Community Release Update

May 15th 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
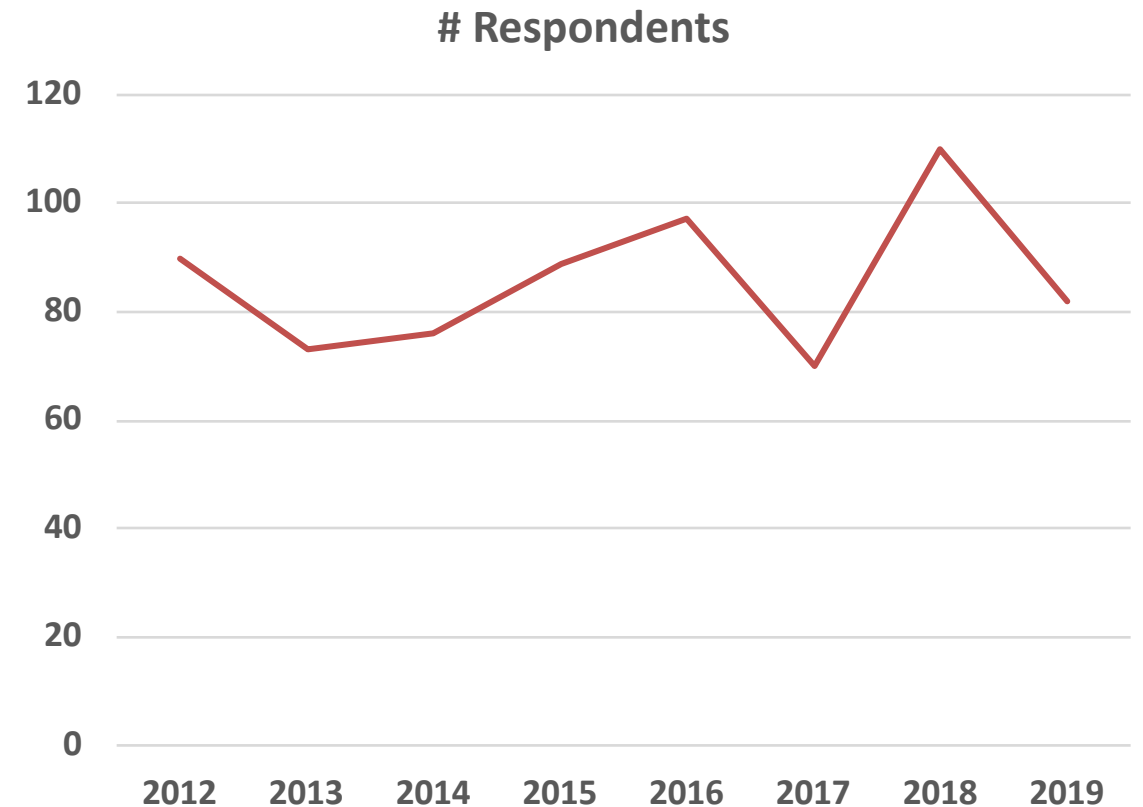- Sets priorities for test matrix

All welcome to attend and/or join the mailing list

For more information visit the wiki
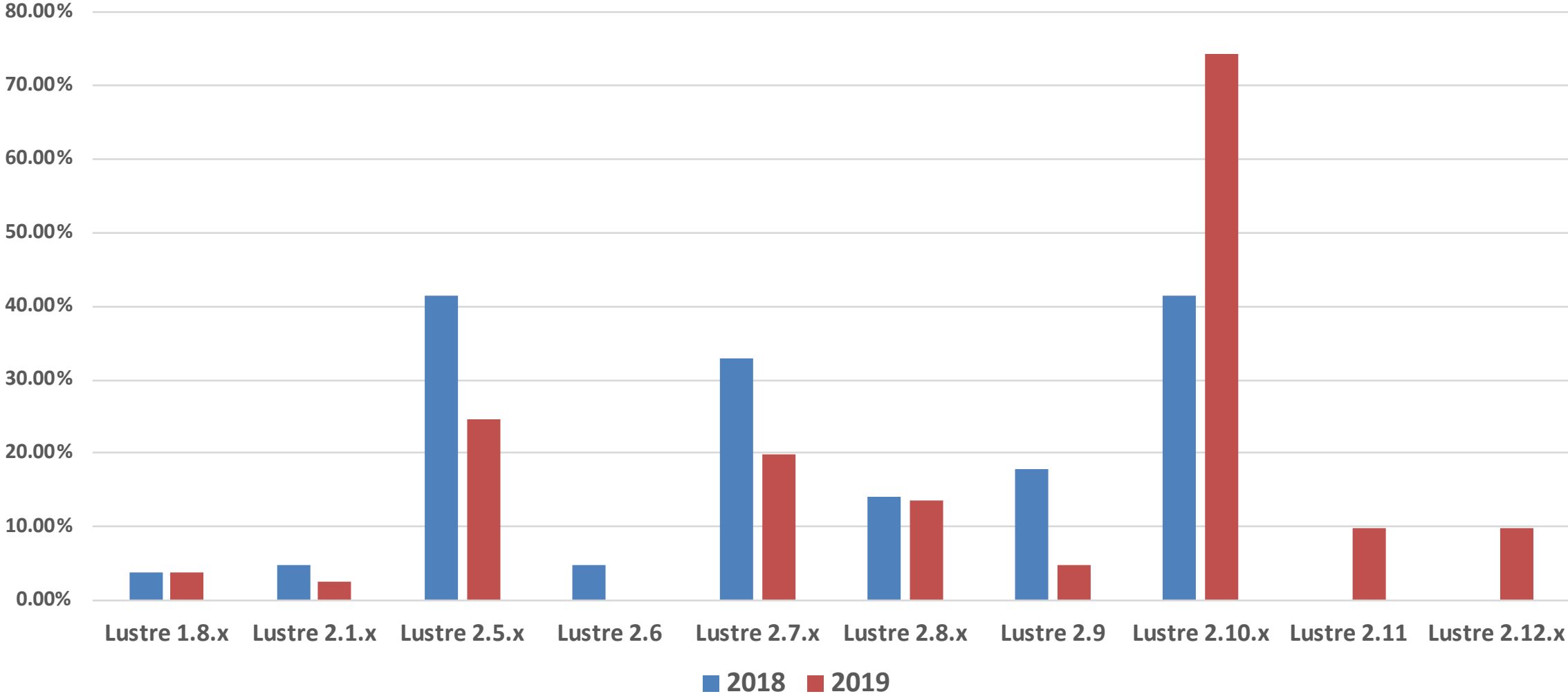
http://wiki.opensfs.org/Lustre_Working_Group

