Getting Started with Semantics in the Enterprise
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Introduction

Should your enterprises’ first ontology look like this (and take 2 years to get there)?

A representation of the internet
(Credit: Bill Cheswick, Lumeta Corp.)
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All new efforts, including semantics require:

- **Budget**
  - Formal (project or RnD effort)
  - Informal

- **Stakeholder support**
  - Listen to issues
  - Brief them about project
  - Keep them up to date
  - Provide post project report
Selecting Semantic Project

To help ensure success and build support for semantics, select a project that:

- Starts with a simple problem (KISS principle)
- Will impact a large number of employees
- Solves a real problem
- Has a user base
- Has a business case comparison
  - Do nothing cost
  - Traditional IT solution cost
  - Semantic cost
- Know when to draw the line
Common Semantic Projects

Some ideas for a first semantic project:

- Semantic integration of various data bases
- Knowledge Exploration
- Semantic annotation
- Automatic document tagging
- Auto-summarization of a document
- Business intelligence mash-ups
- Decision making support
- Common metadata vocabulary for self annotation of documents
There are a number of ontology modelling considerations:

- Approaches to modelling
- Semantic precision of the model
- Reuse (Modularization)
Ontology Modelling: Approaches

- Bottom-up
- Top-down
- Mixed Methodology (works best)
Ontology Modelling: Semantic Precision

How much Semantic precision is needed?

- Do not model everything initially
Ontology Modelling: Semantic Language Selection

Depends on desired rules/logic expressivity
Ontology Modelling: Reuse

**Design ontologies to be reusable**

- As open source or within enterprise
- Keeps costs down
  - For next project
  - For maintenance (collaborative/distributive)
Ontology Engineering Methodologies

Ontology engineering methodologies vary by:

- Comprehensiveness
- Conceptual vs. implementation
- Decentralized vs. centralized ontology development
- Developmental vs. Support processes

Innovatia preferred methodology:

- Melting Point by Alex Garcia

Take an iterative approach:

- Develop one part of ontology, test, correct, test
- Repeat with next part
Ontology Software Tools

Wide variety of new tools needed
- Ontology Editors
- Text mining
- Rules engine/reasoner
- End user interface
- Query languages

Best Practice:
- Learn tool before project, or plan time in project for learning
- Consider open source versus commercial
  - May get you going faster
Data Triple Stores

**Triple stores** store triple assertions for faster querying of data:

- Open source versus commercial?
- Consider an open source triple stores to start with until you understand your requirements for:
  - Scalability (number of triples)
  - Uploading speed
  - Inferencing speed
  - Querying speeds
- Use [Lehigh University](https://www.lehigh.edu/) Benchmark (LUBM) for benchmarking
Applications are needed to present data to end users.

Best practices:

- Define user queries up front
- Initial interface does not have to be fancy
- Plan for iterative usability/feature implementation
Maintenance of a semantic effort

Semantic projects require ongoing support no matter the development approach

• Ontology modification
  – Centralized (top-down)
  – Decentralized contribution (bottom-up)

• Analysis of search requests to publish new search patterns (FAQ or suggested search)

• Business processes needed for maintenance support
  – Mix of centralized for foundational ontology and decentralized for changing parts of ontology
### Finding Semantic Specialists (1 of 2)

#### Staff you may need:

<table>
<thead>
<tr>
<th>New</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Scientific Advisor - Solutions Architect</td>
<td>Guides semantic effort</td>
</tr>
<tr>
<td>N</td>
<td>Domain Expert</td>
<td>Knows content or data very well</td>
</tr>
<tr>
<td>Y</td>
<td>Ontologist</td>
<td>Creates ontology</td>
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<tr>
<td>Y</td>
<td>Text Mining Engineer</td>
<td>Configures text mining processing software</td>
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<tr>
<td>Y</td>
<td>Logics Reasoner</td>
<td>Develop axioms for business rules</td>
</tr>
<tr>
<td>N</td>
<td>Applications Developer</td>
<td>Creates end user interfaces</td>
</tr>
<tr>
<td>N</td>
<td>Database Architect</td>
<td>Understands existing DB</td>
</tr>
<tr>
<td>N</td>
<td>Information Architect</td>
<td>Determine user needs and user testing</td>
</tr>
<tr>
<td>N</td>
<td>Business Analyst</td>
<td>Define requirements, build business case</td>
</tr>
<tr>
<td>N</td>
<td>Project Manager</td>
<td>Keeps the rest of the team on track!</td>
</tr>
</tbody>
</table>
Finding Semantic Specialists (2 of 2)

Where can you find the staff?

- Internally: may require some training
- Local University
  - Professors (high level advice)
  - Post-graduate
  - Students
- Job market (contract): roles/deliverables will need to be clear for best results
Project Management

Semantic projects can conform to normal project management

• Give extra time for learning/experimentation
• Iterative testing based on small component development (Agile-like)
• Can have parallel development
• But, expect to encounter unknowns and budget for it
• Get a Project Manager!
Useful Resources

- Obitko.com
- Semantic Web (Getting Started)
- Semantic Exchange
- Semantic Web for the Working Ontologist (book)
Conclusion

Emotion Ontology