

# Preface

The main purpose of this book is to present advanced software development tools for construction, deployment, and governance of SOA applications. Novel technical concepts and paradigms, formulated during the research stage and during development of such tools, are presented and illustrated by practical usage examples. Hence, the book should be of interest not only to theoreticians but also to engineers who cope with real-life problems. Additionally, each chapter contains an overview of related work, enabling comparison of the proposed concepts with exiting solutions in various areas of the SOA development process. This should make the book interesting for students and scientists who investigate similar issues.

The book consists of an introduction and five chapters addressing the following topics:

- **Specification and Deployment of Business SOA Applications within a Configurable Framework Provided as a Service.** This chapter introduces the main components and features of an integrated framework supporting business processes in a distributed ICT environment based on the Service-Oriented Architecture (SOA) paradigm. The framework's features are divided into areas that span the whole life cycle of business-oriented ICT applications. The framework provides applications and tools for business requirement analysis and comparison, selection and composition of services, efficient communication and provisioning of computational resources, allocation of distributed, virtualized environments, as well as monitoring and management of resource utilization and quality of service indicators.
- **Platform for Development of Electronic Markets of Sophisticated Business Services.** A general architecture of a platform which enables development of electronic markets of sophisticated business services is proposed. The platform consists of the following elements: (i) Service Broker, (ii) Service Registry, (iii) Quote Agents, (iv) Interface Repository, (v) Service servers, (vi) Planner and Task Manager, (vii) User interface, and (viii) Transaction Coordinator.
- **Applying the Service-Oriented Architecture at the Inter-Organizational Level and for Automation of Administrative Procedures.** This chapter introduces a multilevel SOA architecture, describing its core principles, technical layers, and individual levels (known as the Team Level and the Interorganizational

Level). An approach to automation of administrative procedures is also presented along with relevant models. The traditional approach to modeling and execution of administrative procedures is contrasted with dynamic composition. The applicability of the proposed concepts is studied in the context of a real-world SOA application from the construction domain.

- **Dependability Infrastructure for SOA Applications.** The basic services which comprise a dependability infrastructure are presented (this includes group communication, replication, and recovery). Management aspects of SOA dependability infrastructures, including self-configuration and knowledge repository, are investigated. Security problems are also addressed and support for security policy deployment in the form of the ORCA framework is proposed. The applicability of all these concepts is analyzed in the context of the Healthcare Integration Platform and the Medical Event and Data Registration Platform.
- **Implementation, Deployment, and Governance of Adaptive SOA Systems.** The goal of this chapter is to propose a pragmatic methodology for adding and managing adaptability in multiple layers of the S3 stack, and to present the AS3 Studio package, which is a complete suite of tools supporting extensions of SOA systems with adaptability features. The adaptability aspects presented in this chapter are placed in a broader context in order to address a wide range of SOA applications composed of software services (also known as Virtual Services) and hardware components (called Real-World Services).

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