FAST '12

FEBRUARY 14—17, 2012
SAN JOSE, CA

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in cooperation with ACM SIGOPS

10th USENIX Conference on File and Storage Technologies

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The 10th USENIX Conference on File and Storage Technologies (FAST '12) brings together storage system researchers and practitioners to explore new directions in the design, implementation, evaluation, and deployment of storage systems.

The FAST program will again be offering tutorials. Taking place on Tuesday, February 14, the four half-day tutorials give you the opportunity to learn from leaders in the storage industry. Take advantage of the special FAST offer: Buy one tutorial and get the second for free!

Beginning on Wednesday, February 15, the technical program includes 26 papers, Work-in-Progress reports (WIPs), and two poster sessions. See the full program on the reverse side of this page.

Don't miss this opportunity to meet with premier storage system researchers and practitioners for three days of ground-breaking file and storage information and training. Register by Monday, January 23, 2012, at www.usenix.org/fast12 for the greatest savings.

Make your hotel reservation early!
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Call and mention USENIX or FAST or book online via http://www.usenix.org/fast12/hotel.

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Tutorial Program

Tuesday, February 14, 2012

Half Day Tutorials (Morning)

T1 Clustered and Parallel Storage System Technologies UPDATED!
Brent Welch, *Panasas*
This tutorial is aimed at administrators and developers who use HPC systems, especially those using storage systems in these environments. Storage is often a critical part of the HPC infrastructure. This tutorial will show you how to get the most out of your HPC storage environment, based on a solid understanding of the fundamentals and the use of cluster-based performance tools and programming techniques.

T2 Building a Cloud Storage System NEW!
Jeff Darcy, *Red Hat*
The trend toward moving computation into the cloud has resulted in new expectations for storage in the cloud. This tutorial will provide information necessary to build your own cloud-appropriate storage system, including new requirements and new constraints, techniques needed, and case studies.

Half Day Tutorials (Afternoon)

T3 Storage Class Memory: Technologies, Systems, and Applications NEW!
Rich Freitas and Larry Chiu, *IBM Almaden Research Center*
Over the next few years, inexpensive solid-state storage based on flash SSDs or, eventually, storage class memory technology will have a profound impact on the design and use of storage systems. This tutorial is intended for those interested in the design of storage systems for the latter part of this decade. It will focus on the impact the introduction of solid-state memory technologies will have on storage systems.

T4 Understanding the I/O of Columnar and NoSQL Databases NEW!
Jiri Schindler, *NetApp*
Structured data management systems have always been great consumers of data storage. The tutorial is aimed at those who are familiar with the basics of storage and database technologies and want to gain a better understanding of how columnar and NoSQL databases are organized and how to best use storage systems.

Conference Organizers

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Technical Sessions

Wednesday, February 15, 2012

9:00 a.m.–10:30 a.m. Wednesday

OPENING REMARKS AND BEST PAPER AWARDS

IMPLICATIONS OF NEW STORAGE TECHNOLOGY

De-indirection for Flash-based SSDs with Nameless Writes
Yiying Zhang, Leo Prasath Arulraj, Andrea Arpaci-Dusseau, and Remzi Arpaci-Dusseau, *University of Wisconsin—Madison*

The Bleak Future of NAND Flash Memory
Laura M. Grupp, *University of California, San Diego;* John D. Davis, *Microsoft Research;* Steven Swanson, *University of California, San Diego*

When Poll Is Better Than Interrupt
Isoo Yang, Dave B. Minturn, and Frank Hady, *Intel Corporation*

11:00 a.m.–12:20 p.m. Wednesday

BACK IT UP

WAN Optimized Replication of Backup Datasets Using Stream-Informed Delta Compression
Philip Shilane, Mark Huang, Grant Wallace, and Windsor Hsu, *EMC*

Power Consumption in Enterprise-Scale Backup Storage Systems
Zhichao Li, *Stony Brook University;* Kevin M. Greenan and Andrew W. Leung, *EMC;* Erez Zadok, *Stony Brook University*

Characteristics of Backup Workloads in Production Systems
Grant Wallace and Fred Douglis, *EMC*; Hangwei Qian, *Case Western Reserve University*; Philip Shilane, Stephen Smaldone, Mark Chamness, and Windsor Hsu, *EMC*

2:00 p.m.–3:30 p.m. Wednesday

FILE SYSTEM DESIGN AND CORRECTNESS

Recon: Verifying File System Consistency at Runtime
Daniel Fryer, Kuei Sun, Rahat Mahmood, TingHao Cheng, Shaun Benjamin, Ashvin Goel, and Angela Demke Brown, *University of Toronto*

Understanding Performance Implications of Nested File Systems in a Virtualized Environment
Duy Le, *College of William and Mary*; Hai Huang, *IBM T.J. Watson Research Center*; Haining Wang, *College of William and Mary*

Consistency Without Ordering
Vijay Chidambaram, Tushar Sharma, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau, *University of Wisconsin—Madison*

