IT Infrastructure at DESY
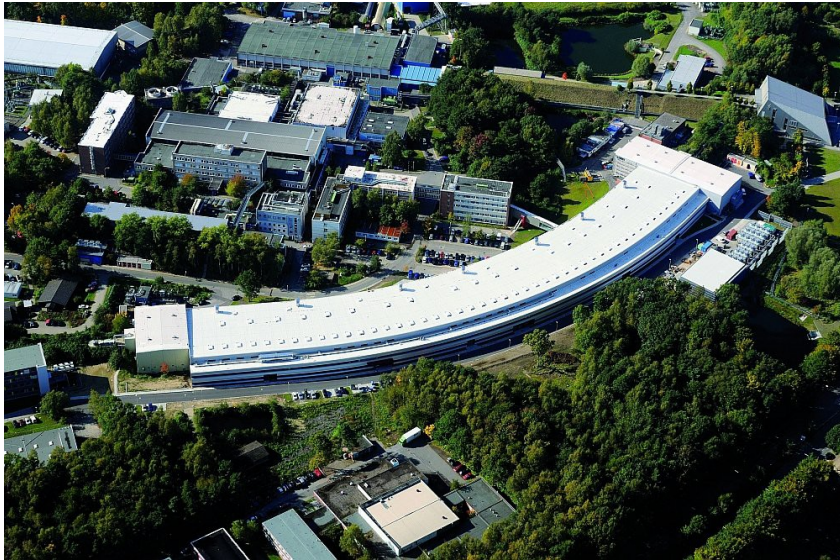
The IT infrastructure for the PETRA III synchrotron

Eugen Wintersberger
IT infrastructure at DESY
BNL, 26.05.2016

HELMHOLTZ | ASSOCIATION

DESY

The PETRA III synchrotron at DESY

Diverse Environment
- **Various kinds of research**
- **Different techniques**
- **Multiple kinds of analysis**

Beamline status: user operation

1. High resolution dynamics beamline
2. Hard x-ray diffraction beamline for time-resolved studies
3. Micro- and nanofocus x-ray scattering
4. Variable polarization XUV
5. HZG/DESY: Imaging
6. Hard x-ray micro/nano probe
7. HZG: High energy materials science
8. High resolution diffraction
9. Resonant scattering and diffraction
10. Coherence applications
11. MPI/HZIR/DESY: Protein crystallography and Bio-Imaging

12. EMBL: BioSAXS
13. EMBL: Macromolecular crystallography I
14. EMBL: Macromolecular crystallography II

Deutsches Elektronen-Synchrotron
Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research
European Molecular Biology Laboratory

