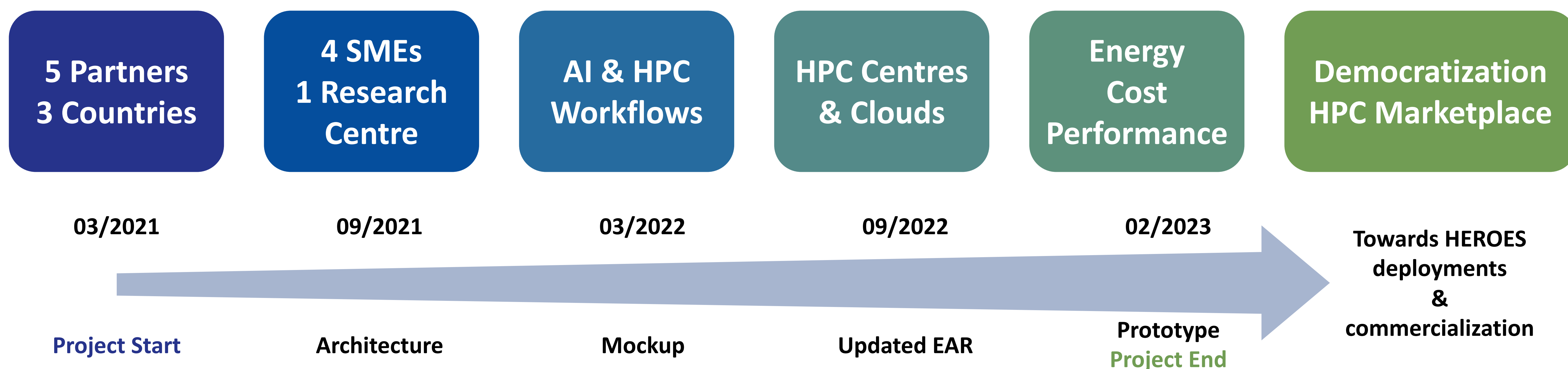


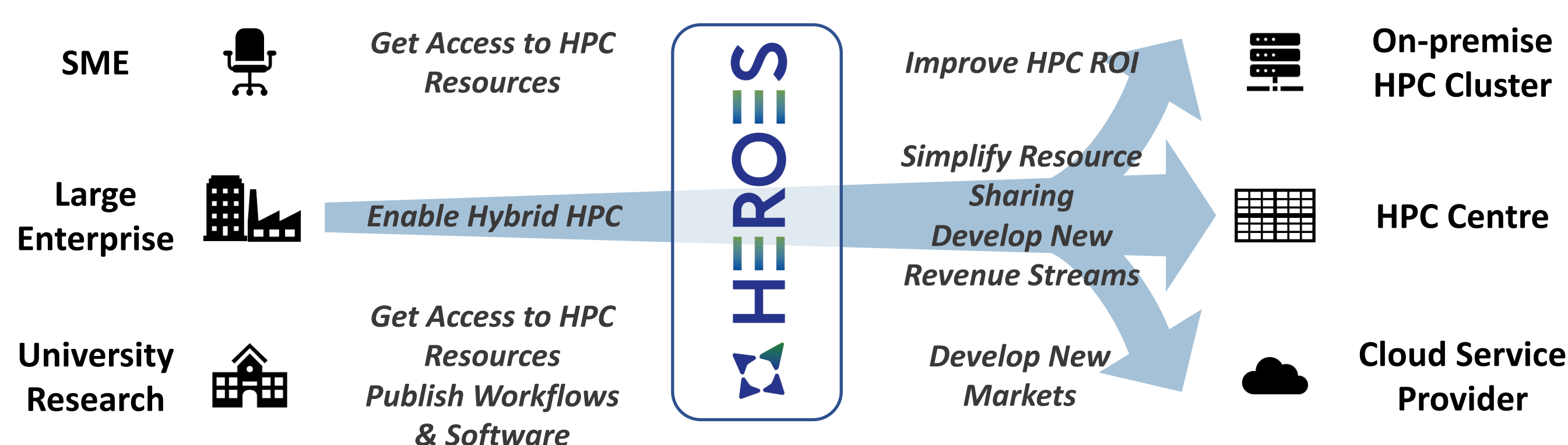
