Semantic Web

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Organizational Issues

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Send mail to arrange for consultation

Web site: http://www.uni-koblenz.de/~staab/lehre/ss05/sw/

BSCW: http://bscw.uni-koblenz.de/bscw/bscw.cgi/0/396243
(get an invitation in the first excercise)
General Schedule

**Lecture**
Thursdays 10.15 MK 208  
Fridays 10.15 MK208

**Excercises**
Tuesdays 14.15 MK107  
Beware of earlier false announcements regarding the room for the excercises!

Check concrete schedule on the web site for details!
Semantic Web

What is the Semantic Web?
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?
Syntax is not enough
Syntax is not enough – B2B

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  ....
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The Semantic Wave

(Berners-Lee, 03)
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
  - Proprietary OWL ontologies for vertical markets
    - c.f. pharmacology, HMO/health care, ... Soft drinks
  - Several new starts in SW space
Now: huge potential

• Data integration identified as $100Bs world-wide market
  – with significant govt interest creating a user-pull
    • Ontology development efforts, in OWL, aimed at information mgt ongoing in US govt include
      – NIST, NLM, EPA, DHS, DoD, DOJ, FDA, NIH, USGS, NOAA

• Huge potential follow-on market - EAI for the small business
  – making external data and info resources integrable
    • Could do for integration what Visicalc (excel) did for report generation
Now: Tools for tool builders

- Like the pre-MOSAIC WWW…
- …but, it is much easier to get started than it was even a year ago,
  - Parsers, APIs, triple-stores
    - http://www.daml.org/tools
    - http://www.w3.org/RDF
  - End to end no longer takes a “miracle”
    - “Building the Semantic Web in one day” (BSCW)
- End user tools just starting to emerge
  - “Metaphors” growing
Tools for markup...
Not tied to specific domains
Not tied to specific domains

M-OntoMat is publicly available
http://acemedia.org/aceMedia/results/software/m-ontomat-annotizer.html
Not tied to specific domains
Semantic Web Application Portal

http://www.ontoweb.org

Ontology Browse & Query Front End

Content Syndication Service

Generated Content Objects

Annotated Web Pages

Participating Site1

Participating Site2

Participating Site\textsubscript{n}

OntoWeb Community

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ISWeb – Lecture „Semantic Web“
Not tied to specific domains

We would like to extend our thanks to the MINDSWAP group at the University of Maryland, for the use of their software, valuable ideas and indispensable help in putting this site together.

- Statement
  - Behavioural_Event
    - Production_Event
      - Excretion
      - Defaecation
      - Utiilation
      - Sucktion
    - Signalling_Event
      - PreMating_Signalling_Event
      - Display
    - Reproduction_Event
      - Genesal_Generation_Event
      - Budding_Event
        - http://www.bistimage.org/SABO/Birth_Event
      - Asexual_Reproduction_Event
      - Budding_Event
      - Sexual_Reproduction_Event
      - Post-Mating_Event
      - Pre-Mating_Event
      - PreMating_Signalling_Event
      - Mate-Choice_Event
      - Mating_Event
      - Fertilization_Event
    - Physical_Manipulation_Event
      - Constriction_Event
      - Tool_Manipulation_Event
    - Transportation_Event
      - Locomotion
      - Migrations_Event
    - Passive_Transportation
    - Intake_Event
      - Feeding_Event
        - Kuikenin
      - Drinking_Event
    - Attack_Event
    - Predation_Event
    - Grooming_Event
    - Defense_Event
Not tied to specific domains

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leukemia

Depictions:

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Not tied to specific domains

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<th>Room</th>
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<td>257</td>
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<td>Haase</td>
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<tr>
<td>Tempich</td>
<td>+49 (721) 608 7382</td>
<td>245</td>
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Shared calendars
Calendar + photos + ...
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:errorReportsTo rdf:resource="mailto:leigh@idodds.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:family_name>Staab</foaf:family_name>  
  <foaf:inbox_sha1sum>ae8d9289b069a4b3728d6c5d39f21c09ca3f0d90</foaf:inbox_sha1sum>  
  <foaf:homepage rdf:resource="http://www.uni-koblenz.de/~staab/"/>
  <foaf:phone rdf:resource="tel:49-261-2872761"/>
  <foaf:workplaceHomepage rdf:resource="http://isweb.uni-koblenz.de/"/>
  <foaf:schoolHomepage rdf:resource="Semantics%20Research%20Teaching"/>
  <foaf:projectHomepage rdf:resource="http://www.isweb.uni-koblenz.de/"/>
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  <foaf:projectHomepage rdf:resource="http://asg-platform.org/cgi-bin/twiki/view/Public/WebHome"/>
  <foaf:projectHomepage rdf:resource="http://www.projecthalo.com/"/>
  <foaf:projectHomepage rdf:resource="http://swap.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

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Coming sooner than you may think…
...and this?
Emerging: Semantic Web Services

Information management capabilities
Discovery, Filtering, Composition

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Semantics and services

input xsd:complex="oncogene"

Oncogene(MYC):
- Found_In_Organism(Human).
- Gene_Has_Function(Transcriptional_Regulation).
- Gene_Has_Function(Gene_Transcription).
- In_Chromosomal_Location(8q24).
- Gene_Associated_With_Disease(Burkitts_Lymphoma).

output xsd:complex="RiskType"

<owl:Class rdf:about="http://annotation.semanticweb.org/iswc/iswc.daml#RiskIndicator">
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="http://annotation.semanticweb.org/iswc/iswc.daml#name"/>
      <owl:allValuesFrom rdf:resource="http://www.w3.org/2000/10/XMLSchema#string"/>
    </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>

OWL-S grounding (coming to WSDL 2.0)
Get a B&N price (In Euros)
Of a particular book
In its German edition?
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Later: Automated composition

Suppose Bill and Joan’s mother goes to her physician complaining of pain and tingling in her legs and the physician proposes the following sequence of activities:

1) A prescription for Prolia, an anti-inflammatory drug.
2) An MRI scan and an electroencephalography, both of these are diagnostic tests to try to determine possible causes for the symptoms.
3) A follow-up appointment with the physician to discuss the results of the diagnostic tests.

Bill and Joan need to do the following things for their mother by using Web services:

1) Fill the prescription at a pharmacy.
2) Make appointments for the two treatments.
3) Make an appointment for doctor’s follow-up meeting.
Longer term?: Adding Proof

You owe me $30

Oh yeah? Prove it

The check is in the email!

{Purchased(user1, book1, AOL); www.confirm.com#t1221122}
{Priceof(book1, $30); AOL-historyDB#29293910}
{Purchase(a,b,c) & Priceof(b,d) -> Owes(a,c,d); www.ont.com/prodont}
The “Policy Aware Web”

1) If $X$ is AC rep of $Y$, $X$ can delegate W3C member access rights in $Y$.
2) Kari is AC rep of Elisa.

1) If $X$ is employee of Elisa, $X$ has W3C member access rights.
2) Tiina is employee of Elisa.

Tiina: I have W3C member access rights
Proof: Alan 1, Alan 2, Kari 1, Kari 2
Conclusion

- The Semantic Web is here
  - The question isn’t if, but “how much”
- Semantic Web technologies have a promising future and an exciting potential
  - The business case is emerging
    - Enterprise integration on the Web
    - Database, image, and services as 1st class Web citizens
    - Portal technology “in the small”
  - The future feed is exciting
    - Rules and Proof -> “Policy Aware” Web