

2011 IEEE 27th Symposium on Mass Storage Systems and Technologies

(MSST 2011)

**Denver, Colorado, USA
23 – 27 May 2011**



**IEEE Catalog Number: CFP11257-PRT
ISBN: 978-1-4577-0427-7**

TABLE OF CONTENTS

WORKLOAD CHARACTERIZATION AND STEERING

Understanding and Improving Computational Science Storage Access through Continuous Characterization	1
<i>P. Carns, K. Harms, W. Allcock, C. Bacon, S. Lang, R. Latham, R. Ross</i>	
Performance Modeling and Analysis of Flash-based Storage Devices	15
<i>H. Huang, S. Li, A. Szalay, A. Terzis</i>	
YouChoose: A Performance Interface Enabling Convenient and Efficient QoS Support for Consolidated Storage Systems	26
<i>X. Zhang, Y. Xu, S. Jiang</i>	

FINDING DATA IN FLASH

S-FTL: An Efficient Address Translation for Flash Memory by Exploiting Spatial Locality	38
<i>S. Jiang, L. Zhang, X. Yuan, H. Hu, Y. Chen</i>	
Hot Data Identification for Flash-based Storage Systems Using Multiple Bloom Filters	50
<i>D. Park, D. Du</i>	
WAFTL: A Workload Adaptive Flash Translation Layer with Data Partition	61
<i>Q. Wei, B. Gong, S. Pathak, B. Veeravalli, L. Zeng, K. Okada</i>	

INTERFACES AND VIRTUALIZATION

Flexible, Modular File Volume Virtualization in Loris	73
<i>R. Appuswamy, D. Moolenbroek, A. Tanenbaum</i>	
Object-based SCM: An Efficient Interface for Storage Class Memories	87
<i>Y. Kang, J. Yang, E. Miller</i>	
Design and Evaluation of Oasis: An Active Storage Framework based on T10 OSD Standard	99
<i>Y. Xie, K. Muniswamy-Reddy, D. Feng, D. Long, Y. Kang, Z. Niu, Z. Tan</i>	

GREEN STORAGE AND THE CLOUD

Reliability-Aware Energy Management for Hybrid Storage Systems	111
<i>W. Felter, A. Hylick, J. Carter</i>	
Semi-RAID: A Reliable Energy-Aware RAID Data Layout for Sequential Data Access	124
<i>X. Li, Y. Tan, Z. Sun</i>	
ZoneFS: Stripe Remodeling in Cloud Data Centers	135
<i>L. Lu, D. Hildebrand, R. Tewari</i>	

MAKING FLASH FASTER AND CLEANER

Harmonia: A Globally Coordinated Garbage Collector for Arrays of Solid-state Drives	145
<i>Y. Kim, S. Oral, G. Shipman, J. Lee, D. Dillow, F. Wang</i>	
Rejuvenator: A Static Wear Leveling Algorithm for NAND Flash Memory with Minimized Overhead	157
<i>M. Murugan, D. Du</i>	
Boosting Random Write Performance for Enterprise Flash Storage Systems	169
<i>T. Xie, J. Kosiba</i>	

SHORT PAPERS

Performance Models of Flash-based Solid-State Drives for Real Workloads	179
<i>S. Boboila, P. Desnoyers</i>	

Sampling-based Garbage Collection Metadata Management Scheme for Flash-based Storage	185
<i>B. Debnath, S. Krishnan, W. Xiao, D. Lilja, D. Du</i>	
Data Allocation Strategies for the Management of Quality of Service in Virtualised Storage Systems	191
<i>F. Franciosi, W. Knottenbelt</i>	
RAID6L: A Log-Assisted RAID6 Storage Architecture with Improved Write Performance	197
<i>C. Jin, D. Feng, H. Jiang, L. Tian</i>	
AoE Storage Protocol Over MPLS Network	203
<i>M. Landowski, P. Curran</i>	
A Forest-structured Bloom Filter with Flash Memory	208
<i>G. Lu, B. Debnath, D. Du</i>	
Using XML and XQuery for Data Management in HPSS	214
<i>M. Meseke</i>	
Evaluation Model For Long Term Data Archiving Systems In The Context Of Earth Observation	220
<i>R. Perez, O. Perez, O. Portela, A. Saenz, A. Nieto, R. Leone, M. Albani, V. Beruti</i>	
The NASA Center for Climate Simulation Data Management System: Toward an iRODS-Based Approach to Scientific Data Services	225
<i>J. Schnase, W. Webster, L. Parnell, D. Duffy</i>	
A Technique for Moving Large Data Sets over High-Performance Long Distance Networks	231
<i>B. Settemyer, J. Dobson, S. Hodson, J. Kuehn, S. Poole, T. Ruwart</i>	
DBLK: Deduplication for Primary Block Storage	237
<i>Y. Tsuchiya, T. Watanabe</i>	
Heat-Based Dynamic Data Caching: A Load Balancing Strategy for Energy-Efficient Parallel Storage Systems with Buffer Disks	242
<i>Z. Zong, X. Qin, X. Ruan, M. Nijim</i>	
Author Index	