

ALICE-USA

T2 and AF Computing @ LBNL

ALICE-USA Annual Meeting
April 20-22 2026

Lawrencium Overview

- Lawrencium: Institutionally-supported HPC Linux Cluster
 - ~2,680 nodes/ ~80,000 cores
 - 7.4PB Lustre parallel file system for Scratch supporting condo-style buy-in
 - Rocky 8, SLURM job scheduler, Singularity containers, Open OnDemand 4
 - Nvidia/AMD GPUs
 - MI50/100, A100, H100 & H200 (and plenty of older stuff)
 - New NDR200/400 Infiniband Fabric
- Four models of access
 - PAYG \$0.01/core-hr
 - Condo Cluster
 - Dedicated cluster support
 - Opportunistic
- PCA - PI Computing Allowance
 - Free - 300K SUs per year
 - Can be shared with your staff or pooled together with other PIs

Storage

- 2x40Gb routed link from LBLNet to HPC network
Currently providing a 8.4PiB CEPH platform
S3/RADOS
Cephfs
NFS
VAST offering
Home, group, software
Infiniband, New NDR fabric
S3, Application Hosting
- Scratch File system
DDN SFA 18K
180GB/s theoretical peak R/W
First 64MB of every file on NVME Flash (Progressive File Layout)
Rest on Spindle
440TB Buy-in available (non-purged space)

Cluster Futures

Upgrades in the near future

Warewulf 4

LDAP migration in progress

More Sane MFA

IPV6!!!!

waiting on timeline

New LRC Generation

LR8 Nodes

51 Node Institutional Purchase

Moved from 4 nodes in 2u to 1n1u (air cooled)

AMD dual-socket 9534 (64 core, 128 threads x 2)

768GB (24 x 32GB, 4800MT/s)

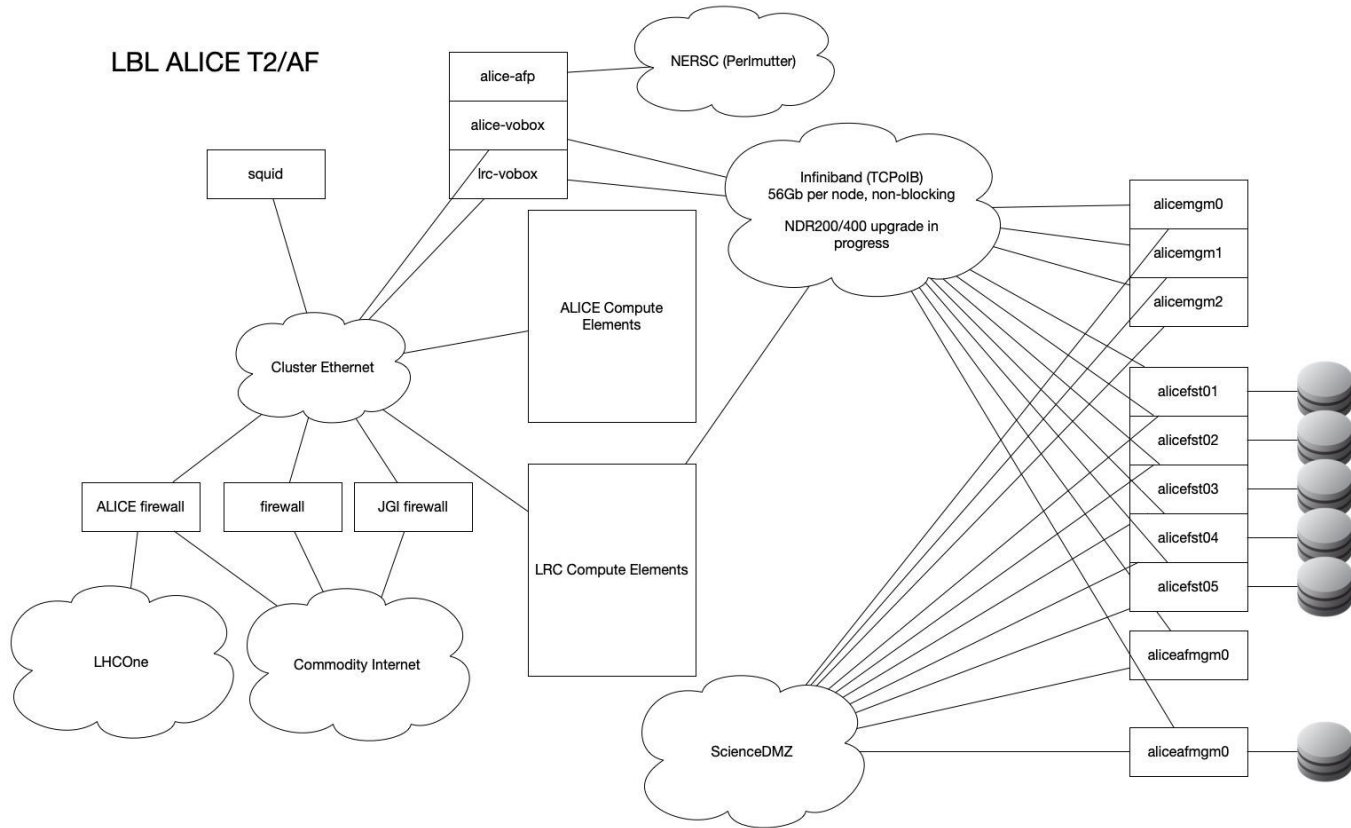
3.84TB local storage (Micron 7450, U.3)

