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Business System Management and Engineering

From Open Issues to Applications

Springer

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Preface

The next generation of business process management (BPM) methods and tools will support the development of a new generation of service-enabled applications that change and evolve over time. The trend is moving from relatively stable, organization-specific applications to dynamic ones supporting business process.

Currently, service-based applications (SBAs) concentrate on composing software services into processes, but do not explicitly correlate business activities and events, such as delivery dates, shipment deadlines and pricing, of different processes in a single end-to-end process. This lack of correlation introduces discontinuities within end-to-end business processes, as information flows may be disrupted. For instance, a possible decoupling of payment information in payment and invoicing processes from delivery data in order management and shipment business processes may violate data integrity and contractual agreements. Furthermore, it may introduce discrepancies, requiring expensive and time-consuming manual reconciliation.

With these backdrops in mind, there is a need for management techniques that can be applied to various tenets of service networks (SNs), including business data, events, operations, process fragments, local and aggregated quality of service (QoS) and associated key performance indicators (KPIs), in order to guarantee the continuity of information flows and the correlation of end-to-end process properties. Currently, this information is deeply buried in SBA code, severely hindering maintenance and adaptation which are essential in SNs. Several research groups have been working on this challenging scenario, focusing on enhancing business system management relying on SBAs.

This book was partially an outcome of the International Workshop on Business System Management and Engineering (BSME 2010) held in Malaga, Spain, during June-July 2010, in conjunction with TOOLS 2010 federated conferences and under the aegis of the EU Network of Excellence on Service Software and Systems (S-Cube). The goal of the workshop was to bring together experts in the field of business process management, service-oriented architectures, and service security to discuss the current state of research and identify new issues, challenges, and research directions. The results of the discussions are reflected in this book that includes extended papers from the authors who had a paper accepted for the workshop.

The book comprises three main parts. The first part, "Open Issues in Business Management," provides a complete and comprehensive overview of emerging issues and research directions in the context of business management, introducing

possible approaches and solutions. Chapter 1 describes the evolution of business trends and business process support during the last few decades, and then discusses some pressing research challenges to be considered in the development of business value networks. Chapter 2 analyzes the problem of providing a digital ecosystem for business services, and then proposes a digital business ecosystem composed of distributed service systems whose business knowledge is exchanged using business artifacts. Chapter 3 presents an approach based on reference modeling techniques that addresses the needs of inter-organizational systems.

The second part, "Open Issues in Assurance and Dependability," discusses research problems and open issues in the context of assurance evaluation, with particular focus on security and dependability of services and business processes. Chapters 4 and 5 consider the problem of providing service-based solutions that address assurance and dependability requirements. In more detail, Chap. 4 discusses issues in the development of a service-oriented collaborative business model with high dependability level that self-adapts to changing environments, while Chap. 5 presents an approach to the modeling of assurance requirements for business services. Chapter 6 introduces security certification of services as a suitable solution to increase user trust and confidence in the correctness and security of services, and then discusses a solution for certification of services at the level of the container deploying them. Chapter 7 presents a layered architectural style for the development of SBAs that constrains dependencies between software elements to allow lifecycle management of software complexity.

The last part, "Open Issues in Composition and Transaction Management," deals with two important aspects of service-based business processes, namely, service composition and transaction management. Chapter 8 explains how the consideration of a cross-organizational SBA changes service composition and orchestration requirements with respect to a closed enterprise, and then describes a conceptual architecture for business transaction management. Chapters 9–11 consider the problem of service composition from different points of view. Chapter 9 studies requirements for service composition and then proposes an approach able to provide service applications whose components come from multiple service domains. Chapter 10 proposes an ontology-based approach that allows one to retrieve process fragments from business process repositories and reuse them in the composition of new business processes. Chapter 11 presents a graph grammar-based approach for dynamic reconfiguration of service-oriented architectures that preserves the quality of service in perturbation-prone environments.

We gratefully acknowledge everyone that contributed to the publication of this book. First, we would like to thank the research community working on service architectures and business process management, and the high quality of their research work, which is hopefully reflected in the book. We would also like to thank the organizers of BSME 2010, the BSME 2010 Program Committee, and all the reviewers involved in the evaluation process for their hard work and dedication. A special thanks goes to Mike Papazoglou, who started the effort

toward BSME 2010 and encouraged us to submit this volume to the Springer Service Science series. Finally, thanks are due to the authors for contributing to this book with the best results of their work. We hope that this book will serve as a valuable reference for researchers and developers working on service-oriented business process management and engineering.

May 2012

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