

# Niraj Tolia

<http://www.tolia.org/> o [ntolia@gmail.com](mailto:ntolia@gmail.com)

## EDUCATION

**Carnegie Mellon University**, Pittsburgh, PA

**Ph.D.** in Electrical and Computer Engineering October 2007

- Focus: Distributed, Storage, and Operating Systems
- Advisor: M. Satyanarayanan

**M.S.** in Electrical and Computer Engineering May 2003

- GPA: 4.0/4.0

**B.S.** in Electrical and Computer Engineering with a double major in Computer Science May 2002

- Graduated with University Honors and Carnegie Institute of Technology College Honors
- GPA: 4.0/4.0

## PROFESSIONAL EXPERIENCE

**EMC/Maginatrics**, Mountain View, CA

**October 2014 - Present**

Senior Director, Software Engineering

- Lead a cross-functional multi-geography team that includes development, QA, and IT to deliver multiple new cloud-based products within EMC's Storage and Data Protection portfolio.
- Effectively managing execution and delivery of three separate, and currently unannounced, new products that will all be released within a span of 6 months from each other.
- Delivered CloudBoost 1.0, a new product to enable Long-Term Cloud Retention for EMC's NetWorker and Avamar data protection software, in less than two months after acquisition.
- Helping drive the CloudBoost vision, roadmap, and technical direction for multiple products based on the CloudBoost platform.
- Worked with EMC's enterprise customers to both enable sales and gather beta product feedback.

**Maginatrics (Acquired by EMC)**, Mountain View, CA

**September 2010 - October 2014**

Vice President, Engineering

- Shipped multiple feature and bug-fix releases for the Maginatrics Cloud Storage Platform.
- Significantly improved release predictability and timing in the face of aggressive schedules.
- Grew engineering team to deliver on an ambitious technical agenda.
- Worked closely with product, sales, and marketing to support and drive the product roadmap and sales pipeline.
- Drove technical engagement and architecture discussions for all our key customer accounts.
- Worked closely with the board and executive team and attended board meetings to help define and drive the vision and execution for the company
- During the acquisition process, led the due diligence for Engineering, IT, and Support in addition to contributions to the Product stream.

**Previous roles:** Chief Architect, Team Lead, and Staff Engineer

- Launched a v1.0 product and led the team through subsequent major and minor feature releases and additional bug fix releases.
- Led the design and architecture of MagFS, a distributed multi-platform enterprise storage system that integrates with public and private cloud-based object stores.
- Recruited the initial engineering team, including personal recruitment of core team members and ultimately helped grow the engineering team to ~30 members.
- Implemented critical backend components including locking and core protocol subsystems.
- Worked closely with product managers to define product strategy and feature roadmaps.
- Worked with the sales and marketing teams on customer, channel, and partner engagements.

**Hedvig**, Santa Clara, CA  
Technical Advisor

**March 2013 - November 2014**

- Until the EMC acquisition, served as a technical advisor for an enterprise-grade product that provided a single, unified software-defined storage platform with block, file, and object storage.

**HP Labs**, Palo Alto, CA  
Senior Researcher, Exascale Computing Lab

**October 2007 - September 2010**

- Conducted research on next-generation “data-centric” data centers and Infrastructure-as-a-Service (IaaS) systems. This included work on non-volatile storage technologies, “big data” and NoSQL frameworks and applications, and the Open Cirrus cloud computing testbed.
- Investigated unified power and cooling management to improve energy efficiency in data centers.
- Managed and mentored an off-shore development team, interns, and post-docs.

**Carnegie Mellon University**, Pittsburgh, PA  
Research Assistant

**August 2002 - October 2007**

- Conducted research on various aspects of distributed systems, focusing on optimizing network transfers over Wide-Area Networks.
- Designed and implemented DOT, an architecture for Internet data transfer services.
- Designed and implemented the CASPER file system that used CAS to optimize client performance and the Lookaside Caching system that integrated portable and distributed storage.
- Designed and implemented the Ganesh and Cedar middleware systems that optimized wide-area and mobile access to database systems.
- Co-led and designed the Snowbird Virtual Machine migration project for optimizing the performance of resource- and interaction-intensive applications.

**Intel Research Labs**, Cambridge, United Kingdom  
Summer Intern

**June 2004 - August 2004**

- Worked on the Xen Virtual Machine (VM) project.
- Investigated the performance impact of isolating device drivers within their own VM.
- Designed a test framework using the iSCSI protocol and used it to evaluate system performance.

