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Information technology — Metamodel framework for interoperability (MFI) —

Part 8: Metamodel for role and goal model registration

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

Partie 8: Métamodèle pour l'enregistrement du modèle de rôle et objectif

Reference number
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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.

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).

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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 19763-8 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: 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

Industrial consortia have engaged in the standardization of domain-specific objects including business process models and software components using common modelling facilities and interchange facilities such as UML (Unified Modelling Language) and XML (eXtensible Markup Language). They are very active in standardizing domain-specific business process models and standard modelling constructs such as data elements, entity profiles, and value domains.

Interoperation among autonomous Web-based applications, such as Web services, is becoming increasingly important. Goals are descriptive statements of the intent of a user or organization, and each goal can be viewed as an objective that a process or a service should achieve. Effective management of goals will facilitate the reuse of information resources in support of those goals. Roles are abstract characterizations of organizational behaviours and responsibilities within a specified organizational context. Descriptions of roles will be helpful in characterizing goals in a complete and correct way, and reusing goals based on roles. Note that any particular set of roles and goals are owned by a specific organization.

There are many existing standards and specifications, typically developed for a specific domain or business area, that can be used to describe or to model goals and the roles associated with these goals. One example is ISO/IEC 14662, Information Technologies - Open-edi reference model, which is a domain specific reference model and introduces the concept of a business goal as a special type of goal that is shared within that community.

This part of ISO/IEC 19763 provides a framework for registering generic descriptive information about models that describe roles and goals.

Information technology — Metamodel framework for interoperability (MFI) —

Part 8:
Metamodel for role and goal 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 the role and goal models of users of services and/or processes.

The metamodel that this part specifies is intended to promote the reuse of goals by roles within/across role and goal model repositories, and further promote services selection across service model repositories based on goals. For this purpose, it provides administrative information and common semantics of role and goal models created with a specific role and goal modelling language, including Goal-oriented requirements modelling (i*) [1], Keep All Objects Satisfied (KAOS) [2], Non-functional Requirement Framework (NFRF) [3], Business Motivation Model (BMM) [4], Reference Model of Open Distributed Processing (RM-ODP) [5] etc. Figure 1 shows the scope of this part. In this figure, "register" refers to the registration activity of registering administrative and descriptive information for role and goal models into the role and goal model registry based on the metamodel specified in this part of ISO/IEC 19763, as well as the mapping between source role and goal metamodels and MFI Role and Goal metamodel.

