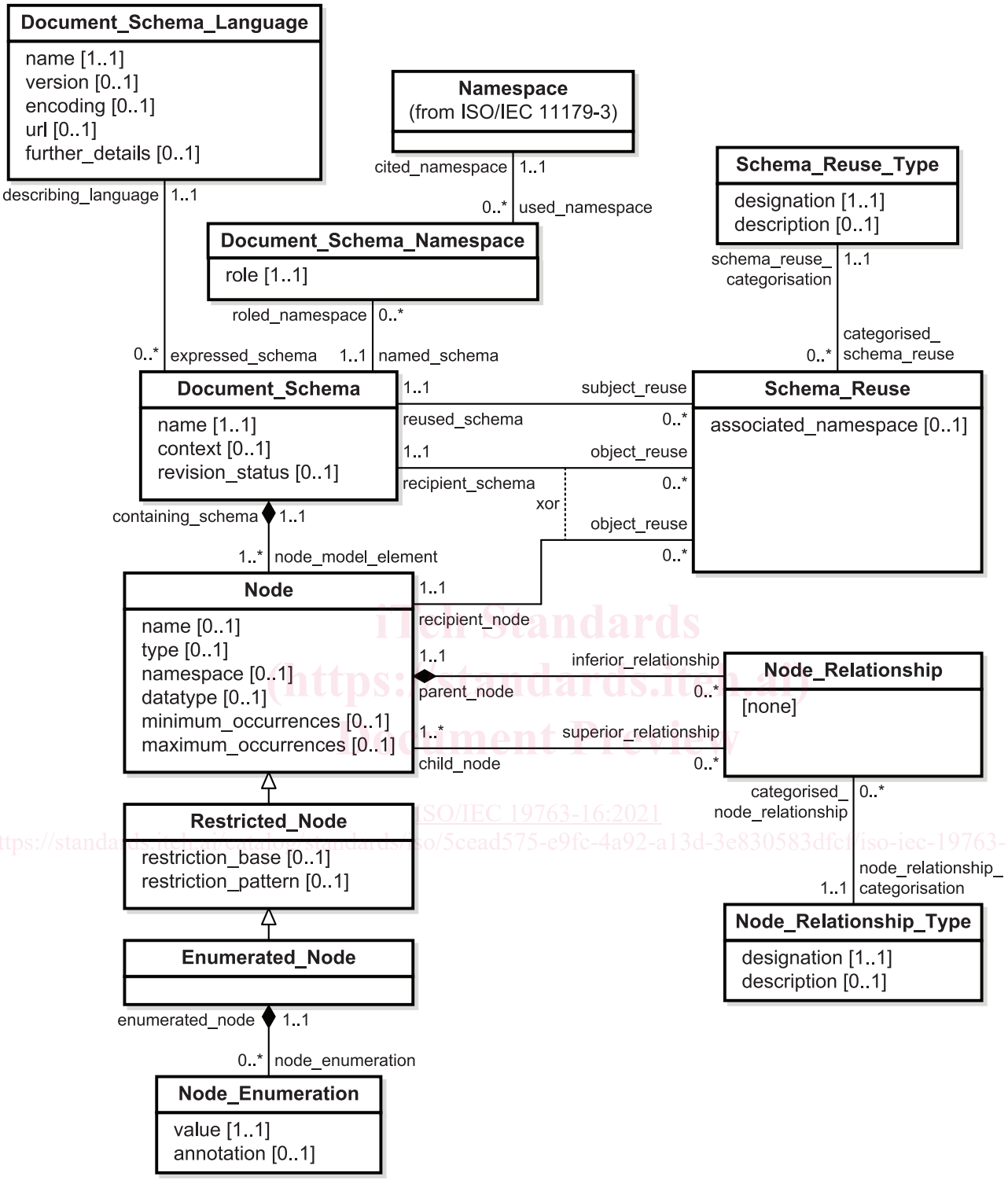


Figure 1 — Metamodel of MFI Document model registration

The metamodel for document model registration comprises the following metaclasses:

— **Document_Schema**

— **Document_Schema_Language**

— **Document_Schema_Namespace**

— **Enumerated_Node**, a subclass of **Restricted_Node**

— **Namespace** (which shall be in accordance with ISO/IEC 11179-3:2013, 7.2.2.3)

