Chapter VII
Introduction to Web Services

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ABSTRACT

This chapter introduces the theory and design principles behind Web Service technology. It explains the models, specifications, and uses of this technology as a means to allow heterogeneous systems to work together to achieve a task. Furthermore, the authors hope that this chapter will provide sufficient background information along with information about current areas of research in the area of Web Services that readers will come away with an understanding of how this technology works and ways that it could be implemented and used.

INTRODUCTION

As the World-Wide Web (WWW) exploded into the lives of the public in the 1990s, people suddenly had vast amounts of information placed at their fingertips. The system was developed to allow information sharing within internationally dispersed working groups. The original WWW consisted of documents (i.e., Web pages) and links between documents. The initial idea of the WWW was to develop a universal information database to publish information that could be ac-
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As organizations started to implement business-to-customer and e-commerce solutions, they realized that the initial technologies associated with the WWW were not sufficient to sell products over the Internet. Additional functionality was required to guarantee that transactions were conducted in a secure way. To this end, SSL (Secure Sockets Layer), a protocol defined by Netscape, was developed for transmitting private documents via the Internet. Using SSL, organizations were able to implement a solution to obtain confidential user information, such as credit card numbers.

With globalization, organizations were progressively undertaking mergers and acquisitions. This has created organizations with an IT environment composed of disparate legacy systems, applications, processes, and data sources. In order to meet increasing customer and business partner expectations for real-time information, organizations were required to link their heterogeneous, autonomous and distributed systems to improve productivity and efficiency. This important requirement led to the development and deployment of EAI (enterprise application integration) solutions. EAI platforms were used for integrating incompatible and distributed systems such as ERP (enterprise resource planning), CRM (customer relationship management), SCM (supply chain management), databases, data sources, data warehouses, and other important internal systems across the corporate enterprise. While useful, most EAI frameworks required costly and proprietary protocols and formats, which presented many technical difficulties when it was needed to integrate internal systems with external systems running on partners’ computers.

The limitations of EAI solutions made most organizations realize that integrating internal systems with external systems to business supply chain members was a key to staying competitive, since the majority of business processes spanned across several organizations. Internal and external systems needed to communicate over networks to allow businesses to complete a transaction or part of a transaction. To achieve this level of integration, business-to-business (B2B) solutions were developed. B2B infrastructures were directed to help organizations to streamline their processes so they could carry out business transactions more efficiently with their business partners (such as resellers and suppliers). To reach a higher level of integration, most B2B solutions have relied on the use of XML as the language to represent data. XML allows one to model data at any level of complexity since it is extensible with the addition of new tags. Data can be published in multiple...