Karlsruher Institut für Technologie

1st HPC Café

12.12.2024

Agenda

1. HPC Café: Kick-Off
   - What and Why?
   - How? → Discussion!

2. Procurement of HoreKa Successor
   - Keynote speech: “Upcoming high performance computer HoreKa-2”
   - Survey on Scientific needs → Discussion!

3. Questions and answers

HPC Café: What and Why?

- **Close exchange** between operators and users
  - **Feedback loop** apart from tickets/announcements
  - Exchange of ideas
- **Informal** meeting
  - „Keynote speech“: Only in case someone wants to share a current challenge/project
  - Focus: **Discussions**
- **Question and answer sessions**

→ Further improve of the **NHR@KIT** services

HPC Café: How?

- Agenda
  - **How** would you like to interact?
- Frequency
  - **How often** should we meet?

Discussion: HPC Café

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Upcoming High Performance Computer HoreKa-2

Naming

- **Not definitive yet**
- Working name: *„HoreKa-2“*

HoreKa-2 Overview / Profile of NHR@KIT

User groups:

- Earth System Sciences
- Material Sciences
- Engineering in Energy and Mobility Research
- Particle and Astroparticle Physics Research

Method focus:

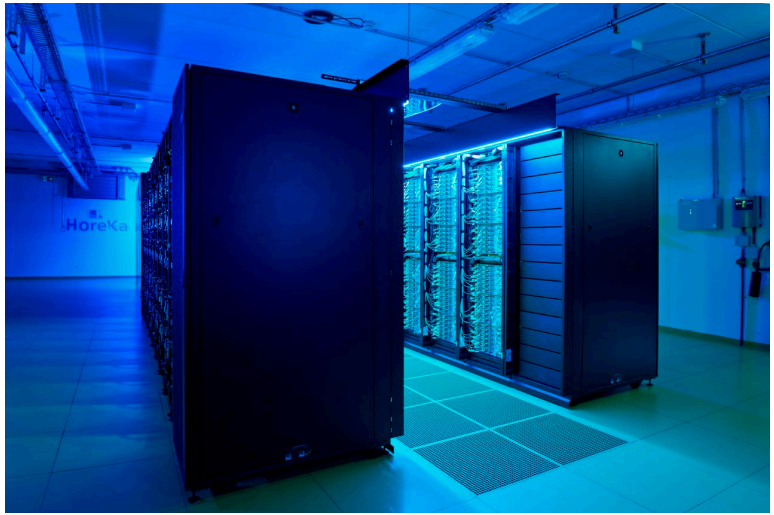
- Data Intensive Computing
- Numerical Algorithms
- Software Sustainability

User support:

- SimDataLabs
- Trainings, Hackathons, Code Summers for GPU Programming
- Continuous Integration/Testing/etc. (Cx)
- Federated Authentification Infrastructure
- Industry Cooperations
- Security Audits
- Mini-Apps for Procurements

HoreKa-2 Overview

- **Budget**
  - ~15 million €
  - ~3 million € HAICORE
- **Procurement:** Q1/2025
- Commissioning of first phase: End of Q4/2025
- **Full commissioning: Mid 2026**
- **Components:** Compute + Filesystem
- **Location:** North Campus
  - DLC, hot water cooled, ~40°C in, ~45°C out
  - Power envelope: less then 1 MW



Procurement Considerations

Basic considerations:

- Tier-2 system
- As technologically open as possible
- Has to serve both HPC and AI workloads
- Energy Awareness

Procurement Considerations Implications

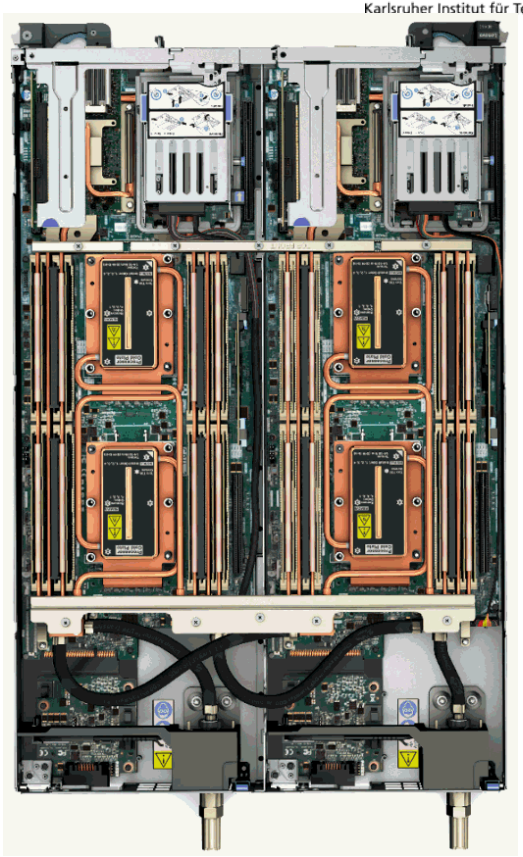
Tier-2:

- Cluster-Size
- Exotic hardware conceivable ←→ Tier-3
- Advanced users assumed

Procurement Considerations Implications

As technologically open as possible:

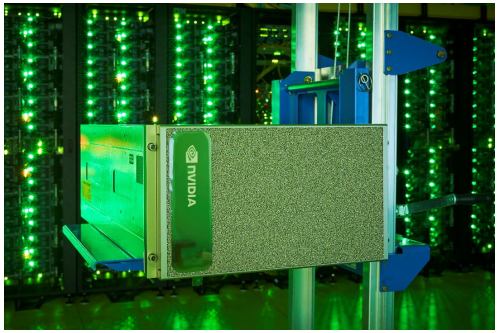
- Exotic hardware conceivable
- Hybrid or not
  - CPU and accelerated nodes
  - Accelerated nodes only
- Possible architectures
  - x86
  - ARM
  - Power
- Accelerators
  - GPU: NVIDIA or AMD
  - Other accelerators

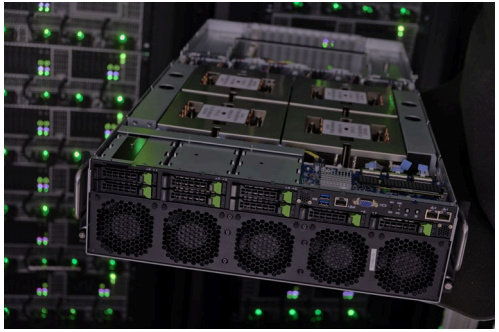


Procurement Considarations Implications

Has to serve both HPC and AI workloads:

- **If hybrid** system
  - **Which split** between CPU and accelerated partitions?
  - Same host architecture on CPU/GPU-nodes?
    - x86/x86?
    - x86/ARM?
    - ARM/ARM?
- Accelerators
  - **Double precision** required? / „HPC-Flavor“ (yes: rather AMD)
  - **Convenience**/off-the-shelf software? / „AI-Flavor“ (yes: rather NVIDIA)

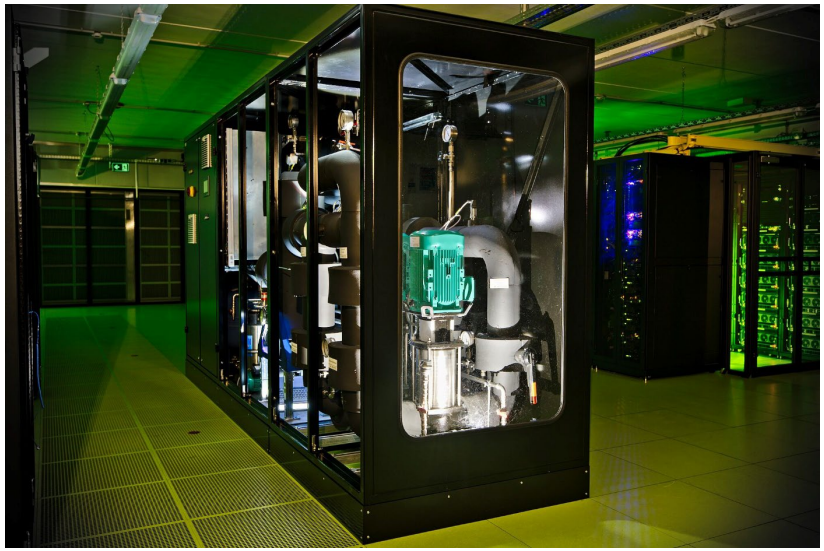




Procurement Considerations Implications

Energy Awareness:

- Fixed **financial budget** for energy
  - Checkpointing
  - Power scaling
  - CPU/GPU-hours → **energy budget** for compute projects
- Full DLC components preferred
- Accelerated codes!
- Please contact SSPE-Team ;)



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End of presentation

Survey on Scientific needs

- How can the system optimally be tailored to the users' needs?
  - Feedback from the scientists!
  - We need to involve our users transparently

  → **Survey on scientific needs for the new high-performance computer HoreKa-2**

- Let’s have a look…
  - https://indico.scc.kit.edu/event/4805/surveys/109?token=653dccee-1454-4904-848e-9b5a6d89923d

Survey / List of questions

- To how many nodes does your job scale?
- Main memory per task / MPI process
- Job profile
- Does the program use checkpointing?
- Number of files
- Storage space
- Data transfer from/to cluster
- HPC or AI workloads
- Job Profile: CPU & GPU Mix
- Porting of Workflows and applications to GPUs
- What type of accelerator is needed?
- Can your application run on ARM?
- Used Software
- Application support services

Survey

- Is anything missing in the survey?
- How would YOUR ideal supercomputer look like?

Discussion: HoreKa-2 and Survey

Questions and Answers

- It‘s up to you!