INTERNATIONAL STANDARD

ISO/IEC 19763-7

First edition
2015-10-15

Information technology — Metamodel framework for interoperability (MFI) —

Part 7: Metamodel for service model registration

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

Partie 7: Métamodèle pour l'enregistrement du modèle de service

Reference number
ISO/IEC 19763-7:2015(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

Figures

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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

ISO/IEC 19763-7 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

With the rapid development of SOC (Service Oriented Computing), more and more computing resources are presented in the form of web services. Meanwhile, business integration based on web services is becoming a popular application development method. A web service is a kind of web based application which encapsulates one or more computing modules and is designed to support interoperable machine-to-machine interaction over a network.

In web service registration and management, ebXML RegRep is a standard defining the service interface, protocols and information model for an integrated registry and repository, which provides basic support for publishing and discovering web services within and across enterprises. Nevertheless, keyword matching is the basic service discovery method in ebXML RegRep, thus the discovery results will be inevitably inaccurate, and the discovery process will be time-consuming. When business information interchange and integration becomes increasingly frequent, major work in web service discovery should be processed by machines. It is, therefore, necessary to semantically describe service information, including functional and non-functional information, and provide corresponding registration and management mechanism.

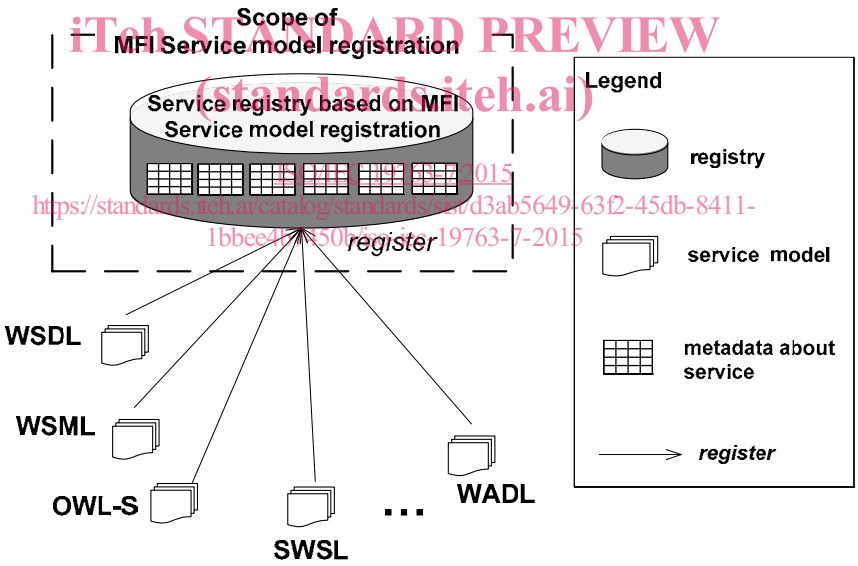
This part of ISO/IEC 19763 provides a framework for registering generic functional and non-functional information about web services.

Information technology — Metamodel framework for interoperability (MFI) — Part 7: Metamodel for service 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 a metamodel for registering models of services, facilitating interoperability through the reuse of services.

This part of ISO/IEC 19763 is only applicable to web services whose capabilities are described by some web service description language (see Annex A for examples of such languages). 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 — Scope of MFI Service model registration

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.

NOTE One or more terms and definitions of the referenced International Standards listed below are used in Clause 3 Terms and Definitions.

ISO/IEC 19763-5, Information technology – Metamodel framework for interoperability (MFI) – Part 5: Metamodel for process 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 following terms and definitions apply.

3.1.1
atomic expression
logical **expression** (3.1.5) that is not decomposed

3.1.2
composite expression
logical **expression** (3.1.5) that comprises multiple **atomic expression**s (3.1.1) and/or other **composite expression**s (3.1.2) by using connectives such as conjunction, disjunction and negation

3.1.3
entity service
web service (3.1.22) that bases its functional boundary on one or more related organization entities, such as customer, employee, invoice and claim

3.1.4
exit condition
constraint that, if true, will cause an operation to finish unsuccessfully

NOTE The operation can be a process or a service operation

3.1.5
expression
sentence which is expressed using a logical notation to specify either a condition that applies to a **service operation** (3.1.18) or a quality of **service** (3.1.17) that applies to a service

3.1.6
goal
intended outcome of user interaction with a **process** (3.1.13) or **service** (3.1.17)

[ISO/IEC 19763-8, 3.1.1]

3.1.7
input message
information contained in the message that a **service operation** (3.1.18) consumes for its execution

3.1.8
involvement type
statement that indicates the type of involvement of a **role**(3.1.16) with a **process** (3.1.13) or **service** (3.1.17)

NOTE Examples are performer, beneficiary, customer

[ISO/IEC 19763-8, 3.1.4]

3.1.9
message type
classification of the message or a set of messages that is/are consumed or generated during execution of a **service operation** (3.1.18)

3.1.10
output message
information contained in the message that the **service operation** (3.1.18) generates after its execution

