

2017 IEEE International Conference on Software Architecture (ICSA 2017)

**Gothenburg, Sweden
3-7 April 2017**



**IEEE Catalog Number: CFP17WIC-POD
ISBN: 978-1-5090-5730-6**

**Copyright © 2017 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP17WIC-POD
ISBN (Print-On-Demand):	978-1-5090-5730-6
ISBN (Online):	978-1-5090-5729-0

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2017 IEEE International Conference on Software Architecture

ICSA 2017

Table of Contents

Welcome Message from the Program Chairs of ICSA 2017	ix
Organization Committee	xi
Program Committee	xiii
Keynote Abstracts	xvi
Sponsors	xx

TS1 (Microservices)

Microservice Ambients: An Architectural Meta-Modelling Approach for Microservice Granularity	1
<i>Sara Hassan, Nour Ali, and Rami Bahsoon</i>	
Workload-Based Clustering of Coherent Feature Sets in Microservice Architectures	11
<i>Sander Klock, Jan Martijn E. M. Van Der Werf, Jan Pieter Guelen, and Slinger Jansen</i>	
Research on Architecting Microservices: Trends, Focus, and Potential for Industrial Adoption	21
<i>Paolo Di Francesco, Ivano Malavolta, and Patricia Lago</i>	

TS2 (Cloud)

Quality Evaluation of PaaS Cloud Application Design Using Generated Prototypes	31
<i>David Gesvindr, Barbora Buhnova, and Ondrej Gasior</i>	
Towards a Reference Architecture for Cloud-Based Plant Genotyping and Phenotyping Analysis Frameworks	41
<i>Banani Roy, Amit Kumar Mondal, Chanchal K. Roy, Kevin A. Schneider, and Kawser Wazed</i>	

TS3 (Web Applications)

Comparing the Built-In Application Architecture Models in the Web Browser	51
<i>Antero Taivalsaari, Tommi Mikkonen, Cesare Pautasso, and Kari Systä</i>	
A Framework for the Structural Analysis of REST APIs	55
<i>Florian Haupt, Frank Leymann, Anton Scherer, and Karolina Vukojevic-Haupt</i>	

TS4 (Security)

Determination and Enforcement of Least-Privilege Architecture in Android	59
<i>Mahmoud Hammad, Hamid Bagheri, and Sam Malek</i>	
Understanding Software Vulnerabilities Related to Architectural Security Tactics: An Empirical Investigation of Chromium, PHP and Thunderbird	69
<i>Joanna C. S. Santos, Anthony Peruma, Mehdi Mirakhorli, Matthias Galstery, Jairo Veloz Vidal, and Adriana Sejfia</i>	

TS5 (Architectural Knowledge)

Experiments in Curation: Towards Machine-Assisted Construction of Software Architecture Knowledge Bases	79
<i>Ian Gorton, Rouchen Xu, Yiming Yang, Hanxiao Liu, and Guoqing Zheng</i>	
Developing an Ontology for Architecture Knowledge from Developer Communities	89
<i>Mohamed Soliman, Matthias Galster, and Matthias Riebisch</i>	
Digital Space Systems Engineering through Semantic Data Models	93
<i>Tobias Hoppe, Harald Eisenmann, Alexander Viehl, and Oliver Bringmann</i>	

TS6 (Collaborative Design and Decision Making)

Continuous Analysis of Collaborative Design	97
<i>Jae Young Bang, Yuriy Brun, and Nenad Medvidovic</i>	
Human Aspects in Software Architecture Decision Making: A Literature Review	107
<i>Antony Tang, Maryam Razavian, Barbara Paech, and Tom-Michael Hesse</i>	
Modeling Context with an Architecture Viewpoint	117
<i>Adriatik Bedjeti, Patricia Lago, Grace A. Lewis, Remco D. De Boer, and Rich Hilliard</i>	

TS7 (Quality)

