Lecture Notes in Computer Science 3712

Commenced Publication in 1973
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Quality of Software Architectures and Software Quality

First International Conference on the
Quality of Software Architectures, QoSA 2005
and Second International Workshop on
Software Quality, SOQUA 2005
Erfurt, Germany, September 20-22, 2005
Proceedings

Springer

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Library of Congress Control Number: 2005932207

CR Subject Classification (1998): D.2.4, F.3, D.4, C.4, K.4.4, C.2

ISSN 0302-9743
ISBN-10 3-540-29033-8 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-29033-9 Springer Berlin Heidelberg New York

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11558569 06/3142 5 4 3 2 1 0

Preface

The goal of software engineering is to achieve high-quality software in a cost-effective, timely, and reproducible manner. Advances in technology offer reductions in cost and schedule, but their effect on software quality often remains unknown. The International Conference on the Quality of Software Architectures (QoSA 2005) focused on software architectures and their relation to software quality, while the International Workshop on Software Quality (SOQUA 2005) mainly focused on quality assurance and more precisely on software testing. These events complement each other in their view on software quality.

One of the main motivations for explicitly modelling software architectures is to enable reasoning on software quality. From a software engineering perspective, a software architecture not only depicts the coarse-grained structure of a program, but also includes additional information such as the program's dynamics (i.e., the flows of control through the system) and the mapping of its components and connections to execution environments (such as hardware processors, virtual machines, network connections, and the like). In this area, QoSA 2005 is concerned with research and experiences that investigate the influence a specific software architecture has on software quality aspects. Additionally, the development of methods to evaluate software architectures with respect to these quality attributes is considered to be an important topic. The quality attributes of interest include external properties, such as reliability and efficiency, as well as internal properties, such as maintainability.

From a business-oriented perspective, software architectures are most often embedded into a greater organizational context (e.g., large enterprises) and cannot be seen in isolation from that context. Requirements that emerge from this context have a major impact on the architecture being developed and have to be dealt with by means of a business-oriented management of software architectures. In this field, QoSA 2005 aims at investigating the impact that activities like the coordination of business architecture and software architecture, business process modelling, assessment and acquisition of (COTS) components, as well as the integration or migration of legacy systems have on the quality of software architectures.

Although it is well-known that software architectures heavily influence software quality, validated research in this area is only recent. Today, even reliable experience reports that go beyond anecdotes from practitioner are rare. For a long time, the software architecture community was mainly concerned with formal specification of architectures. The use of architectures beyond the specification has only lately been taken into consideration by different communities that are producing results on the prediction of various quality attributes, software architecture evaluation, cost estimation, architectural re-use through patterns, etc. By recognizing the intrinsic relationship between the mentioned areas which share an architecture-based approach, the main idea of QoSA 2005 was to bring together researchers and practitioner from these different communities concerned with all areas relating to software architecture quality.

Quality assurance plays an important role in today's world and has gained increased importance. SOQUA 2005, which was organized within the Net.ObjectDays and co-located with QoSA 2005, mainly concentrated on this topic. Object-oriented concepts, component technology, components off the shelf (COTS), and open source software can dramatically reduce development time; however, assuring the quality of systems using these technologies is problematic.

The job of measuring, assuring, and improving the quality of software systems is getting harder with new technologies, not easier. The goal of this workshop was to bring together researchers, engineers, and practitioners to discuss and evaluate the latest challenges and breakthroughs in the field of software quality. The main focus of the workshop was on software quality assurance and more specifically on software testing. The generation of test data is still one of the most prominent problems in this area. Therefore, a number of papers presented and published are dedicated to this important problem.

In line with a broad interest, QoSA 2005 received 32 submissions. From these submissions, 12 were accepted as long papers after a peer-review process. They are published in this volume, together with an extended abstract of the invited talk by Christine Hofmeister. Five additional submissions were considered as original new research, but without having such an elaborated validation as the accepted, more mature long papers. These papers were accepted as posters and were published as short papers in the general Net.ObjectDays 2005 proceedings. Having received this high attraction encourages us to continue with shaping a community that is focused on software architecture quality and establishing QoSA as their primary conference in the future.

SOQUA 2005 attracted 17 submissions from all over the world. In total 6 papers could be accepted as long papers after a peer-review process. These papers are published in this volume, together with an extended abstract on the invited talk by T.Y. Chen. Three additional papers were accepted as short papers, which were published in the Net.ObjectDays proceedings and presented within a special joint session with the Net.ObjectDays Developer Track.

Among the many people who contributed to the success of QoSA 2005 and SOQUA 2005, we would like to thank the members of the Program Committees for their valuable work during the review process, Ch. Hofmeister for her keynote at QoSA 2005, and T.Y. Chen for his invited talk at SOQUA 2005. Additionally, we thank the organizers of the Net.ObjectDays 2005, in particular Mrs. Paradies, for their support in all organizational concerns as well as Mr. Hofmann from Springer for his support in reviewing and publishing the proceedings volume. The QoSA organizers would also like to thank the cooperating partners for their support. The SOQUA organizers are grateful to their cooperating and supporting organizations and in particular to Julia Codrington, Wolfgang Grieskamp, Chani Johnson, and Mario Winter for their support.

July 2005

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