

User Awareness and Personalization in Semantic Portals

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Abstract

Semantic Portals allow for integrated and syndicated data views on information by using ontological knowledge and machine processable semantic descriptions. In particular, Semantic Portals should allow the user to customize the access to information by making advanced use of the semantic descriptions of the information, and should provide individualized views on the data, enhance user awareness and orientation, help the user in detecting relevant informations or relations, etc. In this demonstration, we present the Semantic Portal we have developed for the REWERSE project, and show how portal knowledge can be used to individualize the access to the portal.

1 Motivation

Within the scope of the REWERSE project¹ we developed a couple of Semantic Web Ontologies, among others:

Researcher Ontology: This ontology models persons and their involvements in projects or organizations.

Semantic Web Glossary Ontology: models Semantic Web terms and their relations between each other.

Bookmark Ontology: contains concepts that are necessary to describe and evaluate websites.

These ontologies are already applied to several applications. Such as the Researcher Ontology which is used by the *Personal Publication Reader* [Baumgartner et al., 2005] to gather additional information about authors of specific publications.

The aim of our research work was to build a portal for the REWERSE project, which enables users to access information provided by these ontologies and portal specific data (i. e. *News*, *Appointments*, etc.) in a personalized way and further to let the user benefit from the schema information which is defined in the ontologies. These benefits should include context based navigation through the RDF Data and the ability to query the RDF Data in a schema-specific way.

2 Our Approach

To realize the described kind of portal, we used a portal software which was developed for SWAD-E demonstrator “*The Semantic Web Environment Directory*” (SWED²) [Reynolds et al., 2004].

Below we give a short introduction to this portal software and point out how we customized and extended the software.

2.1 SWAD-E Semantic Portal

A lightly abstracted architecture of the SWAD-E Semantic Portal is illustrated in figure 1.

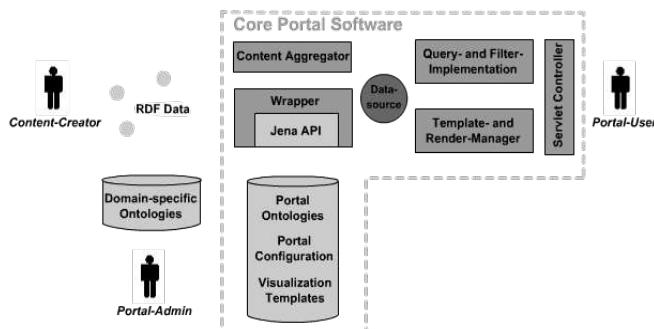


Figure 1 - SWAD-E Semantic Portal Architecture

The *Content Aggregator* (called *Harvester*) is used to read in distributed RDF Data via the Jena API³. This data is encapsulated in a special model (*Datastore*), which is accessible through the portal definition (*Datasource*). Thus the Datasource provides access to the whole dataset including the schema definitions (*Domain-specific Ontologies*). By use of queries and filters it is possible to extract specific data. The Visualization of these data subsets, which match a special filter, is done by *Visualization Templates* (Velocity⁴ Templates).

2.2 Portal Customization

To customize the SWAD-E portal software we had to perform three main tasks. The following had to be edited in the portal configuration file:

²SWED: <http://www.swed.org.uk/> (07/2005)

³Jena API: <http://jena.sourceforge.net/> (07/2005)

⁴Velocity: <http://jakarta.apache.org/velocity/> (07/2005)

¹REWERSE project: <http://rewerse.net/> (07/2005)

```

01: [] rdf:type pcv:DataSource;
02:   rdfs:label "REWERSE Portal";
03:   ...
04:   pcv:sourceURL
05:     <../ResearcherInstances.rdf>;
06:   pcv:ontologySourceURL
07:     <../ResearcherOntology.owl>;
08:   ...

```

Listening 1 - Defining the Datasource

1. **Defining the Datasource:** Specifying the attributes of the portal (i. e. *name*) and announcing which Ontologies and Data should be imported (*listening 1*).
2. **Defining Facets:** Facets are certain attributes of a filter (*matching patterns*). A filter is composed of an arbitrary number of stateful facets.

The following listening illustrates a facet that allows to filter instances of the *Researcher Ontology* by *rdf:type*:

```

01: pcv:facet [
02:   a pcv:HierarchicalFacet;
03:   rdfs:label "Persons.. ordered by type";
04:   pcv:linkProp rdf:type;
05:   pcv:widenP rdfs:subClassOf;
06:   pcv:facetBase reverse:ResearcherConcept;
07:   ...
08: ];

```

Listening 2 - Defining facets

In listening 2 we define a portal built-in facet (*HierarchicalFacet*). Therefore we specify the properties that indicate the type of an instance (*line 04*), the next broader concept (*line 05*) and the most general concept (*line 06*).

3. **Defining Visualization Templates:** The defined templates can be applied to a special context and a particular type of a RDF Resource.

After these three steps are fulfilled and the *Look And Feel* is adjusted in a *Cascading Stylesheet* the portal customization is finished.