Detectors used at PETRA III beamlines

Dectris Pilatus and Eiger systems
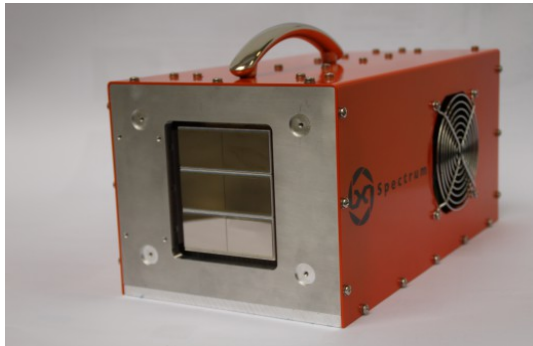
Lambda systems
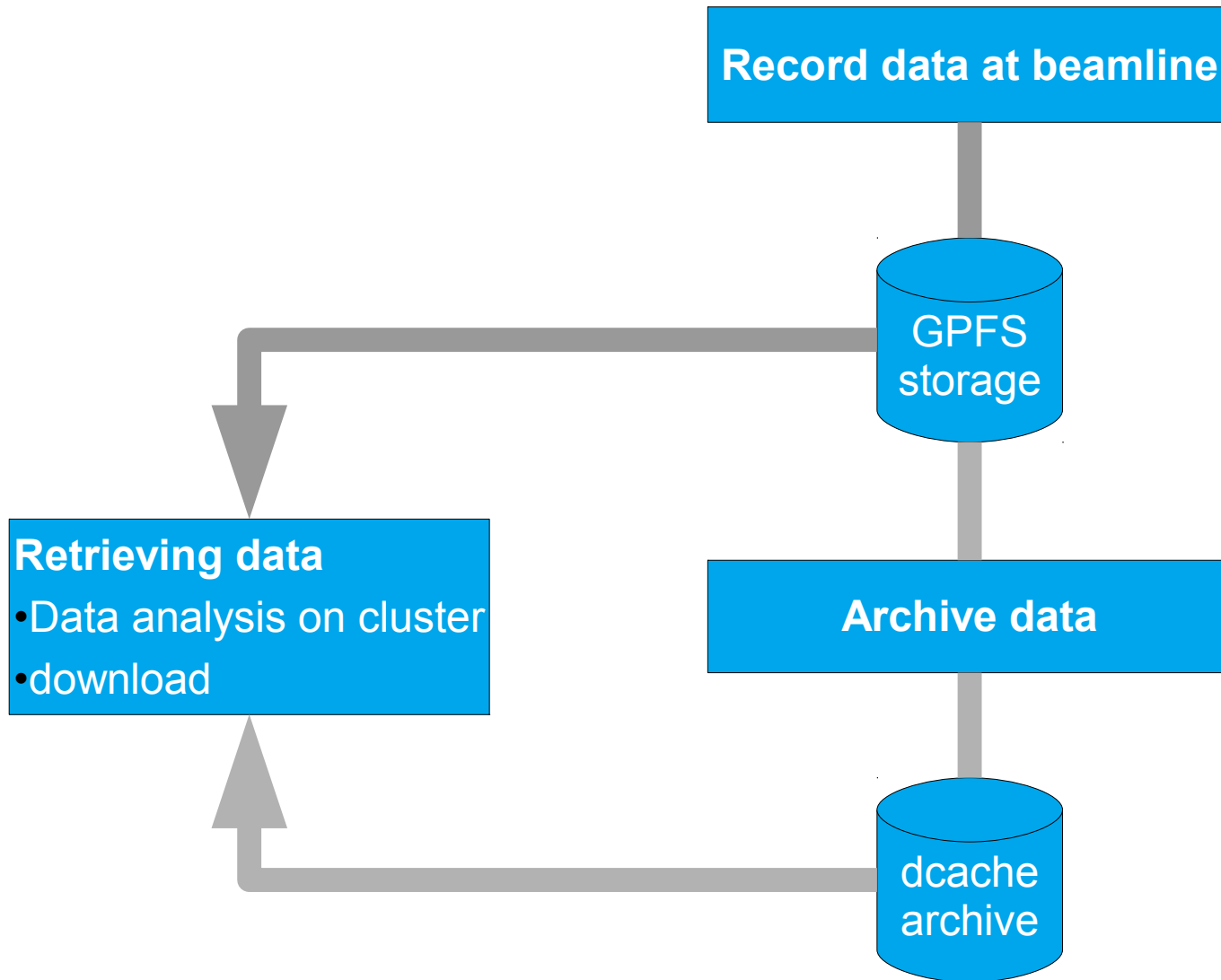- **750k – 2.7GB/s**
- **2M – 3x2.7GB/s**

