

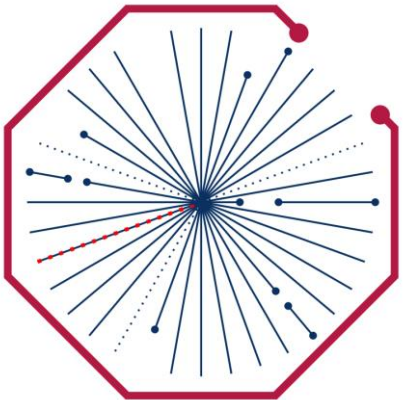


U.S. DEPARTMENT OF
ENERGY

Office of Science



ALICE-USA Computing Project Status and Plan



ALICE-USA Computing Annual Meeting @ ORNL

October 3, 2023

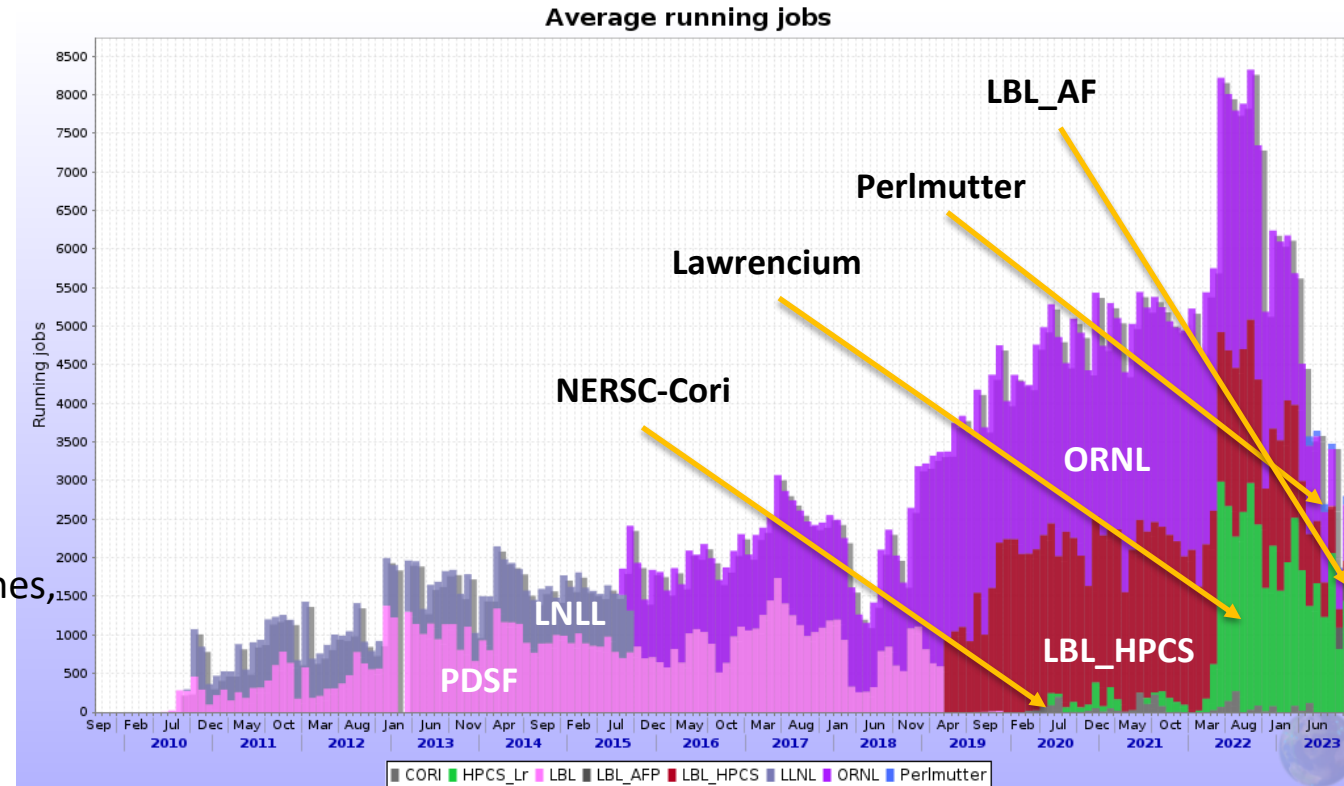
Irakli Chakaberia

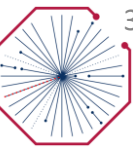


ALICE

Brief History

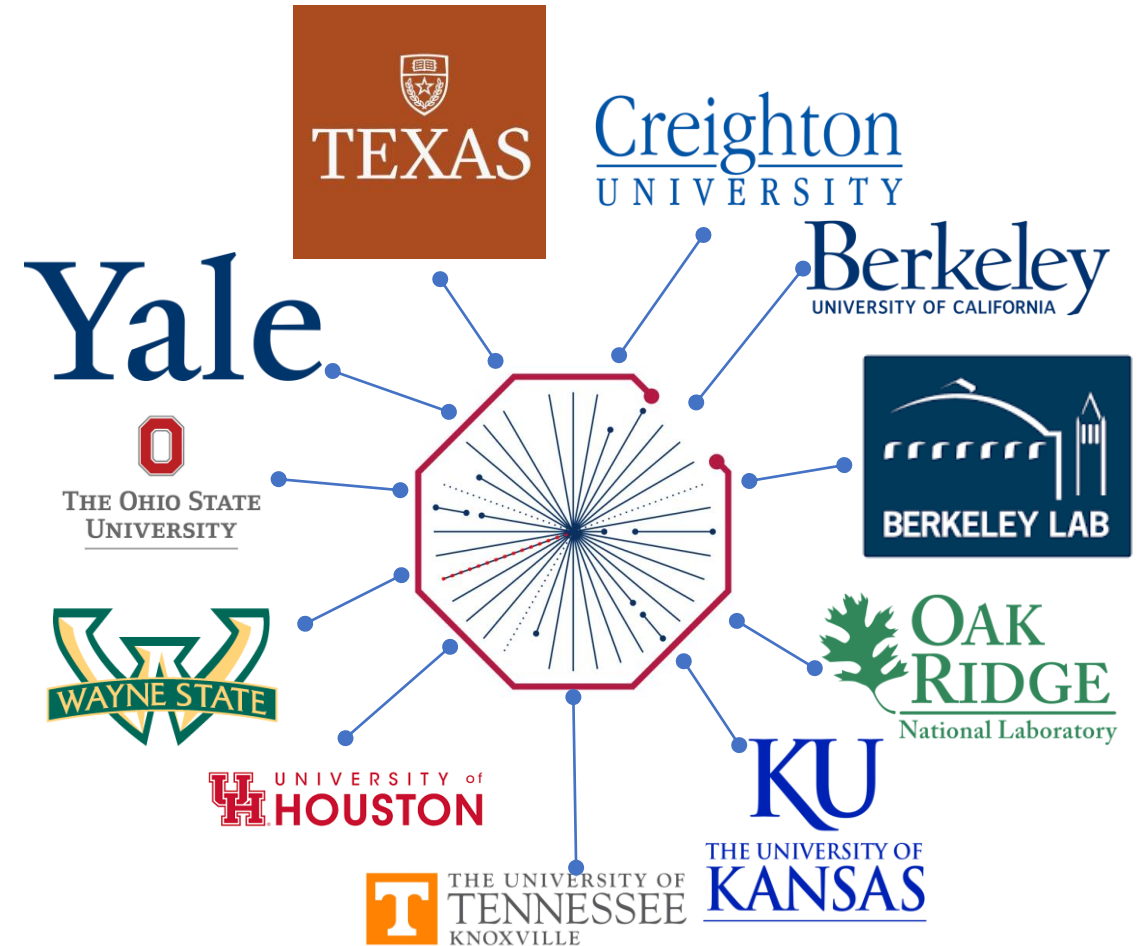
- Original Project Proposal – 2009
 - Nearing 15-year anniversary 😊
- In operational since 2010
- 3-Year Project Review Cycle
 - Initial plan requested in 2014
 - Latest review in July 2021
 - **Potential review in 2024**
- Project Execution & Acquisition Plan (PEAP)
 - Multi-year plan containing resource delivery, milestones, budget estimates, operations guide
 - updated annually & submitted to DOE
 - Latest one submitted in October 2023
- ALICE-USA Computing Website:
 - <https://sites.google.com/lbl.gov/alice-usa-computing/meetings?authuser=1>





US Department of Energy Supported ALICE-USA Group

- The project's main goal is to fulfill DOE funded MoU-based ALICE USA obligations for
 - 11 Institutions
 - 45 M&OA
- Operates ALICE grid facilities at 2 DOE labs
- ALICE-USA Computing core group meets monthly, every third Tuesday of the Month
- We keep very close contact on our SLACK channel
- Project review and planning meetings twice a year
 - Spring meeting at LBL
 - Fall meeting at ORNL



ALICE-USA T2 Sites


- Project currently operates two sites at ORNL and LBNL
- In addition, we provide resources on Lawrenceium (opportunistic) and Perlmutter HPCs



US-ALICE Computing Annual Meetings

- ALICE-USA Computing Meeting at ORNL in December 2022

- US Grid Operations review in May 2023



ALICE-USA Annual ALICE-USA Computing Project Fall Meeting at Oak Ridge National Laboratory

COMPUTING
7-9 Dec 2022
ORNL
America/Los_Angeles timezone

US-ALICE Grid Operations Review

15-17 May 2023
Lawrence Berkeley National Laboratory
America/Los_Angeles timezone

- Overview
- Timetable
