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Abstract

This report contains a draft version of an *OMG Request For Proposals (RFP)* for UML-based Rule Modeling which is intended to be submitted to the OMG with the help of other OMG members. The idea is to use working group I1's results in the area of UML-based rule modeling (notably URML) as a basis for an OMG submission.

Keyword List

standardization, OMG, SBVR, PRR, RIF

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18 March 2008

Abstract

This report contains a draft version of an *OMG Request For Proposals (RFP)* for UML-based Rule Modeling which is intended to be submitted to the OMG with the help of other OMG members. The idea is to use working group I1's results in the area of UML-based rule modeling (notably URML) as a basis for an OMG submission.

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Request For Proposal

OMG Document: <taskforce>/YYYY-MM-NN

Letters of Intent due: <month> <day>, <year>
Submissions due: <month> <day>, <year>

Objective of this RFP

This RFP seeks a specification of an extension of the UML2 metamodel and a corresponding UML2 profile needed to support:

- UML-based modeling of derivation rules and production rules,

- the mapping of UML-based rule models to SBVR concept definitions and PRR production rule representations and

- their serialization to established XML rule formats

For further details see Chapter 6 of this document.

6.0 Specific Requirements on Proposals

6.1 Problem Statement

Different concepts of "rules" show up in different areas of OMG's work. Most notably, there are two recent OMG standards dealing with certain forms of rules: PRR is dealing with *production rules* and SBVR is dealing with *business rules*. Apart from these recent rule languages, also the UML includes an implicit notion of derivation rules in the form of the «derive» dependency stereotype, and OCL includes an explicit notion of a derivation rule in the limited form of a derived value of an attribute or association end. However, none of these rule expression languages defines a UML-based expression and visualization of rules, although this seems to be a natural option, given the fact that a rule is expressed on top of a vocabulary, which can be expressed in the form of a class diagram.

To illustrate the problem let's consider an example where a subclass is defined by means of a derivation rule with the help of a condition on the properties of the superclass. The example rule states:

> *A woman is a female whose age is greater than 21.*

6.1.1 Example Vocabulary
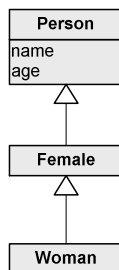
The underlying vocabulary of this rule, depicted in the diagram to the left, includes

  a) the classes *Person*, *Female* and *Woman*, where *Woman* is a subclass of *Female*, which is in turn a subclass of *Person*, and

  b) the *Person* properties *name* and *age*.

6.1.2 Example Rule

The rule can be visualized as shown in the URML diagram [URML] to the right. The circle represents the rule, its label DR stands for *derivation rule*. Incoming arrows attached to a rule circle represent conditions, and the outgoing arrow represents the conclusion.
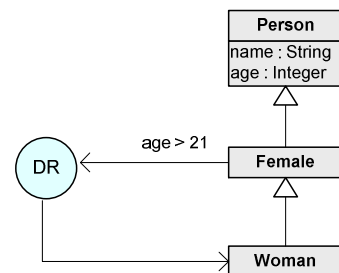
Notice that the condition arrow is annotated with a

Boolean OCL expression (age > 21) in the context of the classifier (Female) to which the condition arrow is attached.

The derived class, *woman*, is defined in the conclusion of the rule, while the condition consists of two parts: a classification of a person as a female and an attached requirement that the age of that female must be greater than 21. This gives us a rule with a classification conclusion for inferring that a person P is a woman, and with a classification condition, requiring that P is a female, and an inequality condition, requiring that the age of P is greater than 21.
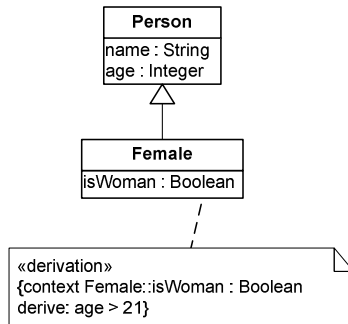
This rule can be expressed with the help of an OCL derivation expression only, if we refactor the *Woman* subclass into a Boolen attribute *isWoman* of the *Female* class. Then, we could express it in the rather non-visual (and harder-to-read) form depicted in the diagram to the left.

```
        ┌──────────────────┐
        │     Person       │
        ├──────────────────┤
        │ name : String    │
        │ age : Integer    │
        └──────────────────┘
                 △
                 │
        ┌──────────────────┐
        │     Female       │
        ├──────────────────┤
        │ isWoman : Boolean│
        └──────────────────┘
                 ╱
                ╱
┌──────────────────────────────────┐
│ «derivation»                     │
│ {context Female::isWoman : Boolean│
│ derive: age > 21}                │
└──────────────────────────────────┘
```

6.2   Scope of Proposals Sought

This RFP solicits normative specifications for:

- an extension of the UML2 metamodel for UML-based Rule Modeling, including all the constructs needed to support derivation rules and production rules;

- a UML2 Profile to support reuse of UML notation for rule modeling;

- a mapping from UML-based production rule models to the OMG Production Rule Representation (PRR);

- a mapping from UML-based derivation rule models to concept definitions according to the OMG Semantics of Business Vocabularies and Rules (SBVR)

and non-normative specifications for mapping UML-based rule models to the W3C Rule Interchange Format [RIF] and to other XML formats for rules such as the REWERSE Rule Markup Language [R2ML].

