

# Spotkanie Polish WLCG z Przedstawicielami Eksperymentów LHC

Michał Bluj, Jacek Kitowski

Virtual Meeting, 21.5.2024 (14:00-15:30)

# Program spotkania

1. Podsumowanie ostatniego okresu działalności (M. Bluj, J. Kitowski)
2. Informacja z posiedzenia C-RRB, April 22, 2024 (M. Bluj)
3. Realizacja zobowiązań przez Sygnatariuszy Polish WLCG (J. Kitowski)
4. Informacje z WLCG/HSF workshop DESY 13-17.5.2024 (J. Kitowski)
5. Bieżące problemy realizacji zobowiązań przez KDM i plany na przyszłość  
(Przedstawiciele Polish WLCG i eksperymentów)
6. AOB

# Zobowiązania na 2023/2024

for 2023										
	Alice* - OK		Atlas - OK		CMS - OK		LHCb - OK		total	
	HS06	TB	HS06	TB	HS06	TB	HS06	TB	HS06	TB
ACK			26 205	2 520	5 100	440			31 305	2 960
PCSS	30 800	3 000							30 800	3 000
NCBJ					5 100	440	63 000	600	68 100	1 040
<b>pledges total</b>	<b>30 800</b>	<b>3 000</b>	<b>26 205</b>	<b>2 520</b>	<b>10 200</b>	<b>880</b>	<b>63 000</b>	<b>600</b>	<b>130 205</b>	<b>7 000</b>
required	60 500	6 300	26 205	2 520	10 206	885	8 625			
pledges/required	51%	48%	100%	100%	100%	99%				
shares, %, 2023	5,2 (T1 + T2)		1,5 (T2)		0,86 (T2)		2,5 (T2)			
							tapes: 5PB			
for 2024										
	Alice ??		Atlas		CMS		LHCb		total	
	HS23	TB	HS23	TB	HS23	TB	HS23	TB	HS06	TB
ACK			27 800	3 000	5 750	500			33 550	3 500
PCSS	64 000	4 000							64 000	4 000
NCBJ					5 750	1 400	63 000	1 500	68 750	2 900
<b>pledges total</b>	<b>64 000</b>	<b>4 000</b>	<b>27 800</b>	<b>3 000</b>	<b>11 500</b>	<b>1 900</b>	<b>63 000</b>	<b>1 500</b>	<b>166 300</b>	<b>10 400</b>
required	60 500	6 300	27 777	2 996	11 500	1 070				
pledges/required	106%	63%	100%	100%	100%	178%				
shares, %, 2024	5,2 (T1 + T2)		1,5 (T2)		0,7214 (T2)		T1 - no requi..nts			
							tapes: 5PB			

# ALICE (1.1.2024-31.03.2024)

Poland — Normalized Elapsed time (HEPSCORE23) \* Number of Processors (months) by Resource Centre and Month (Custom VOs)

Resource Centre	Jan 2024	Feb 2024	Mar 2024	Total	Percent
CYFRONET-LCG2	3	0	0	3	0.01%
PSNC	25,251	14,378	15,375	55,004	99.85%
WUT	71	2	5	77	0.14%
<b>Total</b>	<b>25,324</b>	<b>14,381</b>	<b>15,380</b>	<b>55,084</b>	
<b>Percent</b>	<b>45.97%</b>	<b>26.11%</b>	<b>27.92%</b>		

<b>HS23</b>	
Ave (4-11.2023)	13 002
<b>Ave (1-3.2024)</b>	<b>18 361</b>
<b>Pledges 2023</b>	<b>30 800</b>
Pledges 2024	64 000

Storage (TB)	storage-provided	Catalogue
PCSS 1.12.2023 AliMon used	988	831
PCSS 1.12.2023 AliMon size	2 312	2 400
<b>Pledges 2023</b>	<b>3 000</b>	
Pledges 2024	4 000	

SE Name	AliEn SE			Catalogue statistics					Storage-provided information				
	AliEn name	Tier	Size	Used	Free	Usage	No. of files	Type	Size	Used	Free	Usage	Version
38. Poznan - EOS	ALICE::Poznan::EOS	2	4 PB	448.7 TB	3.562 PB	10.95%	5,164,162	FILE	4 PB	376.8 TB	3.632 PB	9.2%	
39. Poznan - SE	ALICE::Poznan::SE	2	2.4 PB	926.5 TB	1.495 PB	37.7%	11,359,905	FILE	2.312 PB	1.104 PB	1.208 PB	47.75%	Xrootd v4.12.5

