CYFRONET

Academic Computer Centre
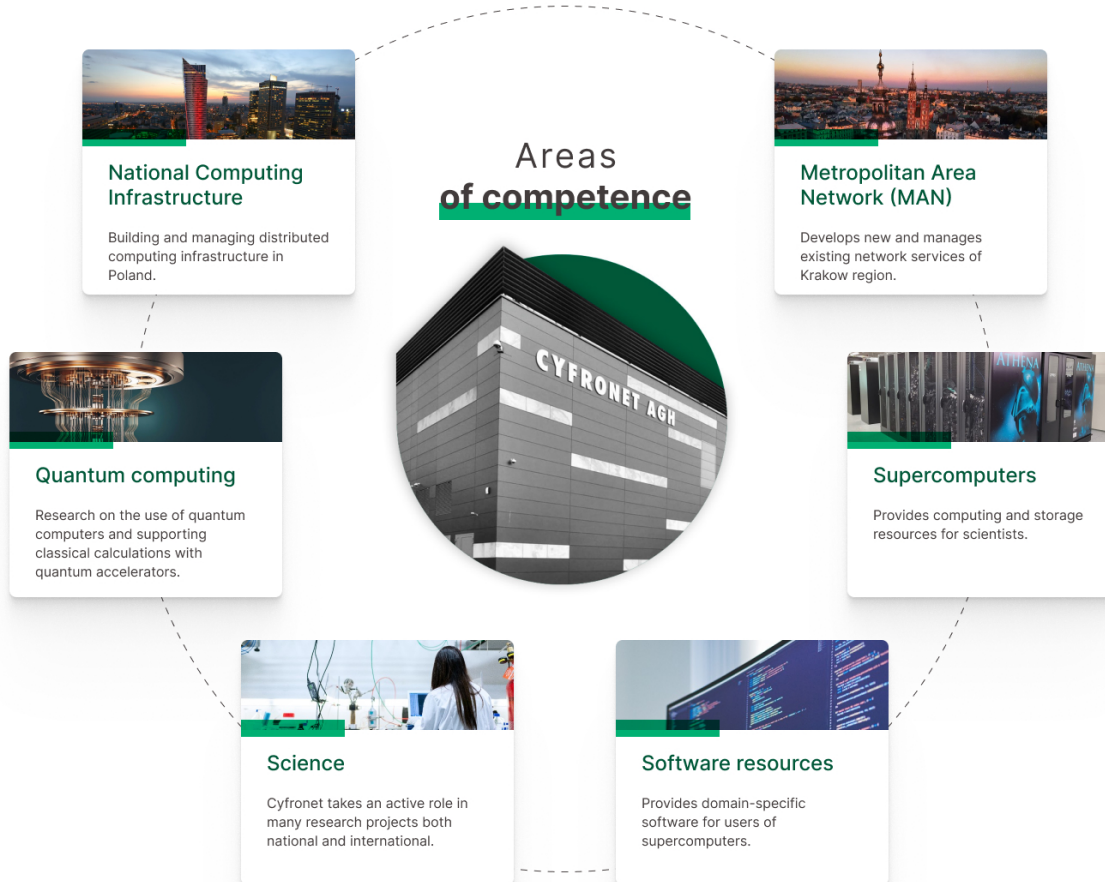CYFRONET AGH

Andrzej Zemła, Marek Magryś

Computing infrastructures in the Open Science ecosystem

- **One of the biggest Polish Academic Supercomputing Centers**

- **50+ year of experience in IT provision (50th anniversary in March 2023)**

- **Legal status: an autonomous within AGH University of Science and Technology**

- **Staff: ~ 180, ca. 90 in R&D**

- **Leader of PLGrid: Polish Grid, Cloud and HPC Infrastructure for Science**

- **Coordinator of EuroHPC activities in Poland**
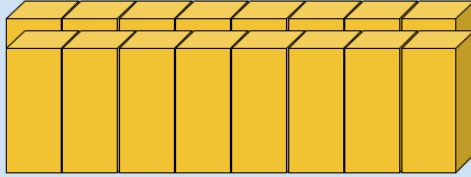
- **Two Data Centers**
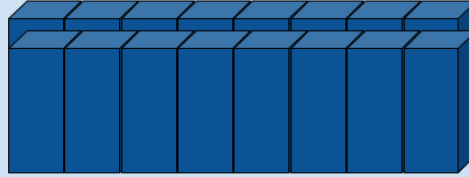
ACK Cyfronet AGH - Areas of competence

Areas
of competence

National Computing Infrastructure

Building and managing distributed computing infrastructure in Poland.

