Ontologies for the Semantic Web, and vice versa

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Semantic Web Applied Ontology SIG of the IAOA
Ontologies for the Semantic Web
The Semantic Web Layer Cake

- User Interface & Applications
- Trust
- Proof
- Unifying Logic
- Query: SPARQL
- Ontology: OWL
- Rule: RIF
- Data interchange: RDF
- XML
- URI/IRI
Tim Berners Lee’s early semantic web layer cake

Semantic Web = unifying language for classical logic = bus

- Conversational interfaces
- Heuristics eg search engines
- non-classical "logics"

- Trusted system eg access control
- Digital Signature
- RDF
- XML

- Higher order
- First Order
- Propositional Logic

- bank machine
- KR inference engine
- Haystack inference engine
Challenges

- Diversity of data and ontology languages:
  - RDF, RDFS, OWL, RIF, SparQL, FOL, HOL
  - actually even more: EER, OBO, UML, SKOS, F-logic, Common Logic, SBVR, …
- matching and alignment — also across languages
- merging/combination along alignments
- distributed data and ontologies
- ontology-based data access/management
OntoIoP
Need for a Unifying Meta Language

Not yet another ontology language, but a meta language covering

- diversity of ontology and data languages
- translations between these
- diversity of operations on and relations among ontologies

Current standards like the OWL API or the alignment API only cover parts of this

The Ontology, Modeling and Specification Integration and Interoperability (OntoIOP) initiative addresses this
The OntolOp initiative

- started in 2011 as ISO 17347 within ISO/TC 37/SC 3
- now continued as OMG standard
  - request for proposals (RFP) to be issued in December 2013
  - proposals answering RFP due in December 2014
- 50 experts participate, ∼ 15 have contributed
- OntolOp is open for your ideas, so join us!
- Distributed ontology language (DOL) is being prepared as one answer to RFP
An Initial Logic Graph for OntolOp
Towards a Semantic Web of ontologies
SparQL for BioPortal

- search for data and metadata across all ontologies
- query (meta)data in fine-grained and application-specific ways
- metadata is organised according to BioPortal Metadata Ontology, which extends the Ontology Metadata Vocabulary (OMV)

Ontohub is a web-based repository engine for distributed heterogeneous (multi-language) ontologies

- prototype available at ontohub.org and develop.ontohub.org
- speaks DOL, RDF, OWL, Common Logic, and other languages
- git repositories as version control backend
- linked data compliant
- annual Ontology summit as a venue for review, and discussion