# ATLAS (1.1.2024-31.03.2024)

## Poland — Normalized Elapsed time (HEPSCORE23) \* Number of Processors by Resource Centre and Month (Custom VOs)

Resource Centre	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Total
CYFRONET-LCG2	26,496	43,674	72,269		235,918	226,199	152,380	97,609	1,022,260
Total	26,496	43,674		167,716	235,918	226,199	152,380	97,609	1,022,260
Percent	2.59%	4.27%		16.41%	23.08%	22.13%	14.91%	9.55%	

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**NO EGI data for ATLAS**

<b>HS23</b>	
Ave (4-11.2023)	127 800
<b>Ave (1-3.2024)</b>	<b>25 700</b>
<b>Pledges 2023</b>	<b>26 200</b>
Pledges 2024	27 800

Data taken from Atlas monitoring

<b>Storage</b>	
Cyfronet ave. (PANDA)	1 100 TB
Cyfronet now (PANDA)	1 780 TB
<b>Cyfronet Ave (1-3.2024)</b>	<b>1 720 TB</b>
<b>Pledges 2023</b>	<b>2 500 TB</b>
Pledges 2024	3 000 TB

# CMS (1.1.2024-31.3.2024)

Poland Poland — Normalized Elapsed time (HEPSCORE23) \* Number of Processors (months) by Resource Centre and Month (Custom VOs)

Resource Centre	Jan 2024	Feb 2024	Mar 2024	Total	Percent
<b>CYFRONET-LCG2</b>	441	0	0	441	2.19%
<b>NCBJ-CIS</b>	14,541	963	4,218	19,723	97.81%
<b>Total</b>	14,983	963	4,218	20,164	
<b>Percent</b>	74.31%	4.78%	20.92%		

2023	Total
7,245	617,370
5,932	152,170
3,176	769,540
11%	

Number of rows per page 30

<b>HS23</b>	
Ave (4-11.2023)	96 200
<b>Ave (1-3.2024)</b>	<b>6 721</b>
<b>Pledges 2023</b>	<b>10 200</b>
Pledges 2024	11 500

Storage (RUCIO)	1.12.2023
Cyfronet alloc.	400 TB
Cyfronet used	358 TB
NCBJ alloc.	630 TB
NCBJ used	512 TB
<b>Storage (RUCIO)</b>	<b>4.5.2023</b>
<b>Cyfronet alloc.</b>	<b>400 TB</b>
<b>Cyfronet used</b>	<b>357 TB</b>
<b>NCBJ alloc.</b>	<b>1 400 TB</b>
<b>NCBJ used</b>	<b>881 TB</b>
<b>Pledges 2023</b>	<b>850 TB</b>
Pledges 2024	1 900 TB

# LHCb (1.1.2024-31.3.2024)

Poland — Normalized Elapsed time (HEPSCORE23) \* Number of Processors (months) by Resource Centre and Month (Custom VOs)

Poland — Normalized Elapsed time (HEPSCORE23) \* Number of Processors (months) by Resource Centre and Month (Custom VOs)

Resource Centre	Jan 2024	Feb 2024	Mar 2024	Total	Percent
CYFRONET-LCG2	0	0	0	0	0%
NCBJ-CIS	42,637	61,957	67,225	171,819	99.99%
PSNC	6	2	5	14	0.01%
<b>Total</b>	<b>42,643</b>	<b>61,960</b>	<b>67,230</b>	<b>171,833</b>	
<b>Percent</b>	<b>24.82%</b>	<b>36.06%</b>	<b>39.13%</b>		

Total
84,922
312,819
49
397,791

<b>HS23</b>	
Ave (4-11.2023)	49 700
<b>Ave (1-3.2024)</b>	<b>57 278</b>
<b>Pledges 2023</b>	<b>63 000</b>
Pledges 2024	63 000

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 d 533 TB  
 022 600 TB

# Pledges for 2024

for 2024										
	Alice ??		Atlas		CMS		LHCb		total	
	HS23	TB	HS23	TB	HS23	TB	HS23	TB	HS06	TB
ACK			27 800	3 000	5 750	500			33 550	3 500
PCSS	64 000	4 000							64 000	4 000
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<b>pledges total</b>	<b>64 000</b>	<b>4 000</b>	<b>27 800</b>	<b>3 000</b>	<b>11 500</b>	<b>1 900</b>	<b>63 000</b>	<b>1 500</b>	<b>166 300</b>	<b>10 400</b>
required	60 500	6 300	27 777	2 996	11 500	1 070				
pledges/required	106%	63%	100%	100%	100%	178%				
shares, %, 2024	5,2 (T1 + T2)		1,5 (T2)		0,7214 (T2)		T1 - no requi..nts			
							tapes: 5PB			



