Vilnius
University

VU HPC

Vilnius University

VU HPC structure

Two locations interconnected with optical lines:

- Bull Sequana system at Faculty of Physics
- Dell & Nvidia system at Faculty of Mathematics and Informatics

Projektas „LIETUVOS GRID NAŠIŲ SKAIČIAVIMŲ TINKLAS (LITGRID-HPC)“ Nr. 01.1.1-CPVA-V-701-08-0004 finansuojamas pagal 2014-2020 metų Europos Sąjungos fondų investicijų veiksmų programos 1 prioriteto „Mokslinių tyrimų, eksperimentinės plėtros ir inovacijų skatinimas“ 01.1.1-CPVA-V-701 įgyvendinimo priemonę „Mokslinių tyrimų, eksperimentinės plėtros ir inovacijų infrastruktūros plėtra ir integracija į europines infrastruktūras“

VU MIF HPC system

- CPU cluster
- GPU cluster
- IBM Power cluster
- Storage with Lustre FS
- 100 Gb/s EDR Infiniband
- 10 Gb/s Ethernet
- Everything managed with Qlustar
- Accessible through Waldur at https://hpc.mif.vu.lt

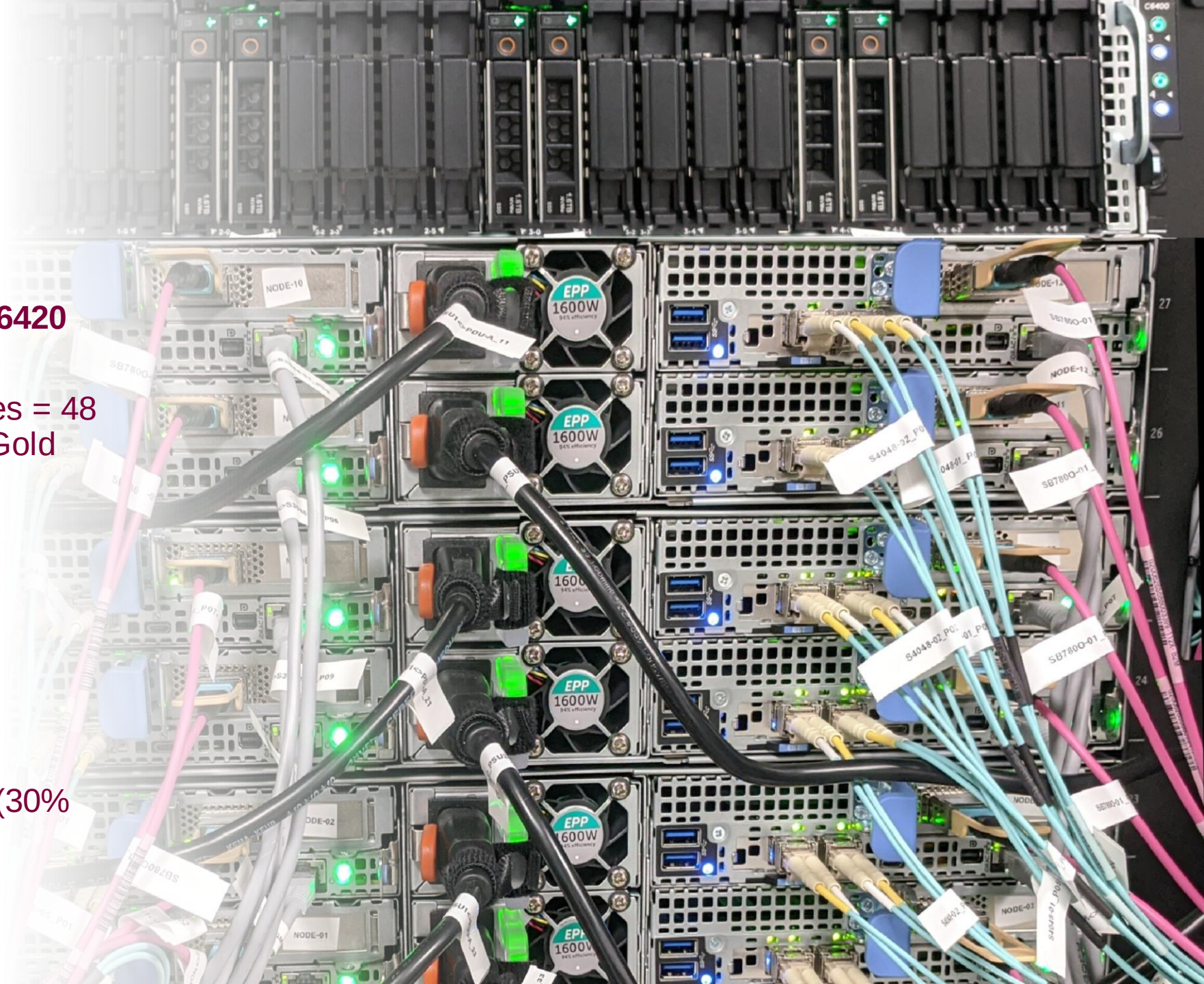
CPU cluster

36 **Dell EMC PowerEdge C6420** nodes:

- CPU: 2 sockets x 24 cores = 48 cores (Intel(R) Xeon(R) Gold 6252 CPU @ 2.10GHz)
- RAM: 384GB RAM

Total:

- 864 CPU cores
- 13,5 TB RAM
- 3TB SSD scratch space (30% nodes)



GPU cluster

3 **Nvidia DGX-1** nodes:

- CPU: 2 sockets x 20 cores = 40 cores (Intel(R) Xeon(R) CPU E5-2698 v4 @ 2.20GHz)
- RAM: 512GB RAM
- HDD: 7TB scratch space (SSD)
- GPU: 8 x NVIDIA Tesla V100, 32GB

Total:

- 120 CPU cores
- 1,5 TB RAM
- 21 TB SSD
- 24 NVIDIA Tesla V100 GPU

IBM Power cluster

2 **IBM Power9 AC922 (8335-GTH)** nodes:

- CPU: 2 sockets x 16 cores = 32 cores (x4 threads) (IBM POWER9 2.3-3.8GHz)
- RAM: 1024GB RAM
- HDD: 3TB scratch space (SSD)
- GPU: 4 x NVIDIA Tesla V100, 32GB

Total:

