Distributed resources of Czech WLCG Tier-2 center

M. Adam, D. Adamová, J. Chudoba, A. Mikula, M. Svatoš, J. Uhlířová, P. Vokáč

CHEP 2019, 4-8.11.2019

Introduction

The Czech WLCG Tier-2 center combines compute and storage resources located in several different cities. It provides the resources to LHC experiments (ALICE and ATLAS) as well as astroparticle experiments (Pierre Auger Observatory (PAO) and the Cherenkov Telescope Array (CTA)) and two particle experiments located at Fermilab (NOvA and DUNE).
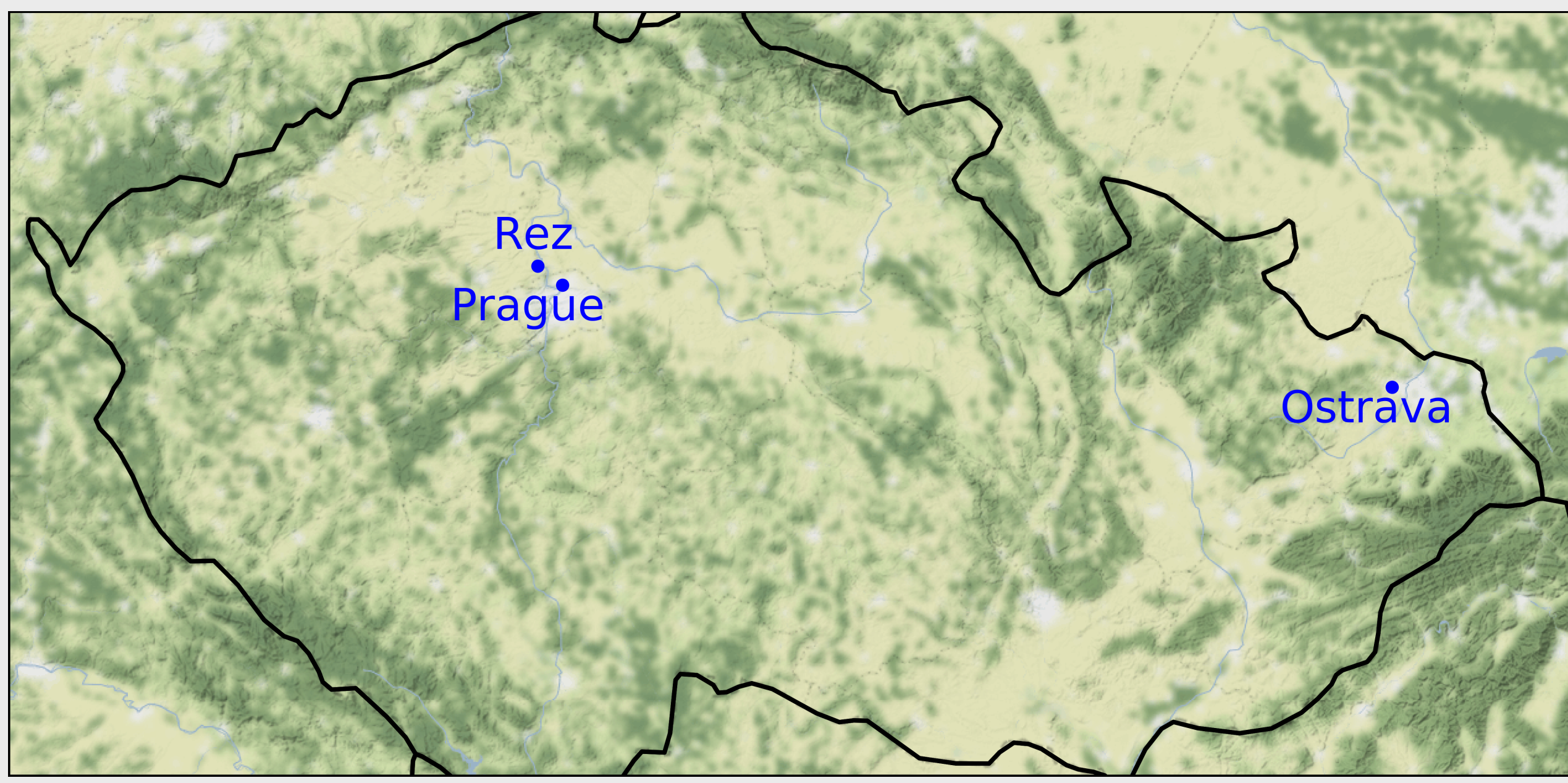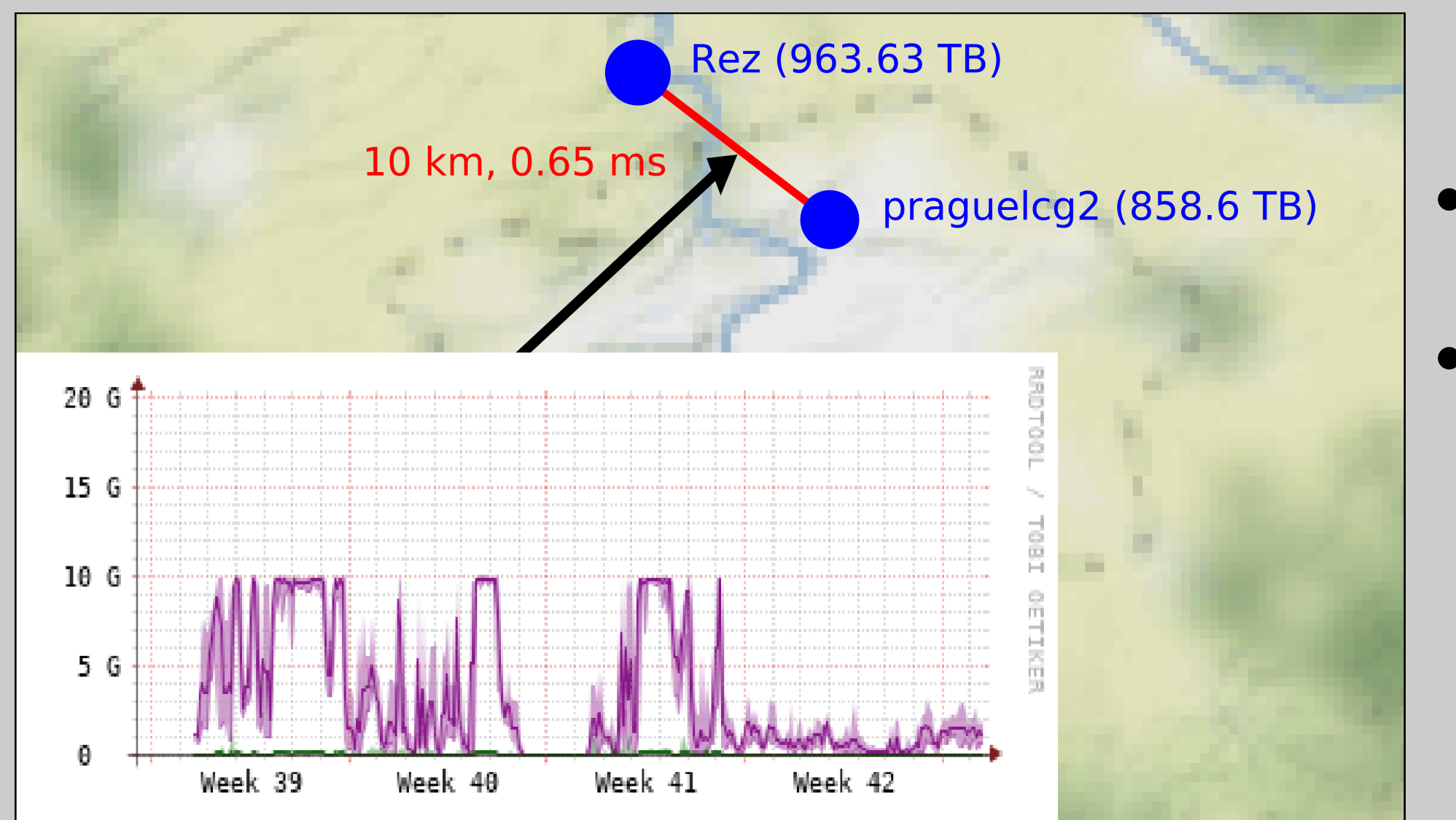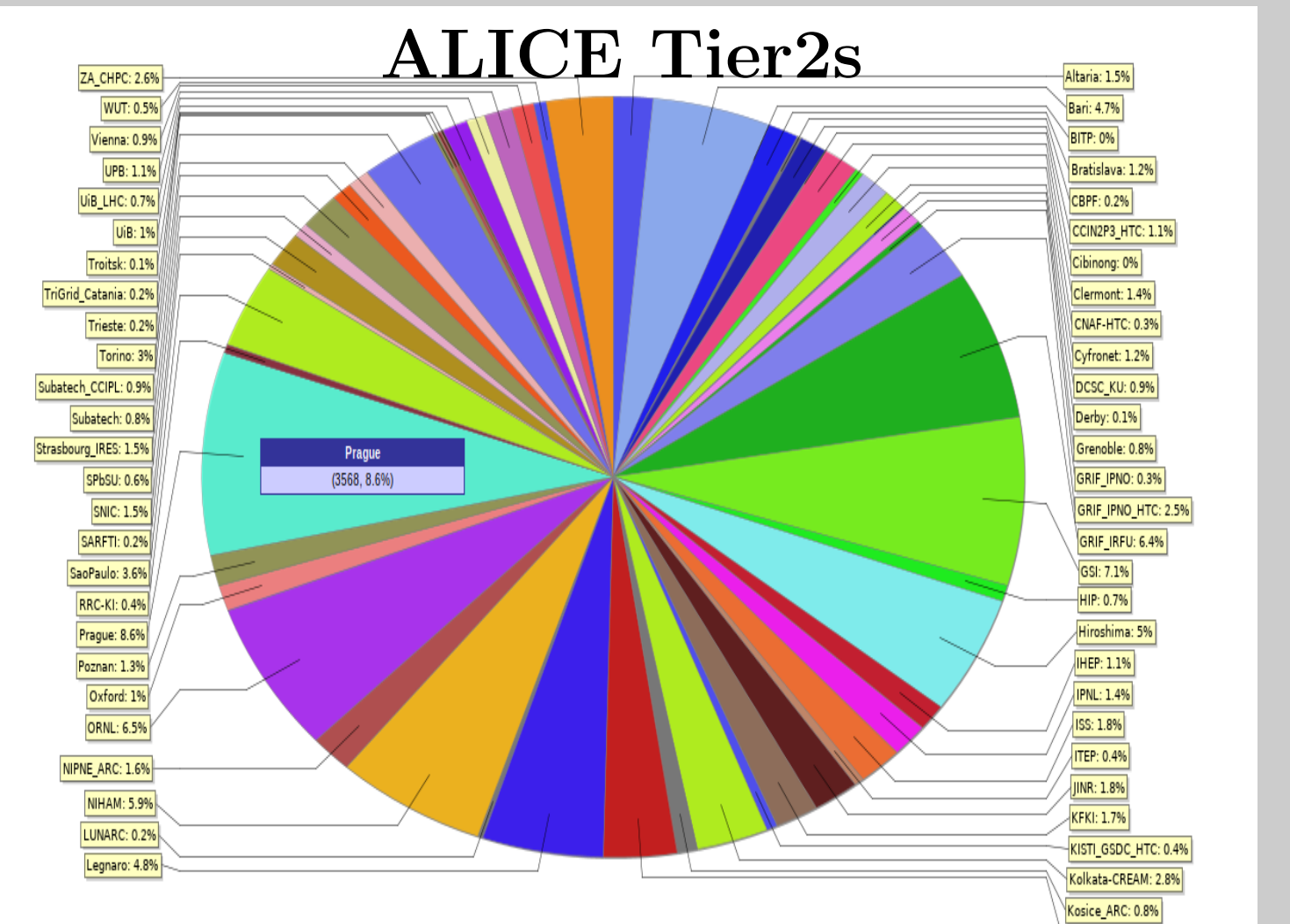