Community Survey

- Has been running for 8 years
- LWG devises questions
- Useful for tracking trends in Lustre usage
- Full details available at http://wiki.opensfs.org/Lustre_Community_Survey
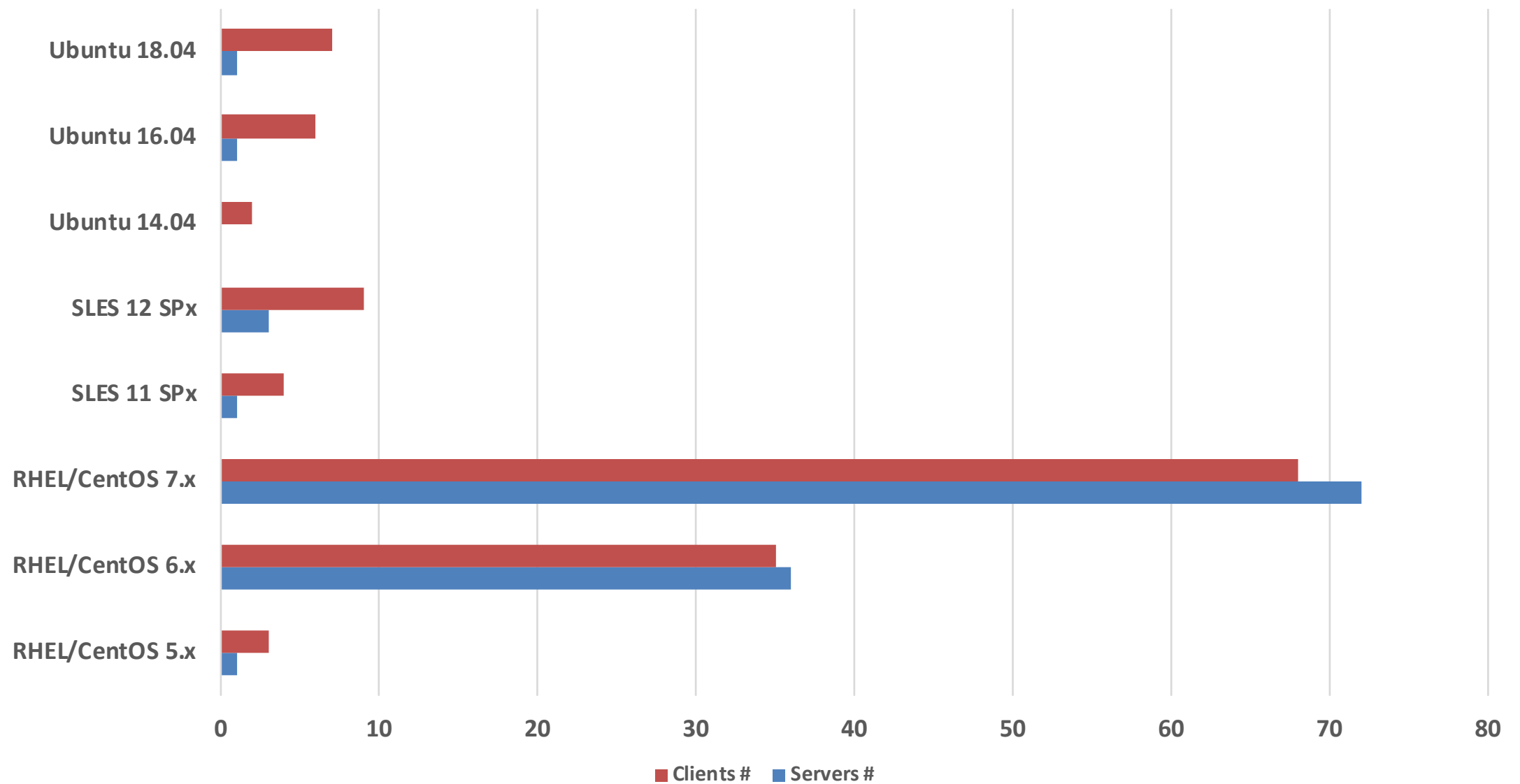
 # Respondents

