INWISS – Integrative Enterprise Knowledge Portal

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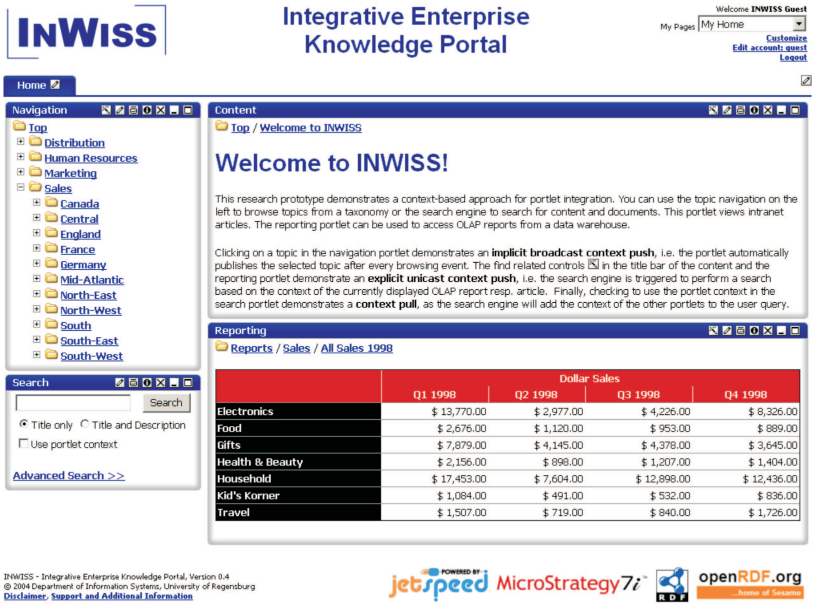
Abstract. Knowledge portals make an important contribution to enabling enterprise knowledge management by providing users with a consolidated, personalized user interface that allows efficient access to various types of (structured and unstructured) information. Today's portal systems allow combining access modules to different information sources side by side on a single portal webpage. However, there is only little interaction between those so called portlets. When a user navigates within one portlet, the others usually remain unchanged, which means that each source has to be searched individually for relevant information. The InWiss prototype demonstrates an approach for communicating the user context among portlets, utilizing Semantic Web technologies. For example, the query context of an OLAP portlet, which provides access to structured data stored in a data warehouse, can be used by a search portlet to automatically provide the user with related intranet articles or documents. For this purpose InWiss utilizes a fuzzy metadata-based information retrieval technique.

1 Overview

A major challenge of today's information systems is to provide the user with the right information at the right time. Using web-based technologies, knowledge portals are an emerging approach for providing a single point of access to various types of information. InWiss addresses integration aspects within enterprise knowledge portals. Today's portal systems allow combining different portal components side by side on a single portal webpage. However, there is only little interaction between those so called portlets. When a user navigates within one portlet, the others remain unchanged, which means that each source has to be searched individually for relevant information.

The InWiss prototype demonstrates an approach for communicating the user context (revealing the user's information need) among portlets. This approach is, to our knowledge, unique. For example, the query context of an OLAP portlet (i.e. the information shown within a certain OLAP report [3]) can be used by a search portlet to automatically provide the user with related intranet articles or documents. This provides for implicit, proactive information retrieval capabilities. We base our approach on a common taxonomy, an enterprise ontology



○ Title only ○ Title and Description

□ Use portlet context

Welcome to INWISS!

This research prototype demonstrates a context-based approach for portlet integration. You can use the topic navigation on the left to browse topics from a taxonomy or the search engine to search for content and documents. This portlet views intranet articles. The reporting portlet can be used to access OLAP reports from a data warehouse.

Clicking on a topic in the navigation portlet demonstrates an **implicit broadcast context push**, i.e. the portlet automatically publishes the selected topic after every browsing event. The find related controls in the title bar of the content and the reporting portlet demonstrate an **explicit unicast context push**, i.e. the search engine is triggered to perform a search based on the context of the currently displayed OLAP report resp. article. Finally, checking to use the portlet context in the search portlet demonstrates a **context pull**, as the search engine will add the context of the other portlets to the user query.

	Dollar Sales			
	Q1 1998	Q2 1998	Q3 1998	Q4 1998
Electronics	$ 13,770.00	$ 2,977.00	$ 4,226.00	$ 8,326.00
Food	$ 2,676.00	$ 1,120.00	$ 953.00	$ 889.00
Gifts	$ 7,879.00	$ 4,145.00	$ 4,378.00	$ 3,645.00
Health & Beauty	$ 2,156.00	$ 898.00	$ 1,207.00	$ 1,404.00
Household	$ 17,453.00	$ 7,604.00	$ 12,898.00	$ 12,436.00
Kid's Korner	$ 1,084.00	$ 491.00	$ 532.00	$ 836.00
Travel	$ 1,507.00	$ 719.00	$ 840.00	$ 1,726.00

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Fig. 1. Screenshot of the InWiss prototype

(with "business objects" like customers, products, etc.), and ontological concept mapping.

