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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

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

This second edition cancels and replaces the first edition (ISO/IEC 19763-7:2015), which has been technically revised.

The main changes are as follows:

— Additional metaclasses and enumerated datatypes have been introduced in the metamodel of MFI service model registration to support registration of heterogeneous services using multiple protocols, including Invocation_Way, Message_Exchange_Pattern, Protocol, and Message_Data_Format.

— Additional metaclasses and enumerated datatypes have been introduced in the metamodel of MFI service model registration to support registration of service evolution, including Service_Evolution, Service_Change, Change_Type, and Change_Impact.

— Annex B has been updated, providing registration examples, including an OpenAPI service registration example and a PROTO service registration example.

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.

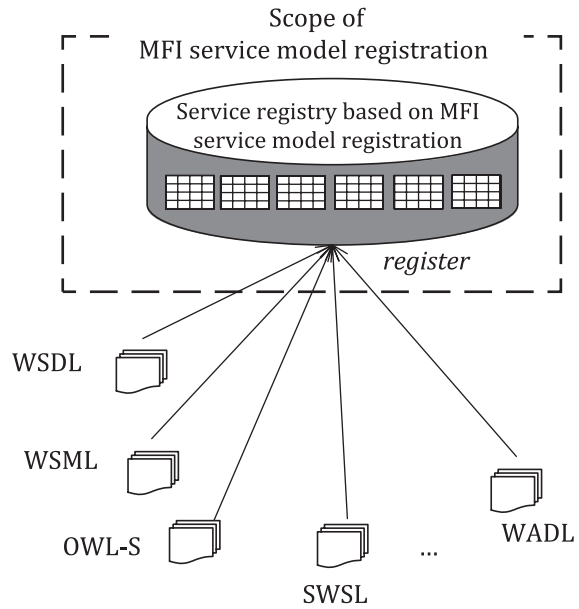
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Introduction

With the rapid development of Service Oriented Computing (SOC), 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 that 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 machine. This shift necessitates the semantic description of administrative and evolution-related metadata of services, along with the provision of corresponding registration and management mechanisms. Moreover, with the rapid growth of service networks and service ecosystems, where large numbers of heterogeneous services coexist and dynamically evolve, the demand for interoperability becomes increasingly critical. Services characterized by more diverse communication protocols, description languages, message exchange patterns, and data formats must be capable of sharing and interaction. To support this, service registration frameworks must be enhanced to ensure that services can be discovered, composed, and evolved within highly dynamic and diverse digital ecosystems.

This document intends to provide a generic framework for registering administrative and evolution information about web services in an explicit way. The relationship between MFI service model registration, the service registry, and service models expressed in different service description languages is illustrated in Figure 1.



Key

service model

metadata about service

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

Figure 1 — Scope of MFI Service model registration

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Information technology — Metamodel framework for interoperability (MFI) —

Part 7:
Metamodel for service 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 administrative and evolution information of models of services, facilitating interoperability through the reuse of services.

This document 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 document.

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

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 and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19763-3, ISO/IEC 19763-5, ISO/IEC 19763-8, ISO/IEC 19763-10 and the following 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
service
kind of application which encapsulates one or more computing modules and can be accessed through a specified interface

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3.2
service operation
execution action of a *service* (3.1)

3.3
expression
sentence which is expressed using a logical notation to specify either a condition that applies to a *service operation* (3.2) or a *QoS assertion* (3.13) that applies to a *service* (3.1)

3.4
atomic expression
logical *expression* (3.3) that has the unit granularity

3.5
composite expression
logical *expression* (3.3) that comprises multiple *atomic expressions* (3.4) and (or) other *composite expressions* (3.5) by using connectives such as conjunction, disjunction and negation

3.6
precondition
constraint that must be true when an operation is invoked

Note 1 to entry: The operation can be a process or *service operation* (3.2).

3.7
postcondition
constraint that must be true at the completion of an operation

Note 1 to entry: The operation can be a process or *service operation* (3.2).

3.8
exit condition
constraint that, if true, causes an operation to finish unsuccessfully

Note 1 to entry: The operation can be a process or *service operation* (3.2).

3.9
message type
type of the message or a set of messages that is (are) consumed or generated during the execution of a *service operation* (3.2)

3.10
input message
information contained in the message that the *service operation* (3.2) consumes for its execution

3.11
output message
information contained in the message that the *service operation* (3.2) generates after its execution

3.12
QoS type
specified non-functional property for a *service* (3.1), such as availability, response time, etc

3.13
QoS assertion
specification of one or more *QoS types* (3.12) for the *service* (3.1)

3.14
web service
kind of *service* (3.1) that is designed to support interoperable machine-to-machine interaction over a network

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3.15
entity service
web service (3.14) that bases its functional boundary on one or more related organization entities, such as customer, employee, invoice and claim

3.16
task service
web service (3.14) with a functional boundary directly associated with a process model

3.17
utility service
web service (3.14) that is dedicated to providing reusable, cross-cutting utility functionality, such as event logging, notification, and exception handling

3.18
service evolution
changes in the functional or non-functional properties of a *service* (3.1) that occur throughout the lifecycle of the *service* (3.1)

Note 1 to entry: Such changes include, but are not limited to, modifications to its computing modules, interfaces, communication protocols, message exchange patterns, or data formats.

3.19
user tag
tag annotated by an individual or organization in order to describe the *service* (3.1) according to the understanding of the creator of the tag

4 Abbreviated terms

ebXML RegRep	ebXML Registry and Repository
GraphQL	Graph Query Language
gRPC	Google Remote Procedure Call
IRI	Internationalized Resource Identifier
MFI Core and mapping	Core model and basic mapping (see ISO/IEC 19763-10)
MFI Process model registration	Metamodel for process model registration (see ISO/IEC 19763-5)
MFI Role and Goal model registration	Metamodel for role and goal model registration (see ISO/IEC 19763-8)
MFI Service model registration	Metamodel for service model registration (see ISO/IEC 19763-7)
OWL-S	Web Ontology Language for Services
QoS	Quality of Service
REST	Representational State Transfer
SOAP	Simple Object Access Protocol
SWRL	Semantic Web Rule Language
SWSL	Semantic Web Service Language

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