

Semantic Standards for Agility

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Standards, Semantics and Rules

Abstract:

- Enterprise modelers are increasingly interested in the semantic integrity and implementation-independence of the business models that underlie service-oriented architectures and object or data models used in applications.
- The semantic web framework offers the most mature and broadly accepted semantic modeling capabilities and the most logically clean and capable formalisms for rules available.
- This framework includes OWL, the web ontology language and the semantic web rule language (SWRL) and its first-order logic extension (SWRL-FOL).
- At the same time, model-driven architecture (MDA) and emerging standards for production rule representation (PRR) and the semantics of business vocabulary and rules (SBVR) from the Object Management Group (OMG) increasingly emphasize implementation independent semantics in enterprise application development.
- This presentation examines the convergence of the business rules community, OMG and W3C on semantics as the critical issue for business rules to realize their promise in mainstream application development.



MDA targets business and technology change

- separates ... logic from ... technology
- document business functionality and behavior
- separate it from the technology that implements it
- insulates it from technology churn

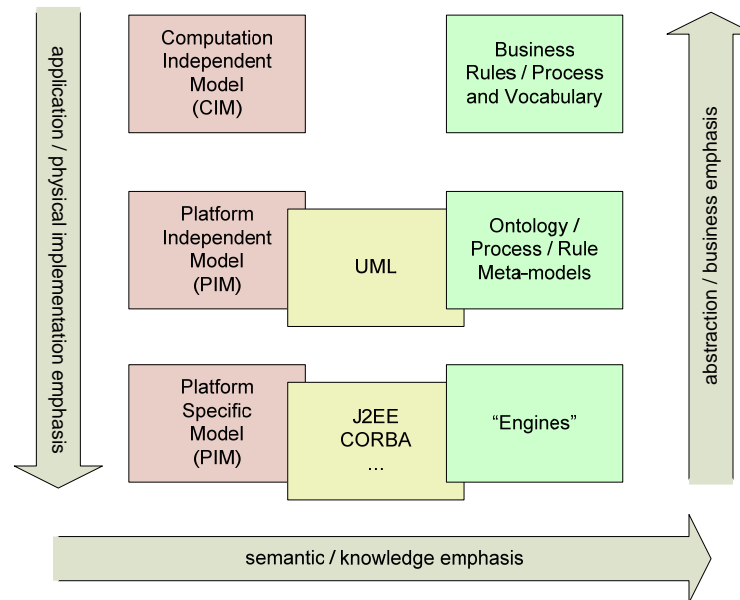
<http://www.omg.org/mda/>

OMG's Model Driven Architecture ® (MDA ®) provides an open, vendor-neutral approach to the challenge of business and technology change. Based on OMG's established standards, the MDA separates business and application logic from underlying platform technology. Platform-independent models of an application or integrated system's business functionality and behavior, built using UML and the other associated OMG modeling standards, can be realized through the MDA on virtually any platform, open or proprietary, including Web Services, .NET, CORBA®, J2EE, and others. These platform-independent models document the business functionality and behavior of an application separate from the technology-specific code that implements it, insulating the core of the application from technology and its relentless churn cycle while enabling interoperability both within and across platform boundaries.

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MDA and business rules share benefits

- The OMG is considering a proposal for a PIM for production rule representation (PRR)
 - > This will reduce or eliminate the onus of (repeatedly) mapping business rules to UML
 - > Enterprises using MDA will benefit from externalized rules
- Expect adoption in 2007, enterprise utility in 2008



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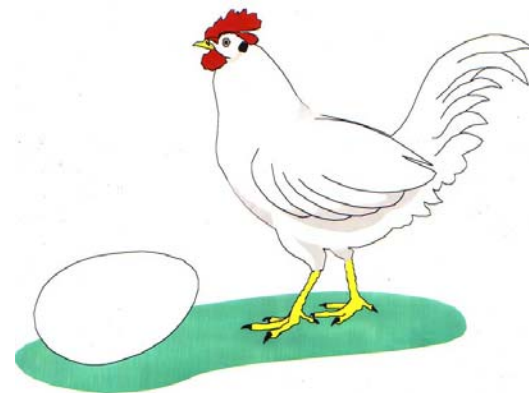
Will business rules break out?

