A Web Service Architecture for Revenue-Earning Information Products

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EXECUTIVE SUMMARY

Industries are adopting Service-Oriented Architectures (SOA) for multi-organizational federated information systems where there is synergistic value in combined services. By contributing information services to the federation, each participant benefits from integrated access to services provided by other participants. However, integrated information services for use by external customers, based on SOA, are rare. One reason for this is the absence of technical mechanisms for information providers to share in the financial rewards associated with the provision of integrated information products to end customers. This article explores issues associated with the design of charging mechanisms within SOAs that permit dynamic composition of services in order to achieve customer goals. It proposes a suite of service components that can implement charging functions and explains their application within an application scenario. The scenario concerns an integrated service that is of interest to customers in local government practice, sociological research, and real property investment.

Keywords: information integration services; revenue generation; SOA; Web Services

INFORMATION INTEGRATION SERVICES

The exploitation of the Web to sell information to a near global audience has grown to form an industry known as Online Information Markets. For example, Bureau Van Dijk (2005) offers several services that combine business information from many sources to provide a customer with a combined view of the information. One service, known as BankScope, is “a financial database covering 11,000 banks world-
wide. It offers up to 8 years of detailed spreadsheet information, details on ownership, two years of Reuters full text articles, ratings and ratings reports” (Bureau Van Dijk, 2005). The service adds value to the source data supplied by world-renowned organizations by combining them and providing easy-to-use interfaces and report generation tools.

Service-oriented architectures promise a new model for online information markets. A wide range of distributed service components offered by multiple vendors may be rapidly composed together by an end client or a value-added service provider. The new service, thus created, can deliver an information product that is derived dynamically from the primary services. This approach has many advantages: primary service providers may have their reusable services offered through many value-added providers and, thus, reach wider markets; primary service providers retain control, responsibility, and accountability for their information, and thus, data quality is encouraged; and primary service providers maintain a connection with their customer market, albeit mediated by a third party but visible to themselves, at a very fine level. On the other hand, value-added service providers may take advantage of best-of-breed primary information services in order to deliver an integrated product to their customers. They may rapidly reengineer their service implementation in order to take advantage of alternative service providers or give runtime choice to their own customers where alternatives exist.

However, service providers may require financial rewards for their contribution to value-added services. Traditionally, in an online information market, a value-added provider would negotiate a prior long-term contract for access to primary information. The primary information provider physically would transfer the information to the value-added provider, possibly with a regular update strategy, and would be disconnected completely from the dynamic on-selling of that information to the end customers of the value-added service. This means that the value-added service provider would manage the collection of revenue from paying customers and would accept the risk that paying customers may choose not to use the primary information. Even though the contract between the primary and value-added service providers might incorporate an element of reward based on the volume of customer use, the primary service provider will have no mechanism for verifying that use. A service-oriented architecture approach can address these problems by distributing the responsibility for charging for information delivered on a dynamic basis, per access, and back to the primary service provider as the access occurs. However, the design of mechanisms for user-pays access to services in this kind of architecture is not straightforward, and has not been previously addressed in the literature.

For an example in this article, we describe a scenario for government information sharing associated with a major transport route in Sydney, Australia, known as the Sydney Information Highway (SIH) (Cameron, Taylor & Abel, 2001). Local and
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