Jacob A Strauss

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EDUCATION

Massachusetts Institute of Technology

Ph.D. in Computer Science — September 2010
Thesis: *Device-Transparent Personal Storage*
Advisors: M. Frans Kaashoek and Robert T. Morris

M.Eng. in Electrical Engineering and Computer Science — September 2002
Thesis: *Choosing Internet Paths with High Bulk Transfer Capacity*

S.B. in Electrical Engineering and Computer Science — June 2001
Minor in Physics

RESEARCH INTERESTS

Distributed computer systems. Networks, operating systems, and storage for mobile devices.

EXPERIENCE

Quanta Research Cambridge, Cambridge MA — 2010–Present
Member of Technical Staff.
Designed and built a wide-area distributed object store for a digital asset library.
Constructed a fault-tolerant controller for a real-time video transcoding system.
Provisioning and management tools for OpenStack installations.

MIT EECS, Cambridge, MA — Spring 2013
Visiting Lecturer.

MIT CSAIL, Cambridge, MA — 2001–2010
Research Assistant in the Parallel and Distributed Operating Systems Group.

Nokia Research Center, Cambridge MA — 2006, 2007–2008, 2009–2010
NRC Intern. Introduction methods, routing, storage and synchronization for personal devices.

ICSI Center for Internet Research, Berkeley CA — Summer 2003
Characterizing sources of congestion in long lived TCP flows.

Vanu Inc, Cambridge MA — Summer 2000, January 2001
Built a software color NTSC decoder. ARM Linux kernel profiling tools.

MIT Center for Space Research, Cambridge MA — Spring 1998–Fall 1999
Communication software and FPGA design for the HETE-2 satellite's primary groundstations.

Enterprise Leasing of New England, Needham MA — Spring 1996–Summer 1997
Built a database, invoicing, and financial reporting system for a lease financing company.

TEACHING

MIT EECS

Recitation Instructor
6.033: *Computer Systems Engineering* — Spring 2011, Spring 2013
6.001: *Structure and Interpretation of Computer Programs* — Spring 2006, Fall 2007

Short course lecturer
6.090: *Building Programming Experience* — January 2007

TEACHING (CONTINUED)

Teaching Assistant

6.033: *Computer Systems Engineering* — Spring 2004
6.829: *Computer Networks* — Fall 2002
6.001: *Structure and Interpretation of Computer Programs* — Spring 2001

Head Lab Assistant — Summer 1999–Fall 2000
Lab Assistant — Spring 1998–Spring 1999
6.001: *Structure and Interpretation of Computer Programs*

RESEARCH PROJECTS

Device Transparent Storage 2008–2011

Introduced a new *device transparent* storage API, whereby each of a user's devices know about and can manage all data objects, as opposed to conventional storage systems that treat each device in isolation. A prototype implementation of this idea, Eyo, provides a device-transparent storage system for personal media collections such as photos, videos and mail. Eyo allows users to manage entire object collections from any device, even from disconnected storage-limited devices holding only a subset of those objects. Eyo faces several challenges, such as handling concurrent updates, tracking changes to objects and presenting these changes to applications, and partitioning and duplicating files across devices to fit each device's storage and network capacity. Eyo achieves these goals through a key design principle: it handles object metadata separately from content, and distributes metadata to all devices. Experiments with Eyo demonstrate that the device-transparent storage API is a good match for real applications, and that Eyo can efficiently pass updates over fleeting network connections [11, 3, 2].

Unmanaged Internet Architecture 2004–2008

The Unmanaged Internet Architecture, or UIA, is a communication architecture that enables users to connect and share information among personal mobile devices without requiring centralized servers. Each user has a local namespace which is shared among all her devices and is always available on every device. Users can assign personal names to each of their devices, and can also name other users and access their friends' namespaces. Users typically assign names to devices by introducing them in person on a local-area (e.g., WiFi) network. After introduction, the resulting names persist and can be used from any location. UIA devices automatically maintain connectivity with other named devices, both in ad-hoc networks and when the global Internet is available, even when devices are behind NATs [8, 7, 6, 5, 4].

Network Bandwidth Estimation 2001–2004

Introduced the *Probe Gap Model* for estimating available bandwidth over Internet paths. This model uses a sequence of packet pairs spaced at the bottleneck link, and measures cross traffic over that link as changes to that initial spacing. Built an active measurement tool, *Spruce*, using this model. Measurements over a wide range of real network paths showed that despite the model's limitations, such as allowing only a single congested link, Spruce performs as accurately as tools that model more network features, producing estimates faster and with much less measurement traffic [10, 9, 12, 13].