# Ustalenia – dla przypomnienia

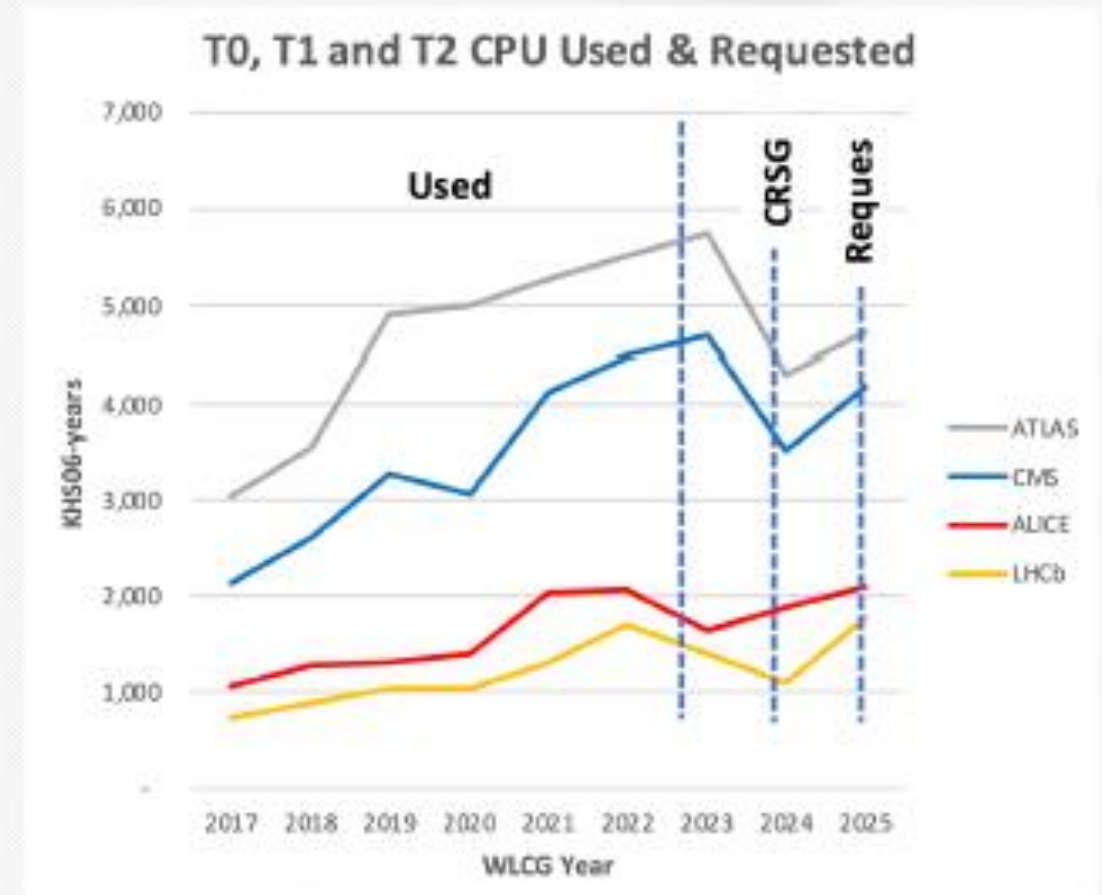
Wg p. 4 Porozumienia i późniejszych ustaleń (w nawiasie osoby kontaktowe ośrodków koordynujących):

- Cyfronet dostarcza i koordynuje zasoby dla współpracy ATLAS oraz dostarcza zasoby dla CMS  
(Marek Magryś, Patryk Lason, Adrian Marszałik, Andrzej Zemła)
- NCBJ dostarcza i koordynuje zasoby dla współpracy LHCb oraz dla CMS  
(Wojciech Wiślicki, Michał Bluj, Henryk Giemza, Tomasz Fruboes)
- PCSS dostarcza i koordynuje zasoby dla współpracy ALICE  
(Krzysztof Kurowski, Norbert Meyer, Marcin Pospieszny, Radosław Januszewski)

Każdy Sygnatariusz Porozumienia (PCSS, Cyfronet, NCBJ) może udostępniać zasoby dla każdego eksperymentu, lecz koordynacja w ramach eksperymentu należy do ośrodka koordynującego.