Usage

ATLAS
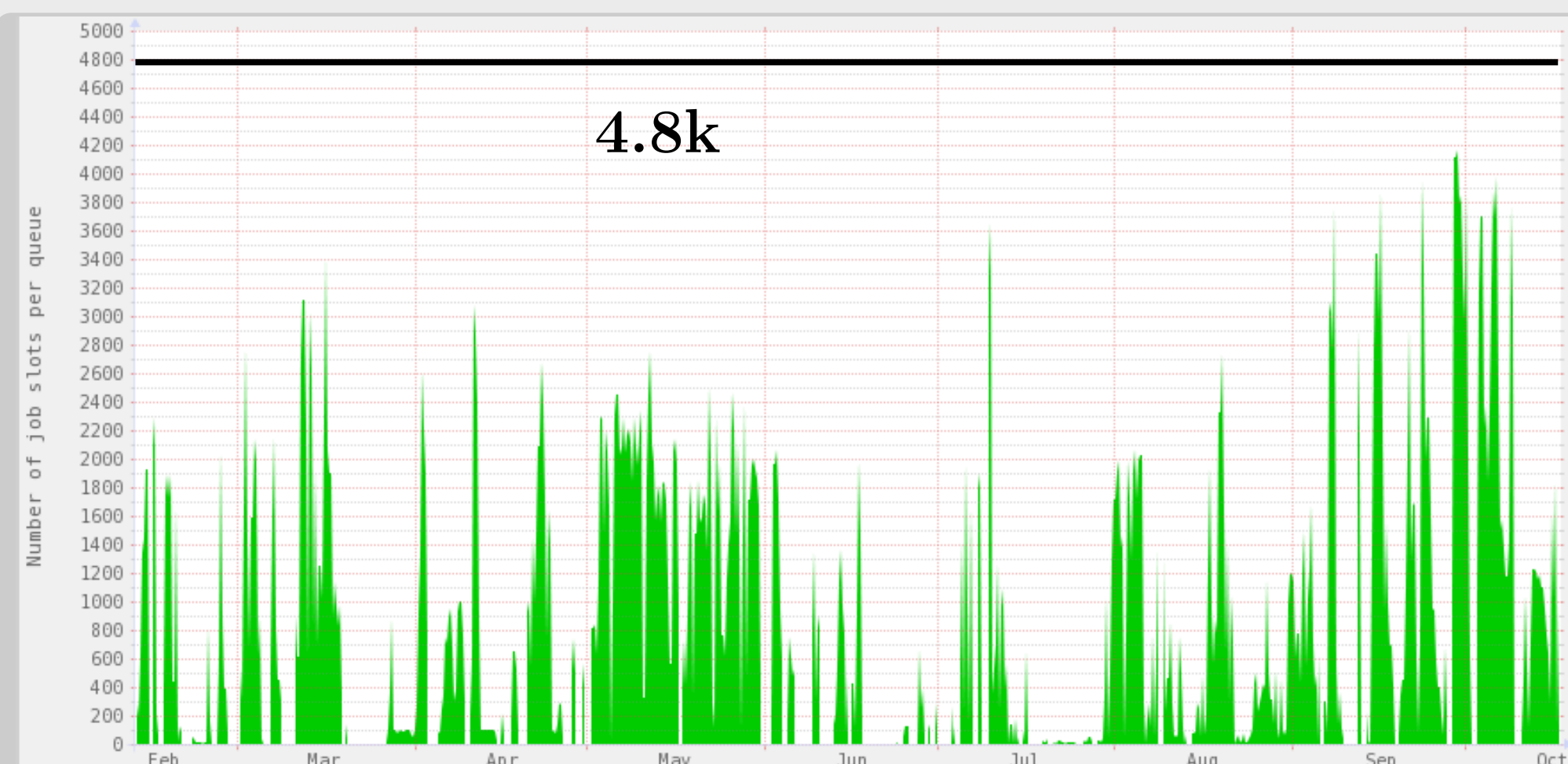

The ATLAS experiment is using computing resources of
- the Computing Center + off-site machines (ATLAS VO bands on the Compute section plot)
