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Eman El-Sheikh · Alfred Zimmermann
Lakhmi C. Jain
Editors

Emerging Trends in the Evolution of Service-Oriented and Enterprise Architectures
Almost 25 years ago Henderson and Venkatraman were writing “Even though the information technology has evolved from its traditional orientation and administrative support toward a more strategic role within an organization, there is still a glaring lack of fundamental frameworks within which to understand the potential of IT for tomorrow’s organizations” (IBM Systems Journal 32(1), 1993). Targeting to master this challenging issue, they developed a model, strategic alignment model, and derived four perspectives of alignment with specific impacts for guiding management practices in order to “leverage IT for transforming organizations.”

More recent technologies and paradigms (such as cloud computing, big data, IoT) show that not the ownership of IT resources but their strategic management is the foundation for sustainable competitive advantage, as it was earlier defended by Mata, Fuerst, and Barney (MIS Quarterly, 1995).

A decade ago, Ross, Weill, and Robertson in their book “Enterprise Architecture as Strategy: Creating a Foundation for Business Execution” (2006) illustrated through numerous companies worldwide, how constructing the right enterprise architecture enhances profitability and time to market, improves strategy execution, and even lowers IT costs.

Enterprise architecture (EA) aimed (i) to understand the interactions and all kinds of articulations between business and IT, (ii) to define how to align business components and IT components, as well as business strategy and IT strategy, and more particularly (iii) to develop and support a common understanding and sharing of those purposes of interest. EA is also used to map the enterprise goals and strategy to the enterprise’s resources (actors, assets, and IT supports) and to manage the evolution of this mapping.

Services are the governing principle for EA. Nearly all newly created EAs are service-oriented. Service-oriented enterprise architecture (SoEA) easily integrates widespread technological approaches such as SOA or emerging ones as cloud computing because they also use service as structuring and governing paradigm. The scope of SoEA is much broader than the scope of the SOA and also includes services not accessible through software such as business services and infrastructure
services. Services of different purposes and granularities may be interconnected in service (value) nets to provide higher-level services.

Today, foundations of social computing influence EA in new ways. The senior management defines organizational structures no longer alone, but weak ties that are initiated by individuals superimpose the organization. Innovation is no longer a process guided by an elite, but can be initiated by every member of an organization. Decisions are no longer only made by experts, but are also results of collaborative processes. Big data technologies allow to process data with higher velocity, variety, and volume and to create new information flows and data services within EAs.

EA is positioned as a coordination and steering mechanism and as an instrument to support the strategic direction of digital enterprises, which new frontiers require permeability and which new structures require elasticity. The service paradigm and the underlying mechanisms offer an accelerator for nurturing the elasticity of EAs and that of the enterprises themselves, to allow them to survive in evolving business ecosystems. In this context, service ecosystems offer a new land of application for the Nash equilibrium.

The new challenges for the “design by reuse” of modern IT solutions (recommended to be built in shorter cycles), in accordance with SOA and EA frameworks, impose in turn new challenges to the “design for reuse.” The latter should (i) handle the potential components (services), in terms of abilities to satisfy functional business requirements in manyfold contexts and also (ii) deal with new capabilities for mastering nonfunctional requirements, such as flexibility, maintainability, and trustworthiness, which may themselves be variable in different contexts.

The twelve chapters of this book all together present challenging issues and hot topics related to the emerging trends in the evolution of service-oriented and enterprise architectures, as the evolution of EAs and systems, the flexibility, the maintainability, the security of the underlying software solutions and infrastructures, the digital transformation, the capability management, the forecasting of service demands, the conciliation of resilient and stable parts of EA, which are essential for the integrity of transactions and reliability of systems, with a fast-speed-architecture offering channels that are pivotal for the customer experience. As advocated by one of the contributors, “Digital Transformation sets a new challenge for the enterprise architect: she has now not just to align the IT with the demands from the business but to enable and even invent new business opportunities. So the architecture capability of an organization gets an active part in shaping the business”.

Selmin Nurcan
University Paris 1 Panthéon-Sorbonne
This research oriented book presents emerging trends in the evolution of Service-Oriented and Enterprise architectures. New architectures and methods of both business and IT are integrating services to support mobility systems, Internet of Things, Ubiquitous Computing, collaborative and adaptive business processes, Big Data, and Cloud ecosystems. They inspire current and future digital strategies and create new opportunities for the digital transformation of next digital products and services. Service-Oriented Architectures (SOA) and Enterprise Architectures (EA) have emerged as useful frameworks for developing interoperable, large-scale systems, typically implementing various standards, like Web Services, REST, and Microservices. Managing the adaptation and evolution of such systems presents a great challenge. Service-Oriented Architectures enable flexibility through loose coupling, both between the services themselves and between the IT organizations that manage them. Enterprises evolve continuously by transforming and extending their services, processes and information systems. Enterprise Architectures provide a holistic blueprint to help define the structure and operation of an organization with the goal of determining how an organization can most effectively achieve its objectives. This book presents several novel approaches to address the challenges of the service-oriented evolution of digital enterprise and software architectures.

The book is directed to the researchers, postgraduate, graduate and undergraduate students, professors and practitioners who are interested in the service-oriented evolution of digital enterprise and software architectures.

We are grateful to the contributors and reviewers for their very valuable expertise and contributions without which this book would not have existed. We wish to show our appreciation to Springer-Verlag for their support right from the concept development to the final typesetting phase of this book.

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Matthias Wißotzki

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Matthias Wißotzki and Anna Sonnenberger

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