



**Sixth NASA Goddard Space Flight
Center
Conference on Mass Storage Systems
and Technologies**



in cooperation with

**Fifteenth IEEE Symposium on
Mass Storage Systems**

**The Inn and Conference Center
University of Maryland, University College
College Park, Maryland, USA
March 23 - 26, 1998**

MONDAY, MARCH 23, 1998

8:00 AM - 12:30 PM ***Tutorial Registration***

Morning Tutorials (Session Chair: *Sam Coleman, Lawrence Livermore National Lab*)

- 8:45 - 9:00 Announcements and Welcoming Remarks
- 9:00 - 11:00 Shared File Systems and Fibre Channel, *Matthew T. O'Keefe (University of Minnesota)*

11:00 - 11:30 ***BREAK***

- 11:30 - 12:30 Protecting File Systems: A Survey of Backup Techniques, *Ann L. Chervenak, Vivekanand Vellanki, Zachary Kurmas (Georgia Tech)*

12:30 - 2:00 ***LUNCH (On Your Own)***

Afternoon Tutorials (Session Chair: *Ben Kobler, NASA Goddard Space Flight Center*)

- 2:00 - 4:00 Data Management for Massive Data Mining: A Tutorial Introduction, *Robert Grossman (Magnify, Inc. and University of Illinois at Chicago)*

4:00 - 4:30 ***BREAK***

- 4:30 - 5:30 The Dynamics of Obsolescence and the Challenges of Legacy Data Storage, *Gordon E. MacKinnon (DataSure Services)*

6:00 - 7:30 ***Evening Reception and Conference Registration***

TUESDAY, MARCH 24, 1998

8:00 AM - 11:00 AM **Continental Breakfast**

8:00 AM - 4:00 PM **Conference Registration**

Morning Session I - Announcements and Keynote (Session Chairs: *Ben Kobler, NASA Goddard Space Flight Center; Sam Coleman, Lawrence Livermore National Lab*)

- 9:00 - 9:15 Announcements and Welcoming Remarks
- 9:15 - 10:30 Entertainment, Storage, and Balance, *Wook (Digital Domain)*

10:30 - 11:00 **BREAK**

Morning Session II - Architecture 1 (Session Chair: *Ethan Miller, University of Maryland, Baltimore County*)

- 11:00 - 11:30 The Design and Performance of a Shared Disk File System for IRIX, *Steven R. Soltis, Grant M. Erickson, Kenneth W. Preslan, Matthew T. O'Keefe, Thomas M. Ruwart (University of Minnesota)*
- 11:30 - 12:00 HPSS/DFS: Integration of a Distributed File System with a Mass Storage System, *Rajesh Agarwalla, Madhu Chetuparambil, Craig Everhart, Niranjana N. Thirumale (Transarc Corporation), Rena Haynes, Hilary Jones (Sandia National Laboratories), Donna Mecozzi (Lawrence Livermore National Laboratory), Bart Parlman (Los Alamos National Laboratory), Jean Pehkonen (IBM Software Group), Richard Ruef, Benny Wilbanks (IBM Worldwide Government Industries), Vicky White (Oak Ridge National Laboratory)*
- 12:00 - 12:30 A Method to Share Data between Compute Clients with Network Attached Storage: Implementation, Operation, and Performance Results, *Ken Fallen, Bill Bullers (Impactdata)*

12:30 - 2:00 **LUNCH (On Your Own)**

12:30 PM - 8:30 PM **Vendor Booths Open**

Afternoon Session I - Tape Optimization (Session Chair: *Jim Ohler, Department of Defense*)

- 2:00 - 2:30 Towards Improved Tape Storage and Retrieval Response Time, *John J. Gniewek (IBM Corporation)*
- 2:30 - 3:00 Benchmarking Tape System Performance, *Theodore Johnson (AT&T Labs - Research, Ethan L. Miller (University of Maryland, Baltimore County))*
- 3:00 - 3:30 Scheduling Non-Contiguous Tape Retrievals, *Bruce K. Hillyer, Avi Silberschatz (Bell Laboratories)*

3:30 - 4:00 **BREAK**

Afternoon Session II - New Technology (Session Chair: *P C Hariharan, System Engineering and Security*)

- 4:00 - 4:30 TeraStor's Near-Field Recording Technology, *Gordon Knight (TeraStor Corporation)*

- 4:30 - 5:00 Charged Particle Technology for Ultra High Density Data Storage, *Andrew H. Bartlett, Homi Fatemi, Marc H. Eberle (Norsam Technologies)*