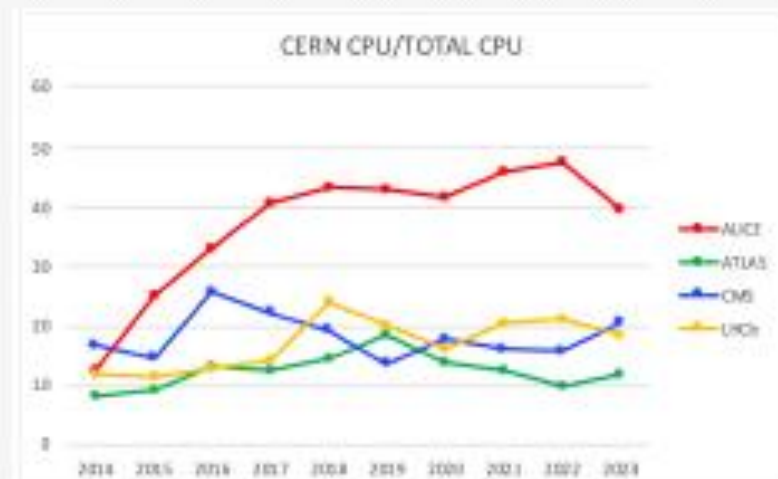
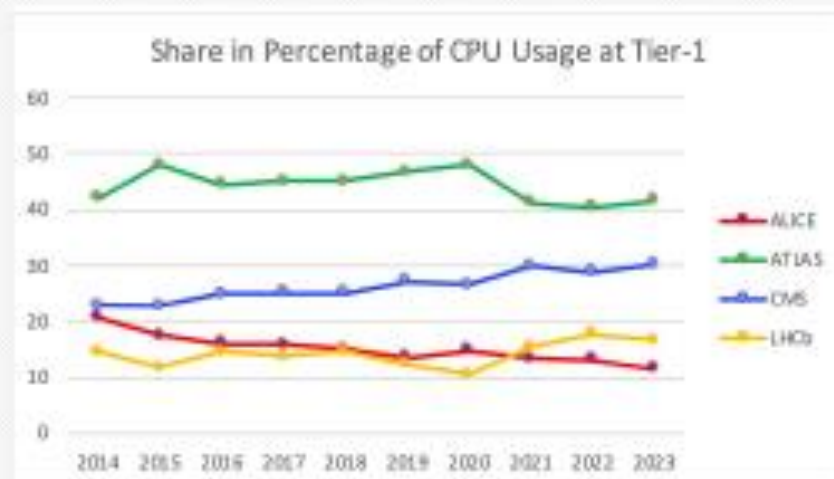
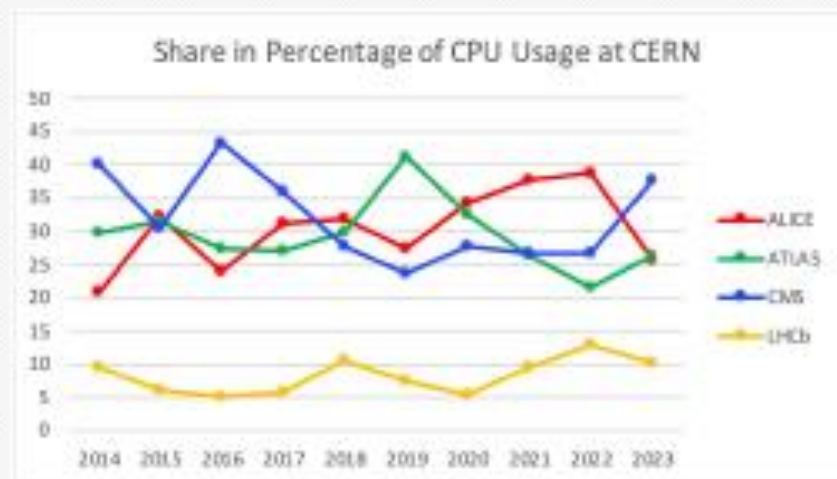
# Resource Utilization in 2023

- CPU utilization dominated by simulation & analysis
- All the Collaborations had taken advantage of opportunistic CPU well above pledged values
- Trends for ALICE and LHCb reflect changes in running plans for 2023, 2024 and 2025



