FAST 2007

February 13–16, 2007, San Jose, CA

USENIX

The 5th USENIX Conference on File and Storage Technologies (FAST '07)

BRINGS TOGETHER STORAGE SYSTEM RESEARCHERS AND PRACTITIONERS TO EXPLORE NEW DIRECTIONS IN THE DESIGN, IMPLEMENTATION, EVALUATION, AND DEPLOYMENT OF STORAGE SYSTEMS.

Back by popular demand, the FAST program again offers tutorials. Taking place on Tuesday, February 13, the half-day tutorials give you the opportunity to learn from leaders in the storage industry. See the complete tutorial program below, and take advantage of the special FAST offer: Buy one half-day tutorial and get the second one for free.

This year's innovative technical program, on Wednesday–Friday, February 14–16, includes 19 technical papers carefully selected from a pool of 98 submissions, as well as 2 invited talks and a Work-in-Progress Session. See the full program on the reverse side of this page.

Don't miss this opportunity to meet with premier storage systems researchers and practitioners for 3.5 days of ground-breaking file and storage information and training. Register today at www.usenix.org/fast2007.

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TUTORIAL PROGRAM

Tuesday, February 13, 2007
HALF DAY TUTORIALS (A.M.)

T1   Disc Drive Technology

Dave Anderson & Willis Whittington, *Seagate*

We will first cover the important components of a drive, how it reads and writes, what causes errors, and how the drive recovers or compensates for them. We will then look at how drives are designed for specific markets. Finally, we'll look at current research and its effects on the future.

T2   NFSv4 and Cluster File Systems

Peter Honeyman, *CITI, University of Michigan*

This tutorial discusses the challenges and solutions in bolting NFSv4 servers to cluster file system nodes. We will cover the major issues of locking, delegation, and shares, giving special attention to fair queuing for NFSv4, NLM, and local locks. We then explore options in client migration for cluster file systems and other issues in server replication and client migration.

HALF DAY TUTORIALS (P.M.)

T3   Cluster Storage and File Systems Technology

Brent Welch & Marc Unangst, *Panasas Inc.*

This tutorial will examine state-of-the-art file systems and the technologies employed to deliver scalable performance across a range of scientific and industrial applications, including in-depth examination of common core features and design trade-offs.

T4   NFS/RDMA: A Deep Dive

Tom Talpey, *Network Appliance, Inc.*

NFS runs over Remote Direct Memory Access (RDMA) fabrics on several platforms, bringing dramatically higher filesharing performance. We will explore the protocols that make this possible, review the interconnects they operate over, and describe both client and server implementation on open source systems.

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REGISTER BY MONDAY, JANUARY 22, 2007, AND SAVE!

http://www.usenix.org/fast2007

Wednesday, February 14

9:00 a.m.–10:00 a.m.   **Wednesday**

Invited Talk
Dawson Engler, *Professor, Stanford University*

10:00 a.m.–10:30 a.m.   **Break**

10:30 a.m.–noon   **Wednesday**

Measure Thrice

Disk Failures in the Real World: What Does an MTTF of 1,000,000 Hours Mean to You?
Bianca Schroeder and Garth A. Gibson, *Carnegie Mellon University*

Failure Trends in a Large Disk Drive Population
Eduardo Pinheiro, Wolf-Dietrich Weber, and Luiz Andre Barroso, *Google*

A Five-Year Study of File-System Metadata
Nitin Agrawal, *University of Wisconsin, Madison*; William J. Bolosky, John R. Douceur, and Jacob R. Lorch, *Microsoft Research*

noon–1:30 p.m.   **Conference Luncheon**

1:30 p.m.–3:00 p.m.   **Wednesday**

Who Put Their Network In My Storage?

Proportional-Share Scheduling for Distributed Storage Systems
Yin Wang, *University of Michigan, Ann Arbor*; Arif Merchant, *Hewlett-Packard Labs*

Argon: Performance Insulation for Shared Storage Servers
Matthew Wachs, Michael Abd-El-Malek, Eno Thereska, and Gregory R. Ganger, *Carnegie Mellon University*

Strong Accountability for Network Storage
Aydan Yumerefendi and Jeff Chase, *Duke University*

3:00 p.m.–3:30 p.m.   **Break**

3:30 p.m.–5:00 p.m.   **Wednesday**

Work-in-Progress Reports (WiPs)

The FAST technical sessions will include slots for Work-in-Progress reports, preliminary results, and "outrageous" opinion statements. We are particularly interested in presentations of student work. To submit, please send a proposal (one page or less) to fast07wips@usenix.org.

