Enterprise Portals and Web Services Integration

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INTRODUCTION

Portals went through the following different life cycle stages: desktop organization and personalization; single intranet-based portals such as human resource and Internet product-based or industry-based portals; functional-based portals such as knowledge management and business intelligence; and integrated intranet-based enterprise portal (EP) covering some or all functions of the enterprise (see for example http://www.ebizq.net/topics/eai/features/1650.html on how integrating portals and business process management (BPM) enabled the presentation of an integrated view of diverse back-end databases). Current research and practice efforts are directed toward making portals an open system supporting different platforms and allowing its integration into emerging technologies such as Web services (WS). A WS, on the other hand, is defined as an integrating loosely coupled application that uses three major standards: WSDL (definition of WS), UDDI (registry and discovery of WS), and SOAP (access of a WS). However, strongly coupled applications may also benefit from WS technologies to componentized diverse application platforms (i.e., databases, file-based legacy systems) using WS technologies. The article emphasizes cross-organization integration of business function and processes, rather than simply accessing general purpose WS such as weather forecasts and currency conversion.

This article highlights challenges stemming from technologies and management issues and opportunities for enhanced application integration and accessibility. Technology-based integration could follow either standard-based open architecture or product-based approach. Current technologies include the product-based MS .NET and the standard-based J2EE and XML. Major players in EP and WS technologies include IBM, Microsoft, Oracle, and BEA, with dedicated efforts and strong commitments to the integration of EP and WS. Major issues related to the management of both technologies include transaction management, message control and choreography, workflow management, and security. The following sections detail the discussions on these challenges and describe opportunities though a master-slave relationship between the two technologies.

CHALLENGES

Two types of challenges are identified: one stemming from the technologies needed to facilitate portal and Web services integration and another stemming from the need to manage the access of multiple loosely coupled systems running on different platforms belonging to multiple organizations.

Technology-Based Integration Issues

Technology-based integration could follow either standard-based open architecture or product-based approach. Major advantages of the first approach are flexibility (jungle view) of adding different software packages based on need, resiliency (tree view) of selecting parts of or all modules of a particular software, and scalability to a particular business function or a gross-functional process. The disadvantage of this approach is the need for careful planning in the selection of these software packages to accomplish strong integration among the different software packages, just as trying to put together Lego pieces. The latter approach conversely permits stronger integration and ease of implementation with its disadvantage stemming from the limitation of the particulars of individual software capabilities.

This article will report on two major standards related to the integration of Web services and portals. Their objective is portal migration from closed system to open system architecture. These standards could form the foundation to developing standards in compliance with the theme of the article of integrating WS and EP.

Java Specification Request (JSR) 168

A Java-based standard that facilitates writing Portlet to interface portals to Web services. Currently, it is used to link portal desktop screen to external general-purpose service such as weather forecast (Abdelnur & Hepper, 2003). Another related standard is Servlet Specification 2.3, SRV.12.1 Section.

Web Services for Remote Portlets (WSRP)

WSRP standard on the other hand, was developed to link portals to Web services based on XML standards (www.oasis-open.org/committees). At this time, the previous standards should evolve from their current status of supporting portal page organization into supporting enterprise portal and Web service integration of business applications.

MANAGEMENT-BASED INTEGRATION ISSUES

Since the integration of EP and WS will dictate multi-organization access to back-end databases and process over the Internet, the following sub-sections highlight certain management issues that are addressed in the process of achieving the targeted integration between EP and WS.

Transaction Management (TM)

TM originally addressed issues related to access and update of distributed databases containing replicated and fragmented data belonging to one enterprise. Within the theme of this article, TM is to control access and update of databases across enterprises as well. The most complex scenario is to have individual participant enterprises also having distributed databases. For example, one company may order certain products from different organizations that employ distributed databases and store product data in its own distributed databases. These two TM functions should be coordinated.

The two-phase commit protocol is the most common one discussed related to Web services composition (Web services transaction management (WS-TXM) Ver1.0, July 28, 2003). These standards should be extended to include links to portals executing certain requests originated from users of Web services or other portals.

Message Control and Choreography

Three levels of messaging are identified: message from requesting users through EP or WS, which is controlled by SOAP, message controlled among composite Web services, which is done through choreography (Yendluri, 2003), and message control between the results of composite Web services request to enterprise back-end database normally controlled by message queuing or advance message queuing (Gawlick, 2002). To support the types of transactions involved in EP/WS integration, all three levels of message control should be coordinated.

Workflow

This issue is related to the previous one and sometimes is discussed in comparison between choreography and workflow (Peltz, 2003). The position of this article is that workflow is a higher level of coordination than choreography as stated in Ader (2004). Workflow includes policies, decisions, and databases to be used in processing of transactions. In EP/WS integration, another aspect becomes important, which is the coordination between the workflow of the interaction and the internal workflows for each of the participant enterprises. Related current and evolving standards should address these issues.

Security (Such as Federated Identity)

Security is an issue even when accessing back-end databases in a single organization. Since EP/WS integration requires access and update databases belonging to multiple enterprises, security becomes more critical. While other enterprise resource planning (ERP) vendors decided to deploy limited modules on the Internet out of fear from security problems, Oracle discarded these fears and deployed all of its modules on the Internet. Early adapters of the model of this article should exactly do that.

First of all, enterprises should determine which data should be protected from access by their competitors advertently or inadvertently. Read only access to other data for all enterprises participating in a transaction over integrated EP/WS should pose no problem. Other types of access should be controlled according to users' identity. The starting point, however, is to build an authentication process for users who access an integrated EP/WS belonging to different enterprises. Currently, two approaches are considered: federated identity and building trust relationship among organization participating in fulfilling a user's request (Gralla, 2004; McAllister, 2004)

Federated identity is based on a single identification using digital signatures of users of multi-enterprise access as in the case of EP/WS integration. Building a trust relationship is based on the rippling of factor of trust among enterprises. If enterprise A trusts B, B trusts C, then A should trust C, and so on. These approaches are just emerging and we have to wait and see how they will fit within the EP/WS integration.

The previous section discussed technical and managerial issues. In the next section we present an opportunity framework that will illustrate how the link could be achieved.

OPPORTUNITIES

Articles such as Gralla's (2003) strongly advocate the link between WS and EP. Both producers and users of portals invested heavily in portals such as IBM's WebSphere, BEA's

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