



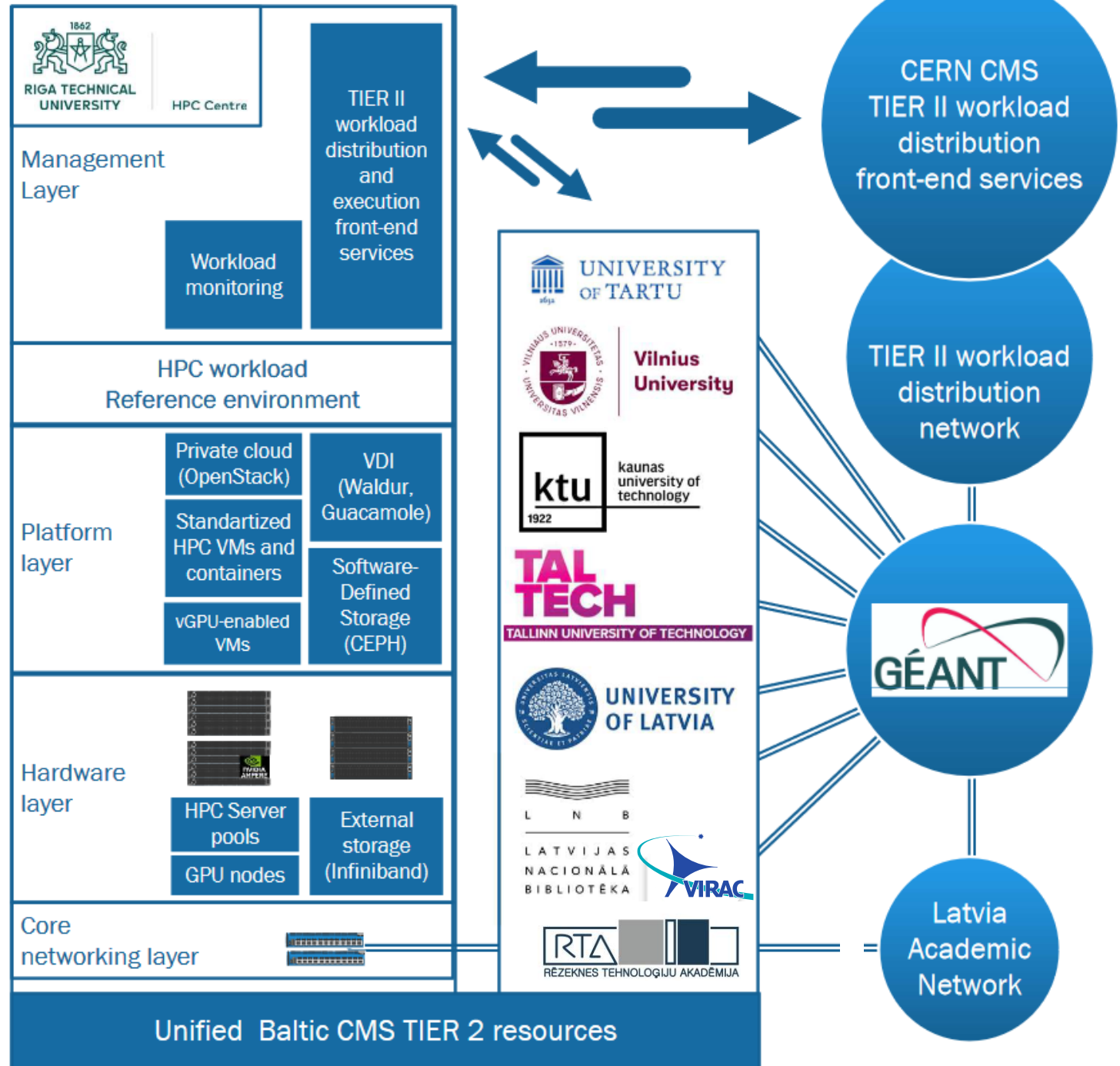
CERN CMS TIER2 Latvia project



The goal

Unite high-performance computing resources from multiple academic institutions in a federated HPC resource pool for efficient processing of CERN CMS TIER II workloads.