3.1.11
postcondition
constraint that must be true at the completion of an operation

NOTE The operation can be a process or a service operation

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

3.1.12
precondition
constraint that must be true when an operation is invoked

NOTE The operation can be a process or a service operation

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

3.1.13
process
collection of related, structured activities or tasks that achieve a particular **goal** (3.1.6)

[ISO/IEC 19763-5, 3.1.12]

3.1.14
QoS assertion
specification of one or more **QoS type**s (3.1.15) for the **service** (3.1.17)

3.1.15
QoS type
specified non-functional property for a **service** (3.1.17), such as availability, response time, etc

3.1.16
role
named specific behaviour of an entity participating in a particular context

[ISO/IEC 19763-8, 3.1.7]

3.1.17
service
application which encapsulates one or more computing modules and can be accessed through a specified interface

3.1.18
service operation
execution action of a **service** (3.1.17)

3.1.19
task service
web service (3.1.22) with a functional boundary directly associated with a process model

3.1.20
user tag
tag annotated by an individual or organization in order to describe the **service** (3.1.17) according to the understanding of the creator of the tag

3.1.21
utility service
web service (3.1.22) that is dedicated to provide reusable, cross-cutting utility functionality, such as event logging, notification, and except handling

3.1.22
web service
service (3.1.17) that is designed to support interoperable machine-to-machine interaction over a network

3.2 Abbreviated terms

ebXML RegRep
ebXML Registry and Repository

[OASIS ebXML RegRep Version 4.0: 2012]

IRI
Internationalized Resource Identifier

[W3C RFC 3987: 2005]

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 Services

QoS
Quality of Service

SWRL
Semantic Web Rule Language

SWSL
Semantic Web Service Language

WADL
Web Application Description Language

WSDL
Web Service Description Language

WSML
Web Service Modelling Language

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 with this part of ISO/IEC 19763 shall include an Implementation Conformance Statement stating

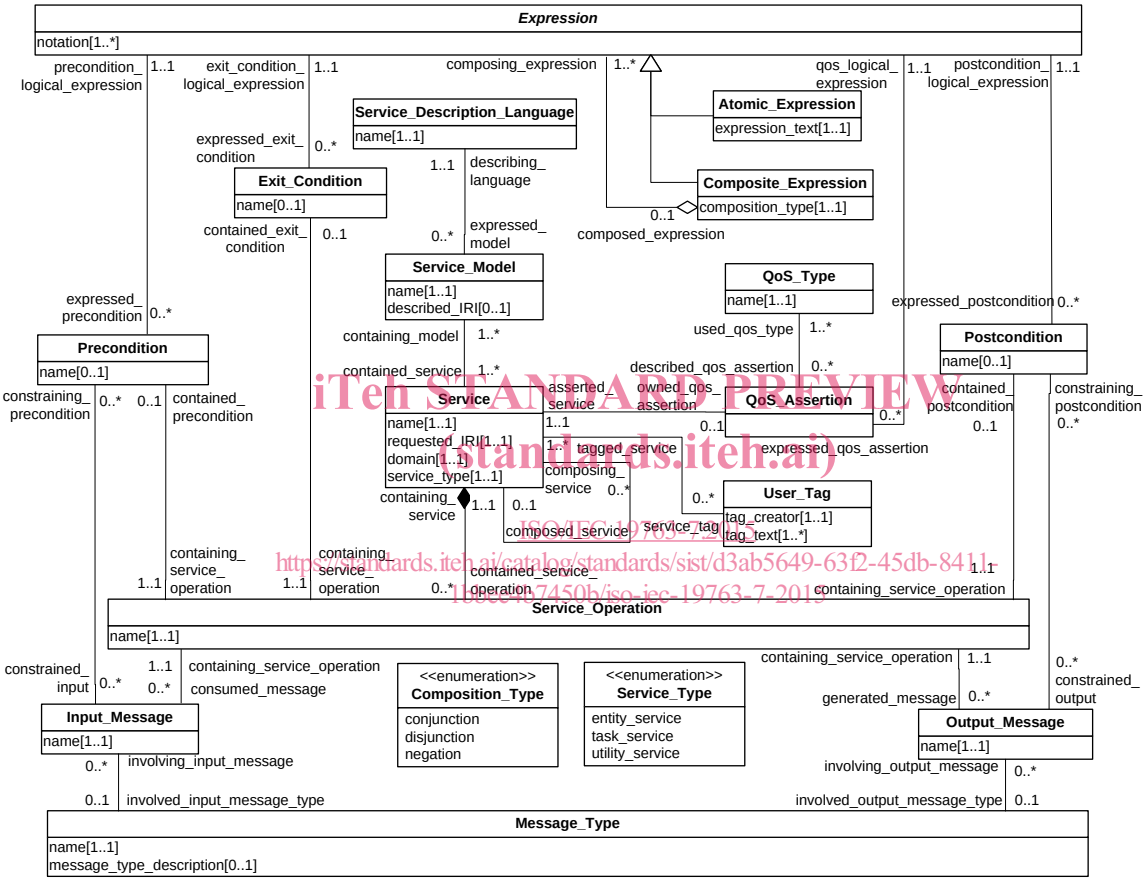
a) whether it is a strictly conforming implementation in clause 4.2.2 or a conforming implementation in clause 4.2.3;

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

5 MFI Service model registration

5.1 Overview of MFI Service model registration

This part of MFI specifies the metamodel that can be used to register functional and non-functional information about web services (hereafter referred to simply as “services”). Examples of some service description languages that can be registered using this metamodel are listed in Annex A.