# CPU Usage in 2023

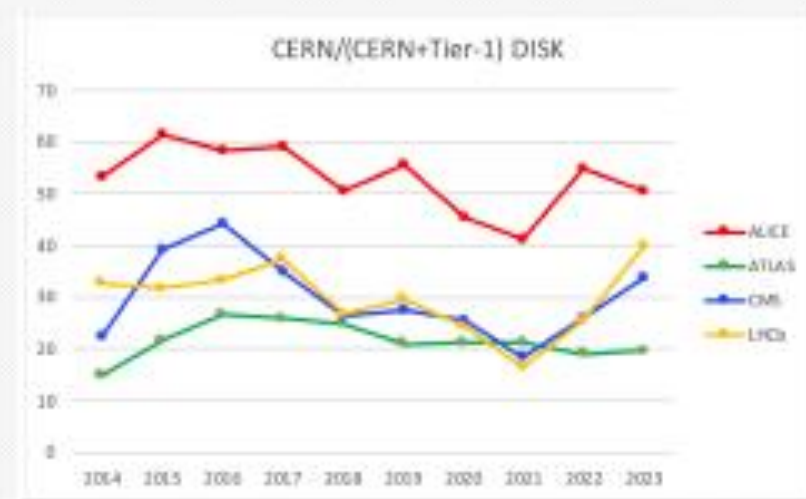
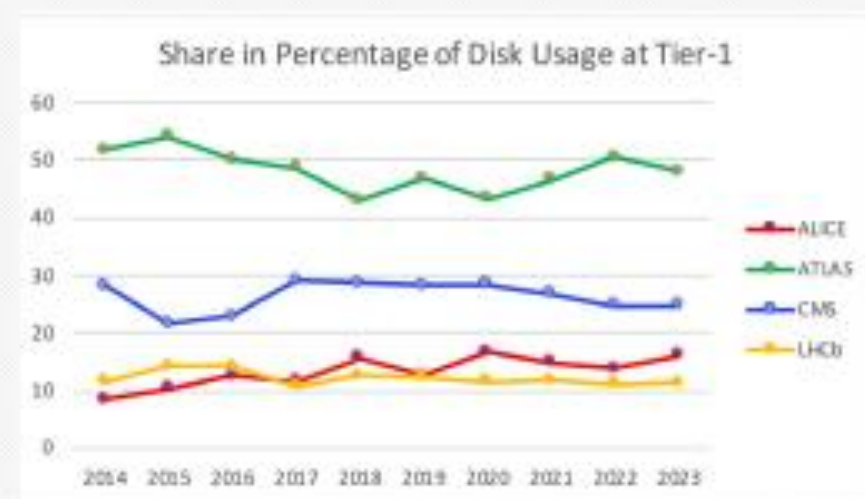
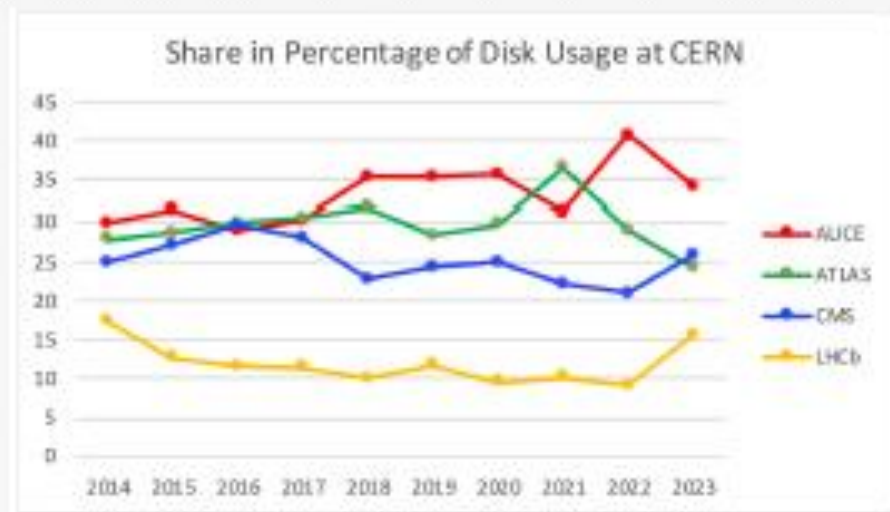
- Total 2023 CPU utilization 13.9 MHS06-years
  - Roughly 1.5M cores used 24-7 through 2023
  - Half delivered by T2 sites, with T1 (30%) and T0 (20%)
- CMS has been largest T0 user; ATLAS and CMS dominate T1 sites