Lustre Community Survey

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

Lustre 2.10.x LTS is the most widely-used production release
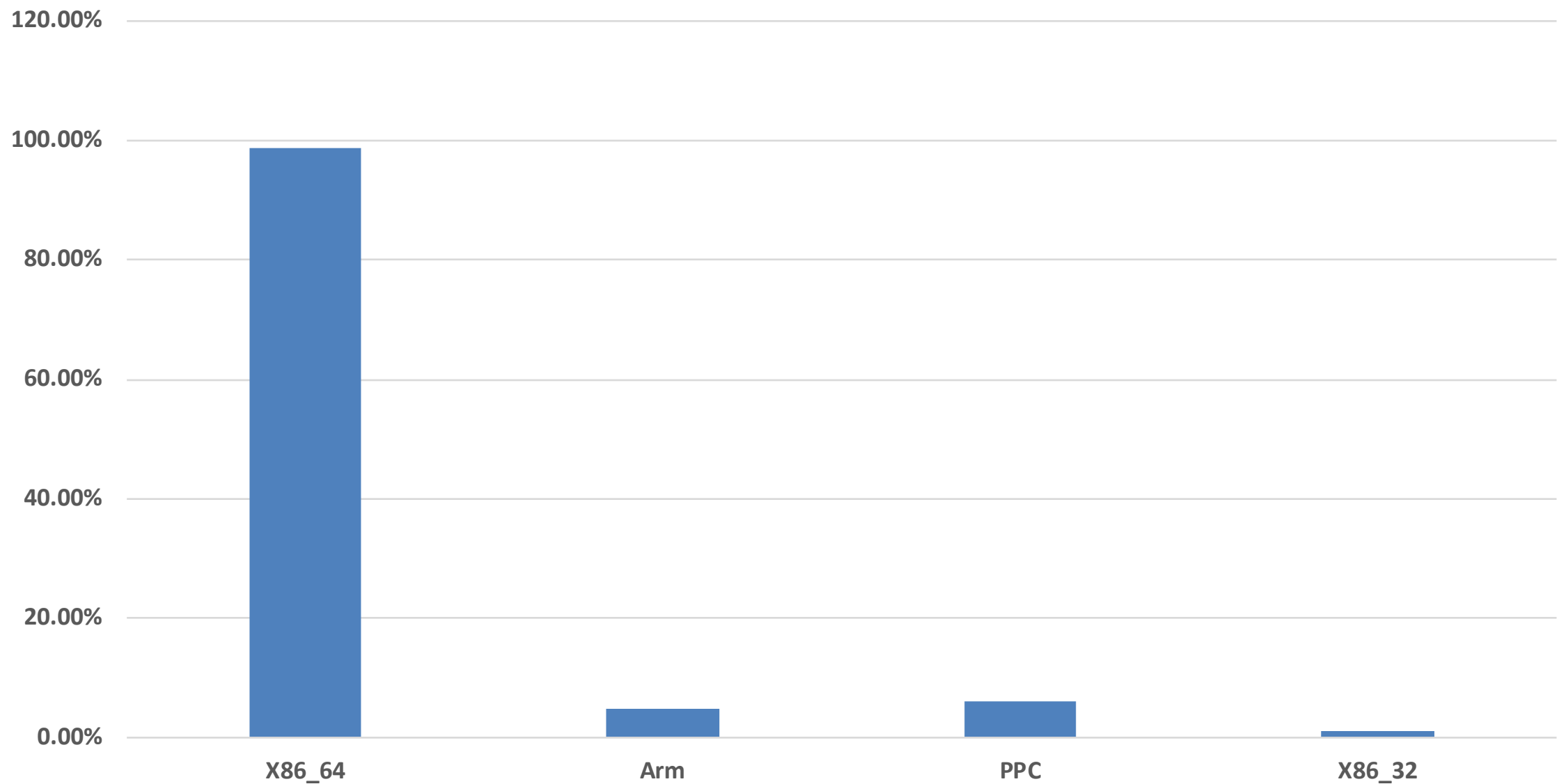
Community Survey - Linux distros

What Linux distributions do you use in production?

RHEL/CentOS 7.x remains most widely-used Linux distribution

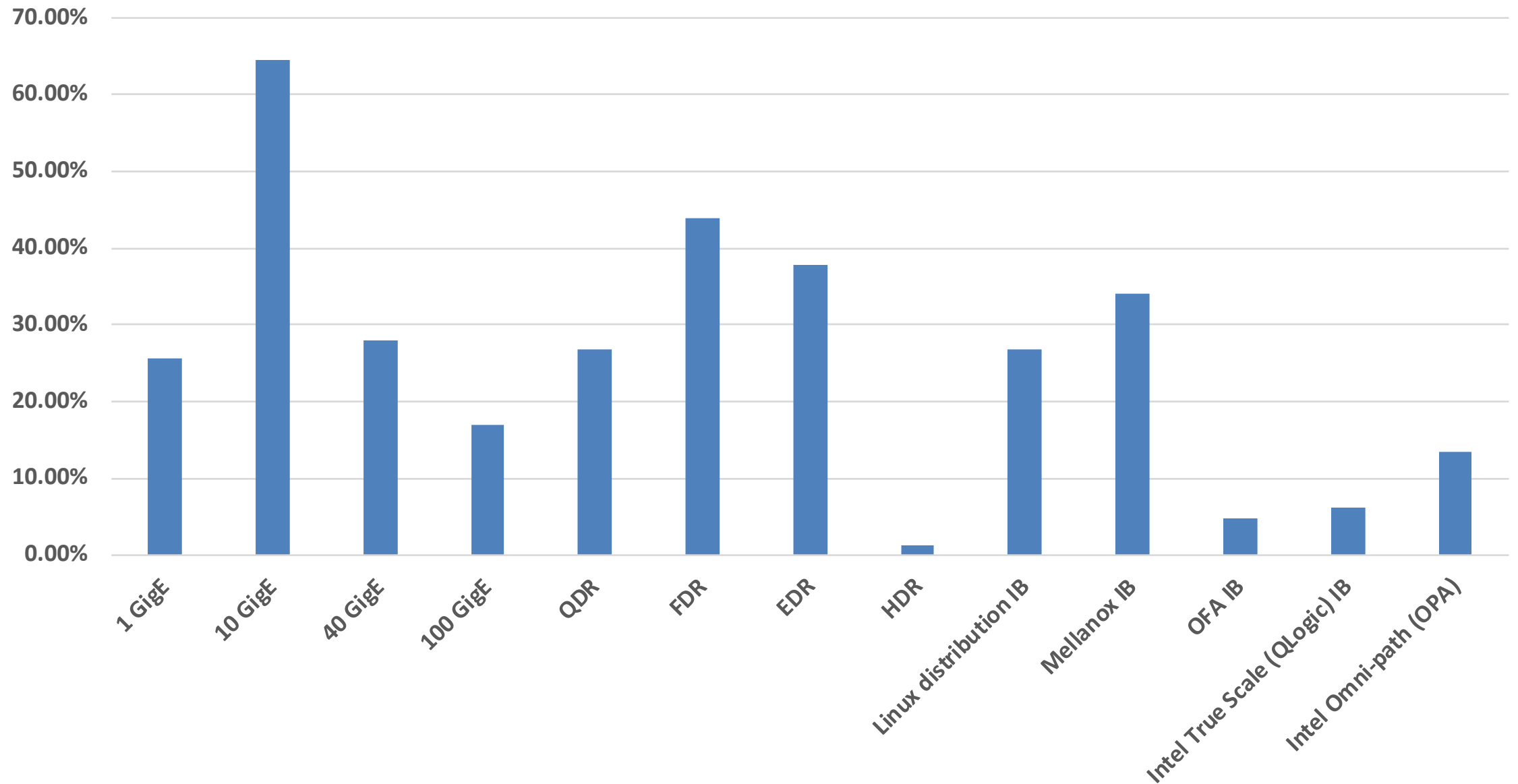# Community Survey – Processor Architecture

