Welcome to Cavallo Point Lodge, Sausalito California
# LUG Participation

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Total Registrants</th>
<th>Organizations</th>
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</table>
Thank You

- Sponsors

- John Fowler – Fireside chat this evening
- Co-coordinators – Dan Ferber & Rich Brueckner
- Support team – Lindsey Stack & Rosie Krupski
- All of our presenters & facilitators
New Lustre.org Wiki

High Performance and Scalability

For the world’s largest and most complex computing environments, the Lustre™ file system redefines high performance, scaling to tens of thousands of nodes and petabytes of storage with groundbreaking I/O and metadata throughput.

More on Lustre performance, service, and support at sun.com/lustre®

What’s New

Upcoming Release of Lustre 1.8

Lustre 1.8 is in the final cycles of release testing and expected to GA in April 2008. Lustre 1.8 will introduce several robust, new features including:

- Adaptive Timeouts
- OSS Read Cache
- OST Pools
- Version-based Recovery

Read more about 1.8 features and why you should upgrade.

Lustre User Group - April 16-17, 2009

LUG is the premier event to learn about Lustre technology, acquire best practices, and share knowledge with other users. Don’t miss this once-a-
Lustre Support Matrix

This matrix lists the networks, kernels, and e2fsprogs versions supported by each available Lustre release. "Supported" means that the component has been tested and verified against Lustre. Any version that is not referenced is not supported and not recommended for use with Lustre.

NOTE: For more detailed information about Lustre 1.6.x releases, see Change Log 1.6.

<table>
<thead>
<tr>
<th>Supported Kernels</th>
<th>Lustre Version</th>
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Vibrant OEM Ecosystem

More to come in 2009...
Sun Lustre Storage System

- Fully integrated Lustre storage solution based on proven reference architecture
- Offers compelling price/performance value through Sun Open Storage products
- Optimized software stack with automated install and configuration tools
- Sun Professional Services and Support to ensure success
Professional Services & Support

Enterprise Installation Service
- HPC and storage installation services

Lustre Implementation Services
- Highly flexible, modular design
- Design, implementation and information transfer

Sun Spectrum Hardware Services Plans
- Dependable maintenance coverage and technical assistance

Sun Spectrum Software Services Plans
- Online technical support, updates (patches), and knowledgeable
More About Lustre Storage System

- Lustre on Sun.com
  http://sun.com/lustre

- Sun Lustre Storage System on Sun.com
  http://sun.com/scalablestorage

- White paper – Solving the I/O Bottleneck: Sun Lustre Storage Solution
Lustre Roadmap Update
Accomplishments in 2008

• 7 of top 10 Supercomputers in the World
  > Almost all customers are now running Lustre 1.6

• New IO performance records
  > 190 GB/s on ORNL Jaguar

• Raising the quality bar
  > Substantially greater scale testing (Hyperion, etc.)
  > Community outreach on test plans

• Advancement on development goals
  > Hundreds of bugs fixes and enhancements to HEAD
  > Lustre 2.0 alpha release
  > Lustre DMU server pre-alpha release
Challenges with Lustre 2.0 & CMD

HEAD to Good

- The Hendrix project development branch diverged from the Lustre production release branch for 18 months
- In the past 18 months we’ve ported or rewrote several hundred bug fixes and minor improvements back to HEAD

Recovery

- CMD implemented only the minimal set of recovery use cases required to satisfy the Hendrix acceptance tests
- There remained considerable architecture and implementation work to complete full recovery

Raising the Quality Bar

- Continually raising standards for product quality assurance testing
- Large scale testing and testing on Cray equipment are now part of the standard quality practice
- We have farther to reach with HEAD than we originally measured and anticipated
Lustre Releases Status

• 2.0 Alpha
  > Available for download now
  http://downloads.lustre.org/public/lustre/Lustre_2.0_Alpha/
  > Acceptance small has run; IOR and Simul runs up to 74 clients
  > CMD and Quotas are unqualified for the alpha

• 1.8.0
  > Failover issues found by HP in RC5 testing
  > We'll release as soon as these are fixed

