Ontohub: an OOR-compliant Repository for Distributed Ontologies

Till Mossakowski\textsuperscript{1,2}, Christoph Lange\textsuperscript{1}, Julian Kornberger\textsuperscript{1}, Henning Müller\textsuperscript{1}

\textsuperscript{1}SFB/TR 8 “Spatial cognition”, University of Bremen, Germany
\textsuperscript{2}DFKI GmbH, Bremen, Germany

2012-03-27
Ontohub: Repository for Distributed Ontologies

Demo site: http://ontohub.informatik.uni-bremen.de
Sources: http://github.com/ontohub/ontohub

- Ontohub is an **ontology repository engine** with a **web frontend**
- specialized on managing **distributed ontologies**
  - ISO Working Draft 17347 (Ontology Integration and Interoperability – Distributed Ontology Language)
    - http://ontolog.cim3.net/cgi-bin/wiki.pl?OntoI0p
  - Distributed means: **logically heterogeneous, modular, interlinked, annotated, and distributed over the Web.**
Ontohub and Distributed Ontologies

Ontohub does not yet support DOL as a language, but only

- **OWL** (RDF/XML works best)
- **Common Logic** (CLIF works best)

But its **notion** of an ontology is **generic**:

- a bag of **entities**
  (a.k.a. symbols; they have kinds, e.g. “Class” in OWL)
- and **axioms**
- in some ontology **language**

All objects identified by IRIs, can have **metadata** and **comments**
(only supported for ontologies so far).
State of Development

- **early stage** but **fully functional**, after two weeks of agile web development (Henning Müller and Julian Kornberger, supervised by Till Mossakowski and Christoph Lange acting as “customers”)
- to be continued (see [http://github.com/ontohub/ontohub](http://github.com/ontohub/ontohub))
- didn’t aim at reinventing BioPortal, but at more distributedness than single-language engines
- gaining practical experience required building a **self-contained prototype**
- implemented a small but essential **subset of the OOR requirements** ([http://ontolog.cim3.net/cgi-bin/wiki.pl?OpenOntologyRepository_Requirement](http://ontolog.cim3.net/cgi-bin/wiki.pl?OpenOntologyRepository_Requirement))
Current Architecture

Ontohub:

OOR:

http://ontolog.cim3.net/cgi-bin/wiki.pl?
OpenOntologyRepository_Architecture/Candidate03#
nid2MUD
Demo I (Main Page)

Try the public demo: http://ontohub.informatik.uni-bremen.de

- as a user: simply **register**
- as an admin (for now): christoph.lange@uni-bremen.de, password "ontohub"

Note: beware of database cleanups!
Demo II (Ontology Overview)

http://ontohub.informatik.uni-bremen.de/ontologies

Ontologies

Search for URI or name

621 Ontologies found

Next >  Last >  25 > per page

strict_linearity
file:///Hets-lib/CommonLogic/colore/between/strict_linearity.clif
failed

sublogic_fullcl
file:///Hets/CommonLogic/TestData/sublogic_fullcl.clif

Cat
file:///db/seeds/cat.clif

Generations
file:///db/seeds/generations.owl

Pizza
file:///db/seeds/pizza.owl

Ontohub Repository for Distributed Ontologies
### Demo III (Search Entities)

**15 Entities** found in 4 Ontologies

1. **OpenAAL Ontology**
   11 Entities found. Showing 1 - 10

<table>
<thead>
<tr>
<th>Text</th>
<th>Kind</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#Person">http://www.openaal.org/SAM/Ontology/person#Person</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#Person">http://www.openaal.org/SAM/Ontology/person#Person</a></td>
</tr>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#AP">http://www.openaal.org/SAM/Ontology/person#AP</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#AP">http://www.openaal.org/SAM/Ontology/person#AP</a></td>
</tr>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#Activity">http://www.openaal.org/SAM/Ontology/person#Activity</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#Activity">http://www.openaal.org/SAM/Ontology/person#Activity</a></td>
</tr>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#Carer">http://www.openaal.org/SAM/Ontology/person#Carer</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#Carer">http://www.openaal.org/SAM/Ontology/person#Carer</a></td>
</tr>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#English">http://www.openaal.org/SAM/Ontology/person#English</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#English">http://www.openaal.org/SAM/Ontology/person#English</a></td>
</tr>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#Fall">http://www.openaal.org/SAM/Ontology/person#Fall</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#Fall">http://www.openaal.org/SAM/Ontology/person#Fall</a></td>
</tr>
<tr>
<td>Class <a href="http://www.openaal.org/SAM/Ontology/person#German">http://www.openaal.org/SAM/Ontology/person#German</a></td>
<td>Class</td>
<td><a href="http://www.openaal.org/SAM/Ontology/person#German">http://www.openaal.org/SAM/Ontology/person#German</a></td>
</tr>
<tr>
<td>ObjectProperty <a href="http://www.openaal.org/SAM/Ontology#has-person-state">http://www.openaal.org/SAM/Ontology#has-person-state</a></td>
<td>ObjectProperty</td>
<td><a href="http://www.openaal.org/SAM/Ontology#has-person-state">http://www.openaal.org/SAM/Ontology#has-person-state</a></td>
</tr>
</tbody>
</table>

2. **FOAF**
   2 Entities found.

