Carl von Ossietzky
Universität
Oldenburg

**Betriebseinheit** für
technisch-wissenschaftliche
Infrastruktur

# Treffen der HPC NutzervertreterInnen

31.03.2023, 10:00 – 11:00 Uhr

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# TOPs

- Status HPC Cluster
  - $WORK ist immer noch ziemlich voll (>95%)
  - Incident $DATA
  - Auslastung 2022

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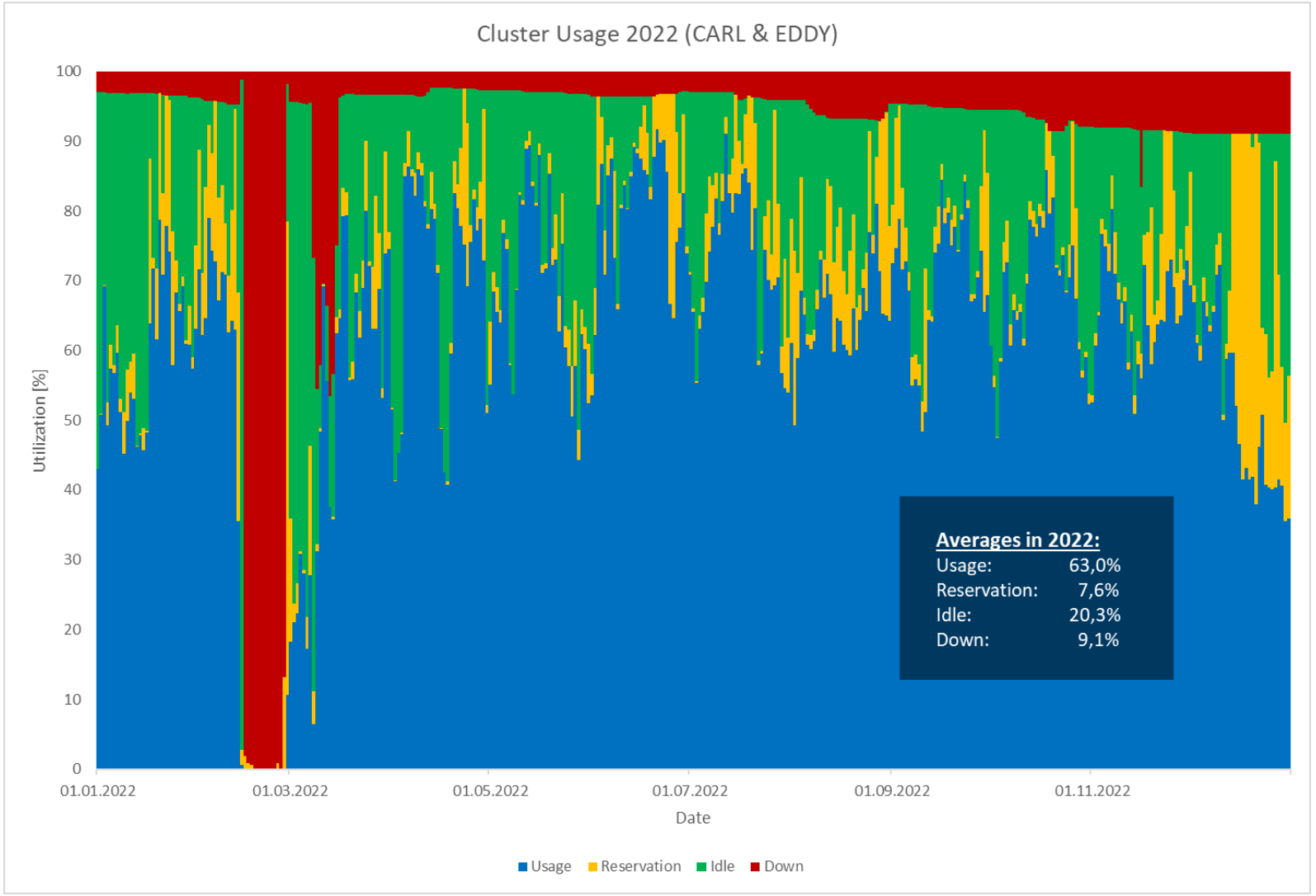
# Clusternutzung CARL & EDDY



