

# C<sup>2</sup>PAP & ORIGINS 2.0

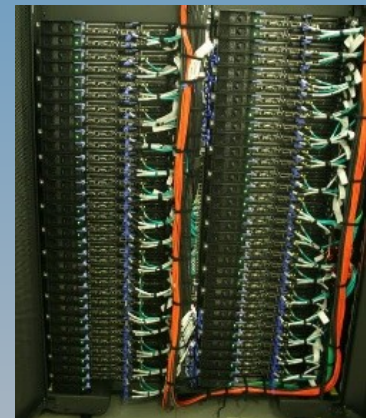
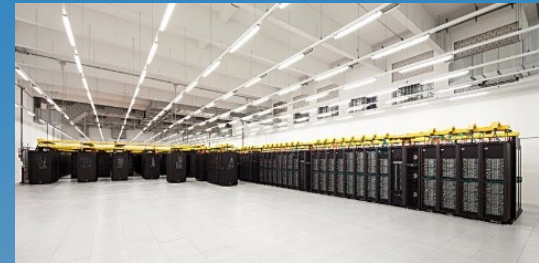
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ORIGINS-2.0  
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- **Overview & Plans**
- **ORIGINS 2.0 Brainstorming Questions**

# C<sup>2</sup>PAP Overview

## Key concepts:

- **Provide compute power and storage for ORIGINS groups**
  - **Medium sized CPU cluster:**  
~3000 CPU cores and 250 TB storage housed and operated at LRZ
  - **Recently added C2PAP@LRZ-cloud**
    - 4 Nvidia Tesla A100 GPUs (ML applications, simulation, ...)
    - 40 core CPU server (VM instances for special services)
- **C2PAP staff provides scientific computing expertise**
  - numerical methods, parallelisation, HPC usage, web services, cloud computing, ...
  - ~2.2 FTE (2 staff@c2pap + 0.2 staff@LRZ)
- **Yearly call for proposals**
  - origins group can ask for computing resources and manpower support



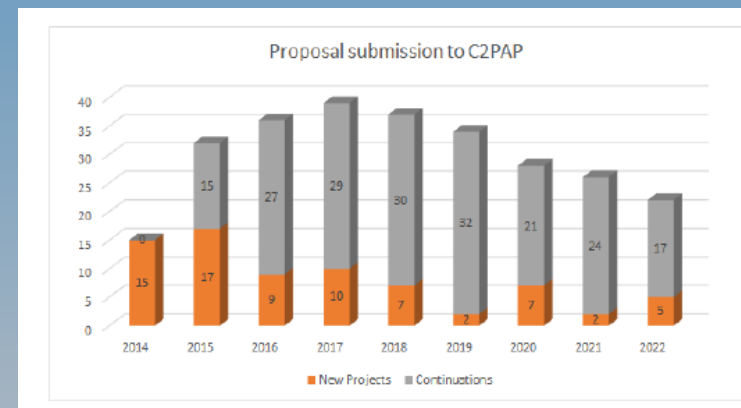
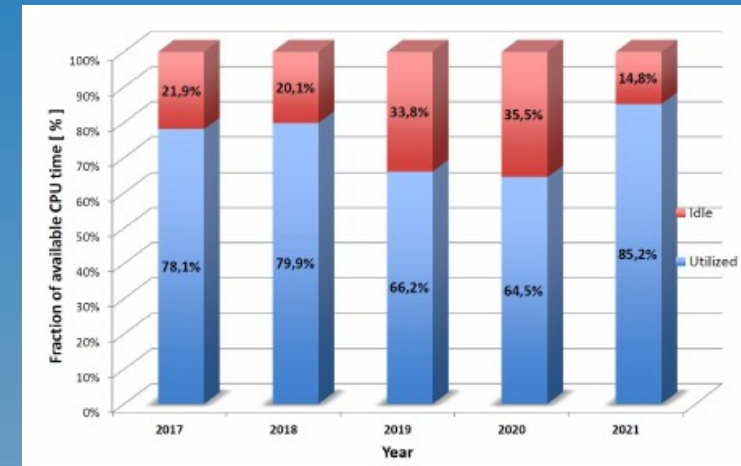
# C<sup>2</sup>PAP

## “DFG-Grossgeräte-Antrag”

- **Current CPU cluster will be phased out 2023 (partition of previous SuperMuc system from 2016)**
- **Configuration of proposed new system**
  - **CPU cluster w/ Xeon sapphire rapids CPUs ~3500 cores, 32 TB RAM**
    - ~2x CPU power
  - **GPU extension: 6 x 4 Nvidia Tesla A100 GPUs**
    - ~6x increase of GPU capacity
  - **Storage: 500 TB LRZ DSS**
    - Shared storage – accessible on all LRZ systems (SuperMuc, Linux cluster, LRZ cloud)
- **Proposal draft completed in Sep – in internal review by ORIGINS**

# C<sup>2</sup>PAP – what worked well

- **CPU cluster runs stable and efficient**
  - well utilized
- **Stable list of projects active on C2PAP**
  - Many projects continue but some newcomers each year
- **New 4 GPU system in cloud well received**
  - usually overbooked
    - More capacity much needed
- **C2PAP expert support to**
  - Parallelization & optimization for HPC
  - setup services (CI, Web portal, pMSSM factory, ...)
  - GPU programming & usage



# C<sup>2</sup>PAP – what could be improved

- **GPU cluster overbooked ... extend capacity**
- **C2PAP staff manpower**
  - **Started with 5 FTE in Universe 2013, now nominally 2+0.2**
    - **Extended periods with only 1+0.2**
    - **Below critical/productive size**
  - **Hard to find good candidates (within constraints of position funding and duration)**
- **Distribution of projects on ORIGINS RUs and CNs**
  - **Some imbalance apparent, i.e. high activity from some RUs/CNs, very little from others**

# C<sup>2</sup>PAP – new directions

- **Strongly increasing demand for GPUs & ML applications**
  - aim to better match with new systems in GGA
- **Further strengthen and improve collaboration with ODSL**
  - Open data science projects, Machine Learning
  - New approaches for cloud-based analysis facilities
- **ORIGINS community involved in large data science research projects (PUNCH4NFDI, ErUM Data, ...)**
  - Actively follow and support
- ...