

Preface



Service-oriented thinking, which is becoming popular in both the business and the information technology (IT) communities, is based on the concept of service as a well-defined, self-contained function that does not depend on the context or state of other services. In the IT community service-oriented architectures (SOAs) have emerged as the main approach for dealing with the challenge of interoperability of systems in heterogeneous environments. SOAs also hold the promise of additional benefits, such as reuse of components, improved reliability, and reduced development and deployment costs. In the business world, the service-oriented approach helps automate the managing of business processes by enabling the “orchestration” of services in order to achieve the needed functionality.

This issue of the *IBM Systems Journal* contains 12 papers that are grouped under four major topics: business aspects of service-oriented thinking, developing SOA solutions, elements of the SOA infrastructure, and formal methods. We acknowledge with gratitude the issue coordinator, Norbert Bieberstein, who took the lead in soliciting papers for the issue, managed paper submission, and advised the editorial staff through the production phase. We also thank the people who, as a working group called to duty by the coordinator, contributed their time and expertise to the selection of papers and to the planning of the issue: Jonathan Adams, Ali Arsanjani, Sanjay Bose, Steve Burbeck, Joel Farrell, George Galambos, Steve Holbrook, Beth Hutchison, Ed Kahan, John F Morar, Karla Norsworthy, Emily Plachy, Rick Robinson, Edward Tuggle, George Zagelow, and Olaf Zimmermann.

The first three papers address *business aspects of service-oriented thinking*. The paper “Impact of service orientation at the business level” by Cherbakov et al. is an introduction to the characteristics of the service-oriented enterprise. The authors describe the changes needed to transform a business into an on demand business, that is, one that can respond quickly to changing market conditions, and they show the crucial role played by componentization and service orientation in effecting this transformation. In “Analysis and simulation of business solutions in a service-oriented architecture,” Kano et al. present techniques for the modeling and analysis of business processes. They demonstrate the applicability of these techniques in two case studies; one involves techniques applicable at design time; the other involves simulation, which is used at runtime. In “Impact of service-oriented architecture on enterprise systems, organizational structures, and individuals,” Bieberstein et al. propose a new organizational structure for optimizing human resources in a service-oriented enterprise and describe the cultural changes required to enable the new structure and the ways to bring it about.

The next three papers relate to *developing service-oriented-architecture solutions*. In “Management of the service-oriented-architecture life cycle,” Cox and Kreger propose an architecture and a possible implementation for a system to manage a deployed SOA implementation, and they illustrate the operation of such a system in two example scenarios. In “Realizing service-oriented solutions with the IBM Rational Software Development Platform,” Brown et al. describe the Rational Software Development

Platform, an extensive set of methods and supporting tools for developing software, focusing on its capability to develop service-oriented applications. In “Service-oriented architecture: Programming model and product architecture,” Ferguson and Stockton describe the programming model for aggregating individual services into composite services, which includes business process components types and the use of the Enterprise Service Bus (ESB) for mediating the exchange of messages. They also cover the integration of SOA with database management: how to publish data through services and integrate services into database operations.

The next five papers cover *elements of the service-oriented architecture infrastructure*. In “Enterprise Service Bus: Making service-oriented architecture real,” Schmidt et al. describe the design of the ESB, the critical infrastructure element for SOA implementations. They cover the essential characteristics of an ESB: the meta-data that describes the service requestors and providers; mediating the exchange of messages between requestors and providers; and the discovery, routing, and matchmaking support for participating services. In “Colombo: Lightweight middleware for service-oriented computing,” Curbera et al. describe an experimental platform based on programming and deployment models designed exclusively for service-oriented applications. The authors show that their approach leads to significant simplification and increased performance for the resulting applications.

In “Web Services Navigator: Visualizing the execution of Web services,” De Pauw et al. describe a new tool that visualizes the behavior of Web services-based applications and enables the operations staff to diagnose problems in the field. In “Business-driven application security: From modeling to managing secure applications,” Nagaratnam et al. propose an approach for implementing security and authorization policies in service-oriented environments. Their approach combines the platform-independent modeling of security and authorization policies leading to implementation and the deployment of policies and their enforcement in the operational environment. In “Events and service-oriented architecture: The OASIS Web Services Notification specifications,” Niblett and Graham summarize the three Web Services Notification documents, issued by the standards consortium OASIS, that will be available soon as Public Review

Drafts. These specifications define a standard interoperable protocol through which Web services can disseminate events.

The last paper of the issue deals with *formal methods*. In “Models for semantic interoperability in service-oriented architectures,” Vetere and Lenzerini present an overview of the issue of semantic interoperability of services. Then, they analyze four basic models of semantic interoperability and provide some guidelines for selecting the one best suited for a given environment.

The next issue of the *Journal* is devoted to *online game technology*, the technology behind this fast-growing sector of the video game industry.

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