Which processor architecture(s) do you use in production?

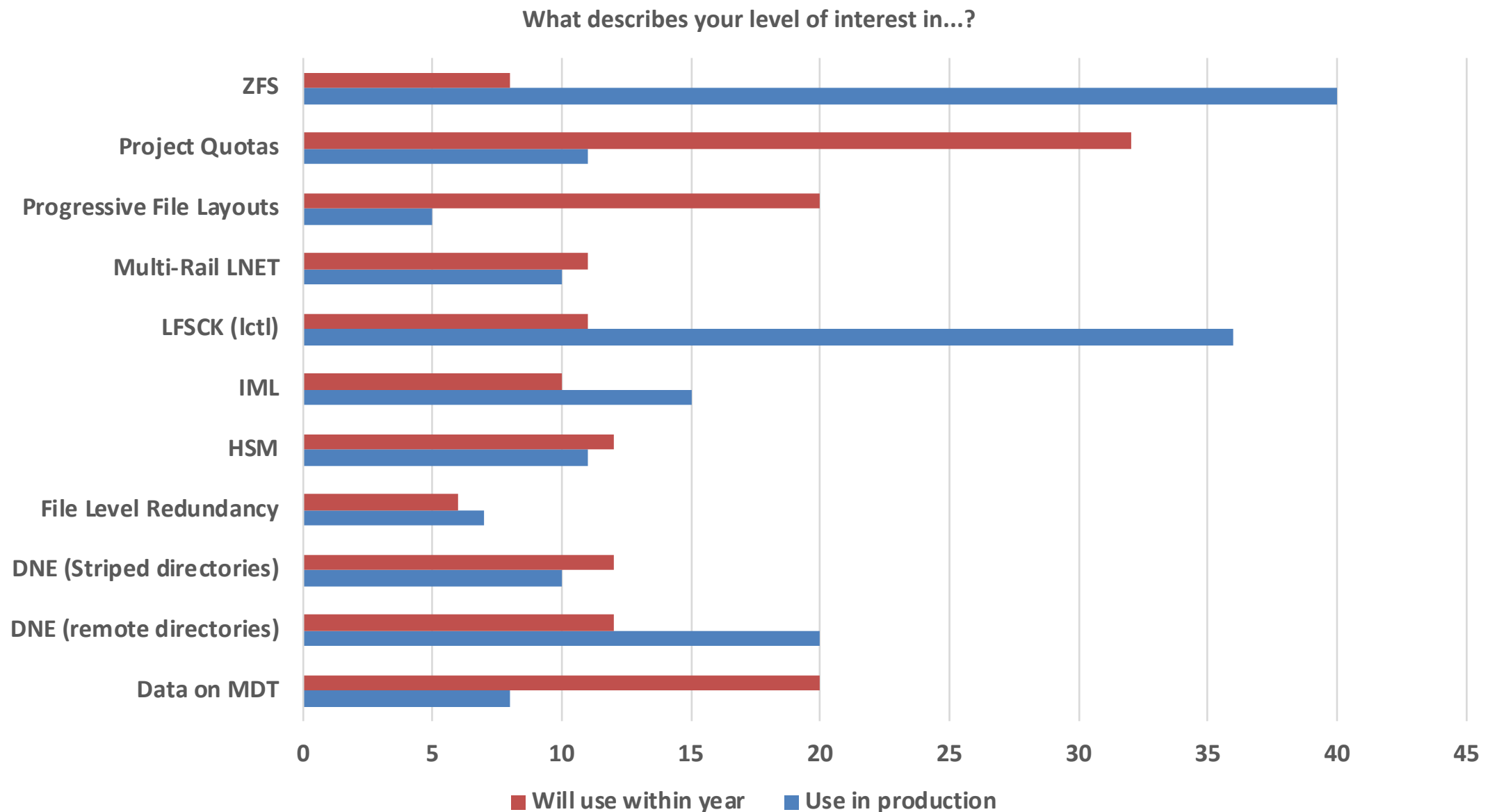X86 is the most common processor architecture

Community Survey - Networks

Which kind of networks do you use with Lustre within your organization?