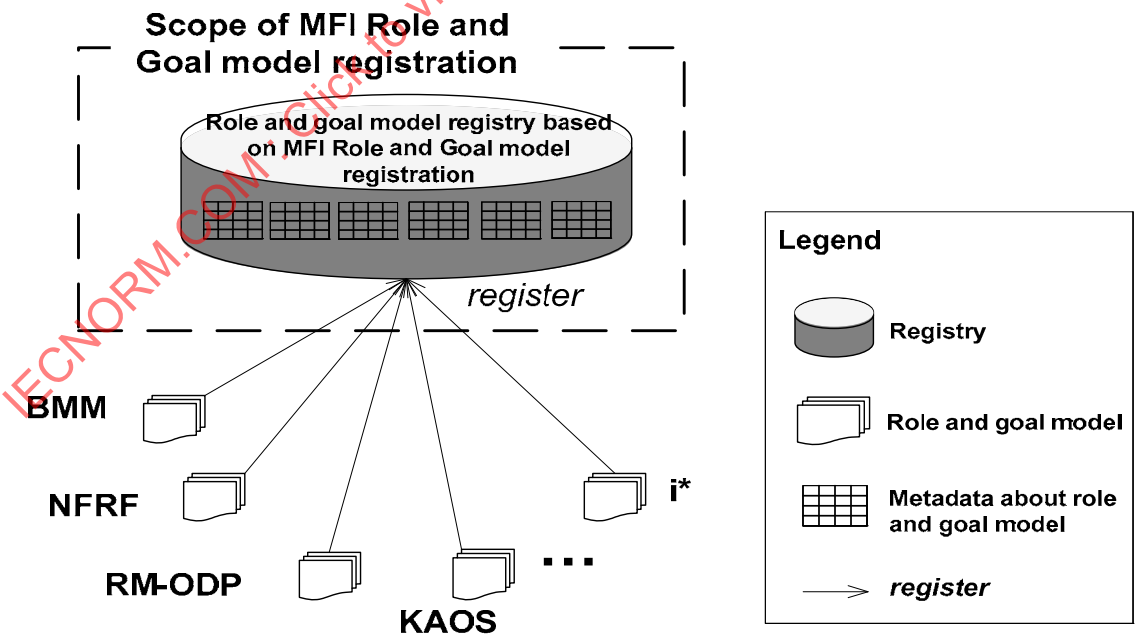


Figure 1 - The scope of MFI Role and Goal model registration

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 19763-7, Information technology – Metamodel framework for interoperability (MFI) – Part 7: Metamodel for service 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
goal
intended outcome of user interaction with a process or service

NOTE Adapted from ISO/IEC TR 25060:2010, 2.7

3.1.2
functional goal
underlying functionality that a process or service is expected to deliver

3.1.3
nonfunctional goal
expected quantitative or qualitative attributes of a functionality

3.1.4
involvement type
statement that indicates the type of involvement of a role with a process or service

NOTE Examples are performer, beneficiary, customer

3.1.5
organization
unique framework of authority within which individuals act, or are designated to act, towards some purpose

NOTE 1 The kinds of organizations covered by ISO/IEC 6523-1 include the following examples:

a) an organization incorporated under law;

b) an unincorporated organization or activity providing goods and/or services including:

1) partnerships;

2) social or other non-profit organizations or similar bodies in which ownership or control is vested in a group of individuals;

3) sole proprietorships;

4) governmental bodies.

c) groupings of the above types of organizations where there is a need to identify these in information interchange.

NOTE 2 Adapted from ISO/IEC 6523-1:1998, 3.1

[ISO/IEC 11179-3:2013 3.2.90]

3.1.6
process involvement
statement that specifies how a particular role is engaged in or contributes in a particular process

3.1.7
role
named specific behaviour of an entity participating in a particular context

[ISO 14813-5:2010, B.1.133]

3.1.8
service involvement
statement that specifies how a particular role is involved in a particular service

3.2 Abbreviated terms

BMM
Business Motivation Model

i*
Goal-oriented requirements modelling

KAOS
Keep All Objects Satisfied

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

NFRF
Non-functional Requirement Framework

RM-ODP
Reference Model of Open Distributed Processing

UML
Unified Modeling Language

XML
eXtensible Markup 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 5.3;

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 5.3;

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 (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 Role and Goal model registration

5.1 Overview of MFI Role and Goal model registration

A role and goal model is used as a representation of roles and goals. A role and goal model is expressed using a specified role and goal modelling language. A role is a named specific behaviour of an entity participating in a particular context. An organization may consist of one or more roles. In an organizational context, a role sets zero, one or more goals. A goal can be either a functional goal or a nonfunctional goal. A functional goal is described by three attributes: each functional goal must have a goal operation that denotes the action of the goal; each functional goal must have a goal object that denotes the entities affected by the goal operation; and each functional goal may have a goal manner that indicates how the goal operation affects the goal object. A nonfunctional goal specifies an expected quantity or quality attribute such as amount, security, safety, performance, usability or flexibility.

When first proposed, a goal is usually a high-level goal. This then needs to be decomposed in order to obtain a more concrete, operational description of the goal. Each decomposition relates together the decomposed goal (the upper goal) and the associated sub-goals (the lower goals). Each decomposition must be described by a decomposition type, which takes a value selected from 'AND', 'OR', or 'XOR', as follows:

