

# **2017 IEEE World Congress on Services (SERVICES 2017)**

**Honolulu, Hawaii, USA  
25 – 30 June 2017**



**IEEE Catalog Number: CFP17SER-POD  
ISBN: 978-1-5386-2003-8**

**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:	CFP17SER-POD
ISBN (Print-On-Demand):	978-1-5386-2003-8
ISBN (Online):	978-1-5386-2002-1
ISSN:	2378-3818

**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 13th World Congress on Services

## SERVICES 2017

### Table of Contents

Message from General Chairs.....	viii
Message from Program Chairs.....	ix
Organizing Committee.....	x
International Program Committee.....	xi
IEEE Computer Society Technical Committee on Services Computing Services Society.....	xii

---

### IEEE Services Session 1 - Cloud and Data Engineering

Location Data Analytics for Space Management .....	1
<i>David Caicedo and Ashish Pandharipande</i>	
Cloud Strife: Expanding the Horizons of Cloud Gaming Services .....	9
<i>Joseph Doyle, Syed Islam, Rabih Bashroush, and Donal O'Mahony</i>	
Extracting Patterns and Variations in Air Quality of Four Tier I Cities in India .....	17
<i>Alka Yadav and Durga Toshniwal</i>	

### IEEE Services Session 2 - Software Engineering In/For Cloud

Engineering Scalable, Secure, Multi-Tenant Cloud for Healthcare Data .....	21
<i>Daniel J. Dean, Rohit Ranchal, Yu Gu, Anca Sailer, Shakil Khan, Kirk Beaty, Senthil Bakthavachalam, Yichong Yu, Yaoping Ruan, and Paul Bastide</i>	
Models@runtime for Monitoring Cloud Services in Google App Engine .....	30
<i>Silvia Abrahão and Emilio Insfran</i>	
Docker2RDF: Lifting the Docker Registry Hub into RDF .....	36
<i>Ahmed Ben Ayed, Julien Subercaze, Frederique Laforest, Tarak Chaari, Wajdi Louati, and Ahmed Hadj Kacem</i>	

## IEEE Services Session 3 - Smart Services and IoT

Secure-EPCIS: Addressing Security Issues in EPCIS for IoT Applications .....	40
<i>Sungpil Woo, Jaehee Ha, Jaewook Byun, Kiwoong Kwon, Yalew Tolcha, Daeyoun Kang, Hoang Minh Nguyen, Myungchul Kim, and Daeyoung Kim</i>	
Wearable IoT Data Architecture .....	44
<i>Richard K. Lomotey, Joseph Pry, Sumanth Sriramoju, Emmanuel Kaku, and Ralph Deters</i>	
Agent-Centred Approach for Assuring Ethics in Dependable Service Systems .....	51
<i>Irfan Šljivo, Elena Lisova, and Sara Afshar</i>	

## IEEE Services Session 4 - Software Service Engineering

gUML: Reasoning about Energy at Design Time by Extending UML	
Deployment Diagrams with Data Centre Contextual Information .....	59
<i>Nigar Jebrael, Adel Nouredine, Joseph Doyle, Syed Islam, and Rabih Bashroush</i>	
RE2SEP: A Two-Phases Pattern-based Paradigm for Software Service Engineering .....	67
<i>Xiaofei Xu, Ruilin Liu, Zhongjie Wang, Zhiying Tu, and Hanchuan Xu</i>	
Adding Support for Theory in Open Science Big Data .....	71
<i>John A. Miller, Hao Peng, and Michael E. Cotterell</i>	
Improving Cloud Computing Virtual Machines Balancing through Hosts and Virtual Machines Similarities .....	76
<i>Gabriel Beims Bräscher, Rafael Weingärtner, and Carlos Becker Westphall</i>	
The Scoring Matrix Generation Method and Recommendation Algorithm in P2P Lending .....	86
<i>Yanmei Zhang, Xiao Geng, and Hengyue Jia</i>	
Blockchain-Based System for Secure Data Storage with Private Keyword Search .....	90
<i>Hoang Giang Do and Wee Keong Ng</i>	
Provenance-Based Analytics Services for Access Control Policies .....	94
<i>Elisa Bertino, Amani Abu Jabal, Seraphin Calo, Christian Makaya, Maroun Touma, Dinesh Verma, and Christopher Williams</i>	
AUSOM: Autonomic Service-Oriented Middleware for IoT-Based Systems .....	102
<i>Umesh Bellur, Nanjangud C. Narendra, and Swarup Kumar Mohalik</i>	
A Semantic-Enabled Framework for Future Internet of Things Applications .....	106
<i>Umesh Bellur, Pankesh Patel, Saurabh Chauhan, and Yongrui Qin</i>	
Comprehensive Evaluation of Urban Sustainable Innovation Ability Based on Factor Analysis Method .....	114
<i>Xin-Nan Li, Liang-Jie Zhang, Huan Chen, and Chun-Xiao Xing</i>	

Towards a Visualization Framework for Service Selection in Cloud e-Marketplaces .....	122
<i>Azubuiké Ezenwoke, Olawande Daramola, and Matthew Adigun</i>	
<b>Author Index</b> .....	130