Part II

Introduction to Semantic Web
Syntax is not sufficient
Information Convergence

• Convergence not just in devices, also in “information”
  – Your personal information (phone, PDA, …)
    Calendar, photo, home page, files…
  – Your “professional” life (laptop, desktop, … Grid)
    Web site, publications, files, databases, …
  – Your “community” contexts (Web)
    Hobbies, blogs, fanfic, social networks…

• The Web teaches us that people will work to share
  – How do we CREATE, SEARCH, and BROWSE in
    the non-text based parts of our lives?
WWW vs. Semantic Web

WWW := Hypertext & Internet & Social Phenomenon

Semantic Web := Semantic Web Language/Data & Ontologies & Internet & Social Phenomenon
Let’s try XML

XML is unspecific:
1. No predetermined vocabulary
2. No semantics for relationships

⇒ 1 & 2 must be specified upfront

Only possible in close cooperations 😞
   – Small, reasonably stable group
   – Common interests or authorities

Not possible in the Web or on a broad scale in general!
Meaning of Informationen:
(or: what it means to be a computer)
XML ≠ Meaning, XML = Structure
Some Principal Ideas

- URI – uniform resource identifiers
- XML – common syntax
- Interlinked
- Layers of semantics – from database to knowledge base to proofs

Design principles of WWW applied to Semantics!!

Tim Berners-Lee, Weaving the Web
The Semantic Web on one Slide

Ontology

Person

Employee

PostDoc

Professor

rdfs:subClass

cooperatesWith

rdfs:Domain

rdfs:Range

rdfs:subClass

 rdf:type

 rdf:type

 swrc:cooperatesWith

Meta-
data

Siegfried Handschuh

http://www.deri.ie/~sha

Steffen Staab

Research:

Semantic Web, Knowledge Management, Natural Language,

http://www.uni-koblenz.de/~staab

URL
The Semantic Web - Inference

Visualization of a Logic Representation:

OWL, F-Logic, etc.
The new Semantic Web Stack

Tim Berners-Lee, ISWC November 2005,
http://www.w3.org/2005/Talks/1110-iswc-tbl/#(12)
Knowledge Provisioning
Tools for markup...
Semi-automatic
Not tied to specific domains

M-OntoMat is publicly available
http://acemedia.org/aceMedia/results/software/m-ontomat-annotizer.html
Shared Workspace (Xarop + Screenshot)
Social networks:
e.g. Friend of a Friend (FOAF)

- Say stuff about yourself (or others) in OWL files, link to who you “know”

```xml
  <rdf:RDF>
    <foaf:PersonalProfileDocument rdf:about=""/>
    <foaf:maker rdf:nodeID="me"/>
    <foaf:primaryTopic rdf:nodeID="me"/>
    <admin:generatorAgent rdf:resource="http://www.idods.com/fonbfaf-a-marc/">
    <admin:errorReportsTo rdf:resource="mailto:leinh@idods.com"/>
  </foaf:PersonalProfileDocument>
  <foaf:Person rdf:nodeID="me"/>
    <foaf:name>Steffen Staab</foaf:name>
    <foaf:title>Prof. Dr </foaf:title>
    <foaf:givenName>Steffen</foaf:givenName>
    <foaf:familyName>Staab</foaf:familyName>
    <foaf:inbox_sha1sum>ae852d1b699e2f723e5633e2f21ce099ad190</foaf:inbox_sha1sum>
    <foaf:homepage rdf:resource="http://www.uni-koblenz.de/~staab/"/>
    <foaf:phone rdf:resource="tel:+49-261-2872781"/>
    <foaf:workplaceHomepage rdf:resource="http://isweb.uni-koblenz.de/"/>
    <foaf:workInfoHomepage rdf:resource="Semantic%20Web%20Research%20Teaching"/>
    <foaf:schoolHomepage rdf:resource="http://www.pug-kielstadt.de/"/>
    <foaf:projectHomepage rdf:resource="http://www.iwmmedia.org/"/>
    <foaf:projectHomepage rdf:resource="http://asg-platform.org/cgi-bin/view/Public/WebHome"/>
    <foaf:projectHomepage rdf:resource="http://www.projecthalo.com/"/>
    <foaf:projectHomepage rdf:resource="http://swap.semanticweb.org/"/>
    <foaf:projectHomepage rdf:resource="http://http://bobber.semanticweb.org/"/>
    <foaf:groupHomepage rdf:resource="http://isweb.uni-koblenz.de/"/>
    <foaf:interest rdf:resource="http://www.wissensmanagement-gesellschaft.de/"/>
  </foaf:Person>
```
Using FOAF in other contexts