A federated HPC Cloud architecture





Objectives

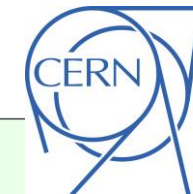
Unite HPC resources

- Identify and unite the High Performance computing (HPC) resources and competencies of academic institutions
- Expand the Latvian CERN CMS Tier II federated cloud infrastructure created in the pilot project connecting with the CERN CMS infrastructure through the GEANT network.

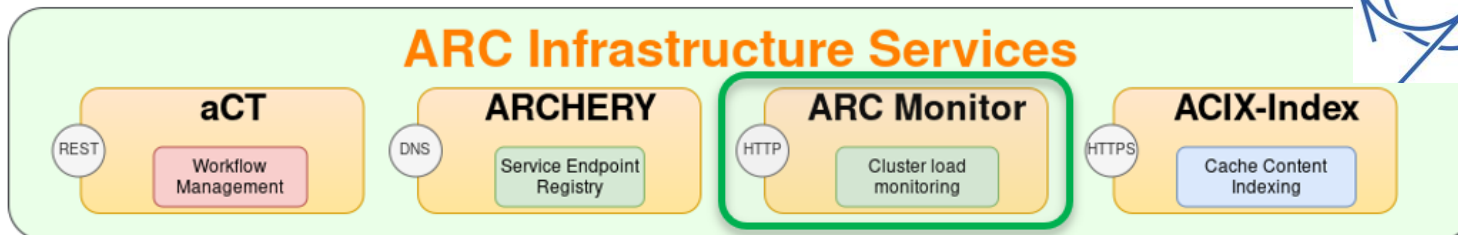
Collaboration partners

- 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, TALTECH.
- Industry partners

