Intelligent Business Portals

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INTRODUCTION

Business Portals are now widely used in e-commerce. Intuitively Portals can be regarded as an information gateway for exchanging business information over the Internet. The process of business information exchange requires the services of *security and access control*, *interoperability* over a variety of software of platforms and systems, *interconnectivity* for communications among different data communication networks, and *scalability* for information being sharable on different hardware devices. So, portals can also be regarded as an information carrier for delivering the right information to the right user, at the right time, to the right place, to make the right decisions. A portal is a packaged piece of information with the properties of self-servicing, personalization, and real-time delivery. From a business point of view, a portal is a mobile, self-explanatory, and just-in-time delivered piece of information. In e-commerce, business information is a set of time-stamped transactions that can be triggered by events in business activities. This article will illustrate and explain the architecture of intelligent business portals for Web-enabled business applications.

BACKGROUND

The portal concept was introduced by Merrill Lynch (Shilakes & Tylman 1998). It was estimated that by the year 2002, the portal market value in Business Intelligence will reach US$7 billion(Bergert 2000), in Content Management will reach US$4.5 billion, and in Data Warehousing and Mart will reach US$2.5 billion. This fast growth has been attributed to the World Wide Web on the Internet and the high-speed network infrastructure.

The origination of portals comes from a question on how we could deliver the right information to users. In traditional *pull technology*, individual Web users have to initiate the search operation to find information on the Web, while in *push technology*, information is sent to individual users with or without solicitation. On the other hand, a user may need to interact with a system to provide information (such as filling out a survey form). Thus, there is a need to provide an application-independent mechanism for switching information between information providers and requestors. This requirement has generalized the traditional many-to-one client-server relation into a many-to-many client-server relation. Inevitably, an information explosion is introduced on the Web. Many Web users are frustrated in dealing with the overwhelming information bombardment. To solve the problem, the portal as a packaged piece of information is used for delivering the right information to the right user.

PROPERTIES OF PORTALS

A portal has the properties of self-servicing, personalization, and real-time delivery. For *self-servicing*, a user would be able to use predefined templates to redesign personalized Web pages. For example, an employee in a business organization can be assigned by a predefined Web site according to the business roles played by the individual. The employee can then modify the Web site according to personal interests and preferences. This Web site then is used to conduct the business.

For *personalization*, a user would be able to deliver and receive information that is dedicated to the person. For example, portals are used by university students to select subjects and view personal enrollment information. For *real-time delivery*, a portal is used as a messaging tool to deliver instant messages to an individual.

From a business point of view, a portal provides mobile, self-explanatory, and just-in-time delivered information. Business intelligence is about how to apply knowledge to making business decisions, searching for useful information, or controlling the business processes.

When portals are used as an approach to the fundamental information infrastructure of e-businesses, we need to know how to maximize their usefulness in order to improve our business performance, competitiveness, and viability. Intelligent portals would be portals with knowledge in order to be driven around on an intranet or on the World Wide Web. In other words, by capturing the domain-specific business knowledge, we can deploy portals on the Web and let their behavior be controlled by a knowledge base. In this case, a knowledge management system (Choo,1998; Liebowitz & Wilcox, 1997) would play an important role in an e-business environment.

This article discusses the theoretical issues on the integration of knowledge management systems with portal deployment mechanisms. We will illustrate and explain

the technological issues in designing and implementing intelligent business portals for Web-enabled business applications.

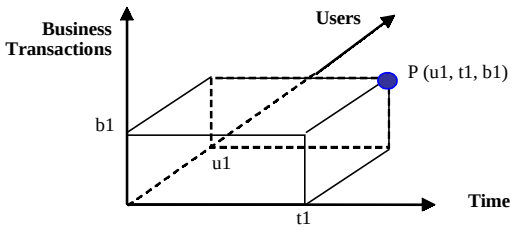
INTELLIGENT PORTALS

Intelligence is the execution of knowledge. When a reasoning mechanism is invoked by a question or a problem, the relevant knowledge is retrieved and a possible answer or solution is then concluded. Intelligence also implies the capability of finding the best solution for a problem. In a business environment, knowledge can be in different forms. It could be a set of if-then production rules for decision-making problems, a set of facts for corporate infrastructure descriptions, or a set of procedural descriptions for the business transactions. Business activities are event driven, so the timely execution of certain business processes is crucial to the success of business. This research area is mainly covered by workflow management (Marin, 2001; WfMC, 1996).

A portal in this context is an information feeder that will satisfy the information needs of different users at different times for different business processes. In Figure 1, it can be seen that a point *P* in the 3-D space is the information about *who is doing what at what time*. Since the business activities can be the predefined workflows (like an application for an insurance policy will go through a step-by-step process to get an approval), a workflow control system should be able to check the information requirements for a particular business process and a particular person. For example, in Figure 1, point *P* may be interpreted as a person "John" on "Monday, 3 Nov, 2003" at "9am" is "placing an order to buy a product".

In an e-business, if a Web site is designed for online ordering, while a user is online, the system should be able to deliver context sensitive information to the order form (e.g., user account number, best sales, etc). Furthermore, a reasoning mechanism may be triggered for context-sensitive reasoning and decision making. In this case, an intelligent portal is a context-sensitive information/service supplier that will accompany the user through the lifetime of the transaction. The 3-D space of the workflow control illustrated in Figure 1 shows the demands of the intelligent portals.

Figure 1. Three-dimensional space for the workflow control



PORTALS VS. AGENTS

Here we need to differentiate intelligent portals from intelligent agents. Intelligent agents (Knoblock & Ambite, 1997) are mobile software programs and are task oriented, while intelligent portals are information carriers and are content based. By using agents, we get things done; by using portals, we know what happened and what information should be supplied. One of the advantages of intelligent portals over intelligent agents concerns the acceptance by general users: agents are the programs to be executed on the clients' machines, while intelligent portals are the pieces of information driven by knowledge to deliver Web services. Consequently, there is no fear from users about potential virus attacks.

KNOWLEDGE MANAGEMENT WITH PORTALS

In a business environment, knowledge management has many aspects, from low-level, day-to-day business process control to high-level, executive decision making. A knowledge management system should be able to collect relevant knowledge, store knowledge in a sharable enterprise memory, communicate the knowledge with parties, and maintain consistencies. In all these activities, a portal can play an important role within an enterprise, that is, as an information carrier to shift information around the organization.

One important task relating to portals in knowledge management is Workflow Management (Allen, 2001; WfMC, 1996). Workflow management involves:

- *Specification* of process control for business transactions, which concerns data coordination, exception handling, recovery, etc. The workflow specifications provide execution plans.
- *Verification* of the feasibility and correctness of a design, while allowing for re-design and implementations for coping with changes.
- *Execution control* for carrying out business transactions. A Workflow Engine is responsible for execution of the processes. During any given execution, a workflow plan may be applied to many individual users. As a result, many concurrent workflow