- Salomon HPC in Ostrava (plot on the left)
  - opportunistic usage
  - submission via ARC-CE machines installed at the Computing Center
- BOINC - running on an unused desktop
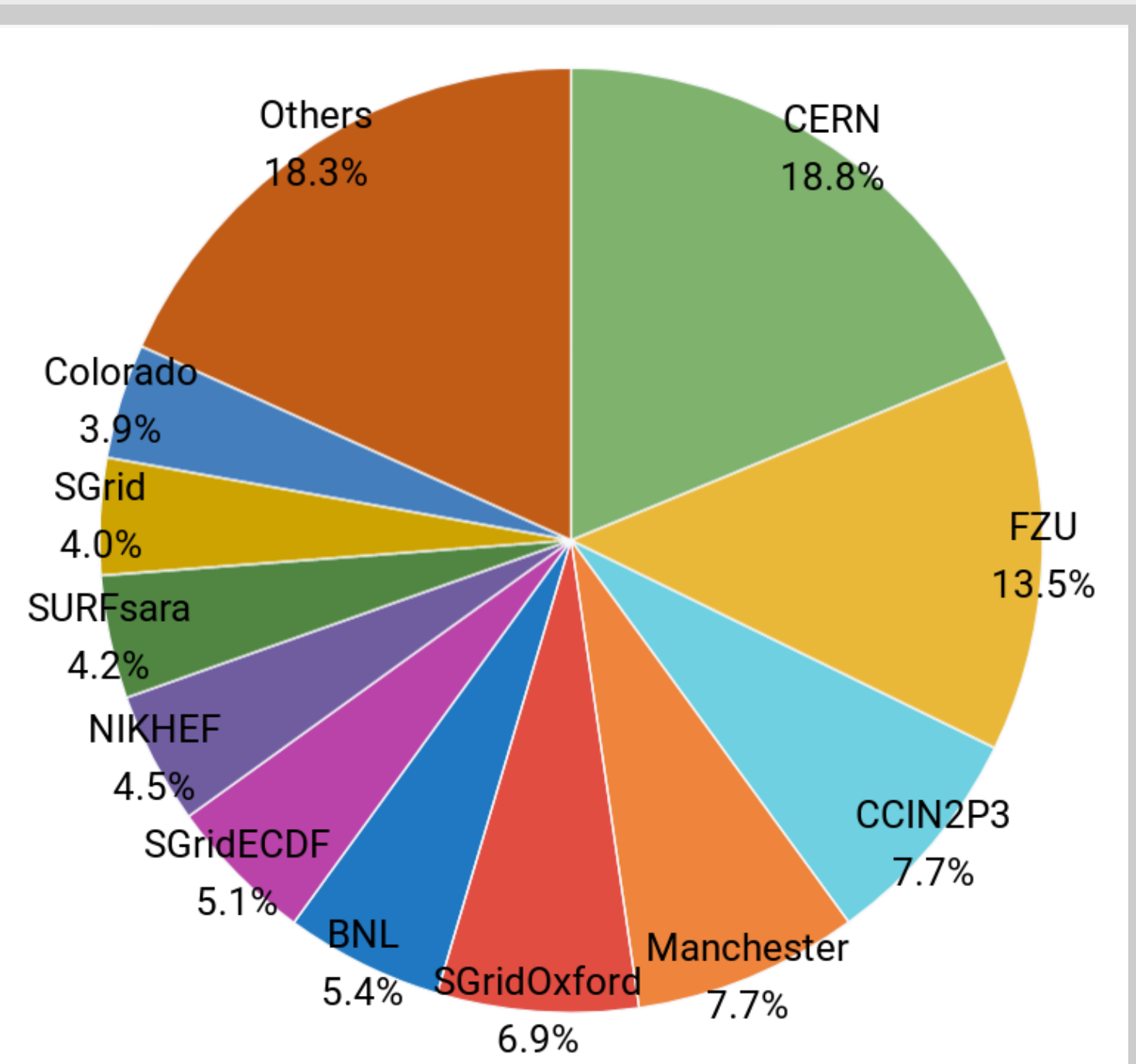
ALICE