- Contribution List
- My Conference
 - My Contributions
- Registration
- Participant List

Contact

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☎ 865 386 3733



- Overview
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- Videoconference



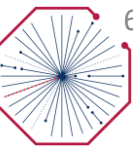
Lawrence Berkeley National Laboratory will host the annual ALICE USA Grid Operations overview meeting.

🕒 Starts 15 May 2023, 10:00
Ends 17 May 2023, 19:00
America/Los_Angeles

📍 Lawrence Berkeley National Laboratory
70a-3377
LBNL BLDG 70a
[Go to map](#)

📎 There are no materials yet.

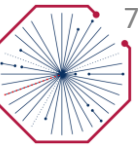




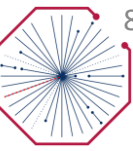
Task Tracking

- After last meeting at ORNL we identified additional tasks not outlined in the key deliverables in PEAP
- We set up a task tracking for the group
- Remaining tasks
 - Perfsonar at both sites
 - CCDB @ LBNL – if needed and beneficial
 - RHEL 8/9 migration
 - IPv6 @ ORNL
 - New AF proposal to DOE

1	LBNL	<input type="checkbox"/>	Perfsonar	3/1/23	ASAP
2	LBNL	<input checked="" type="checkbox"/>	LHCOne	4/1/23	ASAP
3	LBNL	<input type="checkbox"/>	CCDB repository setup	1/20/23	ASAP
4	LBNL	<input checked="" type="checkbox"/>	Migrate from Cori to Perlmutter	6/15/23	ASAP
5	LBNL	<input checked="" type="checkbox"/>	Migrate to whole-node scheduling	5/31/23	ASAP
6	LBNL	<input type="checkbox"/>	RHEL 8 switch on HPCS	2/1/23	ASAP
7	LBNL	<input checked="" type="checkbox"/>	aliproduct shared user on sfapi-vobox		ASAP
+ Add row Shift-Enter					
Group: ORNL Count 4					
					ASAP: 3 Later: 1
8	ORNL	<input type="checkbox"/>	Perfsonar	3/1/23	ASAP
9	ORNL	<input checked="" type="checkbox"/>	CTF Production Resource (PRF)	1/10/23	ASAP
10	ORNL	<input checked="" type="checkbox"/>	CCDB repository setup	1/20/23	ASAP
11	ORNL	<input type="checkbox"/>	IPv6		Later
+ Add row Shift-Enter					
Group: General Count 1					
					ASAP: 1
12	General	<input type="checkbox"/>	New AF Proposal	4/1/23	ASAP



