

Introduction to Ontologies

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What is an Ontology?

- A form of knowledge representation
 - Describes a set of entity types, their properties and their relations to other entities
- Used as a communication tool for formally describing the concepts within a domain
 - Represents a vocabulary and the use of the terms in the vocabulary

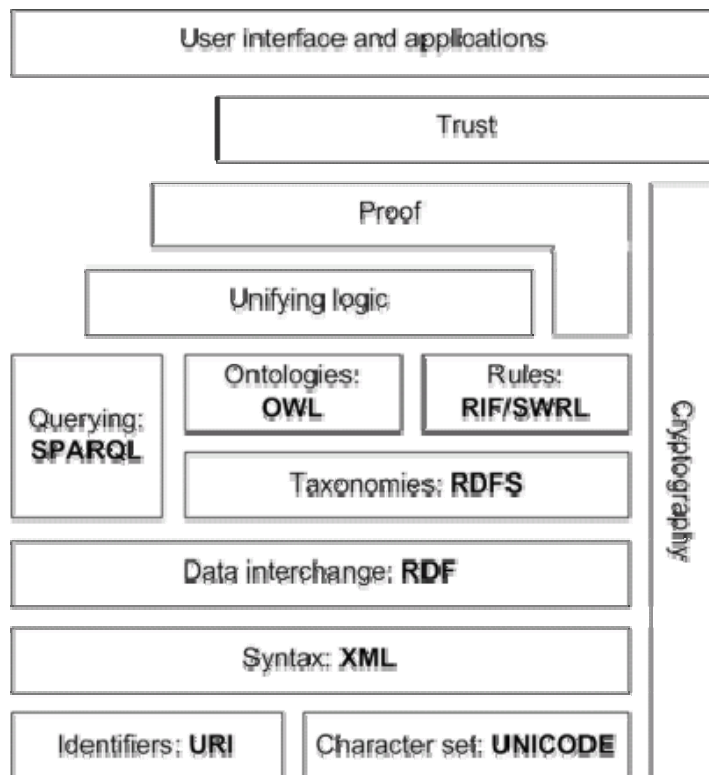


Semantic Web Ontologies

- Alternative (complementary) data modeling language to relational databases
- Dynamic data model, no rigid schema
- Distributed data modeling built in to the ontology specification language
- Data can be integrated from multiple sources without worrying about conflicts in data terminologies
- Ability to synthesize new knowledge based on implications of the stated knowledge
- Great for synthesizing the knowledge from a wide array of experiments where you want to ask “what do we know about X in the context Y...”
- (Probably) not so great at replacing RDBMS’s in transaction/process based systems (e.g., banking, LIMS)



Ontology Syntax



- Specified in graph-based language components:
 - OWL Ontology Language
 - RDFS
 - RDF
- Accessed using SPARQL
- Option to serialized to XML, RDF Store
- Design, application development tools
 - Protégé 4
 - Jena



Sources of Scientific Ontologies



MGED NETWORK



OBO
open biomedical ontologies



- Open Biomedical Ontologies – OBO Foundry
- National Library of Medicine Unified Medical Language System (does not yet use OWL as the representation format)
- NCI Thesaurus
- BioPAX - Biological Pathways Exchange
- MGED Society – MGED ontology
- Gene Ontology

