

Edward P. “Ted” Wobber

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RESEARCH INTERESTS	Distributed systems, operating systems, security	
EDUCATION	Harvard College, Cambridge, Massachusetts, USA A.B., Physics, 1975	
EMPLOYMENT	Principal Researcher Microsoft Research Silicon Valley	Microsoft Corporation 2001-present
	Principal Member Technical Staff (and Senior Consulting Engineer) Systems Research Center, Palo Alto, CA	Digital Equipment Corporation 1985-2001
	Software Engineer Mountain View, CA	3Com Corporation 1984-1985
	Senior Member Programming Staff Systems Software Division, Palo Alto, CA	Xerox Corporation 1981-1984
	Member Programming Staff Advanced Systems Development, Palo Alto, CA	Xerox Corporation 1979-1981
	Systems Analyst Wilmington, MA	Compugraphic Corporation 1978-1979
	Systems Programmer Braintree, MA	Interactive Sciences Corporation 1976-1978
SIGNIFICANT RESEARCH PROJECTS	<p><i>Community Information Management.</i> This project is exploring system support for loosely structured, semitrustful communities with shared information needs. In this context, we are conducting fundamental research in a number of areas that go beyond storage and communication including identity, trust, replication, provenance, and contextual awareness. I have contributed to all aspects of this work while maintaining responsibility for its security component. [1, 8, 10, 11, 12, 13, 28, 32]</p> <p><i>Flashlight.</i> The Flashlight project is exploring existing and new non-volatile memory (NVRAM) architectures and building tools to aid in that endeavor. As part of this work, I helped design a novel and efficient stable metadata representation for flash disks, and led an first-principles study into the constraints on NAND solid-state disk performance. In addition, we made a public release of a trace-based simulator for experimenting with various SSD internal configurations. [2, 9, 14, 27, 33]</p> <p><i>Singularity.</i> The Singularity project focused on the construction of dependable systems through innovation in the areas of systems, languages, and tools. We built a research operating system prototype that employed programming languages extensions, and utilized new techniques and tools for specifying and verifying program behavior. I designed and built the security subsystem for this prototype OS. [16, 17, 29, 30, 35]</p>	

Penny Black. The Penny Black project investigated several techniques to reduce spam by making the sender pay. We considered several currencies for payment: CPU cycles, memory cycles, Turing tests (proof that a human was involved), and plain old cash. We also explored new mechanisms for deploying payment schemes. [3, 19, 20]

Personal Jukebox We prototyped and marketed this portable, battery-operated, hard-disk-based MP3 player several years before the advent of the iPod. I contributed to the PJB file system design and built much of the the PC software to load music into it. [37, 38]

Pachyderm. An elephant never forgets. This web-based, indexed mail repository made it easy to store email forever, and get it back when you want it. As part of this work, we invented numerous fundamental abstractions, such as indexed labels and query-based mail access, that are commonly found in modern mail agents such as Gmail. I designed and built the indexed mail store for this prototype. [39, 40]

AltaVista. I designed and implemented the "advanced query" operation for the Alta Vista search engine (the first internet-scale web search engine).

Network Objects. We designed and built a system for object-oriented distributed programming. Our so-called Network Objects are tightly integrated into the Modula-3 programming language and offer type-safety, dynamic typing, and garbage collection in a distributed environment. Subsequent work added security properties to the system. I implemented most of the base system, and was responsible for an expanded journal article describing it. [5, 23, 41]

Taos authentication. We designed and built the authentication mechanism for SRC's Taos operating system. We proposed a new "speaks for" logic to formalize our design and motivate our implementation. In this work, we introduced the notion of compound principal to describe the precise source of authenticated requests in a distributed system, for example: a delegation from a smart-card, a program acting as a privileged agent, or an encrypted channel acting on behalf of a node. I designed and implemented this Taos security component, and was first author on the paper describing it. [6, 7, 24, 25]

HONORS ACM Distinguished Scientist (2009)

SERVICE Program Committees:

ACTIVITIES

 The Eighth International World Wide Web Conference (1998)

 The Nineteenth ACM Symposium on Operating Systems Principles (2003)

 The Second International Workshop on Storage Security and Survivability (2006)

National Science Foundation Panelist (2006,2007)

Reviewer for the following conferences: SOSP, OSDI, NSDI, ACM CCS, WWW, IEEE Security and Privacy, FAST, CEAS (Email/Anti-Spam), DSN, and MobiSys; and the following journals: ACM Transactions on Information and System Security, IEEE Security and Privacy, Journal of Systems and Software, IEEE Transactions on Computers, and IEEE Computer Architecture Letters.

General Chair, ACM Symposium on Operating Systems Principles 2011

PATENTS 17 United States patents issued, 15 pending

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- [2] Andrew Birrell, Michael Isard, Chuck Thacker, and Ted Wobber. A design for high-performance flash disks. *SIGOPS Operating Systems Review*, 41(2):88–93, 2007.
- [3] Martín Abadi, Mike Burrows, Mark Manasse, and Ted Wobber. Moderately hard, memory-bound functions. *ACM Transactions on Internet Technology*, 5(2):299–327, 2005.
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- [6] Edward Wobber, Martín Abadi, Michael Burrows, and Butler Lampson. Authentication in the Taos operating system. *ACM Transactions on Computer Systems*, 12(1):3–32, 1994.
- [7] Butler Lampson, Martín Abadi, Michael Burrows, and Edward Wobber. Authentication in distributed systems: theory and practice. *ACM Transactions on Computer Systems*, 10(4):265–310, 1992.

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- WORKSHOP
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