ConnectX-6 (Connected at 100Gb)

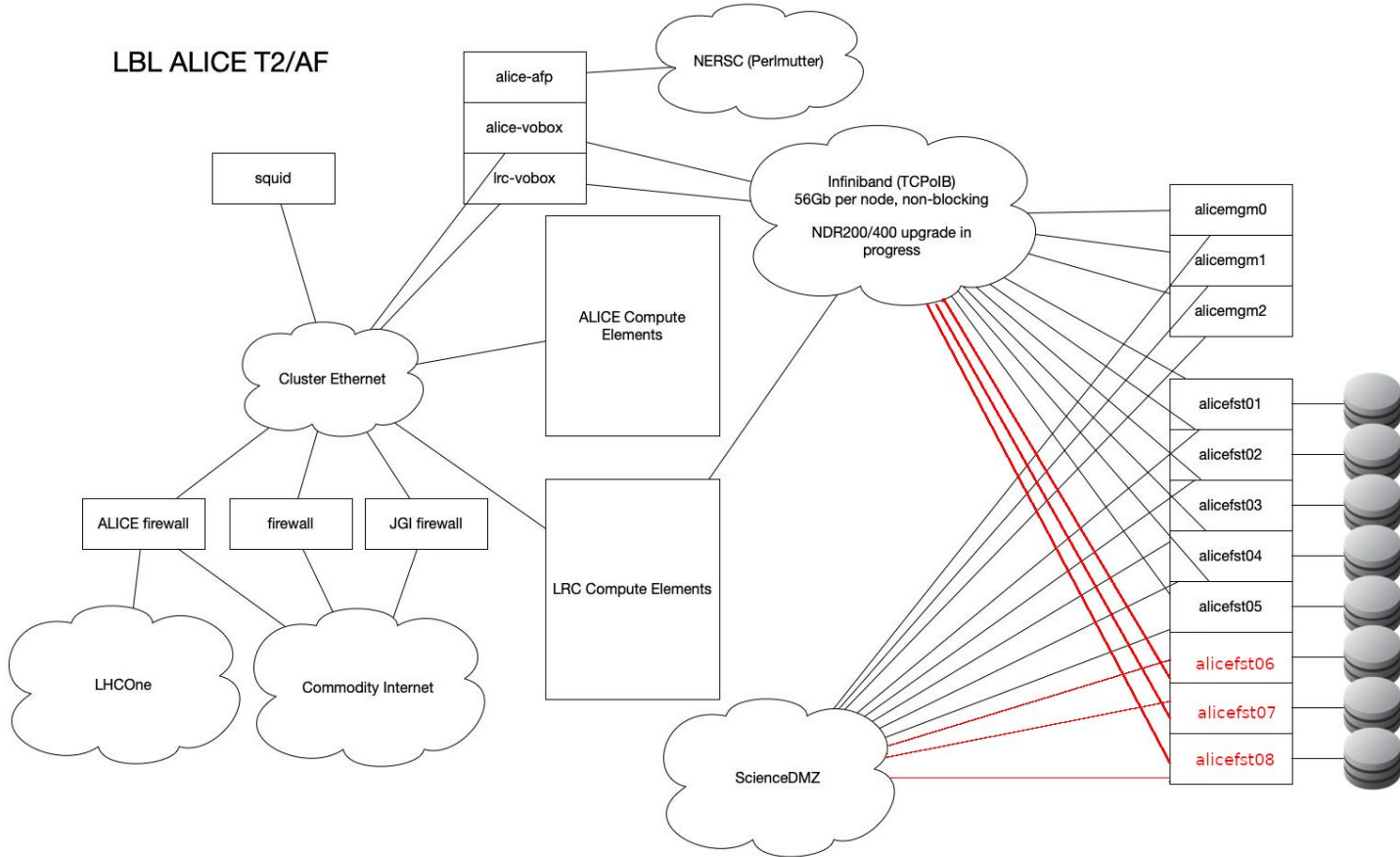
20 new LR8 nodes (Gigabyte)

