Challenges for Rule Systems on the Web

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Nov.-05-2009 RuleML 2009 Challenges

Challenge Goals

- Rule Challenge started in 2007, then 2008, 2009
- What is the semantics of Challenge?
- Inspiring the following PI^3 issues of rule system implementation in the open distributed environment, such as the Web:
  - Portability
  - Interchange
  - Interoperation
  - Integration
- Enabling *de facto* RuleML $\Rightarrow$ RIF to achieve PI^3 of rule systems by using different rule syntax while still preserving their semantics


Challenge Goals (conti.)

Rule Classification

- Deductive (Derivation) rules
- Normative (Integrity) rules
- Reactive (Active) rules
  - Event-Condition-Action (ECA) rules
  - Production rules

- Eventually, achieving the PI^3 issues of rule system implementation for all types of rules.
- But, what are the incentives for rule management system developers to adopt *de facto* standards, such as RIF (or RuleML) in order to enable PI^3?


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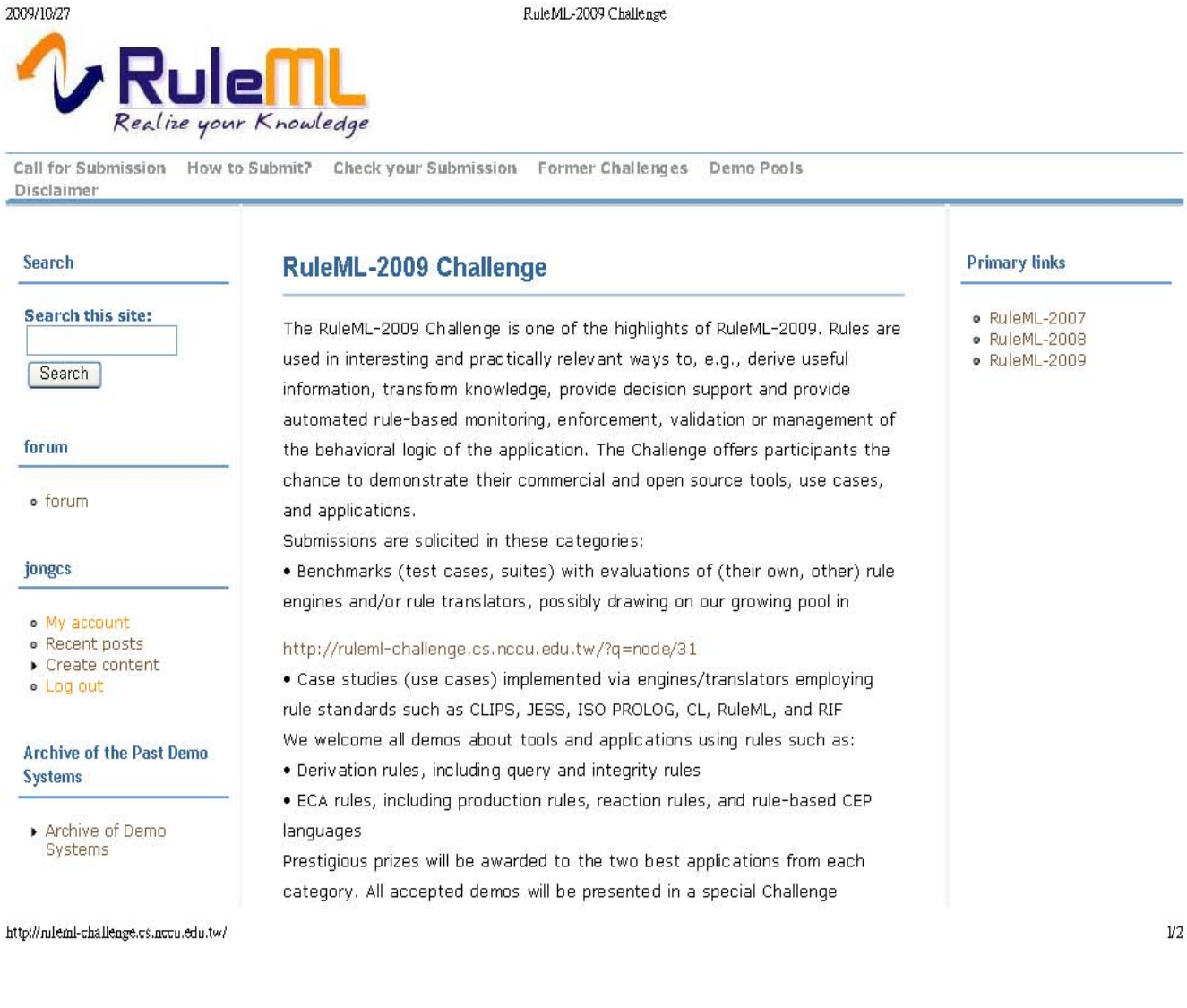
RuleML Challenge Website



