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Transactions on Aspect-Oriented Software Development VIII

Springer

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Editorial

Welcome to Volume VIII of the Transactions on Aspect-Oriented Software Development. This volume begins with two papers that were regular submissions.

The first, "A Model-Driven Framework for Aspect Weaver Construction", by Suman Roychoudhury, Jeff Gray, and Frédéric Jouault, uses the principles of Model-Based Engineering to construct language weavers for various programming languages with a language transformation approach. Models are used to capture the concepts of aspect-oriented language constructs and are then transformed to concrete weavers.

The second paper, "A System of Patterns for Reusable Aspect Libraries", by Maarten Bynens, Eddy Truyen, and Wouter Joosen, provides a comprehensive collection of reusable design patterns for aspects. The framework consists of an architectural pattern, four design patterns, and associated programming idioms as well as guidelines for deciding among available options.

These are followed by a special section on Industrial Applications of Aspect Technology with guest editors Christine Schwanninger and Wouter Joosen, under the management of one of the co-editors-in-chief, Shmuel Katz. The background and the approaches of the special section, including the topics of the papers included, are described in the guest editors' foreword. The first paper in this section is an invited introductory paper on the uses of aspects in industry, by Ramnivas Laddad, which is followed by four papers on a variety of applications of aspects in industry, in widely differing commercial contexts. We hope that the insights presented will be of value to potential and existing industrial users, as well as of interest to researchers concerned with overcoming practical obstacles to using aspects. We thank the guest editors for their effort in producing such a high-quality special section.

During 2011 a special section on Modularity Concepts in Programming Languages is scheduled, and will be guest edited by Gary Leavens and Klaus Ostermann. This special section will highlight original and innovative modularity concepts. Of course, we continue to encourage regular submissions on all topics connected to modularity and the development of aspect-oriented software, especially when a single system decomposition does not adequately treat all concerns.

We thank the editorial board for their continued guidance and input on the policies of the journal, the choice of special issues, and associate-editorship of regular submissions. Thanks are also due to the reviewers, who volunteer significant time, despite their busy schedules, to ensure the quality of articles published in the journal. Most importantly, we wish to thank the authors who have submitted papers to the journal so far.

February 2011

Shmuel Katz and Mira Mezini
Co-Editors-in-Chief

Industrial Applications of Aspect Technology Guest Editors' Foreword

Technologies for aspect oriented software development (AOSD) have been around for more than a decade now and programming support in particular has been experimented by many, not only by researchers and academic practitioners. In fact, AO has been applied in many research projects, and also in many industrial pilots, trials, and applications. Many of these experiments and applications have remained invisible on the radar of the research community that typically wishes to know more about such activities and aims at sharing a better understanding about what works and what needs further investigation.

Although it is inherently hard – actually impossible – to measures all the activities that assess and illustrate industry adoption, some industry tracks in the AOSD conference program have yielded substantial evidence of real-world applications of AOSD (see e.g. http://aosd.net/2011/past_confer.html) and some recent publications (e.g. Aspect-Oriented Software Development in Practice: tales from AOSD-Europe, IEEE Computer, February 2010, pp 19-26, A Rashid) confirm this observation – although the input remains anecdotal.

In search of more evidence, lessons learned, and especially feedback that can help the community move forward, we issued a call for contributions to this special section on Industrial Applications of Aspect Technology.

The aim was to collect examples, experience reports and success stories of applications of aspect technologies in industry, as well as work inspired by AOSD but not explicitly named as such. We solicited descriptions of successful solutions using, building, extending, or integrating AOSD technologies.

We were looking for papers written from the perspective of applying AOSD in a real-world, industrial environment. Therefore, the criteria for acceptance were fundamentally different from those typically used in academic work. Instead of the novelty of the applied approach and the completeness of the literature survey, we were interested in industrial relevance, lessons learned, and the evaluation of these insights motivated through experience in a real-world setting.

Finally, we can present four articles that each cover different industry-grade applications, including a telecommunication platform, a framework for embedding user assistance in independently developed applications, a platform for digital publishing, and a framework for program code analysis and manipulation.

We received eight submissions, each reviewed by up to five peers. We finally accepted the four that best showed real industrial applications. While the quality of the papers was overall very good, only half of them met our specific goal to prove applicability of AO in industrial settings. In addition we asked Ramnivas Laddad, one of the best known practitioners in the field, to provide his view on aspect orientation.

Like many good ideas, Aspect-Oriented Programming had to go through the well-known Gartner Hype Cycle, and survived! Ramnivas Laddad tells the story of AO's most prominent language in his invited contribution, **A Real-world Perspective of AOP**. He discusses the early market acceptance of AspectJ, the impact of platform support in Spring and how AspectJ made its way from an exciting new hype topic to a valuable technology in enterprise computing.