Accurate Analysis of Quality Properties of Software with Observation-Based Markov Chain Refinement	121
<i>Colin Paterson and Radu Calinescu</i>	
Designing Robust Software Systems through Parametric Markov Chain Synthesis	131
<i>Radu Calinescu, Milan Češka, Simos Gerasimou, Marta Kwiatkowska, and Nicola Paoletti</i>	
Challenges on the Relationship between Architectural Patterns and Quality Attributes	141
<i>Gianantonio Me, Giuseppe Procaccianti, and Patricia Lago</i>	

TS8 (Analysis and Technical Debt)

Semantic Differencing for Message-Driven Component & Connector Architectures	145
<i>Arvid Butting, Oliver Kautz, Bernhard Rumpe, and Andreas Wortmann</i>	
On the Understandability of Semantic Constraints for Behavioral Software Architecture Compliance: A Controlled Experiment	155
<i>Christoph Czepa, Huy Tran, Uwe Zdun, Thanh Tran Thi Kim, Erhard Weiss, and Christoph Ruhsam</i>	

What to Fix? Distinguishing between Design and Non-design Rules in Automated Tools	165
<i>Neil A. Ernst, Stephany Bellomo, Ipek Ozkaya, and Robert L. Nord</i>	

TS9 (Continuous Evolution)

Continuous Integration Impediments in Large-Scale Industry Projects	169
<i>Torvald Mårtensson, Daniel Ståhl, and Jan Bosch</i>	
Architecture-Based Change Impact Analysis in Information Systems and Business Processes	179
<i>Kiana Rostami, Robert Heinrich, Axel Busch, and Ralf Reussner</i>	
Continuous Architectural Knowledge Integration: Making Heterogeneous Architectural Knowledge Available in Large-Scale Organizations	189
<i>Juergen Musil, Fajar J. Ekaputra, Marta Sabou, Tudor Ionescu, Daniel Schall, Angelika Musil, and Stefan Biffi</i>	

TS10 (Automotive)

On Service-Orientation for Automotive Software	193
<i>Stefan Kugele, Philipp Oberfell, Manfred Broy, Oliver Creighton, Matthias Traub, and Wolfgang Hopfensitz</i>	
Design Criteria to Architect Continuous Experimentation for Self-Driving Vehicles	203
<i>Federico Giaimo and Christian Berger</i>	

TS11 (Cyber Physical Systems (CPS) and Internet of Things (IoT))

CAPS: Architecture Description of Situational Aware Cyber Physical Systems	211
<i>Henry Muccini and Mohammad Sharaf</i>	
Architecting Emergent Configurations in the Internet of Things	221
<i>Fahed Alkhabbas, Romina Spalazzese, and Paul Davidsson</i>	

TS12 (Traceability)

Mapping Features to Source Code through Product Line Architecture: Traceability and Conformance	225
<i>Yongjie Zheng, Cuong Cu, and Hazeline U. Asuncion</i>	
Traceability Metrics as Early Predictors of Software Defects?	235
<i>Bashar Nassar and Riccardo Scandariato</i>	
Bidirectional Mapping between Architecture Model and Code for Synchronization	239
<i>Van Cam Pham, Ansgar Radermacher, Sebastien Gerard, and Shuai Li</i>	

TS13 (Block Chain)

A Taxonomy of Blockchain-Based Systems for Architecture Design	243
<i>Xiwei Xu, Ingo Weber, Mark Staples, Liming Zhu, Jan Bosch, Len Bass, Cesare Pautasso, and Paul Rimba</i>	

Predicting Latency of Blockchain-Based Systems Using Architectural Modelling and Simulation	253
<i>Rajitha Yasaweerasinghelage, Mark Staples, and Ingo Weber</i>	
Comparing Blockchain and Cloud Services for Business Process Execution	257
<i>Paul Rimba, An Binh Tran, Ingo Weber, Mark Staples, Alexander Ponomarev, and Xiwei Xu</i>	
Author Index	261