2.3 Portal Extensions

Next to the common portal customization we also extended the functionality of the SWAD-E portal software, e.g. with implementing the **Date Facet** which is used to filter *News* according to the creation date (*dc:date*).

In a second iteration we developed own packages to accomplish personalization. These packages provide:

User Management: enables the portal to determine which registered users are online. Registered users are associated with the corresponding instance of the *Researcher Ontology*.

Personal Filters: When a user is logged in, he can use predefined personal filters to navigate to e. g. *News of Working Groups* he is involved in.

Radar: The Radar calculates and visualizes the distance between two *Persons*. We distinguish between:

- *browsing distance:* How many clicks does it take a user to navigate to the same page (*RDF Resource*) another user has just visited?

- *professional distance:* How much relation has a user to another user?

The process of determining the professional distance by using the *Researcher Ontology* is outlined in Figure 2.

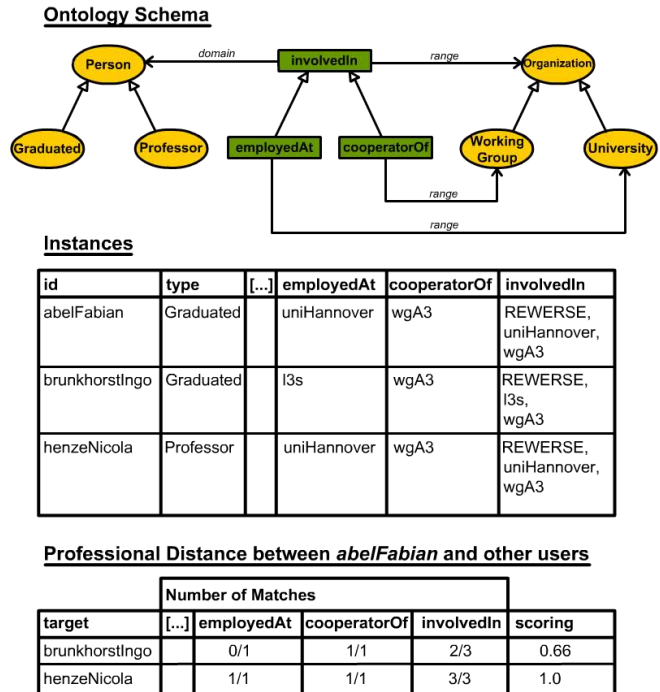


Figure 2 - Calculating the professional distance

3 Conclusion

Our approach to design a portal for the REWERSE Project succeed as we applied the portal software of the SWAD-E Semantic Portal Demonstrator. Next to a common customization, which enabled us to integrate our existing ontologies and RDF Data, we further extended this software to accomplish personalization. A personal menu offers registered users personal predefined filters that allow the user to extract specific *News* which again can be filtered with the new Date Facet. By using the portal infrastructure and our rudimental user management package the Radar is able to determine a professional and a browsing distance between portal users.

At present the REWERSE portal is deployed as a prototype accessible via:

<http://www.personal-reader.de/portal/>

References

- [Baumgartner *et al.*, 2005] R. Baumgartner, N. Henze and M. Herzog. *The Personal Publication Reader: Illustrating Web Data Extraction, Personalization and Reasoning for the Semantic Web*. European Semantic Web Conference ESWC 2005, Heraklion, Greece, 2005
- [Reynolds *et al.*, 2004] D. Reynolds, P. Shabajee, S. Cayzer and D. Steer. *Semantic Portals Demonstrator-Lessons Learnt*. SWAD-Europe deliverable 12.1.7, 2005

Appendix A - Demonstration of the Semantic Portal for REWERSE

1. Start browsing the REWERSE Portal

2. Filter RDF Data and select a certain RDF Resource

3. View the selected RDF Resource

Website	Note	Ratings	Author
Semantic Portal Blog	Der Blog zum Teilprojekt REWERSE Semantic Portal...	very-important quality-very-high	Fabian Abel
Semantic Web W3C	Die offizielle Seite des W3C zum Semantic Web...	very-important quality-high	Fabian Abel

4. View distance to other users

Description

This series of screenshots illustrates some features of the Semantic Portal for REWERSE:

1. Start browsing: The startpage of the portal gives an overview of the portal content. We distinguish two general kind of data, which again can be filtered by use of several Facets:

News: Special RSS Items, which furthermore reference different ontologies.

Researcher: In general these are instances of our *Researcher Ontology*, e. g. Persons or Organizations.

2. Filter RDF Data: In this example we are searching for a certain RDF Resource of type *News*. Therefore we first apply a personal Filter (*Personal Views* -> *My*

News) and then refine our search by using the *DateFacet* whereupon we receive one result.

3. View RDF Resource: The News Item consists of common RSS Item properties (e. g. *description*) and references to other ontologies:

Researcher Ontology: author of the News

Semantic Web Glossary Ontology: keywords that are used to classify the News (here: *Semantic Web*).

Bookmark Ontology: Websites that are related to the categories which classify the News Item (here: 2 sites).

4. Radar: Determine if other users are visiting the portal and calculate the browsing and professional distance to them.

More Details: <http://personal-reader.de/portal/>