- but production rules are programming technology

Metamodels that Specify Information Systems at the PIM/PSM Levels

Name	Type	Developed by	Used by	Form	Reference
13211 Prolog	Standard	ISO		document	www.iso.org
Production Rules Representation	Proposed Specification	OMG		XMI	www.omg.org
RuleML	Metamodel	Consortium (see reference)	Mandarax, the website contains a list of 40 participants (mostly academics)	DTD	www.ruleml.org
SWRL	Metamodel	DAML		XML Schema	www.daml.org

- Shouldn't business rules be at the business level?
- Do rules drive the modeling that drives the architecture?
- Or is capturing a rule only possible after modeling?



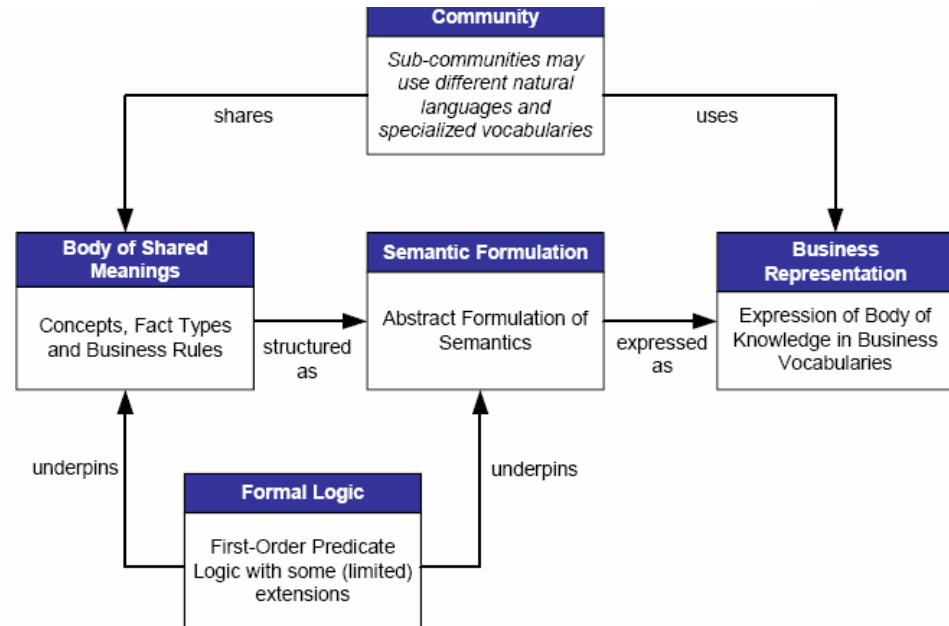
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Semantic modeling at OMG

- SBVR is focused on formal, unambiguous capture of business rules using a normalized vocabulary

If the drop-off location of a rental is not the EU-Rent site of the return branch of the rental then it is obligatory that the rental incurs a location penalty charge...

- Builds on first order logic

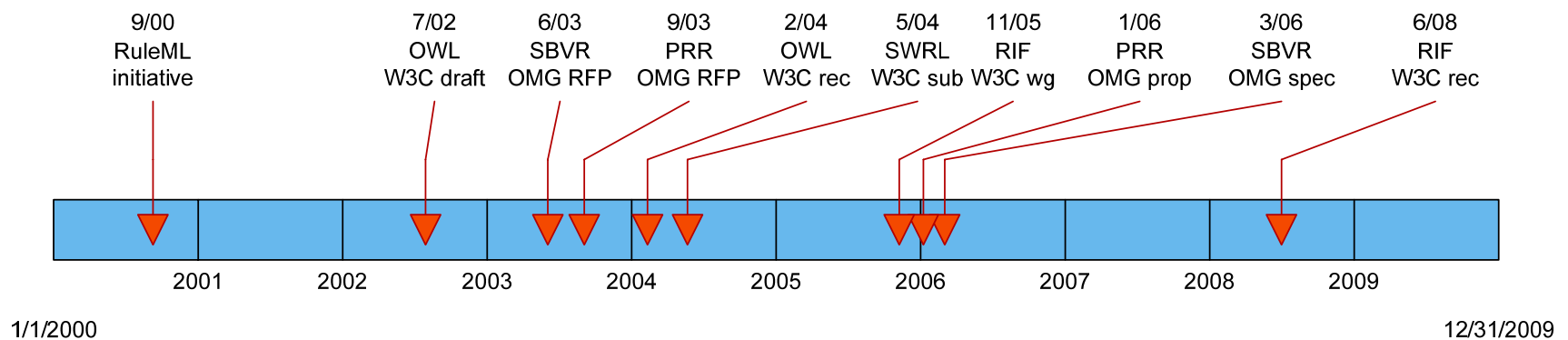


- > but PRR cannot handle logic!
- > and mapping from SBVR to PRR is TBD!

