

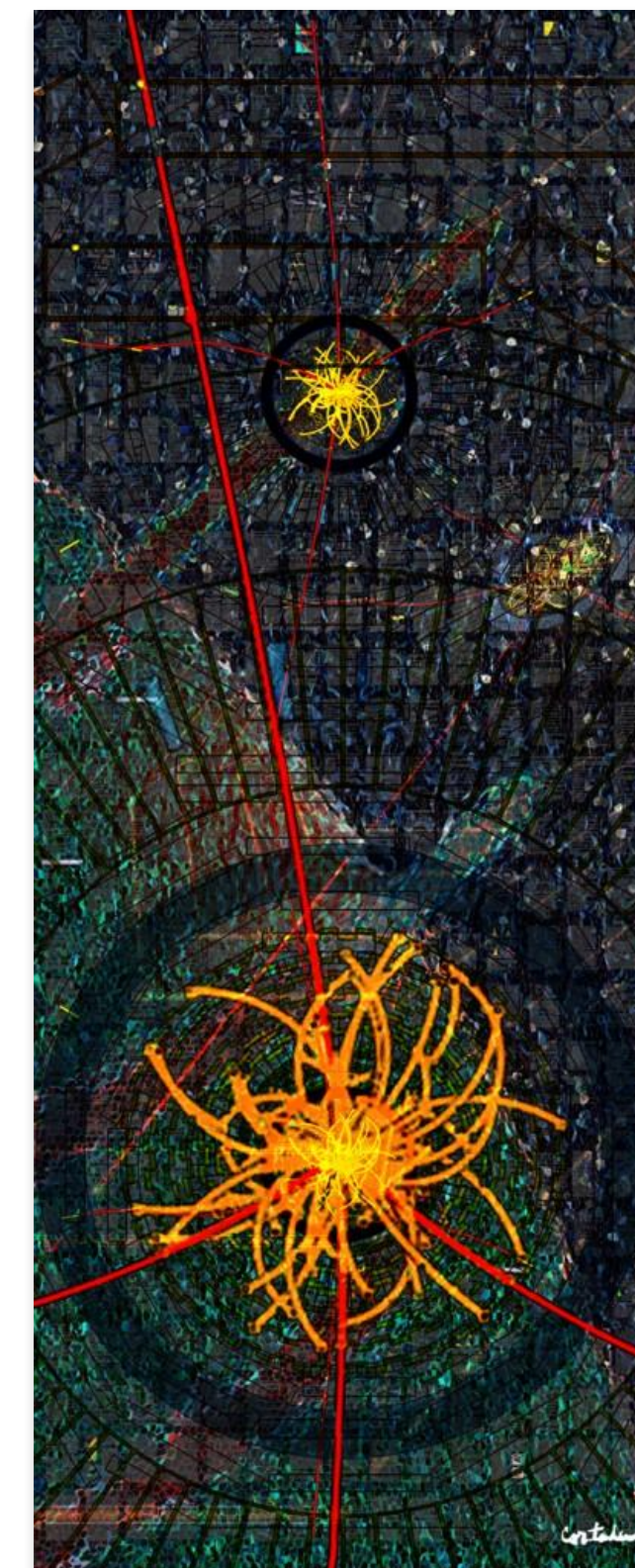
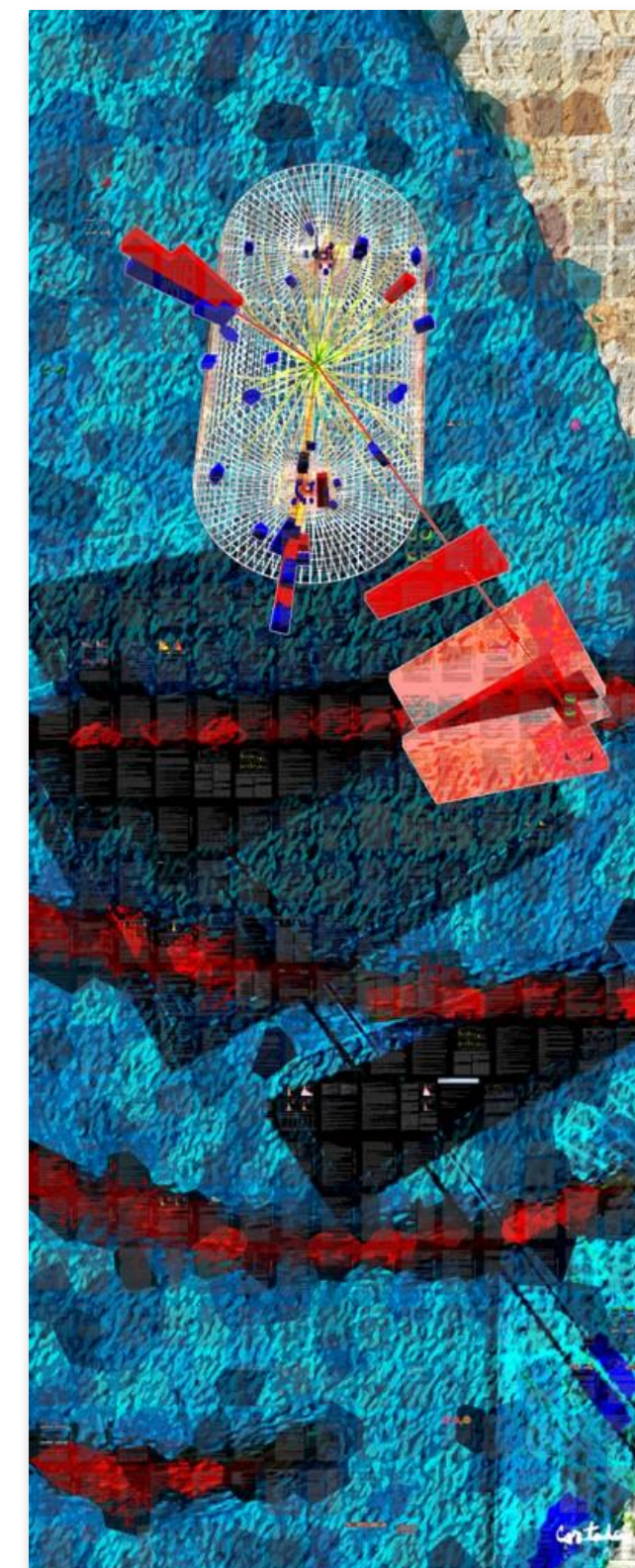
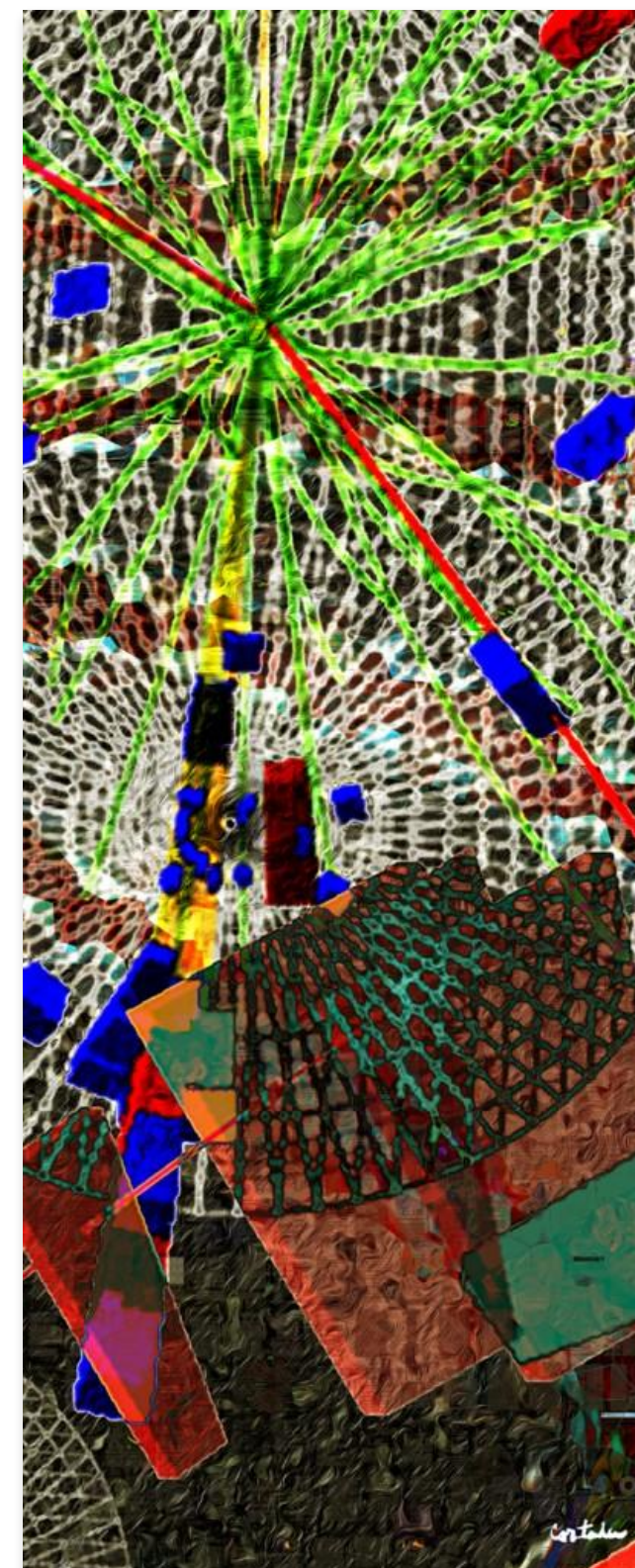
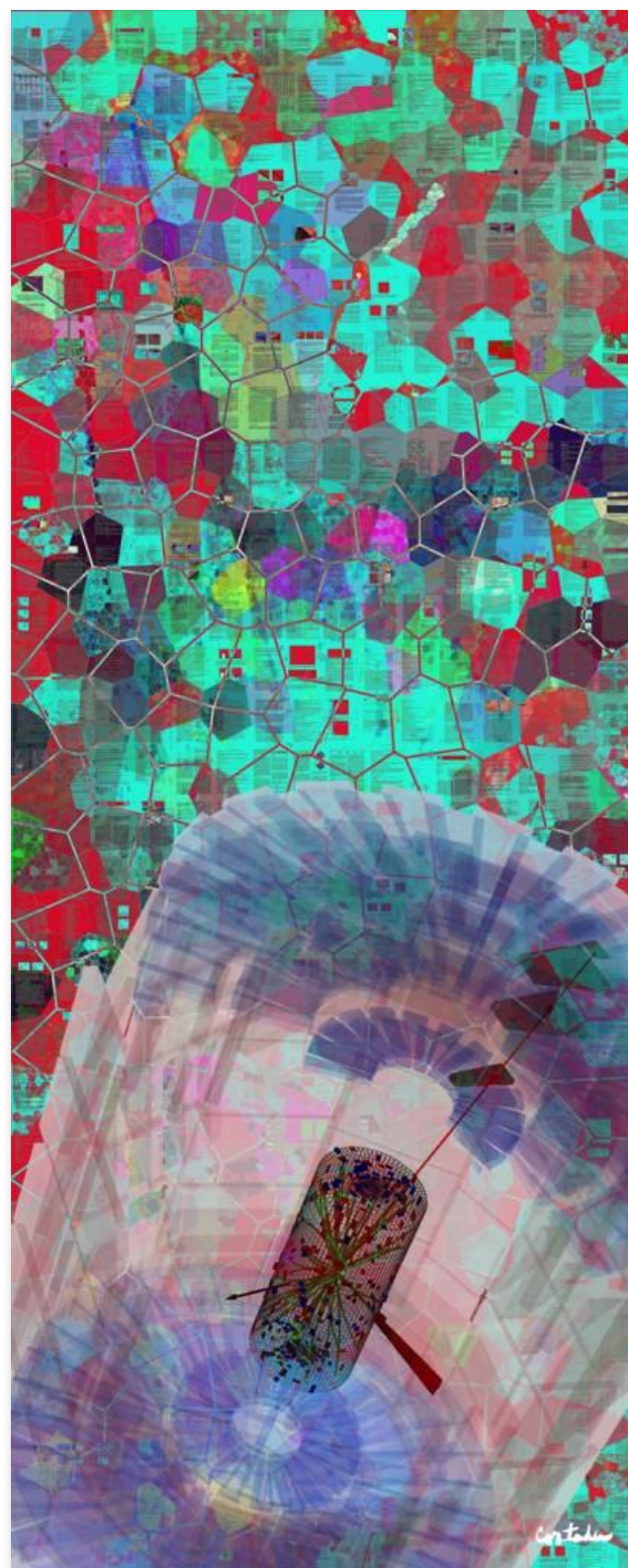
CMS Report

