

# **2017 IEEE 5th International Conference on Future Internet of Things and Cloud (FiCloud 2017)**

**Prague, Czech Republic  
21 – 23 August 2017**



**IEEE Catalog Number: CFP17FIC-POD  
ISBN: 978-1-5386-2075-5**

**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:	CFP17FIC-POD
ISBN (Print-On-Demand):	978-1-5386-2075-5
ISBN (Online):	978-1-5386-2074-8

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2017 IEEE 5th International Conference on Future Internet of Things and Cloud

## FiCloud 2017

### Table of Contents

Message from Chairs.....	x
Conference Organization.....	xii
Program Committee.....	xiv
Keynote.....	xx

---

#### Performance Evaluation and Modelling

A Run Time Technique for Handling Error in User-Estimated Execution Times on Systems Processing MapReduce Jobs with Deadlines .....	1
<i>Norman Lim, Shikharesh Majumdar, and Peter Ashwood-Smith</i>	
The Effect of Workload Computational Demand Variability on the Performance of a SaaS Cloud with a Multi-tier SLA .....	10
<i>Georgios L. Stavrinos and Helen D. Karatza</i>	
Performance Evaluation of Framed Slotted ALOHA with Reservation Packets for M2M Networks .....	18
<i>Vicente Casares-Giner and Jorge Martínez-Bauset</i>	
An Intersection Dynamic VANET Routing Protocol for a Grid Scenario .....	25
<i>Ahmad Abuashour and Michel Kadoch</i>	
A Markov-Based Prediction Model for Host Load Detection in Live VM Migration .....	32
<i>Suhil Bani Melhem, Anjali Agarwal, Nishith Goel, and Marzia Zaman</i>	

#### Security, Privacy and Trust I

Service Assignment in Federated Cloud Environments Based on Multi-objective Optimization of Security .....	39
<i>Talal Halabi and Martine Bellaiche</i>	

A JSON Token-Based Authentication and Access Management Schema for Cloud SaaS Applications .....	47
<i>Obinna Ethelbert, Faraz Fatemi Moghaddam, Philipp Wieder, and Ramin Yahyapour</i>	
How to Adapt Authentication and Authorization Infrastructure of Applications for the Cloud .....	54
<i>Tri Hoang Vo, Woldemar Fuhrmann, and Klaus-Peter Fischer-Hellmann</i>	
Ensuring Information Security for Internet of Things .....	62
<i>Natalia Miloslavskaya and Alexander Tolstoy</i>	
An Empirical Study of Cultural Dimensions and Cybersecurity Development .....	70
<i>Aristotle Onumo, Andrea Cullen, and Irfan Ullah-Awan</i>	

## **IoT Services and Applications**

Technologies for a Thing-Centric Internet of Things .....	77
<i>Elisabetta Farella, Manuele Rusci, Bojan Milosevic, and Amy Lynn Murphy</i>	
Proposal of Adaptive Data Rate Algorithm for LoRaWAN-Based Infrastructure .....	85
<i>Vojtěch Hauser and Tomáš Hégr</i>	
Energy Efficient Design of a Pasture Sensor Network .....	91
<i>Luís Nóbrega, Paulo Pedreiras, Pedro Gonçalves, and Sérgio Silva</i>	
IoT-based Real-Time Telemetry System Design: An Approach .....	99
<i>Ahmet Albayrak</i>	
Improve IoT/M2M Data Organization Based on Stream Patterns .....	105
<i>Mário Antunes, Ricardo Jesus, Diogo Gomes, and Rui L. Aguiar</i>	

## **Energy Efficiency**

GreenCloudTax: A Flexible IaaS Tax Approach as Stimulus for Green Cloud Computing .....	112
<i>Benedikt Pittl, Werner Mach, and Erich Schikuta</i>	
Automatic Inference of Energy Models for Peripheral Components in Embedded Systems .....	120
<i>Nadir Cherifi, Thomas Vantroys, Alexandre Boe, Colombe Herault, and Gilles Grimaud</i>	
Energy-Aware Mobile Edge Computing for Low-Latency Visual Data Processing .....	128
<i>Huy Trinh, Dmitrii Chemodanov, Shizeng Yao, Qing Lei, Bo Zhang, Fan Gao, Prasad Calyam, and Kannappan Palaniappan</i>	
Supporting Energy-Efficient Computing on Heterogeneous CPU-GPU Architectures .....	134
<i>Kyle Siehl and Xinghui Zhao</i>	

Modeling the Effects of Independent Components on Mobile Device Charging Times .....	142
<i>Mathew Schlichting and Jason Sawin</i>	

## **Security, Privacy and Trust II**

Security in Lightweight Network Function Virtualisation for Federated Cloud and IoT .....	148
<i>Philippe Massonet, Laurent Deru, Amel Achour, Sebastien Dupont, Louis-Marie Croisez, Anna Levin, and Massimo Villari</i>	
Concept for Increasing Security of National Information Technology Infrastructure and Private Clouds .....	155
<i>Anatoly Petrovich Durakovsky, Sergey Vladimirovich Dvoryankin, and Victor Sergeevich Gorbatov</i>	
Secure Self-Destruction of Shared Data in Multi-CloudIoT .....	161
<i>Farida Ali Guechi and Ramdane Maamri</i>	
Secure and Reliable Internet of Things Systems for Healthcare .....	169
<i>Göran Pulkkis, Jonny Karlsson, Magnus Westerlund, and Jonas Tana</i>	
A Framework for Trust Assessment of Security Systems on Flexible Networks .....	177
<i>Şerif Bahtiyar, Orhan Ermiş, and Mehmet Ufuk Çağlayan</i>	