# Disk Usage in 2023

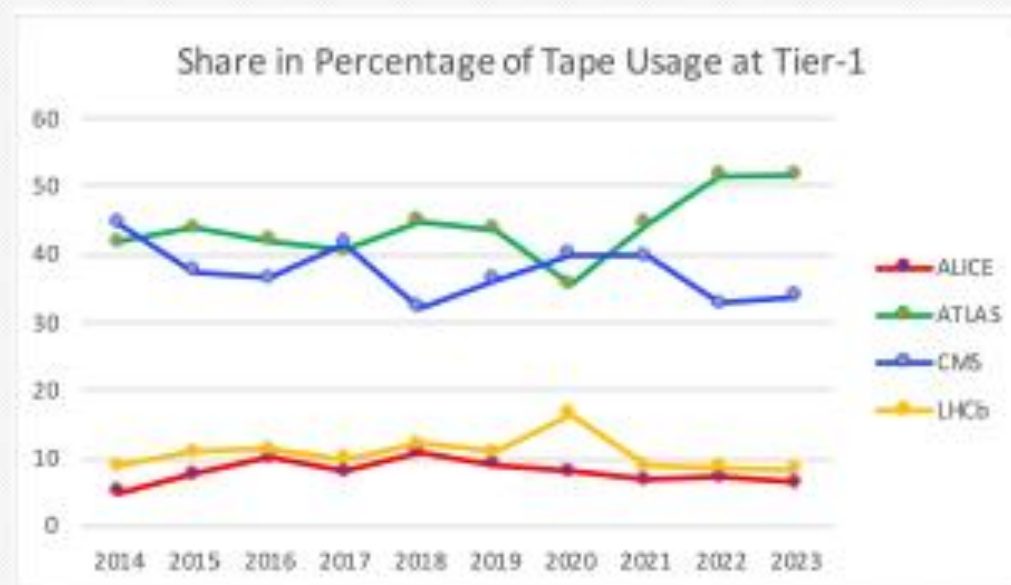
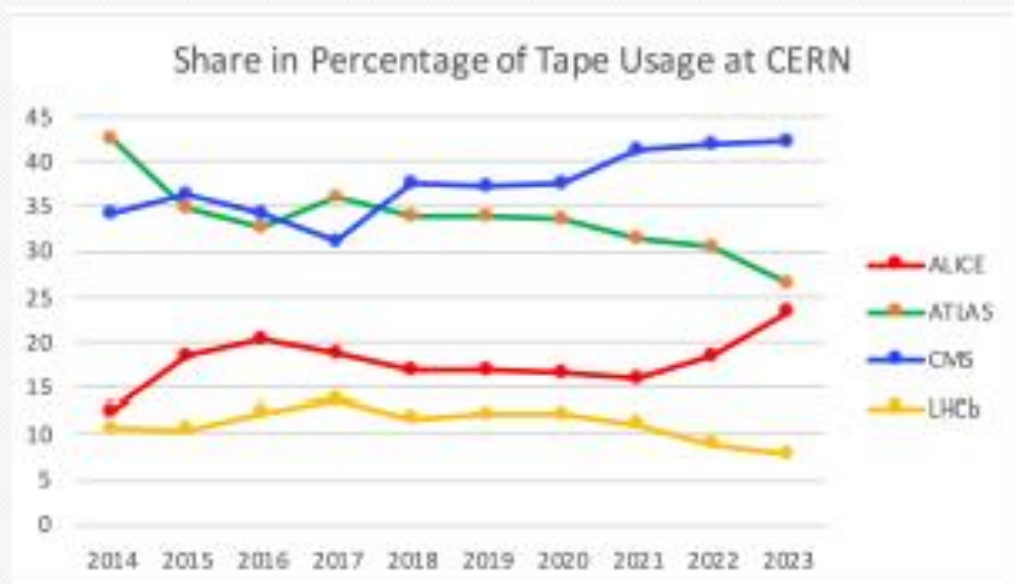
- Disk usage tracked for CERN and T1 sites
- Trends been consistent, though total CERN disk has increased relative to others



# Tape Usage in 2023

7

- Total of 1150 PB up from 880 PB in 2022)
- Increase reflects volume of Run 3 data recorded
- Allocated resources are keeping up with data increase

