

2018 IEEE/ACM International Conference on Utility and Cloud Computing Companion (UCC Companion 2018)

**Zurich, Switzerland
17-20 December 2018**



**IEEE Catalog Number: CFP18S77-POD
ISBN: 978-1-7281-0360-0**

**Copyright © 2018 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:	CFP18S77-POD
ISBN (Print-On-Demand):	978-1-7281-0360-0
ISBN (Online):	978-1-7281-0359-4

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

2018 IEEE/ACM International Conference on Utility and Cloud Computing Companion (UCC Companion)

UCC-Companion 2018

Table of Contents

Message from the UCC/BDCAT 2018 General Chairs	xiv
Message from the UCC 2018 Workshop Chairs	xvi
Message from the UCC/BDCAT 2018 Poster Chairs	xviii
Message from the UCC 2018 Cloud Challenge Chairs	xix
Message from the UCC 2018 Doctoral Research Forum Chairs	xx
CloudAM 2018 Workshop Chairs Welcome Message	xxi
SCCTSA 2018 Workshop Chairs Welcome Message	xxii
QA3C 2018 Workshop Chairs Welcome Message	xxiii
mF2C 2018 Workshop Chairs Welcome Message	xxiv
CNAX 2018 Workshop Chairs Welcome Message	xxv
BDASE 2018 Workshop Chairs Welcome Message	xxvi

Posters

Hierarchical Document Classification Using Overlapped Features	P 1C <i>Jeen-Young Kim (Ewha Womans University) and Daiki Min (Ewha Womans University)</i>
Human Activity Detection via WiFi Signals Using Deep Neural Networks	3 <i>Chien-Cheng Lee (Yuan Ze University) and Xiu-Chi Huang (Yuan Ze University)</i>
Big Data Tools and Cloud Services for High Energy Physics Analysis in TOTEM Experiment	5 <i>Valentina Avati (AGH University of Science and Technology), Milosz Blaszkiewicz (AGH University of Science and Technology), Enrico Bocchi (CERN), Luca Canali (CERN), Diogo Castro (CERN), Javier Cervantes (CERN), Leszek Grzanka (AGH University of Science and Technology), Enrico Guiraud (CERN), Jan Kaspar (CERN), Prasanth Kothuri (CERN), Massimo Lamanna (CERN), Maciej Malawski (AGH University of Science and Technology), Aleksandra Mnich (AGH University of Science and Technology), Jakub Moscicki (CERN), Shravan Murali (CERN), Danilo Piparo (CERN), and Enric Tejedor (CERN)</i>

