RuleML Opening Remarks for the Ontolog Mini-Series on RulesReasoningLP

Harold Boley, Adrian Paschke, Tara Athan

Ontology, Rules, and Logic Programming

for Reasoning and Applications (RulesReasoningLP)

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Some (Meta-)Terminology

We often say "Ontology and Rules" … but:
How does (Formal) Ontology relate to (Formal) Rules?

- $Ontology_{DL}$ Π $Rules_{Datalog}$ = DLP (used in OWL 2 RL)

- $Ontology_{FOL}$ Π $Rules_{Horn}$ = $Rules_{Horn}$

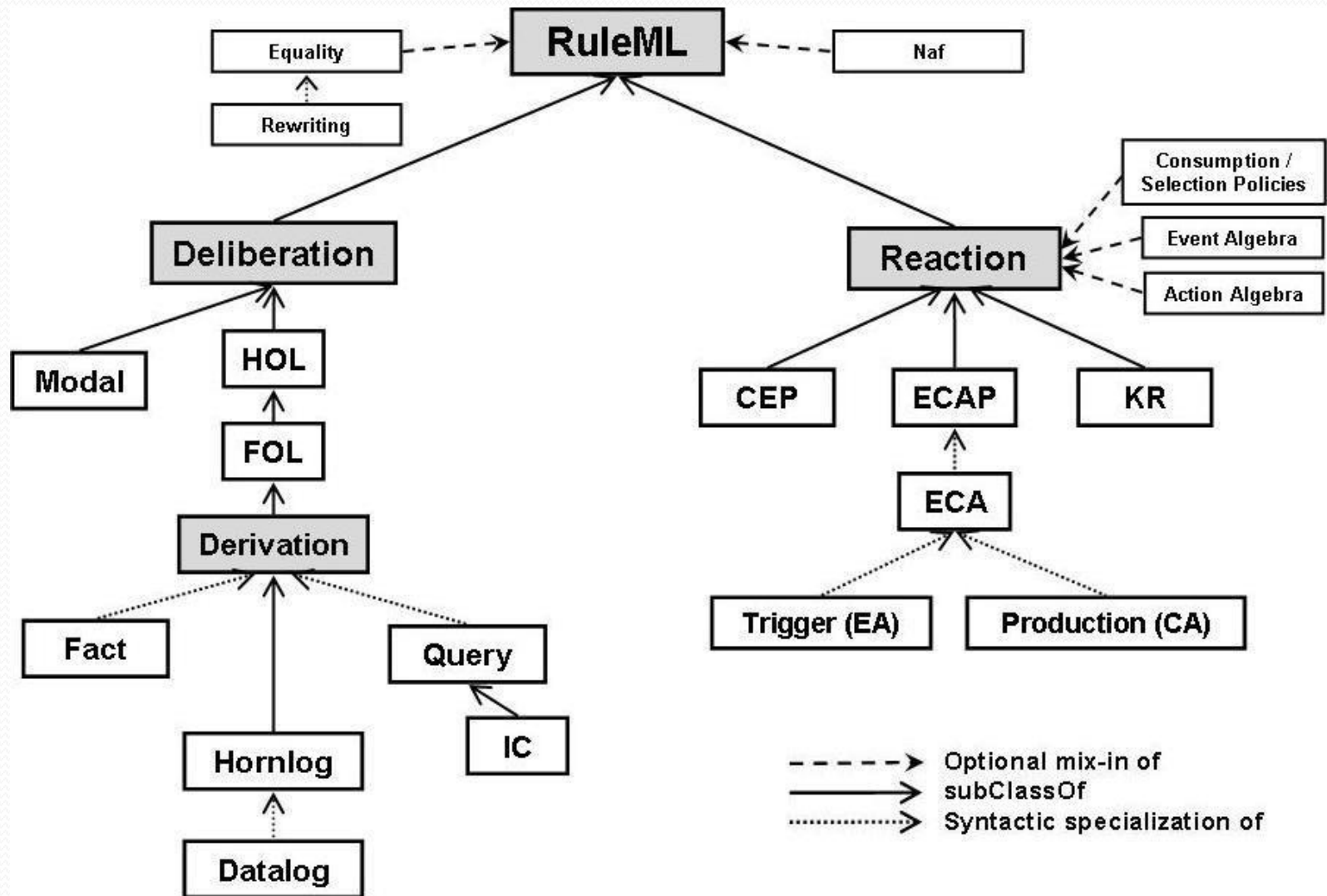- $Ontology_{FOL}$ Π $Rules_{RuleML}$ = $Ontology_{FOL}$ (cf. next slides)

Legend:
Datalog = Horn* without complex terms, DL = Description Logic, DLP = DL Programs,
FOL = First Order Logic, Horn = Horn logic, RuleML = Rule Markup Language

*Often, e.g. in LP, Naf Horn (Horn with Negation as failure) is used as the basis

RuleML Family of Sublanguages (1)

RuleML Family of Sublanguages (2)

- RuleML family covers a wide rule spectrum, from **Deliberation** rules to **Reaction** rules
  - Rule condition part reused across the spectrum
  - Syntactic uniformity enables further reuse
- Family constitutes a deep sublanguage lattice
  - Major sublanguage inclusion path:

    Deliberation $\supset$ HOL $\supset$ **FOL** $\supset$ Derivation $\supset$ **Hornlog** $\supset$ Datalog $\supset$ ...

- Naf mix-in customization of Hornlog RuleML (Naf Hornlog RuleML) leads to Logic Programs

Reaction Rules

Reaction RuleML

Active Databases	Production Rule Systems	Rule-Based Event Notification Systems / Distributed Complex Event Processing	KR Event / Action / Transition / Process Logic Systems

| * Transient Events
* ECA Paradigm
* Global Active Rules
* Trigger (EA Rules)
* Complex Event Algebra | * Implicit Sequence of Knowledge Updates
* CA Rules | * Event / Action Messages
  - Inbound / Outbound
  - Enterprise Service Bus
* (Agent) Conversation
  - Protocols
  - Performatives (e.g. FIPA ACL) | * Event / Action Axioms
* Reasoning on Effects / Transitions
  - fluents / states / processes
  - akin to e.g. state machines, petri-nets or pi-calculus |

Spatio Ontology	Action Ontology	Situation Ontology	Process Ontology	Agent Ontology
Temporal Ontology	Event Ontology			

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Endorsement and Support

- It is crucial for the ontology community at this point to *connect* **Web rule/ontology** efforts *across academia, standards bodies, and industry*

- The **RulesReasoningLP** collaboration of *Ontolog* with *RuleML* and *others* will foster and enhance these connections

- This Ontolog Mini-Series is a **Big Step** for our networked community of communities!