Lecture Notes in Computer Science 4214

Christine Hofmeister   Ivica Crnkovic
Ralf Reussner (Eds.)

Quality of Software Architectures

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Christine Hofmeister
Computer Science and Engineering Department
Lehigh University
Bethlehem, Pennsylvania 18015, USA
E-mail: crh@cse.lehigh.edu

Ivica Crnkovic
Software Engineering Lab
Mälardalen University
SE-721 23 Västerås, Sweden
E-mail: ivica.crnkovic@mdh.se

Ralf Reussner
Institute for Program Structures and Data Organization
University of Karlsruhe (TH)
Karlsruhe, Germany
E-mail: reussner@ipd.uka.de

Preface

Although the quality of a system's software architecture is one of the critical factors in its overall quality, the architecture is simply a means to an end, the end being the implemented system. Thus the ultimate measure of the quality of the software architecture lies in the implemented system, in how well it satisfies the system and project requirements and constraints and whether it can be maintained and evolved successfully. In order to treat design as a science rather than an art, we need to be able to address the quality of the software architecture directly, not simply as it is reflected in the implemented system.

Therefore, QoSA is concerned with software architecture quality directly by addressing the problems of:

- Designing software architectures of good quality
- Defining, measuring, evaluating architecture quality
- Managing architecture quality, tying it upstream to requirements and downstream to implementation, and preserving architecture quality throughout the lifetime of the system

Cross-cutting these problems is the question of the nature of software architecture. Software architecture organizes a system, partitioning it into elements and defining relationships among the elements. For this we often use multiple views, each with a different organizing principle.

But software architecture must also support properties that are emergent, that cannot be ascribed to particular elements. For this we often use the language of quality attributes. Quality attributes cover both internal properties, exhibited only in the development process (e.g., maintainability, portability, testability, etc.), and external properties, exhibited in the executing system (e.g., performance, resource consumption, availability, etc.). Quality attributes cover properties that are emergent, that have a pervasive impact, that are difficult to reverse, and that interact, thereby precluding or constraining other properties.

Thus in addition to examining software architecture quality, QoSA also aims to investigate quality attributes in the context of the problems of the design, evaluation, and management of software architecture. The papers selected for QoSA 2006 describe research and experience on these topics. Architecture evaluation is the most prevalent theme of the papers. The approaches vary from formal models to support evaluation to experience with process-centered approaches. The focus of the evaluation varies from evaluation of a particular quality attribute, such as performance or safety, to approaches where the evaluation covers a number of quality attributes, determined by the evaluator. Other themes for QoSA 2006 were processes for achieving, supporting and ensuring architecture quality. These papers go beyond the problem of evaluation to address software architecture quality at the process level. A final significant theme is the problem of managing and applying architectural knowledge.

Of the 30 papers submitted, 12 were selected as papers for this post-conference proceedings volume. A number of shorter papers describing emerging results or case studies were also presented at QoSA; these papers are published as technical report No 2006/10, of the University of Karlsruhe, on Perspectives in Software Architecture Quality.

As a part of the QoSA conference, a special "Industrial Day" event was organized. This included two inspiring keynote presentations by Jan Bosch and Clemens Szyperski, three tutorials, and a panel in which representatives from several international software-intensive companies participated. The abstracts of the keynotes and tutorials are available in this proceedings volume.

We thank the members of the Program Committee and additional reviewers for their thorough, thoughtful, and timely reviews of the submitted papers. We thank Steffen Becker, Sven Overhage, and Judith Stafford for their work in supporting QoSA and Klaus Krogmann for preparing this LNCS proceedings volume. Finally, we thank the generous sponsors of QoSA 2006: University of Karlsruhe (TH), Mälardalen University, and Västerås City. This conference would not be possible without the support of all the above people and sponsors.

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                                                                Christine Hofmeister
                                                                    Ralf Reussner

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