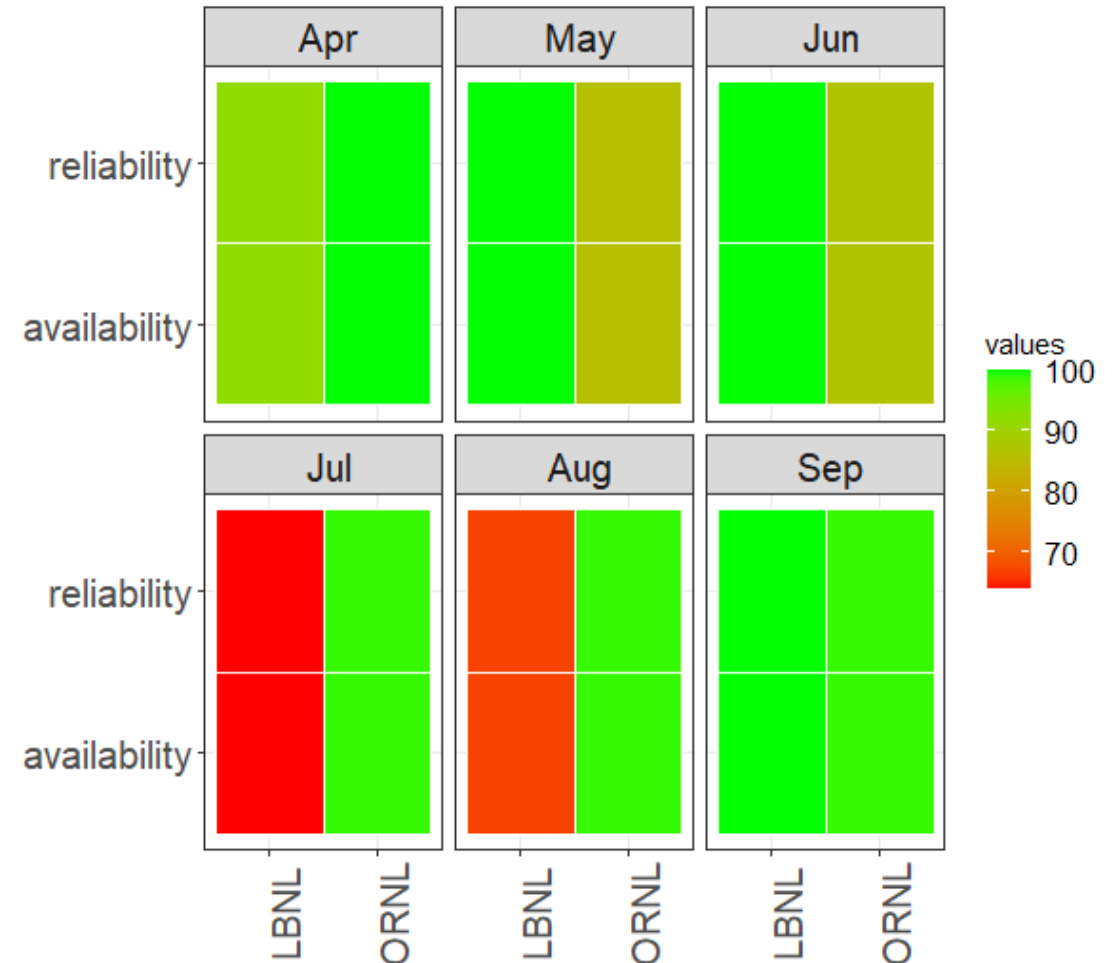
Status of operations | RRB 2023 - now



WLCG Summary

- Target Availability for each site is back to 100%.
- Availability Algorithm:
 $@ALICE_CE * @ALICE_VOBOX * \text{all } \text{AliEn-SE}$
- Since April 2023 we have reported only 104 hours downtime for the LBL_HPCS (and Lawrenceium) and 33 hours for ORNL.
- Low availability is solely due to the challenges related to the EOS upgrade