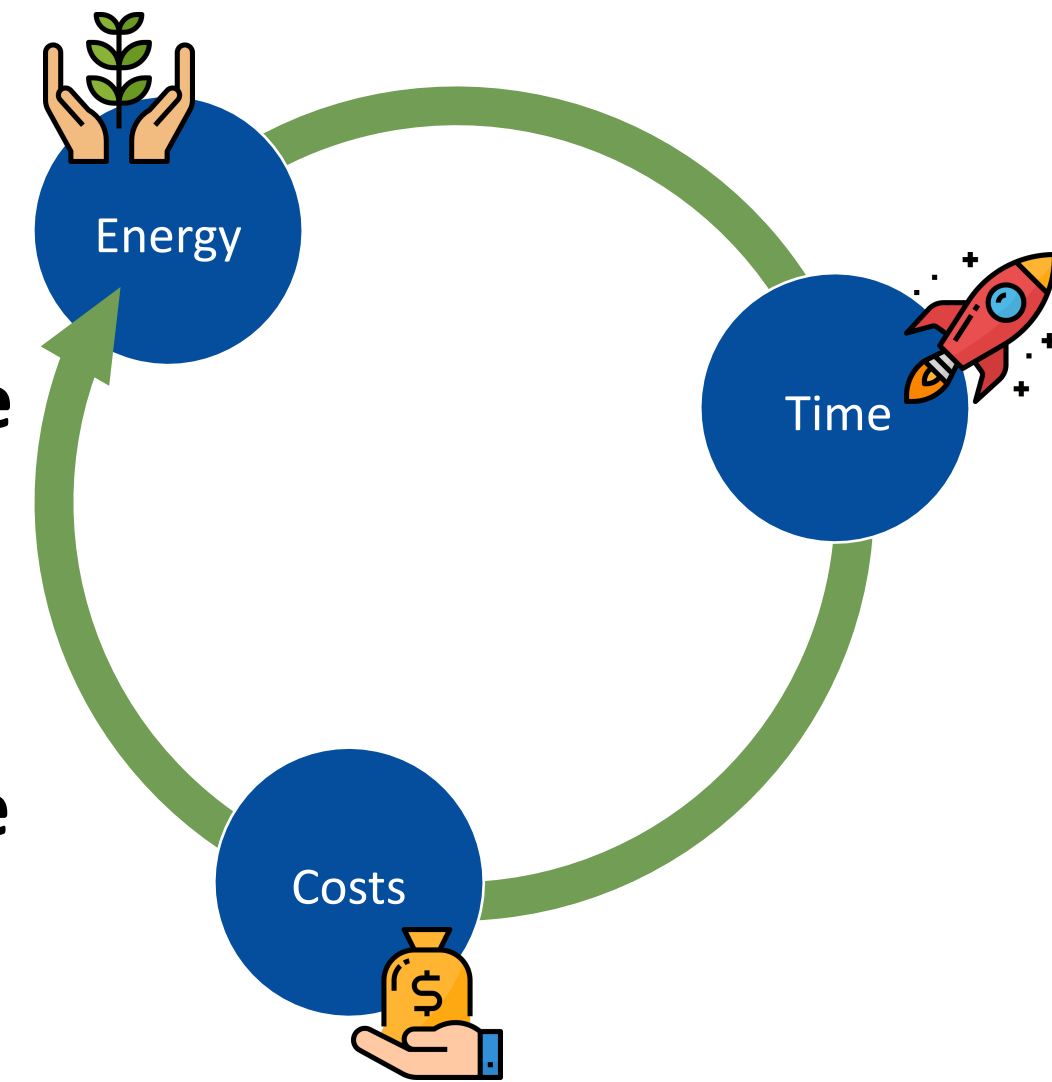
Towards Eco-Responsible Hybrid HPC Marketplaces

