CERN CMS TIER2 Baltic project

Jānis Irbe
Riga Technical University, 2023

«CMS needs and interest in a joint Tier2 computing grid in the Baltic Region»

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The goal

Unite high-performance computing resources from **Baltic academic institutions** in a **federated HPC resource pool** for efficient processing of CERN CMS TIER2 workloads.

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Objectives

HPC Resource consolidation

- Unite the High Performance computing (HPC) resources and competencies of academic institutions
- Expand the Latvian CERN CMS Tier2 federated cloud infrastructure created in the pilot project, connecting with partner infrastructure and CERN through GEANT.

Collaboration partners

- Leading partner - RTU High Energy and Accelerator Technology Center.
- Latvian partners: University of Latvia, National Library of Latvia, Rēzekne Technology Academy and Ventspils Radio Astronomy Center.
- Involving possible Baltic group partners from Estonia and Lithuania: Kaunas Technical University, University of Tartu, Vilnius University, KBFI, TALTECH.
- Industry partners

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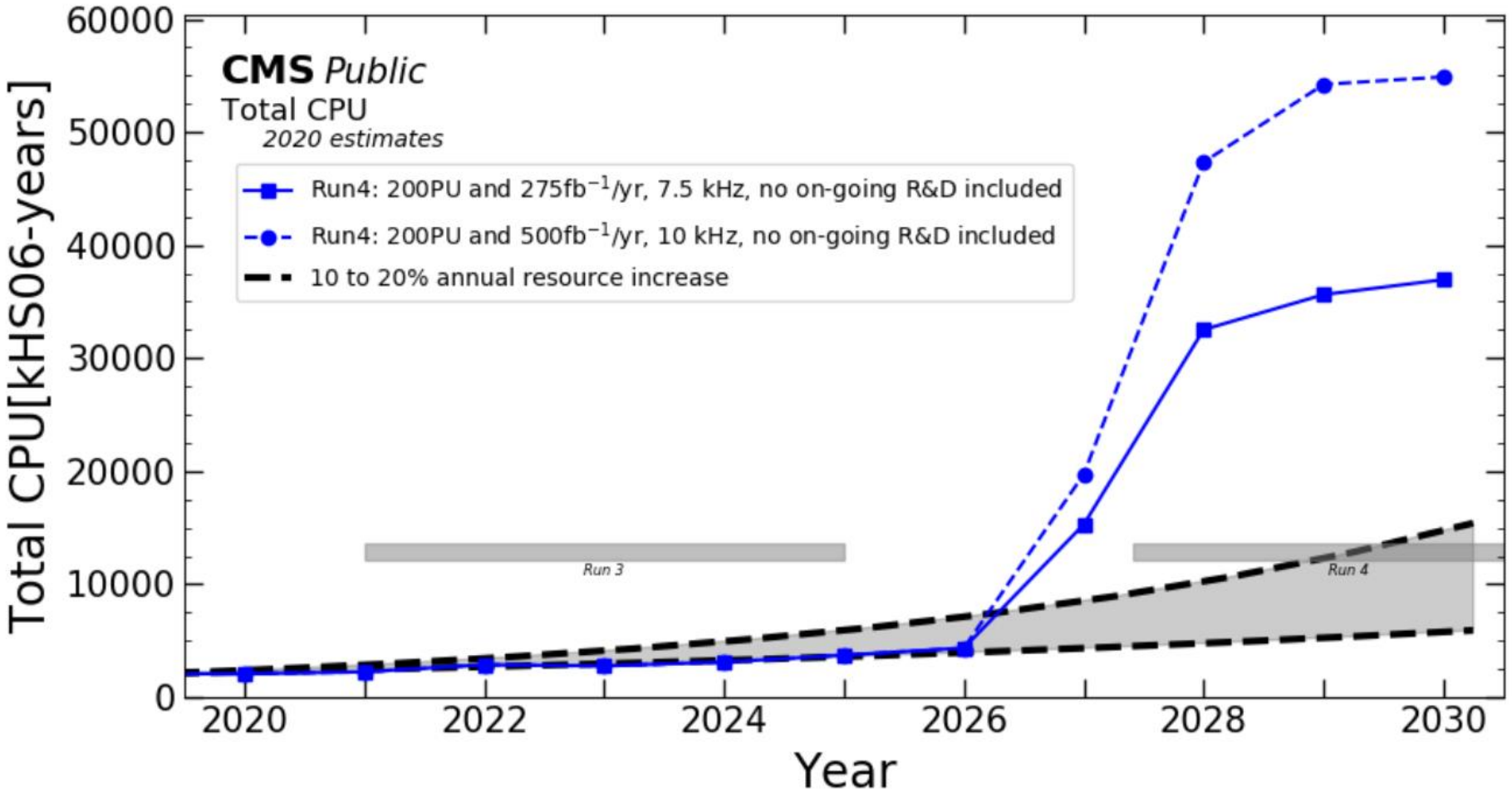
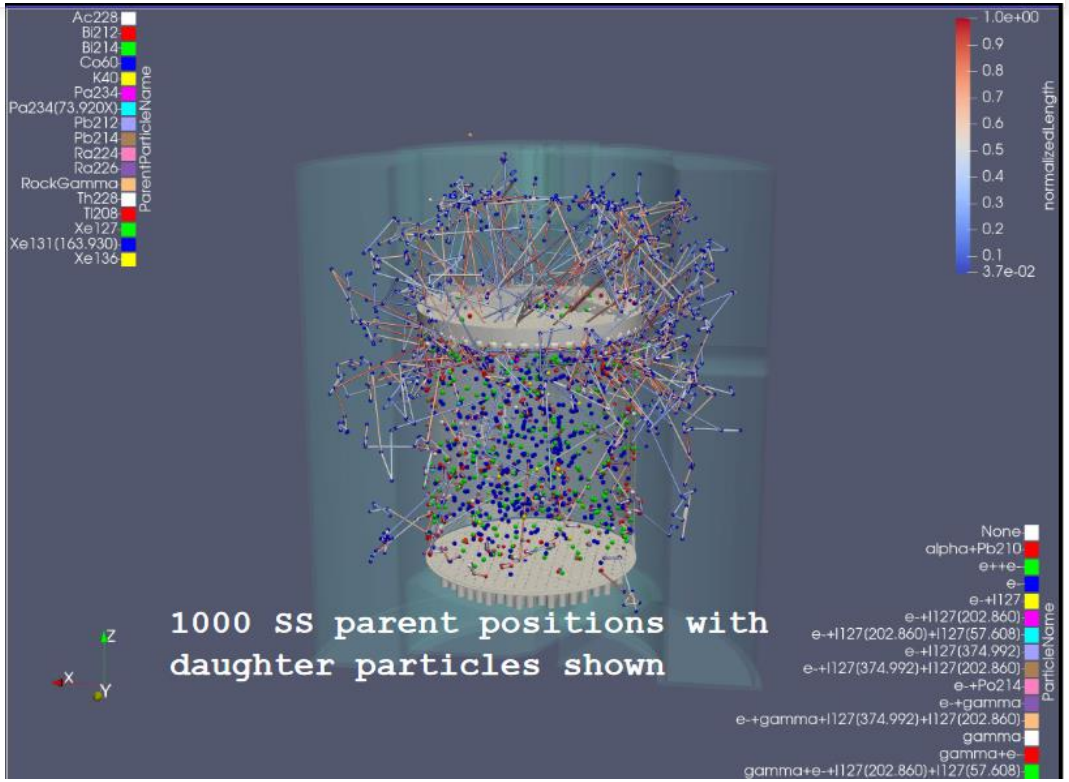
CMS compute requirements

High Luminosity LHC (HL-LHC) will start with Run 4 in 2029.



Changes in CMS TIER2 software

- GridFTP is being replaced by WebDAV, no need for GRID type certificates - tokens are used for authentification instead
- Offline Compute software includes Machine-Learning elements
- Portability libraries like Alpaka are used that are CPU/GPU cross-compatible with autodetection
- Workloads can be distributed on Linux VMs or «thin» singularity containers with cvmfs
- 10G data bandwidth is recommended



PATATRACK Pixel Track Reconstruction with Alpaka

Current partner involvement

- A technical feasibility study was carried out on the possibilities of combining HPC resources;
- Resource allocation and SLA contracts concluded with Latvian partners – LU, VA, LNB, RTA;
- Cooperation agreement for feasibility study concluded with Kaunas Technical University, agreement with Estonia partners regarding consultancy;
- Purchases and delivery of TIER2 HPC nodes and networking equipment have been made, some including GPU processors;
- Planned participation of RTU and partners in activities at CERN, Estonia, Lithuania and Latvia;
- Doctorate students working for CERN are involved in federated TIER2 site building and further operations management;
- Rebuilding the HPC platform and preparing the environment for HPC workflows is in progress and is expected to be finished in May 2023.

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Thank you!

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