

AURISTOR

YOUR DATA • YOUR FILE SYSTEM



AuriStor® File System

An Introduction to the next /afs®



Looking back on HEPIX Fall 2007

- ◎ OpenAFS Gatekeepers presented road show and community wish list

- ◎ Alan Silverman:

- “... it became clear that they could be funded to implement HEP-desired features.” However, he was “sceptical”.

- ◎ Chuck Boeheim:

- Apply to U.S. Dept of Energy for SBIR grant
- Prove ability to deliver on road map



Eight Years Later – AuriStor®

- ◎ Dual protocol stack clients and servers
 - AFS® stack for compatibility with IBM AFS and OpenAFS™ clients and servers
 - AuriStor stack for enhanced functionality
- ◎ Focused improvements:
 - Security
 - Networking
 - Scalability
 - Ease of Use
 - Code Quality



AuriStor® Security!

- GSS Kerberos 5 authentication
 - extensible to other GSS mechanisms
- AES-256/SHA-1 wire protection
 - Upgradable to AES-CTS/SHA-2 (IETF standardization)
- Combined identity tokens (user@device)
 - No more cache poisoning attacks
 - Enhanced authorization models
- Mandatory Security Levels
 - Enforced on a file server basis
 - Required volume security policy must match FS policy



AuriStor® Security!

- Access Control Enhancements
 - Per object not per directory
 - Maximum Access Policy per volume
 - Directory inheritance
 - More than 20 ACEs per ACL
- Callback channel protection
 - No information leakage between FS and CM
 - Lays the groundwork for cache modification
- Services do not run as “root”



AuriStor® Networking!

- Shiny New Rx implementation
 - throughput exceeds 8.2 gbits/second per listener thread
 - Reduced protocol overhead
 - Improved WAN performance
 - Resilience to packet loss and out of order packet delivery
 - Reduced latency
 - Lower CPU utilization and cache line contention
 - Dual IPv4 and IPv6 capable



AuriStor® Scalability!

- Services process up to 16,000 RPCs in parallel
- Year 2038 Safe
- 100ns timestamp granularity
- 2^{64} volumes per cell
- 2^{95} directories and 2^{95} files per volume (theory)
 - 2^{90} objects per volume (practice)
- Maximum database size 2^{64} bytes
- Maximum volume size and quota 2^{64} Kbytes
- Maximum partition size 2^{64} Kbytes