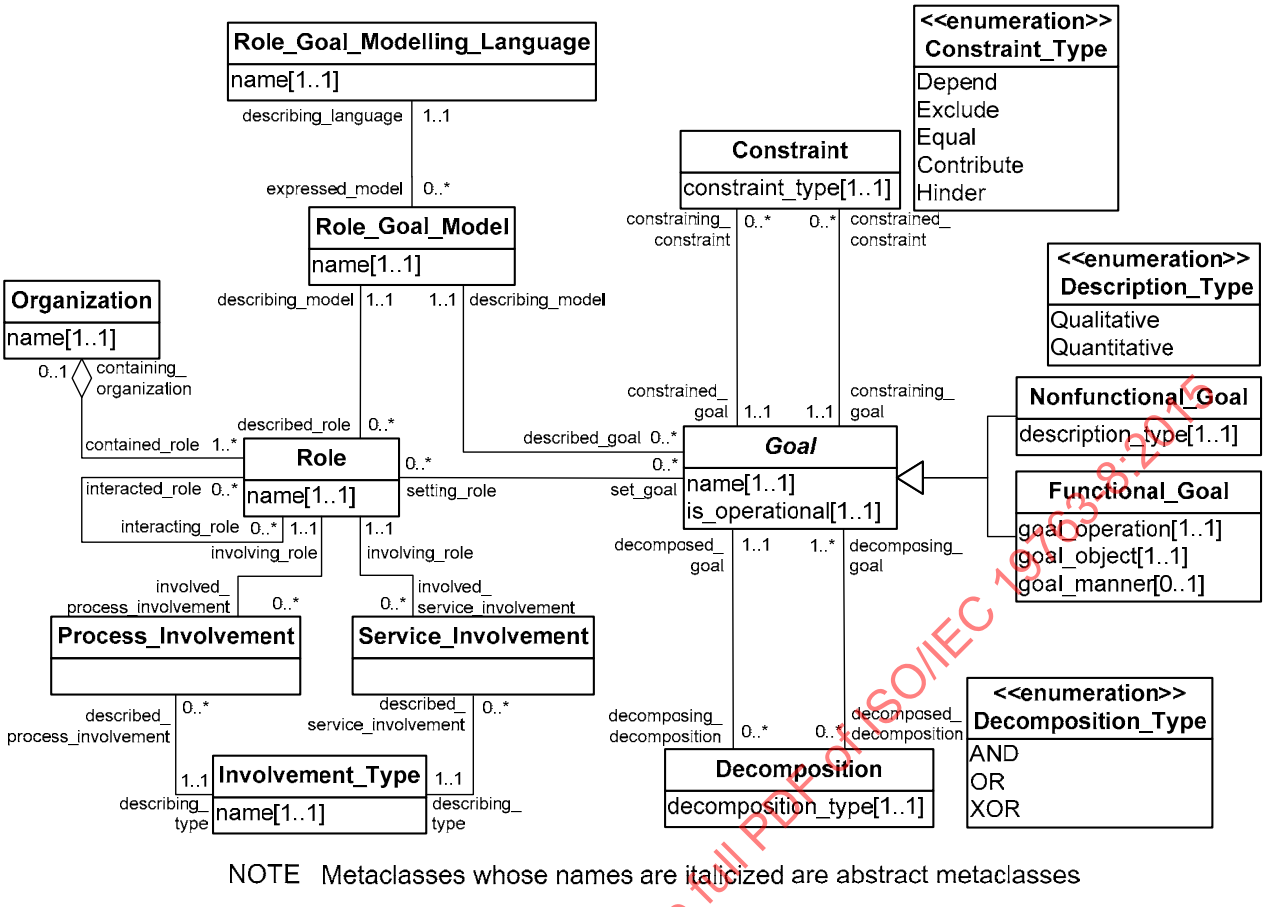
- 'AND' indicates that if the upper goal is selected all the lower goals must be selected.
- 'OR' indicates that at least one of the lower goals must be selected.
- 'XOR' indicates that one and only one goal from the lower goals must be selected.

Goals may constrain other goals. Each constraint represents such a relationship between one and only one constrained goal and one and only one constraining goal. Each constraint must be described by a constraint type, which takes a value selected from 'Depend', 'Exclude', 'Equal', 'Contribute', or 'Hinder', as follows:

- 'Depend' indicates that the realization of the constrained goal depends on the realization of the constraining goal.
- 'Exclude' indicates that the constrained goal and the constraining goal cannot be satisfied simultaneously.
- 'Equal' indicates that the constrained goal and the constraining goal are the same semantically.
- 'Contribute ' indicates that the realization of the constraining goal contributes to the realization of the constrained goal.
- 'Hinder' indicates that the realization of the constraining goal hinders the realization of the constrained goal.

