The Distributed Ontology Language (DOL): Ontology Integration and Interoperability Applied to Mathematical Formalization

Christoph Lange, Till Mossakowski, Oliver Kutz, Michael Grüninger

DOL gives ontology interoperability a formal grounding and makes heterogeneous ontologies and services based on them amenable to automated verification.

Ontology Integration and Interoperability (OntoIOp) Working Group of ISO/TC 37:
- 50 experts (≈ 15 active contributors)
- representing relevant communities:
  - ontology languages and logics e.g. Common Logic, OWL
  - conceptual and theoretical foundations e.g. model theory
  - technical foundations e.g. ontology engineering; linked open data
  - application areas e.g. manufacturing
- ISO 17347 standard (to be available freely)
- committee draft in September 2012; final in 2015
- Standard specifies Distributed Ontology Language:
  - Syntax: text (for humans); XML and RDF (for tools and [web] services)
  - Semantics: direct set-theoretical (+ institutional, category-theoretical); translational, "collapsed"
  - Conformance of basic ontology languages, serializations, documents, applications

Use Case: Verifying Meta-theoretical Relationships in COLORE

Hets (standalone), Ontohub (web: http://ontohub.org)

Tool Support for Verification and Management:

• Hets: multi-logic static ontology analysis and verification
  • Ontohub: logic-independent ontology storage and browsing

Logic Translation Graph for the DOL-conforming Ontology Languages

- COLORE: repository of 500+ Common Logic ontologies (http://colore.googlecode.com)
- commonsense domains: time, space, shape, processes
- mathematical domains: algebraic structures, orderings, graphs, incidence structures
- Meta-theoretical relationships of interest: maps, definitional extension, conservative extension, inconsistency, imports, relative interpretation, faithful interpretation, definable equivalence

The Distributed Ontology Language (DOL):
Ontology Integration and Interoperability
Applied to Mathematical Formalization

Christoph Lange, Till Mossakowski, Oliver Kutz, Michael Grüninger

DOL gives ontology interoperability a formal grounding and makes heterogeneous ontologies and services based on them amenable to automated verification.