

2011 USENIX Annual Technical Conference
June 15–17, 2011
Portland, OR, USA

Message from the Program Co-Chairs vii

Wednesday, June 15

10:30–noon

A Case for NUMA-aware Contention Management on Multicore Systems 1
Sergey Blagodurov, Sergey Zhuravlev, Mohammad Dashti, and Alexandra Fedorova, Simon Fraser University

TimeGraph: GPU Scheduling for Real-Time Multi-Tasking Environments 17
Shinpei Kato, Carnegie Mellon University and The University of Tokyo; Karthik Lakshmanan and Rangunathan Rajkumar, Carnegie Mellon University; Yutaka Ishikawa, The University of Tokyo

Pegasus: Coordinated Scheduling for Virtualized Accelerator-based Systems 31
Vishakha Gupta and Karsten Schwan, Georgia Institute of Technology; Niraj Tolia, Maginatics; Vanish Talwar and Parthasarathy Ranganathan, HP Labs

1:00–2:30

vIC: Interrupt Coalescing for Virtual Machine Storage Device IO 45
Irfan Ahmad, Ajay Gulati, and Ali Mashtizadeh, VMware, Inc.

Power Budgeting for Virtualized Data Centers 59
Harold Lim, Duke University; Aman Kansal and Jie Liu, Microsoft Research

vIOMMU: Efficient IOMMU Emulation 73
Nadav Amit and Muli Ben-Yehuda, Technion and IBM Research; Dan Tsafir and Assaf Schuster, Technion

3:00–4:30

HiTune: Dataflow-Based Performance Analysis for Big Data Cloud 87
Jinquan Dai, Jie Huang, Shengsheng Huang, Bo Huang, and Yan Liu, Intel Asia-Pacific Research and Development Ltd.

Taming the Flying Cable Monster: A Topology Design and Optimization Framework for Data-Center Networks 101
Jayaram Mudigonda, Praveen Yalagandula, and Jeffrey C. Mogul, HP Labs

In-situ MapReduce for Log Processing 115
Dionysios Logothetis, University of California, San Diego; Chris Trezzo, Salesforce.com, Inc.; Kevin C. Webb and Kenneth Yocum, University of California, San Diego

Thursday, June 16

10:30–noon

- Exception-Less System Calls for Event-Driven Servers 131
Livio Soares and Michael Stumm, University of Toronto
- Resizable, Scalable, Concurrent Hash Tables via Relativistic Programming 145
Josh Triplett, Portland State University; Paul E. McKenney, IBM Linux Technology Center; Jonathan Walpole, Portland State University
- Evaluating the Effectiveness of Model-Based Power Characterization 159
John C. McCullough and Yuvraj Agarwal, University of California, San Diego; Jaideep Chandrashekar, Intel Labs, Berkeley; Sathyanarayan Kuppuswamy, Alex C. Snoeren, and Rajesh K. Gupta, University of California, San Diego

1:00–2:30

- Victim Disk First: An Asymmetric Cache to Boost the Performance of Disk Arrays under Faulty Conditions . . . 173
Shenggang Wan, Qiang Cao, Jianzhong Huang, Siyi Li, Xin Li, Shenghui Zhan, Li Yu, and Changsheng Xie, Huazhong University of Science and Technology; Xubin He, Virginia Commonwealth University
- The Design and Evolution of Live Storage Migration in VMware ESX 187
Ali Mashtizadeh, Emr  Celebi, Tal Garfinkel, and Min Cai, VMware, Inc.
- Online Migration for Geo-distributed Storage Systems 201
Nguyen Tran, Marcos K. Aguilera, and Mahesh Balakrishnan, Microsoft Research Silicon Valley