2009/10/27 RuleML-2009 Challenge

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- Archive of Demo Systems

RuleML-2009 Challenge

The RuleML-2009 Challenge is one of the highlights of RuleML-2009. Rules are used in interesting and practically relevant ways to, e.g., derive useful information, transform knowledge, provide decision support and provide automated rule-based monitoring, enforcement, validation or management of the behavioral logic of the application. The Challenge offers participants the chance to demonstrate their commercial and open source tools, use cases, and applications.

Submissions are solicited in these categories:

• Benchmarks (test cases, suites) with evaluations of (their own, other) rule engines and/or rule translators, possibly drawing on our growing pool in

http://ruleml-challenge.cs.nccu.edu.tw/?q=node/31

• Case studies (use cases) implemented via engines/translators employing rule standards such as CLIPS, JESS, ISO PROLOG, CL, RuleML, and RIF

We welcome all demos about tools and applications using rules such as:

• Derivation rules, including query and integrity rules

• ECA rules, including production rules, reaction rules, and rule-based CEP languages

Prestigious prizes will be awarded to the two best applications from each category. All accepted demos will be presented in a special Challenge

Primary links

- RuleML-2007
- RuleML-2008
- RuleML-2009

http://ruleml-challenge.cs.nccu.edu.tw/ 1/2

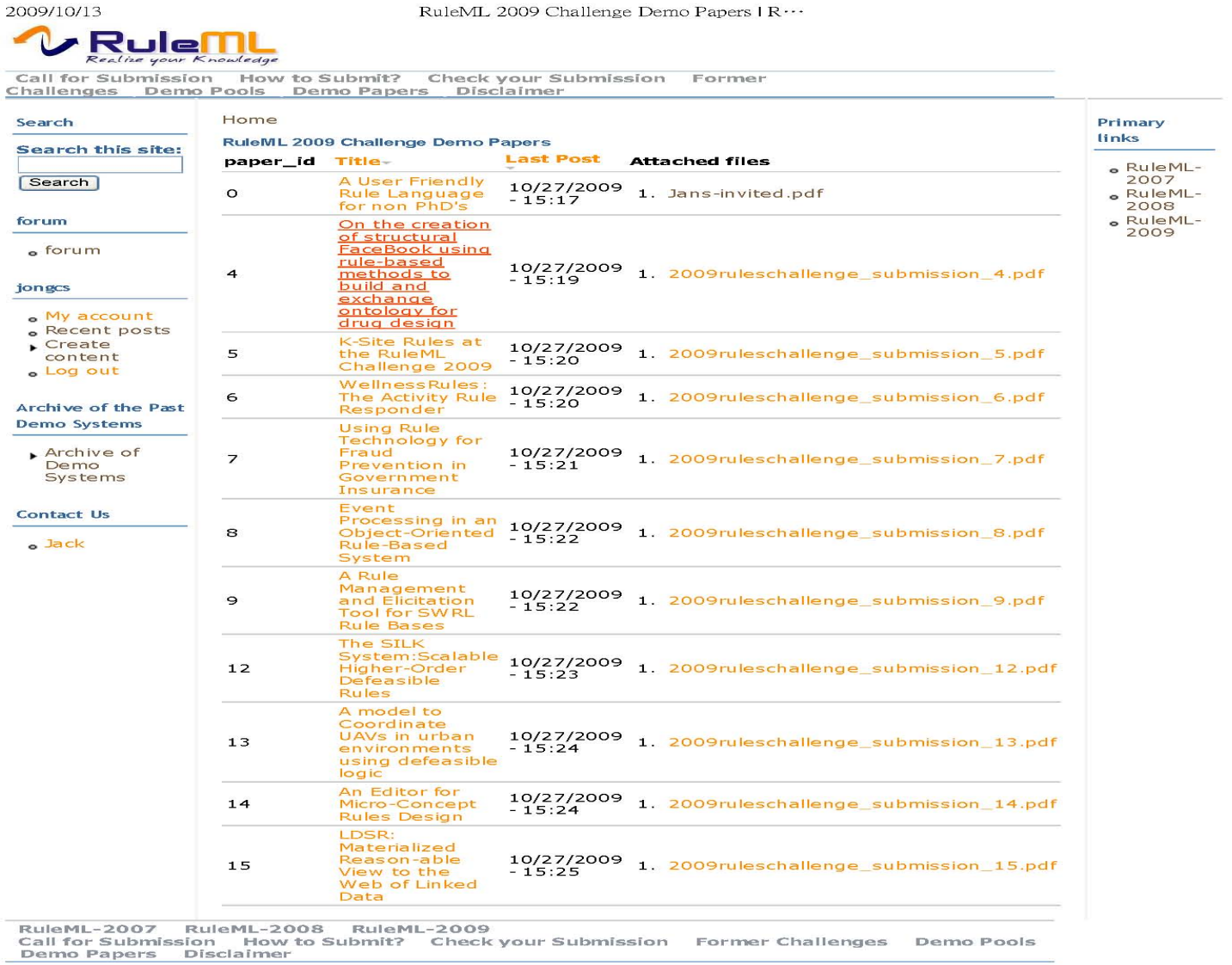
RuleML 2007 Challenge Program

10.15 –12.30 am	Room CLOISTER NORTH
	RuleML-2007 Challenge **Chair: Jochen Hiller**
	Querying the Semantic Web with SWRL *Martin O'Connor, Samson Tu, Csongor Nyulas, Amar Das, Mark Musen (slides)*
