CERN CMS TIER2 Baltic project

Toms Torims
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Riga Technical University, 2022

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

Danilo Piparo, CERN CMS Offline and Computing Co-Coordinator

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.

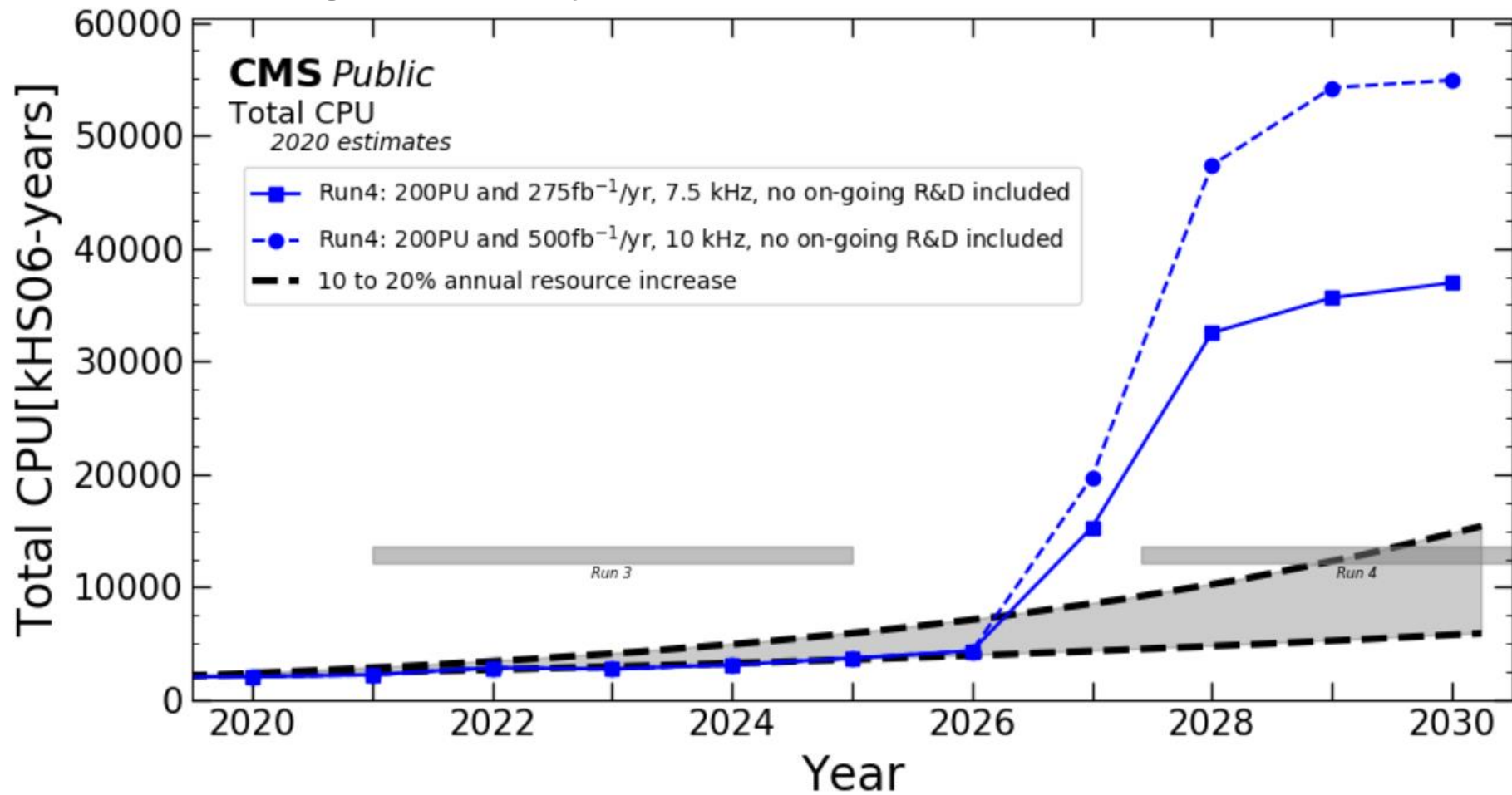# Objectives

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.
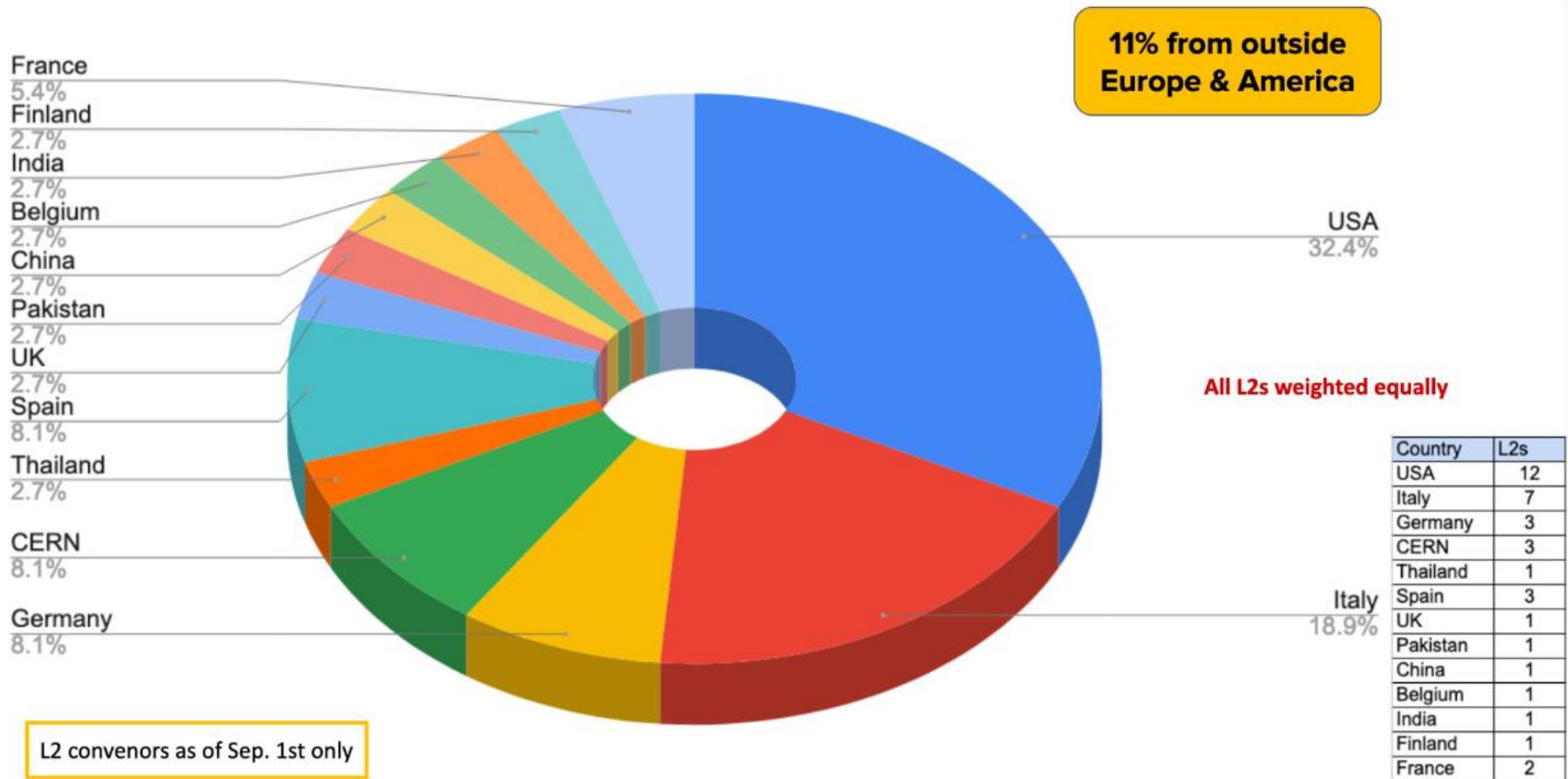
Collaboration partners

- 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.

