

Chapter 19

Integrating Web Portals with Semantic Web Services: A Case Study

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ABSTRACT

Several systems integration proposals have been suggested over the years. However these proposals have mainly focused on data integration, not allowing users to take advantage of services offered by Web portals. Most of the mentioned proposals only provide a set of design principles to build integrated systems and lack in suggesting a systematic way of how to develop systems based on the integration architecture they propose. In previous work we have developed PISA (Web Portal Integration Architecture)—a Web portal integration architecture for data and services—and MIDAS-S, a methodological approach for the development of integrated Web portals, built according to PISA. This work shows, by means of a case study, how both proposals fit together integrating Web portals.

INTRODUCTION

The World Wide Web (or just Web) is now the most popular information source. Besides well-known sources such as static and dynamic Web portals, digital libraries, etc., there are a large number of Web portals that offer users not only data, but

services like bookstores or theatre and flight ticket booking in addition. These services must also be considered as part of any integration efforts. Current integration proposals, however, do not allow users to take advantage of services offered by Web portals. Traditional integration proposals, based on materialized approaches or mediation schemas, have focused on just data integration (see Acuña, Gómez, Marcos, & Bussler, 2005;

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Collet, Huhns, & Shen, 1991; Eyal & Milo, 2001; Mena, Kashyap, Sheth, & Illarramendi, 1996). Some implementations in these works only focus on querying the data available on Web portals and mostly ignore operational aspects offered by Web portals. Moreover, most of the noted proposals only provide a set of design principles to build integration systems and lack in providing a systematic way for building such integrated systems using the architecture they propose.

In previous work, we have presented a complete proposal for integration-oriented Web portal development. This proposal includes both a generic software architecture for the Web portal integration called PISA (Web Portal Integration Architecture) (Acuña, Gómez, Marcos, & Bussler, 2005) and a set of software engineering techniques for the development of integration-oriented Web portals based on the PISA proposal, called MIDAS-S (Acuña & Marcos, 2006).

PISA is a software architecture which defines the main components needed to build integration-oriented Web portals. This architecture takes into account not only data, but also the behaviour offered by Web portals. PISA was defined following a Model-Driven Architecture (MDA) approach (Miller & Mukerji, 2001) as described in Marcos et al. (2006). In that work, a PISA Platform Independent Model (PIM) represents those abstract components required by any integration-oriented system from a conceptual point of view: The PISA Platform Specific Model (PSM) is an instance of PISA-PIM using a specific platform. In the case study developed in this paper, PISA-PSM uses Semantic Web Services technology implemented using the Web Services Modeling Ontology (WSMO) proposal.

MIDAS-S complements prior work on PISA by providing a set of software engineering techniques to ease the development of an integration-oriented Web portal, built using PISA. In turn, MIDAS-S is based on the MIDAS framework (Cáceres, Marcos, & Vela, 2003), which is an MDA framework for Web information systems development that

allows the development of integration-oriented Web portals. MIDAS-S adds a semantic aspect to MIDAS and uses two orthogonal dimensions. First, MIDAS-S gauges the platform dependence degree (following a MDA approach) and specifies the whole system by Computation Independent Models (CIMs), Platform Independent Models (PIMs) and Platform Specific Models (PSMs). Second, MIDAS-S models the system according to three basic aspects—hypertext, content and behavior. In addition, MIDAS-S uses the UML as the only notation for modeling both PIMs and PSMs.

At the PIM level of MIDAS-S, techniques and models proposed by a Service Oriented Development Method (SOD-M) (De Castro, Marcos, & López Sanz, 2006) have been followed to develop the behavioural aspect. A Hypertext Modeling Method or MIDAS (HM³) (Cáceres, De Castro, & Marcos, 2004) was used for the development of Hypertext.

This paper demonstrates how PISA and MIDAS-S fit together to develop integration-oriented Web portals via a case study. In achieving this aim the paper is structured as follows. The following section describes case study, which brings together Web portals employed by Madrid City Hall. Subsequently the main components of the PISA architecture are described. The integrated Web portal development process is then presented in detail. Finally the main conclusions are drawn and directions for future work discussed.

CASE STUDY STATEMENT: INTEGRATING MADRID CITY HALLS WEB PORTALS

Madrid City Hall offers a number of Web Portals containing information about the city, its various Government departments and cultural offerings. The purpose of the integration approach here, therefore, is developing a tool that provides users with the capability of searching across the

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