RRB 2023 Numbers

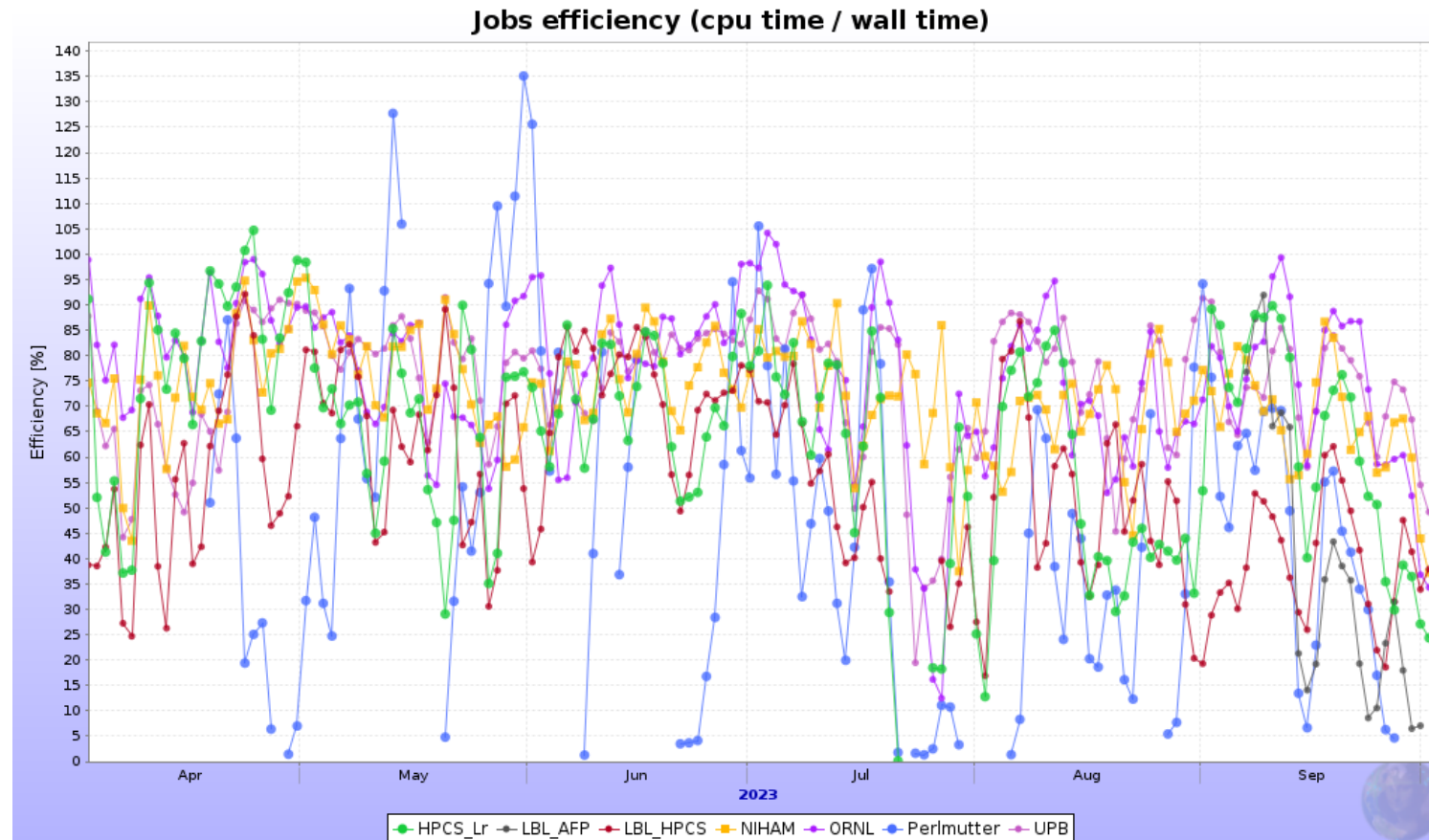


MonAlisa Summary | RRB 2023

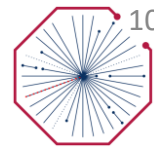
- Average job CPU efficiency over this period is shown in the table
- JobMix defines the average CPU efficiency delivered

Jobs efficiency (cpu time / wall time)

	Series	Last value	Min	Avg	Max
1.	HPCS_Lr	24.37	0	64.53	210.1
2.	LBL_AFP	7.061	0	37.59	183.5
3.	LBL_HPCS	37.93	0	55.27	803.6
4.	NIHAM	37.2	0	72.37	277.9
5.	ORNL	34.32	0	76.34	148.9
6.	Perlmutter	4.645	0	47.41	243.7
7.	UPB	49.18	0	74.59	131.6
Total		27.81		61.16	

