NSDI ’10: 7th USENIX Symposium on Networked Systems Design and Implementation
April 28–30, 2010
San Jose, CA, USA

Message from the Program Co-Chairs .............................................................. vii

Wednesday, April 28

Cloud Services

Centrifuge: Integrated Lease Management and Partitioning for Cloud Services ........ 1
Atul Adya, Google; John Dunagan and Alec Wolman, Microsoft Research

Volley: Automated Data Placement for Geo-Distributed Cloud Services ............... 17
Sharad Agarwal, John Dunagan, Navendu Jain, Stefan Saroiu, and Alec Wolman, Microsoft Research; Harbinder Bhogan, University of Toronto

Optimizing Cost and Performance in Online Service Provider Networks ........... 33
Zheng Zhang, Purdue University; Ming Zhang and Albert Greenberg, Microsoft Research; Y. Charlie Hu, Purdue University; Ratul Mahajan, Microsoft Research; Blaine Christian, Microsoft Corporation

Wireless 1

Exploring Link Correlation for Efficient Flooding in Wireless Sensor Networks .... 49
Ting Zhu, Ziguo Zhong, Tian He, and Zhi-Li Zhang, University of Minnesota, Twin Cities

Supporting Demanding Wireless Applications with Frequency-agile Radios ......... 65
Lei Yang, University of California, Santa Barbara; Wei Hou, Tsinghua University; Lili Cao, Ben Y. Zhao, and Haitao Zheng, University of California, Santa Barbara

Peer-to-Peer

Contracts: Practical Contribution Incentives for P2P Live Streaming .................. 81
Michael Piatek and Arvind Krishnamurthy, University of Washington; Arun Venkataramani, University of Massachusetts; Richard Yang, Yale University; David Zhang, PPLive; Alexander Jaffe, University of Washington

Experiences with CoralCDN: A Five-Year Operational View ......................... 95
Michael J. Freedman, Princeton University

Whānau: A Sybil-proof Distributed Hash Table ........................................... 111
Chris Lesniewski-Laas and M. Frans Kaashoek, MIT CSAIL

Web Services 1

Crom: Faster Web Browsing Using Speculative Execution ............................... 127
James Mickens, Jeremy Elson, Jon Howell, and Jay Lorch, Microsoft Research

WebProphet: Automating Performance Prediction for Web Services ................. 143
Zhichun Li, Northwestern University; Ming Zhang, Microsoft Research; Zhaosheng Zhu, Data Domain Inc.; Yan Chen, Northwestern University; Albert Greenberg and Yi-Min Wang, Microsoft Research

Mugshot: Deterministic Capture and Replay for JavaScript Applications ............. 159
James Mickens, Jeremy Elson, and Jon Howell, Microsoft Research
Thursday, April 29

**Wireless 2**

AccuRate: Constellation Based Rate Estimation in Wireless Networks .......................................................... 175
Souvik Sen, Naveen Santhapuri, and Romit Roy Choudhury, Duke University; Srihari Nelakuditi, University of South Carolina

Scalable WiFi Media Delivery through Adaptive Broadcasts ................................................................. 191
Sayandeep Sen, Neel Kamal Madabhushi, and Suman Banerjee, University of Wisconsin—Madison

Maranello: Practical Partial Packet Recovery for 802.11 ................................................................. 205
Bo Han and Aaron Schulman, University of Maryland; Francesco Gringoli, University of Brescia; Neil Spring and Bobby Bhattacharjee, University of Maryland; Lorenzo Nava, University of Brescia; Lusheng Ji, Seungjoon Lee, and Robert Miller, AT&T Labs—Research

**Routing**

Reverse traceroute ........................................................................................................................................ 219
Ethan Katz-Bassett, University of Washington; Harsha V. Madhyastha, University of California, San Diego; Vijay Kumar Adhikari, University of Minnesota; Colin Scott, Justine Sherry, Peter van Wesep, Thomas Anderson, and Arvind Krishnamurthy, University of Washington

