

WonderWeb Deliverable D19

Impact of foundational ontologies on standardization activities

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WonderWeb Project

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1 Introduction

This final deliverable reports about the impact of the WonderWeb work on foundational ontologies on international standardization efforts, including both official initiatives and de-facto standards. Indeed, the DOLCE ontology and its extensions, notably the DOLCE-Lite-Plus library (<http://www.loa-cnr.it/DOLCE>), are being used in both academic and industrial projects worldwide. Some of them have relevance for standardization issues.

We shall consider here 7 different standardization efforts, corresponding to various activities we have been actively involved with, or we are just aware of:

- The W3C Semantic Web Best Practices and Deployment (SWBPD) working group;
- The DAML-S activities related to ontologies of Web services;
- The IEEE Standard Upper Ontology effort;
- The CIDOC Conceptual Reference Model, an ISO standard supported by the International Council of Museums and resulting from an harmonization work involving several standardization initiatives;
- The UN-FAO harmonization work on fishery terminologies and theauri, part of the more general Agricultural Ontology Service project;
- The WordNet thesaurus, a de-facto standard for many NLP and Semantic Web applications.

2 W3C and DAML standardization activities

The DOLCE ontology has been selected by the Semantic Web Best Practices and Deployment (SWBPD) working group among the publicly available high-profile ontologies to be made available to Semantic Web application developers¹. Cooperation with this working group is going on.

The DOLCE-Lite-Plus ontology, a simplified implementation of DOLCE, has been used to build a *Core Ontology of Services* (COS). In turn, COS has been used to align the OWL-S ontology of web services to DOLCE, providing means to map OWL-S to other ontologies like WSMO and WSA. COS has also interesting properties, since it extends the vision of services from the computational world to the social world, where services are typically to be deployed. OWL-S has been proposed as a standard in the DAML project, and there is a W3C committee working on its updating that would finally lead to a recommendation. COS has been presented at the AAAI2004 Symposium on Semantic Web Services, and at the WWW2004 Conference.

3 The IEEE Standard Upper Ontology

The Standard Upper Ontology Working Group (SUO-WG)², is an initiative for the development of an upper ontology to “support computer applications such as data interoperability, information search and retrieval, automated inferencing, and natural language processing.”³. The group has been working since 2000 and it comprises several experts from around the world including three members of the LOA. Although there are 6 official start documents, the standardization process has been slow and has met several problems due to the novelty of the field and the consequent fact that the application of foundational ontologies to applications is still limited. Things have improved since well developed foundational ontologies became available. Among these, DOLCE has helped

¹ <http://www.w3.org/2003/12/swa/swbpd-charter>

² <http://suo.ieee.org/index.html>

³ <http://grouper.ieee.org/groups/suo/index.html>

the SUO-WG in addressing the discussion especially in two aspects. On the one hand, it has made clear the importance of some philosophical distinctions in applied ontology. On the other hand it has shown how to motivate and justify the basic taxonomy in a way that is understandable to both the researchers working in ontology development and those in ontology application.

Among the discussions of the SUO-WG related to DOLCE, we recall the messages exchanged by S. Borgo, J. Sowa, and C. Menzel on Jul 2003 (in particular, messages from 10449 to 10485 with subject: "SUO: Re: One Stone Fits All") and the messages exchanged by C. Partridge, J. Sowa, and P. Miraglia on Sep 2003 with subject: "SUO: RE: Natural language". The relationship between DOLCE and other initiatives is considered in several discussions between C. Partridge and A. Pease and between P. Martin and W. Matthew in Dec. 2003 (see messages with subject: "SUO: RE: Model of Activity and Action in SUO ontology") and in the work of P. Martin for the SUO list (see his message on 28 Jan 2004 and on 12 May 2004 with subject "SUO: Multi-Source Ontology (MSO) Draft Ballot Question" and "Fw: MSO Ballot Results" respectively).

Note that, although the Laboratory for Applied Ontology is following the activity of the SUO-WG, it has never proposed the DOLCE ontology as a start document since the ontology itself is already considered in the start document MSO (by P. Martin) and because the SUO-WG seems to be not very efficient in carrying out the standardization effort, indeed after 4 years there are still discussions on what the SUO-WG has produced so far and what it should produce in the future (see the message by J. Ring on 21 Aug 2004 with subject "Re: RE: Time to request PAR extension" and the thread after it).

4 The CIDOC-CRM experience (ISO/CD 21127)

Originating from a collaboration with the ICS-FORTH, the DOLCE ontology and the OntoClean methodologies have played a key role in a successful standards harmonization experience, supported by the CIDOC Committee of the International Council of Museums, which led to the development of the CIDOC Conceptual Reference Model (ISO/Committee Draft 21127). Such harmonization activity has been also supported by the OntoWeb project, and is documented in the OntoWeb Deliverable D3.4. An OWL version of CIDOC-CRM has also been aligned to DOLCE-Lite.

As a result of such ontology-based harmonization activities, the following standards and initiatives have been successfully harmonized by the CIDOC Documentation Standards Working Group¹:

1. The recommendations of the CIDOC Committee of the International Council of Museums
2. The OPENGIS standardization effort for interoperability of geographic information. In particular archeologists and National Sites and Monument Records make extensive use of GIS
3. Various conceptual models and ontologies adopted by the Digital Library and the traditional libraries community, in particular the ABC Harmony ontology² and the International Federation of Library Associations (IFLA)'s FRBR model (Functional Requirements for Bibliographic Records).³

¹ <http://cidoc.ics.forth.gr/>

² <http://metadata.net/harmony/results.html>

³ <http://www.oclc.org/research/projects/frbr/default.htm>

5 The UN-FAO experience

Originating from previous work, updated during the WonderWeb project, a harmonization work on existing fishery terminologies and thesauri maintained by the United Nation FAO and other organization in the framework of the Agricultural Ontology Service project¹ has been done with the help of DOLCE-Lite-Plus. In particular, methodologies defined within the WonderWeb project have been employed (see deliverable D16). Currently, three thesauri for an amount of about 35,000 classes and 12,000 individuals have been aligned to DOLCE, allowing improved information extraction application, and query mapping.

6 The OntoWordnet perspective

Following the OntoWordNet research programme of our Lab, DOLCE-Lite-Plus has been used to align about 900 synsets from the noun hierarchies of the WordNet 1.6 English lexical database². WordNet is a de facto standard for many NLP and Semantic Web applications. Such an alignment makes it possible to put the entire 66,000 synsets from WordNet 1.6 (actually about 60,000 classes and 5,000 individuals) under DOLCE-Lite-Plus.

¹ <http://www.fao.org/agris/aos/default.htm>

² <http://www.loa-cnr.it/ontologies/dolce>