<table>
<thead>
<tr>
<th>Text</th>
<th>Kind</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class <a href="http://xmlns.com/foaf/0.1/Person">http://xmlns.com/foaf/0.1/Person</a></td>
<td>Class</td>
<td><a href="http://xmlns.com/foaf/0.1/Person">http://xmlns.com/foaf/0.1/Person</a></td>
</tr>
<tr>
<td>Class <a href="http://www.w3.org/2000/10/swp/pim/contact#Person">http://www.w3.org/2000/10/swp/pim/contact#Person</a></td>
<td>Class</td>
<td><a href="http://www.w3.org/2000/10/swp/pim/contact#Person">http://www.w3.org/2000/10/swp/pim/contact#Person</a></td>
</tr>
</tbody>
</table>
Demo IV (Create an Ontology)

http://ontohub.informatik.uni-bremen.de/ontologies/new
(must be logged in)
Hets ("inference" component) tells Ontohub about the **logic** of an imported ontology, and about its **entities** and **axioms**:

**FOAF**

This is the FOAF (Friend of a Friend) OWL ontology.

---

**Works for any logic supported by Hets**

Hets: Heterogeneous Tool Set, http://www.dfki.de/cps/hets
When Hets fails to process an ontology (here: because [auto-detecting the] logic is not yet supported), Ontohub tells the user:

A OntoIOp registry

Overview

This is a plain RDF ontology. RDF support in Hets is still under development.

<table>
<thead>
<tr>
<th>Overview</th>
<th>Axioms</th>
<th>Entities</th>
<th>Versions 1</th>
<th>Metadata</th>
<th>Comments</th>
<th>Permissions 1</th>
</tr>
</thead>
</table>

URI: http://purl.org/dol/registry/
Name: OntoIOp registry
Logic: 
Owner: admin
Created: 17 minutes ago
Updated: 
Hets status: failed (error)
Hets reports entities and axioms with their name, source text, URI (later), and range.

<table>
<thead>
<tr>
<th>Text</th>
<th>Kind</th>
<th>Name</th>
<th>URI</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>...Q</td>
<td>SequenceMarker</td>
<td>...Q</td>
<td></td>
<td>1.30</td>
</tr>
<tr>
<td>x</td>
<td>Name</td>
<td>x</td>
<td></td>
<td>1.26</td>
</tr>
</tbody>
</table>
Old versions are stored (not more than this, for now), one can upload a new one.
Demo IX (Administration)

Administrator can manage:

- users, teams (also some self-management)
- logics (later: users can contribute \( \sim \) registry)
- (Hets) jobs

**Logics**

2 Logics found

<table>
<thead>
<tr>
<th>Name</th>
<th>URI</th>
<th>Extension</th>
<th>MIME-Type</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWL</td>
<td><a href="http://purl.net/dol/logics/OWL">http://purl.net/dol/logics/OWL</a></td>
<td>owl</td>
<td>application/rdf+xml</td>
<td>edit, delete</td>
</tr>
<tr>
<td>CommonLogic</td>
<td><a href="http://purl.net/dol/logics/CommonLogic">http://purl.net/dol/logics/CommonLogic</a></td>
<td>clif</td>
<td>text/plain</td>
<td>edit, delete</td>
</tr>
</tbody>
</table>
Future I: General Repository Functionality

Improvements of existing features:
- **Search**: partial matches; refine entity search by ontology; show axioms that contain the entity searched for

New features:
- **Metadata and comments** for entities and axioms
- **Metadata** editing
- **Edit** relevant section of an ontology (e.g. “this axiom”)
- **Social features**: invite users, e-mail notifications

Your ideas? https://github.com/ontohub/ontohub/issues
Future II: Decouple Components

- ontology logic and structure detection currently done by locally installed Hets
- decouple, in OOR architecture spirit: let any RESTful web service offer structure and inference services

Your ideas? https://github.com/ontohub/ontohub/issues
Future III: More Distributedness

Next aspects of **distributed ontologies** to be realized:

- **Links** between ontologies
  - formal interpretations and informal alignments
  - optionally including entity→entity maps

- **Linked Data Compliance**
  - download ontologies from Ontohub by URI
  - annotate external ontologies without importing them into Ontohub

- **Registry** for Ontology **Languages** and **Translations**
  - ISO 17347 OntoIOp/DOL: generic framework for existing and future ontology languages
  - host a community-maintained registry for DOL-conforming languages and translations (described in lightweight RDF, fully defined in textbook style or Common Logic)

Your ideas? https://github.com/ontohub/ontohub/issues