**Intel Research Labs**, Pittsburgh, PA  
Summer Intern

**June 2003 - August 2003**

- Worked on Internet Suspend/Resume, a Virtual Machine migration project.
- Investigated the use of Content Addressable Storage (CAS) for improved client caching.
- Used distributed file system traces to analyze performance improvements from using CAS.

**Intel Research Labs**, Pittsburgh, PA  
Summer Intern

**June 2002 - August 2002**

- Worked on Internet Suspend/Resume, a Virtual Machine migration project.
- Designed and implemented CASPER, a CAS-based file system, to optimize VM migration.

**Cisco Systems**, Research Triangle Park, NC  
Software Development Engineer (Co-op Program)

**January 2001 - July 2001**

- Designed and implemented a network processor simulator for 3G routers that provided a complete development environment in the absence of hardware.

#### PATENTS AND INVENTION DISCLOSURES

Eighteen patents and an additional nine disclosures filed on storage, data-intensive applications, Infrastructure-as-a-Service (IaaS) systems, virtualization, non-volatile memory-based systems, and power and cooling.

## REFEREED PAPERS

Iulian Moraru, David G. Andersen, Michael Kaminsky, **Niraj Tolia**, Nathan Binkert, and Parthasarathy Ranganathan. “Consistent, Durable, and Safe Memory Management for Byte-addressable Non Volatile Main Memory.” *Proceedings of the Conference on Timely Results in Operating Systems (TRIOS)*, Nema-colin Woodlands Resort, Farmington, PA, November, 2013.

Vishakha Gupta, Karsten Schwan, **Niraj Tolia**, Vanish Talwar, and Parthasarathy Ranganathan. “Pegasus: Coordinated Scheduling for Virtualized Accelerator-based Systems.” *Proceedings of the 2011 USENIX Annual Technical Conference (USENIX ATC '11)*, Portland, OR, June, 2011.

Shivaram Venkataraman, **Niraj Tolia**, Parthasarathy Ranganathan, and Roy H. Campbell. “Redesigning Data Structures for Non-Volatile Byte-Addressable Memory.” *Proceedings of the 2nd Annual Non-Volatile Memories Workshop (NVMW 2011)*, San Diego, CA, March, 2011.

Shivaram Venkataraman, **Niraj Tolia**, Parthasarathy Ranganathan, and Roy H. Campbell. “Consistent and Durable Data Structures for Non-Volatile Byte-Addressable Memory.” *Proceedings of the 9th USENIX Conference on File and Storage Technologies (FAST '11)*, San Jose, CA, February, 2011.

Gunho Lee, **Niraj Tolia**, Parthasarathy Ranganathan, and Randy H. Katz. “Topology-Aware Resource Allocation for Data-Intensive Workloads.” *Proceedings of the 1st ACM Asia-Pacific Workshop on Systems (ApSys2010)*, New Delhi, India, August, 2010.

Zhikui Wang, **Niraj Tolia**, and Cullen Bash. “Opportunities and Challenges to Unify Workload, Power, and Cooling Management in Data Centers.” Selected as Best Papers from FeBID 2010. In *ACM SIGOPS Operating Systems Review (OSR)*, Volume 44, Number 3, July 2010.

Zhikui Wang, **Niraj Tolia**, and Cullen Bash. “Opportunities and Challenges to Unify Workload, Power, and Cooling Management in Data Centers.” *Proceedings of the 5th International Workshop on Feedback Control Implementation and Design in Computing Systems and Networks (FeBID 2010)*, Paris, France, April 2010.

Luca Parolini, **Niraj Tolia**, Bruno Sinopoli, Bruce H. Krogh. “A Cyber-Physical Systems Approach to Energy Management in Data Centers.” *Proceedings of the 1st ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2010)*, Stockholm, Sweden, April 2010.

**Niraj Tolia**, Zhikui Wang, Parthasarathy Ranganathan, Cullen Bash, Manish Marwah, and Xiaoyun Zhu. “Unified Thermal and Power Management in Server Enclosures.” *Proceedings of the ASME/Pacific Rim Technical Conference and Exhibition (InterPACK '09)*, San Francisco, CA, July 2009.

Zhikui Wang, Cullen Bash, **Niraj Tolia**, Manish Marwah, Xiaoyun Zhu, and Parthasarathy Ranganathan. “Optimal Fan Speed Control for Thermal Management of Servers.” *Proceedings of the ASME/Pacific Rim Technical Conference and Exhibition (InterPACK '09)*, San Francisco, CA, July 2009.