- average efficiency in the last 4 months is above 80%
- XRootD storage spread over two locations
  - ALICE jobs can require enough data to saturate their 10Gbps connection
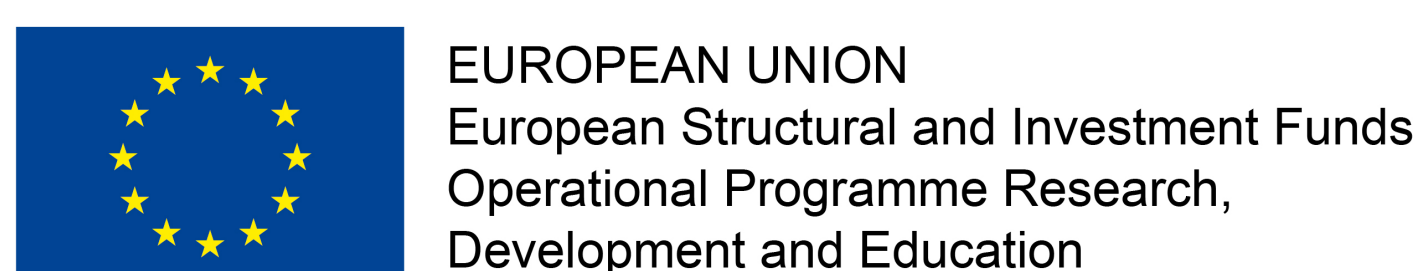
Astrophysics
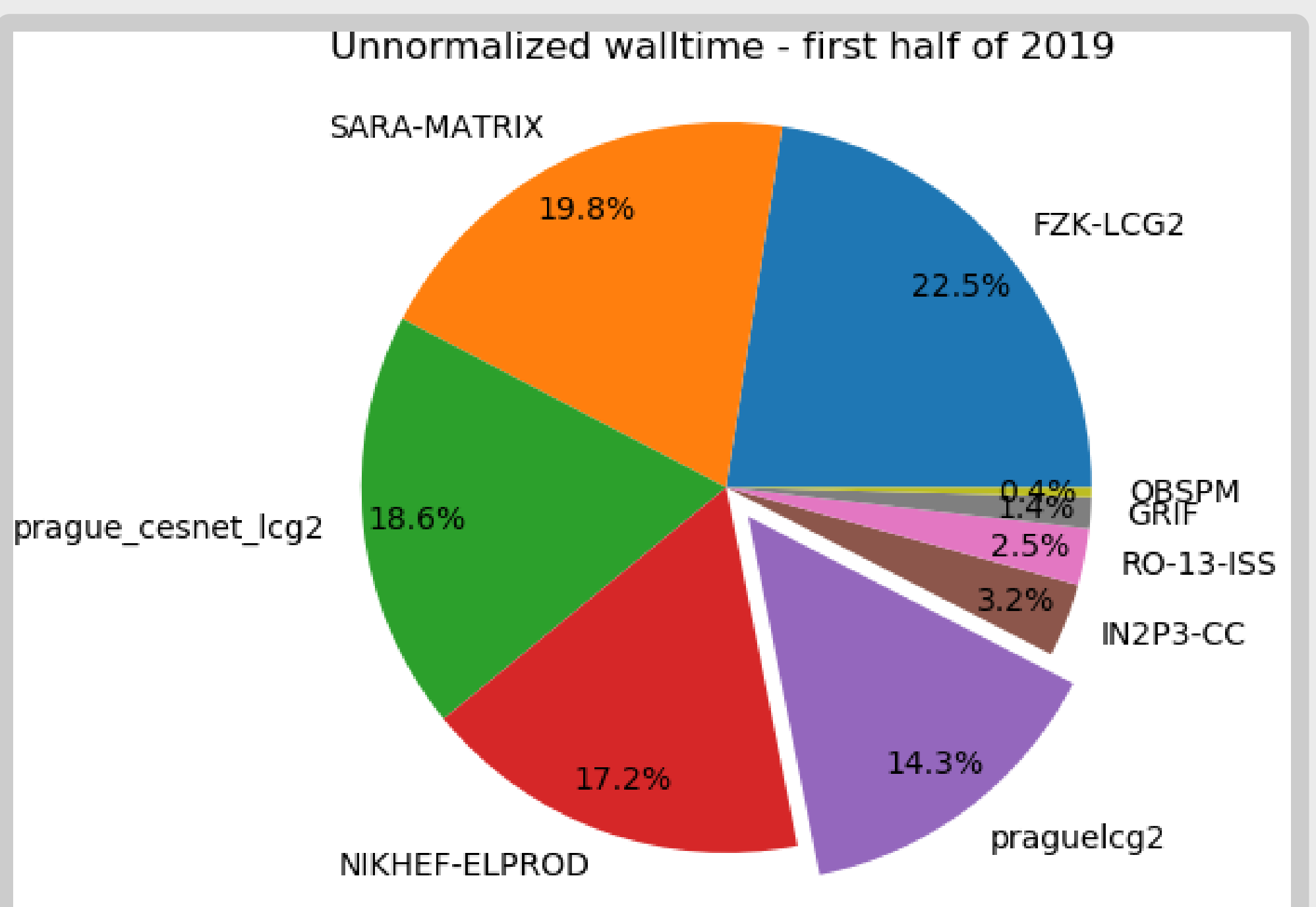
- praguelcg2 contributes significantly to Auger computing resources