4 nodes in 2u (liquid cooled)

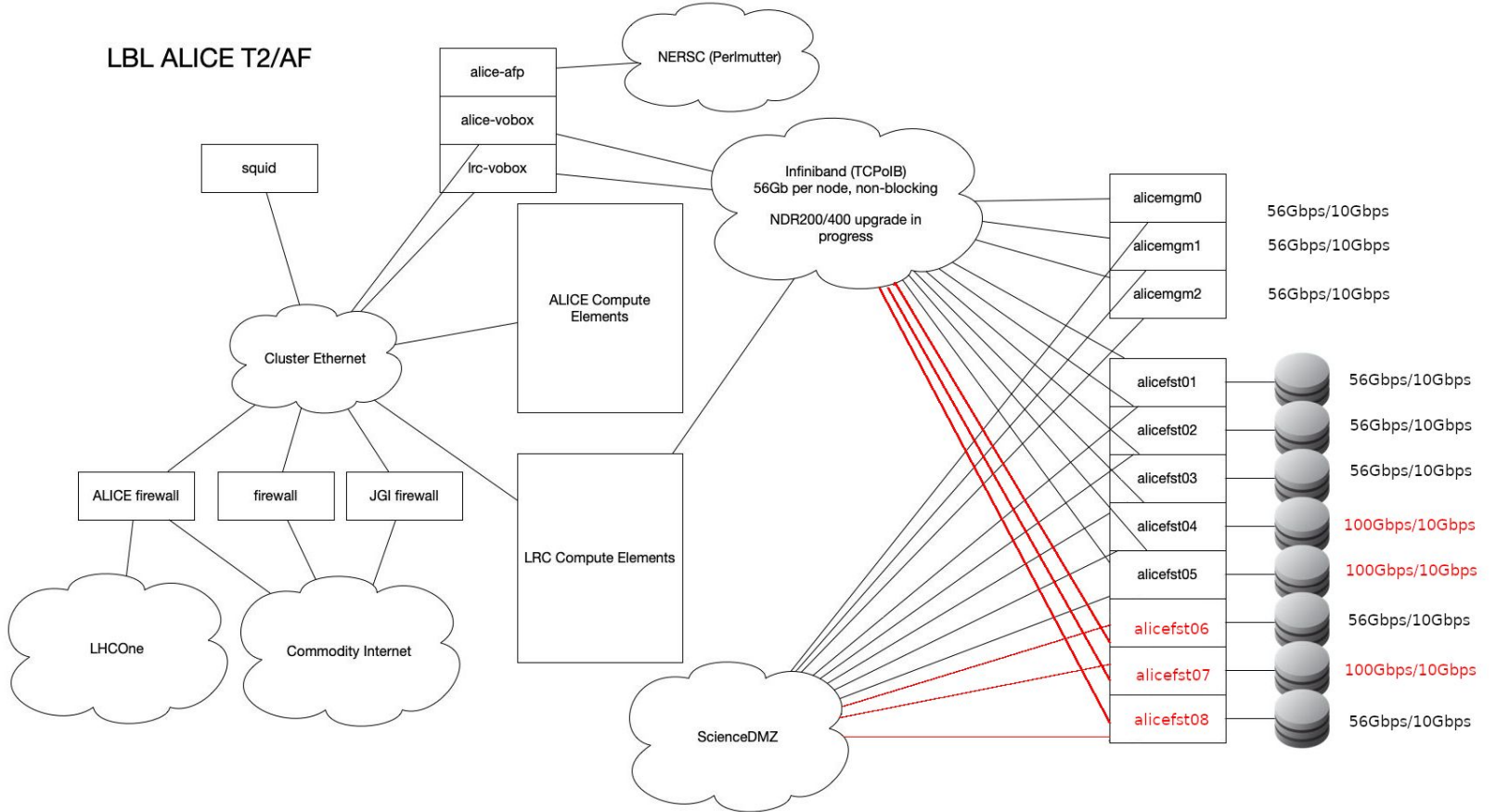
LBL ALICE T2/AF



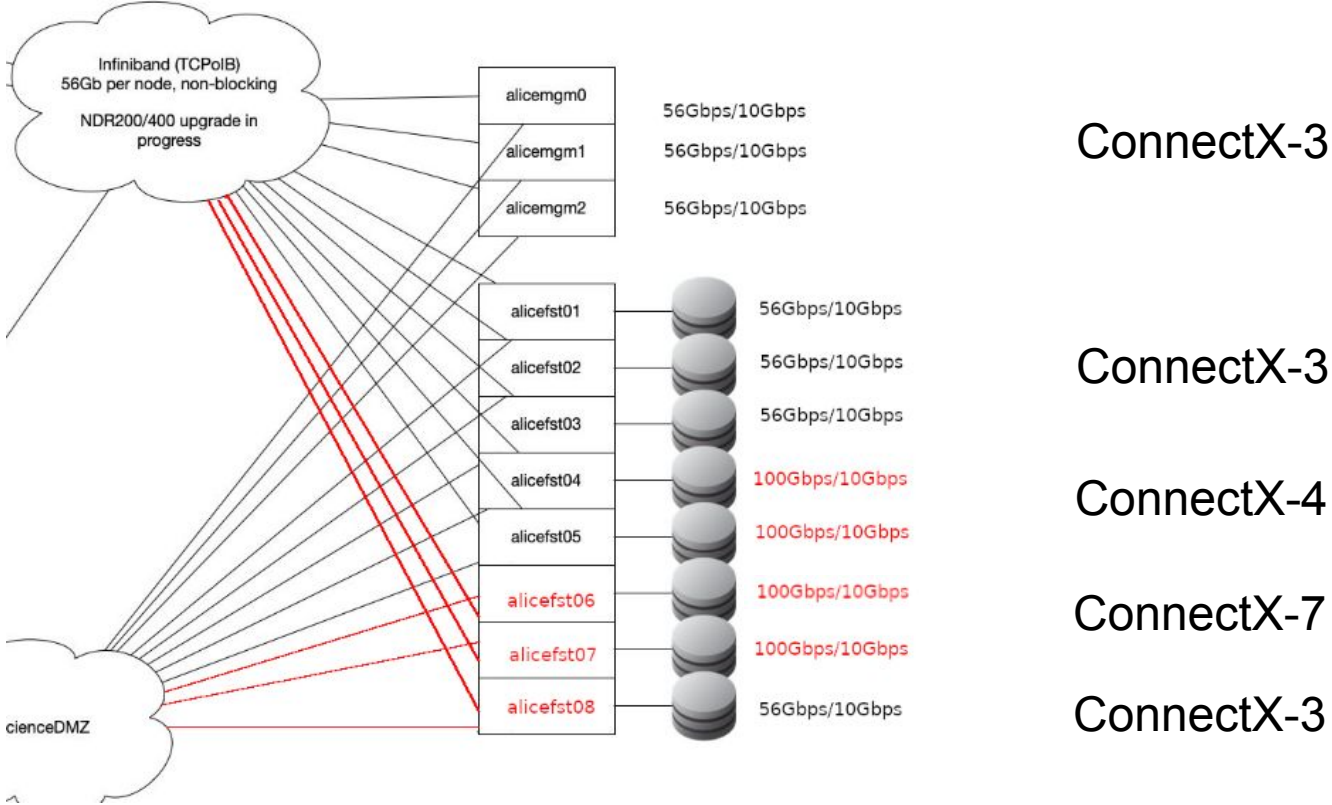
LBL ALICE T2/AF



LBL ALICE T2/AF



InfiniBand dual port cards



HPCS EOS

3 MGM nodes

8 FST nodes

10Gb external, 56Gbps/**100Gbps** internal

600 total drives, 1 warm spare per node

EOS 5.4.1

10Gbps external, 56Gbps/**100Gbps** internal

Currently at 77% usage, 5.74PB out of 7.37PB

Instance	Size	Used	Files	Directories	PCR GB/TB*s	Use%	Vol-x	Path
alicelblhpcs	7.37 PiB	5.74 PiB	107.20 M	103.58 k	0.01	77%	1.00	/eos/alicelblhpcs

AF has been folded back into T2

Lawrencium usage

