Information technology — Metamodel Framework for Interoperability (MFI) — Part 8  Metamodel for role and goal registration

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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.

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ISO/IEC 19763-8 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: Reference model
- Part 2: Core model
- Part 3: Metamodel for ontology registration
- Part 4: Metamodel for model mapping
- Part 5: Metamodel for process model registration
- Part 6: Registration Process
- Part 7: Metamodel for service registration
- Part 8: Metamodel for role and goal registration
- Part 9: Registry of Registries
- TR: Using RGPS for on demand model selection
Introduction

Due to the spread of e-Business and e-Commerce over the Internet, the effective interchange of business transactions or other related information across countries and cultures is an important concern for people in both the IT industry and other non-IT industries.

To follow the current trends of EB or EC, industrial consortia have engaged in the standardization of domain-specific objects including business process models and software components using common modeling facilities and interchange facilities such as UML and XML. They are very active in standardizing domain-specific business process models and standard modeling constructs such as data elements, entity profiles, and value domains.

Moreover, interoperation among autonomous Web-based applications, such as Web services, business processes, is becoming important. Business goals provide a method that describes business processes in a higher abstraction level. Effective managing goals will be helpful for reusing information resources such as business processes in a larger granularity. A goal is a descriptive statement of business intent of a user or an organization, and it can be viewed as an objective that the business system under consideration should achieve. Roles are abstract characterizations of organizational behaviours and responsibilities within specified organizational context. Description of roles will be helpful in characterizing goals in a more complete and correct way.

User-centric mechanism, that is providing personalized services for users, is becoming a kind of urgent requirements in IT industry. In goal description, OMG’s Business Motivation Model (BMM) provides a characterization mechanism of business intent and motivation. However, BMM is absent in directly relating business plan with business implementation, and the relationships among goals described in BMM are insufficient for complex goal decomposition, reasoning and reusing.

This part of ISO/IEC 19763 intends to provide a generic framework for registering descriptive information of roles and goals.
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 users’ roles and goals in specific domains that can be used to describe users’ intention.

The metamodel that this part specifies is intended to promote the reuse of domain information resources with greater granularity.

It does not specify the business model for the elements of business plans, which is the focus of BMM.

2 Conformance

2.1 General

An implementation claiming conformance with this part of ISO/IEC 19763 shall support the metamodel specified in 5.1, depending on a degree of conformance as described below.

2.2 Degree of conformance

2.2.1 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.

2.2.2 Strictly conforming implementation

A strictly conforming implementation

a) shall support the metamodel specified in 5.1;

b) shall not support any extensions to the metamodel specified in 5.1.

2.2.3 Conforming implementation

A conforming implementation
a) shall support the metamodel specified in 5.1;

b) may support extensions to the metamodel specified in 5.1 that are consistent with the metamodel specified in 5.1.

2.3 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 or a conforming implementation (2.2);

b) what extensions are supported if it is a conforming implementation.

3 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: Reference model

ISO/IEC 19763-2, Information technology – Metamodel framework for interoperability (MFI) – Part 2: Core model

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

4 Terms, definitions and abbreviated terms

4.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19763-1, ISO/IEC 19763-2 and ISO/IEC 19763-3 and the following apply.

4.2 Broad terms

4.2.1 Goal
a descriptive statement of business intent of a users or an organization.

4.2.2 Role
abstract characterizations of organizational behaviours and responsibilities within specified organizational context.

4.3 Abbreviated terms

BMM
Business Motivation Model
MFI Core

MFI Role and Goal registration
ISO/IEC 19763-8, Information technology – Metamodel framework for interoperability (MFI) – Part 8: Metamodel for role and goal registration

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

5 Structure of MFI role and goal registration

5.1 Overview of MFI role goal registration

A Role can be played by different Actors. An Actor is an intentional entity that can be either a human actor or a software agent. In an organizational context, Role_Goals are the goals that a role is in charge of. Actors also have their personal preferences, and these personal preferences are modelled as Personal_Goals.

A goal consists of three parts, that is, a verb that indicates the Operation, a noun that indicates the Object dealt with by the operation, and the Manner, a prefix or a suffix that indicates how the operation affects the object. Each operation has its Operation_Type, which should come from verb concepts of domain ontology. Similarly, each object has its Object_Type, which should come from noun concepts of domain ontology.