SCD Projects Meeting

September 1, 2022

Disclaimer

Some of the information shared here are not for public consumption and are meant to inform SCD management. Please don't share.



Upcoming meetings

- LHCC Week: September 11-15
 - Open session [[Indico](#)] on Wednesday September 13 in the morning
- CMS Week: September 19-23 [[Indico](#)]
- HEP-Score Workshop: September 19-20 [[Indico](#)]
- DOE Energy Frontier Comparative Review: September 19-23
- Workshop for the USATLAS-USCMS HPC/Cloud Blueprint: September 26-28 [[Indico](#)]
- HEP-CCE all-hands: October 11-13
- CMS O&C week: October 18-21
- ESnet6 week October 11-13: [[Webpage](#)]
- IRIS-HEP team retreat to prepare for IRIS-HEP 2 proposal: October 12-14
- LHCOPN-LHCONE meeting #49, October 24-25 [[Indico](#)]
- ACAT 2022: October 24-28 [[Indico](#)]
- Blueprint/Alignment meeting IRIS-HEP/HEP-CCE/USLHC ops programs: November 7-11 or November 14-18
- CHEP2023: May 8-12 (2023!)

- Recommendation from Ops review in February
 - Blueprint process about the usage of commercial cloud/HPC resources in the U.S. ATLAS and U.S. CMS collaborations
 - Report should cover: Workflows, Costs (incl. effort), Further R&D, Integration in Experiments
- Workshop will (primarily) be remote, dates are Sept 26th to 28th, a (tentative) agenda is in place:
<https://indico.cern.ch/event/1183995/>
 - We plan to keep presentations short, just long enough to start/guide discussions.
- What we want to accomplish with this workshop is to look beyond technical integration.
 - Workflow suitability and restrictions (not just now, but forward looking)
 - Cost (incl. effort) to use HPC/Cloud resources
 - Impact on other infrastructure (networking, grid sites)
 - Strategic considerations (risk factors with HPC/Cloud use)
 - Security issues and WLCG issues
 - Policy concerns (what could make HPC/Cloud easier/harder to use)
- This is a USATLAS-USCMS workshop and there are deliverables (report to the US programs) we need to focus on. We do expect that most of the discussions are of a general nature though and not just restricted to US issues, so any participation is welcome.