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alice

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PROJECTS

1. alice	13,816,568.1 CPU-hrs	141,291 jobs
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USERS

1. aliproduct	13,816,568.1 CPU-hrs	141,290 jobs
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2. alidev	0.0 CPU-hrs	1 jobs
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LR4 usage (free tier)

PROJECTS

1. alice	3,491,139.1 CPU-hrs	48,829 jobs
2. ac_onsager	1,217,736.4 CPU-hrs	29,313 jobs
3. pc_isotopes	503,469.6 CPU-hrs	13,165 jobs
4. pc_radphysics	236,341.1 CPU-hrs	5,418 jobs
5. pc_enigmamodel	232,170.2 CPU-hrs	786 jobs
6. lr_minnehaha	158,698.6 CPU-hrs	492 jobs
7. pc_neutrinos	132,451.5 CPU-hrs	274 jobs
8. ac_erwmodel25	116,546.6 CPU-hrs	849 jobs
9. pc_moriesc	96,640.5 CPU-hrs	155 jobs
10. lr_geop	80,957.7 CPU-hrs	490 jobs

LR5 usage

PROJECTS

1. alice	11,529,798.8 CPU-hrs	55,442 jobs
2. lr_chandra	310,178.0 CPU-hrs	368 jobs
3. lr_ceder	308,586.5 CPU-hrs	853 jobs
4. ac_scsguest	110,445.7 CPU-hrs	23 jobs
5. lr_tns	97,450.6 CPU-hrs	671 jobs
6. pc_radphysics	46,960.6 CPU-hrs	700 jobs
7. ac_damage	35,129.1 CPU-hrs	182 jobs
8. pc_microbiome	27,906.5 CPU-hrs	1,278 jobs
9. pc_heptheory	23,340.4 CPU-hrs	210 jobs
10. ac_pcdram2	16,890.3 CPU-hrs	13 jobs