Hybrid Eco-Responsible Optimized European Solution



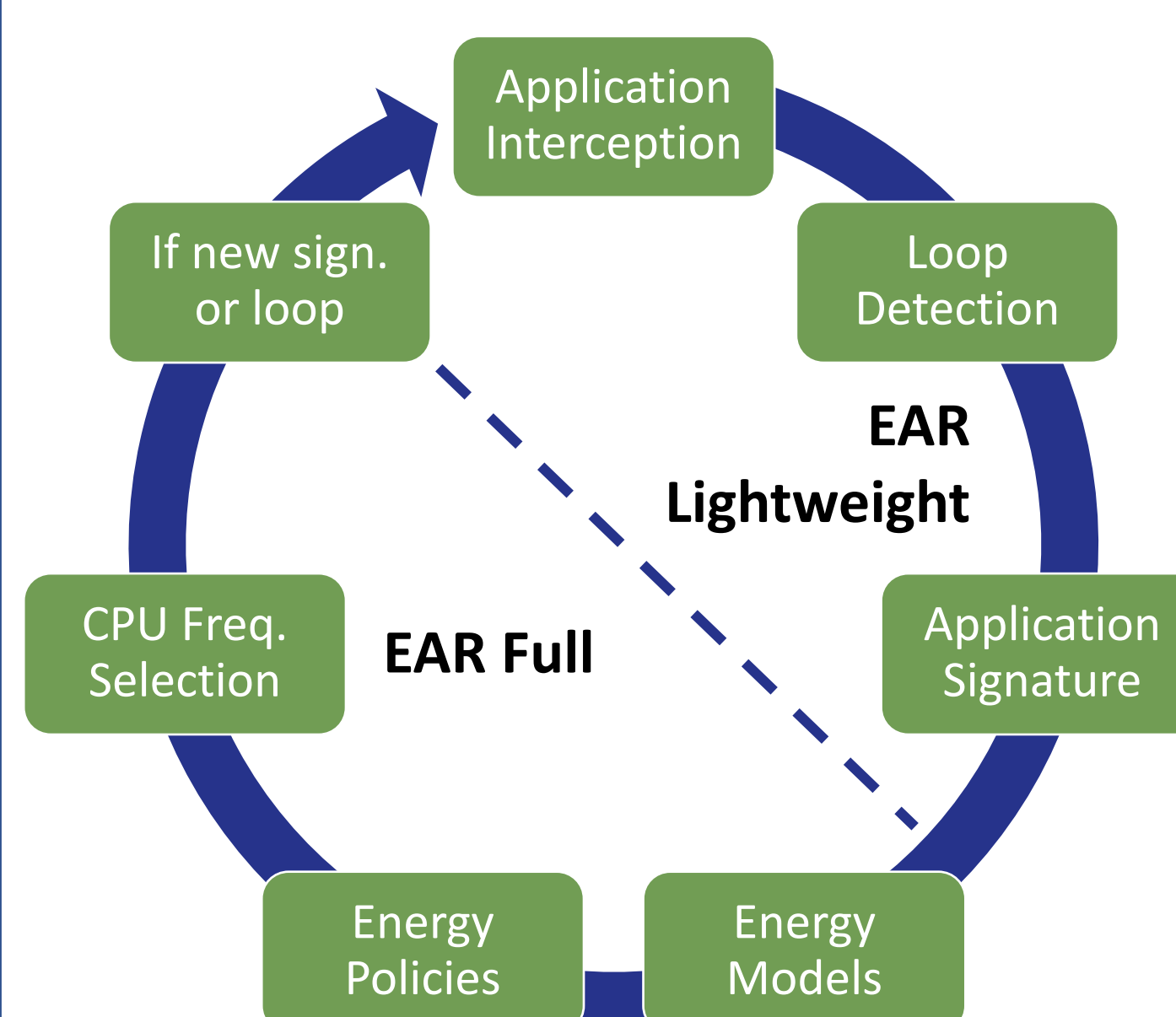
Towards HPC Marketplaces

- Framework to build private or public HPC marketplaces
- Each HEROES platform implementation will be built, managed and operated independently by private or public Service Providers
- Allow end-users to select the best compromise between cost, energy/carbon footprint and performance
- Allow resource providers (HPC Centres, CSP) to publish their resources at their own terms (SLA) to user communities



