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701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

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Chapter VII

Web Service Integration and Management Strategies for Large-Scale Datasets

Yannis Panagis, University of Patras and
Research Academic Computer Technology Institute, Greece

Evangelos Sakkopoulos, University of Patras and
Research Academic Computer Technology Institute, Greece

Spyros Sioutas, University of Patras, Greece

Athanasios Tsakalidis, University of Patras and
Research Academic Computer Technology Institute, Greece

Abstract

This chapter presents the Web Service architecture and proposes Web Service integration and management strategies for large-scale datasets. The main part of this chapter presents the elements of Web Service architecture, the challenges in implementing Web Services whenever large-scale data are involved and the design decisions and business

process re-engineering steps to integrate Web Services in an enterprise information system. The latter are presented in the context of a case study involving the largest private-sector telephony provider in Greece, where the provider's billing system datasets are utilized. Moreover, scientific work on Web Service discovery is presented along with experiments on implementing an elaborate discovery strategy over real-world, large-scale data. Thereby, this chapter aims to illustrate the necessary actions to implement Web Services in a corporate environment, stress the associated benefits, to present the necessary business process re-engineering procedures and to highlight the need for more efficient Web Service discovery.

Introduction

Web Services (WS) is one of the few architectures that were unanimously adopted by the information technology (IT) industry. From the first drafts of WS specifications, the WS architecture has been established as the dominating distributed software development paradigm.

In a nutshell, *Web Services* are collections of operations — parts of larger applications — that are *remotely available* through common Web protocols, without posing any restrictions on the platforms at both communication ends.

The Web Services framework consists of essentially three basic components: The *Web Service Description Language* (WSDL), a language to allow formal functional characterization of the provided functionalities, the *Simple Object Access Protocol* (SOAP), a protocol that defines the format of the information interchange, and the *Universal Description, Discovery, and Integration* (UDDI), which is a catalog of Web Service descriptions.

All three of the components just mentioned are specified using extensions to the common XML language. Every WS transaction is taking place over established Web protocols such as HTTP and FTP. The adoption of cross-platform implemented protocols is what has facilitated the wide acceptance of Web Services as a platform for implementing a wide gamut of applications. These range from major services such as business interaction and customer relationship management, to much more limited services such as checking the price of stock quotes and checking in for a flight.

Despite the wide acclaim of the WS architecture, some very important issues arise when implementing Web Services in the context of enterprise application