Data Coloring for Securing Open-Data in Cloud Computing Environment	P IC
<i>Mary-Jane Sule (University of JOS), Clement Onime (Abdus Salam International Centre for Theoretical Physics), and Daniel Yakmut (Federal University of Lafia)</i>	
Transparent Deployment of Scientific Workflows across Clouds - Kubernetes Approach	9
<i>Michał Orzechowski (AGH University of Science and Technology), Bartosz Balis (AGH University of Science and Technology), Krystian Pawlik (AGH University of Science and Technology), Maciej Pawlik (AGH University of Science and Technology), and Maciej Malawski (AGH University of Science and Technology)</i>	
TeaStore: A Micro-Service Reference Application for Cloud Researchers	11
<i>Simon Eismann (University of Würzburg), Jóakim Kistowski (University of Würzburg), Johannes Grohmann (University of Würzburg), André Bauer (University of Würzburg), Norbert Schmitt (University of Würzburg), Nikolas Herbst (University of Würzburg), and Samuel Kounev (University of Würzburg)</i>	
Towards a Multi-Tier Fog/Cloud Architecture for Video Streaming	13
<i>Eduardo S. Gama (Unicamp), Roger Immich (Unicamp), and Luiz F. Bittencourt (Unicamp)</i>	
Dataflow Adapter: A Tool for Integrating Legacy Applications into Distributed Stream Processing	15
<i>Alexey Podkoritov (South Ural State University), Ksenia Repina (South Ural State University), Gleb Radchenko (South Ural State University), and Andrei Tchernykh (CICESE Research Center)</i>	
Developing an e-Health System Based on IoT, Fog and Cloud Computing	17
<i>Kayo Monteiro (Universidade de Pernambuco), Élisson Rocha (Universidade de Pernambuco), Emerson Silva (Universidade de Pernambuco), Guto Leoni Santos (Universidade Federal de Pernambuco), Wylliams Santos (Universidade de Pernambuco), and Patricia Takako Endo (Universidade de Pernambuco)</i>	
Detecting Epileptic Seizures Using Deep Learning with Cloud and Fog Computing	19
<i>Elisson Rocha (Universidade de Pernambuco), Kayo Monteiro (Universidade de Pernambuco), Emerson Silva (Universidade de Pernambuco), Guto Leoni Santos (Universidade Federal de Pernambuco), Wylliams Santos (Universidade de Pernambuco), and Patricia Takako Endo (Universidade de Pernambuco)</i>	
Robust and Resilient Migration of Data Processing Systems to Public Hadoop Grid	21
<i>Deepak Vasthimal (eBay Inc.)</i>	
Heuristic-Based IoT Application Modules Placement in the Fog-Cloud Computing Environment	24
<i>Natesha B.V. (National Institute of Technology Karnataka) and Ram Mohana Reddy Guddeti (National Institute of Technology Karnataka)</i>	
Using Containers to Execute SQL Queries in a Cloud	26
<i>Weining Zhang (University of Texas San Antonio) and David Holland (University of Texas San Antonio)</i>	

Tutorials

A Simple Path Towards Testing Cloud Applications	28
<i>Francisco Gortázar (Universidad Rey Juan Carlos) and Micael Gallego (Universidad Rey Juan Carlos)</i>	

Cloud Challenge

Security Governance as a Service on the Cloud	30
<i>Ciarán Bryce (University of Applied Sciences and Arts Western Switzerland)</i>	
Cloud Challenge: Secure End-to-End Processing of Smart Metering Data	36
<i>Andrey Brito (UFCG), Christof Fetzer (TU Dresden), Stefan Köpsell (TU Dresden), Marcelo Pasin (UNINE), Pascal Felber (UNINE), Keiko Fonseca (UTFPR), Marcelo Rosa (UTFPR), Luiz Gomes-Jr. (UTFPR), Rodrigo Riella (LACTEC), Charles Prado (INMETRO), Luiz F.R. da Costa Carmo (INMETRO), Daniel Lucani (Chocolate Cloud ApS), Márton Sipos (Chocolate Cloud ApS), László Nagy (Chocolate Cloud ApS), and Marcell Fehér (Chocolate Cloud ApS)</i>	

PhD Symposium

Optimising Cloud-Based Hadoop 2.x Applications	43
<i>Naif Alasmari (University of York)</i>	
Basic Principles of Osmotic Computing: Secure and Dependable MicroElements (MELs) Orchestration Leveraging Blockchain Facilities	47
<i>Alina Buzachis (University of Messina) and Massimo Villari (University of Messina)</i>	
A Review of Adversarial Behaviour in Distributed Multi-Agent Optimisation	53
<i>Farzam Fanatabasi (ETH Zurich)</i>	
Exploring Potential for Resource Request Right-Sizing via Estimation and Container Migration in Apache Mesos	59
<i>Gourav Rattihalli (State University of New York at Binghamton)</i>	
Live Traffic Data Analysis Using Stream Processing	65
<i>Manuel Weißbach (Technische Universität Dresden)</i>	

7th International Workshop on Clouds and (eScience) Applications Management (CloudAM 2018)

