2016 IEEE International Conference on Cloud Engineering (IC2E 2016)

Berlin, Germany
4 – 8 April 2016

IEEE

IEEE Catalog Number: CFP1683U-POD
ISBN: 978-1-5090-1962-5

Copyright © 2016 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number: CFP1683U-POD
ISBN (Print-On-Demand): 978-1-5090-1962-5
ISBN (Online): 978-1-5090-1961-8

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
Web: www.proceedings.com

2016 IEEE International Conference on Cloud Engineering

IC2E 2016

Table of Contents

Message the IC2E 2016 General Chairs ix

Message from the IC2E 2016 Program Commitee Co-Chairs x

IC2E 2016 Organizing Committee and Sponsors xii

Program Committee xiv

External Reviewers xvi

Session 1: Keynote 1

Generalization versus Specialization in Cloud Computing Infrastructures 1
Gustavo Alonso

Session 2: Data Processing in the Cloud

Not All Joules are Equal: Towards Energy-Efficient and Green-Aware Data Processing Frameworks 2
Zhaojie Niu, Bingsheng He, and Fangming Liu

Supporting On-demand Elasticity in Distributed Graph Processing 12
Mayank Pundir, Manoj Kumar, Luke M. Leslie, Indranil Gupta, and Roy H. Campbell

Stela: Enabling Stream Processing Systems to Scale-in and Scale-out On-demand 22
Le Xu, Boyang Peng, and Indranil Gupta

Awan: Locality-Aware Resource Manager for Geo-Distributed Data-Intensive Applications 32
Albert Jonathan, Abhishek Chandra, and Jon Weissman

Session 3: Secure and Reliable Clouds

Information Flow Audit for PaaS Clouds 42
Thomas F. J.-M. Pasquier, Jatinder Singh, Jean Bacon, and David Eyers

Surviving Failures with Performance-Centric Bandwidth Allocation in Private Datacenters 52
Li Chen, Baochun Li, and Bo Li

LOGAN: Problem Diagnosis in the Cloud Using Log-Based Reference Models 62
Byung Chul Tak, Shu Tao, Lin Yang, Chao Zhu, and Yaoping Ruan

Session 4: Invited Talk

The Discovery Cloud: Accelerating and Democratizing Research on a Global Scale 68
Ian Foster, Kyle Chard, and Steven Tuecke

Session 5: Keynote 2

What Could Possibly go Wrong? 78
Jon Crowcroft

Session 6: Efficient Cloud Management

Cost-Aware Scalability of Applications in Public Clouds 79
Daniel Moldovan, Hong-Linh Truong, and Schahram Dustdar

Cloud Instance Management and Resource Prediction for Computation-as-a-Service Platforms 89
Joseph Doyle, Vasileios Giotsas, Mohammad Ashraful Anam, and Yiannis Andreopoulos

A Comparative Evaluation of Algorithms for Auction-Based Cloud Pricing Prediction 99
Sara Arévalos, Fabio López-Pires, and Benjamín Barán

Autoscaling for Hadoop Clusters 109
Anshul Gandhi, Sidhartha Thota, Parijat Dube, Andrzej Kochut, and Li Zhang

Session 7: WIP Session

UIE: User-Centric Interference Estimation for Cloud Applications 119
Seyyed Ahmad Javadi, Sagar Mehra, Bharath Kumar Reddy Vangoor, and Anshul Gandhi

GeoScale: Providing Geo-Elasticity in Distributed Clouds 123
Tian Guo, Prashant Shenoy, and Hakan Hacigu Hacigümüş

Attribute-Based Partial Geo-Replication System 127
Hobin Yoon, Ada Gavrilovska, and Karsten Schwan

A Genetic Algorithm for Dynamic Cloud Application Brokerage 131
Lino Chamorro, Fabio López-Pires, and Benjamín Barán

A Reinforcement Learning-Based Power Management Framework for Green Computing Data Centers 135
Xue Lin, Yanzhi Wang, and Massoud Pedram

Automatic Extraction of Metrics from SLAs for Cloud Service Management 139
Sudip Mittal, Karuna P. Joshi, Claudia Pearce, and Anupam Joshi

SENDIM for Incremental Development of Cloud Networks: Simulation, Emulation and Deployment Integration Middleware 143
Pradeeban Kathiravelu and Luís Veiga

Building Compliance and Security Reference Architectures (CSRA) for Cloud Systems 147
Dereje Yimam and Eduardo B. Fernandez

Session 8: Cloud Networking

Barrier-Aware Max-Min Fair Bandwidth Sharing and Path Selection in Datacenter Networks 151
Li Chen, Baochun Li, and Bo Li

Phurti: Application and Network-Aware Flow Scheduling for Multi-tenant MapReduce Clusters 161
Chris X. Cai, Shayan Saeed, Indranil Gupta, Roy H. Campbell, and Franck Le

Session 9: Keynote 3

Processing Big Data in Motion 171
Roger Barga

Session 10: Cloud Performance

Exploring the Use of Tags for Georeplicated Content Placement 172
Stéphane Delbruel, Davide Frey, and François Taïani

Multi-cache: Dynamic, Efficient Partitioning for Multi-tier Caches in Consolidated VM Environments 182
Sundaresan Rajasekaran, Shaohua Duan, Wei Zhang, and Timothy Wood

Container-Based Cloud Virtual Machine Benchmarking 192
Blesson Varghese, Lawan Thamsuhang Subba, Long Thai, and Adam Barker

Container and Microservice Driven Design for Cloud Infrastructure DevOps 202
Hui Kang, Michael Le, and Shu Tao

Poster Papers

Multiple Virtual Machines Live Migration Performance Modelling — VMware vMotion Based Study 212
Mohamed Esam Elsaid and Christoph Meinel

A Taxonomy on Dynamic Environments for Provider-Oriented Virtual Machine Placement 214
Jammily Ortigoza, Fabio López-Pires, and Benjamín Barán

uCCP: An Approach for Continuous Capacity Planning in the Cloud with Uptime-Based Pricing 216
Kamil Smuga and Christina Thorpe

Towards Audio-Visual Cues for Cloud Infrastructure Monitoring 218
David Bermbach and Jacob Eberhardt

A Hot-Page Aware Hybrid-Copy Migration Method 220
Shuang Wu, Bei Wang, Ce Yang, Qinming He, and Jianhai Chen

Exploring GPU Acceleration of Apache Spark 222
Dieudonne Manzi and David Tompkins

On IO Latency Prediction Accuracy and Automated Load Balancing in Consolidated VM Environments 224
Jun Nemoto and Gregory R. Ganger

Reducing Power Consumption in Data Center by Predicting Temperature Distribution and Air Conditioner Efficiency with Machine Learning 226
Yuya Tarutani, Kazuyuki Hashimoto, Go Hasegawa, Yutaka Nakamura, Takumi Tamura, Kazuhiro Matsudax, and Morito Matsuoka

Enabling Enterprise-Class Workloads in the Cloud 228
Valentina Salapura and Ruchi Mahindru

A Budget Constrained Scheduling Algorithm for Hybrid Cloud Computing Systems Under Data Privacy 230
Amin Rezaeian, Hamid Abrishami, Saeid Abrishami, and Mahmoud Naghibzadeh

IoT End-User Applications Provisioning in the Cloud: State of the Art 232
Sami Yangui, Roch H. Glitho, Fatna Belqasmi, Monique J. Morrow, and Paul A. Polakos

Availability Analysis of Cloud Deployed Applications 234
Manar Jammal, Ali Kanso, Parisa Heidari, and Abdallah Shami

Author Index 236