CHEP 2023

The next [CHEP](#) will be in Virginia (US) May 8-12, 2023

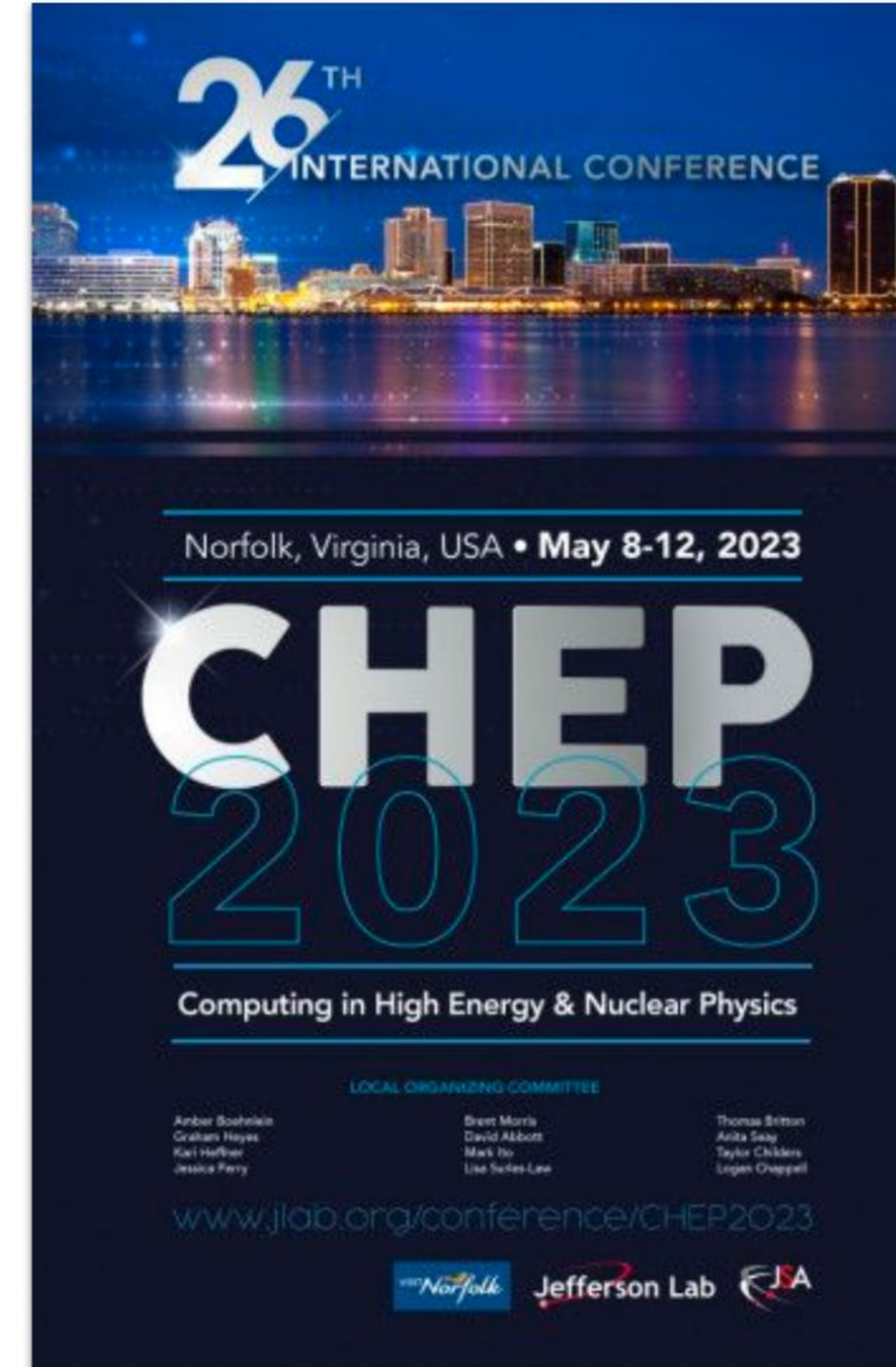
- N.B. “Full” vaccination against COVID-19 is still [required](#) for non-U.S. citizens to enter the country.

The first bulletin has been distributed (attached to [Indico](#)).
Important dates:

- Conference abstract deadline: Nov. 17th
- CMS internal deadline TBD but usually two weeks before the conference deadline.
- As in previous years, abstract submission to CHEP will be done **centrally**.
- As with all conferences, please upload your abstract to [CINCO](#) as early as possible.



N.B. For ACAT 2022 in Bari, since abstract submission was not done centrally (normal for workshops), please update the status of your abstract (accepted, talk/poster) on [CINCO](#).



HEPScore Workshop

- HEPscore: new compute capacity benchmark to replace HS06
 - Containerized workflows of all experiments
- [Workshop](#) scheduled on 19-20 September
 - Organized by the WLCG Benchmarking TF (there is also an Accounting TF)
- Review the status of the benchmark, with input presentations by experiments
 - Presentations also about benchmarking beyond x86 architectures
 - Input questionnaire to be filled by experiments in advance to support discussions
- “The goal of the workshop is to discuss the optimal configuration of a CPU benchmark, based on HEP experiment workloads, that would replace the current HEPspec06 benchmark.”
 - Potentially conclude with some recommendations for the WLCG Collaboration Board?



Mon 19/09 | Tue 20/09 | All days

Print | PDF | Full screen | Detailed view | Filter | Session legend

HEP Benchmark Suite | HEP Workloads | HEPscore Task Force results

10:00	Welcome and purpose of the workshop 6R-012 - conference room, CERN	Domenico Giordano et al. 10:00 - 10:15
	Overview of the Task Force activity 6R-012 - conference room, CERN	Helge Meinhard 10:15 - 10:30
	Analysis of the Measurement Campaign 6R-012 - conference room, CERN	Randall Sobie et al. 10:30 - 11:10
11:00	HEPscore candidates 6R-012 - conference room, CERN	Tristan Sullivan 11:10 - 11:30
	Discussion 6R-012 - conference room, CERN	Round Table 11:30 - 11:40
	Intro to the Workload session 6R-012 - conference room, CERN	Domenico Giordano 11:40 - 11:45
	CMS workloads 6R-012 - conference room, CERN	Dr Tommaso Boccali 11:45 - 12:00
12:00	Lunch Break 6R-012 - conference room, CERN	12:00 - 13:30
13:00	Profiling of HEP Workloads 6R-012 - conference room, CERN	Vincenzo Innocente 13:30 - 14:00
14:00	Alice workloads 6R-012 - conference room, CERN	14:00 - 14:15
	Atlas workloads 6R-012 - conference room, CERN	Walter Lampi 14:15 - 14:30
	LHCb workloads 6R-012 - conference room, CERN	Andrea Valassi 14:30 - 14:45
	Juno workloads 6R-012 - conference room, CERN	Xiaofei Yan 14:45 - 15:00
15:00	IGWN workloads 6R-012 - conference room, CERN	Joshua Lee Willis 15:00 - 15:15
	Coffee break 6R-012 - conference room, CERN	15:15 - 15:35
	Intro to the HEP-Benchmark-Suite session 6R-012 - conference room, CERN	Domenico Giordano 15:35 - 15:40
	The Suite and the Benchmark DB (demo) 6R-012 - conference room, CERN	Gonzalo Menendez Borge 15:40 - 16:00
16:00	Experience of running the Suite @ CERN 6R-012 - conference room, CERN	16:00 - 16:10
	Experience of running the Suite @ IJCLAB 6R-012 - conference room, CERN	Dr Emmanouil Vamvakopoulos 16:10 - 16:20


2023 Preliminary Resource Request

2024 Preliminary Resource Request



The preliminary computing resource request for 2024 was sent to the C-RSG yesterday. The complete document (CMS private!) can be found [here](#).

