



aix*celerate*

Storage and I/O Technologies on CLAIX

Tuning Workshop 2025

December 2nd, 2025 | Aachen

Philipp Martin

Agenda for Today (Dec 2nd, 2025)

Time	Topic	Speaker
9:00 – 9:05	Welcome	Sandra Wienke (RWTH)
9:05 – 10:00	Does I/O Matter to Me?	Philipp Martin (RWTH)
10:00 – 10:30	Storage and I/O Technologies on CLAIX	Philipp Martin (RWTH)
10:30 – 11:00	Coffee Break	
11:00 – 12:00	Tips & Tricks & Tools with respect to I/O	Philipp Martin (RWTH)
12:00 – 12:30	From Thousands of Small Files to Few Very Big Files	Jannis Klinkenberg (RWTH)

- **What is a Filesystem?**

- Definition
- Parameters

- **Filesystems on CLAIX**

- \$HOME / \$WORK
- \$HPCWORK
- \$BEEOND
- \$TMP

- **Miscellaneous**

- Snapshots
- Unorthodox „Filesystems“
- Copy Nodes

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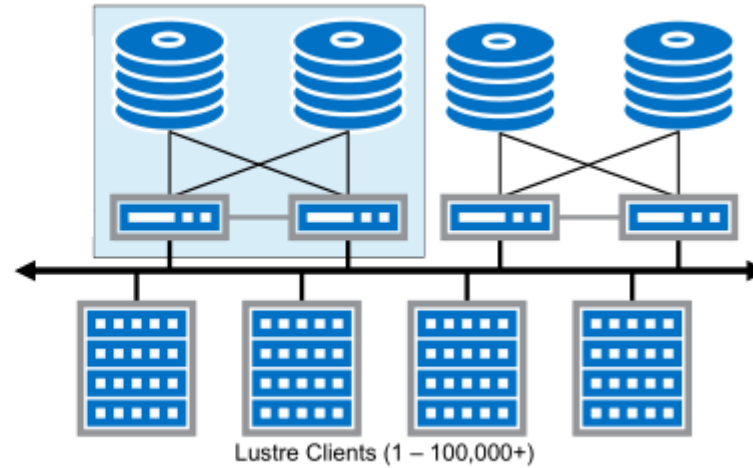
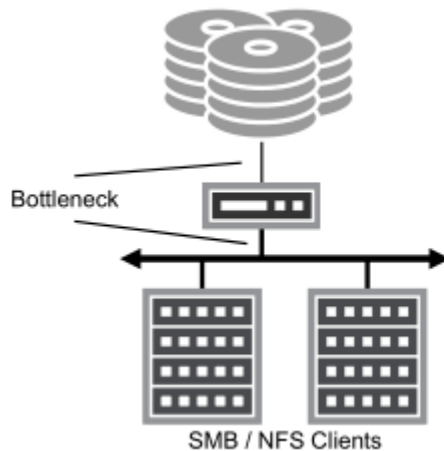
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What is a Filesystem? - Definition

- **“Filesystem” may refer to hardware or software or both**
 - Hardware: HDDs vs SSDs (vs NVMeS etc.)
 - HPC hardware basic building blocks are the same as in your computer
 - Software: different solutions for different needs
 - Cluster file system software builds on “normal” software



