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Alberto Lluch Lafuente · José Proença (Eds.)

Coordination Models and Languages

18th IFIP WG 6.1 International Conference, COORDINATION 2016
Held as Part of the 11th International Federated Conference
on Distributed Computing Techniques, DisCoTec 2016
Heraklion, Crete, Greece, June 6–9, 2016
Proceedings

Editors

Alberto Lluch Lafuente
Technical University of Denmark
Lyngby
Denmark

José Proença
University of Minho
Braga
Portugal

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Foreword

The 11th International Federated Conference on Distributed Computing Techniques (DisCoTec) took place at the Aquila Atlantis Hotel in Heraklion, Greece, during June 6–9, 2016. It was organized by the Institute of Computer Science of the Foundation for Research and Technology – Hellas and the University of Ioannina, Greece. The DisCoTec series is one of the major events sponsored by the International Federation for Information Processing (IFIP). It comprises three conferences:

- COORDINATION, the IFIP WG 6.1 International Conference on Coordination Models and Languages
- DAIS, the IFIP WG 6.1 International Conference on Distributed Applications and Interoperable Systems
- FORTE, the IFIP WG 6.1 International Conference on Formal Techniques for Distributed Objects, Components and Systems

Together, these conferences cover a broad spectrum of distributed computing subjects, ranging from theoretical foundations and formal description techniques to systems research issues.

Each day of the federated event began with a plenary speaker nominated by one of the conferences. The three invited speakers were Tim Harris (Oracle Labs, UK), Catuscia Palamidessi (Inria, France), and Vijay Saraswat (IBM T.J. Watson Research Center, USA).

Associated with the federated event were also two satellite workshops, that took place during June 8–9, 2016:

- The 9th Workshop on Interaction and Concurrency Experience (ICE) with keynote lectures by Uwe Nestmann (Technische Universität Berlin, Germany) and Alexandra Silva (University College London, UK)
- The Final Public Workshop from the LeanBigData and CoherentPaaS projects

Sincere thanks go to the chairs and members of the Program and Steering Committees of the involved conferences and workshops for their highly appreciated efforts. Organizing DisCoTec 2016 was only possible thanks to the dedicated work of the Organizing Committee, including George Baryannis (Publicity Chair) and Vincenzo Gulisano (Workshops Chair), with excellent support from Nikos Antonopoulos and Alkis Polyraakis of PCO-Convin. Finally, many thanks go to IFIP WG 6.1 for sponsoring this event, Springer *Lecture Notes in Computer Science* for their support and sponsorship, and to EasyChair for providing the refereeing infrastructure.

Kostas Magoutis

Preface

This volume contains the proceedings of COORDINATION 2016: the 18th IFIP WG 6.1 International Conference on Coordination Models and Languages held during June 6–9, 2015, in Heraklion, Crete. The conference was co-located with FORTE and DAIS, as part of the DisCoTec federated conferences on distributed computing techniques.

COORDINATION is the premier forum for publishing research results and experience reports on software technologies for collaboration and coordination in concurrent, distributed, and complex systems. The key focus of the conference is the quest for high-level abstractions that can capture interaction patterns and mechanisms occurring at all levels of the software architecture, up to the end-user domain. COORDINATION 2016 solicited high-quality contributions on the usage, study, formal analysis, design, and implementation of languages, models, and techniques for coordination in distributed, concurrent, pervasive, and parallel software-intensive computing systems. COORDINATION 2016 also solicited contributions aimed at adapting and integrating traditional COORDINATION techniques in the realm of multi-agent systems (MAS), which typically involve more coarse-grained (cognitive, intelligent, goal-oriented) components.

The Program Committee (PC) of COORDINATION 2016 consisted of 32 prominent researchers from 19 different countries. We received 44 submissions out of which the PC selected 16 full papers for inclusion in the program. All submissions were reviewed by at least three independent referees; papers were selected based on their quality, originality, contribution, clarity of presentation, and relevance to the conference topics. The review process included an in-depth discussion phase, during which the merits of all papers were discussed by the PC. The selected papers constituted a program covering a varied range of topics and techniques related to system coordination, including: programming and communication abstractions; communication protocols and behavioral types; actors and concurrent objects; tuple spaces; games, interfaces, and contracts; information flow policies and dissemination techniques; and probabilistic models and formal verification. The program was further enhanced by an invited talk by Vijay Saraswat from IBM T.J. Watson Research Lab (USA).

The success of COORDINATION 2016 was due to the dedication of many people. We would like to thank the Steering Committee for inviting us to chair the conference, the authors for submitting high-quality papers, the PC and their subreviewers for their careful reviews and lively discussions during the final selection process, and the invited speaker for his keynote. We also thank the providers of the EasyChair conference management system, which was used to run the review process and to generate the proceedings. Finally, we thank the Organizing Committee from Heraklion, led by Kostas Magoutis, for its contribution in making the logistic aspects of COORDINATION 2016 a success.

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(Logical and Imperative)
Calculi for Distributed Coordination
(Abstract)

Vijay Saraswat

IBM T.J. Watson, USA

Abstract. We review work over the last thirty years on simple, formal models capturing the essence of (realistic) views of distributed coordination. We trace a path through work on concurrent constraint programming, its linear version, connections with the asynchronous pi-calculus, and, more recently, through the imperative resilient X10. As always, the virtue of clean and powerful abstractions is that they can ease design of real systems that address tricky technical concerns. We illustrate with the calculus for resilient X10, designing which forced us to a semantic principle, Happens Before Invariance, which is useful in practice.

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