10 GigE most common networking technology used

Community Survey – Feature Usage

What describes your level of interest in...?

ZFS Production usage continues to grow (~22% 2016; ~36% 2018; 49% 2019)
DNE Striped Directories usage finally starting to get traction
Strong interest in using Project Quotas, PFL and Data on MDT

Community Survey – Primary Usage

How would you characterize your primary usage of Lustre?
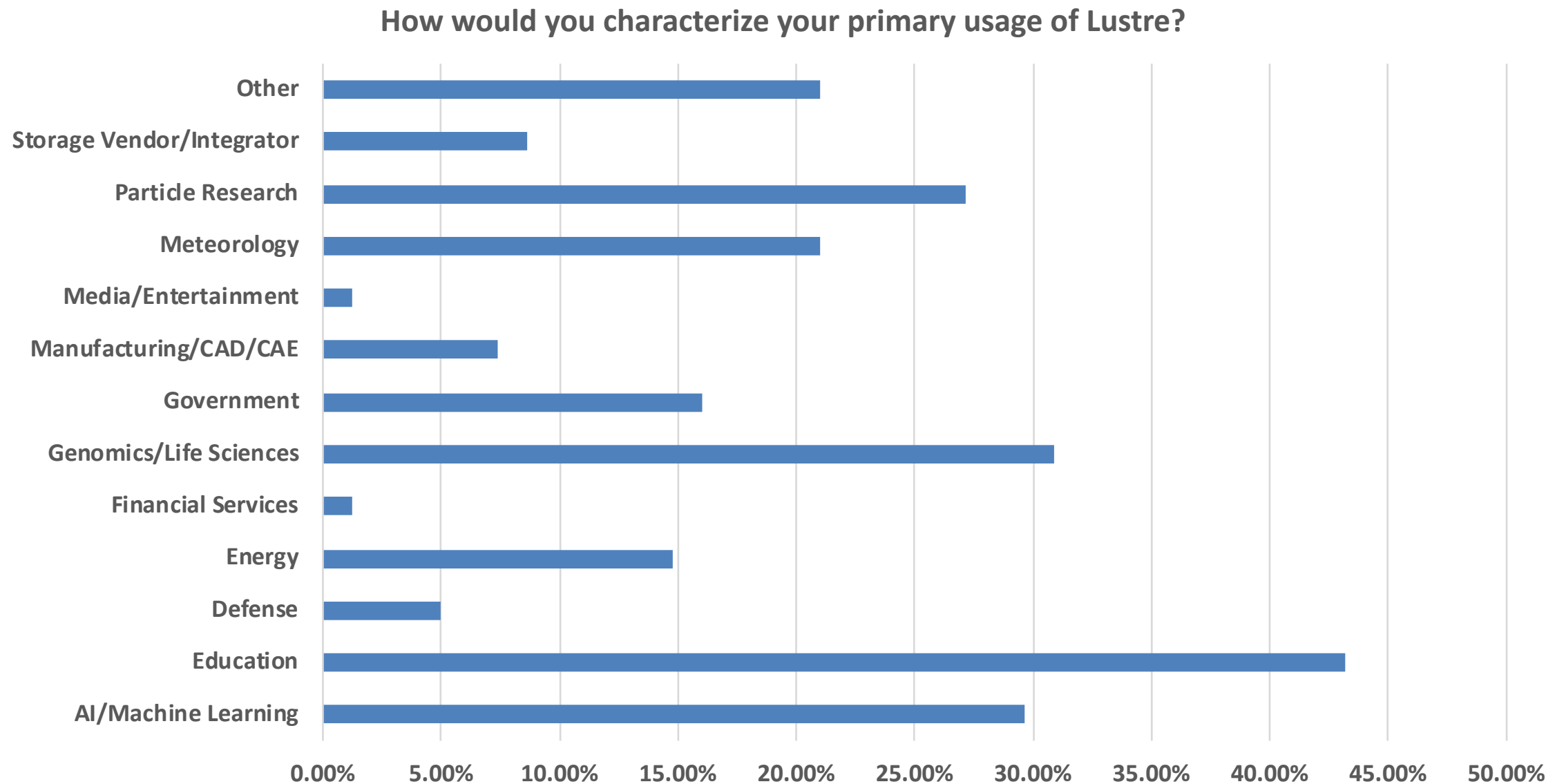
- AI/ML, Life Sciences and Particle Research leading categories
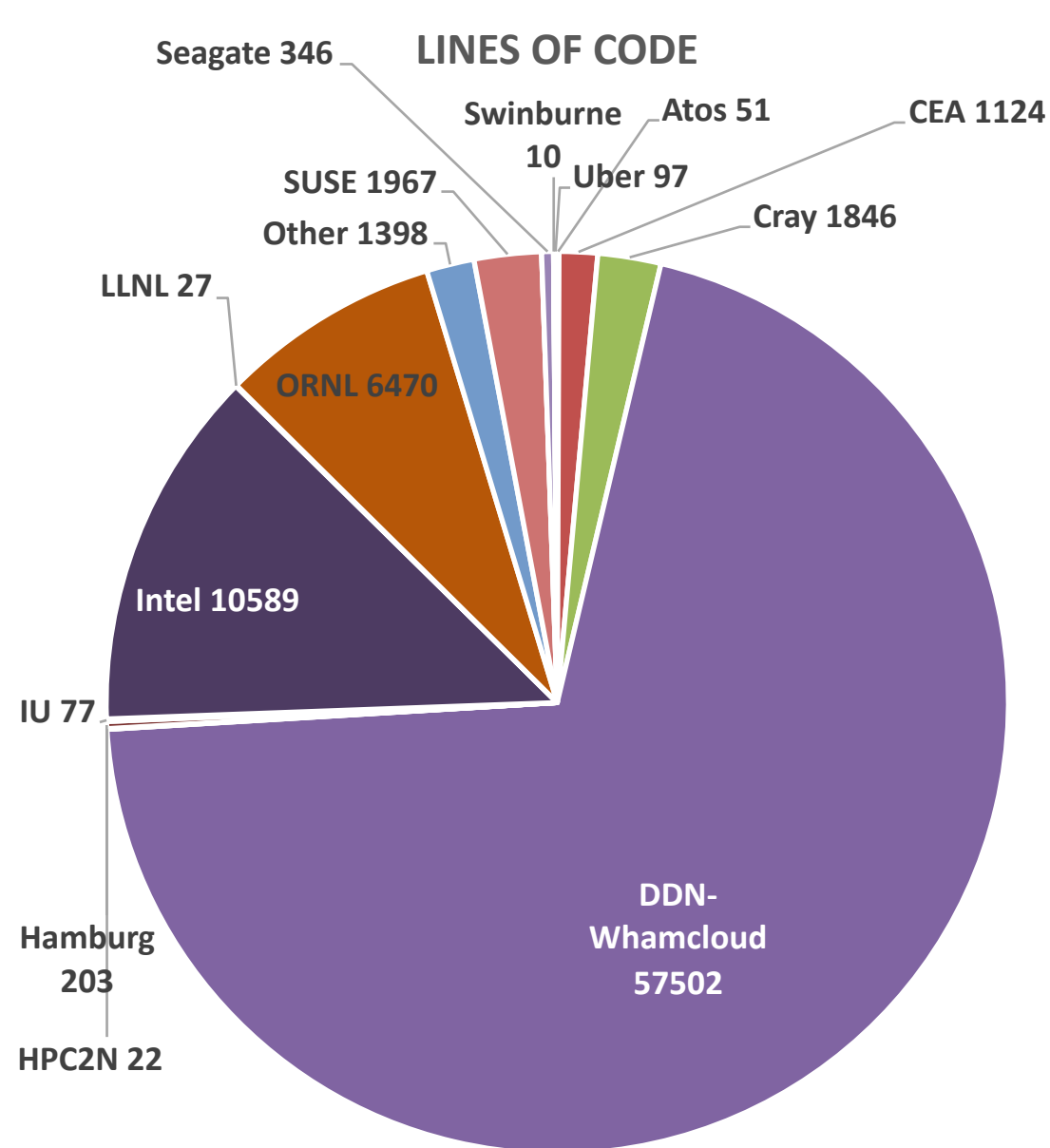- Need to further refine categories based on feedback in Other

