

Aachen Report

Annual Meeting “Föderiertes Computing für die ATLAS- und CMS-Experimente am Large Hadron Collider in Run-3”

Andreas Nowack

Alexander Schmidt, Achim Stahl,

Peter Fackeldey, Alexander Jung, Thomas Kreß, Martin Lipinski,

Abhirikshma Nandi, Valentina Sarkisovi, Marius Teroerde



Financial Boundary Conditions

- granted
 - 450 k€ for computing hardware
 - first half spent in 2022 (CPU:Disk \approx 50:50)
 - second half to be spent in 2023 (CPU:Disk \approx 50:50)
 - 1 FTE (36 months)
 - A. Nowack (larger fraction)
 - M. Lipinski (smaller fraction)
- own RWTH contributions
 - personnel
 - Th. Kreß
 - 1 student assistant (“HiWi”/“WiHi”) (A. Nandi, V. Sarkisovi, P. Fackeldey)
 - rack space
 - electrical power
 - cooling
 - network connection

Tier 2/3 Cluster in Aachen

- part of the federated Tier-2 DESY/Aachen
- production Tier 2/3 cluster since 2008
- pledges for CMS in 2023
 - CPU: 36000 HS06
 - Disk: 2930 TB
- in total:
 - 7312 CPU cores (100035 HS06) running HTCondor
 - 7307 TiB disk storage in dCache
 - 2,9 PiB for CMS central data sets
 - 2,1 PiB for CMS user data + 2,1 PiB for second copy
 - 2×40 Gb/s WAN to outside world
 - internal 10 Gb/s or 1 Gb/s Cu connections
 - hardware from 2020 and 2022: 10 Gb/s (WNs), 2×10 Gb/s (dCache pools)
 - older hardware: 1 Gb/s (WNs), 2×1 Gb/s (dCache pools)
- two HTCondor-CEs operated by KIT (thanks to M. Giffels, M. Fischer)
- opportunistic resources (see next slides)

