Integrating Web Based Applications - Challenges and Opportunities

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An extensive range of Web based applications is currently available providing services in many areas of specialization. With business deployment of the Internet, and as customer acceptance and satisfaction with the services grow, more exciting opportunities start emerging to provide new, often integrated services, as well as customization of existing ones.

While information technology provides industry with the means to identify new product and service opportunities, the increasing demands places new terms and requirements on information technology solutions. This cycle has created unprecedented qualifying factors for integrated enterprise systems, and for applications which are capable of rapid adaptation to the new requirements, for workflow structures and for information processing in general.

Unfortunately, the diversity of applications in each specific domain sector, and the disparity of adopted interfaces, application flows, user roles in different stages of business transactions, data formats and data semantics, all make the integration of Web based applications a rather difficult task.

In this talk we will make a brief link to the lessons learnt from a long history of database community research on heterogeneous database systems integration.

Also, we will discuss application flow diversity, including workflow differences which range from the definition of basic activities to user role(s) where the data provision during the business process complicates the coordination of tasks performed in the integrated application. We will examine the extent and limitations on an integral solution to the integration problem, covering both the data (a well understood and extensively studied topic) and the operational...
aspects of the component systems (an issue mostly ignored by the research community).

To deal with the diversity of application flows, business transaction flows and information flows, we will look at the limitations of traditional workflow management systems, and examine their relevance to the composition of the new integrated applications.

In general, workflow technology provides the necessary modeling capabilities for constructing individual, mostly internal, business processes within an enterprise. There is an expectation and belief that well-designed business frameworks should capture the enduring business process or workflows that are fundamental to the target application domain. However, the abiding processes mostly capture workflows that do not change over time. They are mainly concerned with the high level view of what is done, in what order and by whom, often without the appropriate analysis of the consequences of such technological decisions. The same workflow concept also may provide the means for representing some details of step-by-step activities used to complete a given task. Currently available standards (DCOM, CORBA), or object-oriented enterprise frameworks, provide no advice as what should be a 'right' size activity. Diversity in these decisions, made by autonomous systems designers, make the integration process even harder or impossible without serious investment in system restructuring.

To achieve coherence and to manage the complexity and change inherent in multiple e-services (such as e-commerce applications) an overarching structure is needed where companies connected electronically must share a common foundation for integrating their unique business processes, and embrace the software components. These are components common to e-commerce applications and essential to integrating a multitude of individual applications.

There are two main issues here. Given a target global application, the first problem is to identify the potential relevant local applications among the many applications available on the Web. Once the relevant local applications are found, the next issue is writing the mapping between the global and the local applications. There are many research challenges in regard to the automation of the translations and in handling dynamic aspects of e-services such as activities and data flow.

Links to the relevant literature and experience reports will conclude the talk.