INTERNATIONAL STANDARD

ISO/IEC 19763-5

First edition
2015-08-15

Information technology — Metamodel framework for interoperability (MFI) —

Part 5: Metamodel for process model registration

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

Partie 5: Métamodèle pour l'enregistrement du modèle de procédé

Reference number
ISO/IEC 19763-5:2015(E)

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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 19763-5 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 7: Metamodel for service model registration*

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

— *Part 9: On demand model selection [Technical Report]*

— *Part 10: Core model and basic mapping*

— *Part 12: Metamodel for information model registration*

— *Part 13: Metamodel for form design registration*

Introduction

Business process collaboration and integration is growing due to worldwide economic pressures to streamline product development and delivery, and reduce operational costs. Enterprises are merging and forming partnerships to address these issues. Providing for the registration of process models in a standard registry so that they can be discovered, understood and compared for use and integration, will help to promote interoperation within and across enterprises.

Business process modelling languages and notations are widely used to represent processes for different purposes. However, the differences in the syntax and semantics of process models hamper sharing and reusing them among enterprises. Therefore, it is necessary to provide a generic mechanism to support registration of administrative information and selected metadata about process models.

This part of ISO/IEC 19763 provides a metamodel to support the registration of selected metadata and semantics of process models for process discovery and reuse. It offers guidance which highlights the common semantics of process models, helps people clarify the structure of a process and the relationship between processes, and aids in discovering processes, regardless of the notation in which they were originally written. Any information related to the details of process modelling languages or the platform for process execution is not taken into account. In particular, although the registration information of process models can be used to support further discovery of web services in terms of the associations between process and web services, the process representing either the execution order within a web service or the orchestration of a set of web services is out of the scope of this part.

NOTE In this part, 'process' is meant to be 'business process', and 'process model' is meant to be 'business process model'.

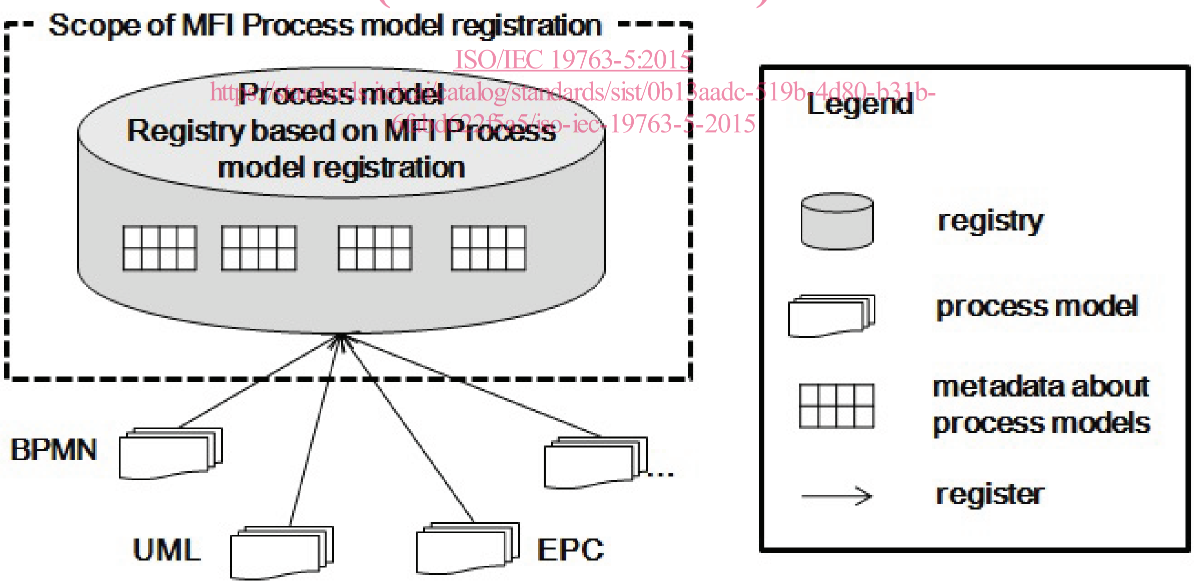
Information technology — Metamodel framework for interoperability (MFI) —

Part 5: Metamodel for process model registration

1 Scope

The primary purpose of the multipart standard ISO/IEC 19763 is to specify a metamodel framework for interoperability.

This part of ISO/IEC 19763 specifies the metamodel that describes a facility to register administrative information and selected metadata about process models. The metamodel specified in this part of ISO/IEC 19763 is intended to promote semantic discovery and reuse of process models within/across process model repositories. For this purpose, it provides selected metadata and common semantics of process models created with a specific process modelling language, including Business Process Model and Notation (BPMN)[1], UML (Unified Modelling Language) Activity Diagram[5] and EPC (Event-driven Process Chain)[7], etc. The metamodel can help discovery of the function and composition of a process, and promote reuse of its components at different levels of granularity. Figure 1 shows the scope of this part of ISO/IEC 19763.