Each role can be involved with a process or a service. Each process involvement provides a relationship between one and only one role and one and only one process. Similarly, each service involvement provides a relationship between one and only one role and one and only one service. In addition, each process involvement and each service involvement is described by one and only one involvement type. This involvement type may be as a performer, as a beneficiary, as a customer, or some similar involvement.

The following Figure 2 is the illustration of the Metamodel of MFI Role and Goal model registration.



NOTE Metaclasses whose names are italicized are abstract metaclasses

Figure 2 - Metamodel of MFI Role and Goal model registration

5.2 Associations between MFI Role and Goal model registration and other parts in MFI

Figure 3 shows the associations between MFI Role and Goal model registration (this part) and MFI Service model registration and MFI Process model registration. Each goal is achieved by zero, one or more services. Each service achieves zero, one or more goals. Each goal is achieved by zero, one or more service operations. Each service operation achieve zero, one or more goals. Each goal is achieved by zero, one or more processes. Each process achieves zero, one or more goals. Each service involvement can be involved in one and only one service. Each service aggregates zero, one or more service involvements. Each process involvement can be involved in one and only one process. Each process aggregates zero, one or more process involvements.

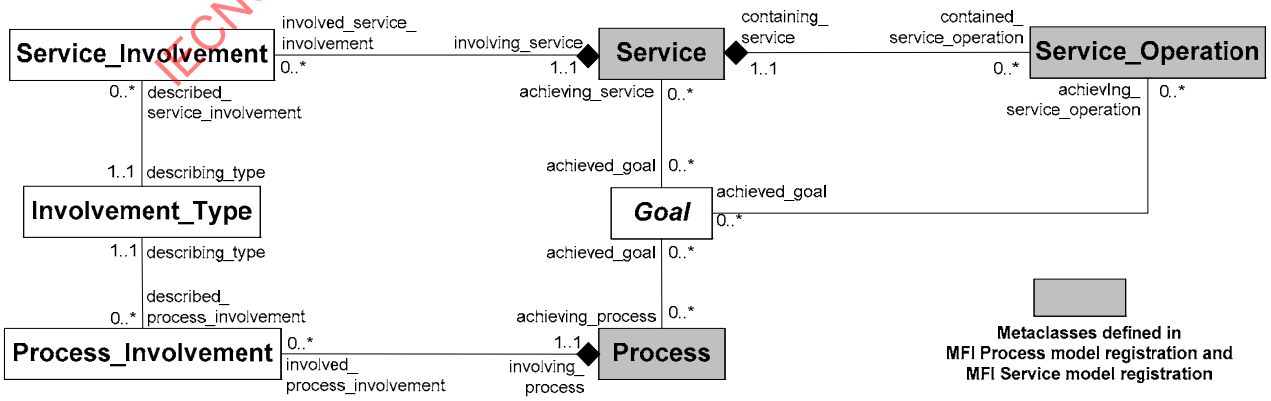


Figure 3 - Associations between MFI Role and Goal model registration and other parts in MFI

Figure 4 shows the associations between the metaclasses in MFI Role and Goal model registration and the metaclasses in MFI Core and mapping. Role_Goal_Model in MFI Role and Goal model registration is a subclass of Model in MFI Core and mapping. Role_Goal_Modelling_Language in MFI Role and Goal model registration is a subclass of Modelling_Language in MFI Core and mapping. All the remaining metaclasses are subclasses of Model_Element in MFI Core and mapping. All subclasses have the association which is inherited from superclass. Some inherited associations are specialized in this part of ISO/IEC 19763 family of standards. The detail of specialization is defined in Clause 5.3.