Metropolitan Area Network (MAN)

Develops new and manages existing network services of Krakow region.

Quantum computing

Research on the use of quantum computers and supporting classical calculations with quantum accelerators.

Supercomputers

Provides computing and storage resources for scientists.

Science

Cyfronet takes an active role in many research projects both national and international.

Software resources

Provides domain-specific software for users of supercomputers.

Supercomputers & Storage

DC Nawojki

Helios - 35 PFLOPS

Prometheus - 2,6 PFLOPS

Cloud Nawojki

Tape library

Lustre scratch a/b
1,5 PB @ 1,8 TB/s

Lustre pr3/pr4
16 PB @ 200 GB/s

Lustre pr1
3 PB @ 30 GB/s

Lustre scratch
5 PB @ 120 GB/s

Ceph S3
36 PB

Fujifilm S3 Glacier
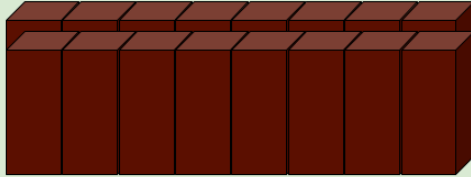60 PB

Lustre scratch
4 PB @ 80 GB/s

Lustre pr2
5 PB @ 30 GB/s

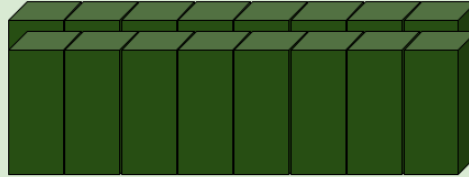**Lustre scratch**
1,5 PB @ 400 GB/s
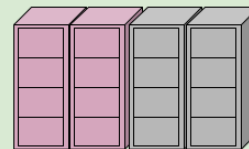
Ceph S3
36 PB

Fujifilm S3 Glacier
60 PB

Ares - 4 PFLOPS

Athena - 7,7 PFLOPS
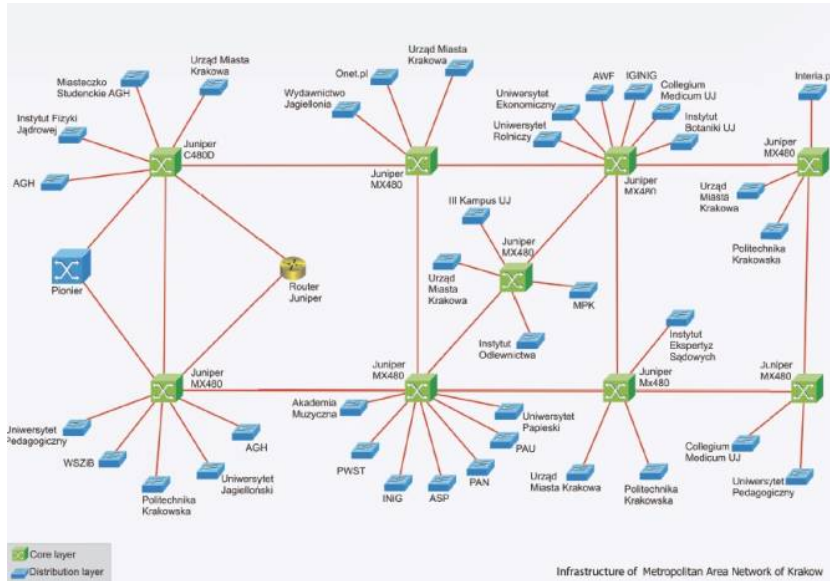
Cloud Podole

Tape library

DC Podole

Storage details

- Each supercomputer has a fast /scratch file systtem
  - Lustre/DAOS optimized for speed (NVMe, tuning etc.)
  - Disk arrays or fast disk servers
  - POSIX access over Infiniband or RoCE network
- Each DC has one shared /pr file system
  - Lustre optimized for capacity and functionality
  - Disk arrays or JBOD
  - POSIX access over Infiniband or RoCE network
- Eech DC has an S3 region
  - Ceph optimized for capacity and ease of integration
  - HDD drives, disk servers
  - S3 protocol access from local networks or the Internet
- Each DC has an S3 Glacier region
  - Fujifilm Object Archive optimized for long-term storage
  - LTO tapes
  - S3 Glacier access from local networks or the Internet