3:00–4:30

- Slow Down or Sleep, That Is the Question. 217
Etienne Le Sueur and Gernot Heiser, NICTA and The University of New South Wales
- Low Cost Working Set Size Tracking 223
Weiming Zhao, Michigan Technological University; Xinxin Jin, Peking University; Zhenlin Wang, Michigan Technological University; Xiaolin Wang, Yingwei Luo, and Xiaoming Li, Peking University
- FVD: A High-Performance Virtual Machine Image Format for Cloud 229
Chunqiang Tang, IBM T.J. Watson Research Center
- Okeanos: Wasteless Journaling for Fast and Reliable Multistream Storage 235
Andromachi Hatzieleftheriou and Stergios V. Anastasiadis, University of Ioannina
- Toward Online Testing of Federated and Heterogeneous Distributed Systems 241
Marco Canini, Vojin Jovanovi , Daniele Venzano, Boris Spasojevi , Olivier Crameri, and Dejan Kostić, EPFL
- CDE: Using System Call Interposition to Automatically Create Portable Software Packages. 247
Philip J. Guo and Dawson Engler, Stanford University
- Vsys: A Programmable sudo 253
Sapan Bhatia, Princeton University; Giovanni Di Stasi, University of Napoli; Thom Haddow, Imperial College London; Andy Bavier, Princeton University; Steve Muir, Juniper Networks; Larry Peterson, Princeton University
- Internet-scale Visualization and Detection of Performance Events 259
Jeffrey Pang, Subhabrata Sen, Oliver Spatscheck, and Shobha Venkataraman, AT&T Labs—Research
- Polygraph: System for Dynamic Reduction of False Alerts in Large-Scale IT Service Delivery Environments. . . 265
Sangkyum Kim, University of Illinois at Urbana-Champaign; Winnie Cheng, Shang Guo, Laura Luan, and Daniela Rosu, IBM Research; Abhijit Bose, Google

Friday, June 17

8:30–9:30

Building a High-performance Deduplication System 271
Fanglu Guo and Petros Efstathopoulos, Symantec Research Labs

SiLo: A Similarity-Locality based Near-Exact Deduplication Scheme with Low RAM Overhead and High Throughput 285
Wen Xia, Huazhong University of Science and Technology Wuhan National Laboratory for Optoelectronics; Hong Jiang, University of Nebraska–Lincoln; Dan Feng, Huazhong University of Science and Technology Wuhan National Laboratory for Optoelectronics; Yu Hua, Huazhong University of Science and Technology Wuhan National Laboratory for Optoelectronics and University of Nebraska–Lincoln

10:00–noon

G²: A Graph Processing System for Diagnosing Distributed Systems 299
Zhenyu Guo, Microsoft Research Asia; Dong Zhou, Tsinghua University; Haoxiang Lin and Mao Yang, Microsoft Research Asia; Fan Long, Tsinghua University; Chaoqiang Deng, Harbin Institute of Technology; Changshu Liu and Lidong Zhou, Microsoft Research Asia

Context-based Online Configuration-Error Detection 313
Ding Yuan, University of Illinois at Urbana-Champaign and University of California, San Diego; Yinglian Xie and Rina Panigrahy, Microsoft Research Silicon Valley; Junfeng Yang, Columbia University; Chad Verbowski and Arunvijay Kumar, Microsoft Corporation

OFRewind: Enabling Record and Replay Troubleshooting for Networks 327
Andreas Wundsam and Dan Levin, Deutsche Telekom Laboratories/TU Berlin; Srinu Seetharaman, Deutsche Telekom Inc. R&D Lab USA; Anja Feldmann, Deutsche Telekom Laboratories/TU Berlin

ORDER: Object centRIC DEterministic Replay for Java 341
Zheming Yang, Min Yang, Lvcai Xu, Haibo Chen, and Binyu Zang, Fudan University

1:00–2:00

Enabling Security in Cloud Storage SLAs with CloudProof 355
Raluca Ada Popa, MIT; Jacob R. Lorch, David Molnar, Helen J. Wang, and Li Zhuang, Microsoft Research

jVPFS: Adding Robustness to a Secure Stacked File System with Untrusted Local Storage Components 369
Carsten Weinhold and Hermann Härtig, Technische Universität Dresden

2:30–3:30

Semantics of Caching with SPOCA: A Stateless, Proportional, Optimally-Consistent Addressing Algorithm . . . 383
Ashish Chawla, Benjamin Reed, Karl Juhnke, and Ghousuddin Syed, Yahoo! Inc.

TidyFS: A Simple and Small Distributed File System 397
Dennis Fetterly, Maya Haridasan, and Michael Isard, Microsoft Research, Silicon Valley; Swaminathan Sundararaman, University of Wisconsin, Madison

4:00–5:00

Eyo: Device-Transparent Personal Storage 411
Jacob Strauss, Quanta Research Cambridge; Justin Mazzola Paluska and Chris Lesniewski-Laas, Massachusetts Institute of Technology; Bryan Ford, Yale University; Robert Morris and Frans Kaashoek, Massachusetts Institute of Technology

Autonomous Storage Management for Personal Devices with PodBase 425
Ansley Post, MPI-SWS; Juan Navarro, TU Munich; Petr Kuznetsov, TU Berlin/Deutsche Telekom Laboratories; Peter Druschel, MPI-SWS