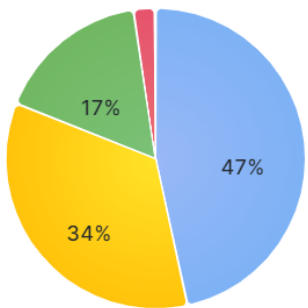


Job Mix – Job Type



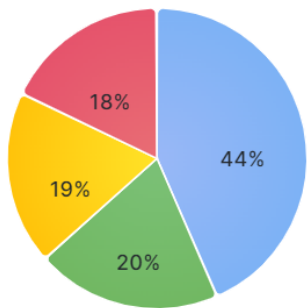
Average Job Mix [LBL_HPCS] ⓘ

Train	47%
SIM	34%
Other	17%
Hyperloop	2%
DAQ	0%



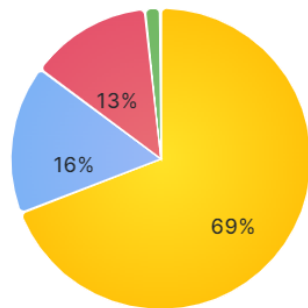
Average Job Mix [LBL_AFP] ⓘ

Train	44%
Other	20%
SIM	19%
Hyperloop	18%
DAQ	0%



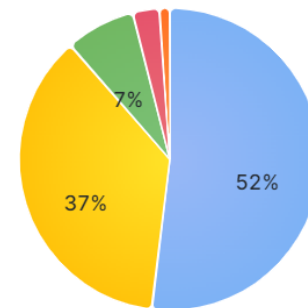
Average Job Mix [Perlmutter] ⓘ

SIM	69%
Train	16%
Hyperloop	13%
Other	2%
DAQ	0%



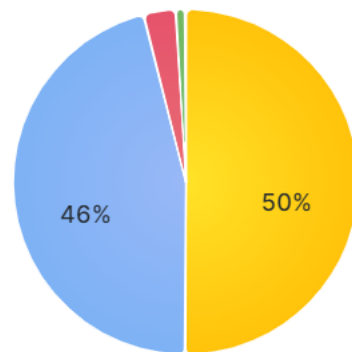
Average Job Mix [ORNL] ⓘ

Train	52%
SIM	37%
Other	7%
Hyperloop	3%
DAQ	1%

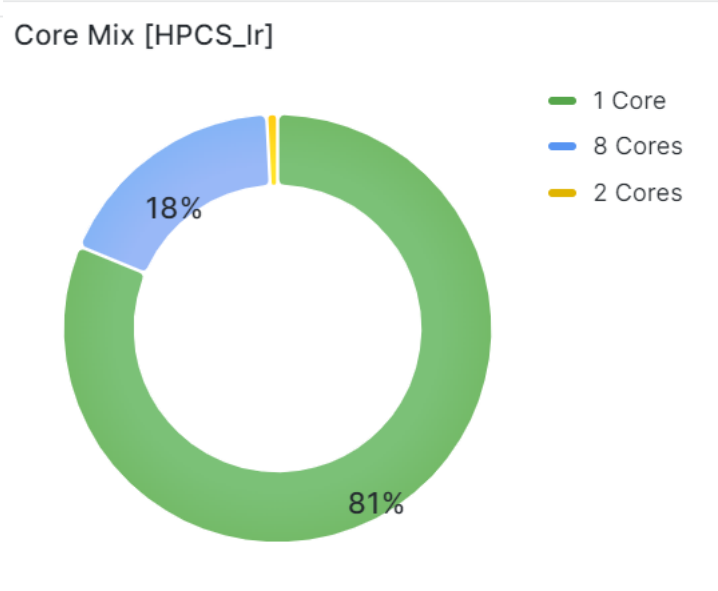
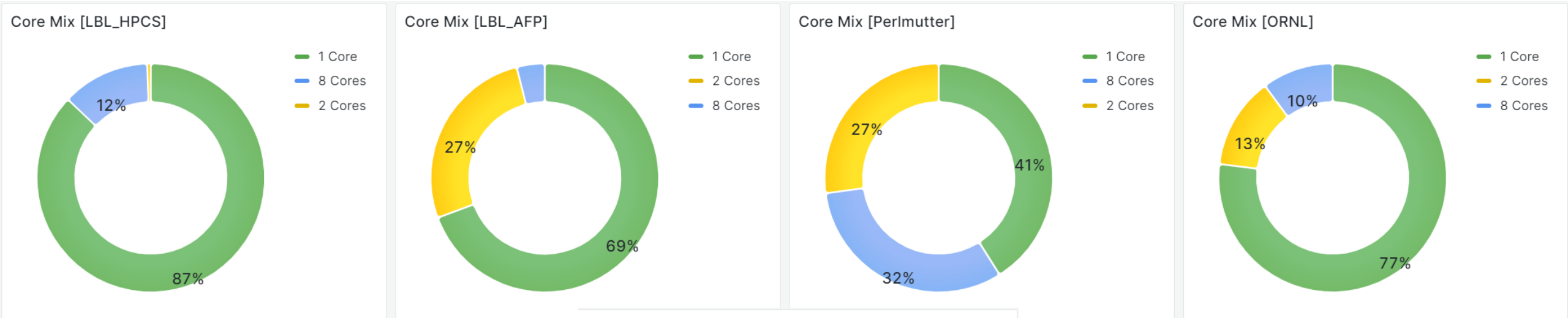
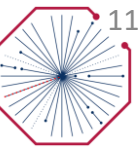


Average Job Mix [HPCS_Lr] ⓘ

SIM	50%
Train	46%
Hyperloop	3%
Other	1%
DAQ	0%



Job Mix – Core Count

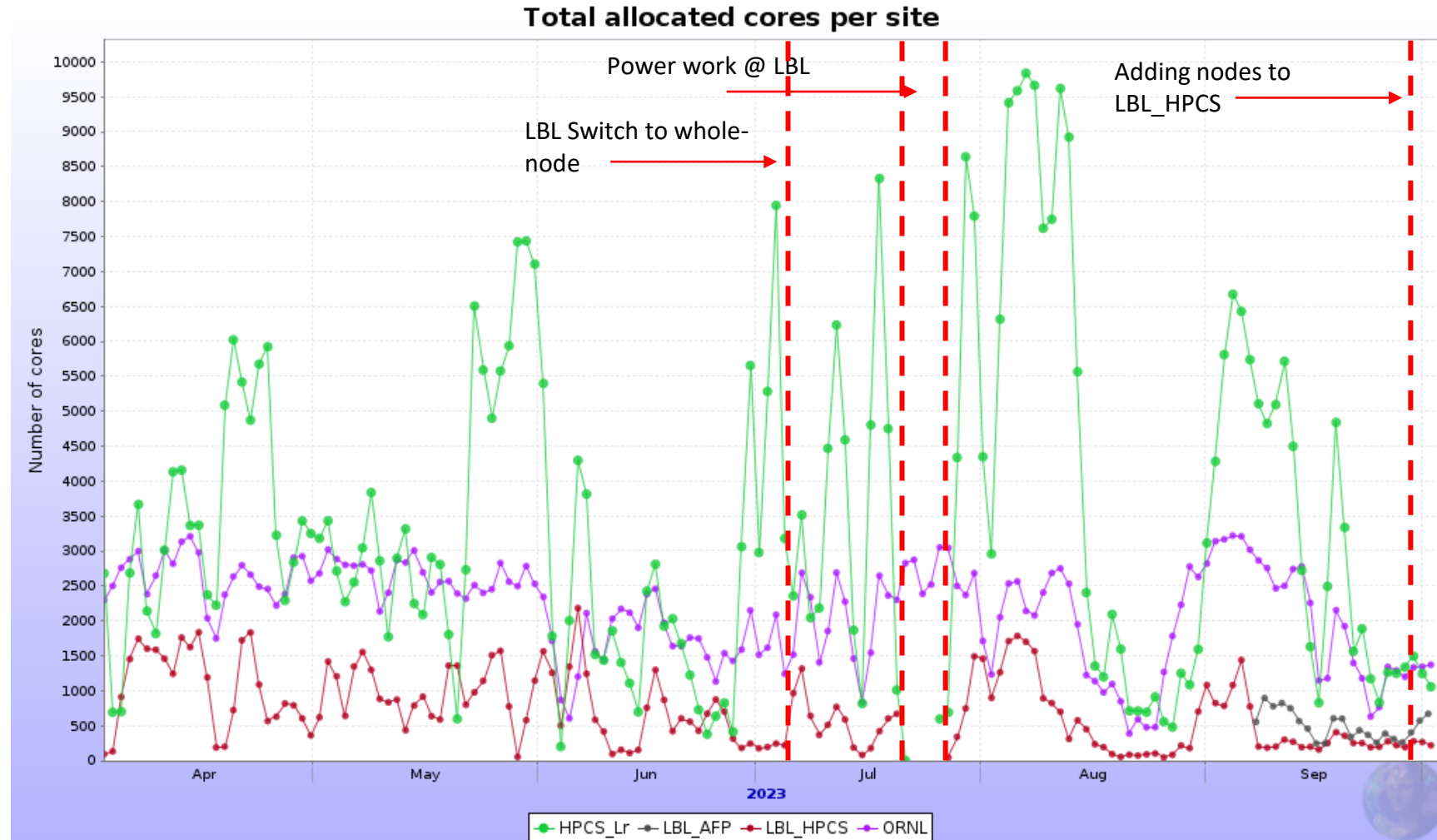
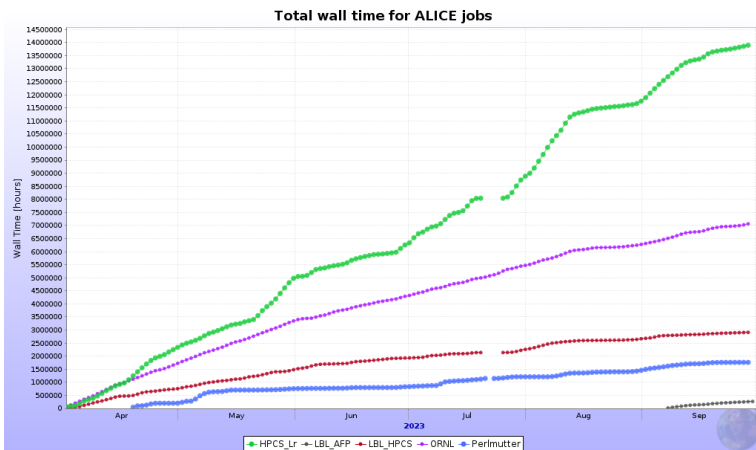