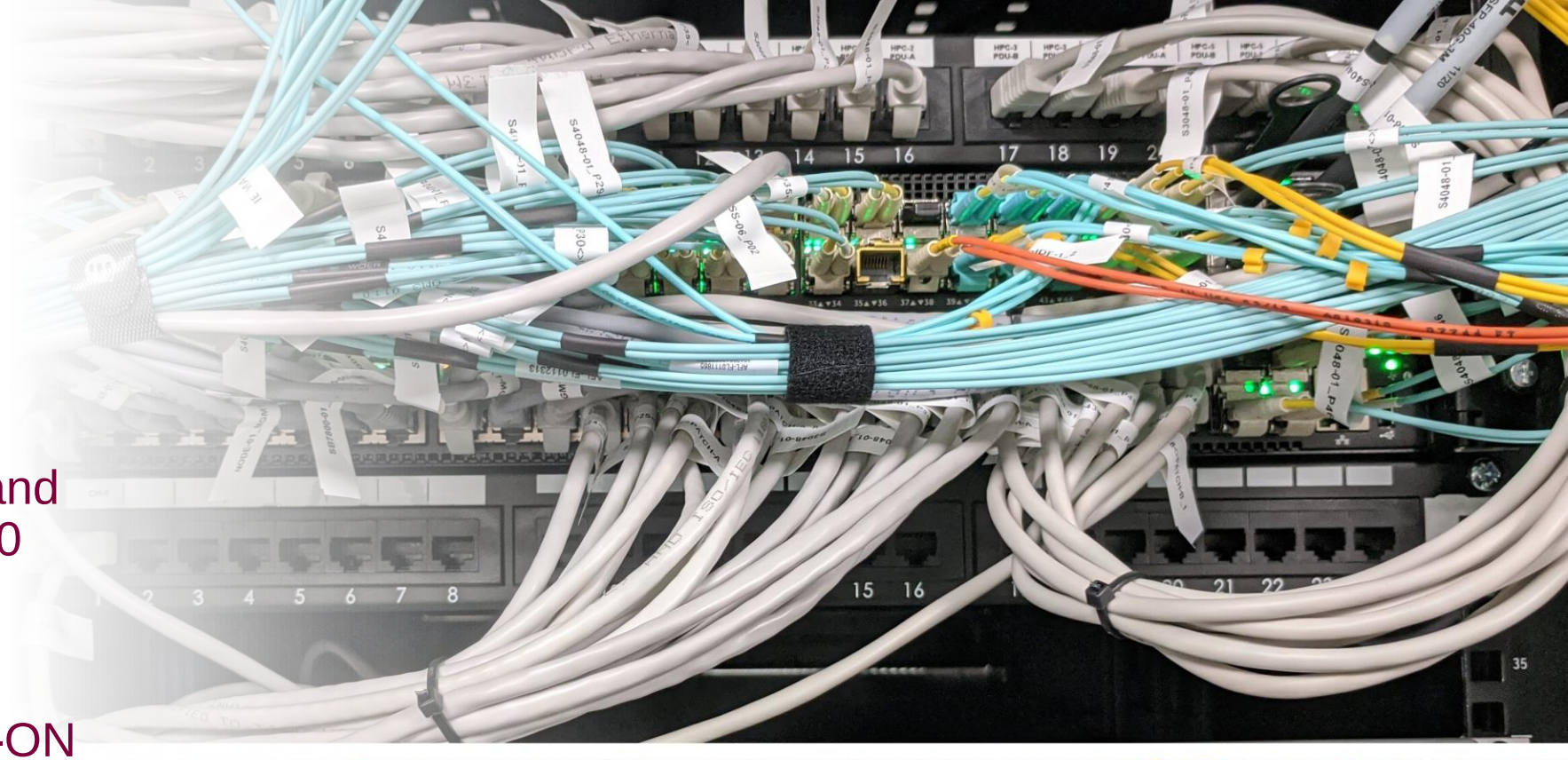
- 64 CPU cores
- 2 TB RAM
- 6 TB SSD
- 8 NVIDIA Tesla V100 GPU