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- nächster HPC Cluster
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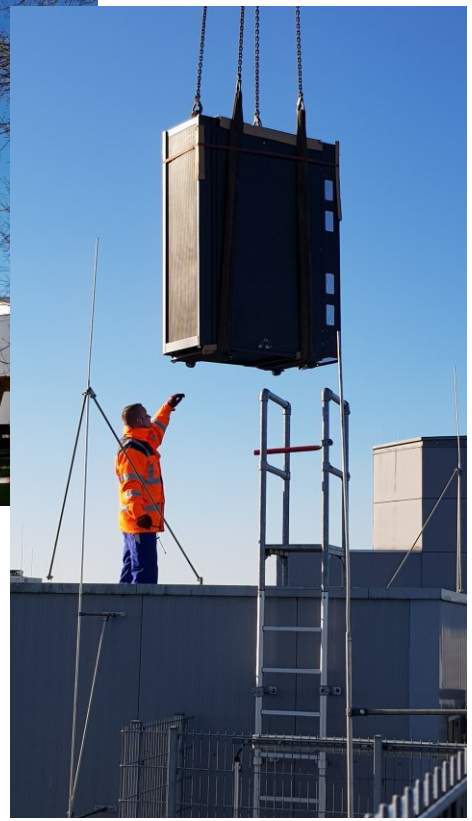
# Anlieferung RE-HPC (2/5 Racks)



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  - Datenmigration
  - Namen

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# Clusternamen

- drei Projekte
  - DFG (bisher CARL):
    - Helene: nach Helene Lange
    - Rosa: nach Rosalinde von Ossietzky-Palm
    - Hedy: nach Hedy Lamarr
    - weitere Vorschläge von Frauennamen mit Bezug OL und/oder HPC? Gerne an stefan.harfst@uol.de
  - RE-HPC
    - wird STORM heißen
  - MOUSE
    - noch unbekannt

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  - Namen
- Sonstiges
  - Workshop "How to AMD?" Di/Mi 14-17 Uhr online, Anmeldung 05.WR.2003
  - Auszeit konto.uol.de am Mo 9-10:30 Uhr
  - …
  - nächster Termin 30.6.23

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# The End

## Danke für die Aufmerksamkeit

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# Overview HPC-Clusters

- CARL-2
  - multi-purpose compute (MPC) cluster as a basic computing resource
  - funded by the University/MWK and the DFG under grant number INST 184/225-1 FUGG (Forschungsgroßgerät nach Art. 91b GG)
  - total funding: 2.400.000€ (+460.000€ HIFMB)
  - responsible PIs: Thorsten Klüner, Jörg Lücke, Stefan Harfst
- RE-HPC and MOUSE (ForWind)
  - CFD cluster for wind energy research
  - funded by REACT-EU under grant number ZW7-95186744 and BMWK under grant number 03EE3067A
  - total funding: 1.667.000€ (REACT-EU, including 167.000€ Uni) and 478.956,21€ (BMWK, HPC-Cluster only, project total is 1.628.058,80€)
  - responsible PI: Laura Lukassen
- used as a shared HPC cluster
  - common infrastructure is shared (e.g. file systems, network)
  - shared administration