CPU Performance | RRB 2022

- Slightly under pledges
- Lawrencium fills the gap
- Almost no downtime

Total wall time for ALICE jobs

Series	Last value	Min	Avg	Max
1. ■ HPCS_Lr	13897632	73215	6883860	13897632
2. ■ LBL_AFP	264451	15446	163568	264451
3. ■ LBL_HPCS	2908378	2463	1777162	2908378
4. ■ ORNL	7061110	62747	4131726	7061110
5. ■ Perlmutter	1760706	47102	1012806	1760706
Total	25892277		13969124	



2023 RRB CPU Delivery vs. Obligations

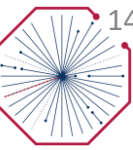
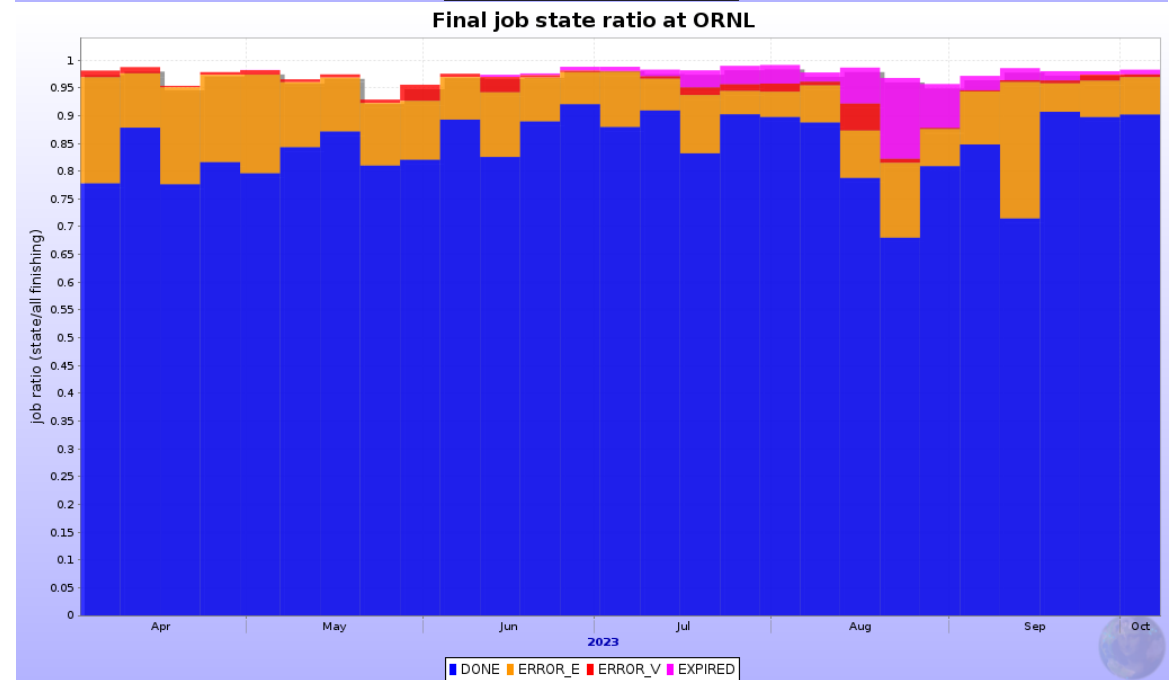
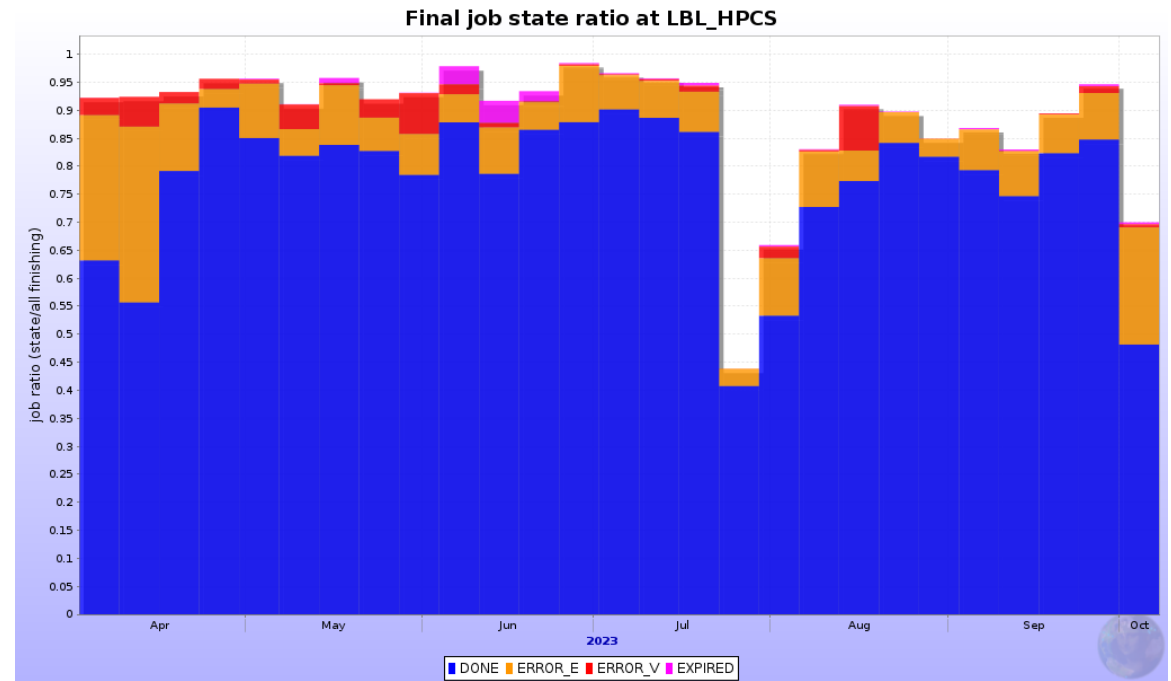
- We had long delays in deploying the 2023 CPU
- FY23 planned CPU purchase for LBNL will happen in FY24 (hopefully Q1)
- Thus T2 delivered CPU is slightly under the pledge
 - Although ML reported accounting does not reflect the fact the the job pressure is also low
 - Low job pressure will cause under-delivery as well
- Lawrenceium puts us over the pledge
- Below are the number for the RRB 2023 – till now