Afternoon Session III - 2 Minute (Poster) Madness (Session Chair: *Fynnette Eaton, Office of Smithsonian Institution Archives*)

5:00 - 5:30

- Analytic Performance Models of Robotic Storage Libraries: Status Update, Theodore Johnson (AT&T Labs - Research)
- Monitoring the Life Expectancy of Compact Discs, *Basil Manns (Library of Congress)*
- Network Data Management Protocol (NDMP), *Trish Terry (PDC Software)*
- On Configuring Hierarchical Storage Structures, *Ali Esmail Dashti, Shahram Ghandeharizadeh (University of Southern California)*
- The Berkeley-San Francisco Fine Arts Image Database, Nisha Talagala, Satoshi Asami, David Patterson, (University of California at Berkeley), Bob Futernick, Dakin Hart (Fine Arts Museums of San Francisco)
- Eliminating the I/O Bottleneck in Large Web Caches, *Alex Rousskov, Valery Soloviev (North Dakota State University)*
- Building and Managing High Performance, Scalable, Commodity Mass Storage Systems, *John Lekashman (NASA Ames Research Center)*
- The Designs of RAID with XOR Engines on Disks for Mass Storage Systems, *Tai-Sheng Chang, Sangyup Shim, David H.C. Du (University of Minnesota)*
- Optimization Configuration for Hierarchical Storage Based Continuous Media Server, *Youjip Won (Intel Corporation), Jaideep Srivastava, Zhi-Li Zhang (University of Minnesota)*
- The Mass Storage Testing Laboratory at GSFC, *Ravi Venkataraman, Joel Williams, David Michaud, P C Hariharan (Systems Engineering and Security Inc.), Ben Kobler, Jeanne Behnke, Bernard Peavey (NASA Goddard Space Flight Center)*
- EUROSTORE - a European Mass Storage Management Project, *Martin Gasthuber (Deutsches Elektronen Synchrotron ,DESY, Germany)*
- Transparent Continuous Access to Infinite Data: A New Vision for Enterprise Data Management, *Don Banks, Christina Mercier (Auspex Systems)*
- Third and Fourth Generation Mass Storage Systems, *Alan Poston (NASA Ames Research Center)*

5:30 PM - 8:30 PM **Evening Reception, Poster Session**

WEDNESDAY, MARCH 25, 1998

8:00 AM - 11:00 AM **Continental Breakfast**

8:00 AM - 4:00 PM **Conference Registration**

8:00 AM - 3:30 PM **Vendor Booths Open**

Morning Session I - Performance 1 (Session Chair: *Bruce Rosen, National Institute of Standards and Technology*)

- 9:00 - 9:30 A Scalability Model for ECS's Data Server, *Daniel A. Menasce, George Mason University; Mukesh Singhal (The Ohio State University)*
- 9:30 - 10:00 A Study on the Use of Tertiary Storage in Multimedia Systems, *Leana Golubchik (University of Maryland), Raj Kumar Rajendran (Columbia University)*

- 10:00 - 10:30 SLEDs: Storage Latency Estimation Descriptors, *Rodney Van Meter (USC/Information Sciences Institute)*

10:30 - 11:00 **BREAK**

Morning Session II - Invited Panel: Scalable Storage for the future, NT, UNIX, MVS, or ...? (Session Chairs: *P C Hariharan, Systems Engineering and Security; Ethan Miller, University of Maryland, Baltimore County*)

11:00 - 12:00

Panel Members:

Felipe Cabrera, Microsoft
 Steve Fessler, IBM
 Richard Lee, Data Storage Technologies, Inc.
 Geoff Peck, Quantum
 Paul Rutherford, EMASS, Inc.
 Wook, Digital Domain

12:00 - 1:30 **LUNCH (On Your Own)**

Afternoon Session I - Architecture 2 (Session Chair: *Rodney VanMeter, Quantum Corporation*)

- 1:30 - 2:00 An Architecture for Using Tertiary Storage in a Data Warehouse, *Theodore Johnson (AT&T Labs - Research)*
- 2:00 - 2:30 On the Design and Implementation of the Multidimensional CubeStore Storage Manager, *Wolfgang Lehner, Wolfgang Sporer (University of Erlangen-Nuremberg, Germany)*
- 2:30 - 3:00 Petabyte File Systems Based on Tertiary Storage, *Marc J. Teller, Paul G. Rutherford (EMASS, Inc.)*

