

Strategy for an OWL specification of LMF

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1 Introduction

This working paper is based on:

- LMF revision-14
- Information sharing on the semantic web: Stuckenschmidt & van Harmelen
- A semantic web primer: Antoniou & van Harmelen
- UML reference manual, second edition

The OWL specification starts from the LMF UML model, not from the LMF DTD.

The following mechanisms need to be represented:

- header
- generalization
- aggregation
- association that is not an aggregation
- adornment by data categories

This document is not a full OWL specification of LMF. It's just a description of the big lines about how represent LMF using OWL.

2 Header

This is a rather regular OWL header.

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#">
<owl:Ontology rdf:about="">
  <rdf:comment>Specification of Lexical Markup Framework (ISO 24613)</rdf:comment>
  <rdf:label>Lexical Markup Framework Ontology</rdf:label>
</owl:Ontology>
<!-- the rest of the model -->
```

</rdf>

3 Generalization

For instance, in order to describe that Representation is a sub-class of FormRepresentation, we will have the following tags:

```
<owl:Class rdf:ID="FormRepresentation">
  <rdfs:subClassOf rdf:resource="#Representation"/>
</owl:Class>
<owl:Class rdf:ID="Representation"/>
```

4 Aggregation

Aggregation is little bit more complex because this notion is not a basic one in OWL. We need to define a "part of" relation.

For instance, in order to represent that a Lexicon is a part of a LexicalResource, we will have the following tags:

```
<owl:Class rdf:ID="Lexicon">
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty ref:resource="#isPartOf"/>
      <owl:allValuesFrom rdf:resource="#LexicalResource">
    </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>
<owl:Class rdf:ID="LexicalResource"/>
<owl:TransitiveProperty rdf:ID="isPartOf"/>
```

5 Association that is not an aggregation

In a few portions of the model, we need to refer from an element to another element by means of a reference. This is not aggregation, in the sense that the referred element is not included. On the contrary, this element is to be shared.

We cannot use the same system as we do in the aggregation section.

For instance, SyntacticBehavior is associated with an identifier of a SubCategorizationFrame.

```
<owl:Class rdf:ID="SyntacticBehavior">
```

```
<rdfs:subClassOf>
  <owl:Restriction>
    <owl:onProperties rdf:resource="#isAssociated"/>
  </owl:Restriction>
</rdfs:subClassOf>
</owl:Class>
<owl:DatatypeProperty rdf:ID="isAssociated">
  <rdfs:range rdf:resource="xsd:Name"/>
</owl:DatatypeProperty>
```

6 Adornment by data categories

This is a little more tricky. We need to allow the decoration of a class by a certain number of pairs attributes-value. The attribute is a data category. The value is either a data category or a string value.

Due to the fact that this mechanism is a general one, it's described on a top level class whose name is LMFClass from which all other classes will inherit.

```
<owl:Class rdf:ID="LMFClass">
  <owl:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="#isAdorned"/>
    </owl:Restriction>
  </owl:subClassOf>
</owl:Class>
<owl:ObjectProperty rdf:ID="isAdorned">
  <rdfs:domain rdf:resource="#LMFClass"/>
  <rdfs:range rdf:resource="#attVal"/>
</owl:ObjectProperty>
<!-- an attVal is a pair comprising an attribute and a value -->
<owl:Class rdf:ID="attVal">
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="#att"/>
    </owl:Restriction>
```

```
</owl:Restriction>
</rdfs:subClassOf>
<rdfs:subClassOf>
  <owl:Restriction>
    <owl:onProperty rdf:resource="#val"/>
  </owl:Restriction>
</rdfs:subClassOf>
</owl:Class>
<!-- the attribute : always a data category -->
<owl:ObjectProperty rdf:ID="att">
  <rdfs:domain rdf:resource="#attVal"/>
  <rdfs:range rdf:resource="#dataCategory"/>
</owl:ObjectProperty>
<!-- the value: either a datacategory or a string -->
<owl:ObjectProperty rdf:ID="val">
  <rdfs:domain rdf:resource="#attVal"/>
  <rdf:Alt>
    <rdfs:range rdf:resource="#dataCategory"/>
    <rdfs:range rdf:resource="xsd:string"/>
  </rdf:Alt>
</owl:ObjectProperty>
<owl:Class rdf:ID="dataCategory"/>
```