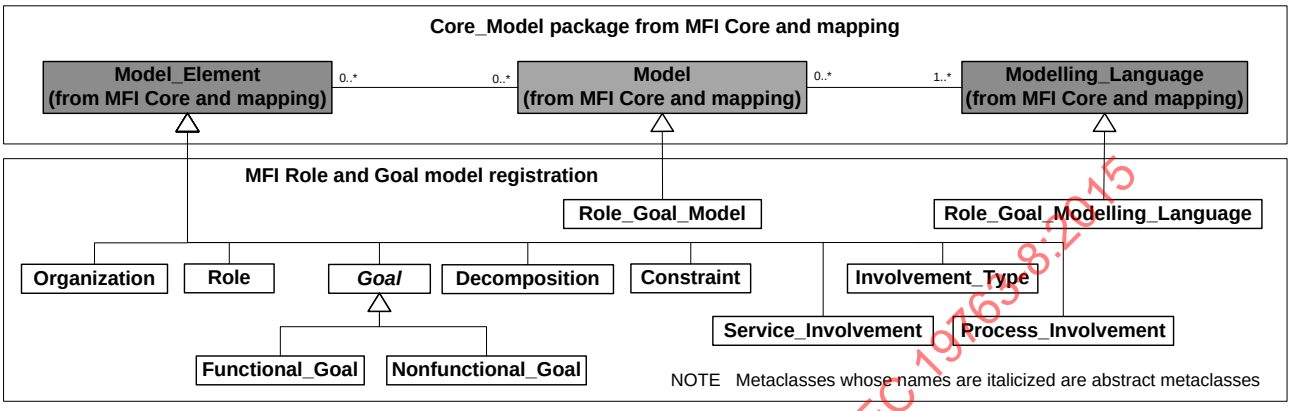


Figure 4 - Associations between MFI Role and Goal model registration and MFI Core and mapping

5.3 Metaclasses in MFI Role and Goal model registration

5.3.1 Constraint

Constraint is a metaclass each instance of which represents a constraint relationship between a constrained goal and a constraining goal.

Superclass

Model_Element (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
constraint_type	Constraint_ Type	1..1	The constraint type that represents whether the constraint is Depend, Exclude, Equal, Contribute, or Hinder

Reference	Class	Multiplicity	Description	Inverse	Precedence
constrained_goal	Goal	1..1	The goal that is constrained by the constraining goal	constraining_ constraint	No
constraining_goal	Goal	1..1	The goal that constrains the constrained goal	constrained_ constraint	No

Constraints

[None]

5.3.2 Constraint_Type

Constraint_Type is an enumerated datatype with the following values:

Value	Description
Depend	An indication that the realization of the constrained goal depends on the realization of the constraining goal
Exclude	An indication that the constrained goal and the constraining goal cannot be satisfied simultaneously
Equal	An indication that the constrained goal and the constraining goal are the same semantically
Contribute	An indication that the realization of the constraining goal contributes to the realization of the constrained goal
Hinder	An indication that the realization of the constraining goal hinders the realization of the constrained goal

5.3.3 Decomposition

Decomposition is a metaclass each instance of which represents a decomposition relationship between a decomposed goal (the upper goal) and its associated sub-goals (the lower goals).

Superclass

Model_Element (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
decomposition_type	Decomposition_Type	1..1	The decomposition type that represents whether the decomposition is AND, OR, or XOR

Reference	Class	Multiplicity	Description	Inverse	Precedence
decomposed_goal	Goal	1..1	The upper goal that is decomposed into the lower decomposing goals	decomposing_decomposition	No
decomposing_goal	Goal	1..*	The set of lower goals that provides the decomposition for the decomposed goal	decomposed_decomposition	No

Constraints

[None]

5.3.4 Decomposition_Type

Decomposition_Type is an enumerated datatype with the following values:

Value	Description
AND	An indication that if the upper goal is selected all the lower goals must be selected
OR	An indication that at least one of the lower goals must be selected
XOR	An indication that one and only one goal from the lower goals must be selected

5.3.5 Description_Type

Description_Type is an enumerated datatype with the following values:

Value	Description
Qualitative	An indication that this nonfunctional goal specifies an expected quality attribute such as security, safety, usability, flexibility or performance
Quantitative	An indication that this nonfunctional goal specifies an expected quantity attribute such as an amount or a specified elapsed time

5.3.6 Functional_Goal

Functional_Goal is a metaclass each instance of which represents the underlying functionality that a process or service is expected to deliver.

Superclass

Goal

Attribute	DataType	Multiplicity	Description
goal_operation	string	1..1	A statement that describes the operation that represents the action of the goal
goal_object	string	1..1	A statement that describes the object that represents the entities affected by goal operation
goal_manner	string	0..1	A statement that describes the manner that represents how the goal operation affects the goal object

Constraints

[None]

5.3.7 Goal

Goal is an abstract metaclass each instance of which represents a descriptive statement of intended outcome of user interaction with a process or service.

