

*Highlights slides (5-10 minute version) of:*  
E-Services on the New Generation Web:  
Automating Business Process Knowledge  
Management

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# Outline of Talk

- Intro: Research on Semantic Web Services (SWS), its Business Uses
  - Rules, contracting, trust, policies
  - Integration, knowledge representation, standards
- Problem: Reusable Knowledge to Describe Services
  - Technique: knowledge representation to standardize on
  - Content investment: how to leverage legacy business process K
- New Technical Approach to represent OO Frameworks using SW
  - Courteous Inheritance: default rules increases reuse in ontologies
- New Strategy: go where the knowledge already is, then work outwards
  - Begin with MIT Process Handbook – open-source version in development
    - Example: process knowledge about selling
  - Future: Transformational wrappers around various legacy OO frameworks
- Roadmapping Market Evolution
  - Early adopters, creators, catalysts
  - Strategic players, forces

# *Big Questions*

## *about the New Generation Web*

- What are the critical features/aspects of the new technology?
- What business problems does it help solve?
- What are the likely innovation evolution paths, and associated entrepreneurial opportunities?

*Some Answers to:*  
*“Why does SWS Matter to Business?”*

- 1. “Death. Taxes. Integration.” - They’re always with us.
- 2. “Business processes require communication between organizations / applications.” - Data and programs cross org./app. boundaries, both intra- and inter- enterprise.
- 3. “It’s the *automated knowledge* economy, stupid!”
  - The world is moving towards a knowledge economy. And it’s moving towards deeper and broader automation of business processes. The first step is automating the use of structured knowledge.
  - Theme: *reuse* of knowledge across multiple tasks/app’s/org’s

# *Problem: Reusable Knowledge to Describe Services*

- Has two aspects:
  1. **Technical/technique problem:** what form of knowledge? I.e., what knowledge representation to standardize on?
  2. **Content investment problem:** how to leverage to accomplish the reuse of legacy business process knowledge?

# *Opportunity for MIT Process Handbook in SWS*

- Need for Shared Web Services / Business Processes Knowledge Bases
- MIT Process Handbook as candidate nucleus for shared business process ontology for SWS
  - 5000+ business processes, + associated class/property concepts, as structured knowledge
  - Open Process Handbook Initiative: *an open-source version, is in progress.* (<http://ccs.mit.edu/ph>)
- Related: use in particular for E-Contracting
  - Interoperable business objects, business processes
  - Also for policies (e.g., trust), 3<sup>rd</sup>-party services

# *New Technical Approach: Courteous Inheritance in the Process Handbook*

- Use SW KR and standards to represent Object-Oriented framework knowledge: class hierarchy, types, generalization-specialization, domain & range, properties/methods' association with classes
- Surprise: use SW *rule* language not the main SW *ontology* language! I.e., use RuleML not OWL.
- Exploit RuleML's nonmonotonic ability to represent prioritized default reasoning as kind of knowledge representation (KR)

## *New Technical Approach, continued*

- Courteous Inheritance KR is built simply on top of the (Situating) Courteous Logic Programs KR of RuleML
  - A few dozen background axioms. Linear-size reformulation. Inferencing is tractable computationally.
- Particularly: represent PH's structured part
  - a scheme specific to PH's flavor of OO
- PH becomes a SWS process ontology repository
  - to be combined, fed, used with/by other SWS
- Kill two birds with one stone:
  - form of K that facilitates leveraging of legacy process K content including PH, OO



## *New Technical Approach, continued more*

- Example(s): selling, PO, price, shipping, delivery, payment, lateness.
- For details, see submitted paper “Beyond Monotonic Inheritance: Towards Semantic Web Process Ontologies” on webpage.
  - Example: selling process

# *Larger Approach: Transformation Wrappers for OO Frameworks*

- New Strategy: go where the knowledge already is, then work outwards
- Future: Transformational wrappers around various legacy OO frameworks
  - C++
  - Java, C#
  - UML
- Can use XSLT, SW tools, and/or XQuery engines to implement the transformations, guided by SWS ontology standardization practices

# *Market Evolution: Discussion Questions*

- Existing and prospective early adopters
- Importance of open source content: seems to be an assumption/axiom for many people
- Prospective sources of open source content