A more detailed motivation and overview of InWiss can be found in [6].

2 Context-based Portlet Integration

Our generic portlet integration approach is based on communicating the user context among portlets. Usually portlets only provide their portlet content for rendering the user interface [8]. In addition, we introduce a Context Bus, where portlets can publish their current context (i.e. a semantic representation of what user the sees). Other portlets can pick that context up and use it to also display related information.

The main idea is to use RDF metadata to represent the context. For example, if a user displays an OLAP report like the one shown in the OLAP portlet in figure 1, the context can be represented as the set of elements (e.g. product categories) shown on the report. Or, a portlet representing a CRM system displaying information about a certain customer can point to a customer object to represent its context. We use an enterprise ontology for this purpose. In addition we use ontological concept mapping if different portlets use different metadata elements to represent the same concept.

We have identified different context integration scenarios and implemented them using inter-portlet communication techniques. The navigation portlet in figure 1 publishes (i.e. pushes) its topic to the other portlets, triggered implicitly by browse events. The search portlet accepts context events from the content and the OLAP portlet. In this case the context push is triggered explicitly when the user clicks a find related control in the portlet title bar. Finally, when checking to use the portal context in the search portlet, the search engine will query (i.e. pull) the context of the other portlets and add it to the user query.

For details on our context-based portlet integration approach see [4].

3 Similarity-based Information Retrieval on Metadata

As mentioned above, a major application for our context-based portlet integration is to provide implicit searches based on the current user context. In order to be able to perform context-based searches, we use metadata queries, rather than full-text searches, due to semantics that can be used, e.g. by utilizing an ontology. It turned out that particularly such implicit queries require a fuzzy retrieval approach. Current metadata querying approaches, however, do not support vague queries. Hence, we developed a metadata-based information retrieval approach similar to classical retrieval models like the Vector Space Model (VSM) [1]. It is based on the similarity of RDF descriptions, i.e. both, the query and the resources are represented as RDF descriptions and the ranking of the search results is done using a similarity measure.

For details on this information retrieval approach for metadata see [7].

4 Architecture and Availability

The running InWiss prototype is accessible at `http://www.inwiss.org`, the source code will be made available for download under the GNU General Public License (GPL) at `http://sourceforge.net/projects/inwiss/`.

Figure 2 shows the overall architecture. The Context Bus is implemented as an extension to the Apache Jetspeed Portal platform[1]. At this point we provide four portlets: One is responsible for displaying content (i.e. intranet articles). A second one provides access to a MicroStrategy 7i OLAP system [2]. The navigation portlet represents a taxonomy-based topic browser. Finally, a fourth portlet is responsible for metadata-based searches.

We use the open source Sesame RDF Framework[3] [2] as a repository for resource metadata, taxonomy, and ontology. The CSAP security module [5] deals with authentication and access control issues.

References

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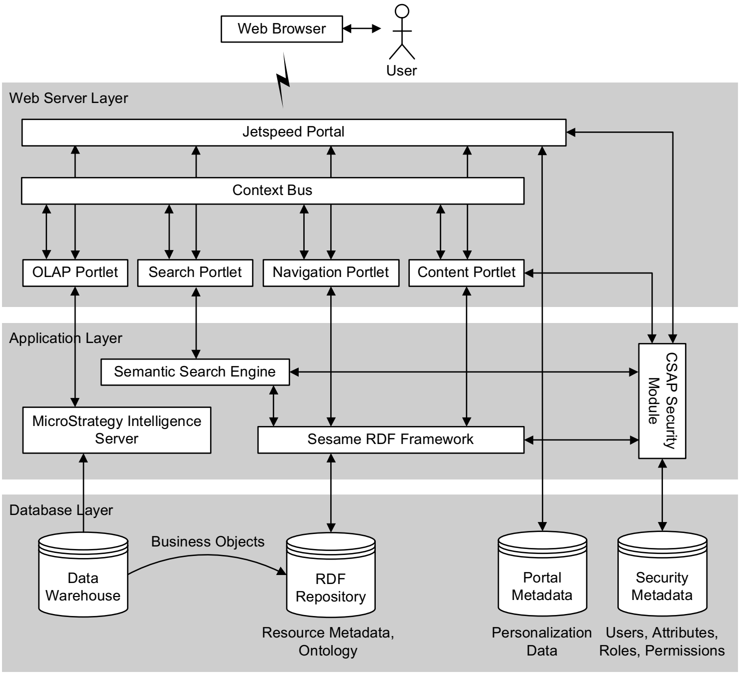

Fig. 2. Architecture of the InWiss prototype

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