— **Node**

— **Node_Enumeration**

— **Node_Relationship**

— **Node_Relationship_Type**

— **Restricted_Node**, a subclass of **Node**

— **Schema_Reuse**

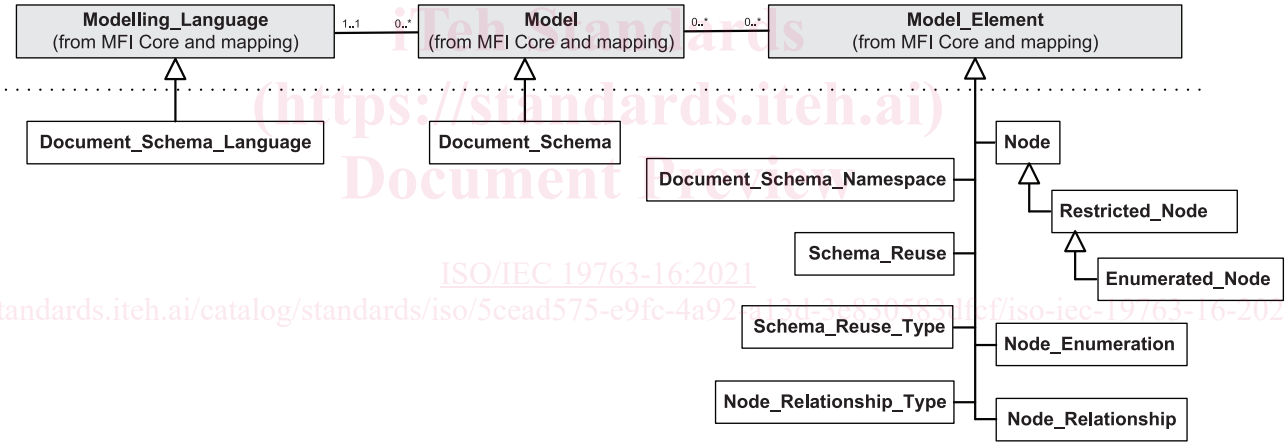
— **Schema_Reuse_Type**

The metamodel is described in detail in Annex A. Detailed specifications of the metaclasses are provided in 5.3.

Examples of the registration of document models using this metamodel are provided in Annex C.

5.2 Association between MFI Document model registration and MFI Core and mapping

The associations between the metaclasses specified in this document and the metaclasses in MFI Core and mapping (ISO/IEC 19763-10:2014, 7.1, 7.2 and 7.3) are shown in Figure 2.



Key

specialisation of metaclasses

Figure 2 — Associations between MFI Document model registration and MFI Core and mapping

Document_Schema_Language in this document is a specialisation of (or subclass of) Modelling_Language (in accordance with ISO/IEC 19763-10:2014, 7.1).

Document_Schema in this document is a specialisation of Model (in accordance with ISO/IEC 19763-10:2014, 7.2).

All the remaining metaclasses are specialisations of Model_Element (in accordance with ISO/IEC 19763-10:2014, 7.3).

The association between Document_Schema and Document_Schema_Language in this document is a specialisation of the association between Model (in accordance with ISO/IEC 19763-10:2014, 7.2) and Modelling_Language (in accordance with ISO/IEC 19763-10:2014, 7.1).

The association between Document_Schema and the remaining metaclasses specified in this document are specializations of the association between Model (in accordance with ISO/IEC 19763-10:2014, 7.2) and Model_Element (in accordance with ISO/IEC 19763-10:2014, 7.3).

MFI Core and mapping (ISO/IEC 19763-10:2014, Clause 9) explains that instances of the metaclasses specified in 5.3 can be extended by the types defined in ISO/IEC 11179-3:2013, Clauses 7 and 8. Annex B provides suggested type extension for each of the metaclasses specified in 5.3.

5.3 Metaclasses in MFI Document model registration

5.3.1 Document_Schema

Document_Schema is a metaclass each instance of which represents a representation of a particular document schema.