Lustre LTS Releases

- Lustre 2.10.0 went GA July 2017
  - Initial LTS branch with regular updates
  - Lustre 2.10.7 went GA March 25th
- Lustre 2.12.0 went GA Dec 2018
  - Current LTS branch
  - Provides reliable option for newer kernels/features
  - Lustre 2.12.1 went GA April 30th 2019
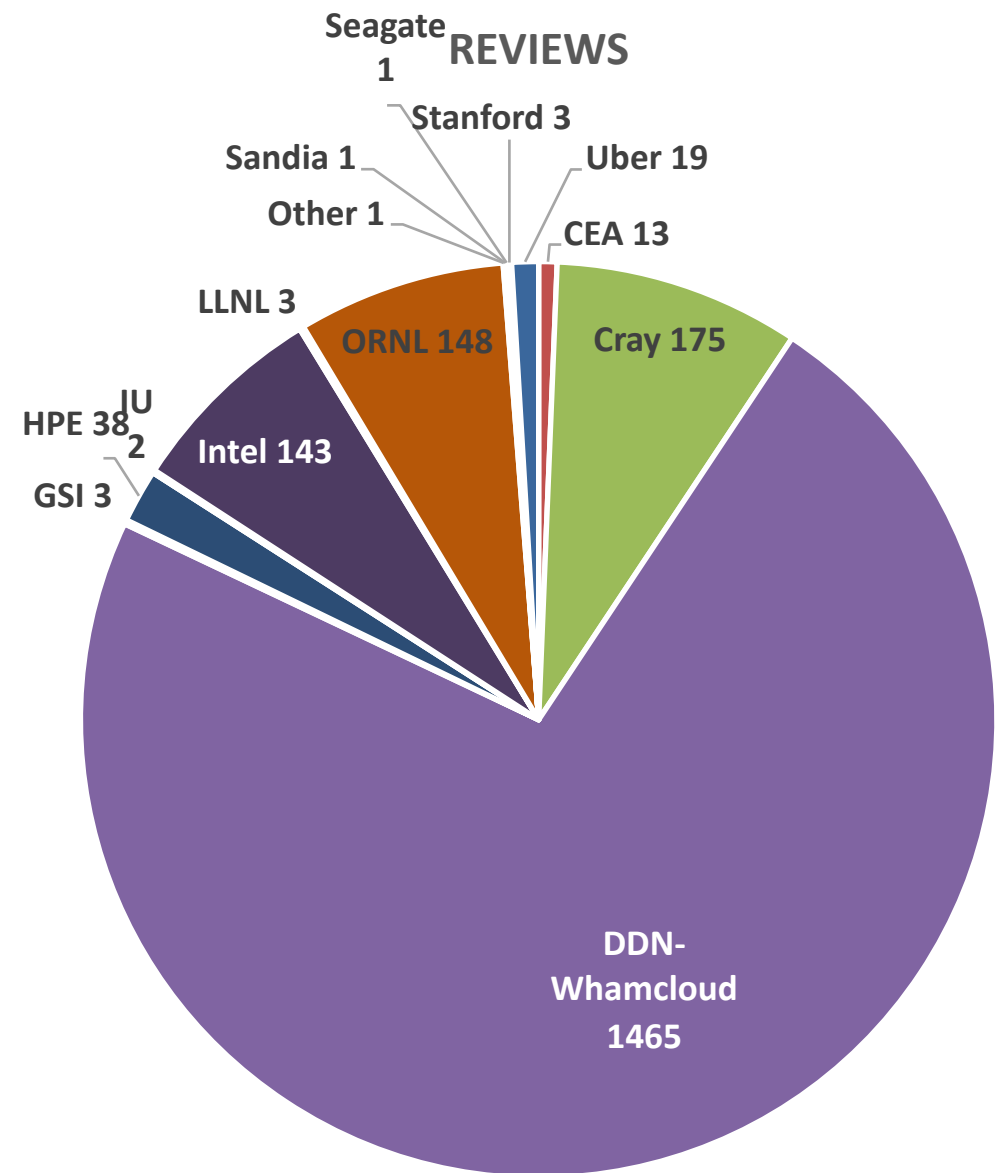 - Lustre 2.12.2 coming soon