Based on the 2024 running scenario from the LPC (via the WLCG), who “*confirmed that at this stage there is no reason to use something different than 2023, apart from the fact that in 2024 the HI run will be pPb and not PbPb.*”

2023 Running Conditions for Computing estimates including contingency 

- ATLAS/CMS luminosity: <math><100/\text{fb}</math>
- ATLAS/CMS average pile-up: <math><50</math> (peak 52)
- LHCb luminosity: <math><15/\text{fb}</math>
- ALICE luminosity (pp): <math><100/\text{pb}</math>
- Running time pp: 6×10^6 seconds
- Running time ions (PbPb): 1.2×10^6 seconds

Same conditions can be assumed for now in 2024 and 2025 for long term projections, except there will be pPb instead of PbPb run in 2024

CMS Scenario for 2024:

Parameter	2023	2024
<i>LHC</i>		
LHC Energy [TeV]	14*	13.6
Average pileup	50	
Integrated luminosity / year [fb^{-1}]	100	
Lifetime pp / year [$\text{s}/10^6$]	6	
Lifetime HI / year [$\text{s}/10^6$]	1.2	
Heavy Ion run type	Pb-Pb	p-Pb
<i>CMS-Specific</i>		
Prompt HLT Rate [kHz]	1.7	
Parked HLT Rate [kHz]	3	
Scouting Rate [kHz]	30	
Run 3 MC events / year in billions	29	
Phase-2 MC events / year in billions	0.5	

2023 Preliminary Resource Request



Preliminary Estimates for CPU, Disk and Tape

CMS		'23 Approved Request - Spring '22	'24 Preliminary Request - Fall '22	Increase wrt '23	
				Abs.	Perc.
CPU [kHS06]	Tier-0	720	750	30	4%
	Tier-1	800	860	60	8%
	Tier-2	1,350	1,500	150	11%
	Total	2,870	3,110	240	8%
Disk [PB]	Tier-0	45	52	7	16%
	Tier-1	98	108	10	10%
	Tier-2	117	130	13	11%
	Total	260	290	30	12%
Tape [PB]	Tier-0	228	293	65	29%
	Tier-1	316	370	54	17%
	Total	544	663	119	22%

Next steps:

- Document will be scrutinized by the C-RSG September 19th and then considered for approval at the October meeting of the RRB, following any C-RSG recommendations.
- Final request (given the experience of 2022 data taking, improved scenarios) will be submitted in early 2023 for consideration at the April RRB

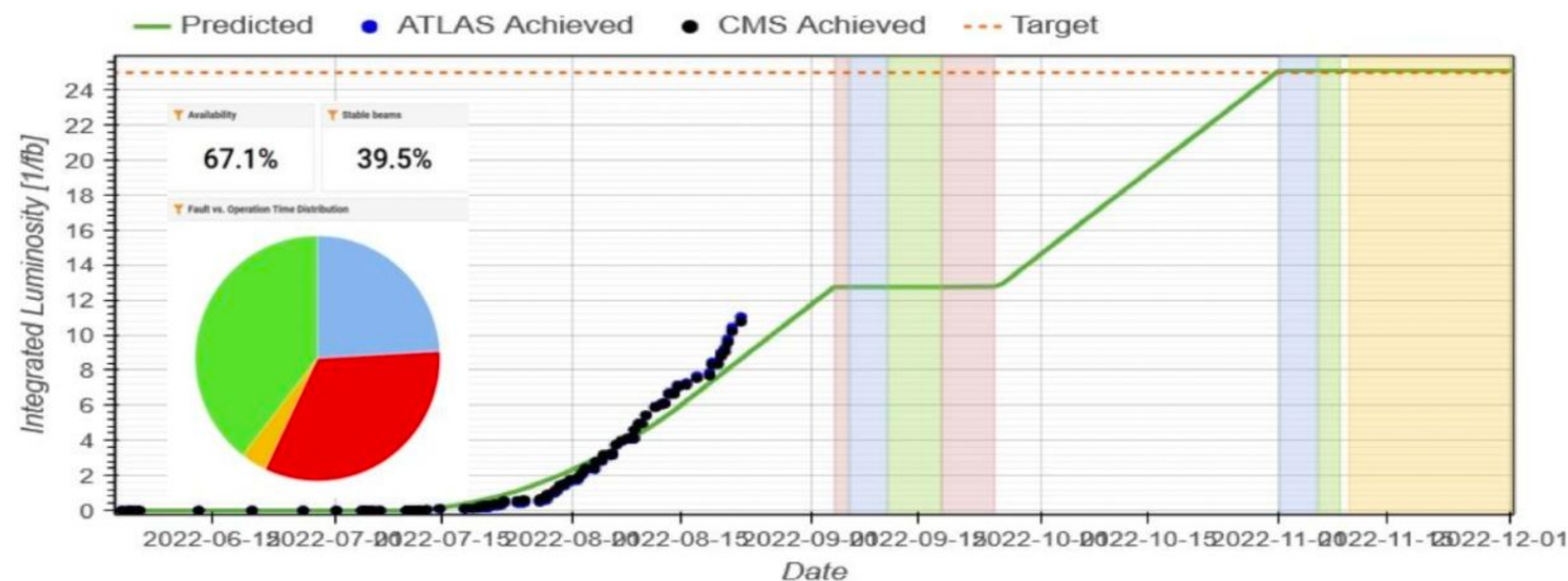


LHC news

From LMC 23/08/2022



Good performance during last weeks with a very positive trend
 Integrated Lumi >10 fb⁻¹
 All this until last Tuesday...



[Generated at: 2022-08-23 23:48:46]

The cooling plant at P4 stopped due to a PLC failure, inducing a cryo stop.
 Subsequent venting of the RF cavity cryomodules, rupturing three safety pressure release disks
 Pictures and details in the following slides.

Status of the LHC 2/2



Warm-up, cool-down, and reconditioning of cryo expected to take ~2 weeks. ETA for beam: **Back to Beam 19 September**

Perhaps not quite so dramatic as it sounds:

- There was a pre-planned two-week machine development and technical stop in September (weeks 36 & 37) in any case.
- LHC was already exceeding projected delivered luminosity before the incident: We still have a good chance to achieve or even exceed the target integrated luminosity for 2022.

Comments (30-Aug-2022 07:20:38)

RF warm-up ongoing
Access possible from 30.08 to 02.09
(contact EN-ACE 161669)

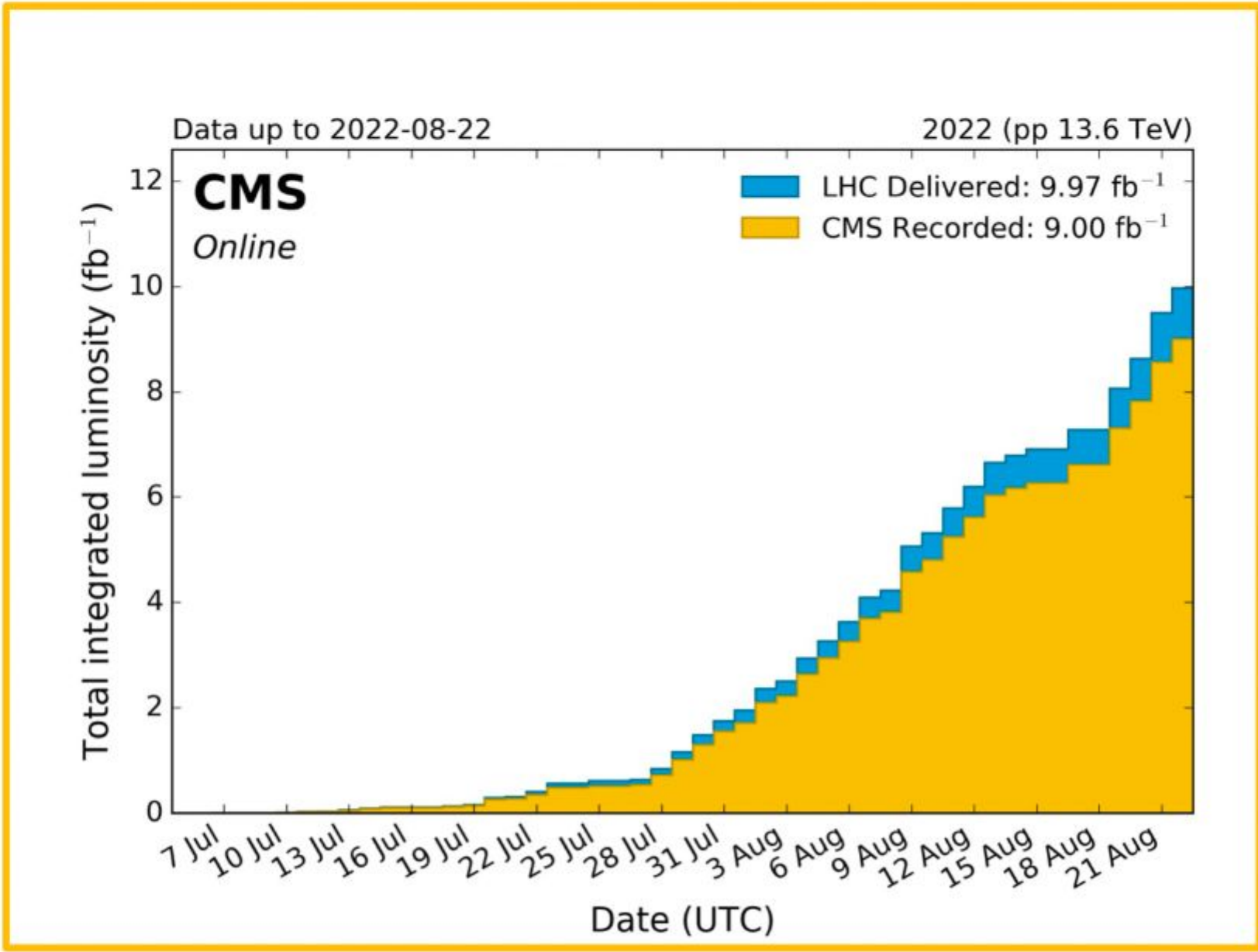
Morning meeting: Wednesday 31/08/22
NO beam until week 37 at least