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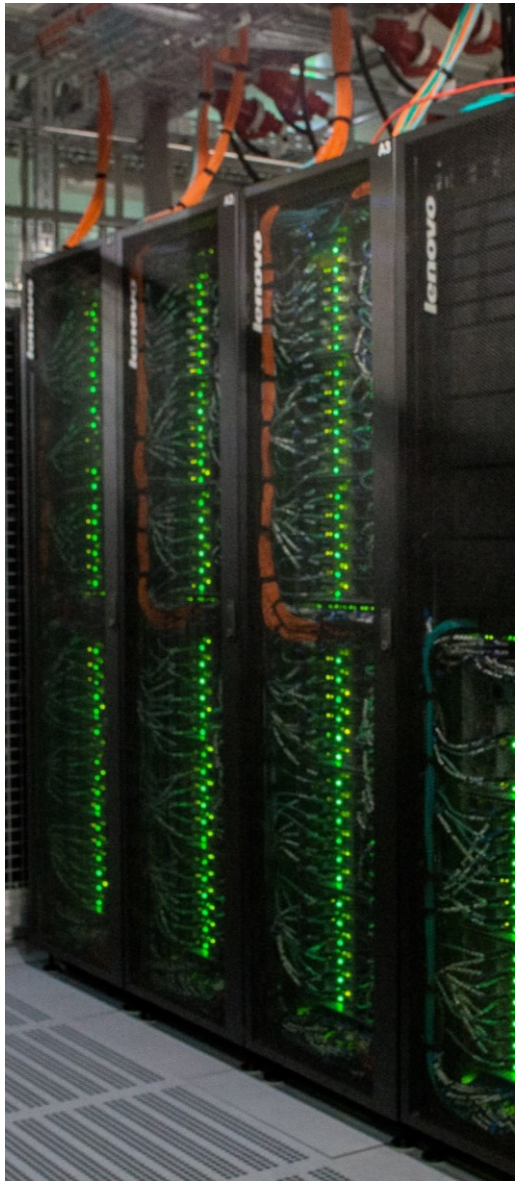
# HPC-Cluster @ University Oldenburg

- shared HPC-cluster
  - close to 160 compute nodes
  - 4 login and 2 administration nodes
  - Infiniband HDR interconnect for parallel computing
  - 25/1GE network for management
  - parallel file system (GPFS) with >4 PiB capacity
  - NFS mounted central storage

  - Linux (RHEL) as OS
  - many scientific applications and libraries available
  - Job Scheduler (SLURM)



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# Summary MPC & CFD

| Feature | MPC | CFD | Total |
|---|---|---|---|
| Nodes | 91 | 70 | 159 |
| CPU-Cores | 11.648 | 8.960 | 20.608 |
| RAM | 91 TiB | 54 TiB | 145 TiB |
| GPUs | 24x H100 94GB | 8x A100 80GB<br>4x A100 94GB | 8x A100 80GB<br>28x H100 94GB |
| GPFS | >2 PiB | >2 PiB | >4 PiB |
| Burst Buffer | 92 TB | - | 92 TB |
| Rmax (CPU) | ~546 TFlop/s | ~414 TFlop/s | 960 TFlop/s |
| Rpeak (GPU) | ~1.440 TFlop/s | ~320 TFlop/s | 1.760 TFlop/s |