REFEREED CONFERENCE AND WORKSHOP PUBLICATIONS

[1] Aleksey Pesterev, Jacob Strauss, Nickolai Zeldovich, and Robert T. Morris. Improving Network Connection Locality on Multicore Systems. In *Proceedings of the ACM EuroSys Conference (EuroSys 2012)*, Bern, Switzerland, April 2012.

[2] Jacob Strauss, Justin Mazzola Paluska, Chris Lesniewski-Laas, Bryan Ford, Robert Morris, and Frans Kaashoek. Eyo: Device-Transparent Personal Storage. In *Proceedings of the 2011 USENIX Annual Technical Conference (USENIX '11)*, Portland, OR, June 2011.

[3] Jacob Strauss, Chris Lesniewski-Laas, Justin Mazzola Paluska, Bryan Ford, Robert Morris, and Frans Kaashoek. Device-Transparency: a New Model for Mobile Storage. In *Proceedings of the Workshop on Hot Topics in Storage and File Systems (HotStorage'09)*, Big Sky, MT, October 2009. Also published in *SIGOPS Oper. Syst. Rev.*, 44(1):5–9, 2010.

[4] Bryan Ford and Jacob Strauss. An Offline Foundation for Online Accountable Pseudonyms. In *Proceedings of the First International Workshop on Social Network Systems (SocialNets 2008)*, Glasgow, Scotland, April 2008.

[5] Dimitris N. Kalofonos, Zoe Antoniou, Franklin D. Reynolds, Max Van-Kleek, Jacob Strauss, and Paul Wisner. MyNet: A Platform for Secure P2P Personal and Social Networking Services. In *Proceedings of the Sixth Annual IEEE International Conference on Pervasive Computing and Communications (PerCom 2008)*, Hong Kong, March 2008.

[6] Chris Lesniewski-Laas, Bryan Ford, Jacob Strauss, Robert Morris, and M. Frans Kaashoek. Alpaca: Extensible Authorization for Distributed Services. In *Proceedings of the 14th ACM Conference on Computer and Communications Security (CCS-2007)*, Alexandria, VA, October 2007.

[7] Bryan Ford, Jacob Strauss, Chris Lesniewski-Laas, Sean Rhea, Frans Kaashoek, and Robert Morris. Persistent Personal Names for Globally Connected Mobile Devices. In *Proceedings of the 7th USENIX Symposium on Operating Systems Design and Implementation (OSDI '06)*, Seattle, Washington, November 2006.

[8] Bryan Ford, Jacob Strauss, Chris Lesniewski-Laas, Sean Rhea, Frans Kaashoek, and Robert Morris. User-Relative Names for Globally Connected Personal Devices. In *Proceedings of the 5th International Workshop on Peer-to-Peer Systems (IPTPS06)*, Santa Barbara, CA, February 2006.

[9] Sachin Katti, Dina Katabi, Charles Blake, Eddie Kohler, and Jacob Strauss. MultiQ: Automated Detection of Multiple Bottleneck Capacities Along a Path. In *Proceedings of the ACM SIGCOMM Internet Measurement Conference '04*, Taormina, Sicily, Italy, October 2004.

[10] Jacob Strauss, Dina Katabi, and Frans Kaashoek. A Measurement Study of Available Bandwidth Estimation Tools. In *Proceedings of the ACM SIGCOMM Internet Measurement Conference '03*, Miami, Florida, October 2003.

Other Publications

[11] Jacob Strauss Device-Transparent Personal Storage. Ph.D. thesis, Massachusetts Institute of Technology, September 2010.

[12] Sachin Katti, Dina Katabi, Eddie Kohler, and Jacob Strauss. M&M: A Passive Toolkit for Measuring, Correlating, and Tracking Path Characteristics. Technical Report MIT-CSAIL-TR-945, MIT Computer Science and Artificial Intelligence Laboratory, April 2004.

[13] Jacob Strauss. Choosing Internet Paths with High Bulk Transfer Capacity. Master's thesis, Massachusetts Institute of Technology, September 2002.

Software Artifacts

2009 Eyo: Device-transparent personal storage system. BSD license.
2006 UIA: a naming and routing protocol suite for personal mobile devices. GPL/BSD license.
2003 Spruce: an active available bandwidth estimation tool. Released under GPL.
2000 6.001 On-Line Tutor: used by several EECS courses at MIT.

Professional Activities

Program Committee, 2nd ACM EuroSys Workshop on Social Network Systems (SocialNets '09).
External Reviews include: SIGCOMM 2003, SOSP 2005, SOSP 2007, NSDI 2008.

Awards

Department Head's Special Recognition Award (MIT EECS Department, 2000)
NSF Young Scholars Program (Northeastern University, 1996)