- Governmental and industry partners

CMS compute requirements

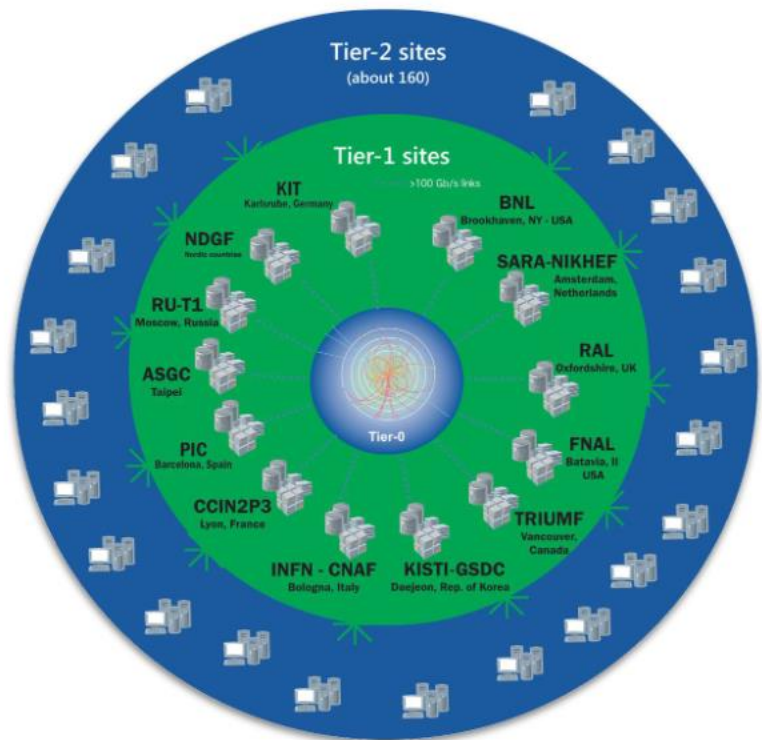**High Luminosity LHC (HL-LHC) will start with Run 4 in 2029.**

Management by Institute

**11% from outside Europe & America**

France 5.4%
Finland 2.7%
India 2.7%
Belgium 2.7%
China 2.7%
Pakistan 2.7%
UK 2.7%
Spain 8.1%
Thailand 2.7%
CERN 8.1%
Germany 8.1%

USA 32.4%

Italy 18.9%

All L2s weighted equally

Country	L2s
USA	12
Italy	7
Germany	3
CERN	3
Thailand	1
Spain	3
UK	1
Pakistan	1
China	1
Belgium	1
India	1
Finland	1
France	2

L2 convenors as of Sep. 1st only

The Baltic region is important

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
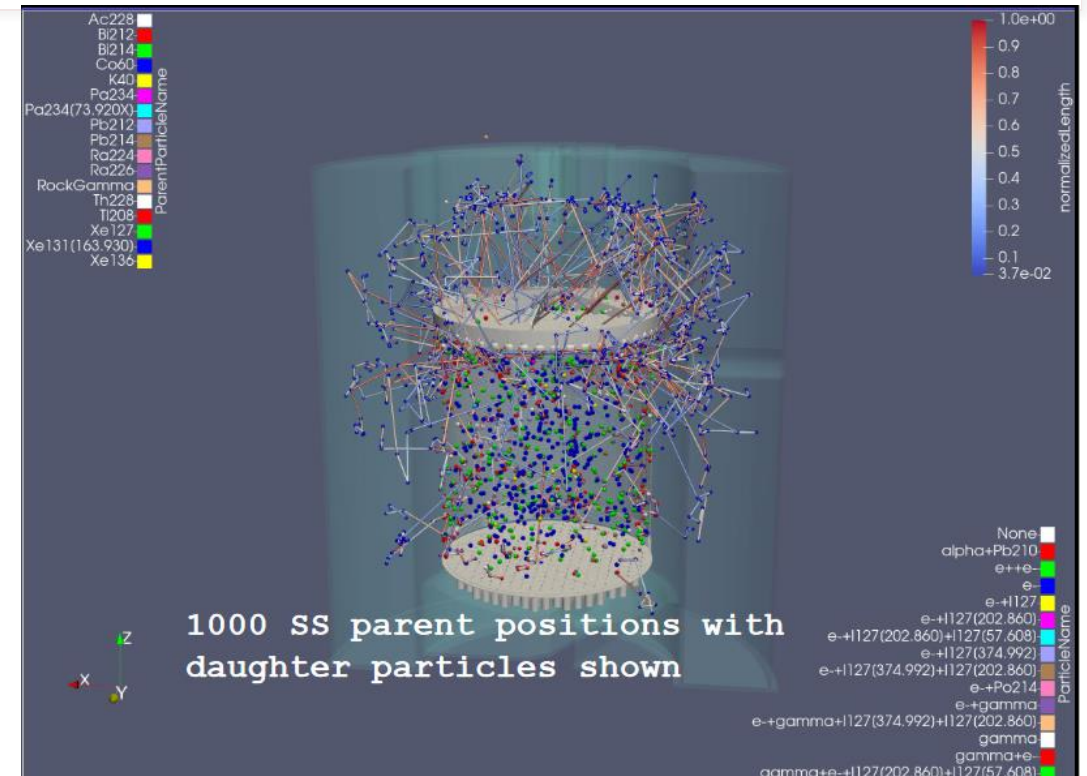
PATATRACK Pixel Track Reconstruction with Alpaka