## **Software Architecture and Middleware**

Production Deployment Tools for IaaS: An Overall Model and Survey .....	183
<i>Hélène Coullon, Christian Perez, and Dimitri Pertin</i>	
An Approach to Failure Prediction in a Cloud Based Environment .....	191
<i>Hussaini Adamu, Bashir Mohammed, Ali Bukar Maina, Andrea Cullen, Hassan Ugail, and Irfan Awan</i>	
Performance Modelling and Analysis of an OpenStack IaaS Cloud Computing Platform .....	198
<i>Kabiru Muhammad Maiyama, Demetres Kouvatso, Bashir Mohammed, Mariam Kiran, and Mumtaz Ahmed Kamala</i>	
Self-Healing in Dynamic Web Service Composition .....	206
<i>Venushini Rajendran, Fang-Fang Chua, and Gaik-Yee Chan</i>	
P-Spar(k)ql: SPARQL Evaluation Method on Spark GraphX with Parallel Query Plan .....	212
<i>Gergő Gombos and Attila Kiss</i>	

## **Context-Awareness and Location-Awareness**

An Adaptive Multimedia Signal Transmission Strategy in Cloud-Assisted Vehicular Networks .....	220
<i>Xing Liu, Zheyi Chen, Kun Hua, Mingyue Liu, and Junyi Zhang</i>	
SAVI-IoT: A Self-Managing Containerized IoT Platform .....	227
<i>Hamzeh Khazaei, Hadi Bannazadeh, and Alberto Leon-Garcia</i>	
iDoRemind: A Location-Based Reminder Application for Android .....	235
<i>Srihari Reddy Pamulapati and Longzhuang Li</i>	
A Cross-Layer BPaaS Adaptation Framework .....	241
<i>Kyriakos Kritikos, Chrysostomos Zeginis, Frank Griesinger, Daniel Seybold, and Jörg Domaschka</i>	

## **Cloud Network Scheduling and Application**

Comparative Analysis of Two Operational Developments within IT Companies' Servitization - Microsoft and HP .....	249
<i>Lukas Bickel and Natalia Kryvinska</i>	
An Integrated Platform for Dynamic Adaptation of Multi-tenant Single Instance SaaS Applications .....	257
<i>Fatma Mohamed, Rabeb Mizouni, Mohammad Abu-Matar, Mahmoud Al-Qutayri, and Jon Whittle</i>	
A Raspberry Pi Based Scalable Software Defined Network Infrastructure for Disaster Relief Communication .....	265
<i>Ron Austin, Peter Bull, and Shaun Buffery</i>	
Cloud Task Scheduling Based on Swarm Intelligence and Machine Learning .....	272
<i>Gaith Rjoub and Jamal Bentahar</i>	

## **Smart Environment**

An Ubiquitous Multi-agent Mobile Platform for Distributed Crowd Sensing and Social Mining .....	280
<i>Stefan Bosse and Evangelos Pournaras</i>	
Critical Analysis in the Research Area of Insider Threats .....	288
<i>Anton Zaytsev, Anatoly Malyuk, and Natalia Miloslavskaya</i>	
DLP as an Integral Part of Network Security Intelligence Center .....	297
<i>Natalia Miloslavskaya, Victor Morozov, Alexander Tolstoy, and Dennis Khassan</i>	
Intelligent Checkpointing Strategies for IoT System Management .....	305
<i>François Aïssaoui Gene Cooperman, Thierry Monteil, and Saïd Tazi</i>	

## Clouds at the Edges

Converging Mobile Edge Computing, Fog Computing, and IoT Quality Requirements .....	313
<i>Paolo Bellavista, Luca Foschini, and Domenico Scotece</i>	
Edge-Supported Approximate Analysis for Long Running Computations .....	321
<i>Ali Reza Zamani, Ioan Petri, Javier Diaz-Montes, Omer Rana, and Manish Parashar</i>	
Service Orchestration in Fog Environments .....	329
<i>Karima Velasquez, David Perez Abreu, Diogo Gonçalves, Luiz Bittencourt, Marilia Curado, Edmundo Monteiro, and Edmundo Madeira</i>	
A Holistic Monitoring Service for Fog/Edge Infrastructures: A Foresight Study .....	337
<i>Mohamed Abderrahim, Meryem Ouzzif, Karine Guillouard, Jérôme François, and Adrien Lebre</i>	
Crowdcloud: Cloud of the Crowd .....	345
<i>Mahmood Hosseini</i>	

## Cloud Federation and Migration

BOSS: A Multitenancy Ad-Hoc Service Orchestrator for Federated Openstack Clouds .....	351
<i>Antonino Galletta, Lorenzo Carnevale, Antonio Celesti, Maria Fazio, and Massimo Villari</i>	
Flexible Composition of System of Systems on Cloud Federation .....	358
<i>Wided Mathlouthi and Narjès Bellamine Ben Saoud</i>	
Exploring Live Cloud Migration on Amazon EC2 .....	366
<i>Ibrahim Ejdayid A. Mansour, Hamid Bouchachia, and Kendra Cooper</i>	
A Watchdog Service Making Container-Based Micro-services Reliable in IoT Clouds .....	372
<i>Antonio Celesti, Lorenzo Carnevale, Antonino Galletta, Maria Fazio, and Massimo Villari</i>	
<b>Author Index</b> .....	<b>379</b>