Workshop on Next Generation Real-Time Embedded Systems

NG-RES 2020, January 21, 2020, Bologna, Italy

Edited by

Marko Bertogna Federico Terraneo



Editors

Marko Bertogna 🗓

Università di Modena e Reggio Emilia, Italy marko.bertogna@unimore.it

Federico Terraneo



Politecnico di Milano, Italy federico.terraneo@polimi.it

ACM Classification 2012

Computer systems organization o Real-time systems; Computer systems organization o Embedded and cyber-physical systems

ISBN 978-3-95977-136-8

Published online and open access by

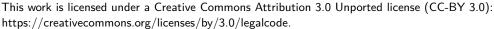
Schloss Dagstuhl - Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at https://www.dagstuhl.de/dagpub/978-3-95977-136-8.

Publication date January, 2020

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at https://portal.dnb.de.

License





In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/OASIcs.NG-RES.2020.0

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 1868-8969

https://www.dagstuhl.de/oasics

Contents

Preface	
Marko Bertogna and Federico Terraneo	0:vii
Invited Talk	
SDN for Dynamic Reservations on Real-Time Networks Luis Almeida	1:1–1:1
Regular Paper	
Energy Minimization in DAG Scheduling on MPSoCs at Run-Time: Theory and Practice Bertrand Simon, Joachim Falk, Nicole Megow, and Jürgen Teich	2:1-2:13
Bao: A Lightweight Static Partitioning Hypervisor for Modern Multi-Core Embedded Systems José Martins, Adriano Tavares, Marco Solieri, Marko Bertogna, and Sandro Pinto	3:1-3:14
A Low Energy FPGA Platform for Real-Time Event-Based Control Silvano Seva, Claudia Esther Lukaschewsky Mauriziano, William Fornaciari, and Alberto Leva	4:1-4:11
Real-Time Task Migration for Dynamic Resource Management in Many-Core Systems	
Behnaz Pourmohseni, Fedor Smirnov, Stefan Wildermann, and Jürgen Teich	5:1-5:14

Preface

This volume collects the papers presented at the first edition of the Workshop on Next Generation Real-Time Embedded Systems (NG-RES 2020). The workshop is co-located with the 2020 edition of the HiPEAC conference and was held at Bologna, Italy on January 21th, 2020.

The traditional concept of embedded systems is constantly evolving to address the requirements of the modern world. Cyber-physical systems, networked control systems and Industry 4.0 are introducing an increasing need for interconnectivity. A steadily increasing algorithmic complexity of embedded software is fueling the adoption of multicore and heterogeneous architectures. As a consequence, meeting real-time requirements is now more challenging than ever. The NG-RES workshop focuses on real-time embedded systems, with particular emphasis on the distributed and parallel aspects. The workshop is a venue for both the networking and multicore real-time communities aiming at cross-fertilization and multi-disciplinary approaches to the design of embedded systems.

The scope of the NG-RES workshop include the following topics:

- Programming models, paradigms and frameworks for real-time computation on parallel and heterogeneous architectures
- Networking protocols and services (e.g., clock synchronization) for distributed real-time embedded systems
- Scheduling and schedulability analysis for distributed and/or parallel real-time systems
- Application of formal methods to distributed and/or parallel real-time systems
- Compiler-assisted solutions for distributed and/or parallel real-time systems
- Middlewares for distributed and/or parallel real-time systems

In this first edition of the workshop four regular papers were accepted, each of which receiving between two and three peer reviews. In addition, we are glad to have an invited talk by Luis Almeida titled "SDN for dynamic reservations on real-time networks". We would like to thank the authors of the NG-RES 2020 papers, the members of our program committee, our invited speaker, our publisher Schloss Dagstuhl as well as the HiPEAC organizers for contributing to the success of this workshop.

Marko Bertogna and Federico Terraneo

Program committee

General Chair

Marko Bertogna, Università di Modena e Reggio Emilia, Italy

Program Chair

Federico Terraneo, Politecnico di Milano, Italy

Web and Submission Chair

Federico Reghenzani, Politecnico di Milano, Italy

Program committee

- Jaume Abella Ferrer, Barcelona Supercomputing Center, Spain
- Benny K. Akesson, TNO, Netherlands
- Roberto Cavicchioli, Università di Modena e Reggio Emilia, Italy
- Francisco J. Cazorla, Barcelona Supercomputing Center, Spain
- Leandro Soares Indrusiak, University of York, United Kingdom
- Alberto Leva, Politecnico di Milano, Italy
- Martina Maggio, Lund University, Sweden
- Christine Rochange, Institut de Recherche en Informatique de Toulouse, France
- Alessandro Vittorio Papadopoulos, Mälardalen University, Sweden
- Marco Solieri, Università di Modena e Reggio Emilia, Italy
- Juergen Teich, Friedrich Alexander Universität, Germany