The role of SKOS in a Web of Data
Some Business Use Cases

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Semantic Web Company
SKOS - Overview

- SKOS = Simple Knowledge Organisation System(s)
- SKOS Core
  http://www.w3.org/2004/02/skos/core/

- Simple, flexible, extensible, machine-understandable representation for...
  - Thesauri
  - Classification Schemes
  - Taxonomies
  - Subject Headings
  - Other types of ‘controlled vocabulary’...
Thesaurus using SKOS

- Europe
  - skos: prefLabel
  - skos: related
    - University of Leipzig
      - skos: prefLabel
  - skos: broader
    - Germany
    - skos: definition
      - Germany is a country in Central Europe
    - skos: narrower
      - Western Germany
      - Federal Republic of Germany
  - skos: narrower
    - Berlin
    - Hamburg
  - skos: narrower
    - Leipzig
## Relations in SKOS

### Relation between Concepts

<table>
<thead>
<tr>
<th>Hierarchical Relations</th>
<th>Broader Concept</th>
<th>skos:broader</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Narrower Concept</td>
<td>skos:narrower</td>
</tr>
<tr>
<td>Associative Relations</td>
<td>Related Concepts</td>
<td>skos:related</td>
</tr>
</tbody>
</table>

### Relation between Concept & Concept Scheme

<table>
<thead>
<tr>
<th>Top Term</th>
<th>hasTopConcept/TopConceptOf</th>
</tr>
</thead>
</table>

![Diagram showing hierarchical and associative relations in SKOS]

Definition of Concepts

Relation between Concept & Labels (Lexical Labels)

<table>
<thead>
<tr>
<th>Equivalence Relationship</th>
<th>Use</th>
<th>skos:prefLabel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use For</td>
<td>skos:altLabel skos:hiddenLabel</td>
<td></td>
</tr>
</tbody>
</table>

Definition of Concepts (Documentation Properties)

<table>
<thead>
<tr>
<th>Descriptive Elements</th>
<th>Scope Note</th>
<th>skos:scopeNote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>skos:definition</td>
<td></td>
</tr>
<tr>
<td>History Note</td>
<td>skos:historyNote skos:changeNote skos:editorialNote</td>
<td></td>
</tr>
</tbody>
</table>
GEMET - GEneral Multilingual Environmental Thesaurus

- European Environment Information and Observation Network

http://www.eionet.europa.eu/gemet/
Example: MeSH - Medical Subject Headings

- US National Library of Medicine
- All articles in MEDLINE are categorized via MeSH
- First published in 1960 - available in English, German and other languages

STW - Standard Thesaurus for Economics

- Leibniz Information Centre for Economics
- [http://zbw.eu/stw/](http://zbw.eu/stw/)

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**Bank secrecy**

- **Bankgeheimnis** (german)
- used for: Banking secrecy

**Broader Terms**

- Secrecy

**Related Terms**

- Banking law

**Subject Categories**

- W.14 Financial Services and Banking

**Persistent Identifier** (for bookmarking and linking)

- [http://zbw.eu/stw/descriptor/13773-1](http://zbw.eu/stw/descriptor/13773-1)
SKOS and the Semantic Web Stack

- DC
- FOAF
- SKOS
- Calendar
- VCard
- DOAP
- RSS
- PICS
- ...

- OWL
- RDFS
- RDF
- URI
- XML
SKOS Thesaurus Tools

http://www.w3.org/2001/sw/wiki/SKOS
„Magic triangle“

Content consuming industries (banks, telco, ...)

Government organisations

Media & content industry

Other Stakeholders:
• Citizens
• Sites: Cities / Regions
• Society
• Industry
• Politicians
• Private & public sponsors
• ….
Linked Data Flows

Some organisations contribute some data to the Linked Open Data Cloud.

Some organisations use Semantic Web standards to integrate data without opening up any data repository.

No worries, there is still a firewall!

Some organisations consume some data from the LOD Cloud.
**ScOT - Schools Online Thesaurus**

**ScOT**

### Australian education vocabularies

**Schools Online Thesaurus (ScOT)**

<table>
<thead>
<tr>
<th>Get RDF</th>
<th>Companies</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Code:</th>
<th>1731</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative labels:</td>
<td>Businesses</td>
</tr>
<tr>
<td>Broader terms:</td>
<td>Business and enterprise</td>
</tr>
<tr>
<td>Narrower terms:</td>
<td>Financial institutions, Incorporated associations, Large scale enterprises, Limited companies, Multinational companies, Not-for-profit organisations, Public companies, Small medium enterprises, Unincorporated associations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Related terms:</th>
<th>Articles of association, Prospectuses, Shareholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>URI:</td>
<td><a href="http://vocabulary.curriculum.edu.au/scot/1731">http://vocabulary.curriculum.edu.au/scot/1731</a></td>
</tr>
<tr>
<td>Last modified:</td>
<td>2009-07-16T00:00:00</td>
</tr>
</tbody>
</table>

SKOS & Linked Data

• SKOS as an interface to identify relevant linked data
• SKOS as a method of glueing the „linked data highways“

Giving and taking of linked data with SKOS
PoolParty: SKOS & Linked Data

http://poolparty.punkt.at/
Improved Search & Recommender with Linked Data

http://poolparty.punkt.at/demozone/

Enterprise Tagging Use Case

2500 users in 20 organizational units

Each user tagged 4-6 resources per day with 3-7 tags

Over 356 days

Tags used by a person were marked as skill (by the user, his superior, human resources)

Standard Thesaurus of Economics

= 108 mio Triples
### Benchmark - Tagging Use Case

#### Query Results:

<table>
<thead>
<tr>
<th>Query</th>
<th>Avg. Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person tag cloud</td>
<td>62</td>
</tr>
<tr>
<td>Person tag cloud for a time span</td>
<td>46</td>
</tr>
<tr>
<td>Resource tag cloud</td>
<td>5</td>
</tr>
<tr>
<td>Users using tags related to mine</td>
<td>27</td>
</tr>
<tr>
<td>Most active tagger for a specific tag</td>
<td>15</td>
</tr>
<tr>
<td>Skills assigned by superior</td>
<td>71</td>
</tr>
<tr>
<td>Skills assigned by a person from human resources</td>
<td>46</td>
</tr>
</tbody>
</table>

- Intel Core i7-920 Quadcore
  - 12 GB DDR3 RAM
  - @Ubuntu 8.04
- OpenLink Virtuoso
  - Version: 06.01.3127
  - Build: May 27 2010
Contact

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