Computing Resources for 8 ErUM Communities

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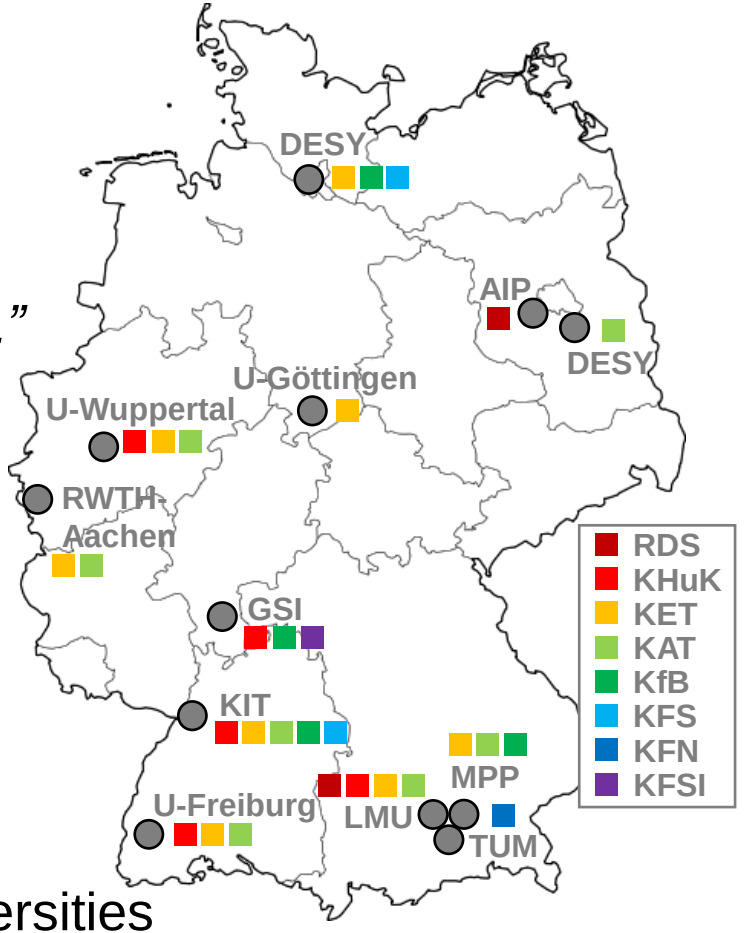
Resource Provider Board

- *"…is the board representing the institutions providing computing resources for the ErUM research area. Initially, this includes…"*
  - **10 ErUM computing centers**, namely:
    - 3 Helmholtz institutions (DESY, GSI, KIT)
    - 1 Leibniz institute (AIP)
    - 5 Universities (AC, FR, GÖ, M, W)
    - 1 Max Planck Institute (MPP)
  - In total > 280.000 CPU-cores, > 700 GPUs, > 260 PB disk and > 100 PB tape storage
  - Operated **24/7** at highest performance, quality and reliability – and **mostly pledged**
- In addition, local compute resources at universities



HPCs, Commercial Clouds, GPUs

	Technical	Organizational
HPCs	▪ Largely comparable CPU-hardware ▪ In principle binary compatible, but adaptations needed ▪ Software stacks different	▪ Resource usage time-limited and not guaranteed → not “pledge-able” ▪ **Totally different model of operation and compute time allocation** ▪ Opportunistic usage possible
Commercial Clouds	▪ Largely comparable CPU-hardware ▪ Storage/CPU bandwidth and WAN bandwidth are also a challenge	▪ Pay-per-use → money is leaving the science system and typically Germany ▪ **Large-scale regular usage typically at high costs** → mostly suitable for burst usage ▪ Sustainability and sovereignty critical
GPUs	▪ **Completely different architecture compared to standard CPUs → different programming paradigm**	▪ Easy integration in ErUM computing centers ▪ Also available in HPCs and Com. Clouds

Quo vadis?

- Future usage of HPCs (e.g., NHR) for compute-intensive tasks
- Discussion on HPC’s model of operation and compute time allocation

- Co-location of data and compute at ErUM computing centers for data-intensive computing and data handling of large-scale experiments
- Addressing the full data life cycle (FAIR principles) up to data archival enabling a data ecosystem for ErUM

Call for Action

- ***Research Software Engineering for efficient HPC & GPU usage***
- ***Strengthen ErUM computing centers for secured data sovereignty***

ErUM computing centers
=
indispensable
research infrastructure
to
transform data
into knowledge