Opportunity to anticipate activities, e.g. disk pools cleanup

Data Taking in 2022: Prospects

- Delivered up to Aug 22nd [see [plot](#) below]: 10 fb^{-1}
- From the [Run Organization meeting yesterday](#): expect 3-4 more weeks of pp physics in October (up to 10 fb^{-1} , maybe more if the machine is really efficient)
- While we planned for 30 fb^{-1} of detector data in 2022 (was 70 in the request), the plans for 2023-24 as communicated by the LPC remain **unchanged**.
 - Realistic target for physics was 25 fb^{-1} (see previous slide)

The loss of run time in 2022, while unfortunate, does not change in any significant way the planning for computing for 2023 or 2024.



The new CMS team

Welcome to the New O&C Team for September 2022



A warm welcome to new L2s in O&C as of September 1st, approved at the [July CB](#).

- ORP: Sal Rappoccio
- Upgrade R&D and TDR: Federico Ferri
- Reconstruction: Matt Nguyen
- Web Services & Security: Muhammad Imran
- SI: Marco Mascheroni (continuing)
- Upgrade Software: Phat Srimanobhas (continuing)


New L3 in DRP for Offline Cloud: Saqib Haleem

And a big thank you to those who are continuing, or moving on to other activities!

A warm welcome also to our incoming SP team tomorrow, as well as many new coordinators of other L1 areas.

Offline Software and Computing - September 2022

Coordinators D. Piparo, J. Letts			
Core Software S. Muzaffar, M. Kortelainen	Computing Operations C. Paus, A. Wightman	Dyn. Res. Provisioning D. Spiga, C. Wissing	Facility Services G. Bagliesi, S. Lammel
Simulation V. Ivantchenko, S. Bein	Workload/Data Mgt. Devel. K. Lannon, D. Cianggottini	Reconstruction C. Caputo, M. Nguyen	Resource Management J. Flix, D. Lange
Monitoring & Analytics F. Legger, B. K. Jashal	Offline Release Planning A. Perrotta, S. Rappoccio	Upgrade Software P. Srimanobhas, A. Di Florio	Submission Infra. A. Perez-Calero, M. Mascheroni
Analysis Infra. & Support S. Belforte, K. Ellis	Upgrade R&D and TDR D. Elvira, F. Ferri	Web Services & Security A. Pfeiffer, M. Imran	
Generators * S. Bhattacharya, M. Lu	Machine Learning * G. Kasieczka, J. Ngadiuba	L1 Software ** C. Caloi, E. Palencia Cortezon	DPOA *** K. Lassila-Perini, C. Lange (Dep.)
Computing Resources Board J. Hernandez, K. Bloom	* Joint with Physics / ** Joint with L1 DPG / *** Joint with CB Mandates can be found here .		




From [CDS](#)

WLCG Planning on Token-based Authentication Migration



Last week WLCG published a proposed token-based authentication transition timeline [document](#) (also attached to [this Indico agenda](#)):

“This document aims to define milestones concerning technical aspects of the transition from X509 proxies with VOMS attributes toward the use of WLCG tokens in all relevant workflows. These milestones are tentative.”

For concerned L2 areas, please have a look at this 5-page document!

A few of the proposed milestones:

- March 2023:
 - VOMS-Admin is switched off for one or more experiments
 - End of HTCondor support for GSI Auth ([link](#)).
- March 2025: Grid jobs use tokens for reading and stageout
- March 2026: Users no longer need X509 certificates

Please let us know your comments and concerns so that we can coordinate CMS input!