CPU Obligations	kHS06
ALICE-USA	94
LBNL HPCS T2	47
ORNL T2	47

US Resources	CPU/Core [HS06/Core]	ALICE-USA Obligation [MHS06 x hr]	CPU Delivered [MHS06 x hr] (ML reporter)	CPU Delivered [MHS06 x hr] (WLCG reporter)	Delivered per Obligation [%] (ML reported)	Delivered per Obligation [%] (WLCG reported)
HPCS_Lr	12.0	201.54	166.77	382.80	82.8	189.9
LBNL	16.7		48.57		24.1	
ORNL	11.5	204.87	80.96	165.60	39.5	80.8
Total		406.41	296.30	548.40	72.91%	134.94%

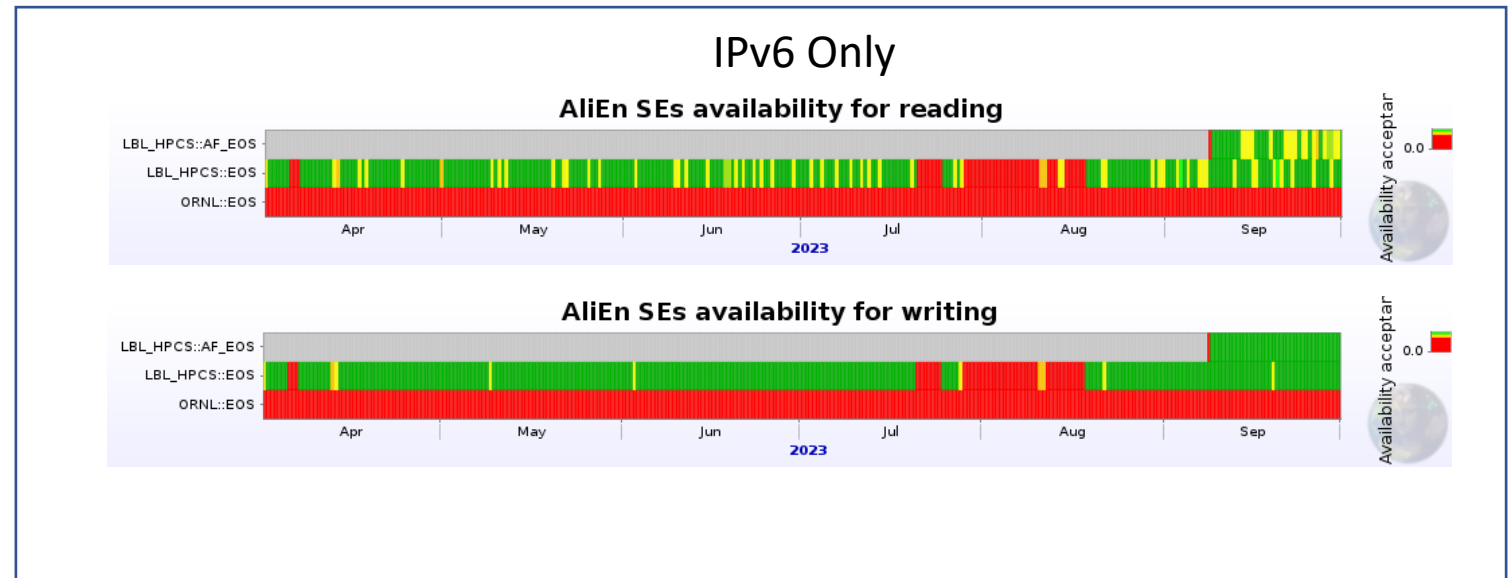
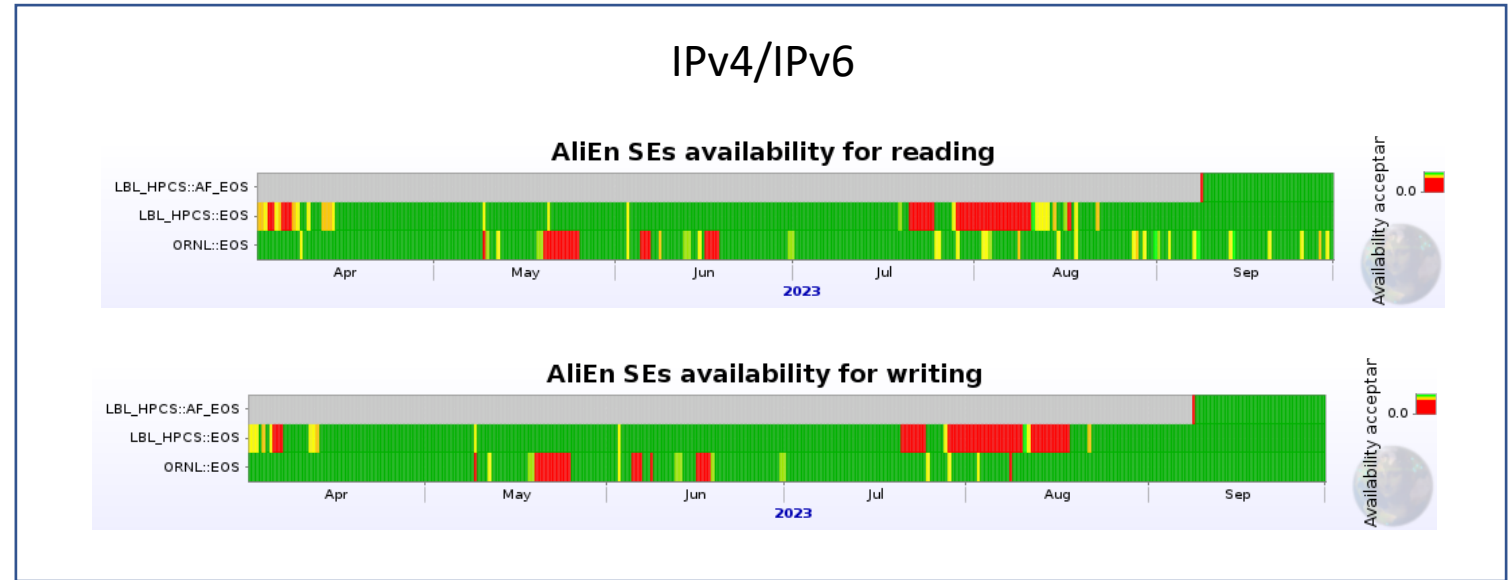
Some of the issues