The regular contributions all describe non-trivial applications of AOSD, and refer to some the most popular aspect-oriented programming languages:

Tackling the Challenges of Integrating 3rd Party Software Using AspectJ by *Uwe Hohenstein and Michael C. Jaeger.* This paper describes the application of aspects in a typical industry project. A system that is not designed for aspects experiences severe architectural challenges that would be expensive or risky to solve with "conventional" technologies. Aspect orientation comes in handy as a powerful tool for the architect to overcome critical situations. In the case described the use of aspect technology has been triggered by the need to deal with performance and stability in a late stage of the development of a service-oriented telecommunication platform at Siemens AG.

Puma: An Aspect-Oriented Code Analysis and Manipulation Framework for C and C++ by *Matthias Urban, Daniel Lohman, and Olaf Spinczyk.* This paper describes a framework for the development of applications that analyze and transform C or C++ source code. The paper not only documents why aspects have proven helpful in the design of this complex system, they also illustrate the maturity of the AspectC++ technology. In addition, and based on their experience, the authors present and motivate useful AspectC++ idioms.

Building a Digital Publishing Platform Using AOSD, Experiences and Lessons Learned by *Dimitri Van Landuyt, Steven Op de beeck, Eddy Truyen, and Pierre Verbaeten.* This paper discusses the development of a platform for publishers who produce digital newspapers alongside traditional broadcast channels and printed press. The authors show how aspect-orientation increases the variability of optional features during the engineering from requirements to run-time. The paper also shows the implementation and deployment of the system using an industry-class aspect-oriented middleware platform, the JBoss application server with JBoss AOP.

An Aspect-Oriented Tool Framework for Developing Process-Sensitive Embedded User Assistance Systems by *Bedir Tekinerdoğan, Serap Bozbey, Yavuz Mester, Erdem Turançiftci, and Levent Alkışlar.* This paper discusses a non-trivial application of integrating context-sensitive user assistance in multiple, independently-developed applications. An aspect-oriented framework combined with dedicated tool support proved to reduce cost not only at development but also at run-time, for both newly-developed and legacy applications. This work has been conducted and validated in the context of the Turkish electronics company Aselsan.

It is not surprising that the majority of the results focus on the use of programming technologies; only one paper reaches out to aspect-oriented software architecture. Programming languages are still the most visible results of AOSD

for the industry. The languages covered are AspectJ, AspectC++, and JBoss AOP, and it is those three that still have the most visible impact in industry. The work in other disciplines, like architecture, requirements engineering, and testing, has made its way into industry less obviously, for example in patterns, tools, or methods for handling crosscutting concerns. Many AO-inspired works are no longer attributed to aspect orientation; even though they grew in exactly that spirit. In effect, we feel that the section illustrates the versatility that definitely characterizes the AOSD adoption process.

In retrospect, we have found the creation of this special section a non-trivial exercise, and especially non-standard for the research community. The outcome however, is a representative sample of what has happened "out there", yet probably only a small tip of the iceberg. Indeed, it remains hard and non-trivial to produce the output we are looking for – especially in times when industry is experiencing tough challenges. Academia rarely has access to the real industry applications, while industry folks hardly have the time to write or even review publications on experience with aspect orientation. AO has influenced many disciplines, but has not developed a community of dedicated consultants that takes over the task of publication, like in other disciplines.

Therefore, special thanks must go to both, the authors and to the reviewers of this special section that took the time to share their experience with us. All their efforts have been greatly appreciated.

December 2010

Christine Schwanninger
Wouter Joosen

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Table of Contents

A Model-Driven Framework for Aspect Weaver Construction 1
Suman Roychoudhury, Jeff Gray, and Frédéric Jouault

A System of Patterns for Reusable Aspect Libraries 46
Maarten Bynens, Eddy Truyen, and Wouter Joosen

Special Focus: Industrial Applications of Aspect Technology

A Real-World Perspective of AOP 108
Ramnivas Laddad

Tackling the Challenges of Integrating 3rd Party Software Using AspectJ 116
Uwe Hohenstein and Michael C. Jaeger

Puma: An Aspect-Oriented Code Analysis and Manipulation Framework for C and C++ 141
Matthias Urban, Daniel Lohmann, and Olaf Spinczyk

Building a Digital Publishing Platform Using AOSD: Experiences and Lessons Learned 163
Dimitri Van Landuyt, Steven Op de beeck, Eddy Truyen, and Pierre Verbaeten

An Aspect-Oriented Tool Framework for Developing Process-Sensitive Embedded User Assistance Systems 196
Bedir Tekinerdoğan, Serap Bozbey, Yavuz Mester, Erdem Turançiftci, and Levent Alkışlar

Author Index 221