Unsupervised Anomaly Event Detection for Cloud Monitoring Using Online Arima	71
<i>Florian Schmidt (TU Berlin), Florian Suri-Payer (TU Berlin), Anton Gulenka (TU Berlin), Marcel Wallschläger (TU Berlin), Alexander Acker (TU Berlin), and Odej Kao (TU Berlin)</i>	

Risk-Based Service Selection in Federated Clouds	77
<i>Usama Ahmed (COMSATS University, Islamabad, Lahore Campus), Ioan Petri (Cardiff University), Omer Rana (Cardiff University), Imran Raza (COMSATS University, Islamabad, Lahore Campus), and Syed Asad Hussain (COMSATS University, Islamabad, Lahore Campus)</i>	
Micro-Workflows: Kafka and Kepler Fusion to Support Digital Twins of Industrial Processes	83
<i>Gleb Radchenko (South Ural State University), Ameer Alaasam (South Ural State University), and Andrei Tchernykh (CICESE Research Center)</i>	
Using Neuromorphic Hardware for the Scalable Execution of Massively Parallel, Communication-Intensive Algorithms	89
<i>Louis Blin (Imperial College London), Ahsan Javed Awan (Imperial College London), and Thomas Heinis (Imperial College London)</i>	
Novel Vector Packing Heuristic for VM Placement Based on the Divide-and-Conquer Paradigm	95
<i>Shravan S.K. (Indian Institute of Science) and J. Lakshmi (Indian Institute of Science)</i>	
Dynamic Multi-Objective Workflow Scheduling for Cloud Computing Based on Evolutionary Algorithms	103
<i>Goshgar Ismayilov (Marmara University) and Haluk Rahmi Topcuoglu (Marmara University)</i>	
A Model-Driven Approach to Automate the Deployment and Management of Cloud Services	109
<i>Anirban Bhattacharjee (Vanderbilt University), Yogesh Barve (Vanderbilt University), Aniruddha Gokhale (Vanderbilt University), and Takayuki Kuroda (NEC Corporation)</i>	
Real-Life Experience with Private Cloud Hosting Heterogeneous Scientific Workloads	115
<i>Dalibor Klusáek (CESNET), Boris Parak (CESNET), Václav Chlumský (CESNET), and Lukáš Hejtmánek (Masaryk University)</i>	

5th International Workshop on Smart City Clouds: Technologies, Systems, and Applications (SCCTSA 2018)

Enabling the Structuring, Enhancement and Creation of Urban ICT through the Extension of a Standardized Smart City Reference Model	121
<i>Nikolay Tcholtchev (Fraunhofer Institute for Open Communication Systems), Philipp Lämmel (Fraunhofer Institute for Open Communication Systems), Robert Scholz (Fraunhofer Institute for Open Communications Systems), Wojciech Konitzer (Fraunhofer Institute for Open Communication Systems), and Ina Schieferdecker (Fraunhofer Institute for Open Communication Systems)</i>	
Realizing Edge Computing Connectivity with Open Virtual Networking	128
<i>Seán Murphy (Zürcher Hochschule für Angewandte Wissenschaften) and Andrew Edmonds (Zürcher Hochschule für Angewandte Wissenschaften)</i>	
Urban Traffic Analysis Using Social Media Data on the Cloud	134
<i>Richard O. Sinnott (University of Melbourne), Yikai Gong (University of Melbourne), Shiping Chen (CSIRO), and Paul Rimba (CSIRO)</i>	

Scalable Detection of Rural Schools in Africa Using Convolutional Neural Networks and Satellite Imagery	142
<i>Mehrdad Yazdani (University of California, San Diego), Mai H. Nguyen (University of California, San Diego), Jessica Block (University of California, San Diego), Daniel Crawl (University of California, San Diego), Naroa Zurutuza (United Nations Children's Fund), Dohyung Kim (United Nations Children's Fund), Gordon Hanson (University of California, San Diego), and Ilkay Altintas (University of California, San Diego)</i>	