Thursday, February 15

9:00 a.m.–10:00 a.m.   **Thursday**

Invited Talk
Steve Kleiman, *CTO, Network Appliance*

10:00 a.m.–10:30 a.m.   **Break**

10:30 a.m.–noon   **Thursday**

The Latest Version

Design and Implementation of Verifiable Audit Trails for a Versioning File System
Zachary N. J. Peterson, Randal Burns, Giuseppe Ateniese, and Stephen Bono, *Johns Hopkins University*

Architectures for Controller Based CDP
Guy Laden, Paula Ta-Shma, Eitan Yaffe, Michael Factor, and Shachar Fienblit, *IBM Haifa Research Laboratory*

Jumbo Store: Providing Efficient Incremental Upload and Versioning for a Utility Rendering Service
Kave Eshghi, Mark Lillibridge, Lawrence Wilcock, Guillaume Belrose, and Rycharde Hawkes, *Hewlett-Packard Labs*

noon–1:30 p.m.   **Lunch (on your own)**

1:30 p.m.–2:30 p.m.   **Thursday**

Scalable Systems

Data ONTAP GX: A Scalable Storage Cluster
Michael Eisler, Peter Corbett, Michael Kazar, Dan Nydick, and Chris Wagner, *Network Appliance*

//TRACE: Parallel Trace Replay with Approximate Causal Events
Michael Mesnier, *Carnegie Mellon University/Intel*; Matthew Wachs, Raja R. Sambasivan, Julio Lopez, James Hendricks, Gregory R. Ganger, and David O'Hallaron, *Carnegie Mellon University*

2:30 p.m.–3:00 p.m.   **Break**

3:00 p.m.–4:30 p.m.   **Thursday**

Cache Prizes

Karma: Know-It-All Replacement for a Multilevel Cache
Michael Factor, *IBM Haifa Research Laboratory*; Assaf Schuster and Gala Yadgar, *Technion*

AMP: Adaptive Multi-stream Prefetching in a Shared Cache
Binny S. Gill, *IBM*; Luis Angel D. Bathen, *University of California, Irvine*

Nache: Design and Implementation of a Caching Proxy for NFSv4
Ajay Gulati, *Rice University*; Renu Tewari and Manoj Naik, *IBM Almaden Research Center*

6:00 p.m.–7:30 p.m.   **Conference Reception**

Friday, February 16

9:00 a.m.–10:00 a.m.   **Friday**

Beyond the Machine Room

TFS: A Transparent File System for Contributory Storage
James Cipar, Mark D. Corner, and Emery D. Berger, *University of Massachusetts*

Cobalt: Separating Content Distribution from Authorization in Distributed File Systems
Kaushik Veeraraghavan, Andrew Myrick, and Jason Flinn, *University of Michigan, Ann Arbor*

10:00 a.m.–10:30 a.m.   **Break**

10:30 a.m.–noon   **Friday**

Making the RAID

PARAID: The Gear-Shifting Power-Aware RAID
Charles Weddle, Mathew Oldham, Jin Qian, and An-I Andy Wang, *Florida State University*; Peter Reiher, *University of California, Los Angeles*; Geoff Kuenning, *Harvey Mudd College*

REO: A Generic RAID Engine and Optimizer
Deepak Kenchammana-Hosekote, *IBM Almaden Research Center*; Dingshan He, *Microsoft*; James Lee Hafner, *IBM Almaden Research Center*

PRO: A Popularity-based Multi-threaded Reconstruction Optimization for RAID-Structured Storage Systems
Lei Tian and Dan Feng, *Huazhong University of Science and Technology*; Hong Jiang, *University of Nebraska, Lincoln*; Ke Zhou, Lingfang Zeng, Jianxi Chen, Zhikun Wang, and Zhenlei Song, *Huazhong University of Science and Technology*