Usually, a Goal is a high-level statement when first proposed, and it needs to be decomposed in order to get a concrete and operational description. Decomposition is a process that an Upper_Goal is decomposed into sub-goals. Operational_Goals are a kind of goals that certain processes can directly achieve. The goal decomposition process ends until the leaf-level subgoals are operational goals. The decomposition relations that characterize the relation between the upper goal and the lower goal set can be divided into Mandatory, Optional, Alternative and OR relations. When the upper goal is selected, the Mandatory relation indicates that the lower goal set must also be selected; the Optional relation indicates that the lower goal set may be or not be selected; the Alternative relation indicates that exactly one goal from the lower goal set must be selected; the OR relation indicates that at least one goal from the lower goal set must be selected.

In addition, the Constraint relation may exist among goals, and the Constraint relations can be either Depend or Exclude relations. The Depend relation means that the realization of a goal depends on the realization of others, and the Exclude relation means that the two goals can’t be satisfied simultaneously.
5.2 Relationship between MFI role and goal registration and other parts in MFI

Figure 3 shows the relationship between MFI role and goal registration and other parts in MFI. That is, Goal will inherit ModelComponent, Object_Type and Operation_Type will inherit Ontology_Atomic_Construct in MFI ontology registration.
5.3 MFI role and goal registration

5.3.1 Goal

**Goal** is a metaclass representing the business intent of a users or an organization.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>DataType</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>1..1</td>
<td>Name of the corresponding goal</td>
</tr>
<tr>
<td>URI</td>
<td>String</td>
<td>1..1</td>
<td>URI where the corresponding goal exists</td>
</tr>
</tbody>
</table>

**Reference Class**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hasOperation</td>
<td>Operation</td>
<td>1..1</td>
<td>Operation that denotes the action that a goal has</td>
</tr>
<tr>
<td>hasObject</td>
<td>Object</td>
<td>1..1</td>
<td>Object that denotes the objects dealt by the goal</td>
</tr>
<tr>
<td>hasManner</td>
<td>Manner</td>
<td>0..1</td>
<td>Manner that indicates how the operation affects the object</td>
</tr>
</tbody>
</table>

**isUpperOf** Decomposition 0..1 Decomposition that the corresponding goal is its upper end

**isLowerOf** Decomposition 0..* Decomposition that the corresponding goal is its lower end

**isSourceOf** Constraint 0..* Constraint that the corresponding goal is its source end

**isTargetOf** Constraint 0..* Constraint that the corresponding goal is its target end

**Constraints**

The value of attribute “URI” has to be unique in this metaclass.

5.3.2 Constraint

**Constraint** is an abstract metaclass that is a superClass of Depend and Exclude.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source</td>
<td>Goal</td>
<td>1..1</td>
<td>The goal that is the source end of the constraint relation</td>
</tr>
<tr>
<td>target</td>
<td>Goal</td>
<td>1..1</td>
<td>The goal that is the target end of the constraint relation</td>
</tr>
</tbody>
</table>

5.3.3 Depend

**Depend** is a metaclass that denotes the dependency relation of two goals

**SuperClass**

Constraint
5.3.4 Exclude

Exclude is a metaclass that denotes the exclusive relation of two goals.

SuperClass
Constraint

5.3.5 Decomposition

Decomposition is an abstract metaclass that is a superClass of Mandatory, Optional, Alternative, and OR. It describes the decomposition relationship between a goal and a goal set.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>upper</td>
<td>Goal</td>
<td>1..1</td>
<td>The goal that is the upper end of the decomposition relation</td>
</tr>
<tr>
<td>lower</td>
<td>Goal</td>
<td>0..*</td>
<td>The goal that is the lower end of the decomposition relation</td>
</tr>
</tbody>
</table>

5.3.6 Mandatory

Mandatory is a metaclass that describes a kind of decomposition relationship. It indicates that when the upper goal is selected, the lower goal set must also be selected.

SuperClass
Decomposition

5.3.7 Optional

Optional is a metaclass that describes a kind of decomposition relationship. It indicates that when the upper goal is selected, the lower goal set may be or not selected.

SuperClass
Decomposition

5.3.8 Alternative

Alternative is a metaclass that describes a kind of decomposition relationship. It indicates that when the upper goal is selected, exactly one goal from the lower goal set must be selected.

SuperClass
Decomposition
5.3.9 OR

OR is a metaclass that describes a kind of decomposition relationship. It indicates that when the upper goal is selected, at least one goal from the lower goal set must be selected.