4th International Workshop on Serverless Computing (WoSC 2018)

Comparison of FaaS Orchestration Systems	148
<i>Pedro García López (Universitat Rovira i Virgili), Marc Sánchez-Artigas (Universitat Rovira i Virgili), Gerard París (Universitat Rovira i Virgili), Daniel Barcelona Pons (Universitat Rovira i Virgili), Álvaro Ruiz Ollobarren (Universitat Rovira i Virgili), and David Arroyo Pinto (Universitat Rovira i Virgili)</i>	
An Investigation of the Impact of Language Runtime on the Performance and Cost of Serverless Functions	154
<i>David Jackson (Institute of Technology, Tallaght) and Gary Lynch (Institute of Technology, Tallaght)</i>	
A Review of Serverless Frameworks	161
<i>Kyriakos Kritikos (ICS-FORTH) and Paweł Skrzypek (7Bulls)</i>	
Visual-Textual Framework for Serverless Computation: A Luna Language Approach	169
<i>Piotr Moczurad (AGH University of Science and Technology) and Maciej Malawski (AGH University of Science and Technology)</i>	
EdgeBench: Benchmarking Edge Computing Platforms	175
<i>Anirban Das (Rensselaer Polytechnic Institute), Stacy Patterson (Rensselaer Polytechnic Institute), and Mike Wittie (Montana State University)</i>	
Cold Start Influencing Factors in Function as a Service	181
<i>Johannes Manner (University of Bamberg), Martin Endreß (University of Bamberg), Tobias Heckel (University of Bamberg), and Guido Wirtz (University of Bamberg)</i>	
Benchmarking FaaS Platforms: Call for Community Participation	189
<i>Jörn Kuhlenkamp (TU Berlin) and Sebastian Werner (TU Berlin)</i>	
Improving Application Migration to Serverless Computing Platforms: Latency Mitigation with Keep-Alive Workloads	195
<i>Wes Lloyd (University of Washington Tacoma), Minh Vu (University of Washington Tacoma), Baojia Zhang (University of Washington Tacoma), Olaf David (Colorado State University Fort Collins), and George Leavesley (Colorado State University Fort Collins)</i>	

3rd International Workshop on Trust in Cloud Computing (IWTCC 2018)

CoRuM: Collaborative Runtime Monitor Framework for Application Security	201
<i>Sajjan Shiva (University of Memphis) and Saikat Das (University of Memphis)</i>	
Formalization and Analysis of a Resource Allocation Security Protocol for Secure Service Migration	207
<i>Gayathri Karthick (Middlesex University), Glenford Mapp (Middlesex University), Florian Kammueler (Middlesex University), and Mahdi Aiash (Middlesex University)</i>	
Building Trustable Remote Monitoring and Management Systems	213
<i>Maghsoud Morshedi (University of Oslo and EyeNetworks), Josef Noll (University of Oslo), and Raheleh Kari (Norwegian University of Science and Technology)</i>	
Revocable, Decentralized Multi-Authority Access Control System	220
<i>Ruqayah R. Al-Dahhan (University of Anbar & Liverpool John Moores University), Qi Shi (Liverpool John Moores University), Gyu Myoung Lee (Liverpool John Moores University), and Kashif Kifayat (Liverpool John Moores University)</i>	
A Secure and Dependable Multi-Agent Autonomous Intersection Management (MA-AIM) System Leveraging Blockchain Facilities	226
<i>Alina Buzachis (University of Messina), Antonio Celesti (University of Messina), Antonino Galletta (University of Messina), Maria Fazio (University of Messina), and Massimo Villari (University of Messina)</i>	

1st Workshop on Quality Assurance in the Context of Cloud Computing (QA3C 2018)