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W3C is helping out

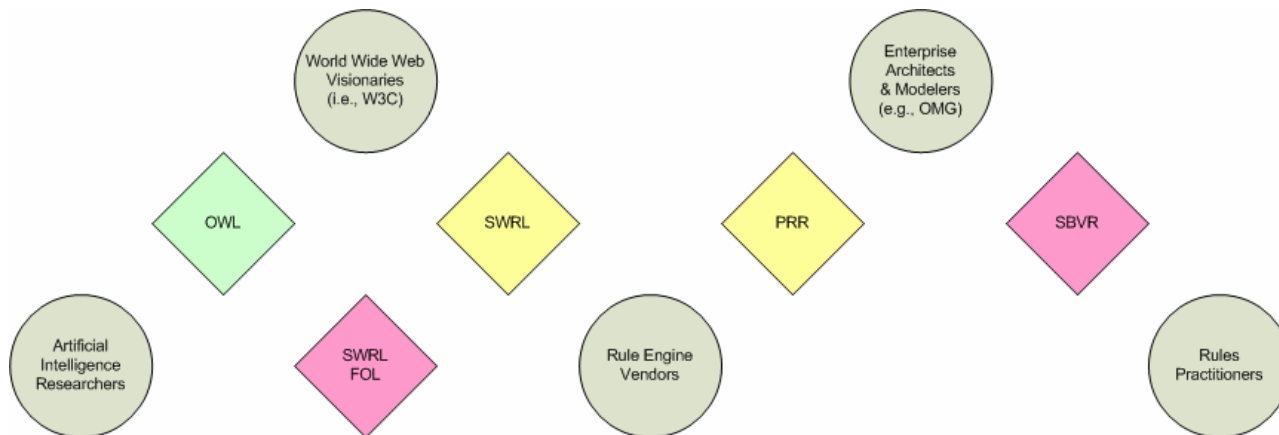
- Semantic web ontology language standard
 - > OWL includes taxonomy and logic
- Semantic Web Rule Language
 - > SRWL = OWL + RuleML
- Working on rule interchange format (RIF)
 - > expect logic in addition to PRR
 - > 1st drafts w/o logic expected 2007