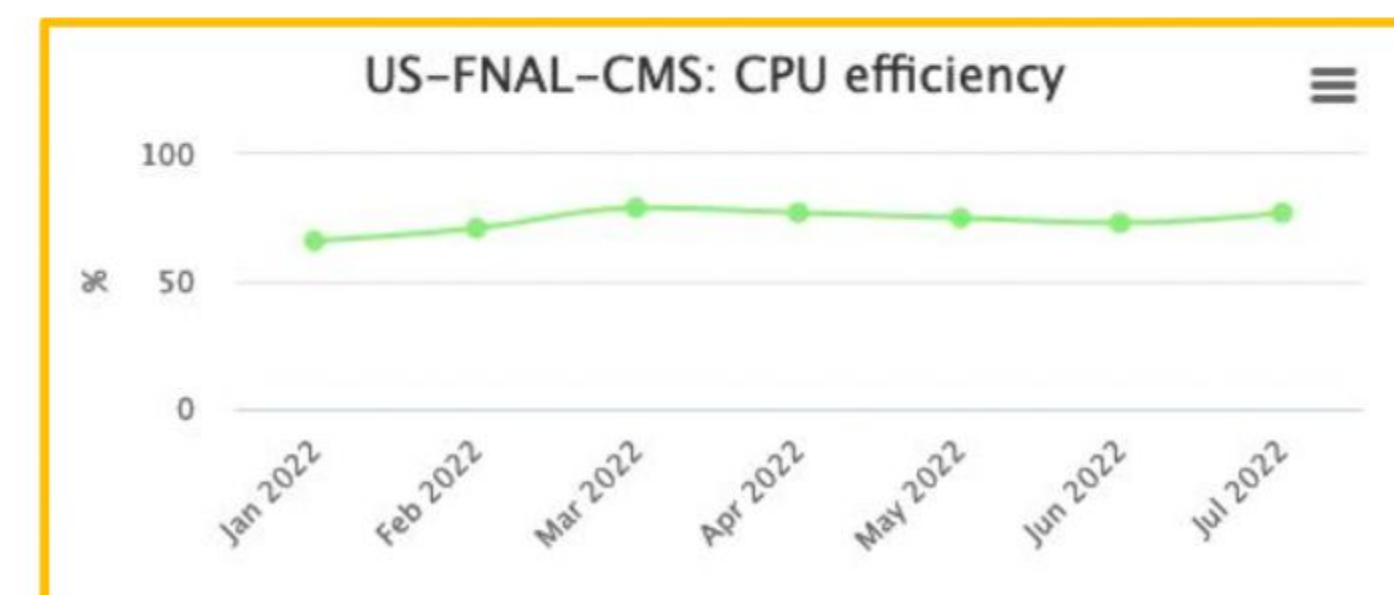
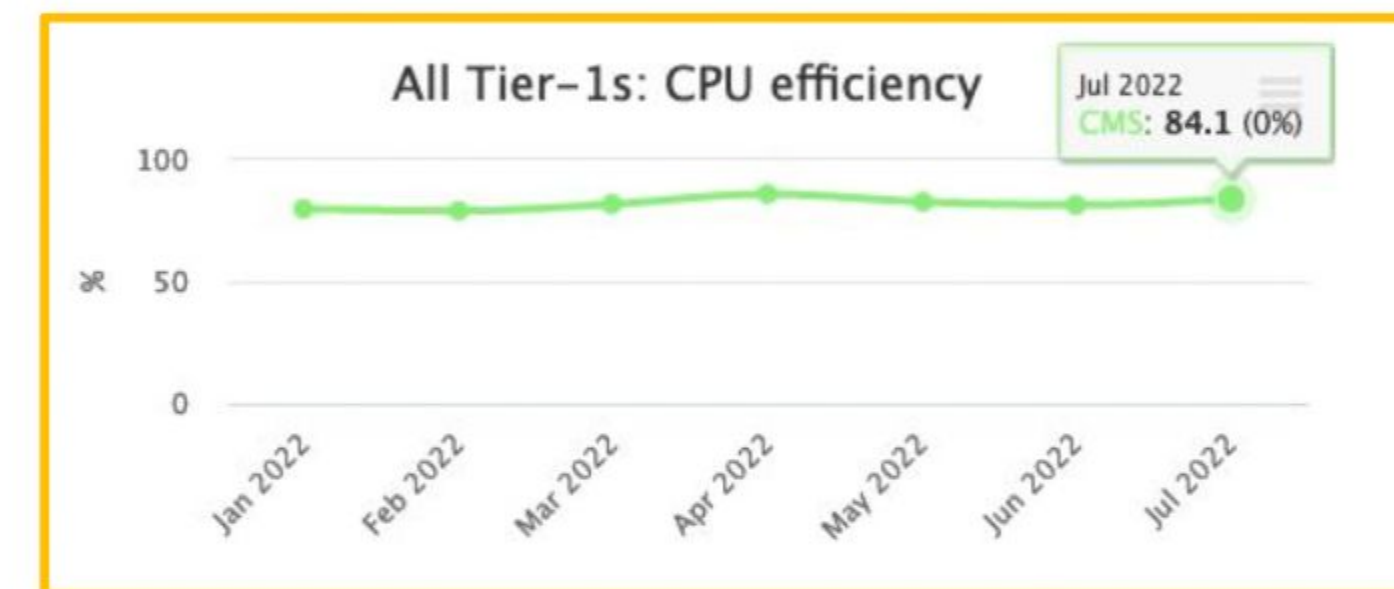
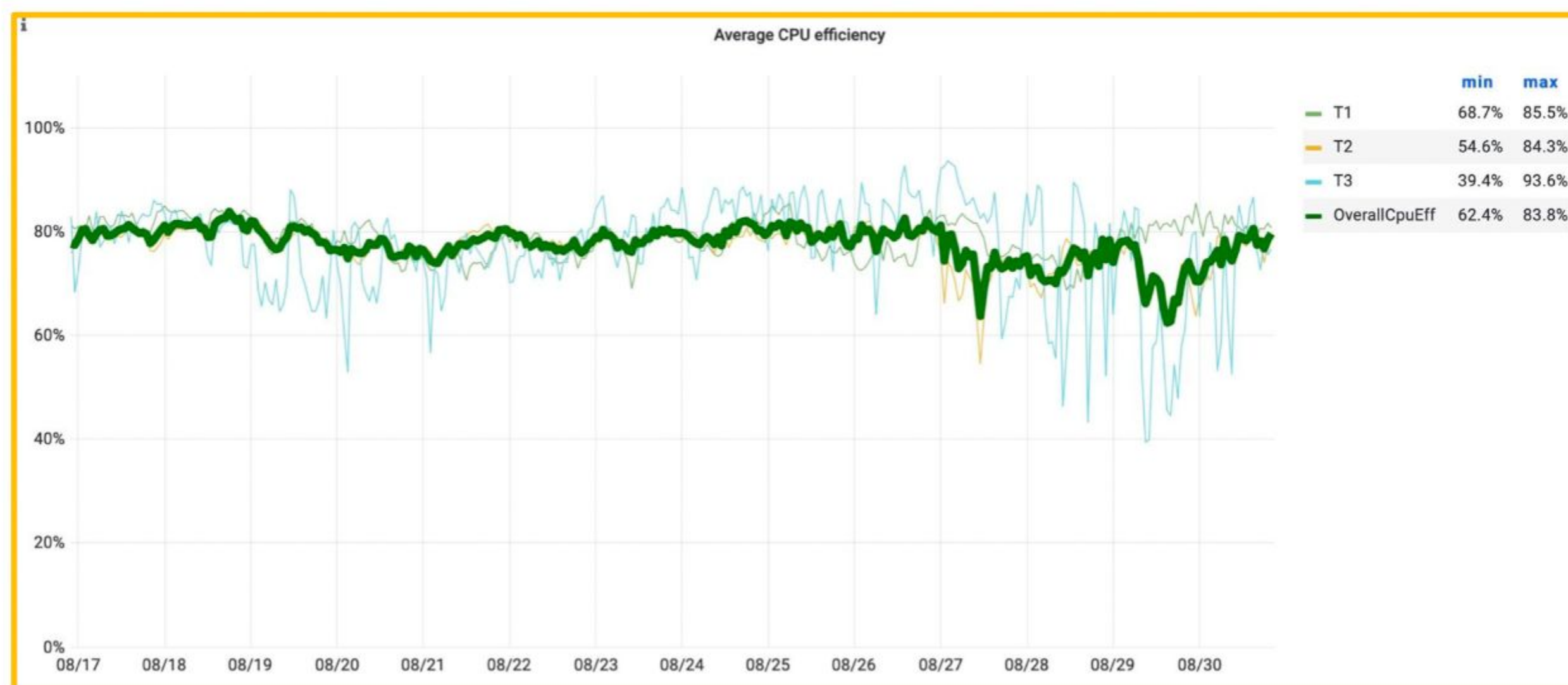
The Future of JIRA at CERN

- The cost of the licenses of the JIRA issue and project tracking tool will increase significantly at CERN by 2024, making it one of the most expensive software packages used at the lab.
 - JIRA is used by several CMS groups
 - We will be requested to take some actions in the coming months
- The [CERN IT-PW](#) (“Platform and Workflows”) communicated to O&C that Atlassian, the company behind Jira is:
 - Changing its license pricing policy
 - Planning to end the support for the current Server products in use at CERN in February 2024 ([more information here](#)).
- CERN is hosting several instances of JIRA, also used by CMS
- Meeting at CERN in 513/1-024 at 10:30 tomorrow (September 1st): [indico](#) and [Zoom](#) coordinates



