

Nico Herzberg
Christoph Hochreiner
Oliver Kopp
Jörg Lenhard

ZEUS 2018

10th ZEUS Workshop, ZEUS 2018,
Dresden, Germany, 8–9 February 2018
Proceedings

Volume Editors

Nico Herzberg
SAP SE, Ausbildungsleitung SAP Dresden
Postplatz 1, DE-01067 Dresden
nico.herzberg@sap.com

Christoph Hochreiner
TU Wien, Distributed Systems Group
Karlsplatz 13, AT-1040 Wien
c.hochreiner@infosys.tuwien.ac.at

Oliver Kopp
University of Stuttgart, Institute for Parallel and Distributed Systems
Universitätsstraße 38, DE-70569 Stuttgart
oliver.kopp@ipvs.uni-stuttgart.de

Jörg Lenhard
Karlstad University, Department of Mathematics and Computer Science
Universitetsgatan 2, SE-65188 Karlstad
joerg.lenhard@kau.se

Copyright © 2018 for the individual papers by the papers' authors. Copying permitted only for private and academic purposes. This volume is published and copyrighted by its editors.

Preface

In February 2018, we had the pleasure to organize the 10th edition of the ZEUS Workshop in Dresden, Germany. This workshop series offers young researchers an opportunity to present and discuss early ideas and work in progress as well as to establish contacts among young researchers. For this year's edition, we selected eight regular submissions, two position papers, and one tool demonstration by researchers from Belgium, Egypt, Germany, Italy, and Switzerland for presentation at the workshop. Each submission went through a thorough peer-review process and was assessed by at least three members of the program committee with regard to its relevance and scientific quality. The accepted contributions cover the areas of Microservices, Business Process Management, and the Internet of Things. In addition, the workshop also hosted a tool session to introduce early stage researchers to tools that ease the literature research and the documentation of architectural decisions for software systems.

The workshop program was further enriched by a keynote held by Prof. Dr. Gerhard P. Fettweis on the topic *5G mobile service – first steps of the era after IoT to Tactile Internet*. Furthermore, the workshop participants were invited to visit the Industrial Internet of Things Test Bed at University of Applied Sciences in Dresden, the Blockchain Meetup Saxony at SAP Dresden, and the Volkswagen Transparent Factory. The best presentation award was given to Justus Bogner from the Herman Hollerith Center Böblingen, for his presentation of the paper *Analyzing the Relevance of SOA Patterns for Microservice-Based Systems*.

The workshop was generously sponsored by SAP SE.

Dresden, February 2018

Nico Herzberg
Christoph Hochreiner
Jörg Lenhard
Oliver Kopp

Organization

Steering Committee

Oliver Kopp	University of Stuttgart
Jörg Lenhard	Karlstad University
Christoph Hochreiner	TU Wien

Local Organizer

Nico Herzberg	SAP SE
---------------	--------

Program Committee Chairs

Nico Herzberg	SAP SE
Christoph Hochreiner	TU Wien
Oliver Kopp	University of Stuttgart
Jörg Lenhard	Karlstad University

Program Committee

Saimir Bala	Vienna University of Economics and Business
Felix W. Baumann	TWT GmbH Science & Innovation
Domenico Bianculli	University of Luxembourg
Daniele Bonetta	Oracle Labs
Jürgen Cito	University of Zurich
Vincenzo Ferme	USI Lugano
Alessio Gambi	Saarland University
Matthias Geiger	University of Bamberg
Georg Grossmann	University of South Australia
Simon Harrer	University of Bamberg
Thomas Heinze	University of Jena
Pascal Hirmer	University of Stuttgart
Christoph Hochreiner	TU Wien
Conrad Indiono	University of Vienna
Meiko Jensen	ULD Schleswig-Holstein
Stefan Kolb	University of Bamberg
Oliver Kopp	University of Stuttgart
Jörg Lenhard	Karlstad University
Daniel Lübke	Leibniz Universität Hannover
Matteo Nardelli	University of Rome Tor Vergata
Jan Sürmerli	Humboldt University of Berlin

Subreviewers

Robin Lichtenthäler	University of Bamberg
Stefan Winzinger	University of Bamberg

Sponsoring Institutions

SAP Deutschland AG

Table of Contents

Challenges and Solutions of Microservices Architecture: A Survey on the State of the Practice	1
<i>Ghofrani Javad and Daniel Lübke</i>	
Analyzing the Relevance of SOA Patterns for Microservice-Based Systems	9
<i>Justus Bogner, Alfred Zimmermann and Stefan Wagner</i>	
Mutation Testing for Microservices	17
<i>Stefan Winzinger</i>	
The Chances of including Extrinsic Factors in Business Process Management	20
<i>Christian Sturm</i>	
Schritte zu einer zertifizierten Informationsflussanalyse von Geschäftsprozessen	24
<i>Thomas Heinze</i>	
RBPSim: A Resource-aware Extension of BPSim Using Workflow Resource Patterns	32
<i>Nehal Afifi, Ahmed Awad and Hisham Abdelsalam</i>	
Supporting IoT Application Middleware on Edge and Cloud Infrastructures	40
<i>Sven Akkermans, Stefanos Peros, Nicolas Small, Wouter Joosen and Danny Hughes</i>	
Towards Decentralized Auto-Scaling Policies for Data Stream Processing Applications	47
<i>Gabriele Russo Russo</i>	
Markdown Architectural Decision Records: Format and Tool Support	55
<i>Oliver Kopp, Anita Armbruster and Olaf Zimmermann</i>	
CloudRef – Towards Collaborative Reference Management in the Cloud	63
<i>Oliver Kopp, Uwe Breitenbücher and Tamara Müller</i>	