



Your File System

Announcing U.S. Dept of Energy SBIR
Grant Supporting Development of Next Generation
OpenAFS

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The YFS Mission

- Develop, deploy, and operate “Write once, Access Manywhere™” global storage solutions
- Support the on-going development of critical path standards and open source technologies

U.S. Department of Energy Small Business Innovative Research Grant

- The U.S. DoE labs are large users of AFS:
 - support their HEPiX research
 - provide global access to home and project data
 - distribute and manage applications
- YFS Inc. applied for a SBIR grant in 2007
- In 2008, received \$99,000 to fund a feasibility study
- In August 2009, awarded US\$648,000 to design, standardize, and implement core protocol enhancements

YFS Requirements of AFS

- Server scalability (>60,000 clients per server vs ~1000)
- Networking
 - 10Gbit networks
 - IPv6
 - TCP and/or SCTP in addition to UDP communications
- Network Traffic Optimization
 - Reducd cache trashing
 - Enhanced file change notification protocol
 - Server based virtual query volumes
- Lazy Read/write replication

YFS Requirements of AFS

- Directory improvements
 - Internationalization, Extended Attributes, Multiple Data Streams per Object
- Mandatory and byte range locks
- End-to-end Security
 - AES-256 encryption
 - Kerberos, X.509 certificates and SCRAM for authentication
 - Per Service Keys
 - Anonymous Client Access is Protected
 - Secure Callback Channels

YFS Phase II Road Map

2010 deliverables

- Rx UDP Improvements
 - Window Size Negotiation*
 - Dynamic Retransmit Calculation*
 - Path MTU Discovery*
 - Large Data Buffers
 - Improved Jumbograms
 - Max Call Negotiation
- Asynchronous Rx API
- RxGK Security Class
- Protection Service
 - Machine Accounts
 - Aliases
- Client Improvements
 - Byte Range Locking
 - Direct/Synchronous I/O
 - Demand Prefetching
- Ubik enhancements
- Rx TCP Transport

YFS Phase II Road Map

2011 Deliverables

- Server Improvements
 - Event driven workflow
 - Posix Ext. Attr. Backend to replace namei
 - Service Port Independence*
 - Split Horizon Support
 - Volume Release Optimizations
 - Lazy Read Write Replication
- IPv6 Support
- Partition UUIDs
- Long Volume Names
- Metadata Improvements
 - Unicode
 - Extended Attributes
 - Alternate Data Streams
 - DOS Names/Attributes
 - Per File ACLs
- Removal of Directory Size Limitations

The Development Team

- Jeffrey Altman
- Matt Benjamin (Linux Box)
- Derrick Brashear
- Chris Clausen
- Tracy Di Marco White
- Ken Hornstein
- Peter Scott (Kernel Drivers)
- Marshall Vale
- Simon Wilkinson

There Remains Much to be Done

- User Experience Improvements
 - File System adoption is driven by demand
 - Demand is determined by usability
 - Usability is the result of user experience improvements and human computer interaction design
- Hadoop Map-Reduce Service for AFS
- Indexing Services
- Deduplication
- Cloud Services APIs
- Automated Load Balancing
- Improved Management Tools

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