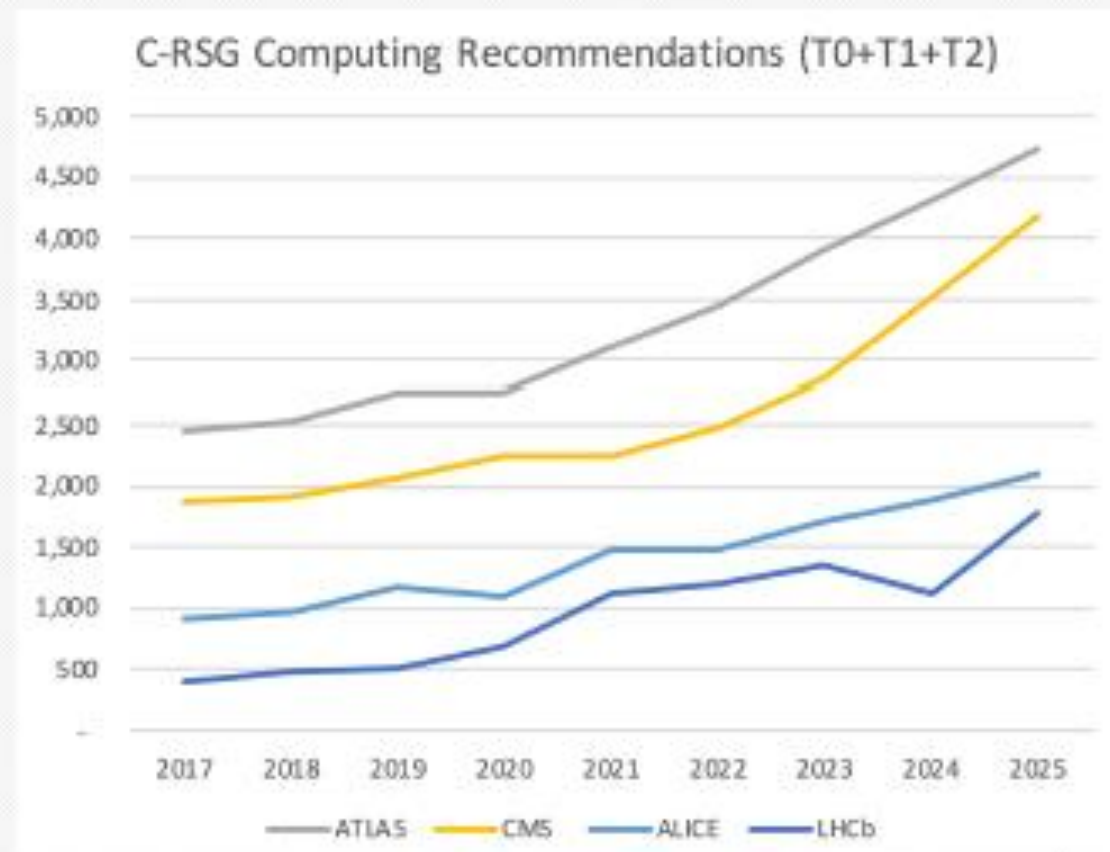




# 2024 Utilization and 2025 Requests

- The 2024 plans are based on the Run 3 schedule
  - Continuing data collection and processing
  - Focus largely on Run 3 analyses
- The 2025 plans are based on the current Run 3 schedule

2025 Requests	ALICE	ATLAS	CMS	LHCb	Total
CPU	+12%	+10%	+19%	+60%	+18%
Disk	+14%	+14%	+19%	+57%	+20%
Tape	+19%	+24%	+27%	+46%	+27%



# Prévessin Data Centre

- ❑ Phase 1 for 4 MW was completed successfully at the beginning of 2024 with a net saving of 5 MCHF on the allocated budget
  - ❑ Inauguration February 23rd, 2024



The inauguration of the new data centre in Prévessin. From left to right: Pippa Wells, CERN's Deputy Director for Research and Computing; Charlotte Warakaulle, CERN's Director for International Relations; Aurélie Charillon, Mayor of Prévessin-Moëns; Joachim Mnich, CERN's Director for Research and Computing; Yves Nussbaum, Director Marché Industrie, AXIMA; and Enrica Porcari, Head of Information Technology Department at CERN. (Image: CERN)

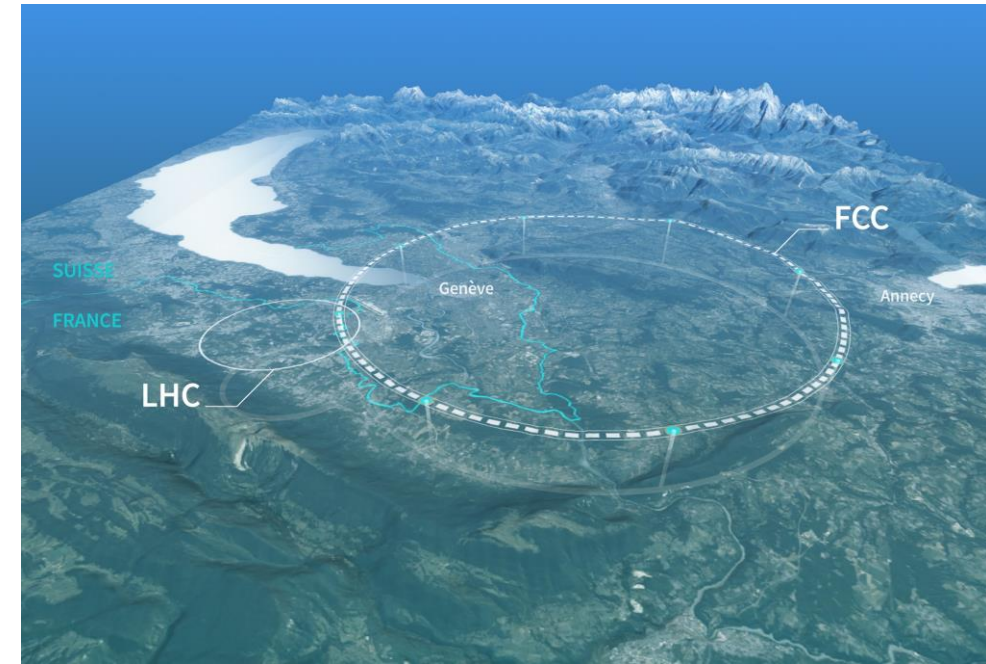


- ❑ Future plans:
  - ❑ WLCG requirements indicate a need for the Phase 2 upgrade to 8 MW ahead of Run 4
  - ❑ Phase 2 upgrade foreseen 2027-mid 2028
  - ❑ Estimated budget 12 MCHF