CPU Efficiency at Sites

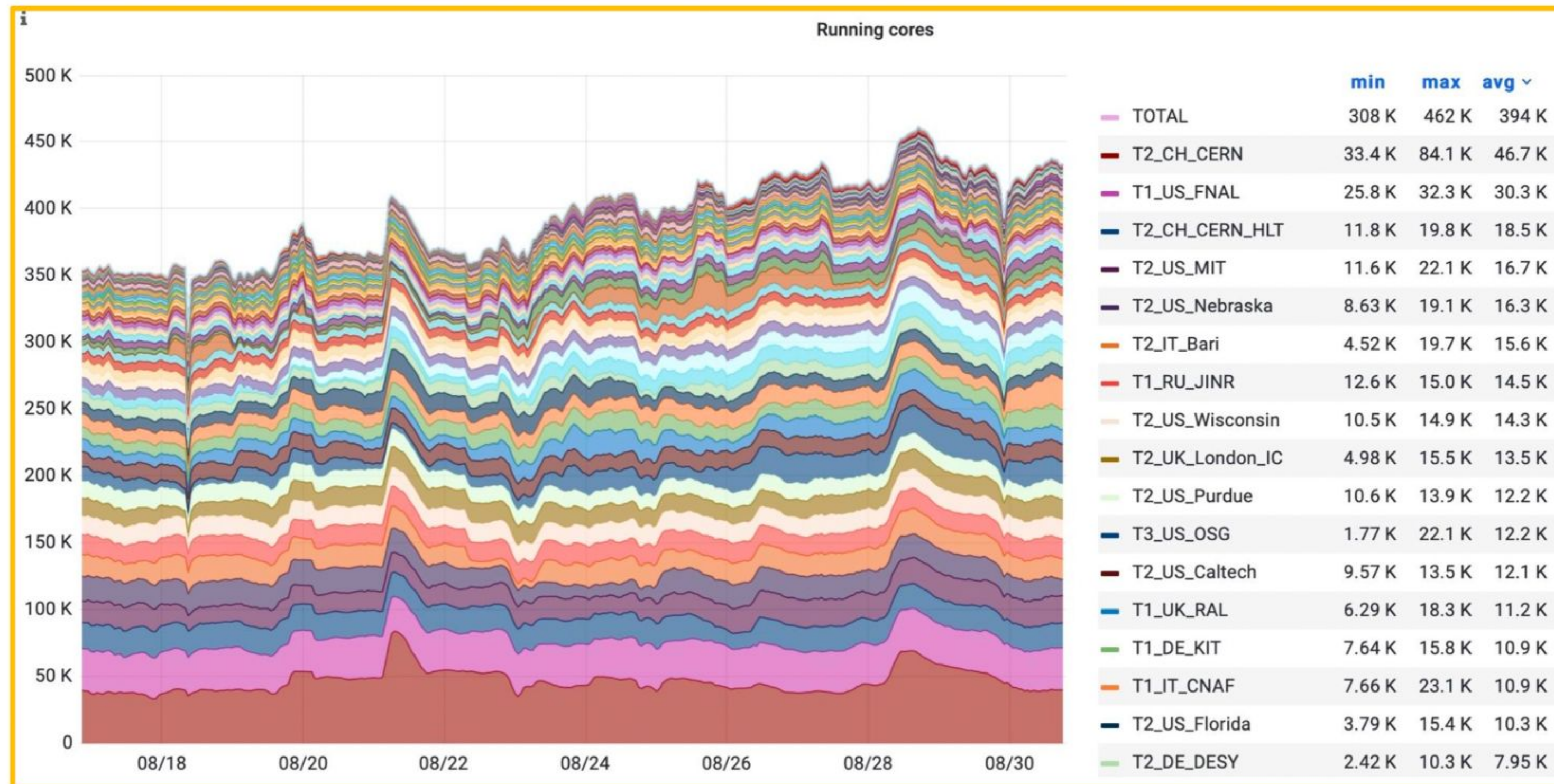
- CPU efficiency stable and good at ~80% over the past two weeks, apart from a dip over the weekend.
 - [Reporting to EGI/WLCG](#) for Fermilab has been partly corrected (thanks David)!
 - This has a huge effect on the high level plots, given the size of FNAL
- **Re-re-convincing LHCC and RRB that we can use our CPUs efficiently would have a VERY high cost.**



Link to monitoring [\[url\]](#)

Computing Resource Utilization (CPU)

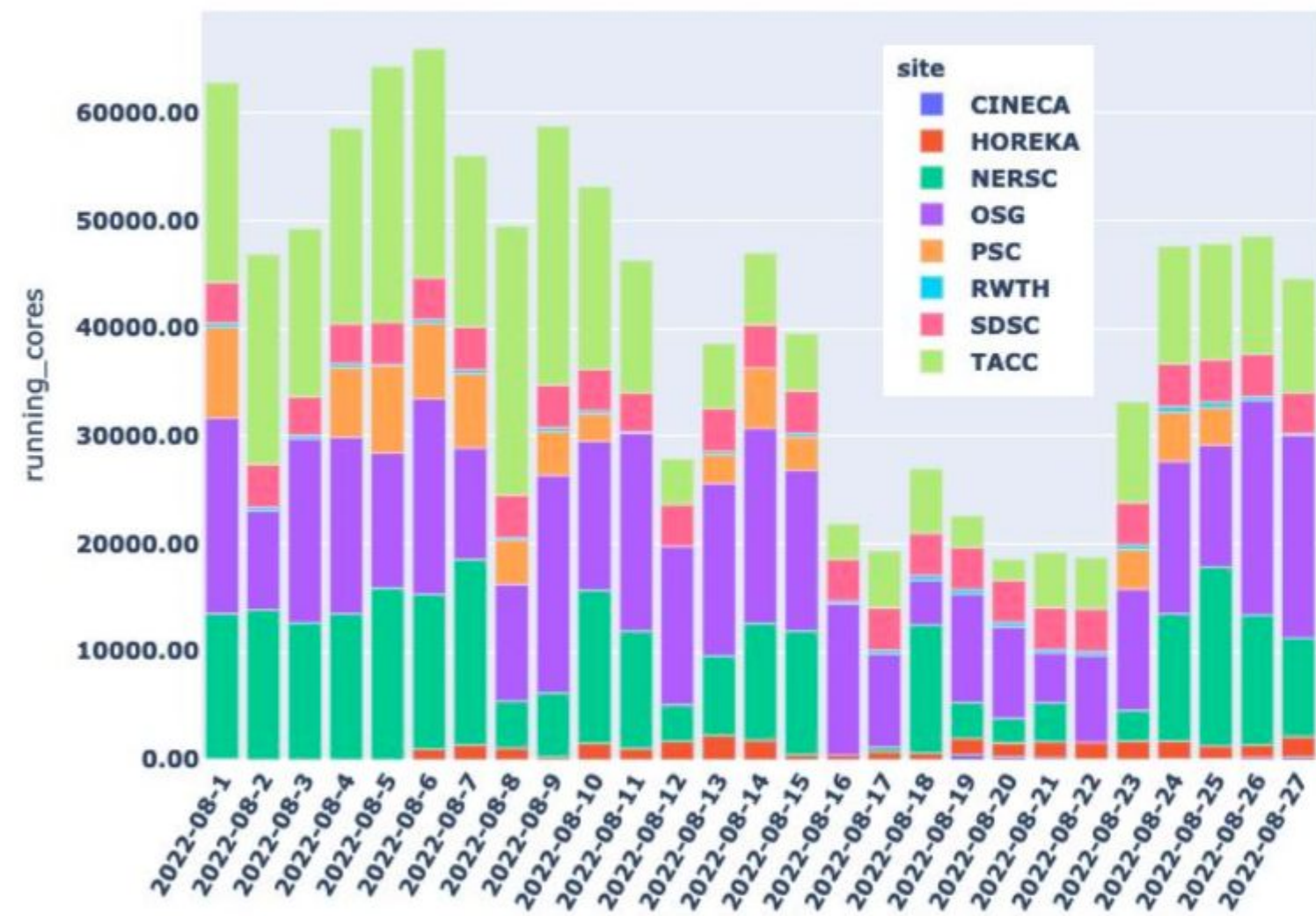
- Record CPU core utilization in the past week: **421K CPU cores on average**.
- Peak at 462K CPU cores (close to a record), even w/o a top-20 contribution from NERSC.



