



PPCES: Machine and Deep Learning

Focus and Agenda



DAS KOMPETENZNETZWERK FÜR HOCHLEISTUNGSRECHNEN.

- **Content that is not covered in this workshop!**
 - In-depth mathematical background of Machine Learning (ML) and Deep Learning (DL)
 - Advanced features and fine tuning of frameworks (see further links)
 - Unfortunately no time to cover all types such as Reinforcement Learning, LLM, ...
- **Content covered in this workshop!**
 - **General introduction into ML / DL**
 - Supervised vs unsupervised learning
 - Techniques: classification / regression / clustering / pre-processing
 - What is the appropriate choice for my task?
 - **Operation and execution (on CLAIX)**
 - Overview of available hardware and software for ML / DL
 - How to run regular or distributed workloads using frameworks such as scikit-learn and PyTorch?
 - Identifying resource utilization on CLAIX
 - **Hands-on exercises (Labs)**

| Zeit | Thema | Berichtende/r |
|---------------|--|---------------------------|
| 09:00 – 10:30 | Introduction to AI, Machine and Preprocessing Techniques – Part 1 | Jannis Klinkenberg (RWTH) |
| 10:30 – 11:00 | Break | |
| 11:00 – 12:30 | Introduction to AI, Machine and Preprocessing Techniques – Part 2 Execution Options for ML / DL Software Lab: Machine Learning with scikit-learn | Jannis Klinkenberg (RWTH) |
| 12:30 – 14:00 | Lunch Break | |
| 14:00 – 14:45 | Introduction to Deep Learning + Example | Jannis Klinkenberg (RWTH) |
| 14:45 – 15:30 | Introduction to Distributed Deep Learning + Example | Jannis Klinkenberg (RWTH) |
| 15:30 – 16:00 | Break | |
| 16:00 – 17:00 | Lab: Deep Learning with PyTorch | Jannis Klinkenberg (RWTH) |

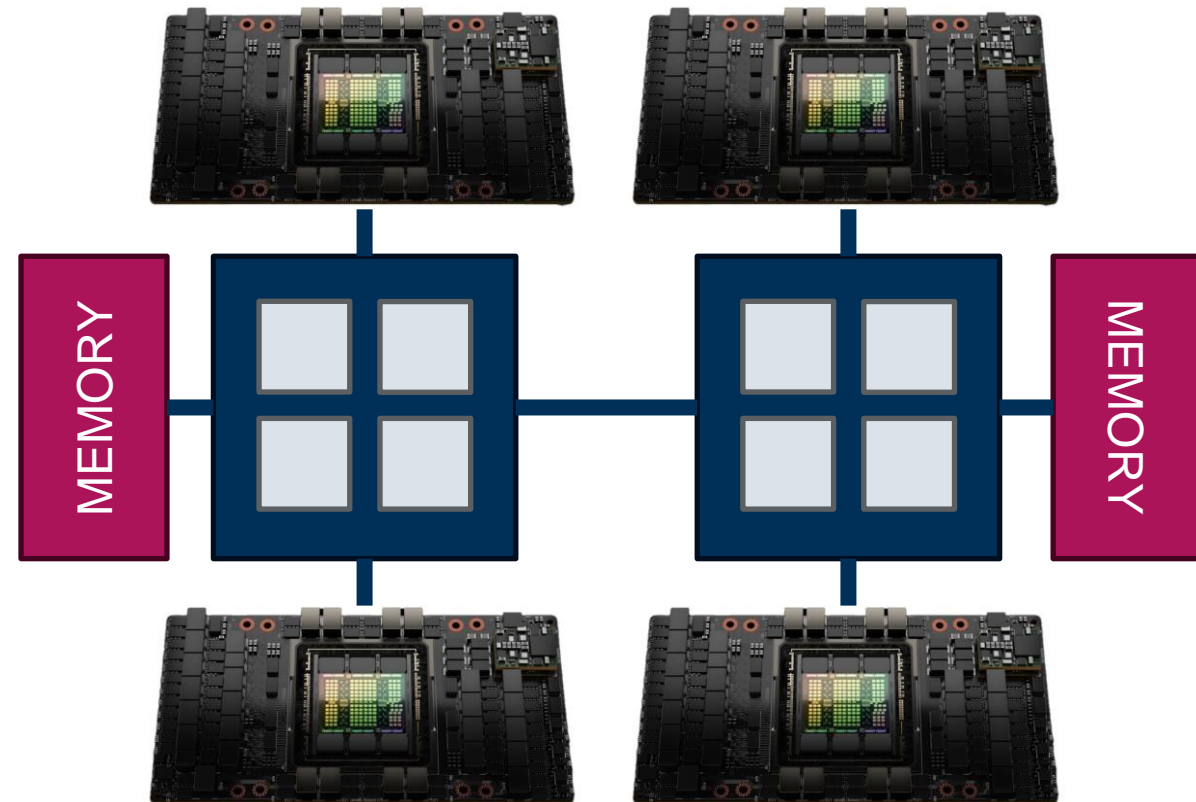
Acknowledgements / Contributors:

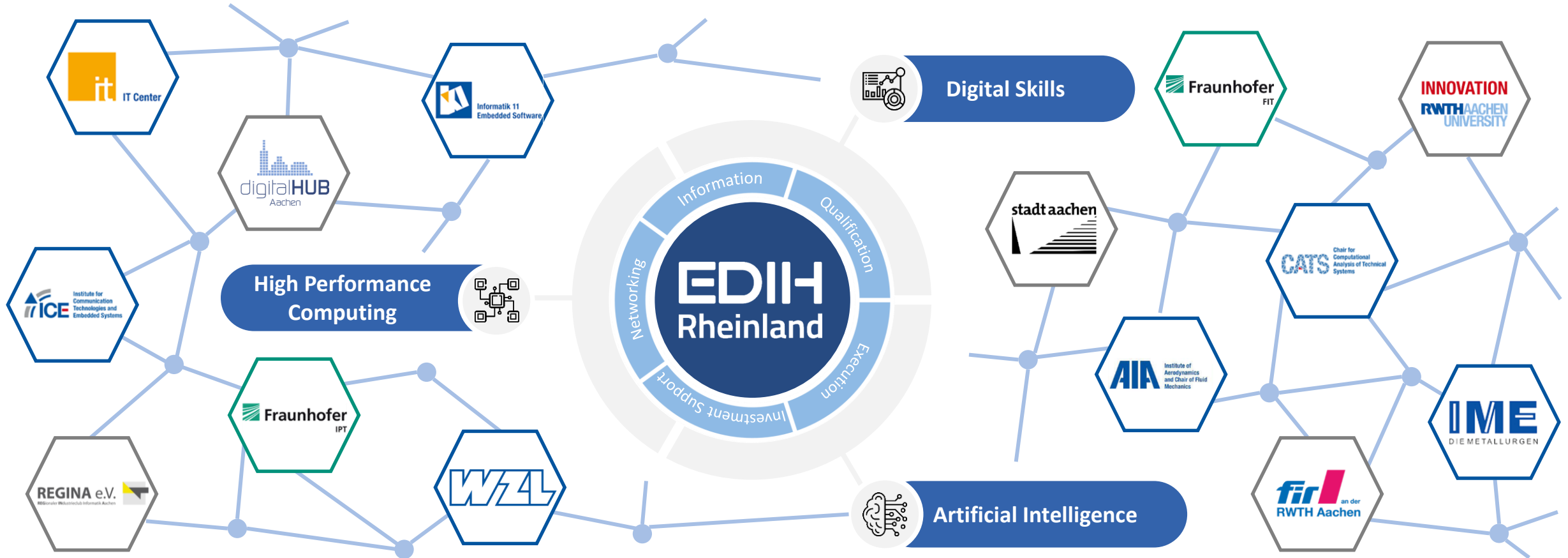
- Georg Zitzlsberger, NVIDIA (formerly IT4I Supercomputing Center, Ostrava)
- Dominik Viehhauser and Radita Liem, IT Center RWTH Aachen University

What hardware are we using today?

– CLAIX 2023 (ML Segment)

- 52 compute nodes, each comprising
 - 2x Intel Sapphire Rapids
 - 2x 48 cores @ 2.1 GHz
 - 512 GB main memory
- 4x NVIDIA H100 (Hopper)
- 96 GB HBM2e
- Infiniband NDR network

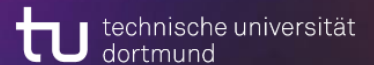




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