Superclass

Model_Element (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
name	string	1..1	Name of the corresponding goal
is_operational	boolean	1..1	The indication that represents whether the goal is operational or not. If the value is TRUE, the goal is operational and cannot be decomposed further

Reference	Class	Multiplicity	Description	Inverse	Precedence
describing_ model	Role_Goal_ Model	1..1	The role and goal model that includes this goal	described_goal	No
setting_role	Role	0..*	The role that sets this goal	set_goal	No
constraining_ constraint	Constraint	0..*	The set of constraints that constrain this goal	constrained_ goal	Yes
constrained_ constraint	Constraint	0..*	The set of constraints that use this goal to constrain other goals	constraining_ goal	Yes
decomposing_ decomposition	Decomposition	0..*	The set of decompositions that decomposes this goal (an upper goal) using other goals (the lower goals)	decomposed_ goal	Yes
decomposed_ decomposition	Decomposition	0..*	The set of decompositions that use this goal (a lower goal) as part of the decompositions of other this goals (the upper goals)	decomposing_ goal	Yes
achieving_ process	Process (from MFI Process model registration)	0..*	The set of processes that achieve this goal	achieved_goal	No
achieving_ service	Service (from MFI Service model registration)	0..*	The set of services that achieve this goal	achieved_goal	No
achieving_ service_ operation	Service_ Operation (from MFI Service model registration)	0..*	The set of service operations that achieve this goal	achieved_goal	No

Constraints

[None]

5.3.8 Involvement_Type

Involvement_Type is a metaclass each instance of which represents a statement that indicates a type of involvement that a role may have with a process or service.

Superclass

Model_Element (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
name	string	1..1	Name of the corresponding involvement type

Reference	Class	Multiplicity	Description	Inverse	Precedence
described_process_involvement	Process_Involvement	0..*	The set of process involvements described by this involvement type	describing_type	Yes
described_service_involvement	Service_Involvement	0..*	The set of service involvements described by this involvement type	describing_type	Yes

Constraints

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

5.3.9 Nonfunctional_Goal

Nonfunctional_Goal is a metaclass each instance of which represents the expected quantitative or qualitative attributes of functionality.

Superclass

Goal

Attribute	DataType	Multiplicity	Description
description_type	Description_Type	1..1	A statement as to whether this nonfunctional goal is a quantitative nonfunctional goal or a qualitative nonfunctional goal

Constraints

[None]

5.3.10 Organization

Organization is a metaclass each instance of which represents a particular organization, a unique framework of authority within which individuals act, or are designated to act, towards some purpose.

Superclass

Model_Element (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
name	string	1..1	Name of the corresponding organization

Reference	Class	Multiplicity	Description	Inverse	Precedence
contained_role	Role	1..*	The set of roles that are performed by actors in this organization	containing_ organization	No

Constraints

[None]

5.3.11 Process_Involvement

Process_Involvement is a metaclass each instance of which represents a statement that specifies how a particular role is involved in a particular process.

Superclass

Model_Element (from MFI Core and mapping)

Reference	Class	Multiplicity	Description	Inverse	Precedence
describing_type	Involvement_ Type	1..1	The involvement type that describes the involvement of the associated role in the associated process	described_ process_ involvement	No
involving_role	Role	1..1	The role that is involved with the associated process through this involvement type	involved_ process_ involvement	No
involving_ process	Process (from MFI Process model registration)	1..1	The process that is involved with the associated role through this involvement type	involved_ process_ involvementt	No

Constraints

[None]

5.3.12 Role

Role is a metaclass each instance of which represents a named specific behaviour of an entity participating in a particular context.