NOTE Not every model needs to exist in a repository before registration.

Figure 1 — The scope of MFI Process model registration

The following are outside the scope of this part of ISO/IEC 19763:

— details related to modelling notations or descriptive languages of process models;

— runtime environments or implementation platforms for executing processes.

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 19763-1, *Information technology — Metamodel framework for interoperability (MFI) — Part 1: Framework*

ISO/IEC 19763-7, *Information technology — Metamodel framework for interoperability (MFI)— Part 7: Metamodel for service model registration*

ISO/IEC 19763-8, *Information technology — Metamodel framework for interoperability (MFI) — Part 8: Metamodel for role and goal model registration*

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

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 19763-7, ISO/IEC 19763-8 and ISO/IEC 19763-10, and the following apply.

3.1.1
activity
set of cohesive *tasks* (3.1.21)

[SOURCE: ISO/IEC 12207:2008, 4.3, modified]

3.1.2
control constraint
restriction on the execution order for a given collection of *processes* (3.1.12)

3.1.3
dependency
relationship between *process model elements* (3.1.14), that specifies the *control constraints* (3.1.2)

3.1.4
event
occurrence of a particular set of circumstances

3.1.5
exit condition
constraint that, if true, will cause an operation to terminate before its completion

Note 1 to entry: The operation can be a process or a service operation.

3.1.6
goal
intended outcome of user interaction with a *process* (3.1.12) or *service* (3.1.18)

[SOURCE: ISO/IEC 19763-8:—, 3.1.1]

3.1.7
guard condition
condition that must be satisfied before an associated *process* (3.1.12) can execute

3.1.8
involvement type
statement that indicates the type of involvement of a role with a *process* (3.1.12) or *service* (3.1.18)

EXAMPLE Performer, beneficiary, customer.

[SOURCE: ISO/IEC 19763-8:—, 3.1.4]

3.1.9
join dependency
kind of a dependency, specifying that the following *process model element* (3.1.14) will start when the selected preceding **process model element**s (3.1.14) are completed

3.1.10
postcondition
constraint that must be true at the completion of an operation

[SOURCE: ISO/IEC 14813-5:2010, B.1.116]

Note 1 to entry: The operation can be a process or a service operation.

3.1.11
precondition
constraint that must be true when an operation is invoked

[SOURCE: ISO/IEC 14813-5:2010, B.1.117]

Note 1 to entry: The operation can be a process or a service operation.

3.1.12
process
collection of related, structured *activities* (3.1.1) or *tasks* (3.1.21) that achieve a particular *goal* (3.1.16)

Note 1 to entry: The activities and tasks are represented by the Process metaclass in this part.

3.1.13
process model
representation of a *process* (3.1.12), using a specific *process modelling language* (3.1.15)

3.1.14
process model element
abstraction of the modelling constructs that constitutes a *process* (3.1.12), including *processes* (3.1.12) and *dependencies* (3.1.3) among them

3.1.15
process modelling language
special language used to represent *processes* (3.1.12)

Note 1 to entry: PSL, BPMN, UML Activities etc. are all process modelling languages.

Note 2 to entry: Special language [ISO 1087-1:2000, 3.1.3].

3.1.16
resource
asset that is utilized, created or consumed by a *process model element* (3.1.14)

Note 1 to entry: The resources can be either physical or virtual.

3.1.17
role
named specific behaviour of an entity participating in a particular context

[SOURCE: ISO/IEC 19763-8:—, 3.1.7]

3.1.18
service
kind of application which encapsulates one or more computing modules and can be accessed through a specified interface

[SOURCE: ISO/IEC 19763-7:—, 3.1.13]

3.1.19
sequence dependency
kind of control constraint between *processes* (3.1.12), specifying that the *processes* (3.1.12) are executed in order

3.1.20
split dependency
kind of control constraint between *process model elements* (3.1.14), specifying that if the preceding *process model element* (3.1.14) is completed, one or more of the following *process model elements* (3.1.14) will execute in parallel

3.1.21
task
specific piece of work to be done

[SOURCE: ISO 16091:2002, 3.1.25]

