



# DECICE

Device-Edge-Cloud Intelligent  
Collaboration Framework



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## Device-Edge-Cloud Intelligent Collaboration Framework

DECICE aims to develop an AI-based, open and portable cloud management framework for automatic and adaptive optimization and deployment of applications in a federated infrastructure, including computing from the very large (e.g., HPC systems) to the very small (e.g., IoT sensors connected on the edge).

EDGE | CLOUD | HPC | IoT | HETEROGENOUS SYSTEMS | AI-SCHEDULING | MACHINE LEARNING | DATA CENTERS | SYSTEM MONITORING | DIGITAL TWIN | KUBERNETES



### BACKGROUND

Growth and higher complexity of cloud computing industry



### CHALLENGE

Ultra-low latency, security and close location (e.g. in Smart Cities)



### SOLUTION

AI-Scheduler: using the available resources of a digital twin

# WE CAUGHT YOUR INTEREST?

## Find out more about DECICE:

Working at vastly different scales requires an intelligent management plane with advanced capabilities that allow it to proactively adjust workloads within the system based on their needs, such as latency, compute power and power consumption. Therefore, we envision an AI-model, which can use a digital twin of the resources available, to make real-time scheduling decisions based on telemetry data from the resources.

The DECICE framework will be able to dynamically balance different workloads, optimize the throughput and latency of the system resources (compute, storage, and network) regarding performance and energy efficiency and quickly adapt to changing conditions.

The framework also gives the necessary tools and interfaces for the administrators and deployment experts to interface with all the infrastructure components and control them to achieve the desired result. The integration of the DECICE framework with orchestration systems will be done through open standard APIs to make it portable, modular and extensible.



# PROJECT CONCEPT

## WHAT we are doing!

Solving the challenge of optimization of both performance and energy or addresses data and job locality.



**AI-based, open and portable cloud management** (from large HPC to small IoT)



**Digital Twin**  
AI-model uses available resources for real-time scheduling decisions



**DECICE framework**  
tool and interface for the administrators and deployment experts



**Open standard APIs**  
portable, modular and extensible

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## CONTACT & FACTS

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Georg-August-Universität  
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## DECICE OBJECTIVES



**LEVERAGE A COMPUTE CONTINUUM** ranging from Cloud and HPC to Edge and IoT.



**AI-SCHEDULER** supporting dynamic load balancing for energy efficient compute orchestration, improved use of Green Energy, and automated deployment.



**API** that increases control over network, computing and data resources.



**DYNAMIC DIGITAL TWIN** of the system with AI-based prediction capabilities.



**REAL-LIFE USE CASES** of DECICE framework (usability and benefits).



**SERVICE DEPLOYMENT** with a high level of trustworthiness and compliance with relevant security frameworks.



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SHAPING THE FUTURE



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