PCO Edge (~1GB/s) and Perkin Elmer (240MB/s) systems
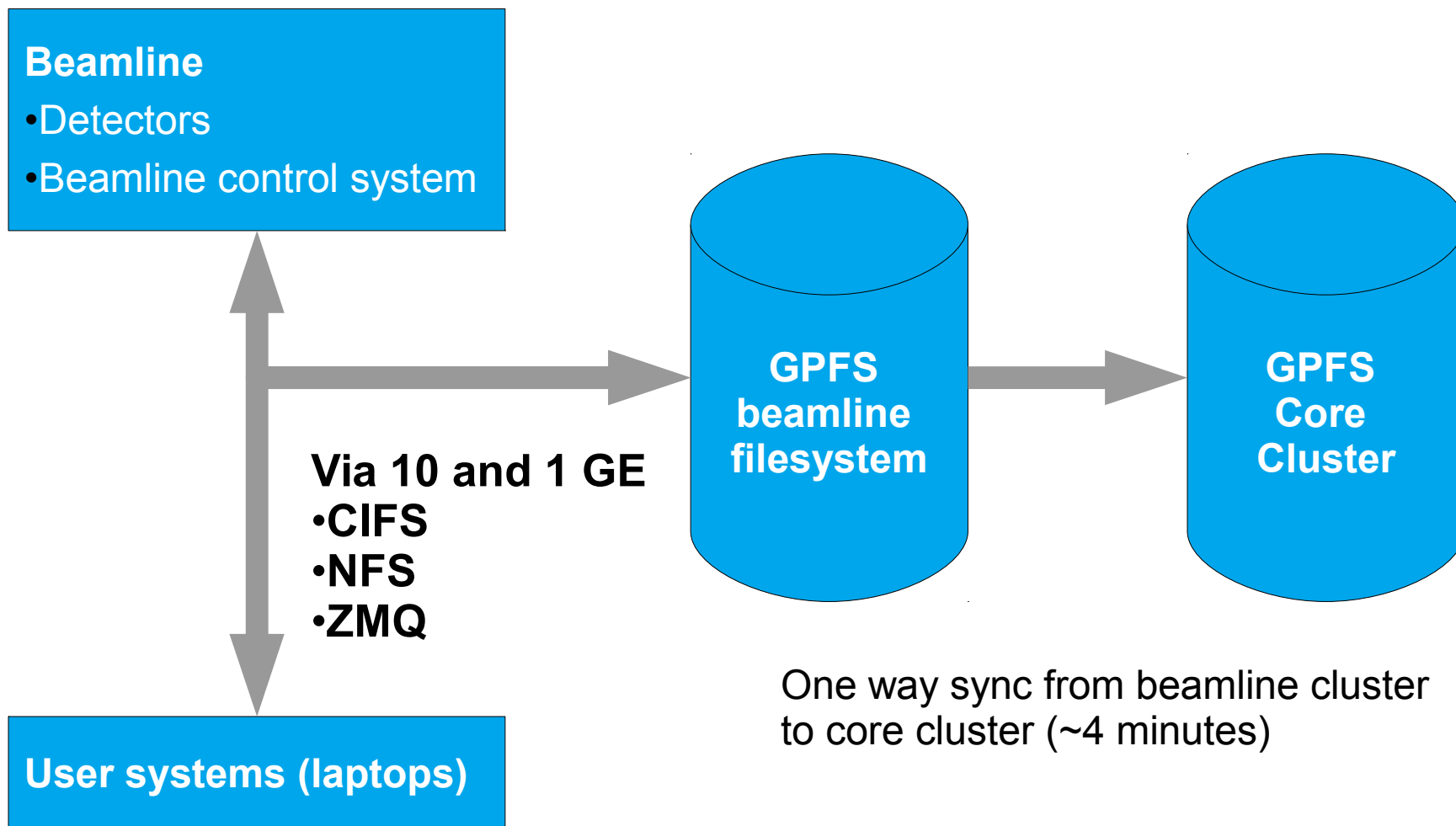
Network Computing center – synchrotron facility