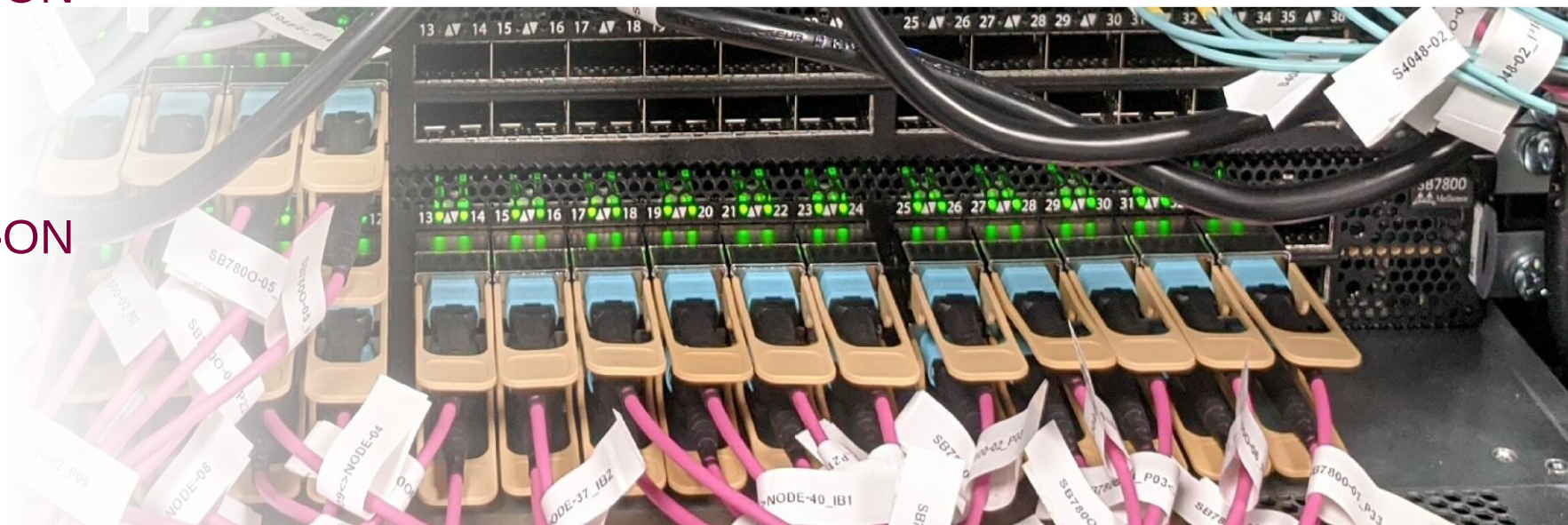
lustre file system

- 2 MDS – DellEMC ME4024, 24 SSD x 1.9TB
- 4 OSS – DellEMC ME4084, 126 HDD x 4TB
- 4 OSS – DellEMC ME4084, 126 HDD x 4TB
- 1 PB raw space
- Usable space 448TB (2/3 disks used)
- 1/3 disks reserved for future projects

Networking

- 100 Gb/s EDR Infiniband
  6x Mellanox SB7800
- 10 Gb/s Ethernet
  3x DellEMC S4048-ON
- 1 Gb/s Ethernet management network
  3x DellEMC S3048-ON

