

Ontology, Rules, and Logic Programming for Reasoning and Applications

(RulesReasoningLP)

Session 2

**Concepts and Foundations of Rules and
Ontologies: Logic Programs, Classical Logic, and
Semantic Web - I**

October 31, 2013

Leo Obrst (MITRE)

Harold Boley (University of New Brunswick, RuleML)

Topics: Ontology, Rules, Reasoning, Logic Programming, and Applications

<http://ontolog.cim3.net/cgi-bin/wiki.pl?RulesReasoningLP#nid3XS0>

- Ontology-Rule Knowledge Representation containing Classical Logic, Declarative Logic Programs (Pure Prolog), and Rulelog
 - Standards incl.: Rule Interchange Format, RuleML, and Common Logic
- Ontology and Rule Reasoning Tools, Systems: Requirements, Design, Implementation
 - Examples include Semantic Web and Description Logic-based systems, First-Order Logic systems, Logic Programming systems, Rulelog systems, and Hybrid Description Logic + Logic Programming (Description Logic Programming) systems
 - E.g., Cyc, Pellet, Jena, Prover9, Vampire, SILK, Coherent, RuleLog; various Prologs such as SWI-Prolog, XSB Prolog, Ciao Prolog, Prova, Flora-2
 - Answer Set Programming, Constraint Logic Programming, Deductive Databases, SAT and SMT reasoners, decision-support systems, business rule systems, etc. [Deductive, Inductive, Abductive, Probabilistic, etc., reasoning]
- Ontology and Rule Reasoning Optimization: Knowledge Compilation from Development Time Ontologies and Rules to Run-Time Reasoning, Tabling, Memo-izing, Extensionalizing, Delayed / Lazy Evaluation, Type Subsumption Encodings, etc.
- Ontology and Rule Reasoning Applications

Goals

<http://ontolog.cim3.net/cgi-bin/wiki.pl?RulesReasoningLP#nid3XS5>

- 1) Sketch out the current field of ontology and rule reasoning: what are the relevant standards, architectures, reasoning methods, reasoning engines, techniques, and applications?
- 2) Provide a perspective on emerging technologies, techniques, and tools relevant for ontology and rule reasoning
- 3) Discuss the issues and architectures involved in developing applications that use ontology and rule reasoning
- 4) Describe visualization and explanation technologies and techniques for ontology and rule reasoning

Mini-Series Program – sessions

[each with co-chairs listed]

<http://ontolog.cim3.net/cgi-bin/wiki.pl?RulesReasoningLP#nid3XRK>

1. RulesReasoningLP: Mini-series Launch Event - Survey and Introduction [Leo Obrst, Benjamin Grosf] [October 24, 2013](#)
2. ***Concepts and Foundations of Rules and Ontologies: Logic Programs, Classical Logic, and Semantic Web - I*** [Leo Obrst, Harold Boley] [Today, October 31, 2013](#)
3. Concepts and Foundations of Rules and Ontologies: Logic Programs, Classical Logic, and Semantic Web - II [Leo Obrst, Pascal Hitzler] [November 21, 2013](#)
4. Guide to Reasoning Applications Development and Cases
[Henson Graves, Ken Baclawski] [December 19, 2013](#)
5. Rule Standards: Common Logic, RuleML, and RIF [Harold Boley, Adrian Paschke, Mike Dean] [January 9, 2014](#)
6. ... And more to come ...

Today's Agenda

- The first of two sessions devoted to addressing the concepts and foundations of the technologies underlying ontology and rule reasoning, especially focused on logic programming and Semantic Web extensions
- Today's Panelists:
 - [HaroldBoley](#) (From Data to Knowledge through Grailog Visualization)
 - [BenjaminGrosz](#) (Hilog, Defeasibility, and the Foundations of Practical Meta Knowledge: A Brief Introduction)
 - [GeorgGottlob](#) (Datalog+/- a Unifying Framework for Ontological Reasoning and Query-Answering)
- Q&A and open discussion (30 min)