

CERN CMS TIER2 infrastructure deployment

CERN Baltic Conference October 11 2023



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tehnoloģiju institūts

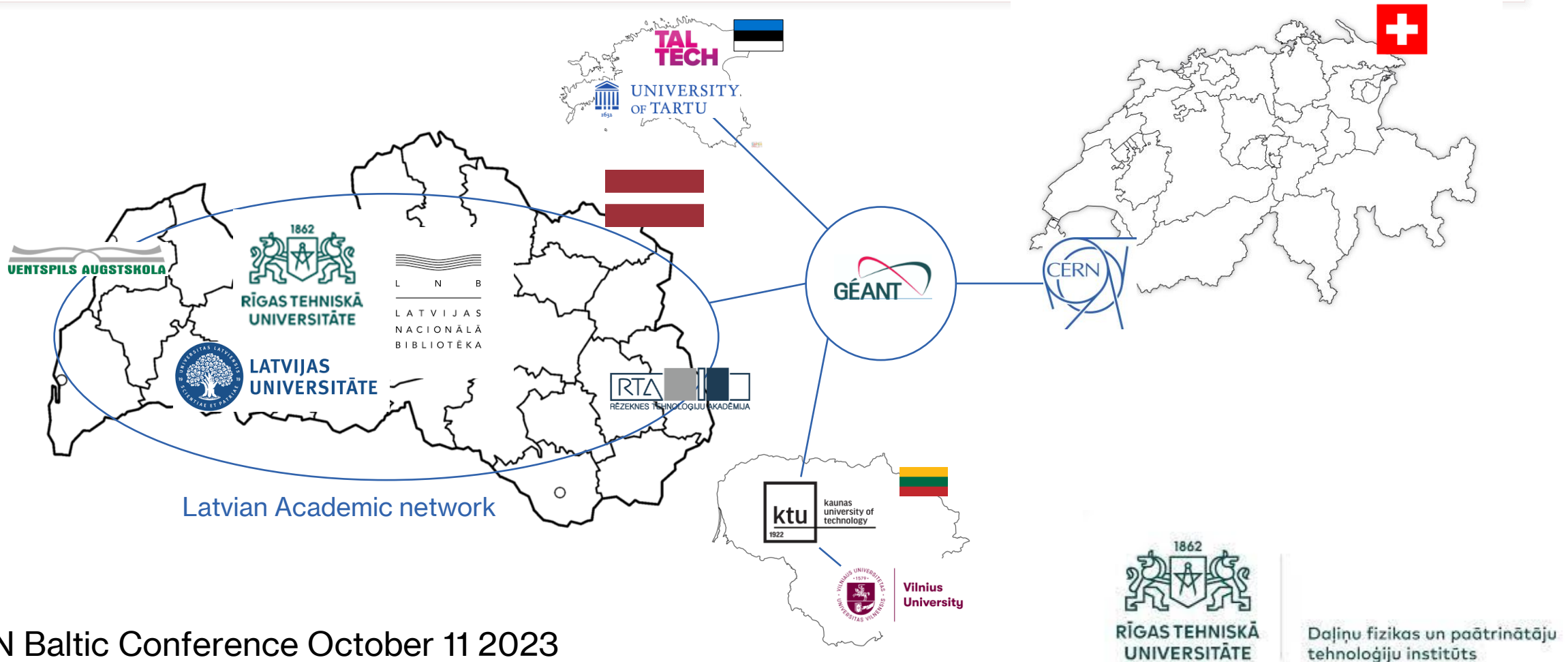
CERN CMS TIER2 project goals

- Cooperation between partners and CERN in high energy physics and HPC
- Project member education about CMS and HPC technologies at CERN
- Involvement of CERN PhD students in TIER2 activities
- Joint participation among partners in EU cross-border HPC projects
- Development of Latvia's HPC infrastructure and its promotion for scientific applications

Project funding and partners

- Funded by Latvia's government via Ministry of Education and Science
- Led by Riga Technical University
- Partners in Latvia:
 - University of Latvia
 - National Library of Latvia
 - Ventspils International Radio Astronomy Centre
 - Rezekne Academy of Technologies
- Baltic partners
 - Kaunas University of Technology (Lithuania)
 - KBFI (Estonia) - consultancy

A federated cloud: Pooling high-performance distributed computing resources as TIER2 site



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Summary of activities (2022-2023)

- CERN Baltic Group meetings held in Latvia, Lithuania and Estonia
- A TIER2 feasibility study with Kaunas Technical University
- 9 TIER2 HPC hyper-converged computing nodes procured and deployed for TIER2 site in RTU managed datacenter
- HPC private cloud infrastructure tenant (OpenStack)
- Deployed scaleable Software Defined Storage (Ceph)
- Configuration of TIER2 middleware

Deployed TIER2 resources in the Main site @RTU



- 9 worker nodes with:
 - Total of 550+ CPU cores, 2.3TB total RAM
 - Total of 1.5PB of CEPH Software Defined Storage
 - nVME pool + HDDs pool
 - 4x25Gb/s LAN connections
 - 100Gb/s gateway to GEANT network
 - One node has nVidia Ampere A40 high-performance GPU for hybrid CPU/GPU processing
- Compact deployment in just half-rack

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Software stack in the Main site @RTU

- Ceph-FS filesystem
- Cent OS 7
- Kubernetes w. CERN VMFS
- ARC-CE (v.6.17)
- A-REX (ARC Resource-coupled EXecution service)
- ARC Information System, Grid Monitor
- Gridftpd service w. Certificates
- SLURM for workload distribution

Challenges we faced during 2023

- New server hardware failure with necessary full replacement delayed the software stack deployment
- Some issues with networking

Cybersecurity concerns

From: [redacted] <[redacted]@gmail.com>
To: [redacted]
Cc: [redacted]; [redacted]; [redacted] <[redacted]@cern.ch>

Hello, [redacted]

We have ARC 7 site [https://\[redacted\].grid.sarfti.ru:443/](https://[redacted].grid.sarfti.ru:443/) It work in ALICE production from APRIL 2023, maybe not very effective:
http://alimonitor.cern.ch/display?SiteBase=SARFTI&interval.max=0&interval.min=15552000000&page=jobs_per_site_done

Best Regards,
[redacted]

Всего доброго,
С уважением,
[redacted]

BT, 26 сент. 2023 г. в 14:45, [redacted] <[redacted]@rtu.lv>:
Hi [redacted],
Thank you very much for information concerning testing ARC7.
alimonitor.cern.ch/display?SiteBase=SARFTI&interval.max=0&interval.min=15552000000&page=jobs_per_site_done

☺ ⏪ ⏩ ⋮
Wed 9/27/2023 4:26 PM



Warning: Potential Security Risk Ahead

Firefox detected a potential security threat and did not continue to [\[redacted\].grid.sarfti.ru](https://[redacted].grid.sarfti.ru). If you visit this site, attackers could try to steal information like your passwords, emails, or credit card details.

What can you do about it?

The issue is most likely with the website, and there is nothing you can do to resolve it.
If you are on a corporate network or using antivirus software, you can reach out to the support teams for assistance. You can also notify the website's administrator about the problem.

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Planned activities for Q4 2023 / Q1 2024

- Participation in O&C Fall event at CERN, Geneva
- Preparation tests and first run of CMS TIER2 workloads at the Main site
- Implementation of monitoring and technical support processes
- Deployment and tests of federated cloud member resources
- GPU workload-processing tests
- Promotion of CERN information stand in the National Library of Latvia