# Other News

- ❑ Midterm report FCC feasibility Study reviewed by CERN Council in February 2024
- ❑ Update European Strategy for Particle Physics launched by CERN Council
  - ❑ 2024: establishment of all committees, selection of meeting venues
  - ❑ 2025: submission of scientific input by community, community Open Symposium and drafting of Strategy document
  - ❑ 2026: Council discussion and update of the Strategy
- ❑ Visit French and Swiss Presidents in November 2024





# TOP500, May 2024 – Polish Centres



Rank	System	Cores	Rmax (PFlop/s)	Rpeak (PFlop/s)	Power (kW)
55	<b>Helios GPU</b> - HPE Cray EX254n, NVIDIA Grace 7200 3.1GHz, NVIDIA GH200 Superchip, Slingshot-11, HPE, Cyfronet	89,760	19.14	30.44	317
76	<b>Proxima</b> - HPE Cray XD220v/HPE Cray XD665, EPYC 9334 32C 3Ghz/Xeon Platinum 8480+ 56C 2GHz, Infiniband NDR200, HPE, GALAXY, PCSS Poznan	58,224	13.82	23.32	
80	<b>Lem</b> - PowerEdge XE9640, Intel Xeon Platinum 8462Y+ 32C 2.8GHz, Nvidia H100 94Gb SXM5, Infiniband NDR200 DELL EMC WCSS, Wrocław	44,992	12.80	20.37	
154	<b>Kraken-Fregata</b> - HPE Cray XD665, AMD EPYC 9334 32C 2.7GHz, Nvidia H100 94Gb SXM5, Infiniband NDR200, HPE, GALAXY Gdansk University of Technology, CI Task	21,904	5.99	10.02	
177	<b>Athena</b> - FormatServer THOR ERG21, AMD EPYC 7742 64C 2.25GHz, NVIDIA A100 SXM4 40 GB, Infiniband HDR, Format sp. z o.o. Cyfronet	47,616	5.05	7.71	147
250	<b>Altair</b> - CH121L V5 Liquid-Cooled, Xeon Platinum 8268 24C 2.9GHz, Infiniband EDR, Huawei Technologies Co., Ltd. PCSS Poznan	63,360	3.53	5.88	829
305	<b>Helios CPU</b> - HPE Cray EX, AMD EPYC 9654 96C 2.4GHz, Slingshot-11, HPE Cyfronet	75,264	3.09	3.35	454
442	<b>Ares</b> - CH121L V5 Liquid-Cooled, Xeon Platinum 8268 24C 2.9GHz, Infiniband EDR, Huawei Technologies Co., Ltd. Cyfronet	37,824	2.34	3.51	487



Rank	TOP500 Rank	System	Cores	Rmax (PFlop/s)	Power (kW)	Energy Efficiency (GFlops/watts)
1	189	<b>JEDI</b> - BullSequana XH3000, Grace Hopper Superchip 72C 3GHz, NVIDIA GH200 Superchip, Quad-Rail NVIDIA InfiniBand NDR200, ParTec/EVIDEN EuroHPC/FZJ Germany	19,584	4.50	67	72.733
2	128	<b>Isambard-AI phase 1</b> - HPE Cray EX254n, NVIDIA Grace 72C 3.1GHz, NVIDIA GH200 Superchip, Slingshot-11, HPE University of Bristol United Kingdom	34,272	7.42	117	68.835
3	55	<b>Helios GPU</b> - HPE Cray EX254n, NVIDIA Grace 72C 3.1GHz, NVIDIA GH200 Superchip, Slingshot-11 HPE Cyfronet Poland	89,760	19.14	317	66.948

- Informacje z WLCG/HSF workshop DESY 13-17.5.2024 (Jacek Kitowski)
  - <https://indico.cern.ch/event/1369601/>
    - Materiały z konferencji: Materiały HSF-WLCG DESY pon.-czw.zip
    - Ciekawy przegląd technologii: Run4\_IT\_computing\_estimates BPS...
- WLCG Collaboration Board meeting 15.5.2024
  - <https://indico.cern.ch/event/1415125/>
  - Materiały: WLCG Collab.Board-Annexes.zip (hasło \*\*\*\*)

- Bieżące problemy realizacji zobowiązań przez KDM i plany na przyszłość (Przedstawiciele Polish WLCG i eksperymentów)
- AOB