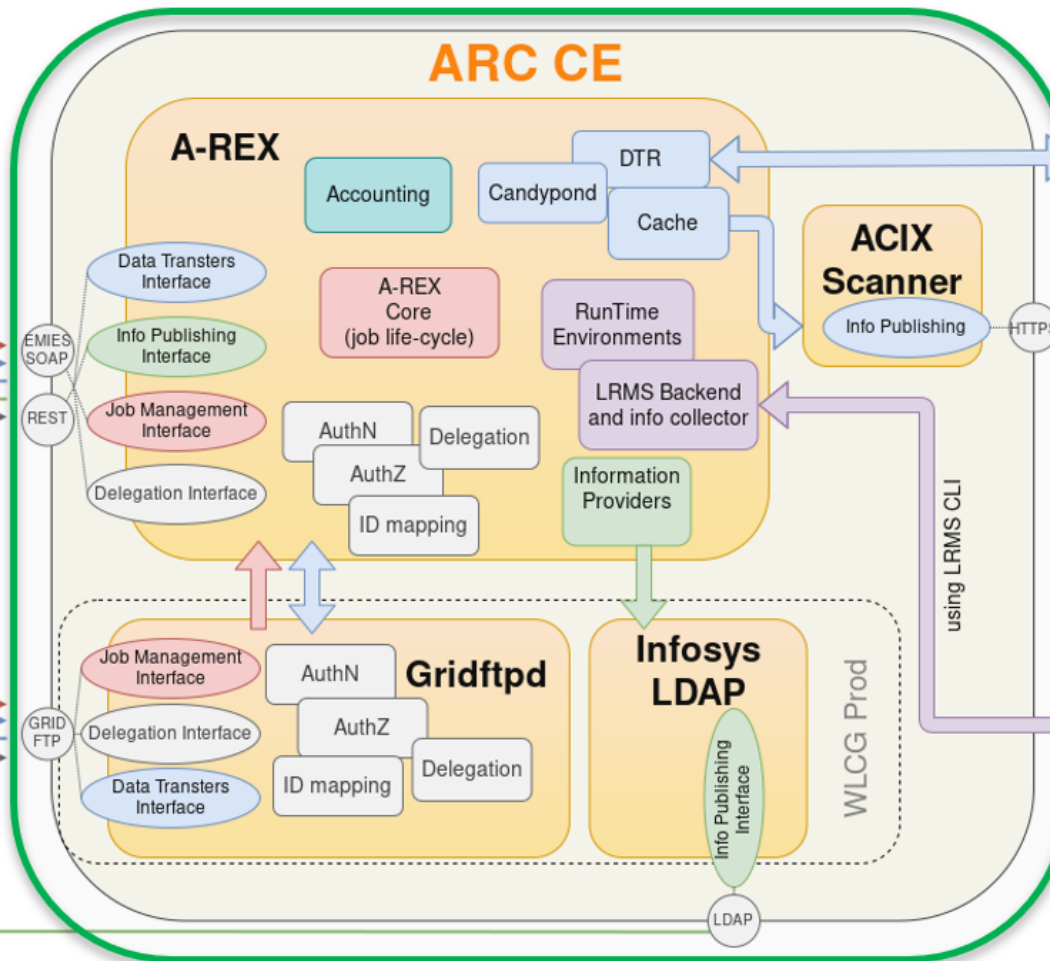
Integration services architecture



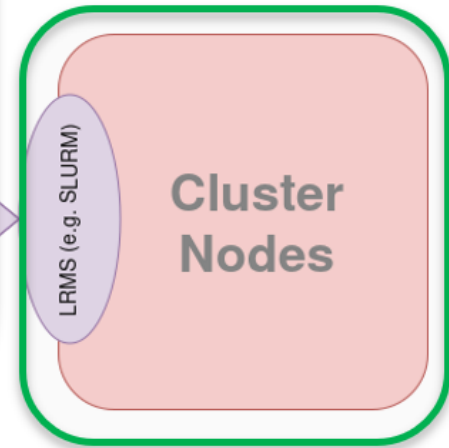
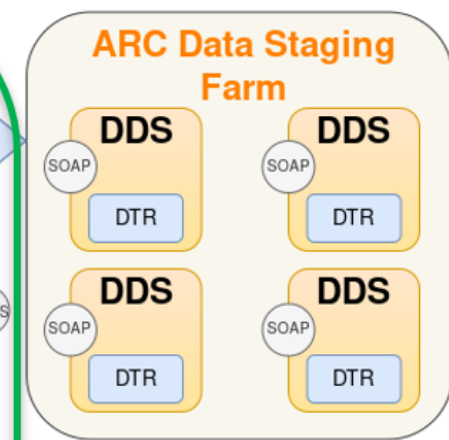
ARC Infrastructure Services



ARC CE



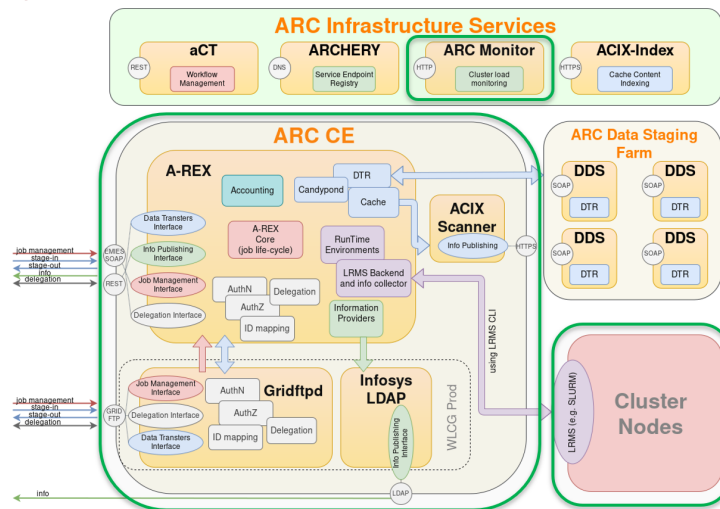
ARC Data Staging Farm



□ Already Tested Modules



Services architecture



ARC-CE and ARC-REX

- ARC-CE (v.6) running on separate VM was implemented and tested for job submitting using test user certificates
- A-REX (ARC Resource-coupled EXecution service) and gridftpd service now is ready for job submitting and fetching.

Monitoring

- ARC Information System provides web-based Grid Monitor with user-friendly overview of all cluster(s) resources and current jobs