LR6 usage

PROJECTS

1. alice	26,025,680.9 CPU-hrs	114,694 jobs
2. lr_mp	6,457,085.5 CPU-hrs	39,889 jobs
3. lr_tns	5,601,289.6 CPU-hrs	40,171 jobs
4. pc_heptheory	1,869,179.0 CPU-hrs	21,822 jobs
5. lr_statmech	1,517,658.5 CPU-hrs	4,529 jobs
6. lr_chandra	1,327,792.5 CPU-hrs	1,634 jobs
7. lr_mhg2	1,054,082.2 CPU-hrs	50,372 jobs
8. lr_amos	677,042.7 CPU-hrs	1,647 jobs
9. pc_rubinlab	660,495.5 CPU-hrs	304,007 jobs
10. ac_scsguest	491,453.8 CPU-hrs	1,227 jobs

LR7 usage

PROJECTS

1. alice	13,685,183.6 CPU-hrs	21,153 jobs
2. pc_heptheory	618,036.4 CPU-hrs	265,255 jobs
3. lr_chandra	527,775.2 CPU-hrs	1,046 jobs
4. pc_chippsruiz	502,636.0 CPU-hrs	260 jobs
5. pc_mrnet	474,776.3 CPU-hrs	244 jobs
6. lr_amos	471,459.5 CPU-hrs	1,607 jobs
7. pc_chippswang	442,846.4 CPU-hrs	342 jobs
8. lr_statmech	427,781.3 CPU-hrs	447 jobs
9. ac_scsguest	317,508.7 CPU-hrs	57 jobs
10. pc_enigmamodel	316,395.8 CPU-hrs	32,043 jobs

LR8 usage

PROJECTS

1. alice	13,581,140.9 CPU-hrs	15,619 jobs
2. lr_chandra	6,603,052.4 CPU-hrs	5,370 jobs
3. lr_mhg2	1,850,300.2 CPU-hrs	10,451 jobs
4. lr_amos	993,610.5 CPU-hrs	324 jobs
5. lr_statmech	631,518.5 CPU-hrs	1,254 jobs
6. pc_pbd2025	599,568.9 CPU-hrs	787 jobs
7. pc_beamcore	492,214.0 CPU-hrs	130 jobs
8. pc_agtdpa	116,168.4 CPU-hrs	616 jobs
9. pc_envisionai	100,760.8 CPU-hrs	44 jobs
10. pc_nucleardata	95,614.6 CPU-hrs	89 jobs

OVERALL usage (all partitions, top 10 shown)

PROJECTS

1. alice	68,312,943.2 CPU-hrs	255,737 jobs
2. lr_chandra	8,768,798.1 CPU-hrs	8,418 jobs
3. lr_mp	6,457,085.5 CPU-hrs	39,889 jobs
4. lr_tns	5,698,740.3 CPU-hrs	40,842 jobs
5. lr_mhg2	2,904,382.4 CPU-hrs	60,823 jobs
6. lr_statmech	2,576,958.2 CPU-hrs	6,230 jobs
7. pc_heptheory	2,510,555.8 CPU-hrs	287,287 jobs
8. lr_amos	2,142,112.8 CPU-hrs	3,578 jobs
9. ac_onsager	1,217,736.4 CPU-hrs	29,313 jobs
10. ac_scsguest	919,408.3 CPU-hrs	1,307 jobs

EOS Merge + Server Count Increase

- new servers on-site - will "simply" split off existing 2nd jbods to new servers
- Will be added to existing T2
- Create new dir for AF on T2, set quota
- ask you to copy AF to T2
 - a. We don't really have the spare space but would like to stripe the data...
- fold existing AF back into T2 (was previously T2)
- Start Experiments with Erasure Coding

Projects

Owncloud + Cephfs

- Kubernetes OCIS
- Stand-alone REVA instance
- Custom Public OIDC forthcoming
- Ongoing Collaboration with Giuseppe and team

Monitoring Project

- Vast S3 backend
- LGTM or ELK
- Alloy migration