- After EOS problems in March of this year no major failures for job running
- CVMFS automounter is doing its job well
- Both sites stay above 80% for the successful jobs
- Major part of the errors come from the “execution” error, and they are mostly well correlated across sites.



Storage Performance | RRB 2023

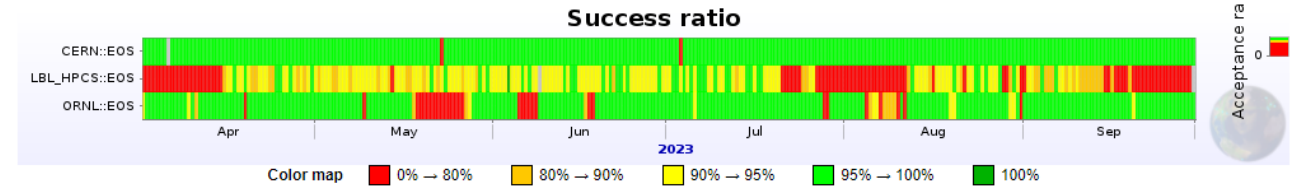
- SE availability
 - We had a full EOS upgrade on both sites
 - This resulted in some SE availability during the EOS4 -> EOS5 transition
- IPv6 has been up at LBNL since early RRB2021
- IPv6 at ORNL is still looming on a horizon



	READ	WRITE
LBNL	89.3	86.4
ORNL	95.3	94.8

EOS Issues at LBL

- EOS file problem at LBNL is a long standing one
- During EOS upgrade drains clearly showed there were files that could not be accessed by EOS
- The bad file lists were composed and exchanged
- What is left: files need to be removed from the central database? Anything else?



Averaged metrics for the selected interval						
SE Name	Start	End	Success ratio	Corrupt ratio	Inaccessible ratio	Internal error ratio
CERN::EOS	01 Apr 2023 03:47	30 Sep 2023 22:08	99.31 %	0.25 %	0.41 %	0.03 %
LBL_HPCS::EOS	01 Apr 2023 03:42	29 Sep 2023 21:29	78.45 %	1.12 %	20.42 %	0.00 %
ORNL::EOS	01 Apr 2023 03:43	30 Sep 2023 22:05	93.77 %	0.30 %	5.93 %	0.00 %

Status codes extracted from the crawler

SE Name: Interval:

Status Type	Status Code	Status Count	Status Code Ratio	Download throughput
FILE_OK	S_FILE_CHECKSUM_MATCH	604	37.99 %	38.17 Mb/s
FILE_INACCESSIBLE	XROOTD_EXITED_WITH_CODE	986	62.01 %	
TOTAL		1590	100 %	

Status codes extracted from the crawler

SE Name: Interval:

Status Type	Status Code	Status Count	Status Code Ratio	Download throughput
FILE_OK	S_FILE_CHECKSUM_MATCH	17410	99.38 %	75.09 Mb/s
	E_CATALOGUE_MD5_IS_BLANK	10	0.06 %	84.23 Mb/s
FILE_INACCESSIBLE	XROOTD_EXITED_WITH_CODE	92	0.53 %	
FILE_CORRUPT	MD5_CHECKSUMS_DIFFER	6	0.03 %	
TOTAL		17518	100 %	



Questions