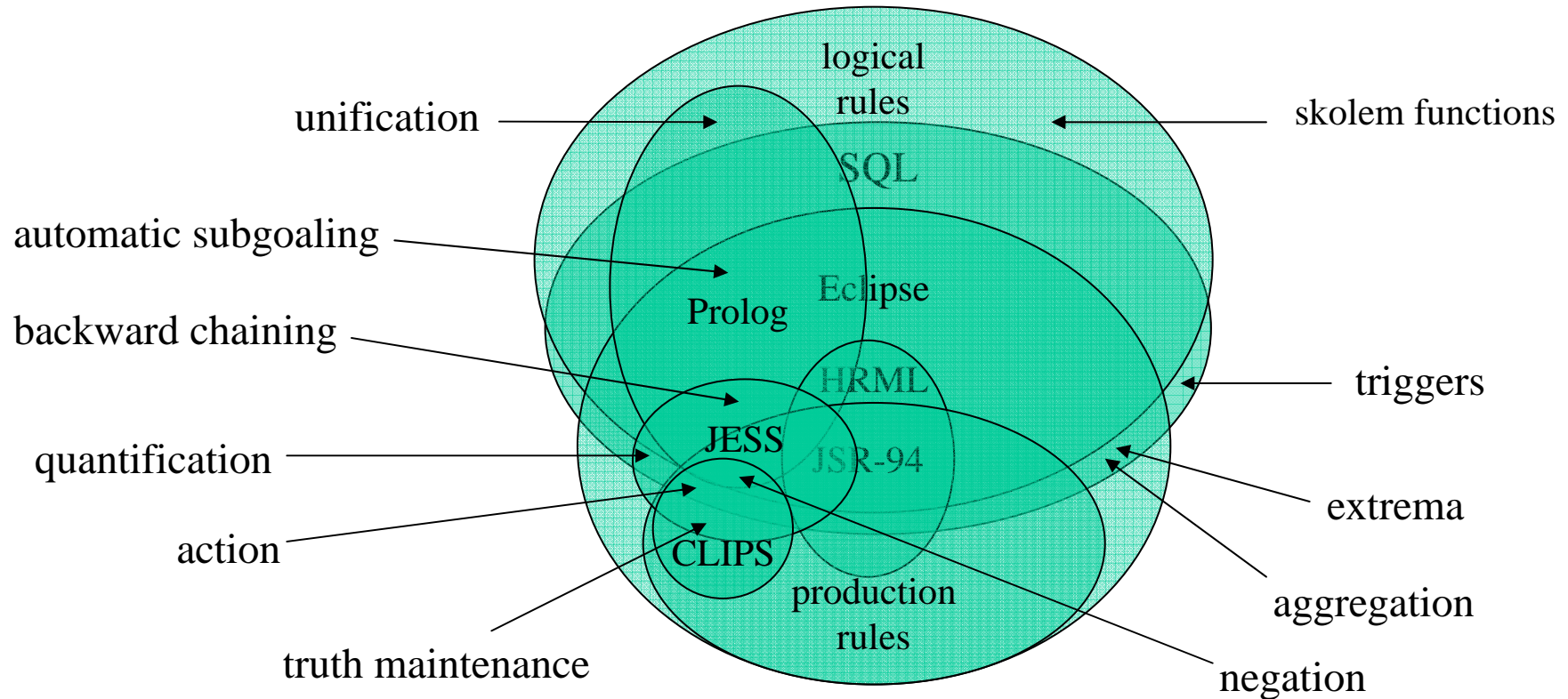
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Challenging issues for convergence

- Interchangeable semantics w/ SBVR or OWL
 - > Unknown between W3C and OMG
 - > Interoperability limited to W3C pending ...
- Commercial traction for logic unclear
 - > Business has practical issues with FOL
 - > AI researchers have issues with business rules

