

Timothy Wood

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Research Interests

My research focuses on building scalable, high performance data centers and cloud platforms utilizing virtualization technologies to improve management and reliability. My work is grounded by end-to-end prototype systems that tackle realistic problems in novel ways.

Education

Ph.D. in Computer Science - expected May 2011

University of Massachusetts, Amherst, MA

Thesis: *Improving Data Center Resource Management, Deployment, and Availability with Virtualization*

M.S. in Computer Science - February 2009

University of Massachusetts, Amherst, MA

B.S. in Electrical & Computer Engineering, Highest Honors - May 2005

Rutgers University, Piscataway, NJ

Research Experience

Research Assistant, UMass Amherst, Fall 2005-Present

Advisor: Prashant Shenoy

Ph.D. research on resource management, deployment, and reliability challenges in modern data centers and cloud computing platforms.

Research Intern, AT&T Research, Florham Park, NJ, Winter 2008 and Summer 2010

Mentors: Kobus van der Merwe and K.K. Ramakrishnan

Investigated how to use network virtualization to seamlessly connect cloud and data center sites. This collaboration resulted in a patent disclosure, one VEE and two HotCloud papers.

Research Intern, HP Labs, Palo Alto, CA, Summer 2007 - Fall 2008

Mentor: Lucy Cherkasova

Developed statistical techniques to model the overheads of virtualization and accurately predict how an application's resource needs change when moved into a virtual environment. The work resulted in six patent disclosures and a paper at Middleware.

Undergraduate Researcher, WINLAB, Rutgers University, 2003-2005

Advisor: Yanyong Zhang

Created protocols for detecting Denial of Service attacks and methods to minimize their effects, with an emphasis on sensor networks.

Teaching & Mentoring Experience

Instructor, CS197U: Introduction to Unix and Linux, Fall 2009, Spring 2010, and Fall 2010

Developed the curriculum and taught this new one credit course to 20-30 students each semester. Ran lectures and supervised lab sessions where students did hands-on assignments.

Teaching Assistant/Grader, CS377: Operating Systems, Spring 2010, and Fall 2010

Created new homework assignments, wrote lecture notes, graded student work, and guest lectured.

Undergraduate Research Mentor, Summer 2009

Advised four undergraduate students as part of the department's Research Experience for Undergraduates (REU) summer program. Met regularly with the students and helped plan their overall research goals.

Conference and Workshop Publications

ZZ and the Art of Practical BFT Execution

Timothy Wood, Rahul Singh, Arun Venkataramani, Prashant Shenoy, and Emmanuel Cecchet. To appear in *EuroSys*, 2011.

CloudNet: Dynamic Pooling of Cloud Resources by Live WAN Migration of Virtual Machines

Timothy Wood, K.K. Ramakrishnan, Jacobus van der Merwe, and Prashant Shenoy. To appear in the *International Conference on Virtual Execution Environments (VEE)*, 2011.

Disaster Recovery as a Cloud Service: Economic Benefits & Deployment Challenges

Timothy Wood, Emmanuel Cecchet, K.K. Ramakrishnan, Prashant Shenoy, Jacobus van der Merwe, and Arun Venkataramani. *Workshop on Hot Topics in Cloud Computing (HotCloud)*, 2010.

The Case for Enterprise Ready Virtual Private Clouds

Timothy Wood, Alexandre Gerber, K.K. Ramakrishnan, Jacobus van der Merwe, and Prashant Shenoy. *Workshop on Hot Topics in Cloud Computing (HotCloud)*, 2009.

Memory Buddies: Exploiting Page Sharing for Smart Colocation in Virtualized Data Centers

Timothy Wood, Gabriel Tarasuk-Levin, Prashant Shenoy, Peter Desnoyers, Emmanuel Cecchet, and Mark Corner. *International Conference on Virtual Execution Environments (VEE)*, 2009. **(Selected as one of the four top papers)**

Profiling and Modeling Resource Usage of Virtualized Applications

Timothy Wood, Ludmila Cherkasova, Kivanc Ozonat, and Prashant Shenoy. *ACM International Middleware Conference*, 2008.

Black-box and Gray-box Strategies for Virtual Machine Migration

Timothy Wood, Prashant Shenoy, Arun Venkataramani, and Mazin Yousif. *Fourth Symposium on Networked Systems Design and Implementation (NSDI)*, 2007.

Efficient Data Migration in Self-managing Storage Systems

Vijay Sundaram, Timothy Wood, and Prashant Shenoy. *Third International Conference on Autonomic Computing, Dublin (ICAC)*, 2006.

The Feasibility of Launching and Detecting Jamming Attacks in Wireless Networks

Wenyuan Xu, Wade Trappe, Yanyong Zhang, and Timothy Wood. *ACM MobiHoc*, May 2005.

Channel Surfing and Spatial Retreats: Defenses Against Wireless Denial of Service

Wenyuan Xu, Timothy Wood, Wade Trappe, and Yanyong Zhang. *Workshop on Wireless Security*, 2004.

Journal Publications

Sandpiper: Black-box and Gray-box Resource Management for Virtual Machines

Timothy Wood, Prashant Shenoy, Arun Venkataramani, and Mazin Yousif. *Elsevier Computer Networks: Special Issue on Resource Management in Virtualized Data Centers (53)*, 2009.

Memory Buddies: Exploiting Page Sharing for Smart Colocation in Virtualized Data Centers

Timothy Wood, Gabriel Tarasuk-Levin, Prashant Shenoy, Peter Desnoyers, Emmanuel Cecchet, and Mark Corner. *ACM SIGOPS Operating Systems Review (43)*, July 2009

Agile dynamic provisioning of multi-tier Internet applications

Bhuvan Uргаonkar, Prashant J. Shenoy, Abhishek Chandra, Pawan Goyal, and Timothy Wood. *ACM Transactions on Autonomous and Adaptive Systems (3)*, 2008.

Articles Under Submission

BenchLab: An Open Testbed for Realistic Benchmarking of Web Applications

Emmanuel Cecchet, Veena Udayabhanu, Timothy Wood, Prashant Shenoy.

Modellus: Automated Modeling of Complex Data Center Applications

Peter Desnoyers, Timothy Wood, Prashant Shenoy, Sangameshwar Patil, and Harrick Vin.

Posters and Invited Presentations

CloudNet: Optimizing WAN Migration in Virtual Private Clouds. Invited talk at IBM Student Workshop for Frontiers of Cloud Computing, September 2010.

RUBiS v2 and the Art of System Benchmarking. Poster at SOSp, October 2009.

Profiling and Modeling Resource Usage of Virtualized Applications. Presentation at Xen Summit, June 2008.

Memory Buddies: Exploiting Sharing for Server Consolidation. Poster at VMWorld, September 2007.

Automating VM Migration with Sandpiper. Invited presentation at Intel, August 2007.

I have also been the presenter for all conference papers for which I am first author.

Honors and Awards

SOSP Travel Scholarship, 2009

“Memory Buddies” selected as one of the four best papers at VEE, 2009

Passed Ph.D Candidacy Exam with Distinction, 2008 (one of 17 such awards since 1995)

Department Nominee for IBM Fellowship, 2008

Graduated with Highest Honors from Rutgers, 2005

Rutgers Undergraduate Research Fellowship, 2004

Member of Tau Beta Pi and Eta Kappa Nu Honor Societies, 2004-2005

Service

Program Committee, First International Conference on Utility and Cloud Computing (UCC 2010)

Graduate Representative, UMass Computer Science Department, 2009-2010

External reviewer for NSDI '07, NSDI '08, HotCloud '09, SenSys '10, Usenix '10, and EuroSys '10

References

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