Lustre 2.12

- GA Dec 2018
- OS support
  - RHEL 7.6 servers/clients
  - SLES12 SP3/Ubuntu 18.04 clients
- Interop/upgrades from latest Lustre 2.10.x and 2.11
- Number of useful features
  - DNE Directory Restriping (LU-4684)
  - LNet Network Health (LU-9120)
  - Lazy Size on MDT (LU-9538)
  - T10PI end to end data checksums (LU-10472)
- http://wiki.lustre.org/Release_2.12.0

Lustre 2.12 Contributions

LINES OF CODE

- Seagate 346
- Swinburne 10
- Atos 51
- Uber 97
- CEA 1124
- SUSE 1967
- Other 1398
- Cray 1846
- LLNL 27
- ORNL 6470
- Intel 10589
- IU 77
- Hamburg 203
- HPC2N 22
- DDN-Whamcloud 57502

Data courtesy of Dustin Leverman (ORNL)

REVIEWS

- Seagate 1
- Stanford 3
- Sandia 1
- Uber 19
- Other 1
- CEA 13
- LLNL 3
- ORNL 148
- Cray 175
- HPE 38
- IU 2
- GSI 3
- Intel 143
- DDN-Whamcloud 1465

Analysis of commits on git.whamcloud.com v2.11.50 to 2.12.0

Lustre Version Statistics

Version	Commits	LOC	Developers	Organizations
1.8.0	997	291K	41	1
2.1.0	752	92K	55	7
2.2.0	329	58K	42	10
2.3.0	586	87K	52	13
2.4.0	1123	348K	69	19
2.5.0	471	102K	70	15
2.6.0	885	147K	76	14
2.7.0	742	201K	65	15
2.8.0	995	147K	92	17
2.9.0	737	74K	121	16
2.10.0	732	108K	85	14
2.11.0	860	134K	87	18
2.12.0	697	82K	90	19

Statistics courtesy of Chris Morrone (LLNL)/ Dustin Leverman (ORNL)

Source: http://git.whamcloud.com/fs/lustre-release.git
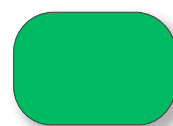
Lustre 2.13

- Targeted for Q3 2019 release
- OS support
  - RHEL 7.6 servers/clients
  - SLES12 SP4/Ubuntu 18.04 clients
- Interop/upgrades from latest Lustre 2.12.x
- Ships with latest ZFS 0.7.x but ZFS 0.8.x ready
- Number of useful features targeted; feature freeze May 31st
  - Persistent Client Cache (LU-10092) IN PROGRESS
  - User Defined Selection Policy (LU-9121) IN PROGRESS
  - Self Extending Layouts (LU-10070) IN PROGRESS
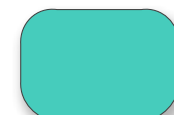- http://wiki.lustre.org/Release_2.13.0

Lustre Community Roadmap

* 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

Lustre in Linux Kernel

- Added to kernel staging area in 3.11
  - Basic code reformatting had not been done beforehand
  - Kernel staging rules made subsequent updates challenging
- Removed from staging area in 4.17
- Work is continuing at https://github.com/neilbrown/lustre
  - SUSE and ORNL driving this initiative
  - Plan to resubmit when code is ready for acceptance
- Major ldiskfs patches merged into upstream ext4/e2fsprogs
 - Now much easier to keep Lustre e2fsprogs current

Lustre in the Cloud

- Intel AWS offering transferred to DDN-Whamcloud
  - https://aws.amazon.com/marketplace/pp/B07FTX9GBV
  - Used in production environments since 2015
- Amazon announced FSX for Lustre Software in Nov 2018
  - https://aws.amazon.com/fsx/lustre/
- Google also interested in Lustre
  - Gave several talks about Lustre at SC18 and entered IO-500
  - Whamcloud GCP offering launched April 2019
    - https://console.cloud.google.com/marketplace/details/ddnstorage/cloud-edition-for-lustre
- Multiple offerings on Azure
  - Cray offering has been available since late 2017
    - https://azure.microsoft.com/en-ca/solutions/high-performance-computing/cray/
  - Whamcloud offering launched May 2019
    - https://azuremarketplace.microsoft.com/en-us/marketplace/apps/ddn-whamcloud-5345716.lustre_on_azure?tab=Overview&pub_source=email&pub_status=success