3.2 Abbreviated terms

BPMN	Business Process Model and Notation [SOURCE: OMG BPMN version 2, formal/2011-01-03]
EPC	Event-driven Process Chain
MFI	Metamodel framework for interoperability [SOURCE: ISO/IEC 19763-1:2007, 4.2]
MFI Core and mapping	ISO/IEC 19763-10, Information technology – Metamodel framework for interoperability (MFI) – Part 10: Core model and basic mapping
MFI Process model registration	ISO/IEC 19763-5, Information technology – Metamodel framework for interoperability (MFI) – Part 5: Metamodel for process model registration
MFI Role and Goal model registration	ISO/IEC 19763-8, Information technology – Metamodel framework for interoperability (MFI) – Part 8: Metamodel for role and goal model registration
MFI Service model registration	ISO/IEC 19763-7, Information technology – Metamodel framework for interoperability (MFI) – Part 7: Metamodel for service model registration
OWL-S	Web ontology language for service [7]
PSL	Process Specification Language [ISO/IEC 18629-1]
UML	Unified Modeling Language [ISO/IEC 19505-2]

4 Conformance

4.1 General

An implementation claiming conformance with this part of ISO/IEC 19763 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 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.

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 might cause undefined behaviour.

4.3 Implementation Conformance Statement (ICS)

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

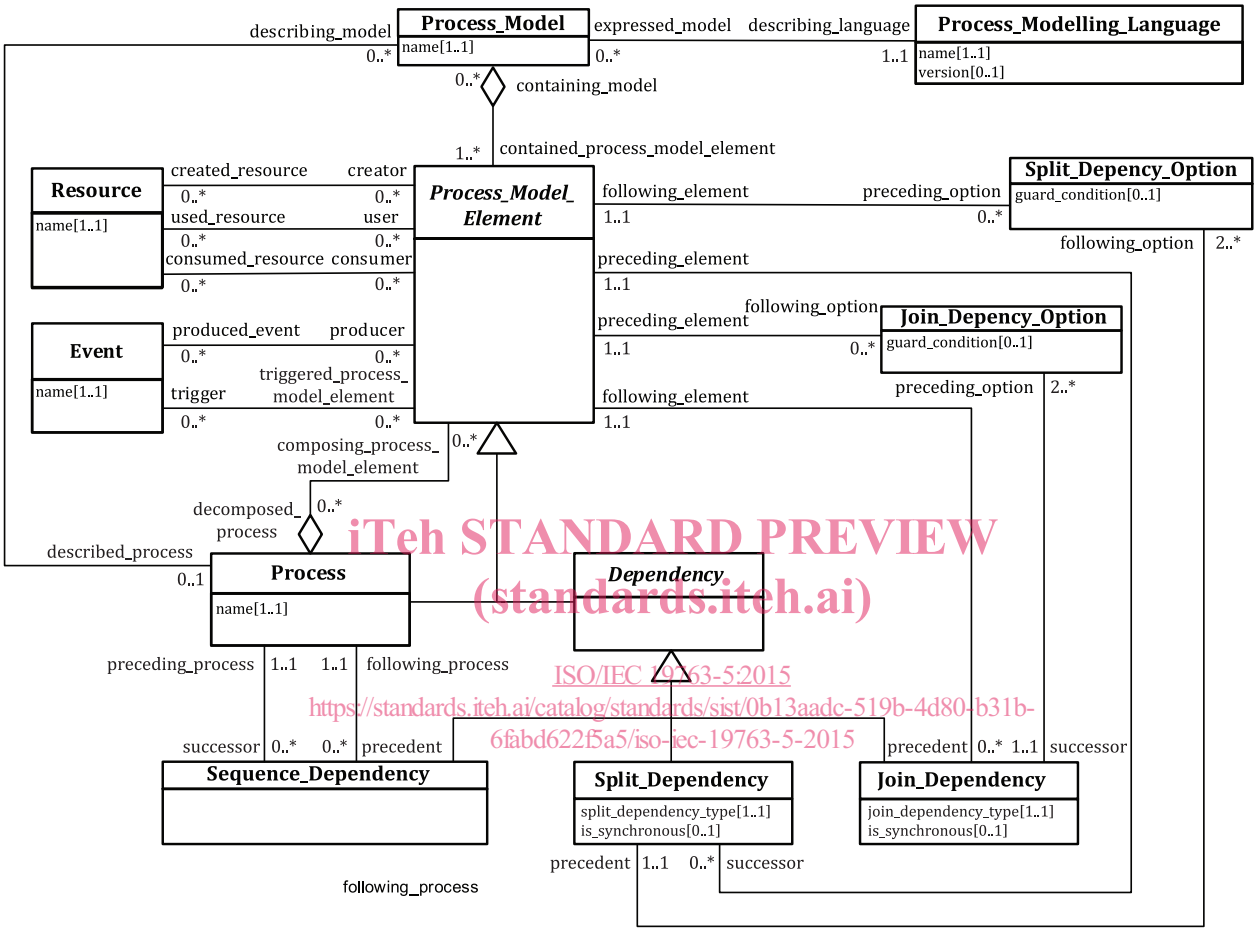
a) whether it is a strictly conforming implementation (see 4.2.2) or a conforming implementation (see 4.2.3);

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

5 Structure of MFI Process model registration

5.1 Overview of MFI Process model registration

MFI Process model registration provides a generic metamodel to register selected metadata about process models described by a specific modelling language. Figure 2 shows the metamodel for process model registration.