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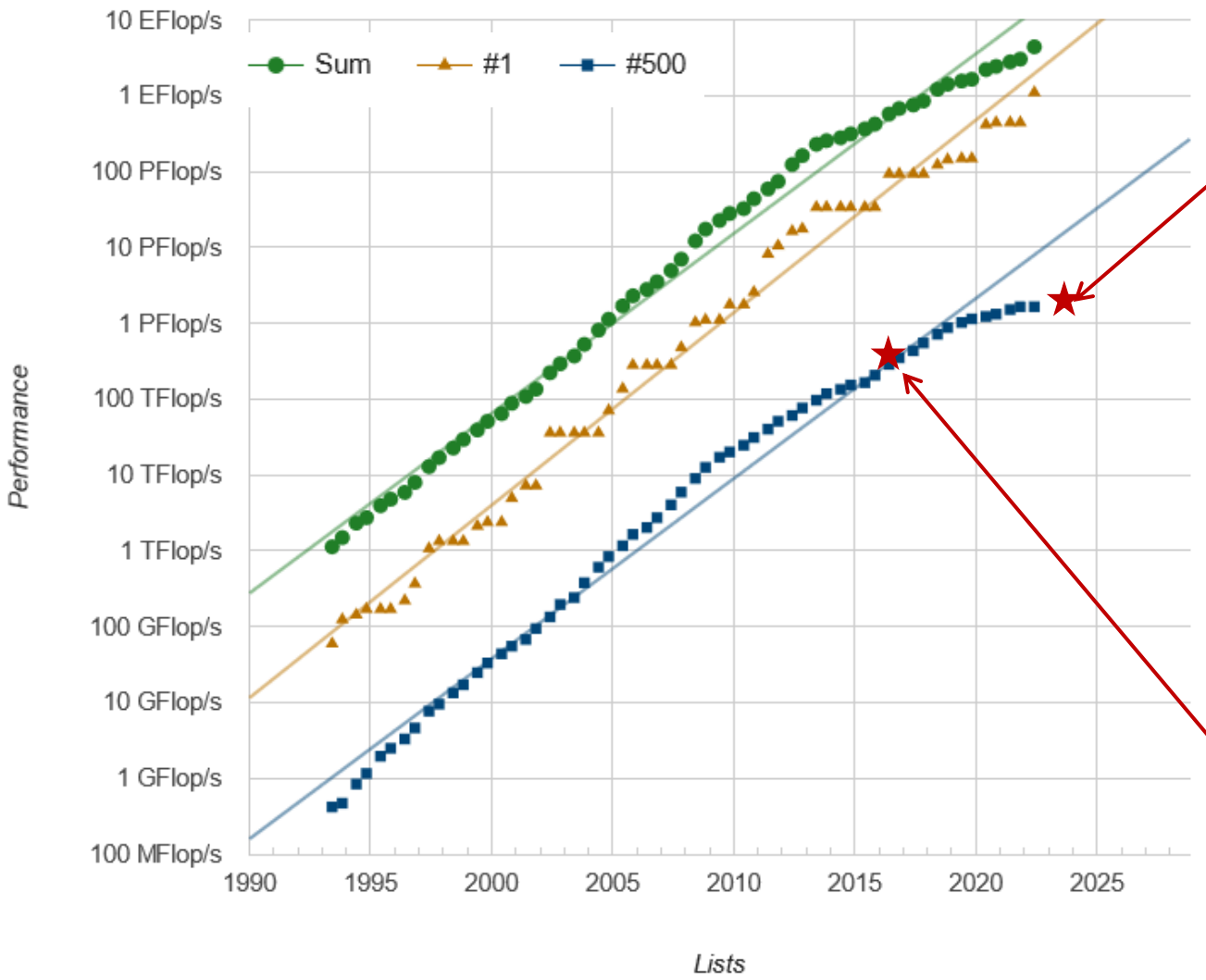
# Node Configurations and Project Assignment

| | Node Type | Node Cnt | CPU / GPU | RAM | Assignment |
|---|---|---|---|---|---|
| MPC | MPC-STD | 42 | 2x AMD Genoa EPYC 9554, 64C, 3.1 GHz, 360W | 768 GB | DFG |
| | | 14 | | | HIFMB |
| | MPC-BIG | 24 | | 1124 GB | DFG |
| | | 2 | | | AG EST |
| | MPC-PP | 2 | | 4096 GB | DFG |
| | | 1 | | | HIFMB |
| | MPC-GPU | 6 | CPU identical to MPC-STD, 4x Nvidia H100 94GB SXM | 1024 GB | DFG |
| CFD | CFD-STD | 52 | 2x AMD Genoa EPYC 9554, 64C, 3.1 GHz, 360W | 768 GB | RE-HPC |
| | | 16 | | | MOUSE |
| | CFD-GPU | 1 | identical to MPC-GPU | 1024 GB | MOUSE |
| | | 1 | 2x AMD Milan EPYC 7713, 64C, 2.0 GHz, 225W, 8x Nvidia A100 80GB SXM | | RE-HPC |

# Top500 Performance Development




**MPC/CFD**
- not ranked
- Rpeak 2,720 TFlop/s (CPU+GPU)
- 161 nodes, 20,608 cores
- 145 TiB RAM

4.7x Rpeak
0.28x nodes
1.53x cores
1.48x RAM

**CARL/EDDY**
- Rank 363
- Rmax (CPU) 457.2 TFlop/s
- Rpeak 577 Tflop/s (CPU+GPU)
- 571 nodes, 13,500 cores
- 98 TiB RAM

# Details on MPC/CFD-STD Compute Nodes

- compute nodes equipped with
  - CPU: 2x AMD „Genoa“ EPYC 9554, 64C @ 3.1GHz, 360W TDP
  - RAM: 768 GB (24x 32GB DDR5 @ 4800MHz)
  - Infiniband: ConnectX-6 HDR/200GbE (SharedIO, see below)
  - direct water-cooling (DWC) for CPUs, RDIMMs, and more
- two nodes on a single tray
  - shared  DWC
  - shared IB-connector