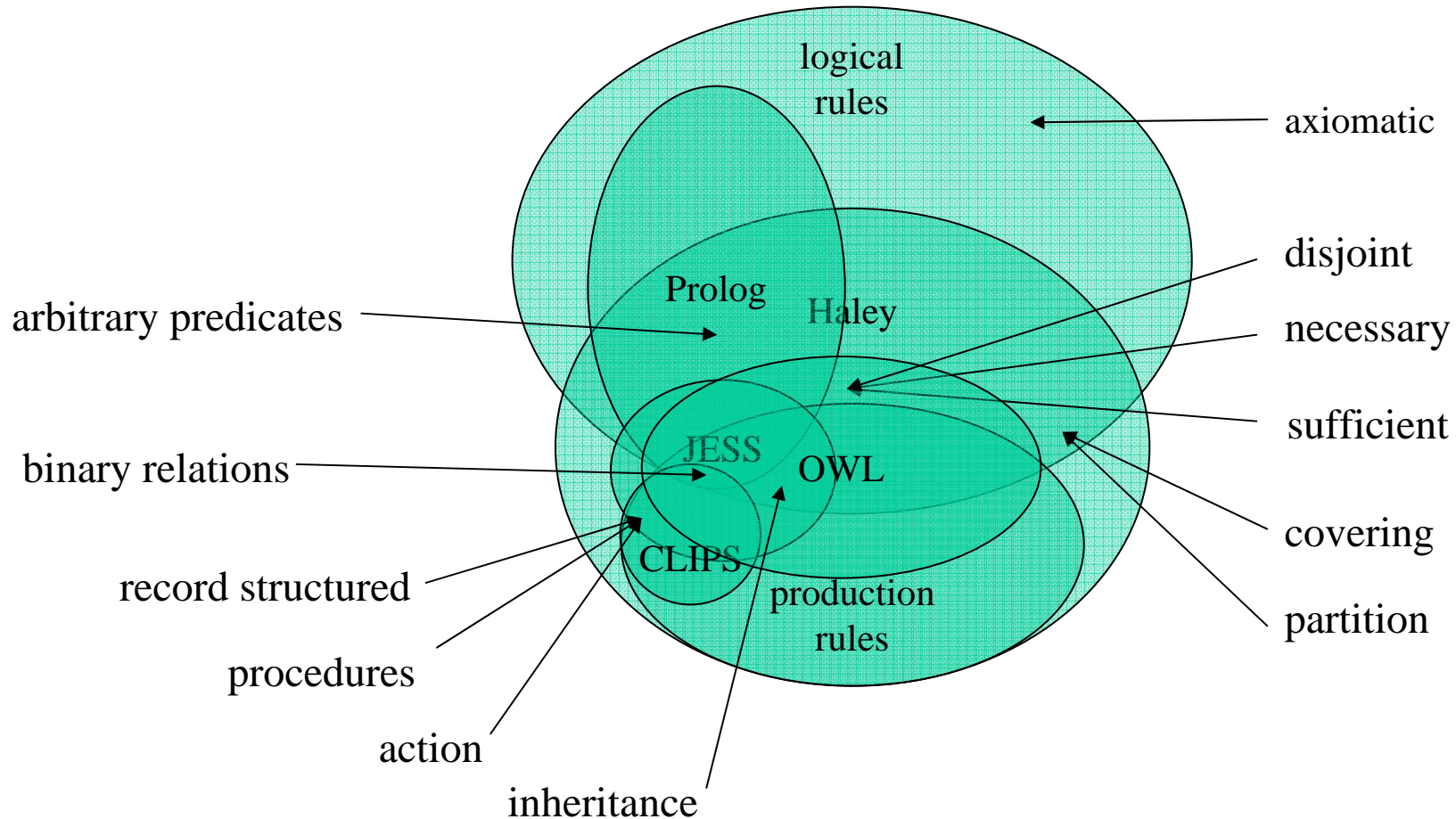


Logical capabilities of PRR and BRE



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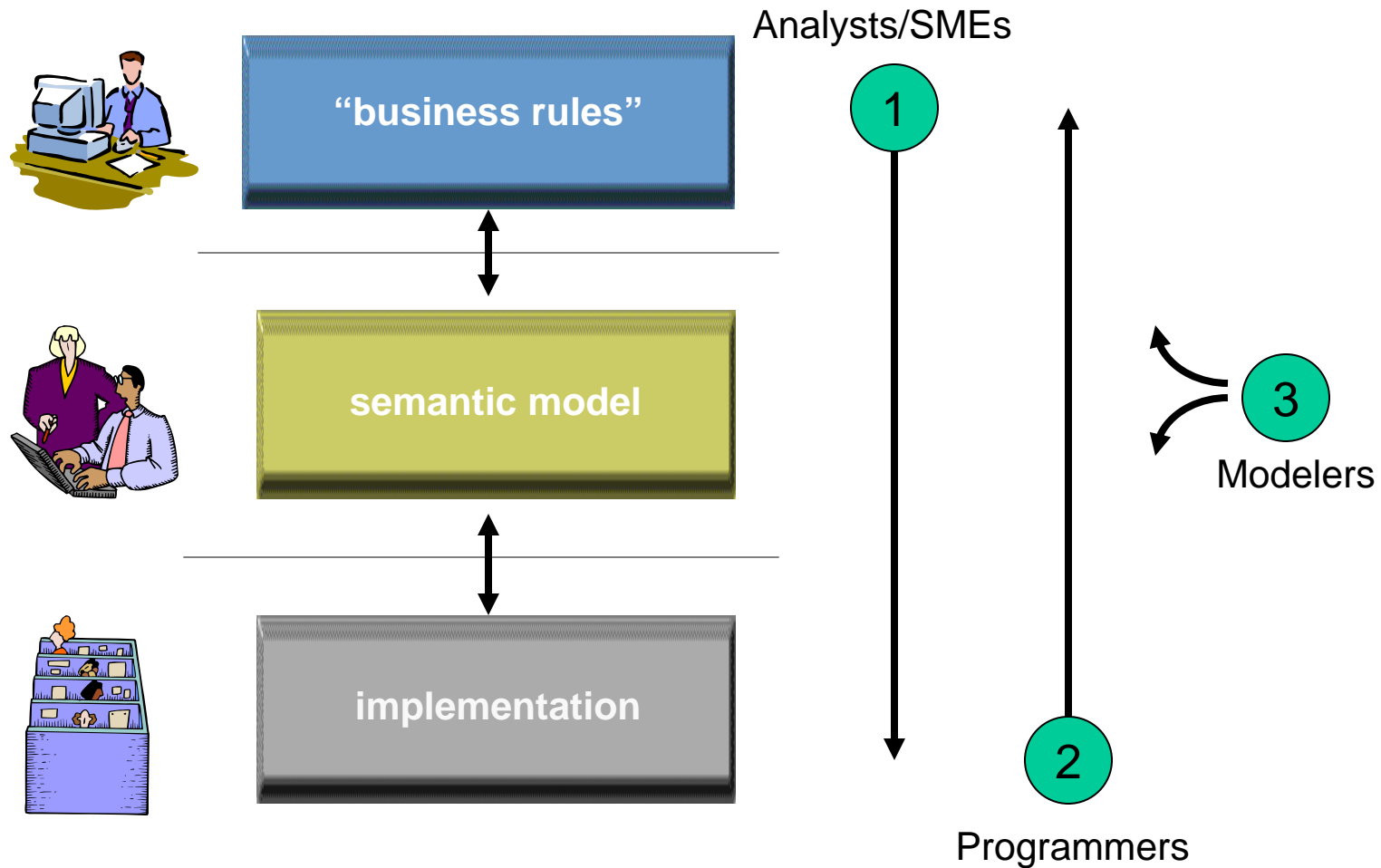
Ontological semantics of OWL and rules



