

IRENE Y. ZHANG

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EDUCATION	University of Washington Ph.D. in Computer Science and Engineering Advisors: Hank Levy, Arvind Krishnamurthy, and Steve Gribble University of Washington M.S. in Computer Science and Engineering Advisors: Hank Levy, Arvind Krishnamurthy, and Steve Gribble Thesis: <i>Simplifying Mobile/Cloud Applications with Sapphire</i> Massachusetts Institute of Technology M.Eng. in Electrical Engineering and Computer Science Advisor: M. Frans Kaashoek Thesis: <i>Efficient File Distribution in a Flexible, Wide-area File System</i> Massachusetts Institute of Technology S.B. in Computer Science and Engineering	Seattle, WA Cambridge, MA June 2009 Cambridge, MA June 2008
INTERESTS	Operating systems, virtualization, distributed systems and networking	
RESEARCH	Simplifying Mobile/Cloud Applications with Sapphire Sapphire is a new distributed programming environment for mobile/cloud applications. Sapphire consists of a new object-oriented distributed programming model, a distributed runtime system built for Android Dalvik and Sun JVMs, and a library of pluggable components for distributed runtime management including client-side caching, code-offloading, peer-to-peer deployment and Paxos state machine replication. Improving VM Checkpoint Restore Performance With collaborators at VMware, I developed two techniques for improving the performance of restoring checkpointed virtual machines. The first estimates and prefetches the working set of the checkpointed VM on restore, improving the responsiveness of the VM during restore. The second groups memory pages together on disk that are likely to be accessed together, improving disk efficiency during restore. Transactional Consistency and Automatic Cache Management In-memory application caches like memcached introduce significant complexity to web applications because they provide a simple get-put interface, violate the consistency guarantees of the underlying database and leave cache invalidations to the application. TxCache addresses these problems by providing a programming model for caching, transactional consistency across the entire system and automatic cache invalidations generated by the database. WheelFS and Large File Distribution The goal of WheelFS is to provide a general wide-area storage solution with a standard POSIX interface. The challenge is that any storage system operating in the wide-area must make trade-offs for performance and trade-off decisions are often better made by applications. WheelFS solves this problem by allowing applications to configure the file system using keywords embedded in the pathname. My thesis work focused on adding support for efficient file distribution to WheelFS for distributing large files and handling flash crowds.	

PUBLICATIONS	I. Zhang, T. Denniston, Y. Baskakov, A. Garthwaite. <i>Optimizing VM Checkpointing for Restore Performance in VMware ESXi</i> . In Proc. of USENIX ATC '13. San Jose, CA. June 2013.	
	I. Zhang, A. Garthwaite, Y. Baskakov, K. Barr. <i>Fast Restore of Checkpointed Memory Using Working Set Estimation</i> . In Proc. of VEE '11. Newport Beach, CA. March 2011.	
	D. Ports, A. Clements, I. Zhang, S. Madden, B. Liskov. <i>Transactional Consistency and Automatic Management in an Application Data Cache</i> . In Proc. of OSDI '10. Vancouver, Canada. October 2010.	
	J. Stribling, Y. Sovran, I. Zhang, X. Pretzer, J. Li, F. Kaashoek, R. Morris. <i>Flexible, Wide-Area Storage for Distributed Systems with WheelFS</i> . In Proc. of NSDI '09. Boston, MA. April 2009.	
	I. Zhang, A. Garthwaite, Y. Baskakov, K. Barr, J. Pool, K. Christopher. <i>Fast Restore of Checkpointed Memory Using Working Set Estimation</i> . Poster at SOSP '09. Big Sky, MT. October 2009.	
	I. Zhang, K. Barr. <i>Improving VMware Workstation Restore using Working Set Estimation</i> . Poster at VMworld '08. Las Vegas, NV. September 2008.	
TEACHING	Operating Systems Engineering (6.828)	Sept - Dec 2008
	Teaching Assistant, MIT Department of EECS Developed and graded labs assignments where students build an exokernel-style OS. Held weekly office hours to help students with labs and OS fundamentals like virtual memory management, interrupt handlers and process management.	
	Intro. to Digital Systems Lab (6.111)	Jan - May 2008
	Teaching Assistant, MIT Department of EECS Taught weekly recitations and helped students with labs using FPGAs and Verilog. Helped students design and implement complex final projects such as 3D object tracking. Received student evaluation of 6.3/7.0, one of the highest ratings in the last 5 years.	
	Computation Structures (6.004)	Jan - Dec 2007
	Lab Assistant, MIT Department of EECS Held office hours to help students design and build a processor and small OS kernel in simulation.	
HONORS AND AWARDS	Intro. to Computer Science and Programming (6.00)	Sept - Dec 2006
	Lab Assistant, MIT Department of EECS Taught students basic computer science concepts using Python such as recursion, abstraction and OOP.	
	National Science Board Annual Board Meeting Student Panel	2013
	National Science Foundation Fellowship	2013
	ARCS Foundation Fellowship	2012
	Jeff Dean and Heidi Hopper Endowed Regental Fellowship	2012
	VMware Academic Program Top Intern Project	2008
	CRA Outstanding Undergraduate Award, Honorable Mention	2008
	Officer, Eta Kappa Nu EECS Honor Society	2008
	Northern Telecom/BNR Award for Best Undergrad. Lab Project	2006

WORK EXPERIENCE	VMware, Inc. MTS, Virtual Machine Monitor Group	Cambridge, MA Jan 2010 - Feb 2013
	VMware, Inc. R&D Intern, Virtual Machine Monitor Group	Cambridge, MA Jul - Dec 2009
	VMware, Inc. R&D Intern, Core Performance Group	Cambridge, MA Jun - Aug 2008
	Quickware Engineering and Design Engineering Intern	Waltham, MA Jun - Aug 2007
	Cummins, Inc. Engineering Intern, Analysis Led Design	Columbus, IN Jun - Aug 2005
	Cummins, Inc. International Business Intern	Beijing, China Jun - Jul 2004
	ArvinMeritor, Inc. Web Development Intern	Columbus, IN Aug 2003 - May 2004