Vishakha Gupta, Ada Gavrilovska, Karsten Schwan, Harshvardhan Kharche, **Niraj Tolia**, Vanish Talwar, Parthasarathy Ranganathan. “GVIM: GPU-accelerated Virtual Machines.” *Proceedings of the 3rd Workshop on System-level Virtualization for High Performance Computing (HPCVirt 2009)*, Nuremberg, Germany, March 2009.

**Niraj Tolia**, Zhikui Wang, Manish Marwah, Cullen Bash, Parthasarathy Ranganathan, and Xiaoyun Zhu. “Delivering Energy Proportionality with Non Energy-Proportional Systems – Optimizing the Ensemble.” *Proceedings of the Workshop on Power Aware Computing and Systems (HotPower '08)*, San Diego, CA, December 2008.

H. Andrés Lagar-Cavilla, **Niraj Tolia**, Eyal de Lara, M. Satyanarayanan, and David O'Hallaron. "Interactive Resource-Intensive Applications Made Easy." *Proceedings of the ACM/IFIP/USENIX 8th International Middleware Conference (Middleware 2007)*, Newport Beach, CA, November 2007.

**Niraj Tolia**, M. Satyanarayanan, and Adam Wolbach. "Improving Mobile Database Access Over Wide-Area Networks Without Degrading Consistency." *Proceedings of the 5th International Conference on Mobile Systems, Applications, and Services (MobiSys 2007)*, San Juan, Puerto Rico, June 2007.

H. Andrés Lagar-Cavilla, **Niraj Tolia**, M. Satyanarayanan, and Eyal de Lara. "VMM-Independent Graphics Acceleration." *Proceedings of the 3rd International ACM Conference on Virtual Execution Environments (VEE '07)*, San Diego, CA, June 2007.

**Niraj Tolia** and M. Satyanarayanan. "Consistency-preserving Caching of Dynamic Database Content." *Proceedings of the 16th International World Wide Web Conference (WWW2007)*, Banff, Canada, May 2007.

Partho Nath, Michael Kozuch, David O'Hallaron, Jan Harkes, M. Satyanarayanan, **Niraj Tolia**, and Matt Toups. "Design Tradeoffs in Applying Content Addressable Storage to Enterprise-scale Systems Based on Virtual Machines." *Proceedings of the 2006 USENIX Annual Technical Conference (USENIX '06)*, Boston, MA, May-June 2006.

**Niraj Tolia**, Michael Kaminsky, David G. Andersen, and Swapnil Patil. "An Architecture for Internet Data Transfer." *Proceedings of the 3rd Symposium on Networked Systems Design and Implementation (NSDI '06)*, San Jose, CA, May 2006.

**Niraj Tolia**, Jan Harkes, Michael Kozuch, and M. Satyanarayanan. "Integrating Portable and Distributed Storage." *Proceedings of the 3rd USENIX Conference on File and Storage Technologies (FAST '04)*, San Francisco, CA, March 2004.

**Niraj Tolia**, Michael Kozuch, M. Satyanarayanan, Brad Karp, Thomas Bressoud, and Adrian Perrig. "Opportunistic Use of Content Addressable Storage for Distributed File Systems." *Proceedings of the 2003 USENIX Annual Technical Conference (USENIX '03)*, San Antonio, TX, June 2003.

Jason Flinn, Shafeeq Sinnamohideen, **Niraj Tolia**, and M. Satyanarayanan. "Data Staging on Untrusted Surrogates." *Proceedings of the 2nd USENIX Conference on File and Storage Technologies (FAST '03)*, San Francisco, CA, March 2003.

#### OTHER REFEREED AND INVITED PUBLICATIONS

M. Satyanarayanan, Benjamin Gilbert, Matt Toups, **Niraj Tolia**, Ajay Surie, David R. O'Hallaron, Adam Wolbach, Jan Harkes, Adrian Perrig, David J. Farber, Michael A. Kozuch, Casey J. Helfrich, Partho Nath, and H. Andrés-Lagar Cavilla. "Pervasive Personal Computing in an Internet Suspend/Resume System." *IEEE Internet Computing*, Vol. 11, No. 2, March, 2007.

**Niraj Tolia**, David G. Andersen, and M. Satyanarayanan. "Quantifying Interactive User Experience on Thin Clients." *IEEE Computer*, Vol. 39, No. 3, March 2006.

**Niraj Tolia**, David G. Andersen, Michael Kaminsky, and Swapnil V. Patil. "What the Protocol Stack Missed: The Transfer Service." Work-In-Progress Abstract, *20th ACM Symposium on Operating Systems Principles*, Brighton, United Kingdom, October 2005.