RuleML Position Statement

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Context

The RuleML Initiative was founded in 2000 to provide a standard rule language and an interoperability platform integrating various business rule languages, inferencing systems, and knowledge representation paradigms. It has gained increasing momentum within the standards, academic, and industrial communities (e.g., W3C, the Joint Committee, and SWSI/WSMO). The RuleML Initiative will continue its mission as the neutral 'umbrella' organization it has been since 2000, attracting companies to the Semantic Web, providing bridges between other efforts as well as semantics and syntax for rule-oriented languages of the Next Web. Its position and collaboration with all standards bodies gives RuleML the ability to scale its family of sublanguages to meet the needs of various other standardization efforts such as personalization and mobile devices, knowledge and workflow management, as well as privacy, security, and trust policies .

Overview

The RuleML Initiative collaborates with the W3C on the standardization of rules on the Web, including in distributed systems, autonomous computing, the Semantic Web, and semantically enabled Service Oriented Architectures (SOA).

This document acts as an executive summary of the detailed vision and layout for a phased implementation of the standardization process. We will introduce the RuleML layered family and modular categorization of rule types to illustrate our fundamentally scalable and neutral approach. It is important that the lower level concepts find their way across the various layers to ensure consistency of the standard, and enable an efficient reuse of the various rule types and their adoption by other standards, applications, and areas of research and development with an urgent need for rules (Web Services and Semantic Web

Services, Choreography, Policies, Mobile Web and Wireless devices, Privacy standards, Security standards, Business Process Standards, etc.).

The RuleML Initaitive has long collaborated with the JSR94 effort to complement and support the requirements for standard interfaces for rule representation and execution in mainstream software systems. We currently also work towards offering support for Web Services Policy efforts and providing a platform for interoperability of existing ("legacy") rule systems. This is a key effort for all rules vendors, supporters (tools, database, and EAI vendors), as well as users to get involved in the Semantic Web, and help with the adoption of W3C recommendations such as RDF and OWL as well as related specifications such as SWRL and SWSL.

The RuleML Family of Sublanguages

The RuleML vision is an approach integrating various rule paradigms, defining overarching concepts and sublanguage modules that have appropriate expressiveness for the Web representation layers of all kinds of rule-based systems and application domains.

At an early stage, the RuleML Initiative founders defined a family as the starting point for rule standardization. Since then, a number of workshops, agreements, and publications within the Initiative and other standards bodies have helped refine the modular categorization of rules, in the process of maturing them pragmatically, semantically, and syntactically. We started with Derivation Rules, namely Datalog (and its unary and binary specializations), Hornlog, and Equalog, followed with important work on Production Rules, Event-Condition-Action-Postcondition (ECAP) Rules, and a version of the SCLP paradigm.

The current general design is available at the following URL:

http://www.ruleml.org/design/RuleML_Lattice.JPG.

The current implementation of Derivation Rules is accessible from the following URL:

 http://www.ruleml.org/modularization/#Model.

The RuleML Initiative was the first standardization effort to webize rule-based systems in the manner of RDF and N3 (e.g., using URIs for the OIDs of Object-Oriented Databases). Drawing on SHOE, we pioneered the introduction of URIs in logic programming and rule-based systems, and have offered support for other paradigms such as distributed systems (CORBA, DCOM, RMI, Message-based protocols, etc). All RuleML sublanguages are Web-enabled.

Tool support plays an important role for sustaining the family of sublanguages: (1) Translators are available (e.g., in XSLT and Java) to interoperate between

RuleML sublanguages as well as between RuleML and other rule languages; they are being collected at http://www.ruleml.org/translators. (2) Engines are available (e.g., in Java and C#) to interpret RuleML sublanguages; examples are OO jDREW, Mandarax/Oryx, and Sweet Rules. (3) Editors for RuleML are available (e.g., in Mandarax) and IDEs are under development.

Overall Scope

It has been our experience since 2000, that the rule standardization process requires a long-term vision to ensure full understanding of the needs and the requirements of various communities. Each sublanguage also requires a very strict and explicit scope in order to guarantee the delivery of mature results in a phased fashion. We will outline in this section the approach that we intend to follow to achieve our goals. Focussing on certain sublanguages, the , planned W3C Working Group can directly build on RuleML.

W3C WG Scope

The scope we propose for the W3C WG focusses rule sublanguages from more basic expressiveness to first order logic (FOL). "Basic" expressiveness here includes Datalog rules, Horn rules, and probably several additional features as well. All sublanguages are optionally positional, slotted, and webized. The W3C effort in its initial phase (approximately 9 months) would focus on refining this basic specification and integrating it coherently with OWL and RDF.

It would do so while drawing on RuleML (including both LP and FOL RuleML) and other existing designs such as N3, SWSL, Common Logic, and WSML (each of which is more or less closely related to RuleML).

The W3C effort in its second phase (approximately an additional 6-9 months) would focus on extending to additional expressiveness and usages.

All this will build on the long history of interactions between the RuleML Initiative and W3C, including the Semantic Web and Web Services Activities, which already led to a cross-fertilizations between RuleML and W3C efforts.

Moreover, the acknowledged W3C Member Submission on SWRL contains RuleML as the rule component, the pending W3C Member Submission on SWRL FOL contains FOL RuleML as the rule component, and the upcoming W3C Member Submission on SWSL will use RuleML for the SWSL-Rules markup.

Conclusions

The RuleML Initiative was formed in 2000 to provide a neutral platform for the adoption of rules across software systems, and on the Web. It pioneered the Webized representation of a modular family of sublanguages to cater for a variety of needs on the Web, and in distributed platforms. In this paper, we provide a RuleML experience report and propose a technical scope for a working group charter. Details on the RuleML Initiative can be found at http://www.ruleml.org.