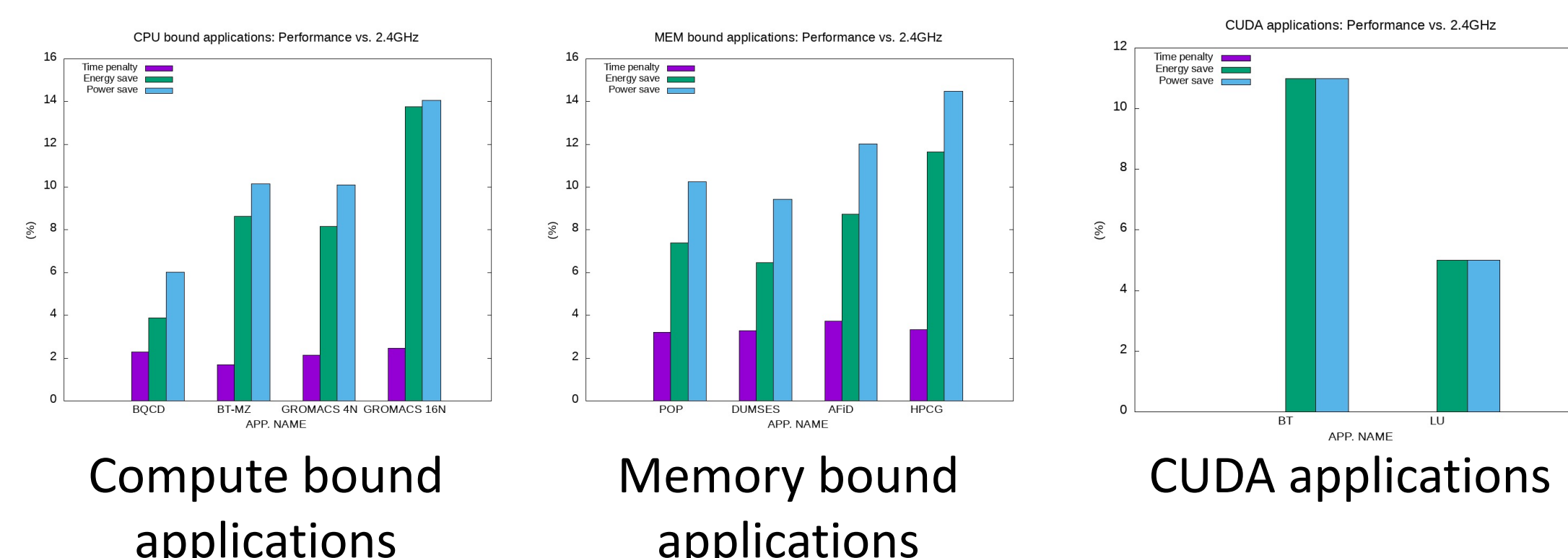
EAR Energy efficiency

Energy Aware Runtime is a management framework optimizing the energy and efficiency of an HPC cluster