Fermilab

- Prague (FZU OSG site) participation in DUNE and NOvA experiment
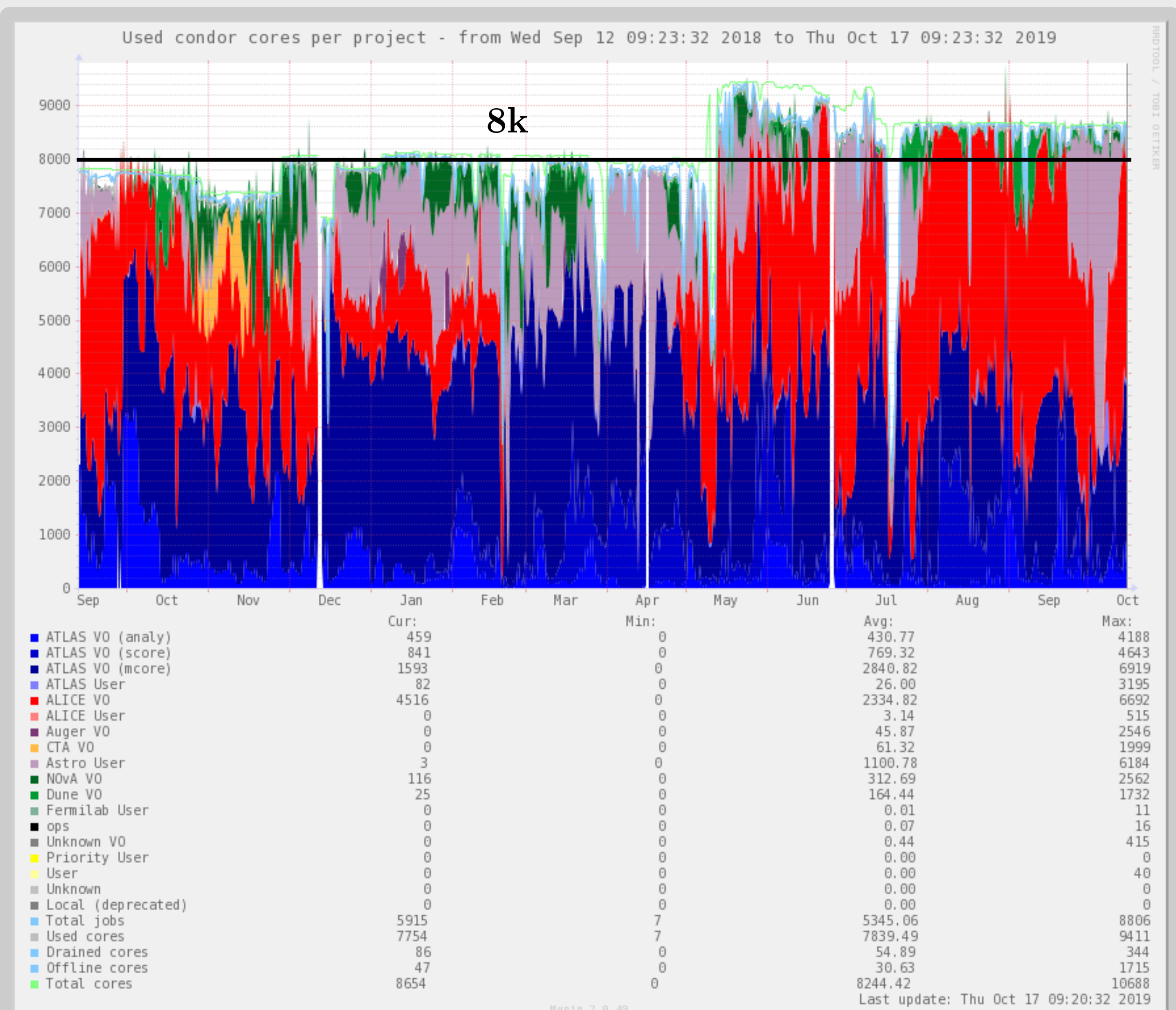
Acknowledgement

Site description

Storage

- Prague
  - DPM
    * $\sim$ 3 PB for ATLAS, $\sim$ 200 TB for Auger, $\sim$ 300 TB for Dune
  - XRootD
    * $\sim$ 1 PB for ALICE
  - StashCache (XCache)
    * caching big CVMFS files to improve Fermilab jobs efficiency
- Rez
  - XRootD
    * $\sim$ 1 PB for ALICE
- Ostrava
  - dCache
    * tape archiving for local users
  - backup

Compute

The HTCondor batch system allows usage of off-site machines. The $\sim$ 8k CPU cores (consisting of Intel and AMD (EPYC) processors) are distributed amongst the Institute of Physics (the Computing Center), the Faculty of Mathematics and Physics of the Charles University, Faculty of Nuclear Sciences and Physical Engineering of the Czech Technical University and CESNET. Usage by the experiments is based on fair-share.

Network

- external
  - 100 Gbps to LHCONE
  - 10 Gbps to the Charles University and to Rez
  - 40 Gbps to Pasnet/Internet
- internal
  - storage nodes - typical 40Gb and at least 10Gb for older servers
  - worker nodes - 10Gb for all new machines with many cores
  Systems are dual-stack with preference to IPv6.