4:00 p.m.–5:20 p.m. Wednesday

FLASH AND SSDS, PART I

Reducing SSD Read Latency via NAND Flash Program and Erase Suspension
Guanying Wu and Xubin He, *Virginia Commonwealth University*

Optimizing NAND Flash-Based SSDs via Retention Relaxation
Ren-Shuo Liu and Chia-Lin Yang, *National Taiwan University*; Wei Wu, *Intel Corporation*

SFS: Random Write Considered Harmful in Solid State Drives
Changwoo Min, *Samsung Electronics*; Kangnyeon Kim, *Sungkyun-kwan University*; Hyunjin Cho, *Samsung Electronics*; Sang-Won Lee and Young Ik Eom, *Sungkyun-kwan University*

5:30 p.m.–7:30 p.m. Wednesday

POSTER SESSION & RECEPTION

Thursday, February 16, 2012

9:00 a.m.–10:20 a.m. Thursday

OS TECHNIQUES

FIOS: A Fair, Efficient Flash I/O Scheduler
Stan Park and Kai Shen, *University of Rochester*

Shredder: GPU-Accelerated Incremental Storage and Computation
Pramod Bhatotia and Rodrigo Rodrigues, *MPI-SWS*; Akshat Verma, *IBM Research—India*

Adding Advanced Storage Controller Functionality via Low-Overhead Virtualization
Muli Ben-Yehuda, *IBM Research—Haifa*; Eran Borovik; Michael Factor, Eran Rom, and Avishay Traeger, *IBM Research—Haifa*; Ben-Ami Yassour

10:50 a.m.–12:20 p.m. Thursday

MOBILE AND SOCIAL

ZZFS: A Hybrid Device and Cloud File System for Spontaneous Users
Michelle Mazurek, *Carnegie Mellon University*; Eno Thereska, Dinan Gunawardena, Richard Harper, and James Scott, *Microsoft Research*

Revisiting Storage for Smartphones
Hyojun Kim, *NEC Labs and Georgia Tech*; Nitin Agrawal and Cristian Ungureanu, *NEC Labs*

Serving Large-scale Batch Computed Data with Project Spock
Roshan Sumbaly, Jay Kreps, Lei Gao, Alex Feinberg, Chinmay Soman, and Sam Shah, *LinkedIn Corp*

2:00 p.m.–3:30 p.m. Thursday

WORK-IN-PROGRESS REPORTS (WIPS)
WiPs are the traditional short talks that expose a new idea or project.

4:00 p.m.–5:20 p.m. Thursday

CLOUD

BlueSky: A Cloud-Backed File System for the Enterprise
Michael Vrable, *Google*; Stefan Savage and Geoffrey M. Voelker, *University of California, San Diego*

Rethinking Erasure Codes for Cloud File Systems: Minimizing I/O for Recovery and Degraded Reads
Osama Khan and Randal Burns, *Johns Hopkins University*; James Plank and William Pierce, *University of Tennessee*; Cheng Huang, *Microsoft Research*

NCCloud: Applying Network Coding for the Storage Repair in a Cloud-of-Clouds
Yuchong Hu, Henry C.H. Chen, and Patrick P.C. Lee, *The Chinese University of Hong Kong*; Yang Tang, *Columbia University*

5:30 p.m.–7:30 p.m. Thursday

POSTER SESSION & RECEPTION

Friday, February 17, 2012

9:00 a.m.–10:20 a.m. Friday

A LITTLE BIT OF EVERYTHING

Extracting Flexible, Replayable Models from Large Block Traces
Vasily Tarasov and Santhosh Kumar, *Stony Brook University*; Jack Ma, *Harvey Mudd College*; Dean Hildebrand and Anna Povzner, *IBM Research—Almaden*; Geoff Kuenning, *Harvey Mudd College*; Erez Zadok, *Stony Brook University*

scc: Cluster Storage Provisioning Informed by Application Characteristics and SLAs
Harsha V. Madhyastha, *University of California, Riverside*; John C. McCullough, George Porter, Rishi Kapoor, Stefan Savage, Alex C. Snoeren, and Amin Vahdat, *University of California, San Diego*

iDedup: Latency-aware, Inline Data Deduplication for Primary Storage
Kiran Srinivasan, Tim Bisson, Garth Goodson, and Kaladhar Voruganti, *NetApp*

11:00 a.m.–Noon Friday

FLASH AND SSDS, PART II

Caching Less for Better Performance: Balancing Cache Size and Update Cost of Flash Memory Cache in Hybrid Storage Systems
Yongseok Oh, *University of Seoul*; Jongmoo Choi, *Dankook University*; Donghee Lee, *University of Seoul*; Sam H. Noh, *Hongik University*

Lifetime Management of Flash-Based SSDs Using Recovery-Aware Dynamic Throttling
Sungjin Lee and Taejin Kim, *Seoul National University*; Kyungho Kim, *Samsung Electronics*; Jihong Kim, *Seoul National University*