Integrated Manager for Lustre

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

- IML 4.0 GA Oct 2017
  - Compatible with Lustre 2.10.x
  - latest maintenance release 4.0.10.1
  - Distributed under an MIT license
  - Possible to upgrade from Intel EE 2.x/3.x
- IML 5.0 coming soon
  - Compatible with Lustre 2.12.x
  - Extending scale of clusters it can manage
  - More flexibility around HA schemes
  - Reduced resource utilization
  - Will require downtime to upgrade
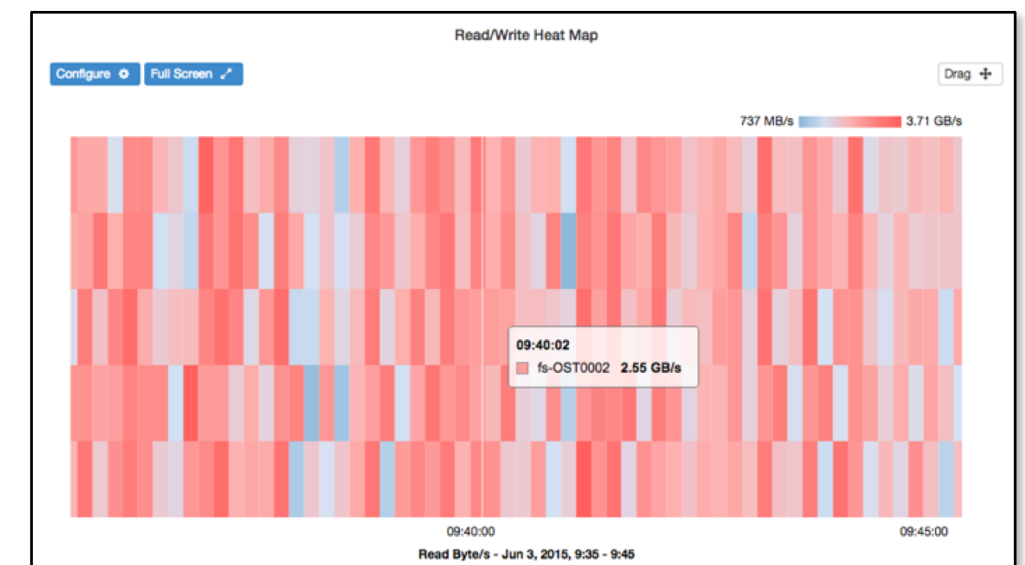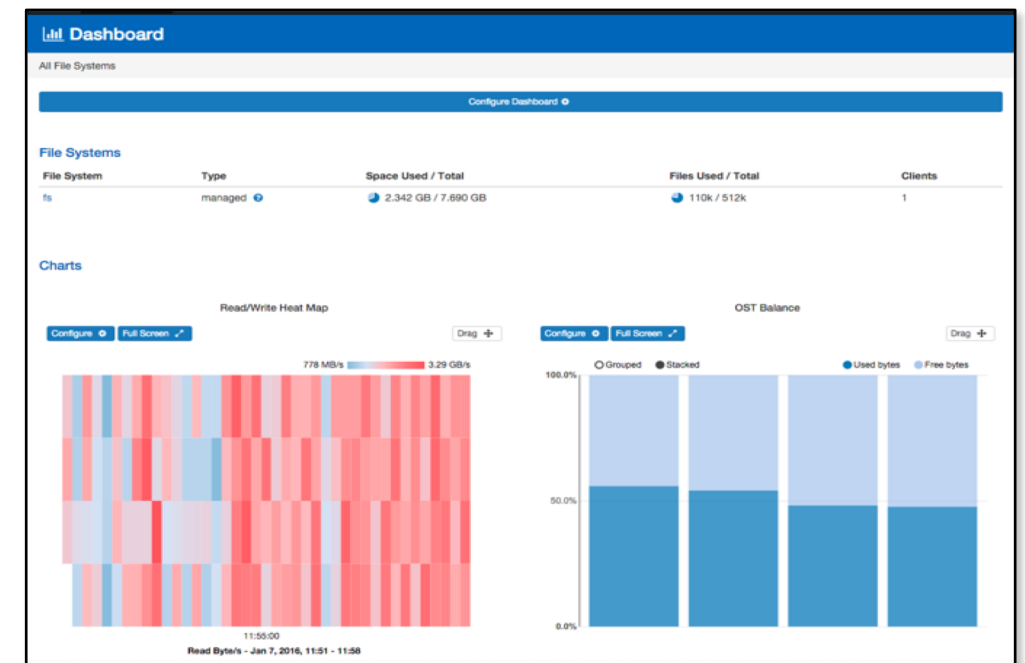
Lustre Release Documentation

- Latest version of manual dynamically available to download
  - http://lustre.org/documentation/
  - Also links for how to contribute

- If you know of gaps then please open an LUDOC ticket
  - If you have not got time to work out the correct format to submit then unformatted text will provide a starting point for someone else to complete

- Large amount of content exists on lustre.org

  - http://wiki.lustre.org/Category:Lustre_Systems_Administration

  - Lustre Internals content being refreshed

Summary

- LTS model has been well adopted; focus switching to 2.12.x LTS
- Lustre 2.13 feature freeze at end of month
- Lustre 2.12.2 coming soon
- Plenty of options for those interested in contributing to Lustre
- LWG http://wiki.opensfs.org/Lustre_Working_Group

Thank you

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