Superclass

Model (which shall be in accordance with ISO/IEC 19763-10:2014, 7.2)

Attribute	DataType	Multiplicity	Description
name	String	1..1	A statement specifying the name by which this document schema is known.
context	String	0..1	A statement describing the universe of discourse covered by this document schema.
revision_status	String	0..1	A statement describing revision or version status of this document schema.

Reference	Class	Multiplicity	Description	Inverse	Precedence
describing_language	Document_Schema_Language	1..1	The document schema language in which this schema is expressed.	expressed_schema	No
roled_namespace	Document_Schema_Namespace	0..*	The set of namespaces that are cited in this schema.	named_schema	Yes
node_model_element	Node	1..*	The set of nodes contained within this document schema.	containing_schema	Yes
subject_reuse	Schema_Reuse	0..*	The set of schema reuses that record that this schema is reused within another schema (the recipient schema) or as a node in another schema (the recipient node).	reused_schema	Yes
object_reuse	Schema_Reuse	0..*	The set of schema reuses that record that this schema reuses another schema (the reused schema).	recipient_schema	Yes

Constraints

[None]

5.3.2 Document_Schema_Language

Document_Schema_Language is a metaclass each instance of which represents a representation of a particular document schema language.

Superclass

Modelling_Language (which shall be in accordance with ISO/IEC 19763-10:2014, 7.1)

Attribute	DataType	Multiplicity	Description
name	String	1..1	A statement specifying the name by which this document schema language is known.
version	String	0..1	A statement specifying the version of this particular document schema language.
encoding	String	0..1	A statement specifying the encoding that is used within this particular document schema language.
url	String	0..1	A statement specifying the URL that may be used to access the specification of this particular document schema language.
further_details	String	0..1	A statement providing any necessary further details necessary to unambiguously specify this particular document schema language.

Reference	Class	Multiplicity	Description	Inverse	Precedence
expressed_schema	Document_Schema	0..*	The set of document schemas that are expressed in this language.	describing_language	Yes

Constraints

[None]

5.3.3 Document_Schema_Namespace

Document_Schema_Namespace is a metaclass each instance of which represents a representation of a particular namespace that is cited within a schema.

Superclass

Model_Element (which shall be in accordance with ISO/IEC 19763-10:2014, 7.3)

Attribute	DataType	Multiplicity	Description
role	String	1..1	A statement specifying the role that this particular namespace is playing within the related document schema. Examples are “Target”, “Prefix” and “Default”.

Reference	Class	Multiplicity	Description	Inverse	Precedence
cited_namespace	Namespace	1..1	The namespace cited for use with this role in the related document schema.	used_namespace	No
named_schema	Document_ Schema	1..1	The document schema for which this namespace is specified with this role.	roled_namespace	No

Constraints

[None]

5.3.4 Enumerated_Node

Enumerated_Node is a metaclass each instance of which represents a representation of a particular type of node within a schema, a restricted node for which there is a set of permitted values specified for the restricted node.

Superclass

Restricted_Node

Attribute	DataType	Multiplicity	Description
[None]			

Reference	Class	Multiplicity	Description	Inverse	Precedence
node_ enumeration	Node_ Enumeration	2..*	The set of valid values for this node.	enumerated_ node	Yes

Constraints

[None]

5.3.5 Namespace

Namespace is a metaclass defined in ISO/IEC 11179-3:2013, 7.2.2.3. It is shown here to indicate the additional reference required for this document.

Superclass

[None]

Attribute	DataType	Multiplicity	Description
[None]			

Reference	Class	Multiplicity	Description	Inverse	Precedence
used_namespace	Document_Schema_ Namespace	0..*	The set of document schema namespace within which this namespace is the cited namespace.	cited_namespace	Yes

Constraints

[None]

5.3.6 Node

Node is a metaclass each instance of which represents a representation of a particular node within a schema. Node has one subclass; Enumerated_Node.

Superclass

Model_Element (which shall be in accordance with ISO/IEC 19763-10:2014, 7.3)

Attribute	DataType	Multiplicity	Description
name	String	0..1	A statement specifying the name for this node.
type	String	0..1	A statement specifying the type of this node. Examples are “simple”, “complex”, “group”, “sequence”, “choice”, “element” and “attribute”.