	Developing News Awareness with Reactive Rules - An Application for Detecting Scoops Ahead of the Crowd *Marco Seiriö (demo | slide 1 | slide 2 | rules)*
	Implementing the UServ Product Derby with the TAKE rule compiler *Jens Dietrich (slides | demo)*
	GoPubMed *Andreas Doms (movie | demo)*
	Drools *Marc Proctor*
	Implementation of Production Rules for a RIF Dialect: A MISMO Proof-of-Concept for Loan Rates *Tracy Bost, Phillipe Bonnard, Mark Proctor (movie | demo)*
	Extracting and visualizing business rules from legacy source code *Erik Putrycz (slides)*
	The Rule Manager; a graphical business rules environment *Marco Ensing (slides)*
	The OO jDREW Engine of Rule Responder: Naf Hornlog RuleML Query Answering *Benjamin Larry Craig (slides | demo)*
	A Wiki and SOA Endpoint for Rules in Open Vocabulary, Executable English *Adrian Walker (abstract | movie | slides | demo)*


RuleML 2008 Challenge Program

RuleML-2008 Challenge Chair: Yuh-Jong Hu
Storing and Querying RIF Rules in pureXML *Susan Malaika*
Please Pass the Rules: A Rule Interchange Demonstration *Gary Hallmark, Christian de Sainte Marie, Marcos Didonet Del Fabro, Patrick Albert and Adrian Paschke*
Self-sustained Routing for Event Diffusion in Sensor Networks *{RuleML-2008 Challenge Winner Award}* *Kirsten Terfloth and Jochen Schiller*
On Extending RuleML for Modal Defeasible Logic *Guido Governatori and Duy Pham*
Building Collaborative Legal Rulebases with Jureeka! *{RuleML-2008 Challenge Runner-up Award}* *Michael Poulshock*
Seamless Software Evolution with Rule Based Control Flow Externalization *Urjaswala Vora, Peeyush Chomal, Rahul Upadhyay and Abhishek Tewari*
PROLOGA: from Business Knowledge Modeling to RuleML *Jan Vanthienen*
Deploying a Distributed Symposium Planner Through Rule Responder *Benjamin Larry Craig*
Symposium Dinner