6.2.1   Extension of the UML2 Metamodel

Proposals are expected to provide an extension of the UML2 metamodel by adding elements for derivation rules and production rules accommodating

a) the different kinds of atomic formulas that are expressible with the help of classes, properties and associations, and that are used in rule conditions and conclusions;

b) the different kinds of rule action expressions defined by PRR

6.2.2 UML2 Profile for Rule Modeling

Proposals are expected to provide a UML2 profile for rule modeling, providing intuitive symbols for rules and their constituents while reusing UML notation as much as possible.

6.2.3 Mapping from UML-Based Production Rule Models to the OMG Production Rule Representation

Proposals are expected to provide a mapping of UML-Based Production Rule Models to PRR OCL.

6.2.4 Mapping from UML-Based Derivation Rule Models to Concept Definitions according to the OMG Semantics of Business Vocabularies and Rules

Proposals are expected to provide a mapping of UML-Based Derivation Rule Models to SBVR definitions (or "closed projections").

6.2.5 Mapping from UML-Based Rule Models to the W3C Rule Interchange Format

UML-based derivation rule models are to be mapped to the RIF *Basic Logic Dialect*, while UML-based production rule models are to be mapped to the RIF *Production Rule Dialect* (provided that the W3C RIF Working Group will provide a W3C Recommendation for this RIF dialect).

6.3 Relationship to Existing OMG Specifications

The following OMG specifications are referenced in this RFP:

- Production Rule Representation (PRR), OMG Adopted Specification, http://www.omg.org/spec/PRR/1.0/

- Semantics of Business Vocabulary and Business Rules (SBVR), dtc/07-06-05

-

6.4   Related Activities, Documents and Standards

< Note to RFP Editors: List documents, URLs, standards, etc. that are relevant to the problem and the proposals being sought. Also describe any known overlaps with specification activities or specifications, competing or complementary, from other standards bodies. >

6.5   Mandatory Requirements

6.5.1   Submitters shall specify a Rule Modeling Metamodel using MOF 2 Core that shall represent a language for vocabulary-based derivation rules and production rules where the underlying vocabularies are represented as UML class models.

6.5.1.1   Proposals shall use the appropriate elements of 2.x versions of OMG metamodels including, MOF, UML, and OCL. The resulting metamodel shall be MOF2-compliant.

6.5.2   Proposals shall specify a UML2 Profile for rule modeling.

6.6   Optional Requirements

6.6.1   Proposals may specify mappings to XML-based rule formats such as the W3C Rule Interchange Format (RIF) or the REWERSE Rule Markup Language (R2ML).

6.7   Issues to be discussed

< Note to RFP Editors: Describe the issues that proposals should discuss. Issues to be discussed shall be stated in terms of phrases such as:

"Proposals shall discuss how... ", or
"Proposals shall include information on...", or
"Proposals shall provide the design rationale for...".>

These issues will be considered during submission evaluation. They should not be part of the proposed normative specification. (Place them in Part I of the submission.)

6.8   Evaluation Criteria

< Note to RFP Editors: Conformance to the mandatory requirements along with consideration of the optional requirements and issues to be discussed, are

implied evaluation criteria. RFP authors should describe any additional criteria that submitters should be aware of that will be applied during the evaluation process. >

6.9 Other information unique to this RFP

< Note to RFP Editors: Include any further information pertinent to this RFP that does not fit into the sections above, or which is intended to override statements in the Chapters 1 to 5. >

6.10 RFP Timetable

The timetable for this RFP is given below. Note that the TF or its parent TC may, in certain circumstances, extend deadlines while the RFP is running, or may elect to have more than one Revised Submission step. The latest timetable can always be found at the OMG *Work In Progress* page at http://www.omg.org/schedules/ under the item identified by the name of this RFP. Note that "<month>" and "<approximate month>" is the name of the month spelled out; e.g., January.

Event or Activity	Actual Date
Preparation of RFP by TF	
RFP placed on OMG document server	*"Three week rule"*
Approval of RFP by Architecture Board *Review by TC*	
TC votes to issue RFP	*<approximate month>*
LOI to submit to RFP due	*<month> <day>, <year>*
Initial Submissions due and placed on OMG document server ("Three week rule")	*<month> <day>, <year>*
Voter registration closes	*<month> <day>, <year>*
Initial Submission presentations	*<month> <day>, <year>*
Preliminary evaluation by TF	
Revised Submissions due and placed on OMG document server ("Three week rule")	*<month> <day>, <year>*
Revised Submission presentations	*<month> <day>, <year>*
Final evaluation and selection by TF *Recommendation to AB and TC*	
Approval by Architecture Board *Review by TC*	

TC votes to recommend specification	*<approximate month>*
BoD votes to adopt specification	*<approximate month>*

< Note to RFP Editors: Insert additional chapter if needed here and update the list and brief description of chapters in Chapter 1. >