

# 1<sup>st</sup> 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**

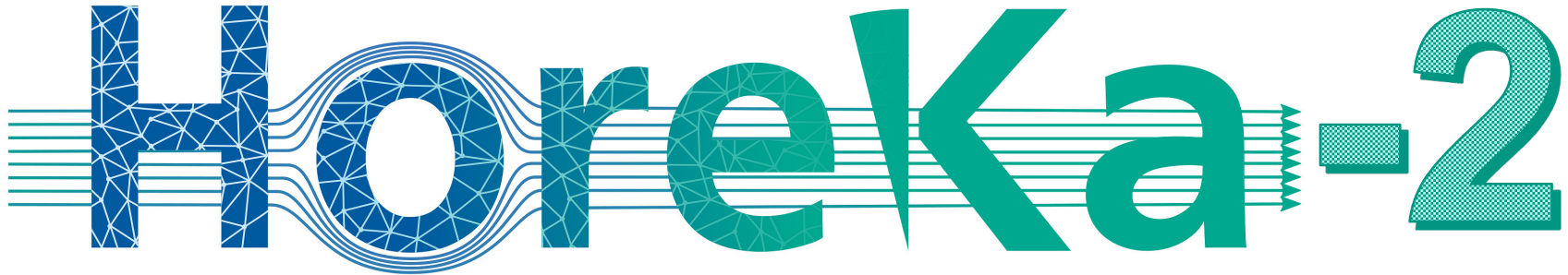
→ Further improve of the **NHR@KIT** services

# HPC Café: How?

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

# Discussion: HPC Café

# Upcoming High Performance Computer HoreKa-2



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 Authentication Infrastructure
- Industry Cooperations
- Security Audits
- Mini-Apps for Procurements



# HoreKa-2 Overview

## ■ Budget

- ~15 million €
- ~3 million € HAICORE

## ■ Procurement: Q1/2025

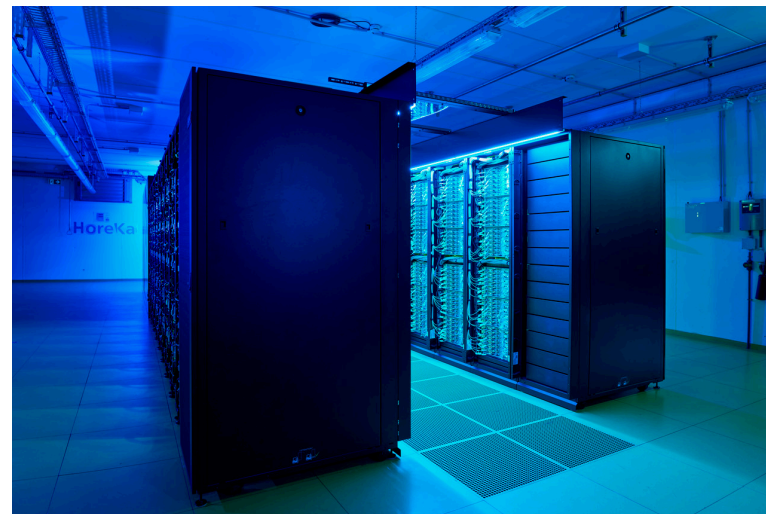
## ■ Commissioning of first phase: End of Q4/2025

## ■ Full commissioning: Mid 2026

## ■ Components: Compute + Filesystem

## ■ Location: North Campus

- DLC, hot water cooled, ~40°C in, ~45°C out
- Power envelope: less than 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:

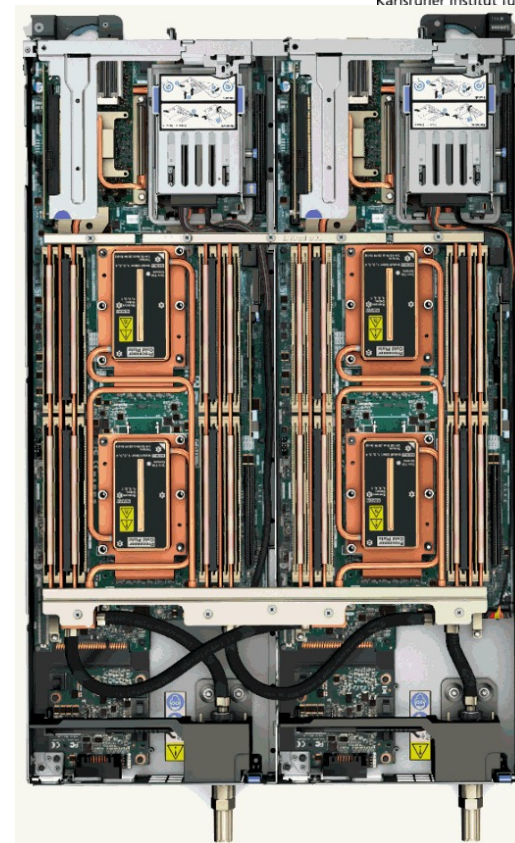
- Cluster-Size
- Exotic hardware conceivable  $\leftrightarrow$  Tier-3
- Advanced users assumed



# 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 Considerations Implications

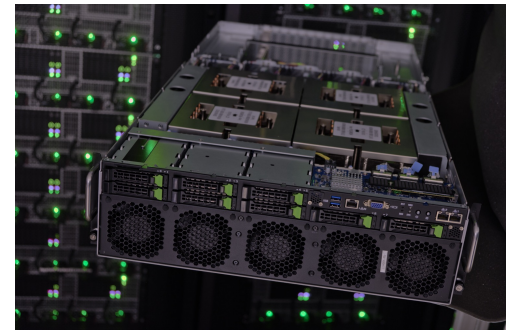
## Has to serve both HPC and AI workloads:

### ■ If hybrid system

- **Which split** between CPU and accelerated partitions?
- Same host architecture on CPU/GPU-nodes?
  - x86/x86?
  - x86/ARM?
  - ARM/ARM?

### ■ Accelerators

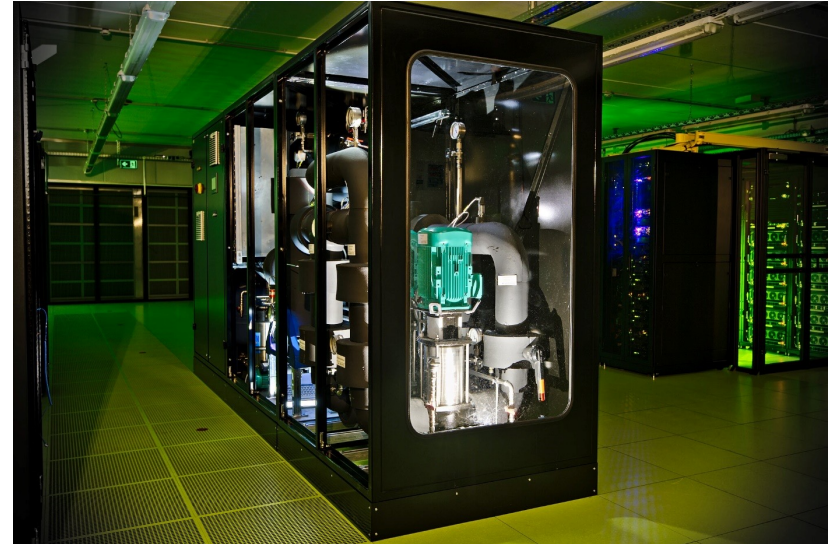
- **Double precision** required? / „HPC-Flavor“  
(yes: rather AMD)
- **Convenience**/off-the-shelf software? / „AI-Flavor“  
(yes: rather NVIDIA)



# 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 ;)



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!