NOTE Metaclasses whose names are italicized are abstract metaclasses.

Figure 2 — The metamodel of MFI Process model registration

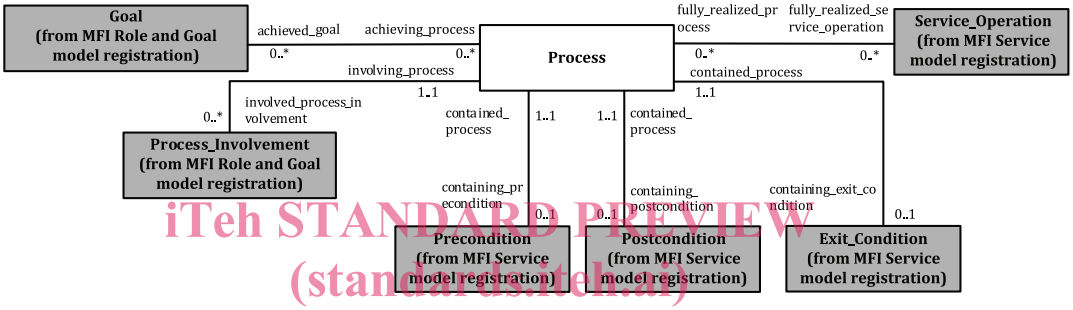
In this part, a process model is used as a representation of a process, and it describes the contained process model elements using a specified process modelling language. The process model elements include processes and dependencies between processes and/or other process model elements. For each process model element, there are some events that can be used to trigger a process model element or to be produced by a process model element. To achieve a particular goal, some resources are used, created or consumed by a process model element.

Dependencies represent the control constraints among processes represented by a process model. In this part, a dependency can be specialized as a sequence dependency, a split dependency, or a join dependency. A sequence dependency specifies that the processes are executed in order. A split dependency specifies that when the preceding process model element is completed, one or more of the following process model elements will execute in parallel. A join dependency specifies that the following process model element will start when the selected preceding process model elements are completed. In a split dependency, a split dependency type is used to specify a logical gate for the following processes. In a join dependency, similarly, a join dependency type is used to specify a logical gate for the preceding processes. In this part, the values of both a split dependency type and a join dependency type can be

XOR, OR and AND. For a split dependency type, XOR means that one and only one of the succeeding process model elements is allowed to execute, OR means that one or more of the succeeding process model elements are allowed to execute, and AND means that all of the succeeding process model elements must execute. For a join dependency type, XOR means that the succeeding process model element executes if one and only one of the preceding process model elements completes successfully, OR means that the succeeding process model element executes if one or more of the preceding process model elements completes successfully, and AND means that the succeeding process model element executes if, and only if, all of preceding process model elements completes successfully. In addition, a split dependency option represents the guard conditions of the following process model elements to be executed after the value of a split dependency type is decided. Similarly, a join dependency option specifies the guard conditions of the preceding process model elements to be executed after the value of a join dependency type is decided.

5.2 Associations between MFI Process model registration and other parts in MFI

Figure 3 shows the associations between MFI Process model registration, MFI Role and Goal model registration, and MFI Service model registration.



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

Figure 3 — The associations between MFI Process model registration, MFI Role and Goal model registration and MFI Service model registration

The association between MFI Process model registration and MFI Role and Goal model registration specifies that each process achieves zero, one or more goals, and each goal is achieved by zero, one or more processes. A goal may exist that is not specified to be achieved by a process, and a process may exist which is not applied to achieve a specific goal. Similarly, each process involves zero, one or more process involvements, where each process involvement is the involvement of a role with a process, such as actor or beneficiary. Each process involvement indicates that a role is involved in the execution of one and only one process. A process involvement shall have exactly one associated process.

The association between MFI Process model registration and MFI Service model registration specifies that each process is fully realized by zero, one or more service operations, and each service operation can fully realize zero, one or more processes. A process may exist that is not specified to be realized by a service, and a service may exist that is not applied to realize a process. Each process may have one precondition and/or one postcondition. A process may exist with no associated precondition or postcondition. Each process has zero or one exit condition to state a set of conditions that will exist to cause a process to terminate before its completion. Each precondition, each postcondition and each exit condition can be defined using either a composite expression or an atomic expression.

The associations between the metaclasses in MFI Process model registration and the metaclasses in MFI Core and mapping are shown in Figure 4.