Superclass

Model_Element (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
name	string	1..1	The name by which this role is known within the organization

Reference	Class	Multiplicity	Description	Inverse	Precedence
set_goal	Goal	0..*	The set of goals, each of which is set by this role	setting_role	Yes
interacting_role	Role	0..*	The set of roles with which this role interacts	interacted_role	No
interacted_role	Role	0..*	The set of roles with which this role is interacted	interacting_role	Yes
involved_process_involvement	Process_Involvement	0..*	The set of process involvements, each of which specifies the involvement of this role in a particular process	involving_role	Yes
involved_service_involvement	Service_Involvement	0..*	The set of service involvements, each of which specifies the involvement of this role in a particular service	involving_role	Yes
describing_model	Role_Goal_Model	1..1	The role and goal model that includes this role	described_role	No
containing_organization	Organization	0..1	The organization in which an actor performs this role	contained_role	Yes

Constraints

No two roles may have the more than one relationship with each other through the interacting_role/interacted_role association.

5.3.13 Role_Goal_Model

Role_Goal_Model is a metaclass each instance of which specifies roles and goals using a role and goal modelling language.

Superclass

Model (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
name	string	1..1	The name by which this role and goal model is known

Reference	Class	Multiplicity	Description	Inverse	Precedence
describing_ language	Role_Goal_ Modelling_ Language	1..1	The role and goal modelling language in which this role and goal model is expressed. This reference specializes the "describing_ language" reference which is inherited from its superclass	expressed_ model	No
described_goal	Goal	0..*	The set of goals that are specified by this role and goal model	describing_ model	Yes
described_role	Role	0..*	The set of roles that are specified by this role and goal model	describing_ model	Yes

Constraints

[None]

5.3.14 Role_Goal_Modelling_Language

Role_Goal_Modelling_Language is a metaclass each instance of which describes the role and goal models.

Superclass

Modelling_Language (from MFI Core and mapping)

Attribute	DataType	Multiplicity	Description
name	string	1..1	The name by which this role and goal modelling language is known

Reference	Class	Multiplicity	Description	Inverse	Precedence
expressed_model	Role_Goal_Model	0..*	The set of role and goal models that are expressed using this role and goal modelling language. This reference specializes the "expressed_model" reference which is inherited from its superclass	describing_language	Yes

Constraints

[None]

5.3.15 Service_Involvement

Service_Involvement is a metaclass each instance of which represents a statement that specifies how a particular role is involved in a particular service.

Superclass

Model_Element (from MFI Core and mapping)

Reference	Class	Multiplicity	Description	Inverse	Precedence
describing_type	Involvement_Type	1..1	The involvement type that describes the involvement of the associated role in the associated service	described_service_involvement	No
involving_role	Role	1..1	The role that is involved with the associated service through this involvement type	involved_service_involvement	No
involving_service	Service (from MFI Service model registration)	1..1	The service that is involved with the associated role through this involvement type	involved_service_involvement	No

Constraints

[None]

Annex A

(informative)

Examples

A.1 Introduction

This annex illustrates the registration of role and goal models using the metamodel specified in MFI Role and Goal model registration. It shows how MFI Role and Goal model registration can harmonize with existing specifications related to role and goal models.

The examples are not exhaustive, only the primary objects relevant to the transformations between example model elements and metaclasses of MFI Role and Goal model registration are described. Not every possible transformation is illustrated.

The examples all follow the same format. First, the example models are presented, one for each example. This is then followed by the transformation tables between the example model elements and metaclasses of MFI Role and Goal model registration. Finally, there are the set of illustrative registration of object instances.

A.2 Example 1 - Trip Arrangement in i*

The roles and goals associated with the arrangement of a trip ("Trip Arrangement") are expressed in the i* model shown in Figure A.1. More specifically, there is a single role: the "Trip Agent". There are two requirements (shown as soft-goals) associated with the main goal: that the trip should be "Timely" and "Customer-focused". The detailed tasks involved with achieving the goal include obtaining customer authorization, allocating available resources (accommodation, meal, transportation, etc), and organizing those resources into trip course within a timeline.

