

Meg Walraed-Sullivan

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Objective and Research Interests

Networking, Distributed Systems, Operating Systems, Large-Scale Systems.

I am an experienced network architect, specializing in topology and protocol co-design. I solve problems related to large-scale networks and distributed systems, with an emphasis on real-world applicability of my research.

Experience

- 2015–present **Senior Network Protocol Design Engineer (*Network Architect*)**, SpaceX.
Responsible engineer for routing and topology. Designed multi-thousand low earth orbit satellite constellation providing global Internet connectivity. Defined distributed, fault tolerant architecture for addressing, routing and forwarding across satellites, including software-defined architecture for maintaining connectivity, forming dynamic links, and running adaptive routing algorithms across dynamic network of moving satellites. Designed distributed packet-processing pipeline, including protocol conversion, header suppression, and flow classification. Defined all control plane messaging and protocols for constellation and supporting ground network.
- 2012–2015 **Post Doc Researcher**, *Mobility and Networking Research Group*, Microsoft Research.
Project Lead, Theia: rack-scale architecture that enables simple and cheap networking for ultra-dense data centers
Collaborator, Batfish: a static analysis tool for router configuration in enterprise networks
- 2005–2012 **Research Assistant**, *Amin Vahdat, Keith Marzullo*, UC San Diego.
In depth study of distributed systems applications in large-scale networks
- Summer **Research Intern**, *Doug Terry*, Microsoft Research Silicon Valley.
- 2006, 2007 Designed Cimbiosys data replication system with Community Information Management team, including platform API and two applications: distributed version control system and distributed calendar application
- 2005-2012 **Independent Tutor**, *Students Age 12-81*.
Computer Science: Complexity, Java, Data Structures, Architecture, Operating systems, Algorithms, Programming Languages
Math: Algebra, Geometry, Calculus, Linear Algebra
Standardized Tests: SAT, PSAT, LSAT, GRE
- 2004-2005 **Software Design Engineer**, *Windows Fundamentals Group*, Microsoft Corporation.
Designed and developed code for file system integration in legacy OS compatibility project
Contributed to Microsoft Application Compatibility Toolkit 5.0
- 2003-2004 **Software Engineer**, *School of Human Ecology*, Cornell University.
Designed, developed, implemented, and supported a full scale palm pilot application and corresponding desktop conduit software
- 2003-2004 **Teaching Assistant**, *School of Engineering*, Cornell University.
Courses: ECE 230 (Digital Design) and ECE 476 (Microcontrollers)
Instructed lab sessions, including interactively debugging students' digital and analog circuits, graded written reports and held weekly office hours for individual student instruction
- 2000-2003 **Programming Associate**, *Bruce Holenstein, Gravic, Inc.*.
Designed, developed, and implemented a budget application with Microsoft Visual Basic
Designed database applications in C for Linux/DB2

Education

- 2005–2012 **PhD**, *University of California, San Diego*, Computer Science.
Advised by Professor Amin Vahdat and Professor Keith Marzullo
Dissertation: Scalable, Fault-Tolerant, and Efficient Data Center Networking
- 2003–2004 **M.Eng.**, *Cornell University*, Electrical and Computer Engineering.
Advised by Dr. Bruce Land
Thesis Project: Interfaced standard MIDI device to PC using Atmel microcontroller
Thesis Projects: Built mini OS: user-level thread library, file system, UDP/TCP over Windows NT kernel
- 1999–2003 **B.S.**, *Cornell University*, Electrical and Computer Engineering.
Key Project Serially interfaced musical keyboard to television using Atmel microcontroller

Publications

- NSDI 2015 A General Approach to Network Configuration Analysis. Ari Fogel, Stanley Fung, Luis Pedrosa, *Meg Walraed-Sullivan*, Ramesh Govindan, Ratul Mahajan, Todd Millstein
- HotNets 2014 Theia: (Simple and Cheap) Networking for Ultra-Dense Data Centers
Meg Walraed-Sullivan, Jitendra Padhye, David A. Maltz
- CoNEXT 2013 Aspen Trees: Balancing Data Center Fault Tolerance, Scalability and Cost
Meg Walraed-Sullivan, Amin Vahdat, Keith Marzullo
- SOCC 2011 ALIAS: Scalable, Decentralized Label Assignment for Data Centers
Meg Walraed-Sullivan, Radhika Niranjana Mysore, Malveeka Tewari, Ying Zhang, Keith Marzullo, Amin Vahdat
- DISC 2011 Brief Announcement: A Randomized Algorithm for Label Assignment in Dynamic Networks. *Meg Walraed-Sullivan*, Radhika Niranjana Mysore, Keith Marzullo, Amin Vahdat
- Tech Report 2011 A Randomized Algorithm for Label Assignment in Dynamic Networks
Meg Walraed-Sullivan, Radhika Niranjana Mysore, Keith Marzullo, Amin Vahdat
- NSDI 2009 Cimbiosys: A Platform for Content-based Partial Replication
Venugopalan Ramasubramanian, Thomas L. Rodeheffer, Douglas B. Terry, *Meg Walraed-Sullivan*, Ted Wobber, Catherine C. Marshall, Amin Vahdat
- ICDIM 2007 Fast encounter-based synchronization for mobile devices. Daniel Peek, Douglas B. Terry, Venugopalan Ramasubramanian, *Meg Walraed-Sullivan*, Thomas L. Rodeheffer, Ted Wobber
- Patent 2009 ACCUMULATING STAR KNOWLEDGE IN REPLICATED DATA PROTOCOL
20090240719 V. Ramasubramanian, T. L. Rodeheffer, D. B. Terry, *M. Walraed-Sullivan*, T. Wobber

Leadership and Service

- 2015 Technical Program Committee, USENIX Annual Technical Conference (ATC).
- 2014 Treasurer, ACM Symposium on Cloud Computing (SoCC).
- 2013 Panel Member, National Science Foundation (NSF).
- 2013 Technical Program Committee, USENIX Annual Technical Conference (ATC).
- 2012–present External Reviewer: Transactions on Networking, IEEE Micro, SOSP 2013, NSDI 2012.
- 2001–present Member and director of university and professional a cappella singing groups.