Seamless BGP Migration with Router Grafting ....................................................................................... 235
Eric Keller and Jennifer Rexford, Princeton University; Jacobus van der Merwe, AT&T Labs—Research

**Datacenter Networking**

ElasticTree: Saving Energy in Data Center Networks ................................................................................. 249
Brandon Heller, Stanford University; Srin Seetharaman, Deutsche Telekom R&D Lab; Priya Mahadevan, Hewlett-Packard Labs; Yiannis Yiakoumis, Stanford University; Puneet Sharma and Sujata Banerjee, Hewlett-Packard Labs; Nick McKeown, Stanford University

SPAIN: COTS Data-Center Ethernet for Multipathing over Arbitrary Topologies ........................................ 265
Jayaram Mudigonda and Praveen Yalagandula, HP Labs; Mohammad Al-Fares, University of California, San Diego; Jeffrey C. Mogul, HP Labs

Hedera: Dynamic Flow Scheduling for Data Center Networks ................................................................. 281
Mohammad Al-Fares and Sivasankar Radhakrishnan, University of California, San Diego; Barath Raghavan, Williams College; Nelson Huang and Amin Vahdat, University of California, San Diego

**Improving MapReduce**

Airavat: Security and Privacy for MapReduce ....................................................................................... 297
Indrajit Roy, Srinath T.V. Setty, Ann Kilzer, Vitaly Shmatikov, and Emmett Witchel, The University of Texas at Austin

MapReduce Online ...................................................................................................................................... 313
Tyson Condie, Neil Conway, Peter Alvaro, and Joseph M. Hellerstein, University of California, Berkeley; Khaled Elmeleegy and Russell Sears, Yahoo! Research

**Web Services 2**

The Architecture and Implementation of an Extensible Web Crawler .................................................... 329
Jonathan M. Hsieh, Steven D. Gribble, and Henry M. Levy, University of Washington

Prophecy: Using History for High-Throughput Fault Tolerance .............................................................. 345
Siddhartha Sen, Wyatt Lloyd, and Michael J. Freedman, Princeton University
Friday, April 30

Malware

Carousel: Scalable Logging for Intrusion Prevention Systems .................................................... 361
Vinh The Lam, University of California, San Diego; Michael Mitzenmacher, Harvard University; George Varghese, University of California, San Diego

SplitScreen: Enabling Efficient, Distributed Malware Detection ............................................. 377
Sang Kil Cha, Iulian Moraru, Jiyong Jang, John Truelove, David Brumley, and David G. Andersen, Carnegie Mellon University

Behavioral Clustering of HTTP-Based Malware and Signature Generation Using Malicious Network Traces . . . . 391
Roberto Perdisci, Georgia Institute of Technology and Damballa, Inc.; Wenke Lee and Nick Feamster, Georgia Institute of Technology

Network Performance

Glasnost: Enabling End Users to Detect Traffic Differentiation .................................................. 405
Marcel Dischinger and Massimiliano Marcon, MPI-SWS; Saikat Guha, MPI-SWS and Microsoft Research; Krishna P. Gummadi, MPI-SWS; Ratul Mahajan and Stefan Saroiu, Microsoft Research

EndRE: An End-System Redundancy Elimination Service for Enterprises ........................................ 419
Bhavish Aggarwal, Microsoft Research India; Aditya Akella and Ashok Anand, University of Wisconsin—Madison; Athula Balachandran, Carnegie Mellon University; Pushkar Chitnis, Microsoft Research India; Chitra Muthukrishnan, University of Wisconsin—Madison; Ramachandran Ramjee, Microsoft Research India; George Varghese, University of California, San Diego

Cheap and Large CAMs for High Performance Data-Intensive Networked Systems ........................................ 433
Ashok Anand, Chitra Muthukrishnan, Steven Kappes, and Aditya Akella, University of Wisconsin—Madison; Suman Nath, Microsoft Research