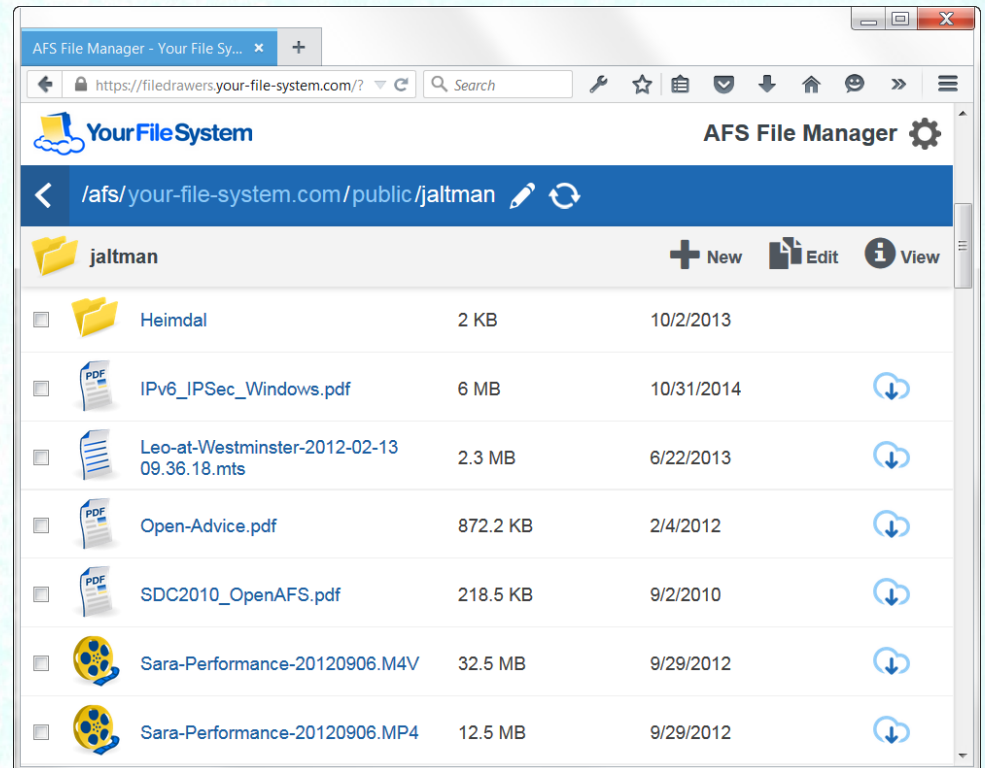
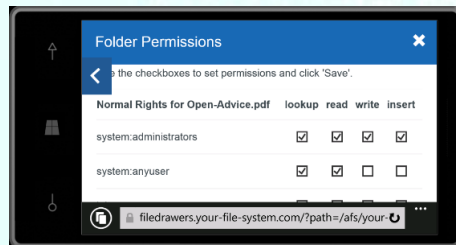
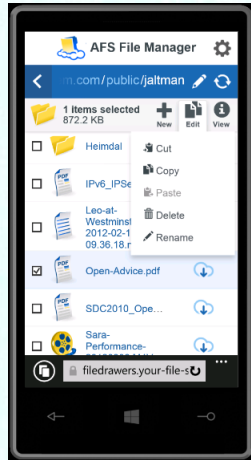
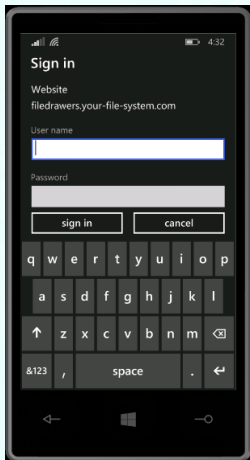


AuriStor® Ease of Use!

- ◎ New installers
 - Windows and OSX
 - One installer per platform
 - Heimdal included
- ◎ Automated Token Acquisition for Windows Domain Logons
 - No credential manager required
- ◎ Windows Explorer Shell integration



AuriStor® FileDrawers for mobile



AuriStor® Improved Code Quality!

- ⦿ pthreads or Windows threads; no LWP
- ⦿ One shared library per module
- ⦿ Command line tools are wrappers around thread safe libraries
- ⦿ Test suites for all libraries and services



AuriStor® Zero Flag Days!

- ◎ AuriStor database servers required for advanced functionality
- ◎ Mixed deployments are supported but ...
 - Clients, File Servers, and DB Servers can be deployed in any order or combination
 - OpenAFS Servers in AuriStor cells cannot
 - store volumes containing Security Policies, New ACLs, Large Volume or Vnode IDs, Extended directories, etc
 - AuriStor Servers in OpenAFS cells cannot:
 - Provide advanced security services
 - Publish non-v4 addrs
 - Use non-standard port numbers



AuriStor® Availability!

◎ Packages for:

- Red Hat Enterprise Linux 5.x, 6.x and 7.x
 - YFSI is a Red Hat Technology Partner
- Fedora 21 and above
- Debian 7 and 8
- Solaris 11
- Microsoft Windows 6.0 (Vista / Server 2008) through Windows 10
- OSX 10.9 (Mavericks) and 10.10 (Yosemite)
 - El Capitan awaiting final OS release
- iOS 6.0 and above

◎ World-wide export license has been obtained



AuriStor® Pricing!

- ◎ Annual Subscription priced by
 - Number of cells
 - Number of servers
 - Number of protection service entities (users + machines)
 - Excluding disabled entities and “afs only” entities
- ◎ Support services
 - includes unlimited web support (9-5 UTC+5/M-F)
 - Premier support services available at extra cost
- ◎ Source code licenses are available





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255 W 94TH ST

New York NY 10025 USA

+1 212 769-9018

sales@your-file-system.com

<http://www.your-file-system.com>