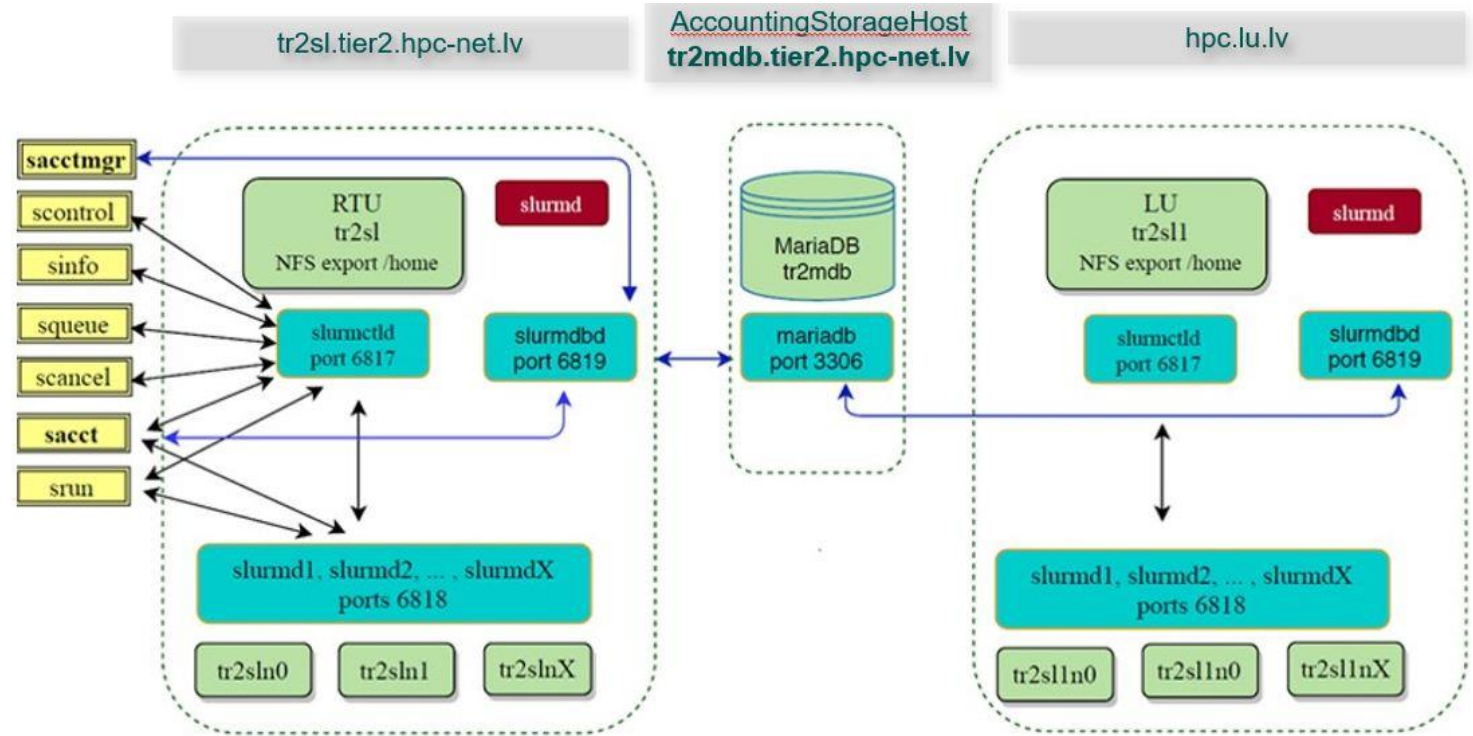
Initial setup to meet TIER II requirements

8 servers: PowerEdge
R650xs, 2 x Intel Xeon Gold
6338 2G, 32C/64T – in total
512 cpu cores
RAM: **8GB/core**
Scratch: 1.6TB NVMe
25GB/core
Storage: **384 TB SAS disks/**
7200rpm

Batch system: **Slurm**
federated configuration.
Tested with LU cluster
ARC-CE: currently VM, tested
A-REX, ARC-Datadelivery-
Service, ARC-Gridftpd, ARC-
Infosys-Ldap, ARC Monitor.