Evaluation of Cloud Portability of Legacy Applications	232
<i>Francesco De Angelis (Università di Camerino) and Andrea Polini (University of Camerino)</i>	
Perceived Needs and Gains from an Industrial Study in Cloud Testing Automation	238
<i>Antonia Bertolino (Consiglio Nazionale delle Ricerche), Antonello Calabro (Consiglio Nazionale delle Ricerche), Eda Marchetti (Consiglio Nazionale delle Ricerche), Anton Cervantes Sala (Worldline Iberia SAU), Guiomar Tuñón de Hita (Naeva Tec), Ilie Daniel Gheorghe Pop (Fraunhofer FOKUS Institute), and Varun Gowtham (Technische Universität Berlin)</i>	
A Systematic Mapping Study on Real-Time Cloud Services	245
<i>Jakob Danielsson (Malardalen University), Nandinbaatar Tsog (Malardalen University), and Ashalatha Kunnapilly (Malardalen University)</i>	
A Smart Testing Framework for IoT Applications	252
<i>Brian Ramprasad (York University), Joydeep Mukherjee (York University), and Marin Litoiu (York University)</i>	

Implementing Quality of Service and Confidentiality for Batch Processing Applications	258
<i>Igor Ataide (UFCG), Gabriel Vinha (UFCG), Clenimar Souza (UFCG), and Andrey Brito (UFCG)</i>	

1st Workshop on Managed Fog-to-Cloud (mF2C 2018)

Transportation Ecosystem Framework in Fog to Cloud Environment	266
<i>Matija Cankar (XLAB d.o.o.), Sašo Stanovnik (XLAB d.o.o.), and Hugo Landaluce (University of Deusto)</i>	
Anatomy of a Fog-to-Cloud Distributed Recommendation System in Airports	272
<i>Antonio Salis (Engineering Sardegna Srl), Roberto Bulla (Engineering Sardegna Srl), Glauco Mancini (Engineering Sardegna Srl), Paolo Cocco (Engineering Sardegna Srl), and Jens Jensen (UKRI Science and Technology Facilities Council)</i>	
A Performance Study of Geo-Distributed IoT Data Aggregation for Fog Computing	278
<i>Shigeru Imai (Rensselaer Polytechnic Institute), Carlos A. Varela (Rensselaer Polytechnic Institute), and Stacy Patterson (Rensselaer Polytechnic Institute)</i>	
Maritime IoT Solutions in Fog and Cloud	284
<i>Matija Cankar (XLAB d.o.o.) and Sašo Stanovnik (XLAB d.o.o.)</i>	
Do We Really Need Cloud? Estimating the Fog Computing Capacities in the City of Barcelona	290
<i>Jordi Garcia (UPC BarcelonaTech), Ester Simó (UPC BarcelonaTech), Xavier Masip-Bruin (UPC BarcelonaTech), Eva Marín-Tordera (UPC BarcelonaTech), and Sergi Sánchez-López (UPC BarcelonaTech)</i>	
Towards a Secure and GDPR-Compliant Fog-to-Cloud Platform	296
<i>Shirley Crompton (UKRI Science and Technology Facilities Council) and Jens Jensen (UKRI Science and Technology Facilities Council)</i>	
Prototyping a Secure, Hierarchical Internet of Things System	302
<i>Emma Tattershall (UKRI Science and Technology Facilities Council), Callum Iddon (UKRI Science and Technology Facilities Council), and Jens Jensen (UKRI Science and Technology Facilities Council)</i>	
FogQN: An Analytic Model for Fog/Cloud Computing	307
<i>Uma Tadakamalla (George Mason University) and Daniel Menascé (George Mason University)</i>	

1st Workshop on Cloud-Native Applications Design and Experience (CNAX 2018)

Towards Cloud Native Continuous Delivery: An Industrial Experience Report	314
<i>Aleksi Häkli (Vincit), Davide Taibi (Tampere University of Technology), and Kari Systa (Tampere University of Technology)</i>	