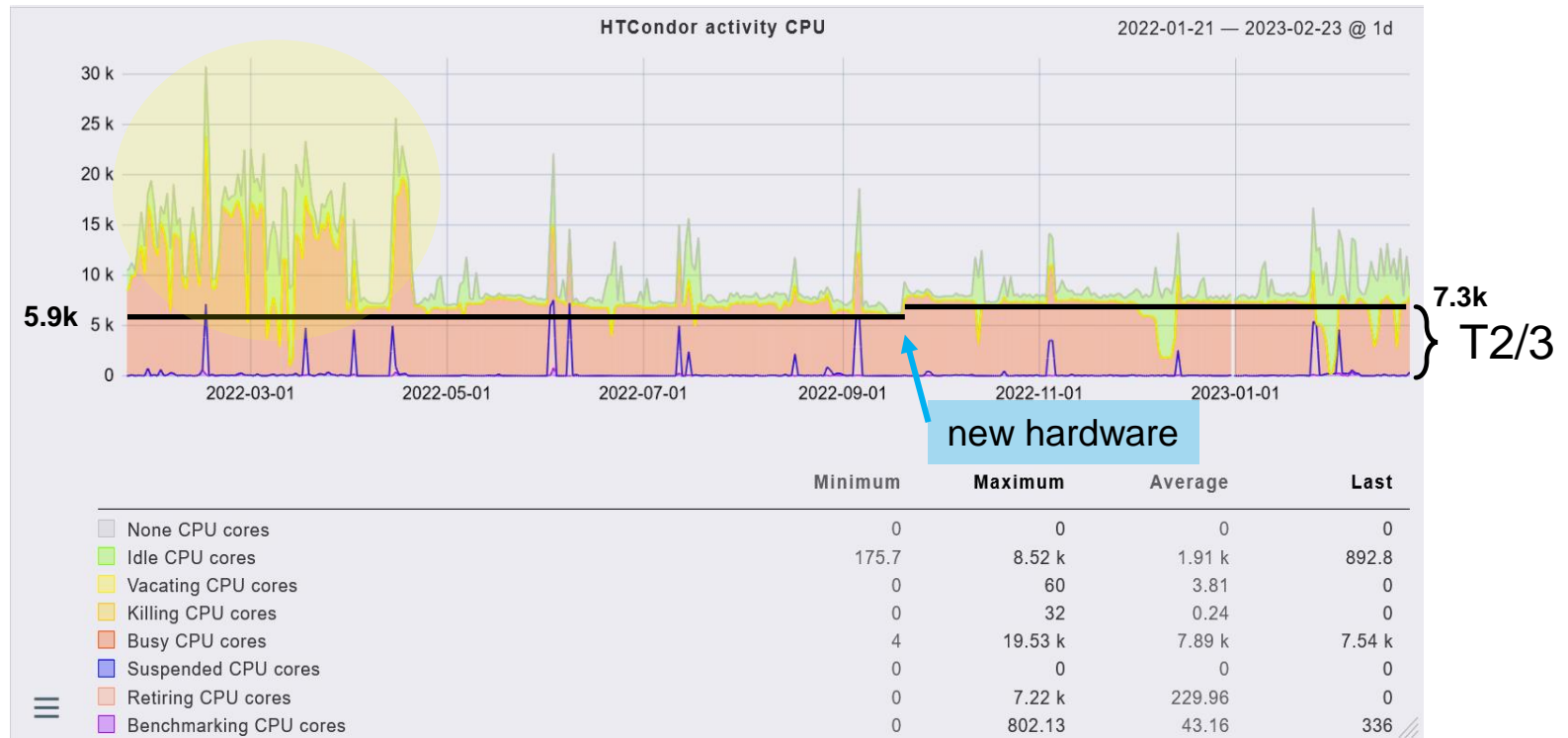


Opportunistic Resources

- HPC cluster CLAIX @ RWTH
 - using COBaID/TARDIS (developed by KIT) to add resources dynamically and transparently
 - set up by F. von Cube (KIT)
 - May 2021–May 2023:
 - two consecutive one-year project grants with 500 CPU cores on average
 - data access by WAN
 - plan for May 2023 and beyond
 - continuing on a smaller scale (50–100 CPU cores)
 - current application scheme for compute time with an explicit research aim does not fit well our use-case where compute time is offered for a large variety of CMS jobs
 - maintaining the setup
 - adapt to changing environment, demands ...
 - RWTH is a NHR site

Opportunistic Resources

- HPC cluster CLAIX @ RWTH
 - enormous additional resources can be included



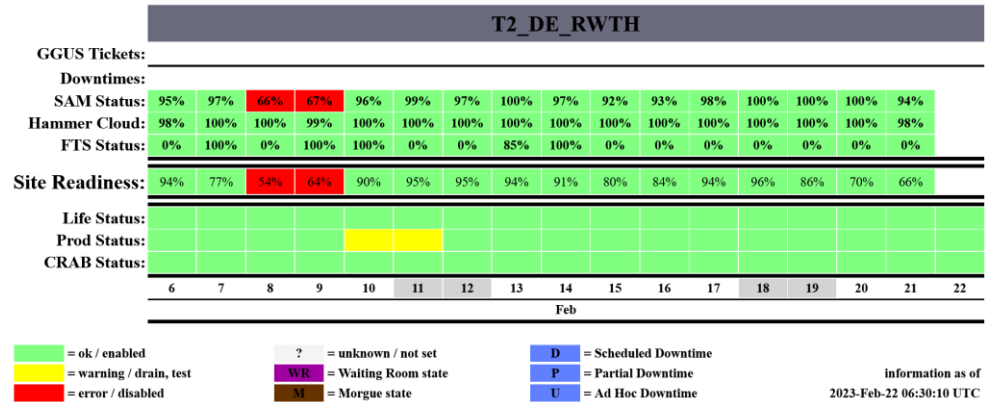
Opportunistic Resources: Opening Up New Providers

- HPC cluster @ Jülich Supercomputing Centre, Forschungszentrum Jülich
 - integration development by A. Jung in the scope of FIDIUM
 - thanks to Ch. Wissing (DESY) and FZJ
 - using COBaID/TARDIS
 - challenge
 - very restrictive firewall
 - data access from the job to other Tier centers must be tunneled

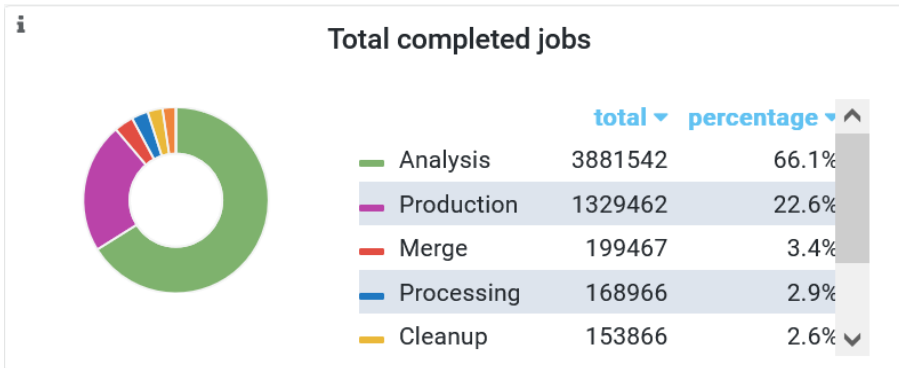


Performance of Grid Cluster

- in general very high site availability
- pledges are always fulfilled
 - CMS got even more due to opportunistic resources



- jobs since 2022-01-01 (using CMS submission tools)



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Outlook

- procurement of new hardware this year
- ongoing work (FIDIUM) on opportunistic resources
- we are interested to provide and maintain Tier 2 resources for CMS and German CMS users in the future in whatever site setup (local/hybrid/remote)
- sufficient expert personnel to maintain specific computing services for CMS and to support CMS users in all future Tier 2 site operation scenarios is crucial

Thank you for your attention

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung



III. Physikalisches
Institut B

RWTHAACHEN
UNIVERSITY