Note that arbitrary OWL in its fullness covers 1st order logic but is practically targeted at ontology definition using description logic

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Different views of agility requirements



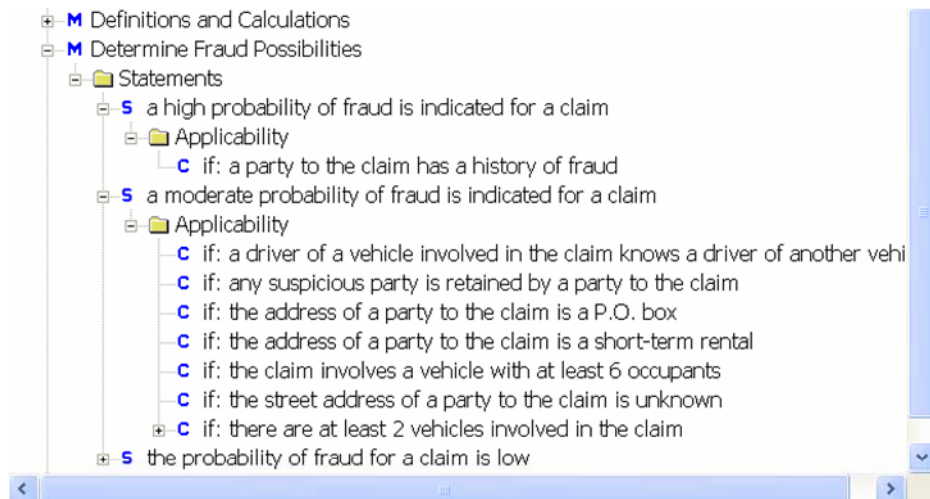
A practical view

- BRMS objective:
 - > Unify SBVR concepts with OWL taxonomy
 - > Unify SBVR roles with SWRL-FOL predicates
 - > Map SBVR / SWRL-FOL to interoperable rules
 - > Support SWRL-FOL and SBVR interchange
- BRE objective:
 - > requisite extended logical capabilities
 - > compatible with interoperable rules from BRMS
- Interoperability objective
 - > XML rule format pending RIF
 - > HRML addresses interoperability
 - » Open XSD and documentation
 - » Funding 3rd party / open source BRE support
 - » see <http://www.haley.com/HRML.html> for research and contributions
 - > Covers PRR functionality plus requisite extensions
- Open issues:
 - > SBVR is similar to Authority
 - > albeit without natural language understanding or BRE deployment
 - > targets our BRE which supports extensions of PR required for SBVR to gain traction
 - > but Authority does not meet the BRMS interchange requirement above



The business user view

- Separate the capture and management of business logic from interoperability concerns
 - > understand business rules in their natural language
 - > support other useful metaphors
- Map between intuitive metaphors and interoperable formats automatically
 - > acquire taxonomy and language incrementally during the capture process
 - > separately acquire and perform CIM / PIM mappings

