Lustre Community Release Update
HPCAST - November 16\textsuperscript{th} 2019

Peter Jones, Whamcloud
OpenSFS Lustre Working Group
OpenSFS Lustre Working Group

Lead by Peter Jones (Whamcloud) and Dustin Leverman (ORNL)
Single forum for all Lustre development matters
• Oversees entire Lustre development cycle
• Maintains the roadmap
• Plans major releases
• Collects requirements for future Lustre features
• Sets priorities for test matrix
All are welcome to attend and/or join the mailing list
For more information visit the wiki
• http://wiki.opensfs.org/Lustre_Working_Group
Lustre Community Survey (Mar 2019)

Which Lustre versions do you use in production? (select all that apply)

Lustre 1.8.x
Lustre 2.1.x
Lustre 2.5.x
Lustre 2.6
Lustre 2.7.x
Lustre 2.8.x
Lustre 2.9
Lustre 2.10.x
Lustre 2.11
Lustre 2.12.x

Lustre 2.10.x LTS is the most widely-used production release
Lustre Kernel Policy

- Confusion for a number of years about Linux distro support
  - Questions about omissions from the Lustre support matrix
  - “Support” is an overloaded term
  - Many more distros than listed work, but these are the ones tested
  - Should developers provide fixes for all kernels in the tree?
- LWG discussed and decided to clarify
  - Developers only need to fix primary distros when making changes
  - Other distros rely on interested parties maintaining them
  - Lustre/Changelog updated to make clearer distinction
  - Policy on Lustre.org wiki
Lustre LTS Transition

• LTS change from 2.10.x to 2.12.x announced at SC18
  • Driver was amount of change to support newer kernels
• Some concerns have been raised that two years is not LT 😁
• Large numbers of sites deployed 2.10.x LTS releases
  • Some sites upgraded fully to 2.12.x
  • Some sites using 2.12.x clients
  • Some sites work with vendors who offer longer support versions
  • Some sites using changes ported back to 2.10.x if required
• Will again seek community input before any future changes
Lustre 2.12.x LTS

- Lustre 2.12.3 went GA Oct 21\textsuperscript{st}
  - RHEL 7.7 server and client support
  - RHEL 8.0 client support
  - MOFED 4.7
  - ZFS 0.7.13
  - Bug fixes from early 2.12.x deployments
    - \texttt{http://wiki.lustre.org/Lustre_2.12.3_Changelog}

- Lustre 2.12.4 targeted for late Q4
  - RHEL 8.1 client support
Lustre 2.13

• RC1 in release testing ATM; hopefully GA by end of month
• OS support
  • RHEL 7.7 servers/clients
  • RHEL8.0/SLES12 SP4/Ubuntu 18.04 clients
• Interop/upgrades from latest Lustre 2.12.x
• Ships with ZFS 0.7.13 by default
• Number of useful features
  • Persistent Client Cache (LU-10092)
  • Overstriping (LU-9846)
  • Self Extending Layouts (LU-10070)
• http://wiki.lustre.org/Release_2.13.0
Lustre 2.13 Contributions

Aggregated data by organization between 2.12.50 and 2.12.90 tags

Source: http://git.whamcloud.com/fs/lustre-release.git/shortlog/refs/heads/master

Data courtesy of Dustin Leverman (ORNL)
## Lustre Version Statistics

<table>
<thead>
<tr>
<th>Version</th>
<th>Commits</th>
<th>LOC</th>
<th>Developers</th>
<th>Organizations</th>
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<td>291K</td>
<td>41</td>
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<td>159K</td>
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</tbody>
</table>

Statistics courtesy of Chris Morrone (LLNL)/ Dustin Leverman (ORNL)  
Source: [http://git.whamcloud.com/fs/lustre-release.git](http://git.whamcloud.com/fs/lustre-release.git)
Lustre 2.14

• Targeting late Q2/early Q3 release
• OS support
  • RHEL 8.1 servers/clients
  • RHEL 8.1/SLES15 SP1/Ubuntu 20.04 clients
• Interop/upgrades from 2.13 and latest Lustre 2.12.x
• Ships with ZFS 0.8.2 by default
• Number of useful features
  • FLR Erasure Coding (LU-10911)
  • Pool Quota (11023)
  • DNE Auto Restriping (LU-11025)
Lustre Community Roadmap

2.12
- Lazy Size on MDT
- LNet Health
- DNE Dir Restriping

2.13
- Persistent Client Cache
- Multi-Rail Routing
- Overstriping

2.14
- FLR Erasure Coding
- Pool Quota
- DNE Auto Restriping

2.15
- Client Encryption
- Writeback Cache

* Estimates are not commitments and are provided for informational purposes only
* Fuller details of features in development are available at [http://wiki.lustre.org/Projects](http://wiki.lustre.org/Projects)
Lustre in Linux Kernel

- SUSE/ORNL working on getting Lustre client into Linux kernel
  - https://github.com/neilbrown/lustre
  - Patches pushed for review on lustre-devel mailing list
- Major ldiskfs patches merged into upstream ext4/e2fsprogs
  - Now much easier to keep Lustre e2fsprogs current
Lustre in the Cloud

- Intel launched AWS offering early 2015
- Cray Azure offering has been available since late 2017
- Amazon announced FSX for Lustre Software in Nov 2018
- DDN-Whamcloud have offerings on GCP, Azure and AWS
- Amazon and Ali Cloud both contributed to Lustre 2.13
Integrated Manager for Lustre

https://github.com/whamcloud/integrated-manager-for-lustre/releases

- IML 5.0 GA in May
  - Lower manager/agent resource usage
- IML 5.1 now GA
  - https://github.com/whamcloud/integrated-manager-for-lustre/releases/tag/v5.1.0
  - Lustre 2.12.3 support
    - Parallel deploy servers with CLI
Lustre’s Longevity

- Project active for over 20 years
- Maintaining stability and performance in the most demanding environments is not an easy problem to solve
- Constant evolution to deal with changing requirements of hardware and usage
- Permissive open source license has meant many organizations can use and contribute effectively

For some further Lustre heritage...

Lustre at SC19

- **Sat Nov 16th**
  - HPCAST (Grand Hyatt) 8 am

- **Tue Nov 19th**
  - DDN booth (#617) 1:15pm
  - IO-500 BOF (205-207) 12:15pm
  - Arm BOF (301-303) 5:15pm
  - OpenSFS Lustre BOF (205-207) 5:15pm

- **Weds Nov 20th**
  - SUSE booth (#1917) 3pm
  - Stanford booth (#1255) 3:30pm

- **Thur Nov 21st**
  - Stanford booth (#1255) 1:30pm
SAVE THE DATE

LUSTRE USER GROUP (LUG) 2020

JUNE 9 - 12, 2020
BERKELEY, CALIFORNIA

Hosted by LBNL/NERSC, UC Berkeley Research IT, and OpenSFS
Summary

• LTS model has been well adopted
  • Focus currently on switching to 2.12.x LTS
• Lustre 2.12.3 and IML 5.1 GA
• Lustre 2.13 and 2.12.4 coming soon
• Plenty of options for those interested in contributing to Lustre
Thank you

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