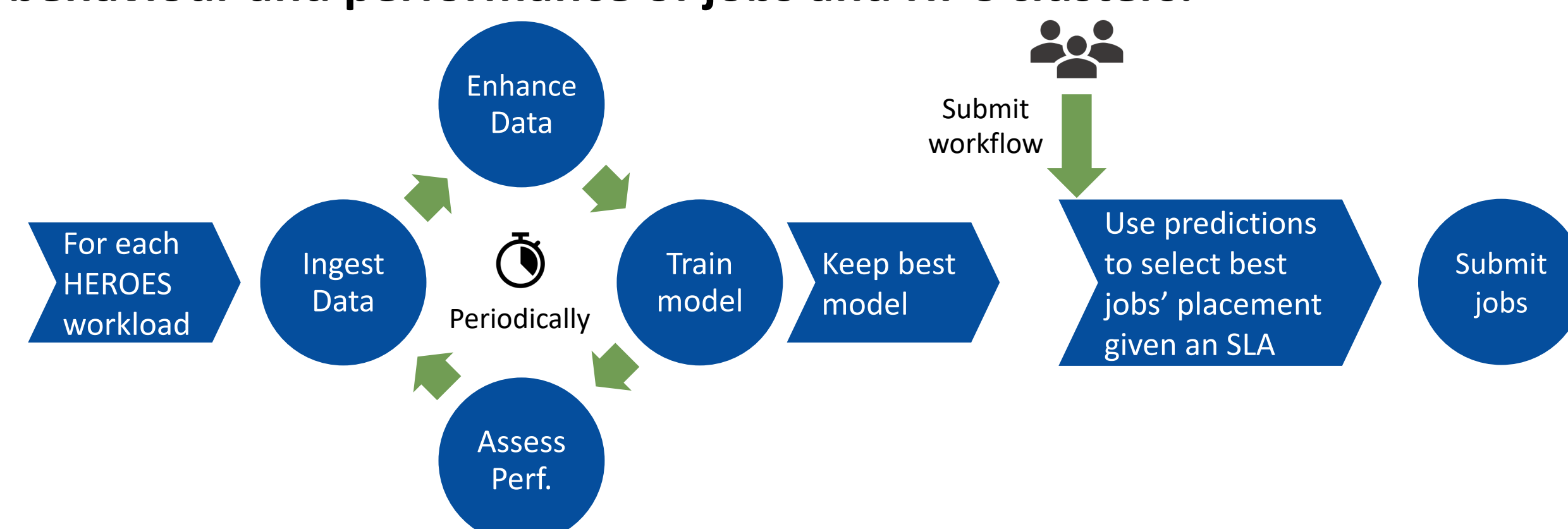
- Energy and performance accounting
- Dynamic energy optimization through the detection of the needs of the inner loops of the applications and use of DVFS (Dynamic Voltage & Frequency Scaling)
- Global energy management and capping

Energy Optimization with EAR

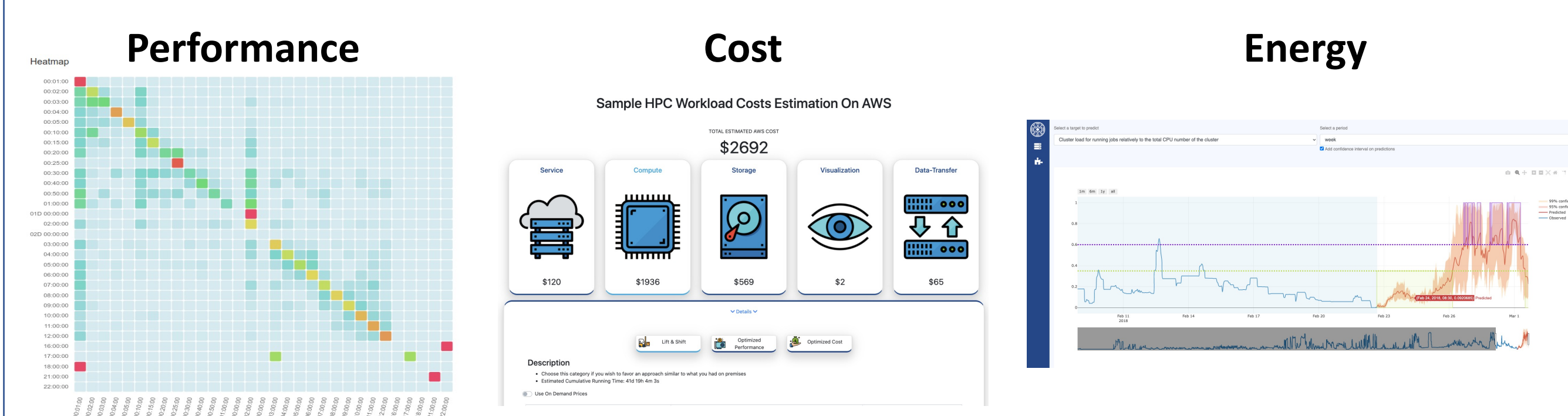


Decision Module

The OKA data science platform is used to analyse and predict the behaviour and performance of jobs and HPC clusters.