From <https://wiki.lustre.org/images/6/64/LustreArchitecture-v4.pdf>

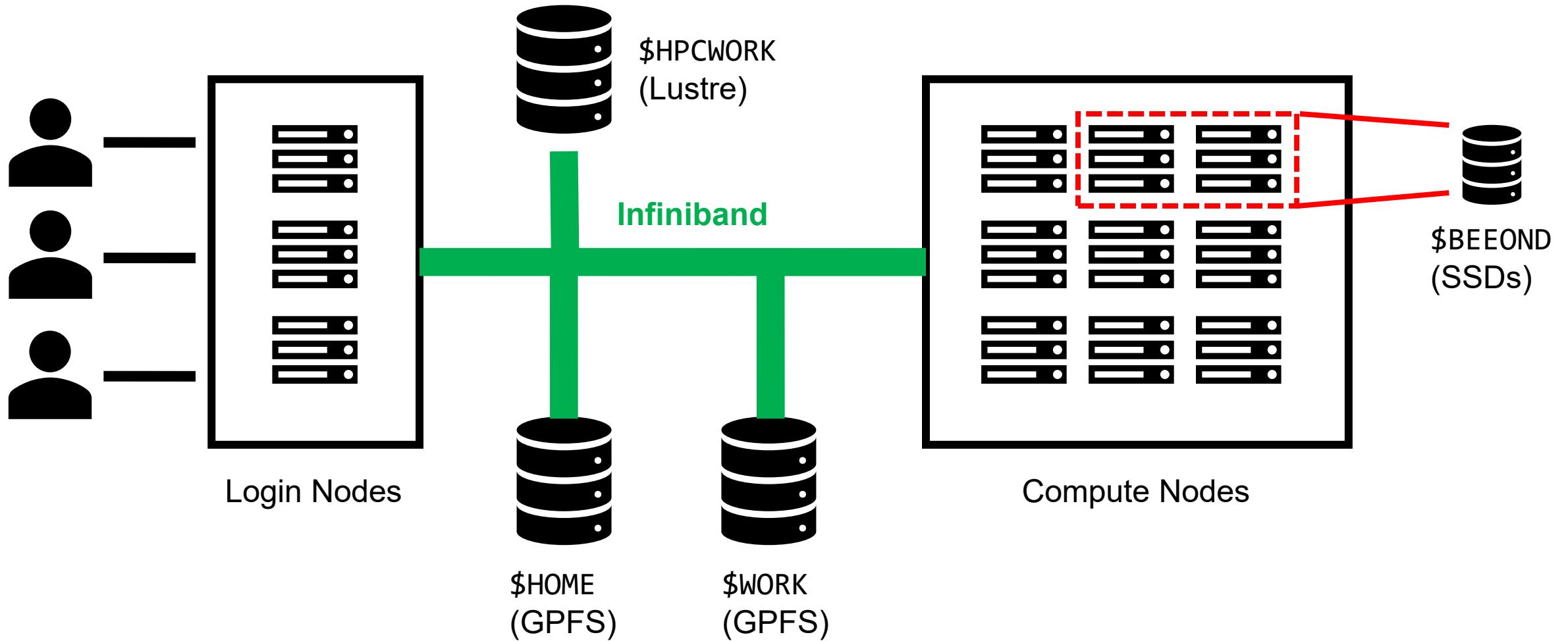
What is a Filesystem? - Parameters

- **Performance**
 - Bandwidth
 - Metadata
- **Reliability**
 - Uptime
 - Snapshots
 - Backup
- **Capacity**
 - Total size in Bytes
 - Total number of files

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Filesystems on CLAIX - Overview



Filesystems on CLAIX - Overview

Access	Filesystem	Max. Quota	File Quota	Backup	Pros	Cons
\$HOME	GPFS	150 GB*	~ 1 Mio.*	Tape (off-site)	- Reliable - Backup	Limited quota and BW
\$WORK	GPFS	250 GB*	~ 1 Mio.*	Snapshots	Reliable	Limited quota and BW
\$HPCWORK	Lustre	1000 GB*	~ 1 Mio.*	-	High quota and BW	- Less reliable - Not always good for metadata
\$BEEOND	BeeGFS	1.5 TB / 700 GB p. N.	-	-	- High BW and metadata - Combined storage	- Temporary - Only exclusive nodes - Transfers required
\$TMP	XFS	1.5 TB / 700 GB p. N.	-	-	High BW and metadata	- Temporary - Transfers required

* Default quota

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Live Demo

Miscellaneous – Unorthodox Filesystems

- **/dev/shm**
 - Shared Memory
 - Node local
 - Use if you know what you are doing
- **CvmFS**
 - Cern-VM Filesystem
 - Stores software packages
 - ImageNet dataset available here

Miscellaneous – Copy Nodes

- **Copy Nodes**

- copy23-{1,2}.hpc.itc.rwth-aachen.de
- High network speed
- No job management
- No modules
- For large file transfers to/from external sources