Squid server
Login nodes: **CVFMS**

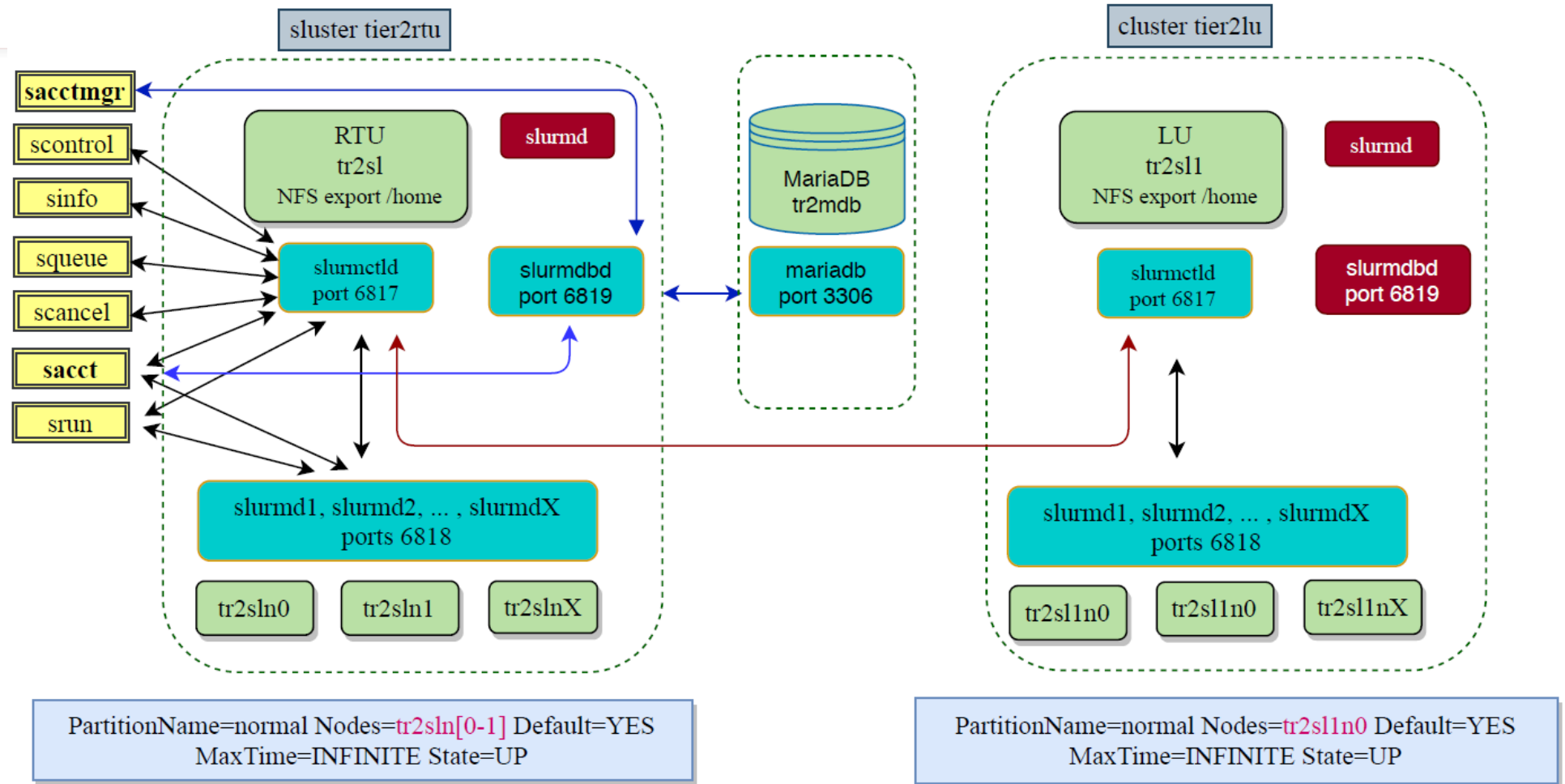
Workload management: clustered model



\$ sinfo

PARTITION	CLUSTER	AVAIL	TIMELIMIT	NODES	STATE	NODELIST
tr2sl-1-normal*	tier2test	up	infinite	1	idle	tr2sl-1n0
debug	lucluster	up	2:00:00	1	idle	node1
normal*	tier2rtu	up	infinite	2	idle	tr2sl-n[0-1]
regular*	lucluster	up	infinite	1	mix	node3
regular*	lucluster	up	infinite	3	alloc	node[2,5,8]
regular*	lucluster	up	infinite	3	idle	node[4,6-7]

Workload management: federated clusters model





Partner involvement

- Joint development of unified cross-border TIER II architecture
- Pledging HPC resources for Baltic TIER II to become part of federated cloud
- Growing into Baltics HPC GRID with aim to provide HPC services to our governments and industries
- Centralized IT operations to maintain continuous workload execution
- Developing tight collaboration with CERN via joint research activities in Computer Science field



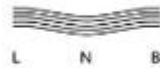
Vilnius University



UNIVERSITY OF LATVIA



kaunas university of technology



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Thank you!