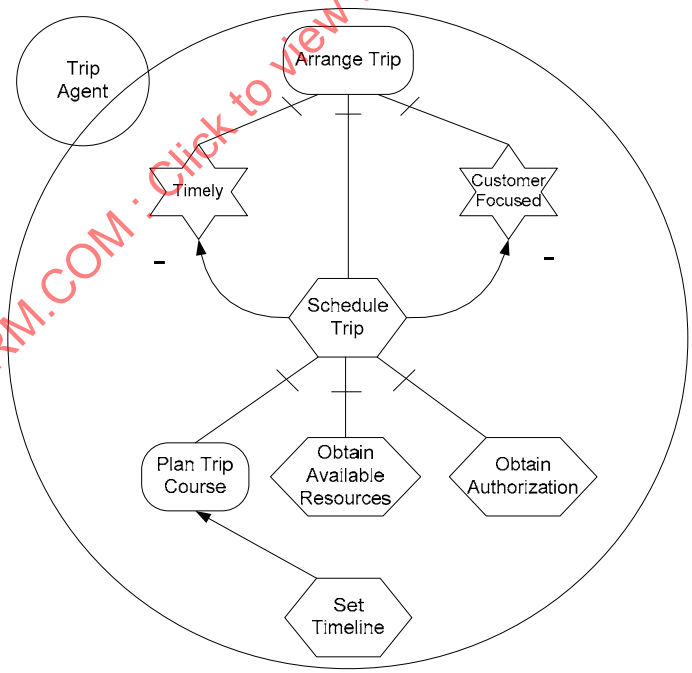


Figure A.1 - Example of Trip_Arrangement model in i*

The transformation between the i* model elements used in this example and the metaclasses of MFI Role and Goal model registration is illustrated in Table A.1, in which Task-Decomposition Links are mapped to Decomposition (decomposition_type, value: 'AND'), Means-ends Links are mapped to Decomposition

(decomposition_type, value: 'AND'); Contribution Links are mapped to Constraint (constraint_type, value: 'Contribute').

The details of the registration of the “Trip Arrangement” model are shown in Figure A.2.

Table A.1 - Transformations for Example 1

i* notation	Metaclasses of MFI Role and Goal model registration	i* notation	Metaclasses of MFI Role and Goal model registration
Role	Role	Task-Decomposition-link	Decomposition
Goal	Functional_Goal	Means-ends link	
Task		Contributions to soft goals	Constraint
Soft-Goal	Nonfunctional_Goal		

<Role_Goal_Model>
Object101

Attribute/Reference	Literal/Instance
name	"Trip_Arrangement_Model"
describing_language	Object102
described_role	Object103
described_goal	Object104, Object106, Object107, Object108, Object112, Object113, Object114, Object116

<Role_Goal_Modelling_Language>
Object102

Attribute/Reference	Literal/Instance
name	"i*"
expressed_model	Object101

<Role>
Object103

Attribute/Reference	Literal/Instance
name	"Trip_Agent"
describing_model	Object101
set_goal	Object104

<Functional_Goal>
Object104

Attribute/Reference	Literal/Instance
name	"Arrange_Trip"
is_operational	"FALSE"
goal_operation	"Arrange"
goal_object	"Trip"
describing_model	Object101
setting_role	Object103
decomposing_decomposition	Object105

<Decomposition>
Object105

Attribute/Reference	Literal/Instance
decomposition_type	'AND'
decomposed_goal	Object104
decomposing_goal	Object106, Object107, Object108

<Nonfunctional_Goal>
Object106

Attribute/Reference	Literal/Instance
name	"Timely"
is_operational	"TRUE"
description_type	'Qualitative'
describing_model	Object101
decomposed_decomposition	Object105

<Nonfunctional_Goal>
Object107

Attribute/Reference	Literal/Instance
name	"Customer_Focused"
is_operational	"TRUE"
description_type	'Qualitative'
describing_model	Object101
decomposed_decomposition	Object105

<Functional_Goal>
Object108

Attribute/Reference	Literal/Instance
name	"Schedule_Trip"
is_operational	"TRUE"
goal_operation	"Schudule"
goal_object	"Trip"
describing_model	Object101
decomposed_decomposition	Object105
constrainting_constraint	Object109, Object110
decomposing_decomposition	Object111

<Constraint>
Object109

Attribute/Reference	Literal/Instance
constraint_type	'Depend'
constrained_goal	Object108
constraining_goal	Object106

<Constraint>
Object110

Attribute/Reference	Literal/Instance
constraint_type	'Depend'
constrained_goal	Object108
constraining_goal	Object107

Figure A.2 - Registration of the Trip_Arrangement example (Part 1 of 2)