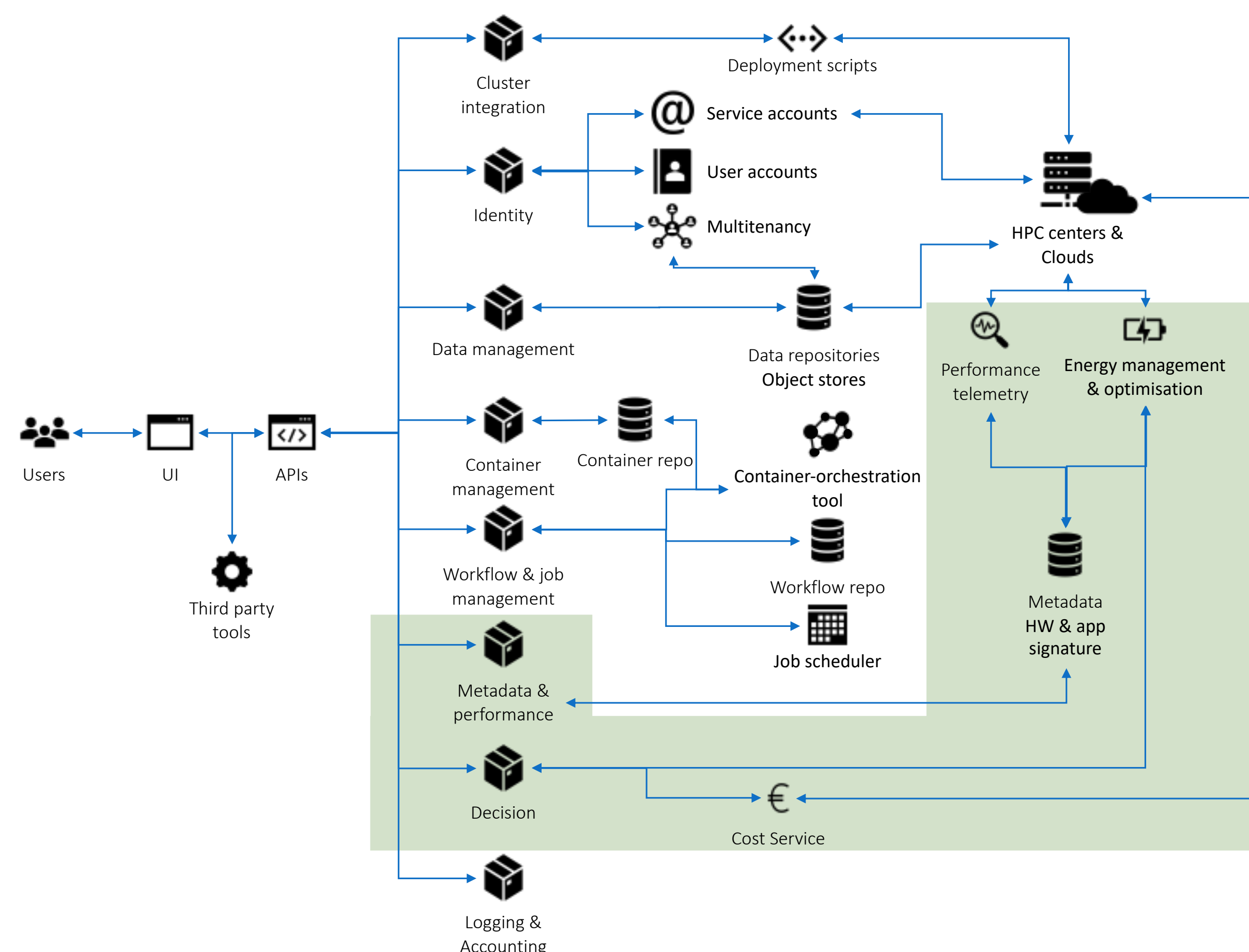


- Job requirements predictions (rand. forest, grad. Boost., Adaboost...)
- Timeseries forecasting (LSTM, Neural Prophet...)
- Multi-target predictors, Application independent (no specific modelling)
- Mixed AI/ML & classical algorithmic approach
- Heterogeneous data sources/metrics (Job Sched., EAR, Data Enhancers...)



Architecture

- Multi-tenant & Secure
- Tasks execution through Singularity jobs
- Centralized identity/data/workflow... management
- Remote submission, job monitoring, data transfers through SSH



EAR: <https://www.bsc.es/research-and-development/software-and-apps/software-list/ear-energy-management-framework-hpc>

OKA: <https://oka.how>