Nowadays, Web services are becoming a major research topic for computer scientists, engineers and business consulting professionals. Therefore, there appear a large number of topics and research about the Web services from various aspects. This book provides researchers, scholars, professionals, and educators with the most current research and architecture on Web services with organizations and individuals worldwide.

Chapter I, “Challenges and Opportunities for Web Services Research,” by Liang-Jie Zhang, IBM T. J. Watson Research Center (USA), analyzes the trend of the increasing business requirements and points out the necessity of capturing and mapping it into a solution skeleton for Web services solution creators and researchers. This chapter presents some challenges incurred by the current Web services research topics from the modeling, interoperability, and mathematical foundations points of view, followed by some observations about the opportunities and possible directions for moving Web services forward via illustrative ideas such as business semantic computing as well as killer application driven Web services research approach.

Chapter II, “Authentication Techniques for UDDI Registries,” by Elisa Bertino, Purdue University (USA); Barbara Carminati, and Elena Ferrari, University of Insurbia at Varese (Italy), shows that the key role in the Web Service architecture is played by UDDI registries, i.e., a structured repository of information that can be queried by clients to find the Web services that better fit they needs. This chapter proposes an approach based on Merkle hash trees, which provides a flexible authentication mechanism for UDDI registries, as well as its two relevant benefits.

Chapter III, “Web Services Enabled E-Market Access Control Model,” by Harry Wang and Leon Zhao, University of Arizona (USA); and Hsing K. Cheng, University of Florida (USA), discusses the pressing need for a comprehensive access control model to support secure e-market operations. By integrating several access control
models such as role-based access control, coalition-based access control, and re-
lationship driven access control, this chapter proposes a comprehensive security control
mechanism to support advanced access control in e-markets, which is referred as
e-market access control (EMAC) model. It also illustrates how the EMAC model
can support e-market access control via an automotive e-market example.

**Chapter IV**, “Dynamically Adaptable Web Services Based on the Simple Object
Access Protocol,” by Kevin Curran and Brendan Gallagher, University of Ulster
(UK), introduces the simple object access protocol (SOAP) from its definition,
its function and other aspects. This chapter describes a SOAP Web service, and
demonstrates how SOAP’s platform and language independence can be used to
overcome common limitations such a bandwidth, memory capacity, as well as
disparate programming environments.

**Chapter V**, “Advanced Data Compression Techniques for SOAP Web Services,”
by Christian Werner, Carsten Buschmann and Stefan Fischer, Institute of Telematics
and University Lübeck (Germany), introduces a new experimental concept for
SOAP compression based on differential encoding, which makes use of the com-
monly available WSDL description of a SOAP Web service. This chapter explores
compression strategies and supplies a detailed survey and evaluation of state of the
art binary encoding techniques for SOAP. Moreover, it discusses different strate-
gies for compressing SOAP messages more efficiently than gzip does as well as
some future work.

**Chapter VI**, “Mobile Agents Meet Web Services,” by Cristian Mateos, Alejandro
Zunino and Marcelo Campo, Universidad Nacional al Centro (Argentina), presents
MoviLog, a novel programming language for enabling mobile agents to consume
Web services. This chapter introduces Web services and the Semantic Web, the
related work, and MoviLog. Furthermore, it explains the approach for integrating
MoviLog and Web services, and describes an agent implemented with MoviLog.

**Chapter VII**, “RAWS & UWAS: Reflective and Adaptable Web Services Run-
ning on the Universal Web Application Server,” by Javier Parra-Fuente and Marta
Fernández-Alarcón, Computer Languages and Systems Department, Pontifical
University of Salamanca, Madrid campus (Spain); and Salvador Sánchez-Alonso,
Information Engineering Research Unit, University of Alcalá (Spain), introduces the
basic concepts of reflection which will be applied to Web services (the introspective
characteristics and the analysis of the structural and behavioral reflection of the Web
service), the architecture model of a reflective and adaptable Web service, and the
automatic generation mechanism to obtain the reflective infrastructure needed for
a Web service to be dynamically adaptable. This chapter presents the RAWS and
the universal web application server (UWAS) architectures; in order to show how
Web service can behave like a reflective and adaptable Web service by modifying
the original code, it also introduces the dynamic generation process of a meta-Web
service.
Chapter VIII, “Metadata Based Information Management Framework for Grids,” by Wei Jie, Tianyi Zang, Terence Hung, Institute of High Performance Computing (Singapore); and Stephen Turner, and Wentong Cai, Nanyang Technological University (Singapore), presents an information management framework, a hierarchical structure which consists of VO layer, site layer and resource layer, for a grid virtual organization (VO). This information management framework is a three-layer structure supporting information generation, collection, updates and accessing. This chapter proposes different models of information data organization for information management in grids and simulation experiments conducted to evaluate the performance of these models.

Chapter IX, “Architectural Foundations of WSRF.NET,” by Glenn Wasson and Marty Humphrey, University of Virginia (USA), discusses the architectural foundations of WSRF.NET, which is an implementation of the full set of specifications for WSRF and WS-notification on the Microsoft.NET framework. In this chapter, a concrete example of the design, implementation and deployment of a WSRF-compliant service and its accompanying WSRF-compliant client are used to guide the discussion. Meanwhile, it describes a use-case scenario for constructing and consuming a WSRF-compliant Web service in WSRF.NET.

Chapter X, “QoS-Aware Web Services Discovery with Federated Support for UDDI,” by Chen Zhou, Liang-Tien Chia and Bu-Sung Lee, Nanyang Technological University (Singapore), presents a UX architecture that is QoS-aware and facilitates the federated discovery for Web services. With the need to provide QoS-awareness in UDDI and service discovery between enterprise domains, this chapter proposes a solution called UDDI eXtension (UX). Differing from the original UDDI system, the new system is aware of the basic service performance information with relatively small overhead from the feedback.

Chapter XI, “Proactively Composing Web Services as Tasks by Semantic Web Agents,” by Vadim Ermolayev and Natalya Keberle, Zaporozhye National University, (Ukraine); Oleksandr Kononenko, Nokia Research Center (Finland); and Vagan Terziyan, University of Jyvaskyla (Finland), presents the framework for agent-enabled dynamic composition of Semantic Web services. This chapter focuses on one of the major open problems—dynamic composition of a desired complex service by a coalition of rational cooperative freelance software agents—and it offers a new understanding of a service as an intelligent agent capability implemented as a self-contained software component.

Chapter XII, “Web Services Identification: Methodology and CASE Tool,” by Hemant Jain and Huimin Zhao, University of Wisconsin-Milwaukee (USA); and Nageswara R. Chinta, Tata Consultancy Services (India), proposes a formal approach to Web services identification, which is a critical step in designing and developing effective Web services. By discussing the Web services identification problem and reviewing approaches being used in identifying reusable assets and in designing business components, the authors then presents a formal approach to Web services
identification. It also describes the implementation of the approach in a CASE tool and its application to identifying Web services for auto insurance claim system. Since Web services are indispensable and becoming more and more significant in the modern world, how to use high-tech methods to make Web services be utilized by people more efficiently is the crucial problem. Now you don’t need to worry about this. As an outstanding collection of the latest research associated with the Web services this book presents different kinds of research of the Web services to people of all circles.