Migrating Live Streaming Applications onto Clouds: Challenges and a CloudStorm Solution	321
<i>Huan Zhou (University of Amsterdam), Spiros Koulouzis (University of Amsterdam), Yang Hu (University of Amsterdam), Junchao Wang (University of Amsterdam), Cees de Laat (University of Amsterdam), Alexandre Ulisses (MOG Technologies), and Zhiming Zhao (University of Amsterdam)</i>	
Auto-Scaling a Defence Application across the Cloud Using Docker and Kubernetes	327
<i>San Kho Lin (University of Melbourne), Umer Altaf (University of Melbourne), Glenn Jayaputera (University of Melbourne), Jiajie Li (University of Melbourne), Davis Marques (University of Melbourne), David Meggyesy (University of Melbourne), Sulman Sarwar (University of Melbourne), Shivank Sharma (University of Melbourne), William Voorsluys (University of Melbourne), Richard Sinnott (University of Melbourne), Ana Novak (Australian Defence Science and Technology Group), Vivian Nguyen (Australian Defence Science and Technology Group), and Kristan Pash (Australian Defence Science and Technology Group)</i>	
Archer: An Event-Driven Architecture for Cyber-Physical Systems	335
<i>Javier Moreno Molina (BBVA New Digital Business), Juan Ferrer García (BBVA New Digital Business), and Carlos Kuchkovsky Jiménez (BBVA New Digital Business)</i>	
Towards a Unified Description Language for Simulations in Cloud Environments	341
<i>Nils Weiss (Hamburg University of Applied Sciences), Thomas Preisler (Hamburg University of Applied Sciences), and Wolfgang Renz (Hamburg University of Applied Sciences)</i>	

1st Workshop on Big Data Analytics for Sustainable Environments (BDASE 2018)

The Adoption of Big Data Concepts for Sustainable Practices Implementation in the Construction Industry	349
<i>Paola Reyes Veras (University of Wolverhampton), Subashini Suresh (University of Wolverhampton), and Suresh Renukappa (University of Wolverhampton)</i>	
A Review of Applications of Extended Reality in the Construction Domain	P 1C
<i>Mustafa Al-Adhami (University of Huddersfield), Ling Ma (University of Huddersfield), and Song Wu (Huddersfield Uninversity)</i>	
IoT-Fog Optimal Workload via Fog Offloading	359
<i>Mohammed Al-khafajiy (Liverpool John Moores University), Thar Baker (Liverpool John Moores University), Atif Waraich (Liverpool John Moores University), Dhiya Al-Jumeily (Liverpool John Moores University), and Abir Hussain (Liverpool John Moores University)</i>	
SinP[N]: A Fast Convergence Activation Function for Convolutional Neural Networks	365
<i>Ka-Hou Chan (Macao Polytechnic Institute), Sio-Kei Im (Macao Polytechnic Institute), Wei Ke (Macao Polytechnic Institute), and Ngan-Lin Lei (Macao Polytechnic Institute)</i>	

Developments of Policies Related to Smart Cities: A Critical Review	370
<i>sina keshvardoost (University of Wolverhampton), Suresh Renukappa (University of Wolverhampton), and Subashini Suresh (University of Wolverhampton)</i>	
Group Recommendation Method Based on Item Type Proportion Factor	376
<i>Pengcheng Xuan (Hohai University), Yan Tang (Hohai University), and Wangsong Wang (Hohai University)</i>	
Predicting Colorectal Surgery Duration to Improve the Scheduling of Operating Theatres	PIC
<i>Wai Leng Leong (National University of Singapore), Sean Shao Wei Lam (Duke-NUS Medical School & Singapore Health Services), James Yan Pang (National University of Singapore), Marcus Eng Hock Ong (Duke-NUS Medical School, Singapore Health Services, & Singapore General Hospital), and Hiang Khoon Tan (Duke-NUS Medical School, Singapore Health Services, & Singapore General Hospital)</i>	
Author Index	387