

OPEN STORAGE REVOLUTIONIZING THE STORAGE INDUSTRY

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Storage IT Challenges Increased Demand for Capacity & Performance





What We Hear From Customers





Open Source Economy is on the Rise



By 2012, 80% of All Commercial Software will Include Open Source

Gartner 1/08



The Open Storage Approach Delivering Breakthrough Economics and Scalability

opensolaris

General Purpose Components





Open Storage - History Repeating Itself

- The Open Source and Industry Standard Computing revolutions happened in servers over the last decade
- It's happening in storage right now
- Open Storage is the future





Open Storage Delivers

Freedom from lock-in, a global community effort of 1000s sharing a passion to make storage better





Breakthrough Economics



Dynamic Scale For Your Infrastructure



The Open Storage Advantage

Open Source Software with Industry Standard Hardware

Empowers Developers to Create Storage Services Quickly for Multiple Platforms

Offers Enterprise Reliability and Scalability at 1/10th the Cost of Closed, Proprietary Storage



Which open source OS for Open Storage ?



- ZFS, QFS, SAM-FS
- NFS, CIFS
- NDMP
- iSCSI
- Sun Cluster
- FMA
- SMF
- Dtrace
- Industrial strength, scaling 64 bit kernel



What is **ZFS**?

A new way to manage data

End-to End Data Integrity

With check-summing and copy-on-write transactions

Easier Administration

A pooled storage model – no volume manager



Immense Data Capacity

The world's first 128-bit file system

Huge Performance Gains

> Especially architected for speed



Copy-on-Write and Transactional





End-to-End Checksums



Prevents:

- > Silent data corruption
- Panics from corrupted metadata
- > Phantom writes
- > Misdirected reads and writes
- > DMA parity errors
- > Errors from driver bugs
- > Accidental overwrites



No More Volume Manager! Automatically add capacity to shared storage pool





Data Compression

- Reduces the amount of disk space used
- Reduces the amount of data transferred to disk increasing data throughput





Extreme Network Performance

Project "Crossbow": Multithreading From Plug to App

Industry's First Multithreaded 10 GbE Networking Card

From \$498. (US) per 10 GbE Port

Get It »

» Sign up for a FREE 60-Day Trial of Sun's 10 GbE Networking Card





opensolaris Solaris





Self-diagnosis in milliseconds **Fine-grained recovery** Zero source code changes required Close relationship with AMD, Intel, SPARC engineers **Solaris Fault Manager Solaris Service Manager**

Predictive self healing Stops problems before they happen







- 16 GB system:
 32% reduction in annual downtime
 - System: 4 CPU
 - 44% reduction in annual interruption rate

Predictive Self Healing: Memory Diagnosis and Retire



Service management

Increases Availability Automatically detects software failures
Restarts processes
No manual intervention required
Reduces opportunity for human error

Ease of Use

Service dependency control
Single point of service management
Single location for service configuration data
Transactional configuration control

Compatible

No application changes required
Supports existing start-up mechanisms



Solaris Cluster

Extreme Availability

Ease of Use

Open Choice

 High availability across geographies Web-based GUI Automated installation 50+ applications already integrated Single click to add new applications Advanced Oracle integration Supported on Sun x86 and SPARC platforms Supports storage from Sun and other industry-leading vendors **Open source**

Faster fail-over and recovery

through kernel integration

Advanced algorithms to

prevent data corruption



Extreme Observability: DTrace

Designed for Production Systems



 Safe; always there Instrument anything, anywhere Dynamic operation No instrumenting, no overhead No code changes required



Why Applications Don't Perform Waiting for DATA



Slower



- Today's Multi-Core, Multi-Socket application server design are increasingly held back by slow storage
- When requesting data, the server spends most of it's time waiting for storage
- Application performance remain sluggish regardless of the Server CPU horsepower
- The traditional remedy of adding more expensive DRAM may no longer suffice as data sets double every 2 years



CPU to Storage Discontinuity The number of HDDs needed to keep up





SSDs Keep Up w/ CPU Moore's Law controls both





Where to Store Data? Optimization Trade-Off





SDDs – Why Now? \$/GB & IO Crossover in 2009





Cost Effective Performance SSDs are 120X more IOPS cost effective



- Enterprise HDD
 - > 180 Write IOPS
 - > 320 Read IOPS
 - > 1TByte
- \$ per IOPS: 2.43



- Enterprise SSD
 - > 7,000 Write IOPS
 - > 50,000 Read IOPS
 - > 128GByte
 - > \$ per IOPS: 0.02



ZFS Hybrid Storage Pool





You Can Start using Open Storage Today



Storage arrays









J4200

J4400



Multiplatform Support You Can Use



Cumulative Data



What's Around the Corner

Open Archive Solid State Disk Storage Servers JBODs



What's Around the Corner

Come look in the autumn

Talk to us now (NDA required)



Open Unified Storage Server

Thank you !

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