17th International Workshop on Worst-Case Execution Time Analysis

WCET 2017, June 27, 2017, Dubrovnik, Croatia

Edited by
Jan Reineke
OASIcs – OpenAccess Series in Informatics

OASIcs aims at a suitable publication venue to publish peer-reviewed collections of papers emerging from a scientific event. OASIcs volumes are published according to the principle of Open Access, i.e., they are available online and free of charge.

Editorial Board

- Daniel Cremers (TU München, Germany)
- Barbara Hammer (Universität Bielefeld, Germany)
- Marc Langheinrich (Università della Svizzera Italiana – Lugano, Switzerland)
- Dorothea Wagner (Editor-in-Chief, Karlsruher Institut für Technologie, Germany)

ISSN 2190-6807

http://www.dagstuhl.de/oasics
## Contents

Preface

*Jan Reineke* ................................................................. 0:vii

Committee

................................................................................. 0:ix

### Regular Papers

**STR2RTS: Refactored StreamIT Benchmarks into Statically Analyzable Parallel**

*Benjamin Rouxel and Isabelle Puaut* .................................... 1:1–1:12

**Best Practice for Caching of Single-Path Code**

*Martin Schoeberl, Bekim Cilku, Daniel Prokesch, and Peter Puschner* ........... 2:1–2:12

**On the Representativity of Execution Time Measurements: Studying Dependence**

*Fabrice Guet, Luca Santinelli, and Jerome Morio* ............................ 3:1–3:13

**Tightening the Bounds on Cache-Related Preemption Delay in Fixed Preemption**

*Filip Marković, Jan Carlson, and Radu Dobrin* ............................ 4:1–4:11

**Early WCET Prediction using Machine Learning**

*Armelle Bonenfant, Denis Claraz, Marianne de Michiel, and Pascal Sotin* ....... 5:1–5:9

**Worst-Case Execution Time Analysis of Predicated Architectures**

*Florian Brandner and Amine Naji* ........................................ 6:1–6:13

**Towards Multicore WCET Analysis**

*Simon Wegener* .................................................................. 7:1–7:12

**The Heptane Static Worst-Case Execution Time Estimation Tool**

*Damien Hardy, Benjamin Rouxel, and Isabelle Puaut* ...................... 8:1–8:12

**The W-SEPT Project: Towards Semantic-Aware WCET Estimation**

*Claire Maiza, Pascal Raymond, Catherine Parent-Vigouroux, Armelle Bonenfant, Fabienne Carrier, Hugues Cassé, Philippe Cuvelot, Denis Claraz, Nicolas Halbwachs, Erwan Jahier, Hanbing Li, Marianne De Michiel, Vincent Mussot, Isabelle Puaut, Christine Rochange, Erven Rohou, Jordy Ruiz, Pascal Sotin, and Wei-Tsun Sun* . 9:1–9:13

**The P-SOCRATES Timing Analysis Methodology for Parallel Real-Time**

*Applications Deployed on Many-Core Platforms**

*Vincent Nelis, Patrick Meumeu Yomsi, and Luís Miguel Pinho* ............. 10:1–10:9
It is my pleasure to welcome you to the proceedings of the 17th International Workshop on Worst-Case Execution Time Analysis (WCET 2017). This year the proceedings are published prior to the workshop in order to further stimulate interaction among participants at the event. WCET 2017 is going to take place in Dubrovnik, Croatia as a satellite event of the 29th Euromicro Conference on Real-Time Systems (ECRTS 2017), the premier European venue for research in the broad area of real-time and embedded systems.

The goal of the workshop is to bring together people from academia, tool vendors and users in industry who are interested in all aspects of timing predictability of real-time systems. This is reflected by the makeup of the program committee, as well as the authors of the papers in the proceedings, which consists of academic researchers, tool vendors, and colleagues from industry. This year we received 14 high-quality submissions, out of which the program committee selected 10 for presentation at the workshop and for publication in the proceedings. These papers cover a broad range of timely topics, including, among others, parallel real-time benchmarks, early-stage WCET prediction using machine learning, and approaches to multi-core WCET analysis. I hope that you will find the program interesting and inspiring for your future work!

Putting together this year’s workshop program was a team effort. First of all, I would like to thank the authors for their submissions. The program committee and the external reviewers did a great job in evaluating the submissions and in providing constructive feedback to the authors. Thank you for that! I am also grateful to the ECRTS 2017 general chair, Martina Maggio and her team, and the Real-Time Technical Committee Chair of Euromicro, Gerhard Fohler, for their support in organizing the workshop. Thank you also to the team at Schloss Dagstuhl, in particular Marc Herbstritt, for their help in preparing these proceedings.

I am looking forward to welcoming you to WCET 2017 in Dubrovnik! I encourage all participants to embrace the opportunity for discussion and interaction with the authors and other workshop attendees.

Saarbrücken, May 26, 2017
Jan Reineke
Committee

Program Chair

- Jan Reineke – Saarland University, Germany

Program Committee

- Sebastian Altmeyer – University of Amsterdam, Netherlands
- Clément Ballabriga – Lille 1 University, France
- Florian Brandner – Télécom ParisTech, France
- Hugues Cassé – IRIT - Université de Toulouse, France
- Francisco J. Cazorla – Barcelona Supercomputing Center, Spain
- Heiko Falk – Hamburg University of Technology, Germany
- Niklas Holsti – Tidorum Ltd, Finland
- Claire Maïza – Grenoble INP/Verimag, France
- Kartik Nagar – Purdue University, United States
- Luis Miguel Pinho – CISTER Research Centre/ISEP, Portugal
- Dumitru Potop Butucaru – INRIA Rocquencourt, France
- Wolfgang Puffitsch – Oticon A/S, Denmark
- Peter Puschner – Vienna University of Technology, Austria
- Martin Schoeberl – Technical University of Denmark, Denmark
- Benoît Triquet – Airbus Group, France

External Reviewers

- Pedro Benedicte – Barcelona Supercomputing Center, Spain
- Sebastian Hahn – Saarland University, Germany
- Farouk Hebbache – CEA LIST, France
- Michael Jacobs – Saarland University, Germany
- Suzana Milutinovic – Barcelona Supercomputing Center, Spain
- Amine Naji – ENSTA ParisTech, France
- Dominic Oehlert – Hamburg University of Technology, Germany

Steering Committee

- Guillem Bernat – Rapita Systems Ltd., United Kingdom
- Björn Lisper – Mälardalen University, Sweden
- Isabelle Puaut – University of Rennes I/IRISA, France
- Peter Puschner – Vienna University of Technology, Austria