RuleML 2009 Challenge Program



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RuleML 2009 Challenge Demo Papers

paper_id	Title	Last Post	Attached files
0	A User Friendly Rule Language for non PhD's	10/27/2009 - 15:17	1. Jans-invited.pdf
4	On the creation of structural FaceBook using rule-based methods to build and exchange ontology for drug design	10/27/2009 - 15:19	1. 2009ruleschallenge_submission_4.pdf
5	K-Site Rules at the RuleML Challenge 2009	10/27/2009 - 15:20	1. 2009ruleschallenge_submission_5.pdf
6	WellnessRules: The Activity Rule Responder	10/27/2009 - 15:20	1. 2009ruleschallenge_submission_6.pdf
7	Using Rule Technology for Fraud Prevention in Government Insurance	10/27/2009 - 15:21	1. 2009ruleschallenge_submission_7.pdf
8	Event Processing in an Object-Oriented Rule-Based System	10/27/2009 - 15:22	1. 2009ruleschallenge_submission_8.pdf
9	A Rule Management and Elicitation Tool for SWRL Rule Bases	10/27/2009 - 15:22	1. 2009ruleschallenge_submission_9.pdf
12	The SILK System:Scalable Higher-Order Defeasible Rules	10/27/2009 - 15:23	1. 2009ruleschallenge_submission_12.pdf
13	A model to Coordinate UAVs in urban environments using defeasible logic	10/27/2009 - 15:24	1. 2009ruleschallenge_submission_13.pdf
14	An Editor for Micro-Concept Rules Design	10/27/2009 - 15:24	1. 2009ruleschallenge_submission_14.pdf
15	LDSR: Materialized Reason-able View to the Web of Linked Data	10/27/2009 - 15:25	1. 2009ruleschallenge_submission_15.pdf

Primary links

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Rule and Data Model

- Previously, rules cope with the data model, e.g., relational database (RDB) or object-oriented database (OODB)
- Currently, rules integrate with ontologies, RDF(S), OWL-DL (OWL 2)
- So, the challenge for rule systems is more than mere rule representation
- Further consider the integration issue of rule with its corresponding data/knowledge model is unavoidable!
- However, compatibility of reactive rules with RDF(S) and OWL DL (OWL 2) is still unclear?


Semantic Web Languages

Ontology or/and Rule Language

Semantic Web Languages Classification

- Ontology Languages: RDF(S), OWL-DL, OWL2
- Rule Languages: N3, RuleML, R2ML, RIF
- Ontology+Rule Language: SWRL, OWL 2 RL profile, OWL 2+RIF?

- Up to now (2009), RIF, including RIF Core, RIF-BLD, RIF-PRD are W3C candidate recommendations
- Semantic web languages are ingredients to semantics-enabled policy languages.
- Why semantics-enabled policy language leverages semantic web language?


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Semantics-enabled Policy Language

Combination of Rule and Ontology

Combination of Ontology and Rule

- We only consider homogeneous combination
- DLP $\rightarrow$ SWRL $\Rightarrow$ What's next?
- Rules in the OWL 2 Profiles:
  - OWL 2 EL
  - OWL 2 RL
  - OWL 2 QL

- Why not consider hybrid combination?
  - computational decidability
  - Web-enabled issue
  - Availability of ontology and rule systems development tools


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Semantics-enabled Policy Language (conti.)

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Policy Language Classification

- DL-based policy language: Rei, KAoS
- LP-based policy language: RuleML, RIF, Protune
- AIR (AMORD In RDF): RDF and N3

- Designing/Enforcing Policies as combination of ontology and rule (or as either ontology or rule) for business processes and semantic web services are interesting research issues.
- Legalized semantics-enabled policy is another one.