Link to monitoring [\[url\]](#)

HPC Capacity in Europe

Cores used at HPCs in August



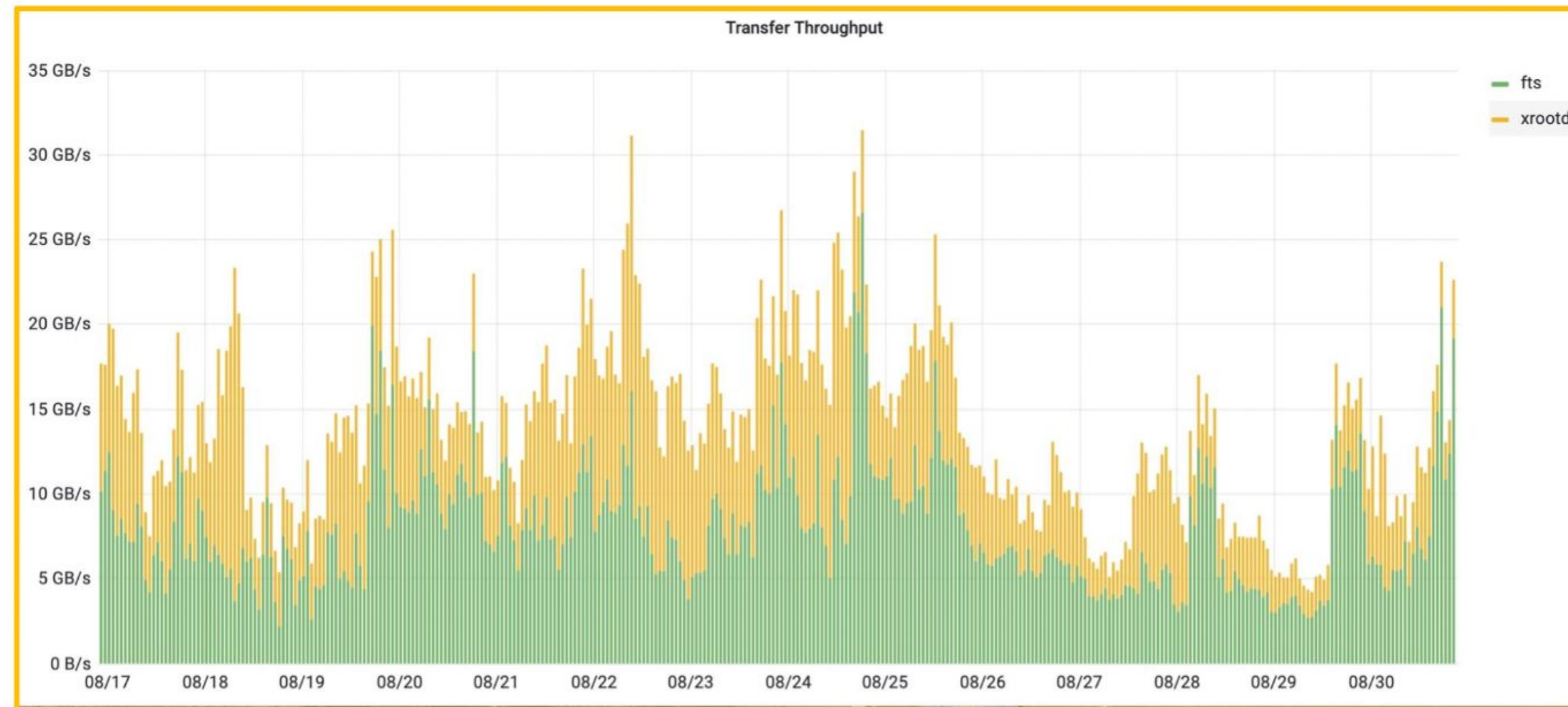
- CMS needs more capacity at HPCs in Europe
- First step: get back CINECA with M100
 - Physics validation campaign to be opened in [ValDB](#) this week

Monitoring still not in production:
please provide feedback to DRP! [\[url\]](#)

Network Utilization: FTS & XRootD

- Relatively stable network utilization over the past two weeks.
- N.B. There is a question from the C-RSG (and answer from CMS) in the [request document](#) about network monitoring.

CMS-1 The C-RSG asks that the CMS Collaboration, in its next submission to C-RSG, reports on how additional network monitoring could be beneficial to the experiment.



- Tier-0 export traffic can be found [here](#).

Link to WLCG monitoring [\[url\]](#)

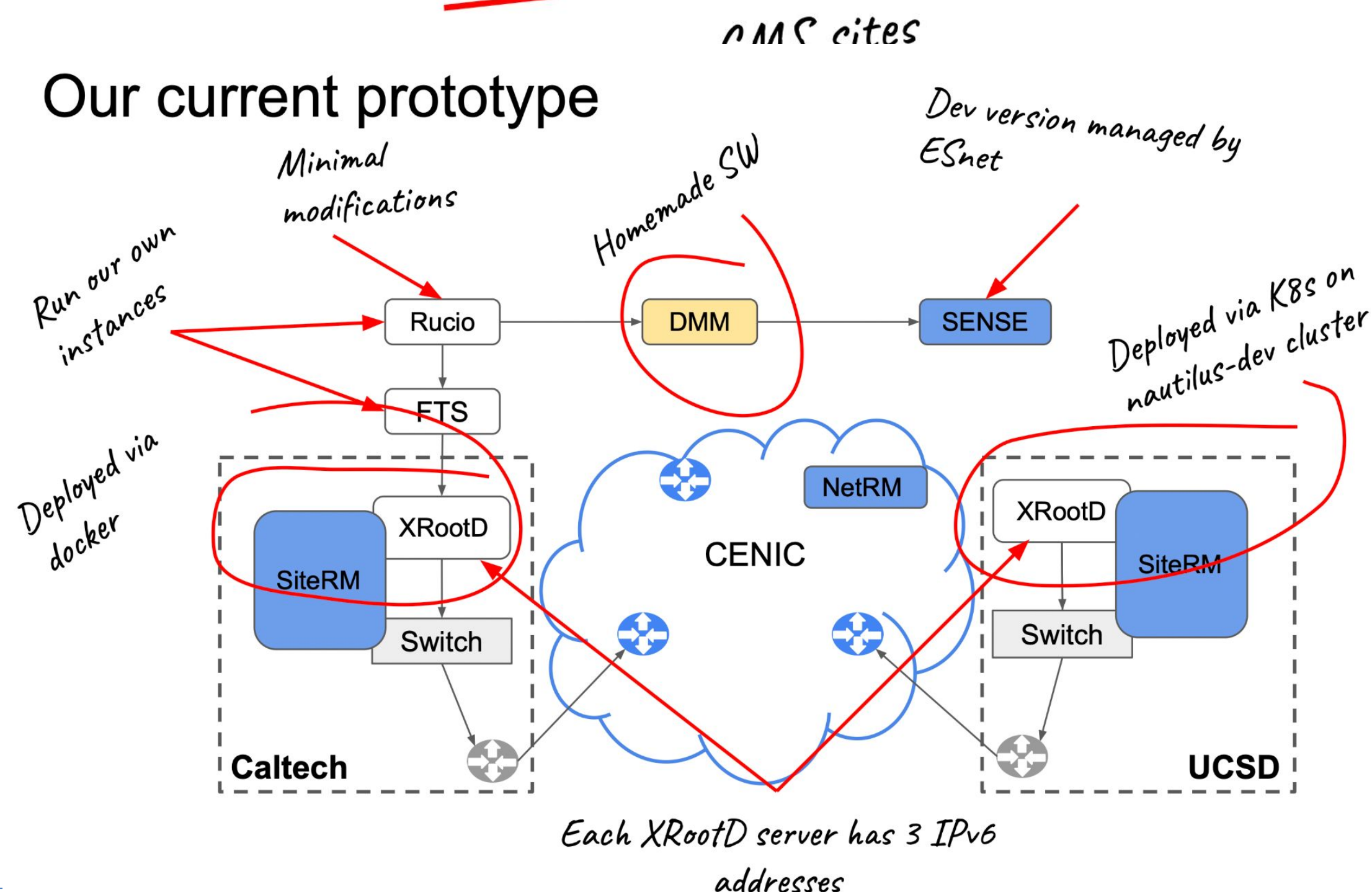
WLCG DOMA Rucio/Sense Presentation

- WLCG DOMA General Meeting from Aug 31: <https://indico.cern.ch/event/1188340/>
- Talk about Rucio/Sense: “Managed Network Services for Exascale Data Movement Across Large Global Scientific Collaborations”

Using SENSE *To move data in Rucio*

~~Managed Network Services for Exascale Data Movement Across Large Global Scientific Collaborations~~

Our current prototype



FNAL is working on being part of the testbed