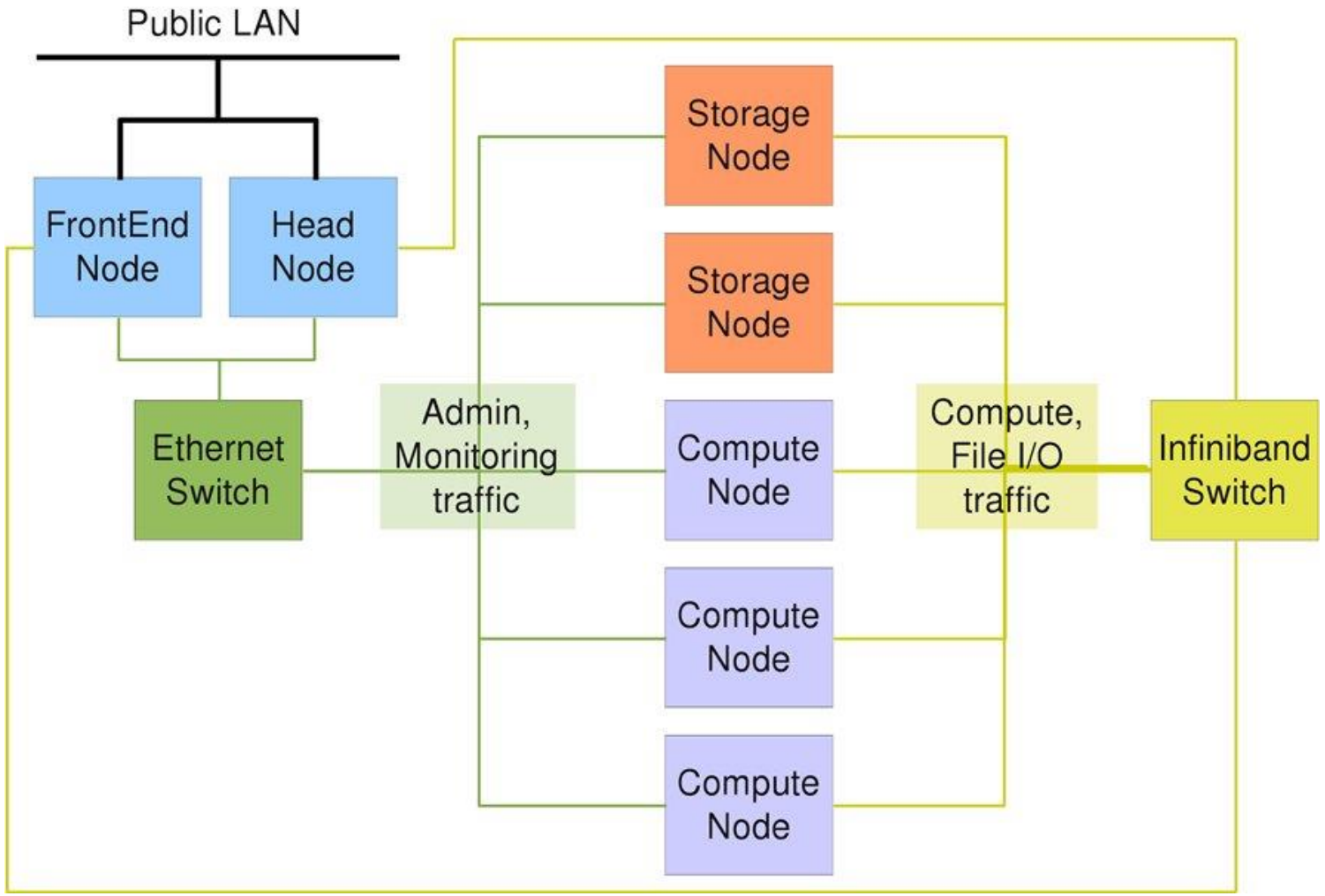




Vilnius University

HPC cluster managed with Qlustar (version 11)

- Network booting of nodes
- Management of nodes
- SLURM management
- Monitoring via ganglia and nagios

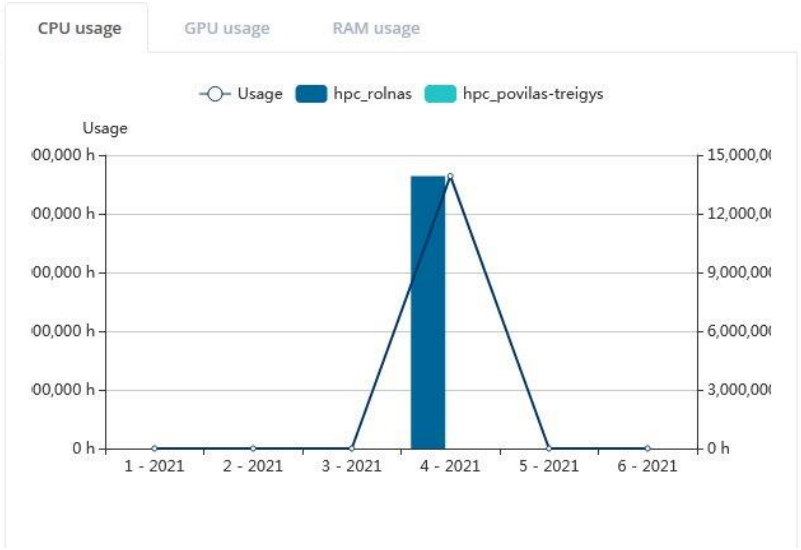


Vilnius University

WALDUR

An open-source digital platform for publishing and managing cloud and HPC services.

- Accessible at - https://hpc.mif.vu.lt
- Authentication with eduGAIN and via Lithuanian LITNET FEDI
- Real-time, historical and predictive reports
- Register organizations
- Create projects within organizations
- Assign resources to projects
- Assign users to projects



Vilnius University

- Accessible at - https://hpc.mif.vu.lt/hub
- Using HPC resources via SLURM
- JupyterLab and classic Notebook access
- Limited to local MIF users for now
- Working to allow access via Waldur

Experience in GRID, HPC and Cloud projects

- LitGrid (LCG-CE)
- BalticGrid (LCG-CE)
- BalticGrid II (LCG-CE)
- NorduGrid (ARC-CE)
- LT-BY-Cloud (OpenNebula)
- SESAME NET - Supercomputing Expertise for SmAll and Medium Enterprise Network
- EuroCC / CASTIEL

Vilnius
University

CONTACTS

Faculty of Mathematics and Informatics
Open Access Research Center
itapc@mif.vu.lt