Jennifer Golbeck
http://trust.mindswap.org
Get a B&N price (In Euros)
Of a particular book
In its German edition?
Steffen Staab (22)
ISWeb – Informationssysteme & Semantic Web
Now.

• RDF, RDFS and OWL are ready for prime time
  – Designs are stable, implementations maturing
• Major Research investment translating into application development and commercial spinoffs
  – Adobe 6.0 embraces RDF
  – IBM releases tools, data and partnering
  – HP extending Jena to OWL
  – OWL Engines by Ontoprise GmbH, Network Inference, Racer GmbH
  – Ontoprise is a strategic partner for Oracle and Software AG
  – Proprietary OWL ontologies for vertical markets
    • c.f. pharmacology, HMO/health care, ... Soft drinks
Now: Plenty of annotations – unfortunately, not in the open

- Taggings are daily practice:
  - Flickr, http://www.flickr.com/
  - Delicious, http://del.icio.us/
  - Bibsonomy,…
- Plenty of annotations
  - Dooyoo, E-pinions
  - Quipe, http://www.quipe.com/
  - Froogle, http://froogle.google.com/
  - RSS
  - E-Science data curation, http://www.jisc.ac.uk/index.cfm?name=pub_escience
  - Semantic Wikis
- Web 2.0
  - would be easier with Semantic Web!
The Semantic Wave

(Berners-Lee, 03)
Semantic Technologies vs. Semantic Web

Semantic Technologies

- Used by „Early Adopters“
- Mature
  - Deductive Databases
    (Research since early 80ies)
  - Description logics
    (Research since late 70ies)
  - Ontobroker (Research prototype since 1990; commercial since 1999)

  • A lot of knowledge about integration with existing technology (databases, modelling, …)

Semantic Web

- Still „research-oriented“
- Currently: Used in Intranets
- Currently: Used for internet applications with simple ontologies (Dublin Core, RSS, PICS, FOAF,…)
- Quite some way to go for full fledged success, initial take-up now by some focus groups
Application areas for Semantic Technologies

- Software engineering: conceptual approaches need semantic interchange language
- Data description:
  - Databases in bioinformatics
  - Multimedia data (complementary to MPEG 7/21)
- Data integration: data exchange benefits from semantic interchange language
- "Plug n‘play“ for dynamic (not necessarily "automatic“!!!) business process configuration: needs rich semantic descriptions
## Prospectives of Semantic Web

or

WWW vs. Semantic Web revisited

<table>
<thead>
<tr>
<th>WWW :=</th>
<th>Semantic Web :=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertext &amp;</td>
<td>Semantic Web Language/Data &amp;</td>
</tr>
<tr>
<td>Internet &amp;</td>
<td>Ontologies &amp;</td>
</tr>
<tr>
<td>Social Phenomenon</td>
<td>Internet &amp;</td>
</tr>
<tr>
<td></td>
<td>Social Phenomenon</td>
</tr>
</tbody>
</table>

Without Social Phenomenon = Intranet

Without Social Phenomenon = Semantic Data Integration

New and important paradigms at their time, but „less“ outreach
„Less“ vs „More“ Outreach

„Less“ equals a multi-billion dollar market

„More“ equals a change as radical as triggered by the WWW
Overview Literature