Integrating SPARQL Endpoints into Directory Services

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We demonstrate[1] the integration of RDF knowledge bases from our social, semantic collaboration tool OntoWiki via SPARQL endpoints into directory services based on the Lightweigth Directory Access Protocol (LDAP). In order to achieve this, we translate LDAP queries into SPARQL queries and transform the incoming SPARQL results back into the LDAP data model. The transformation component is implemented as a backend for the widely used OpenLDAP server[2].

LDAP based directory services are an important part in the IT infrastructure of most organisations and enterprises. They act as a central service for integrating new applications into an IT infrastructure and can be accessed by many different types of clients ranging from content management systems to personal email tools.
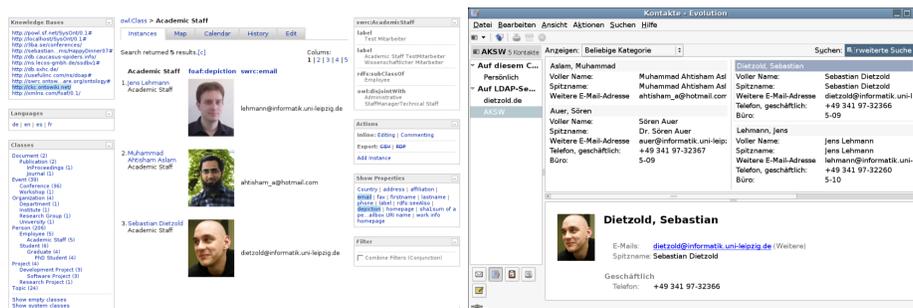

Fig. 1. "Same same but different": Visualization of a common RDF model in OntoWiki (left) and over LDAP in the email-reader evolution (right)

Typical content which is stored in directory services is information about users or hardware. Even though it has a complex schema with global unique

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[1] Sources and documentation: http://aksw.org/Projects/LDAP/Backend.
[2] http://www.openldap.org

object identifiers and sophisticated syntax matching rules, LDAP lacks powerful semantics and is restricted to a tree like data model.

To combine the user acceptance of LDAP directory services and the semantic power of RDF knowledge bases, we decided to implement a SPARQL endpoint backend for OpenLDAP.

The core functionality of the backend is:

1. *Transformation of given LDAP query strings into SPARQL queries*: This is done in a straightforward way. LDAP query strings allow AND, OR and NOT composition of simple attibute filters. An attribute filter consists of an attribute name, a filter type (equality, presence, order, ...) and a filter value. The corresponding SPARQL query uses UNION, OPTIONAL, FILTER and BOUND constructs and matched schema names.
2. *Match RDF schema / OWL ontology URIs to LDAP schema identifiers*: There are two ways to deliver RDF data over LDAP directories. First, it is possible to translate a complete LDAP schema to OWL [2, 3]. In the following, this OWL ontology can be used for instance creation. Second, we allow to configure matching tables for easy integration of given RDF models (e.g. a mapping from FOAF[3] to inetOrgPerson [4]).

This demo will allow users to modify and query the content of an RDF knowledge base[4]. The modifications can be done using the semantic collaboration tool OntoWiki [1]. To query the knowledge base, any LDAP capable mail user agent can be used (see figure 1). The demo is not limited to OntoWiki knowledge bases but can be used in combination with arbitary SPARQL endpoints containing information about people.

References

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[3] http://www.foaf-project.org/

[4] We want to use the model of all submitted ESWC2007 FOAF documents here.