

Foreword

In the world where systems complexity is permanently increasing and cost of maintenance plays a main role in the total cost of ownership, the quote by Leonardo da Vinci, “Simplicity is the ultimate sophistication,” gains new significance. Especially, one way to introduce simplicity is to use the abstraction of services that is the major focus of this book. Nikola Milanovic and his colleagues introduce in this volume methodologies to engineer reliable Service Oriented Architectures (SOAs) which lead to managing complexity by treating applications as services, and devising Service Level Agreements which, in principle, simplify life of both system providers and customers. It goes without saying that the progress to service science and service engineering will simplify system design and implementation, and will deliver higher availability and performance, as well as cost transparency.

The world is moving towards the open system science, where, in addition to classical synthesis and analysis, the dimension of management has to be considered. And so it is with services where management plays a critical role. Managing resources, optimizing performance and dependability, as well as minimizing cost, are and will be ongoing challenges for SOA. This is due to open-ended systems, multiple degrees of freedom, growing complexity, frequent configurations and reconfigurations, upgrades, updates, cyber attacks, and new requirements, especially regarding the real time.

This volume addresses many of these problems and concerns by offering an entire spectrum of solutions ranging from managing via Service Level Agreements and Service Level Management contracts on the expectations side to real implementations and fault injection for estimating resilience from the engineering perspective. We also can gain an insight into both analysis and synthesis for the all important problem of service composition. Service compositions, if successful, will dramatically change the spectrum of service offering, but to get to this point we need to solve a number of problems, such as: feasibility of compositions, Quality of Service of composed services, overhead of a composition process, automation of composition, and cost of composed service. Many of them are addressed in this volume. Finally, the question of service availability and fault tolerance gains significance in the service environment where proliferation of computer applications to all walks of life and growing expectations by users with regard to reliance will force service providers to search for dependable, fault-tolerant SOAs. Several contributions in this volume offer interesting approaches to these challenges.

The trend in this decade is “zero-mania” by focusing on minimization of cost, power consumption, downtime, time-to-market, et cetera. This trend is relevant to the SOA community as the services are expected to be provided for a low cost, with minimal downtime and have to be developed quickly to meet ever more diversified market needs. The result is that the time for modelling, measurements, and assessment is limited, and once some hypotheses are verified in part, they frequently become obsolete due to new technologies, environments, and applications. Not surprisingly, the computer science com-

munity can boast a relatively small number of useful “laws” and principles, not only due to complexity and system dynamics, but also due to immense diversity of applications. The SOA approach has a real chance to change all this, and might be able to find rules for quantifying services by attaching to them aforementioned attributes. This, in turn, may lead to a development of some “laws” for trading the performance, cost, and Quality of Service quantifiable attributes such as service availability. One should not forget the qualitative attributes as they do play an important role, not only in our daily lives, but in the SOA world as well (“beauty is in the eyes of the beholder”).

This volume is a significant contribution to pave the way for such “laws” where both formal and empirical methods are necessary to create a world with a plethora of services which are well understood by developers, providers, and customers and deliver highly-available, secure, trusted services in environments ranging from cyber-physical systems to cloud computing.

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