*Abstract and Bio for Ontolog Forum webcon presentation*

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**Rulelog: Highly Expressive yet Scalable Logic enabling Cost-Efficient Ontologies**

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We present Rulelog, a new logic that is highly expressive yet scalable, and Textual Logic, a related new approach to natural language processing that does logic-based mapping between English text and Rulelog knowledge. We have developed their theory and implementation techniques in over a decade of research work, including in Vulcan's SILK and Project Halo, jointly with many others. A commercial implementation is underway from Coherent Knowledge Systems, a new startup. RIF-Rulelog is in draft as an industry standard submission to W3C from RuleML.

Rulelog extends normal declarative logic programs (LP) to permit defeasible higher-order logic formulas but achieves computational tractability. Two keys to that tractability are: avoiding unrestricted reasoning-by-cases; and restraint, a kind of bounded rationality that leverages the third truth value ("undefined") in the well founded semantics. Flora-2, an open-source semantic rule engine (built on top of open-source XSB Prolog), implements most of Rulelog's expressiveness.

Rulelog is a "big tent" knowledge representation (KR) that is sound semantically relative to classical logic (e.g., OWL-DL and Common Logic), in addition to supersuming LP (e.g., SPARQL, SQL, and essentially RIF-BLD, OWL-RL/RDF(S), and semantic production rules). Knowledge can thus be translated semantically into Rulelog from all of the above, typically without major (or, in many cases, any) practical information loss.

Rulelog's expressive power enables cost-efficient knowledge acquisition (KA), including about ontologies. KA can start from effectively unrestricted English, via Textual Logic, which includes:

1. Rapid interactive logical disambiguation: Effectively unrestricted English sentences can be semi-automatically disambiguated into Rulelog in rapid fashion. In a pilot study in the domain of college-level biology, roughly 10 minutes of labor per sentence was required by knowledge engineers, using Automata Linguist, a new tool.
2. Textual terminology: Any English phrase corresponds one-to-one to a logical term. Ontological terminology emerges naturally and automatically from English text's phraseology, instead of requiring laborious separate specification and social agreement. This leverages background lexical ontological knowledge about English, available open-source.

In addition, Rulelog's expressive power enables:

1. Seamless mapping: Ontology mappings can be represented concisely and flexibly, and tightly combined in the same logic/system/knowledge-base with ontologies and rules/facts knowledge that employs the ontologies' terminology.
2. Inheritance with exceptions: Ontologies based on class hierarchies can be made more concise and reusable by allowing inheritance to have exceptions, rather than requiring inheritance to be strict (as in OWL/RDF(S)).

**Bio:** (same as at http://www.coherentknowledge.com/team/) 

[Benjamin Grosof](http://www.mit.edu/%7Ebgrosof)  is an industry leader in knowledge representation, reasoning, and acquisition. He has pioneered semantic technology and industry standards for rules, the combination of rules with ontologies, the applications of rules in e-commerce and policies, and the acquisition of rules and ontologies from natural language (NL). He has had driving roles in RuleML, W3C RIF (Rule Interchange Format), and W3C OWL-RL (rule-based ontologies). He led the invention of several fundamental technical advances in knowledge representation, including courteous defeasibility, restraint bounded rationality, and the rule-based technique which rapidly became the currently dominant approach to commercial implementation of OWL. He has extensive experience in machine learning, probabilistic reasoning, and user interaction design.

Dr. Grosof has experience applying core technology for knowledge, reasoning, and related HCI in a wide variety of application areas, including: trust/privacy/security, contracts, compliance, legal, and services engineering; financial/insurance services, risk management, and regulations; defense and national intelligence; biomedical research; and data/decision analytics. From fall 2007 to early 2013, he led a large research program in Artificial Intelligence (AI) and rule-based semantic technologies at Vulcan Inc. for Paul G. Allen; this centered around the SILK system for highly expressive, yet scalable, rules. Previously he was an IT professor at MIT Sloan (2000-2007) and a senior software scientist at IBM Research (1988-2000). He is president of the expert consulting firm Benjamin Grosof & Associates founded while he was at MIT, and is affiliate faculty in the AI group at U. Washington. His background includes 4 major industry software releases, 2 years in software startups, a Stanford PhD (Computer Science), a Harvard BA (Applied Mathematics), 2 patents, and over 50 refereed publications.