OWL-S Issues

DAML Web Services Coalition

Presented by:

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http://www.daml.org/services/

Top-level Outline

- **Language status (25 min.)**
  - **OWL-S Status & Evolution (David Martin)**
  - **New features of process model; surface language (Mark Burstein)**
- **Security extensions (Tim Finin) (20)**
- **Supporting products (Katia Sycara) (10)**
  - **Tools, demos, use cases**
- **Outreach & uptake (Katia) (10)**
  - **Standardization efforts & strategies**
  - **Users, workshops, books, papers**
- **Open issues & challenges (David) (10)**
- **Roadmap for language evolution (David) (15)**
  - **Transition to SWSL**

Profile: Issues

- Relationship to Process Model may need further clarification
- OWL is well suited to characterizing & classifying services
- But greater expressiveness needed for many things (contracting & negotiation)

Process Model: Issues

- Polymorphism of parameters
- Functional Data Transform (with dataflow)
- Exceptions
- Synchronization constructs
- Grid / OGSA tie in
- Execution traces
- Process control (lifecycle) / monitoring
- Mixed process vs. separate
- Multiparty interactions; process visibility
  - Cross role interaction style
  - More explicit messaging

Grounding: Issues

Issue: update for WSDL 2.0 (when final)

- May generate new WSDL requirements (e.g. for conditional outputs)
- Mismatch of “service”; no match for WSDL faults

- OWL / WSDL Mapping mechanisms
  - XSLT works, but not transparent
  - Put more mapping info in the grounding ontology (?)
  - Interesting issues around direct use of OWL in WSDL specs

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Roadmap

- Finalize 1.1 (June)
- OWL-S Note (?)
- Transition to SWSL
- SWSL Note: September 2004

Transition to SWSL

- OWL-S Profile + Atomic Process + Grounding, enhanced with Rules
- Replace/extend the OWL-S composite Process model with concepts from the core of PSL
- Convergence with “high-level” languages
  - F-Logic + HiLog + CTR

The Why and How of Near-term Impact in SWS's

- Policies in Security/Trust, Contracts, Advertising, Monitoring
  - Combine rules + ontologies in LP
  - Extend OWL-S profile
- Verification of process properties, compatibility, and enactment
  - Combine ordering constraints with pre-conditions/effects as in PSL
  - Extend OWL-S grounded atomic processes
  - Longer term: (semi-)automated composition

“Divide and Conquer”

Key observation: LP better for some things, FOL for other things

1. “SCAMP”: Identify short-term deliverable in space of negotiation, contracts, matchmaking
   - One starting point: OWL-S profile
   - Using LP basis
2. Identify short-term deliverable in space of specifying process-related aspects of web services
   - Starting points: partial spec of process sequencing (Singh event algebra?) + pre-condition/effect
   - How: Using FOL basis
3. “Bridge”: Identify a core conceptual ontology that
   - Can support activities of the first two bullets
   - Can be specified in LP
   - Can be specified in FOL

SCAMP drill down: Goals of Version1

- Develop upper and middle ontology in selected areas
- Policy specification and enforcement
  - TRUST: policies for security, access, privacy
  - Contracts: pricing, delivery, cancellations, non-performance
  - Monitoring: task of enforcing policies, policies for dealing with non-compliance, exceptions
  - Borrow from ebXML, EDI, XACML, P3P, LegalXML,…??
- Simple advertising/discovery
  - E.g., based on keywords and simple ontology
  - More complex dynamic discovery not focus of version 1
- "Data Mapping": not a focus for version 1
  - Larger than just semantic web services
  - Other groups working on it – XML, U Wash, …
  - Will wait for dust to settle; can be incorporated

Process modeling drill-down: Goals for Version 1

- Need: mechanism for blending different aspects of SWS
  - World-modifying actions
  - Activity ordering constraints
    - More abstract than OWL-S 1.0 process model, Petri nets, automata
- Goal: Ontology/language that permits specifying properties of services, incorporating the above
  - Primary application: Verifying properties, compatibility
  - Later: other analysis; optimization; auto-composition; monitoring
- Minimum requirements
  - Selected components of PSL-(outer)core
  - At least as powerful as Singh's event algebra
  - Pre-conditions and effects
- Deliverable:
  - Technical document with proposal and rationale
  - One or more exemplary use cases

Conceptual Core Ontology: Drill-down for Version 1

- Challenge
  - LP approach “good” for policies and contracts
  - FOL approach “good” for axiomatization
- Goal: Provide a single ontology to support these and other specification/reasoning paradigms
  - Perhaps specify using set-theoretic formalism
    - “Easy for layman to understand”
  - Should be axiomatizable in FOL
  - Should be specifiable in LP
  - If we succeed, then both FOL and LP can build out from the common basis
- Starting point
  - PSL-(outer)-core: exists mapping to set-theoretic formulation
- Deliverable: ????

The End

- www.daml.org/services
  - www.daml.org/services/owl-s
  - www.daml.org/services/swsl
  - www.daml.org/services/swsa
- Ontologies, docs, examples
- Community:
  Publications, tools, use cases

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1. “SCAMP”: Identify short-term deliverable in space of negotiation, contracts, matchmaking
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   - How: Using FOL basis

Requirement: That (1.) and (2.) interoperate

SCAMP drill down: Goals of Version1

- Key foci
  - Policy specification and enforcement
    - Trust: policies for security authorization, access, privacy/confidentiality
    - Contracts: pricing, delivery, refunds, cancellations, non-performance, …
      - Contract agreements, proposals, requests for proposals, advertisements
    - Monitoring: task of enforcing policies (e.g., for trust or contracts), policies to handle exceptions & non-compliance (compare results to promises)
    - Borrow from ebXML, EDI, XACML, P3P, LegalXML,…??
  - Start from spirit and particulars of OWL-S Profile
  - Choosing good rule language
    - RuleML with extensions, e.g., ontology import/incorporation (DLP OWL and later OO with default inheritance), HiLog, and F-Logic syntax.
    - Need a surface syntax
  - Framework for negotiation
- Primary deliverable: technical document - proposal & rationale
- Later deliverable: illustrative application scenario examples
- Defer: Complex discovery/matchmaking
- Defer “data mapping”

SCAMP drill down: Goals, cont.'d

- Develop upper and middle ontology in selected areas
- Simple advertising/discovery
  - E.g., keywords, simple ontology, partial contracts
  - More complex dynamic discovery not focus of version 1
- "Data Mapping": not a focus for version 1
  - Larger than just semantic web services
  - Other groups working on it – XML, U Wash, …
  - Will wait for dust to settle; can be incorporated

SCAMP drill down: Goals of Version1

- Key foci
  - Base on OWL-S profile ontology for now
  - Policy specification and enforcement
    - TRUST: policies for security, access, privacy
    - Contracts: pricing, delivery, cancellations, non-performance
    - Monitoring: task of enforcing policies, policies for dealing with non-compliance, exceptions
    - Borrow from ebXML, EDI, XACML, P3P, LegalXML,…??
  - Choosing good rule language
    - RuleML with extensions?
    - Need a surface syntax
  - Framework for negotiation
- Primary deliverable: technical document with proposal and rationale
- Note: Advertising, “data mapping” deferred

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  - If we succeed, then both FOL and LP can build out from the common basis
- Starting point
  - PSL-(outer)-core: exists mapping to set-theoretic formulation
- Deliverable: ????