Infrastructure of Metropolitan Area Network of Krakow

Cyfronet develops new and manages existing network services of Krakow region

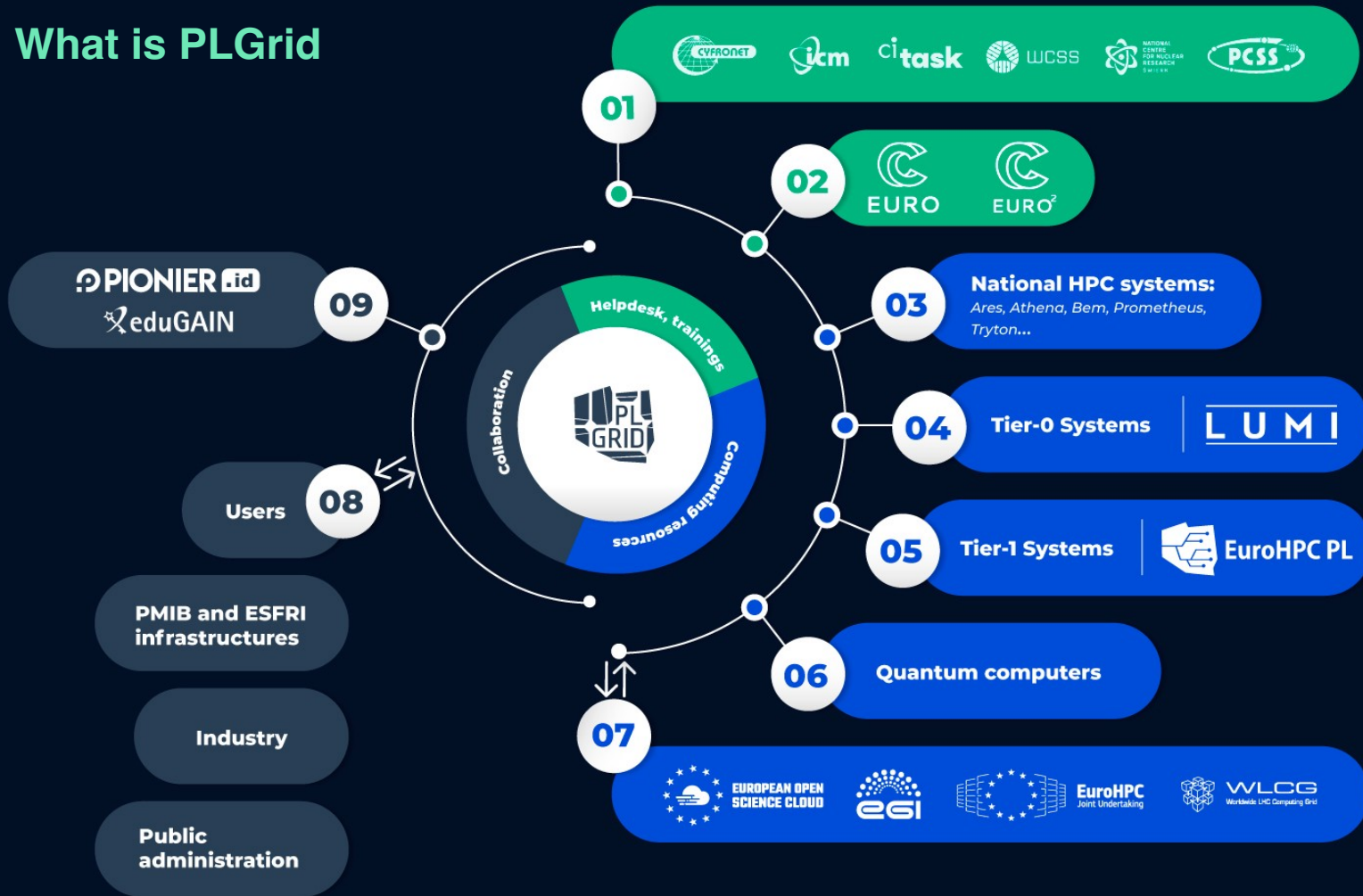Cyfronet is member of Pionier consortium

PLGrid Consortium

Established in 2007 under an agreement between the largest polish HPC centers in order to build and manage distributed computing infrastructure for science - PLGrid infrastructure