Proposed Federated Baltic TIER2 HPC Cloud architecture

RTU Augstas enerģijas daļiņu fizikas un paātrinātāju tehnoloģiju centrs
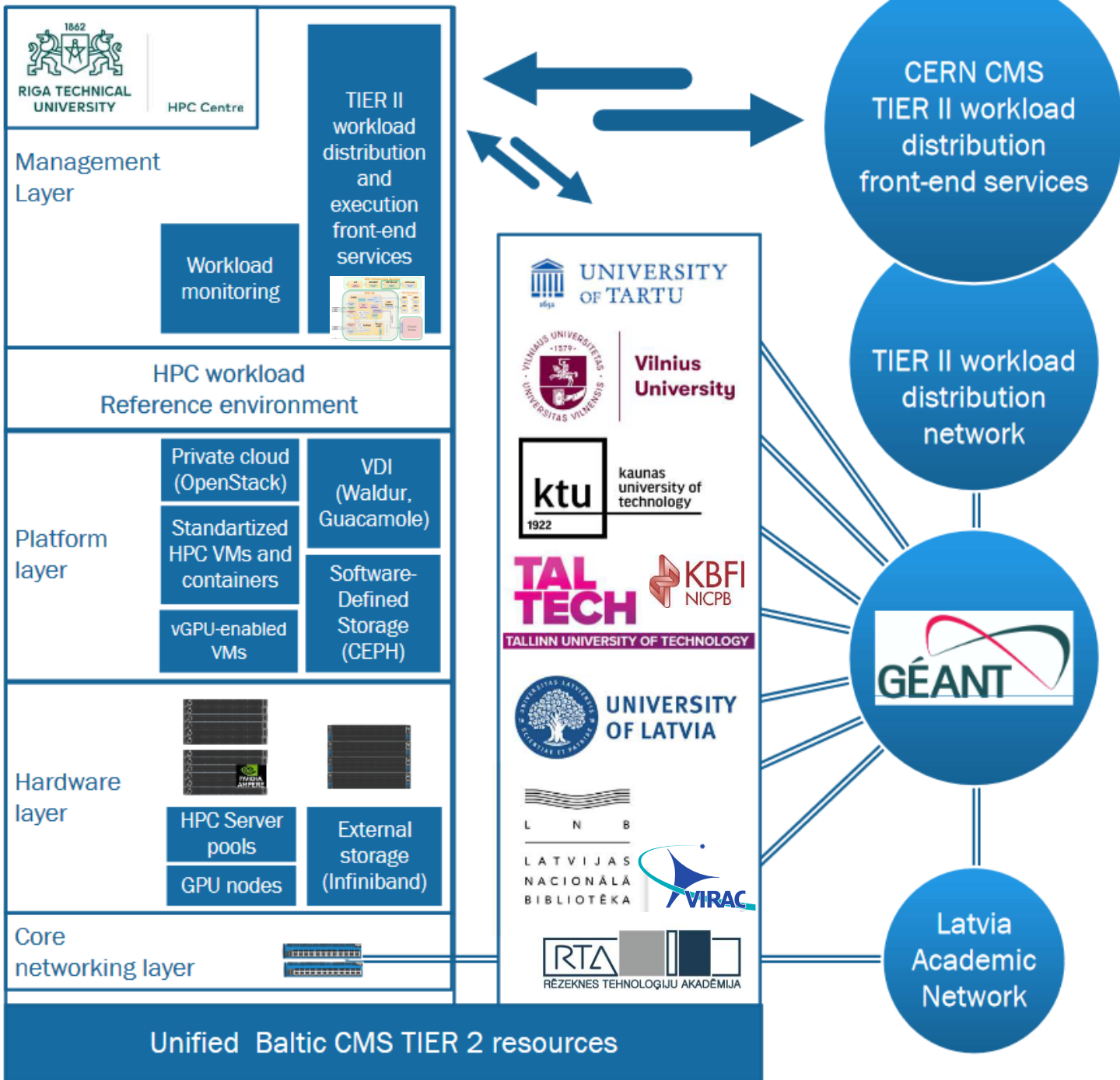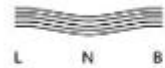
Partner involvement

- Gained knowledge of building unified cross-border TIER2 architecture

- HPC resources for Baltic TIER2 can become part of federated cloud to provide HPC services to our govenments and industries

- Coordinated IT operations to maintain continuous workload execution

- Tight collaboration with CERN via joint research activities in Computer Science field

Thank you!

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