- 3 Arista switches with 2x40GE (fibre) each in the hall

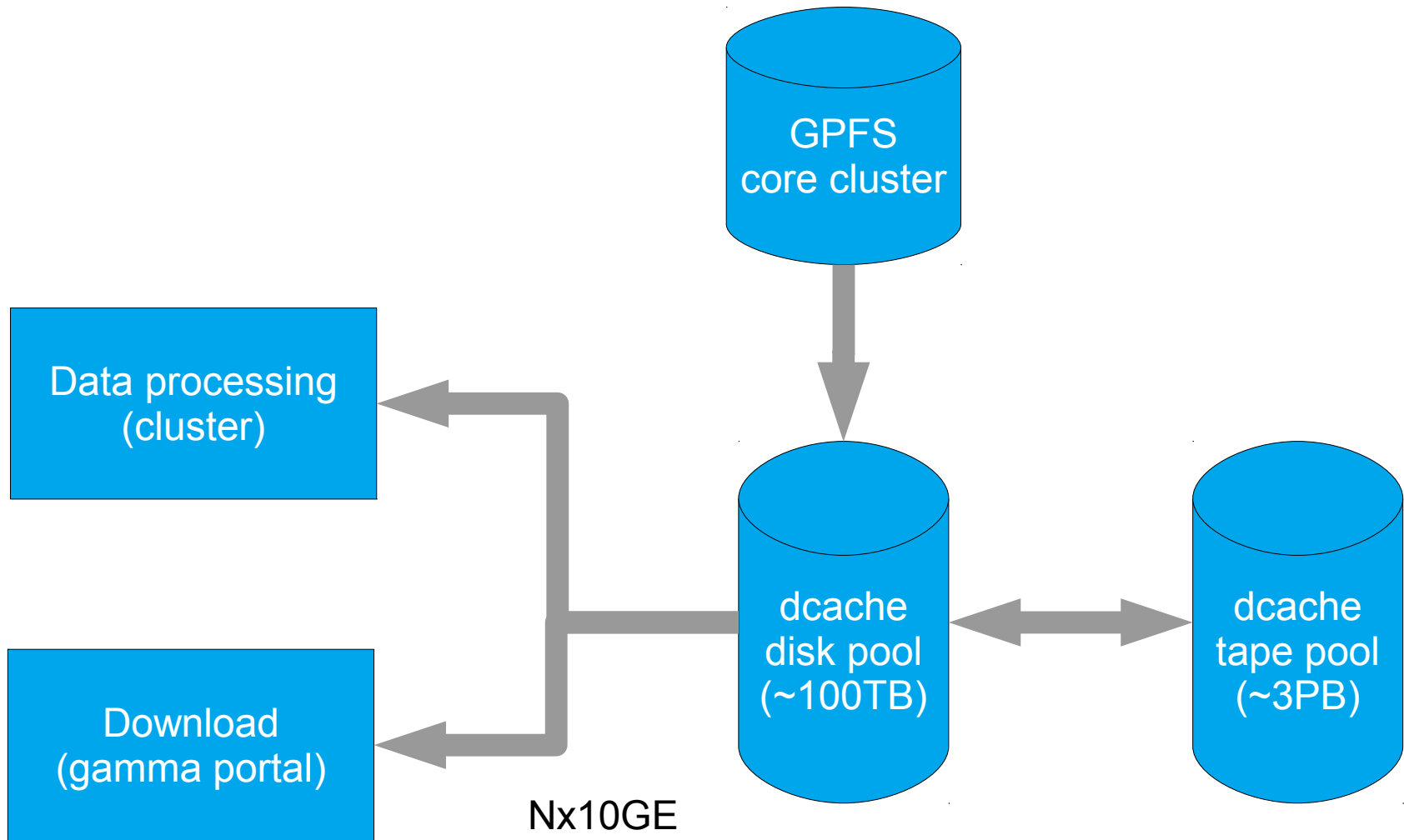- Total bandwidth 240 GE

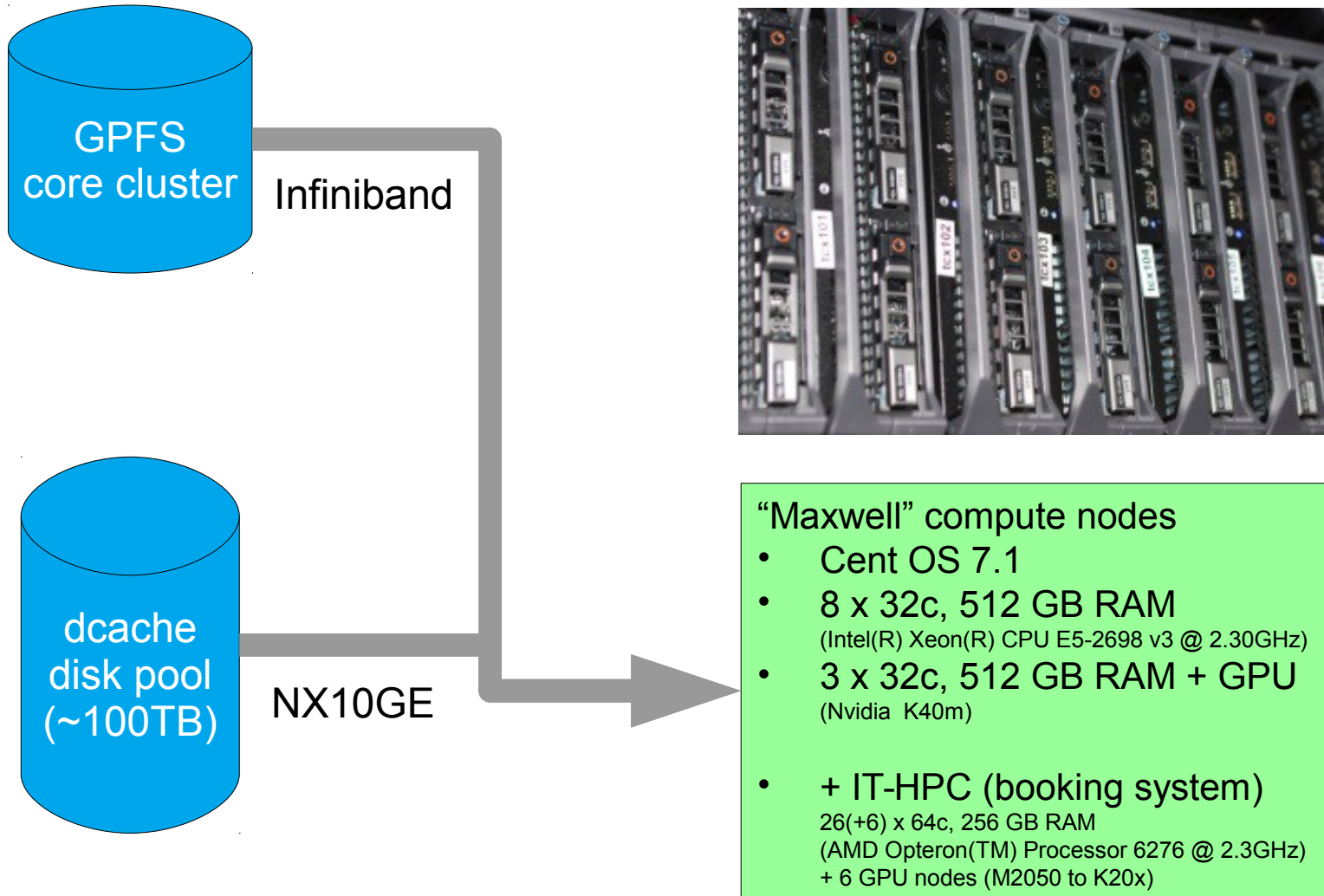- Can double bandwidth easily

Data lifecycle

Record data at beamline

GPFS storage

Retrieving data
- Data analysis on cluster
- download

Archive data

dcache archive

Beamline storage

Beamline
- Detectors
- Beamline control system

Via 10 and 1 GE
- **CIFS**
- **NFS**
- **ZMQ**

User systems (laptops)

GPFS beamline filesystem

GPFS Core Cluster

One way sync from beamline cluster to core cluster (~4 minutes)

Long time archive (dcache)

GPFS core cluster

Data processing (cluster)

Download (gamma portal)

dcache disk pool (~100TB)

dcache tape pool (~3PB)

Nx10GE

DESY

Supercomputing and storage

GPFS core cluster

Infiniband

dcache disk pool (~100TB)

NX10GE

"Maxwell" compute nodes
- Cent OS 7.1
- 8 x 32c, 512 GB RAM
  (Intel(R) Xeon(R) CPU E5-2698 v3 @ 2.30GHz)
- 3 x 32c, 512 GB RAM + GPU
  (Nvidia K40m)

- + IT-HPC (booking system)
  26(+6) x 64c, 256 GB RAM
  (AMD Opteron(TM) Processor 6276 @ 2.3GHz)
  + 6 GPU nodes (M2050 to K20x)

Data transfer to user facilities: Gamma-Portal

- Different views
- Locate data by keyword search in metadata
- Download & stage
- Project leader & applicant can manage ACLs