3:00 - 3:30 **BREAK**

Afternoon Session II - Standards (Session Chair: *Don Sawyer, NASA Goddard Space Flight Center*)

- 3:30 - 4:00 Internet Protocols for Network-Attached Peripherals, *Steve Hotz, Rodney Van Meter, Greg Finn (USC/Information Sciences Institute)*
- 4:00 - 4:30 Experiences with Open Vault, A Prototype Implementation of a Standards Effort, *Curtis Anderson (Silicon Graphics)*
- 4:30 - 5:00 Media Error Monitoring and Reporting Information (MEMRI) - An Emerging Standard to Determine Optical Tape Data Integrity, *Fernando Podio (National Institute of Standards and Technology), William Vollrath (LOTS Technology), Joel Williams (Systems Engineering and Security), Ben Kobler (NASA Goddard Space Flight Center), Don Crouse (LSC Inc.)*

Afternoon Session III - Random Access (Session Chair: *Sam Coleman, Lawrence Livermore National Lab*)

- 5:00 - 6:00 Extemporaneous talks on topics pertinent to the conference theme (*Speakers should sign up by 4:00 PM, Tuesday, March 24, 1998*)

Evening Reception and Dinner

- 6:00 - 7:00 Cocktail reception, limited open bar
- 7:00 - 8:00 Dinner

- 8:00 - 9:00 Invited Talk: Digital Television and the Future of Mass Storage, *Mark Gray, CEO, Chairman of the Board, Founder, Pluto Technologies*
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THURSDAY, MARCH 26, 1998

8:00 AM - 11:00 AM **Continental Breakfast**

8:00 AM - 12:00 Noon **Conference Registration**

8:00 AM - 12:30 PM **Vendor Booths Open**

Morning Session I - Performance 2 (Session Chair: *Jean-Jacques Bedet, Hughes STX*)

- 9:00 - 9:30 Evaluating RAID in the Real World, *Ian Bird, Rita Chambers, Mark Davis, Andy Kowalski, Bob Lukens, Sandy Philpott, Roy Whitney (SURA/Jefferson Lab)*
- 9:30 - 10:00 Long Term File Activity Patterns in a UNIX Workstation Environment, *Timothy Gibson, Ethan Miller (University of Maryland Baltimore County)*
- 10:00 - 10:30 Performance Tuning of a High Capacity/High Performance Archive for the Earth Observing Systems Project, *Alla Lake (Lockheed Martin)*

10:30 - 11:00 **BREAK**

Morning Session II - Site Reports (Session Chair: *Bill Callicott, Consultant*)

- 11:00 - 11:30 Building a Database for the Large Hadron Collider (LHC): the Exabyte Challenge, *Jamie Shiers (CERN, Switzerland)*
- 11:30 - 12:00 A Data Handling Architecture for a Prototype Federal Application, *Chaitanya K. Baru, Reagan W. Moore, Arcot Rajasekar, Wayne Schroeder, Michael Wan (San Diego Supercomputer Center), Richard L. Klobuchar, David M. Wade (Science Applications International Corp.), Randall K. Sharpe, Jeff Terstriep (National Center for Supercomputing Applications)*
- 12:00 - 12:30 Scientific Data Archive at the Environmental Molecular Sciences Laboratory, *Daniel R. Adams, David M. Hansen, Kevin G. Walker (Pacific Northwest National Laboratory), John D. Gash (Lawrence Livermore National Laboratory)*

12:30 - 1:30 **LUNCH (On Your Own)**

Afternoon Session I - Vendor Solutions (Session Chair: *John Berbert, NASA Goddard Space Flight Center*)

- 1:30 - 1:45 Using Track-Following Servo Technology in Fujitsu Tape Drives, *Randy Glissman (Fujitsu Computer Products of America)*
- 1:45 - 2:00 The Effect of New Tape Drive Technology on Data Management, *Fred Rybczynski (Storage Technology Corporation)*
- 2:00 - 2:15 Virtual Storage Manager, *Stephen H. Blendermann, Dennis F. Reed (Storage Technology Corporation)*
- 2:15 - 2:30 From Double- to Quad-Density on DST, *Tracy G. Wood (Ampex Data Systems Corporation)*
- 2:30 - 2:45 Petabyte Mass Memory System using the Newell Opticel - Part 2, *Chester W. Newell (Primelink Technologies, Inc.)*
- 2:45 - 3:00 Network Attached Storage - A New Performance Paradigm, *Bill Moren (Ciprico, Inc.)*
- 3:00 Conference Adjourns