CI TASK
Gdansk

Centre of Informatics Tricity Academic Supercomputer and network

Interdisciplinary Centre for Mathematical and Computational Modelling at University of Warsaw

PCSS
Poznan

ICM UW
Warsaw

NCBJ
Swierk

Poznan Supercomputing and Networking Center

National Centre For Nuclear Research

WCSS
Wroclaw

Wroclaw Centre forNetworking and Supercomputing

CYFRONET
Cracow

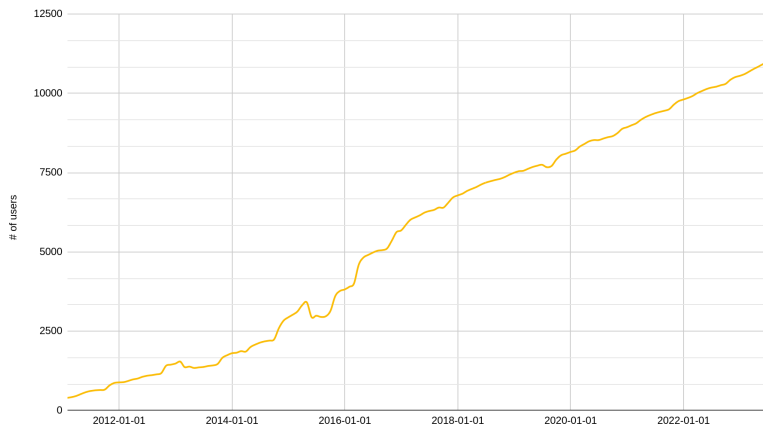Academic Computer Centre Cyfronet AGH

What is PLGrid

PLGrid user community

PLGrid users active accounts
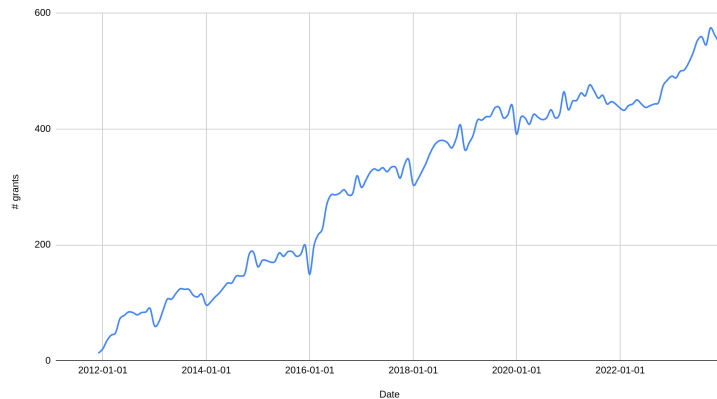
>14k users

61 Universities

63 Scientific institutes

9 Doctoral Schools

Number active computational grants per month (since 2012)

>4,5k completed computational grants

>4k publications

PLGrid infrastructure for EOSC

Project on *Polish Roadmap for Research Infrastructures*:

National Cloud Infrastructure PLGrid for EOSC

- ❖ **federated cloud computing services**

- ❖ **large-scale data processing**

- ❖ **FAIR for computer science datasets**

- ❖ **repeatability and reproducibility of results**

- ❖ **domain-specific tools**

- ❖ **common infrastructure exposed to EOSC**

Summary

Practical implementation of Open Science is not possible without appropriate IT infrastructure

Cyfronet's professional hardware resources as well as experienced staff are ready to support Open Science

The scientific community of PLGrid infrastructure users can be both a recipient and provider of knowledge

Practical example: RODBUK repository
- hosting
- administration
- security
- support