**SuperClass**
Decomposition

5.3.10 Operation

Operation is a metaclass that denotes the action that a goal has.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>DataType</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>1..1</td>
<td>Name of the corresponding goal</td>
</tr>
</tbody>
</table>

**Reference**

<table>
<thead>
<tr>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hasOperationType</td>
<td>1..1</td>
<td>The type of operations, which should come from verb concepts of domain ontology</td>
</tr>
<tr>
<td>isOperationOf</td>
<td>0..*</td>
<td>That goal that has this operation</td>
</tr>
</tbody>
</table>

**Constraints**
The value of attribute “name” has to be unique in this metaclass.

5.3.11 Object

Object is an abstract metaclass that denotes the objects dealt by the goal.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>DataType</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>1..1</td>
<td>Name of the corresponding object</td>
</tr>
</tbody>
</table>

**Reference**

<table>
<thead>
<tr>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hasObjectType</td>
<td>1..1</td>
<td>The range of the object, which should come from noun concepts of domain ontology</td>
</tr>
<tr>
<td>isObjectOf</td>
<td>0..*</td>
<td>That goal that has this object</td>
</tr>
</tbody>
</table>

**Constraints**
The value of attribute “name” has to be unique in this metaclass.
5.3.12 Manner

Manner is a metaclass that indicates how the operation affects the object.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>DataType</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>1..1</td>
<td>Name of the corresponding object</td>
</tr>
</tbody>
</table>

Reference

<table>
<thead>
<tr>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hasObjectType</td>
<td>1..1</td>
<td>The range of the object, which should come from noun concepts of domain ontology</td>
</tr>
</tbody>
</table>

isMannerOf

| Goal      | 0..*         | That goal that has this manner                                             |

Constraints

The value of attribute “name” has to be unique in this metaclass.

5.3.13 Operation_Type

Operation_Type is a metaclass that denotes the type of operations, which should come from verb concepts of domain ontology.

Reference

<table>
<thead>
<tr>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>isTypeOf</td>
<td>1..*</td>
<td>The operation that has this corresponding Operation_Type</td>
</tr>
</tbody>
</table>

5.3.14 Object_Type

Object_Type is a metaclass that denotes the type of objects, which should come from noun concepts of domain ontology.

Reference

<table>
<thead>
<tr>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>isTypeOf</td>
<td>1..*</td>
<td>The object that has this corresponding Object_Type</td>
</tr>
</tbody>
</table>

5.3.15 Upper_Goal

Operational_Goal is a metaclass that denotes a kind of goals that can be the upper end of decomposition.

SuperClass

Goal
5.3.16 **Operational Goal**

Operational Goal is a metaclass that denotes a kind of goals that certain processes can directly achieve.

**SuperClass**
Goal

**Constraints**
An Operational goal cannot be the upper end of decomposition.

5.3.17 **Role**

Role is a metaclass that denotes abstract characterizations of organizational behaviours and responsibilities within specified organizational context.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>DataType</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>1..1</td>
<td>Name of the corresponding role</td>
</tr>
</tbody>
</table>

Reference Class Multiplicity Description
playedBy    Class    Multiplicity   Description
Actor   1..* The actors who play the role

takesCharge Class Multiplicity Description
Role_Goal  1..* The role_goal that owned by the role

The value of attribute "name" has to be unique in this metaclass.

5.3.18 **Actor**

Actor is a metaclass that denotes an intentional entity.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>DataType</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>1..1</td>
<td>Name of the corresponding actor</td>
</tr>
</tbody>
</table>

Reference Class Multiplicity Description
plays    Class    Multiplicity   Description
Role   0..* The roles that the actor can play

prefers Class Multiplicity Description
Personal_Goal  0..* The personal_goal that owned by the actor

The value of attribute "name" has to be unique in this metaclass.

5.3.19 **Role_Goal**

Role_Goal is a metaclass that denotes the goals that a role is in charge of.

**SuperClass**
Goal

Reference Class Multiplicity Description
takenChargeBy    Class    Multiplicity   Description
Role   1..1 The role who is in charge of the role_goal
5.3.20 Personal_Goal

Personal_Goal is a metaclass that denotes the goals that an actor prefers.

**SuperClass**
Goal

<table>
<thead>
<tr>
<th>Reference</th>
<th>Class</th>
<th>Multiplicity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PerferredBy</td>
<td>Actor</td>
<td>1..*</td>
<td>The actor who prefers the personal_goal</td>
</tr>
</tbody>
</table>