• 1.6.7.1
  > Directory corruption fix for 18695 now available for download
Call to Action: Lustre 2.0 Testing

• Intermediate Release Milestones Until GA
  > New builds every 4-6 weeks; next milestone is May 7
  > Builds will be available for download via FTP
  > Release milestone criteria and test results will be published on lustre.org

• We need ample community testing and feedback
  > Please install, test and provide feedback
  > Post defects in Bugzilla and comments/suggestions to lustre-discuss
  > We are recruiting beta test sites for the fall (talk to Jessica Popp for details)
## Lustre Release Plan

### April 2009
- **Lustre 1.8.0**
  - OST Pools
  - OSS Read Cache
  - Adaptive Timeouts
  - Version based recovery (VBR)

- **Lustre 1.8.x**
  - Simplified Interoperation with 2.x

**Supported until end April, 2010**
- RHEL 5, SLES 10
- RHEL 6 in 1.8.x after RHEL 6 GA
- SLES 11 in 1.8.x

### Q4 2009
- **Lustre 2.0.0**
  - Server and Client Restructure for CMD and ZFS
  - Clustered MetaData Early Evaluation (No Recovery)
  - Security GSS Early Evaluation
  - Server Change Logs
  - Commit on Share
  - MDS Performance Enhancements

**Supported until end April, 2010**
- RHEL 5 & 6, SLES 10 & 11

### 2010
- **Lustre 2.x Release(s)**
  - ZFS Lustre GA
  - Improved SMP Scaling
  - Clustered MetaData Early Eval w/Recovery
  - Size on MDS
  - Imperative Recovery

**Supported until end April, 2010**
- RHEL 5, SLES 10
- RHEL 6 in 1.8.x after RHEL 6 GA
- SLES 11 in 1.8.x

### 2011+
- **Lustre 3.0.0**
  - Clustered MetaData GA
  - Beginning of Other HPCS Enhancements

- **Lustre 3.x Release(s)**
  - Online Data Migration
  - Write Back Cache
  - Proxies

### Release in 2.x or 3.x Depending on Readiness
- HSM/HPSS
- HSM/SAM-QFS
- Windows Native Client
- Security GA
- Network Request Scheduler
- pNFS Exports
- Scalable health monitoring
EOL for Current Lustre Releases

• Lustre 1.4
  > Support for 1.4.x will officially cease on June 30, 2009; no further 1.4.x maintenance releases

• Lustre 1.6
  > Regular quarterly 1.6.x maintenance releases will cease with Lustre 1.8.0; ad-hoc 1.6.7.x releases for critical issues only (e.g. 1.6.7.1)
  > Support for 1.6.x will officially cease one year after 1.8.0 (ends April, 2010)

• Lustre 1.8
  > This becomes our active production code line until Lustre 2.0.0
  > We'll deliver 1.8.x maintenance releases on a quarterly basis (bug fixes, minor performance improvements)
Metadata Performance Project

• Joint Sun/Cray/ORNL project team launched to improve single metadata server performance

• Mission
  > Create a suite of metadata performance tests
  > Benchmark baseline performance metrics
  > Identify and implement improvements
  > Measure and quantify incremental improvements

• Release vehicles
  > Lustre 1.8 – modest performance improvements with minimal risk (RPC reduction; async operations; LNET SMP scaling)
  > Lustre 2.0 – More ambitious improvements specific to the new metadata code base on the HEAD branch (Size on MDS)
  > Lustre 3.0 – CMD, Metadata Writeback Cache
Top Lustre Group Goals for 2009

• Maintain Lustre lead in performance and installed base for "extreme" HPC
• Get the Lustre HEAD code base into ship shape
• Integrate Lustre with ZFS/DMU (kernel space)
• Expand support, service, and OEM partnerships around the world
Lustre and the Future

- Continued focus on extreme HPC
- Capacity
  - Exabytes of storage
  - Trillions of files
  - Many client clusters each with 100,000's of clients
- Performance
  - TB's/sec of aggregate I/O
  - 100,000's of aggregate metadata ops/sec
- Community Driven Tools and Interfaces
  - Management and Performance Analysis
Questions?
THANK YOU

pbojanic@sun.com