Challenges and opportunities

Chapter 15

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Opportunities

- Semantic web enterprise applications
  - Tool of integration of enterprise applications
  - Sharing data with a defined meaning
  - Limit human interaction with and apply automatic reasoning
- Sematic web services
  - Bring data and software together
  - Automate discovery, invocation, composition and monitoring of Web Services through machine processing
- Semantic search
  - More meaningful metadata
  - Form web into semantic network
  - Search through logical connections

Challenges

1. Balancing expressive power vs useful reasoning
2. Ontology availability, development and evolution
3. Scalability of Semantic Web Content
4. Multilingual
5. Proof and Trust of the Semantic Web Languages
6. Semantic Web Services Implementation
7. Ease of Development and deployment vs. Payoff
8. Balancing proprietary and open standards

Balancing expressive power vs useful reasoning

- RDF(S) provides classes and properties
  - Not enough for reasoning
- OWL Full
  - Union of RDF and OWL
  - Full expressiveness but undecidable
- OWL DL
  - Efficient reasoning
  - Not fully compatible with RDF
  - Better expressiveness with rule logic (SWRL)
- Choice of OWL decides on reasoning

Ontology availability, development and evolution

- Ontology development is essential to the Semantic Web because ontologies, by providing vocabulary and semantics of the annotations, are carriers of the meaning
- Highly skilled developers
- General public cannot participate in development
- High cost and long development time

Scalability of Semantic Web Content

- Need to organize
- Ability to search the represented information
  - Even when rapidly expanding
- Possible representation of ontology based annotated pages whose linking reflect the structure.
  - Does not exploit all semantics
- Indexes to group semantic web content based on topics
  - Easier development but hard task go aggregate on a global scale

Multilingual

- English predominant for Web (55,5%)
- Support for multiple languages needed
- Not only content but also ontologies, annotations, and UI

Proof and Trust of the Semantic Web Languages

- Consumer confidence in the accuracy of information
- Content must be constantly updated to be valid

Semantic Web Services Implementation

- Bring programs and data together using discovery, implementation, and maintenance
- Build on top of SOAP and WSDL technologies
- Dynamically invoked by other services in the network
- OWL-S using WDSL as service grounding
- Challenge: developing a standard that vendors will uniformly accept

Ease of Development and Deployment vs. Payoff

- Difficult to use highly structured layering of many languages to deliver logic and machine-processing
- Example: AOL, Microsoft, CompuServe vs Berners-Lee in 1980’
  - Expensive systems offering duplicated and limited amounts of information
  - Cheap, efficient, easy and simple way for universal access to information for free
- Necessary to find cheap, simple and convenient way to produce ontology and maintain logics for semantic web to succeed
- Cannot succeed if it involves too demanding requirements for ontology, logic processing and content generation

Balancing proprietary and open standards

1. Vendor dominates and sets a standard
   - Centralized network
2. Vendor and markets collaborate
   - Decentralized network
3. Standards established by organizations
   - Distributed network

- Smooth growth with vendor-specific frameworks will remain problematic
- Open standard allow the applications to be more utilized