Transactions on Aspect-Oriented Software Development II
Welcome to the second volume of Transactions on Aspect-Oriented Software Development. The successful launch of the journal and publication of its first volume in March 2006 has been followed by a steady stream of submissions as well as several special issue proposals on topics ranging from Early Aspects and aspect interactions through to aspect-oriented programming and middleware technologies. This volume comprises two regular papers and six papers constituting a special section on AOP Systems, Software and Middleware.

The first article “On Horizontal Specification Architectures and Their Aspect-Oriented Implementations” by Aaltonen, Katara, Kurki-Suonio and Mikkonen proposes the use of horizontal architectures to improve alignment between system requirements and aspect-oriented implementations realizing those requirements. The authors’ approach builds on their earlier work on the DisCO method which utilizes the notion of superpositions as a basis of aspect composition. The second article “A Framework for Policy Driven Auto-Adaptive Systems Using Dynamic Framed Aspects” by Greenwood and Blair synthesizes techniques such as event–condition–action rules and parameterization with dynamic AOP to develop reusable aspects that can be woven at run time. The goal of the authors’ work is to support auto-adaptive behaviour using such reusable aspects. They present performance measurements as well as metrics-based evaluation of their approach in this context.

The remaining six papers focus on various topics in AOP systems, software and middleware. The guest editors, Yvonne Coady, Hans-Arno Jacobsen and Mario Südholt, provide an introduction to these in their editorial.

We wish to thank the editorial board for their continued guidance, commitment and input on the policies of the journal, the choice of special issues as well as associate-editorship of submitted articles. We also thank the guest editors, Yvonne Coady, Hans-Arno Jacobsen and Mario Südholt, for putting together the special section on AOP systems, software and middleware. Thanks are also due to the reviewers who volunteered time from their busy schedules to help realize this volume. Most importantly, we wish to thank the authors who have submitted papers to the journal so far, for their contributions maintain the high quality of Transactions on AOSD.

The journal is committed to publishing work of the highest standard on all facets of aspect-oriented software development techniques in the context of all phases of the software life cycle, from requirements and design to implementation, maintenance and evolution. The call for papers is open indefinitely and potential authors can submit papers at any time to: taosd-submission@comp.lancs.ac.uk. Detailed submission instructions are available at: http://www.springer.com/sgw/cda/frontpage/0,,3-164-2-109318-0,00.html. Two more special issues on current important topics, “Early Aspects” and “Aspects, Dependencies and Interactions”, are in preparation. Calls for such special issues are publicized on relevant Internet mailing lists, Web sites as well as conferences such as the Aspect-Oriented
Software Development conference. We look forward to further high-quality submissions from prospective authors and their publication in future volumes of Transactions on AOSD.

Awais Rashid and Mehmet Aksit
Co-editors-in-chief
Organization

Editorial Board
Mehmet Aksit, University of Twente
Don Batory, University of Texas at Austin
Shigeru Chiba, Tokyo Institute of Technology
Siobhán Clarke, Trinity College Dublin
Theo D’Hondt, Vrije Universiteit Brussel
Robert Filman, Google
Shmuel Katz, Technion-Israel Institute of Technology
Gregor Kiczales, University of British Columbia
Karl Lieberherr, Northeastern University
Mira Mezini, University of Darmstadt
Ana Moreira, New University of Lisbon
Linda Northrop, Software Engineering Institute
Harold Ossher, IBM Research
Awais Rashid, Lancaster University
Douglas Schmidt, Vanderbilt University
David Thomas, Bedarra Research Labs

List of Reviewers
Don Batory          Joerg Kienzle
Klaas van den Berg  Micheal Kircher
Lodewijk Bergmans   Julia Lawall
Gordon S. Blair     Cristina Lopez
Lynne Blair         David H. Lorenz
Johan Brichau       Florence Maraninchi
Fei Cao             Jean-Marc Menaud
Walter Cazzolla      Mira Mezini
Shigeru Chiba       Gilles Muller
Ruzanna Chitchyan   Juan Manuel Murillo
Siobhán Clarke      Gail Murphy
Thomas Cleenewerk   James Noble
Yvonne Coady        Carlos Noguera
Pascal Costanza     Harold Ossher
Geoff Coulson       Klaus Ostermann
Krysztof Czarnecki  Renaud Pawlak
Cormac Driver       Monica Pinto
Eric Eide           Raghu Reddy
Eric Ernst          Martin Robillard
Tzilla Elrad        Douglas Schmidt
Robert France       Christa Schwanninger
Marc E. Fiuzycki    Marc Segura-Devilletechaise
Lidia Fuentes       Ian Sommerville
<table>
<thead>
<tr>
<th>Alessandro Garcia</th>
<th>Olaf Spinczyk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Gill</td>
<td>Stefan Tai</td>
</tr>
<tr>
<td>Andy Gokhale</td>
<td>Eric Tanter</td>
</tr>
<tr>
<td>Aniruddha Gokhale</td>
<td>Wim Vanderperren</td>
</tr>
<tr>
<td>Jeff Gray</td>
<td>BartVerheecke</td>
</tr>
<tr>
<td>Phil Greenwood</td>
<td>J. Vitek</td>
</tr>
<tr>
<td>Stephan Hanenberg</td>
<td>Jon Whittle</td>
</tr>
<tr>
<td>William Harrison</td>
<td>Xiaoqing Wu</td>
</tr>
<tr>
<td>Stephan Herrmann</td>
<td>Egon Wuchner</td>
</tr>
<tr>
<td>Kabir Khan</td>
<td>Charles Zhang</td>
</tr>
<tr>
<td>Gregor Kiczales</td>
<td></td>
</tr>
</tbody>
</table>
# Table of Contents

On Horizontal Specification Architectures and Their Aspect-Oriented Implementations .................................................. 1  
* Timo Aaltonen, Mika Katara, Reino Kurki-Suonio, Tommi Mikkonen  

A Framework for Policy Driven Auto-adaptive Systems Using Dynamic Framed Aspects .................................................. 30  
* Phil Greenwood, Lynne Blair  

Focus: AOP Systems, Software and Middleware

Guest Editors’ Introduction .................................................. 66  
* Yvonne Coady, Hans-Arno Jacobsen, Mario Südholt  

Aspect-Oriented Development of Crosscutting Features in Distributed, Heterogeneous Systems .................................................. 69  
* Eric Wohlstadter, Premkumar Devanbu  

Shakeins: Nonintrusive Aspects for Middleware Frameworks .......... 101  
* Tal Cohen, Joseph (Yossi) Gil  

Run-Time and Atomic Weaving of Distributed Aspects .............. 147  
* Eddy Truyen, Wouter Joosen  

TOSKANA: A Toolkit for Operating System Kernel Aspects .......... 182  
* Michael Engel, Bernd Freisleben  

Lean and Efficient System Software Product Lines: Where Aspects Beat Objects .................................................. 227  
* Daniel Lohmann, Olaf Spinczyk, Wolfgang Schröder-Preikschat  

Providing Configurable QoS Management in Real-Time Systems with QoS Aspect Packages .................................................. 256  
* Aleksandra Tešanović, Mehdi Amirijoo, Jörgen Hansson  

Author Index .................................................. 289