4th International Workshop on Security and Dependability of Critical Embedded Real-Time Systems

CERTS 2019, July 9, 2019, Stuttgart, Germany

Mikael Asplund
Michael Paulitsch



Editors

Mikael Asplund

Linköping University, Sweden mikael.asplund@liu.se

Michael Paulitsch

Intel, Germany michael.paulitsch@intel.com

ACM Classification 2012

Security and privacy \to Embedded systems security; Computer systems organization \to Embedded and cyber-physical systems; Computer systems organization \to Dependable and fault-tolerant systems and networks

ISBN 978-3-95977-119-1

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/978-3-95977-119-1.

Publication date July, 2019

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.CERTS.2019.0

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	
Mikael Asplund and Michael Paulitsch	0:vii
Regular Papers	
Combined Security and Schedulability Analysis for MILS Real-Time Critical Architectures	
Ill-ham Atchadam, Frank Singhoff, Hai Nam Tran, Noura Bouzid, and Laurent Lemarchand	1:1-1:12
System Calls Instrumentation for Intrusion Detection in Embedded Mixed-Criticality Systems	24.240
Marine Kadar, Sergey Tverdyshev, and Gerhard Fohler	2:1-2:13
Argument Patterns for Multi-Concern Assurance of Connected Automated Driving Systems	
Fredrik Warg and Martin Skoglund	3:1–3:13
Sustainable Security & Safety: Challenges and Opportunities Andrew Paverd, Marcus Völp, Ferdinand Brasser, Matthias Schunter, N. Asokan, Ahmad-Reza Sadeghi, Paulo Esteves-Veríssimo, Andreas Steininger, and	
Thorsten Holz	4:1-4:13
On Fault-Tolerant Scheduling of Time Sensitive Networks	
Radu Dobrin, Nitin Desai, and Sasikumar Punnekkat	5:1-5:12

Preface

This is the fourth iteration of the workshop on security and dependability of critical embedded real-time systems (CERTS) and it is co-located with the 31st Conference on Real-Time Systems (ECRTS'19) held at the premises of Bosch in Stuttgart, Germany on July 9-12, 2019. The technical program of the workshop includes multiple peer reviewed papers and a keynote from Dr. Borislav Nikolic from TU Braunschweig on the topic of Safety and Security aspects of TSN.

The aim of this workshop is to bring researchers and practitioners from a variety of domains, viz., real-time and embedded systems, security, dependability and cyber-physical systems to name just a few. The idea is to foster a community that looks at all of these topics and develops techniques, algorithms, policies and frameworks to improve the security and dependability of critical systems. We hope that the papers and the keynote will help foster such discussions and collaborations.

CERTS 2019 owes its success to a variety of people. We would like to thank the steering committee that consists of: Paulo Esteves-Verissimo, Marcus Völp, Antonio Casimiro and Rodolfo Pellizzoni. We would also like to thank the technical program committee members for taking the time to review and provide feedback for the papers. In addition, we also wish to thank the organizers of ECRTS 2019, in particular: Steve Goddard and Martina Maggio in the Organization Committee, Sophie Quinton (Program Chair and very helpful with web issues) and Gerhard Fohler (Real-Time Technical Committee Chair). Finally, we would like to thank the authors and participants of the workshop without whom this event would not be successful.

We hope that you will enjoy the CERTS 2019 program and that it will foster many new research directions and collaborations.

Michael Paulitsch Intel Labs Mikael Asplund Linköping University

Workshop Organizers and Program Committee

Workshop Organizers:

Michael Paulitsch, Intel Mikael Asplund, Linköpings Universitet

Technical Program Committee:

Antônio Augusto Fröhlich, Federal University of Santa Catarina, Brazil Rakesh Bobba, Oregon State University, US Christian Esposito, University of Naples Federico II, Italy Marisol Garcia Valls, Universidad Carlos III de Madrid, Spain Martin Gilje Jaatun, University of Stavanger, Norway Karl Goeschka, Vienna University of Technology, Austria Gert Jervan, Tallinn University of Technology, Estonia Zbigniew Kalbarczyk, University of Illinois at Urbana-Champaign, US Martina Maggio, Lund University, Sweden Sibin Mohan, University of Illinois at Urbana-Champaign, US Sasikumar Punnekkat, Maelardalen University, Sweden Hans Reiser, Universität Passau, Germany Soheil Samii, General Motors, US Elena Troubitsyna, KTH, Sweden Bryan Ward, MIT Lincoln Laboratory, US Saman Zonouz, Rutgers University, US

Steering Committee:

Marcus Voelp, SnT – University of Luxembourg Paulo Esteves-Verissimo, SnT – University of Luxembourg Antonio Casimiro, University of Lisboa Rodolfo Pellizzoni, University of Waterloo