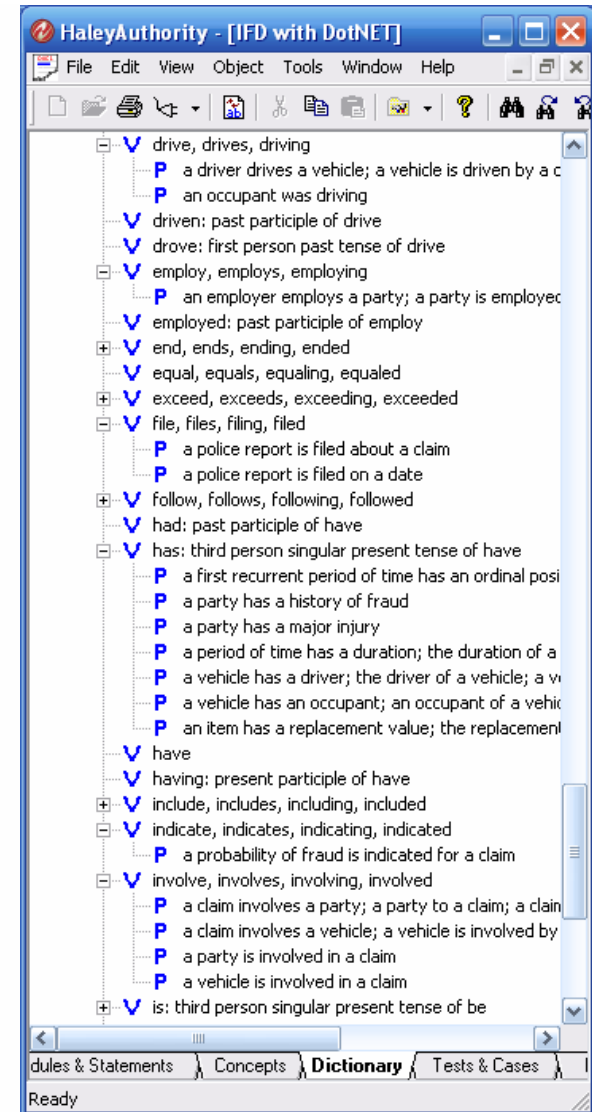
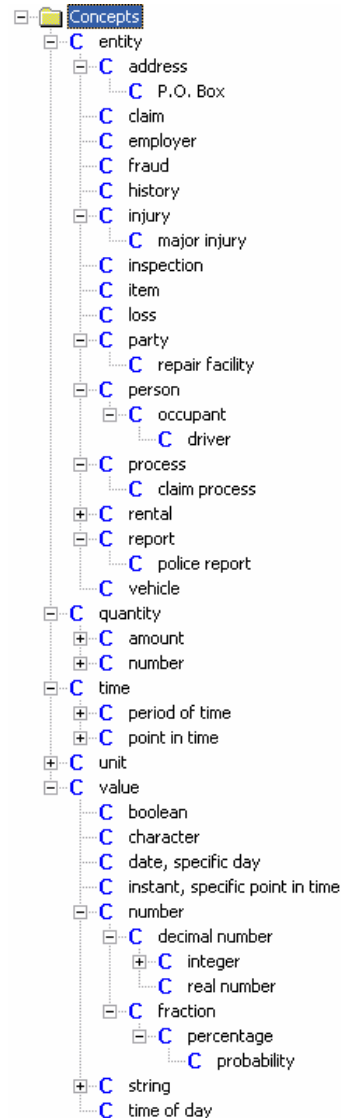
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Ontologies need vocabulary!