NOTE Metaclasses whose names are italicized are abstract metaclasses

Figure 2 —Metamodel of MFI service model registration

Figure 2 shows the metamodel for the registration of services. This metamodel allows the registration of the common functional and non-functional features of services described using a number of service description languages. Each service model, expressed using a specific service description language, may describe one or more services. Each service is described by zero or one QoS assertion. This QoS assertion is used to represent the quantitative or qualitative non-functional features of the service, such as response time, cost, reliability, etc. Each QoS assertion is defined using one and only one expression, which may be a composite expression or an atomic expression. Each QoS assertion is of one or more QoS types.

A service is an independent and modular component and it can be accessed only by interfaces. For this reason the functional capability of a service is expressed using service operations, where each service operation denotes an execution action of the service. Each service is comprised of zero, one or more service operations. Each service operation is described with zero or one precondition, with zero or one post condition and with zero or one exit condition. A precondition specifies a constraint that must be true when a service operation is invoked. A postcondition specifies a constraint that must be true at the completion of a

service operation. An exit condition specifies a constraint that, if true, will cause an operation to finish unsuccessfully. Each precondition, each postcondition and each exit condition is defined using one and only one expression, which may be a composite expression or an atomic expression. Each service operation is also described with zero, one or more input messages and with zero, one or more output messages. Each input message specifies information that the operation needs for its execution. Each output message specifies information that the operation generates after its successful execution. Each message type provides a description of a message or a set of messages, where each of these messages is consumed or generated during execution of a service operation. Each input message is constrained by zero, one or more preconditions and each output message is constrained by zero, one or more post conditions. Each service can be annotated by zero, one or more user tags, each of which may be created by any person using the service.

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

Figure 3 shows the associations between MFI Service model registration (this part) and MFI Role and Goal model registration and MFI Process model registration.

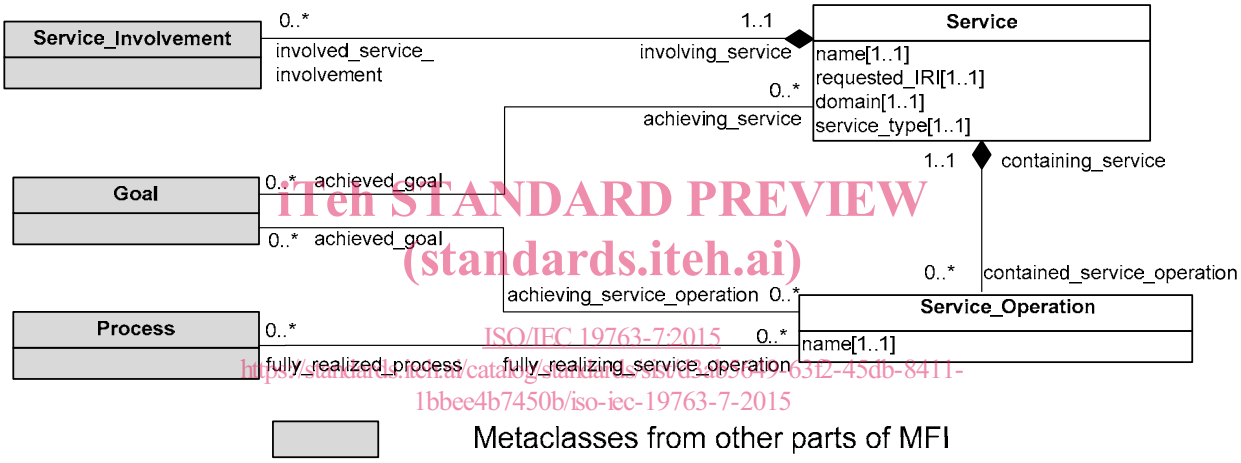


Figure 3 —The associations between MFI Service model registration and MFI Process model registration and MFI Role and Goal model registration

Each service achieves zero, one or more goals. Each goal is achieved by zero, one or more services. Each service operation achieves zero, one or more goals. Each goal is achieved by zero, one or more service operations. Each service operation can fully realize zero, one or more processes. Each process is fully realized by zero, one or more service operations. Each service involves zero, one or more service involvements, where each service involvement is the involvement of a role with a service, such as actor or beneficiary. Each service involvement indicates that a role is involved in the execution of one and only one service.

The association between the metaclasses in MFI Service model registration and the metaclasses in MFI Core and mapping is shown in Figure 4.