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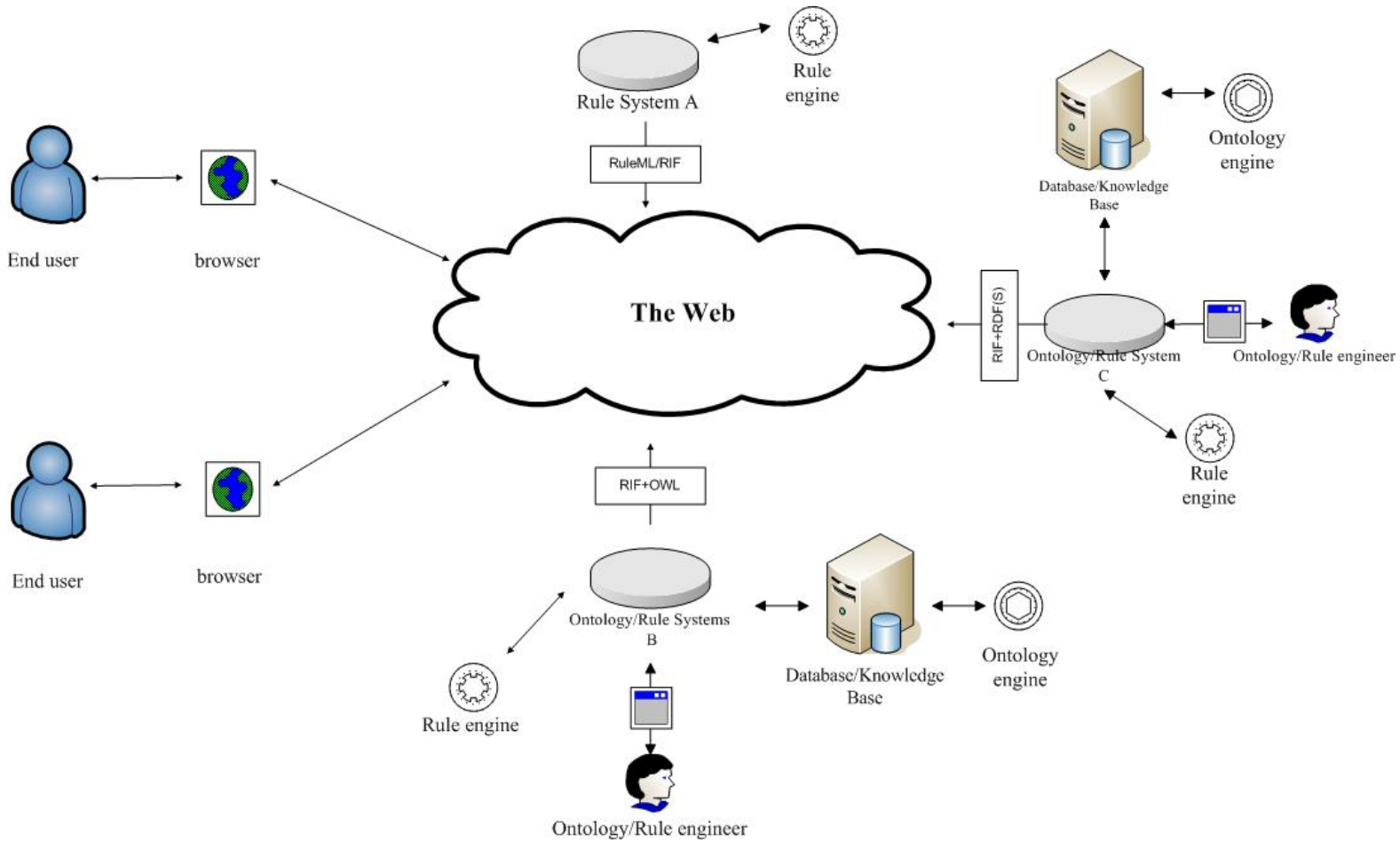
Enforcing Rule Systems on the Web



Rule Management Systems and Engines

- Rule systems integrated in the semantic web development framework:
  - Protégé
  - ARQ Jena, ARC 2
  - Eclipse (or UEStudio) IDE
- Standalone rule management systems:
  - Commercial rule systems and engines
  - Academic rule systems and engines
- Benchmark for the rule systems and engines: not ready yet??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Grand Challenges for Rule Systems on the Web

1. Webizing knowledge representation
   1. Webizing ontologies
   2. Webizing rules
   3. Webizing ontology+rule?
2. Open source vs. proprietary rule systems
3. Rules vs. SPARQL (or SPARUL) and OWL 2 QL, Co-existent or Competetive?
4. Compatibility RIF with RDF(S) or OWL DL (OWL 2) data sources
5. Enabling heterogeneous rule systems on the (Semantic) Web
6. The successful key factor is having enough successful use cases with a sufficient amount of empirical data sets on the Web for rule systems to play with!