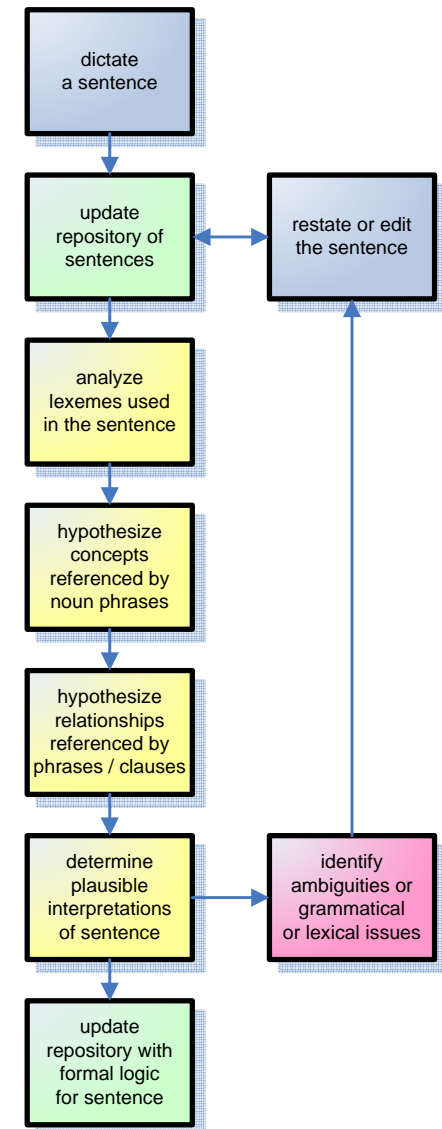
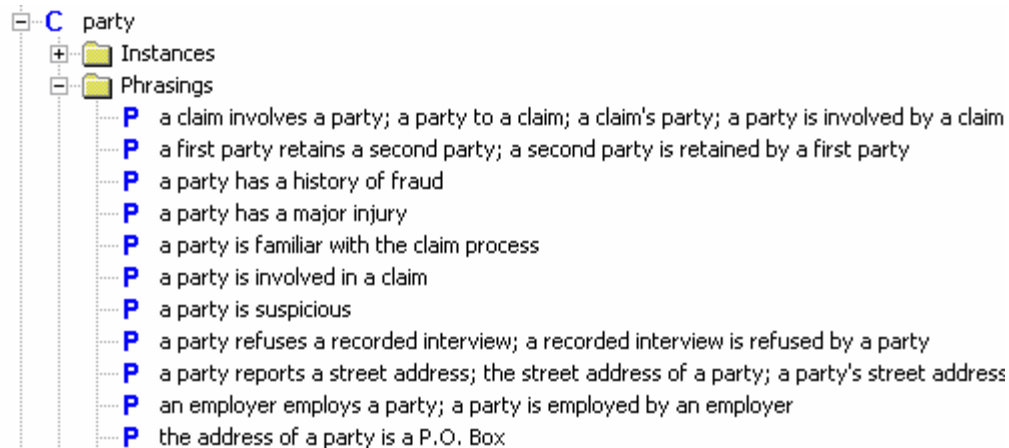
- Without both, translation from natural language to interoperable formats is not feasible
- Required for people who are not overly formal or technical to perceive relevance
- That is, necessary for mainstream adoption of BRE via target user community of BRMS market

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Understanding rules w/ linguistic ontologies

- Capture business rules without regard to OMG or W3C
 - > don't rewrite rules in SWRL-FOL or SBVR
 - > derive SWRL-FOL or SBVR from rules
- Acquire ontology and vocabulary at the same time
 - > don't write rules based on OWL ontology
 - > don't limit rules to SBVR vocabulary
 - > build the ontology and acquire the vocabulary needed to understand what is captured



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Ontologies relevant to business rules

- Upper ontologies as in SUMO, Cyc, Authority
- Ontologies based on industry standards (e.g., XSD)
 - > ACORD
 - > MISMO
- Regulatory mandates
 - > esp. healthcare
- OWL ontologies
 - > many healthcare related
- CRM
 - > e.g., salesforce.com

P a building does not include a number of basements
P a building does not include a number of fire divisions
P a building does not include a number of stories
P a building does not include a number of units
P a building does not measure an amount of area
P a building has been occupied for a duration
P a building includes a number of basements
P a building includes a number of fire divisions
P a building includes a number of stories
P a building includes a number of units
P a building is covered by a commercial coverage
P a building is located an amount of distance from a fire hydrant
P a building is located an amount of distance from a fire station
P a building is located in a location
P a building is not covered by a commercial coverage
P a building is not located in a location
P a building is not occupied during a construction
P a building is not under construction
P a building is not vacant
P a building is occupied during a construction
P a building is under construction
P a building is vacant
P a building measures an amount of area
P a building was built in a specific month
P a building was not built in a specific month
P a building's amount of area
P a building's number of basements
P a building's number of fire divisions
P a building's number of stories
P a building's number of units
P a commercial coverage covers a building
P a commercial coverage does not cover a building
P a fire hydrant is located an amount of distance from a building
P a fire station is located an amount of distance from a building
P a number of basements is included by a building
P a number of basements is not included by a building