HEROES
Vers des places de marché pour le calcul intensif

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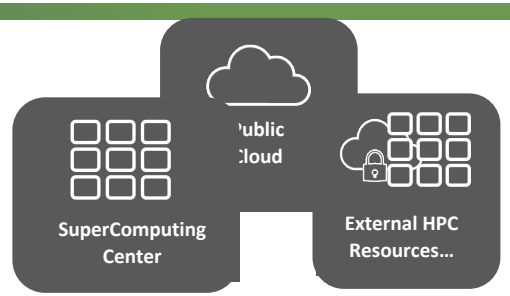
HEROES Framework at a glance
From HPC as a Service Towards HPC Marketplaces

HEROES

https://heroes-project.eu



Industry Support

Best Resource for the Job
Energy Efficient – Result in Time – Cost Optimised

Publish SuperComputing Resources

HPC Now!

UC IT

BSC

doit SYSTEMS

NEOVIA INNOVATION

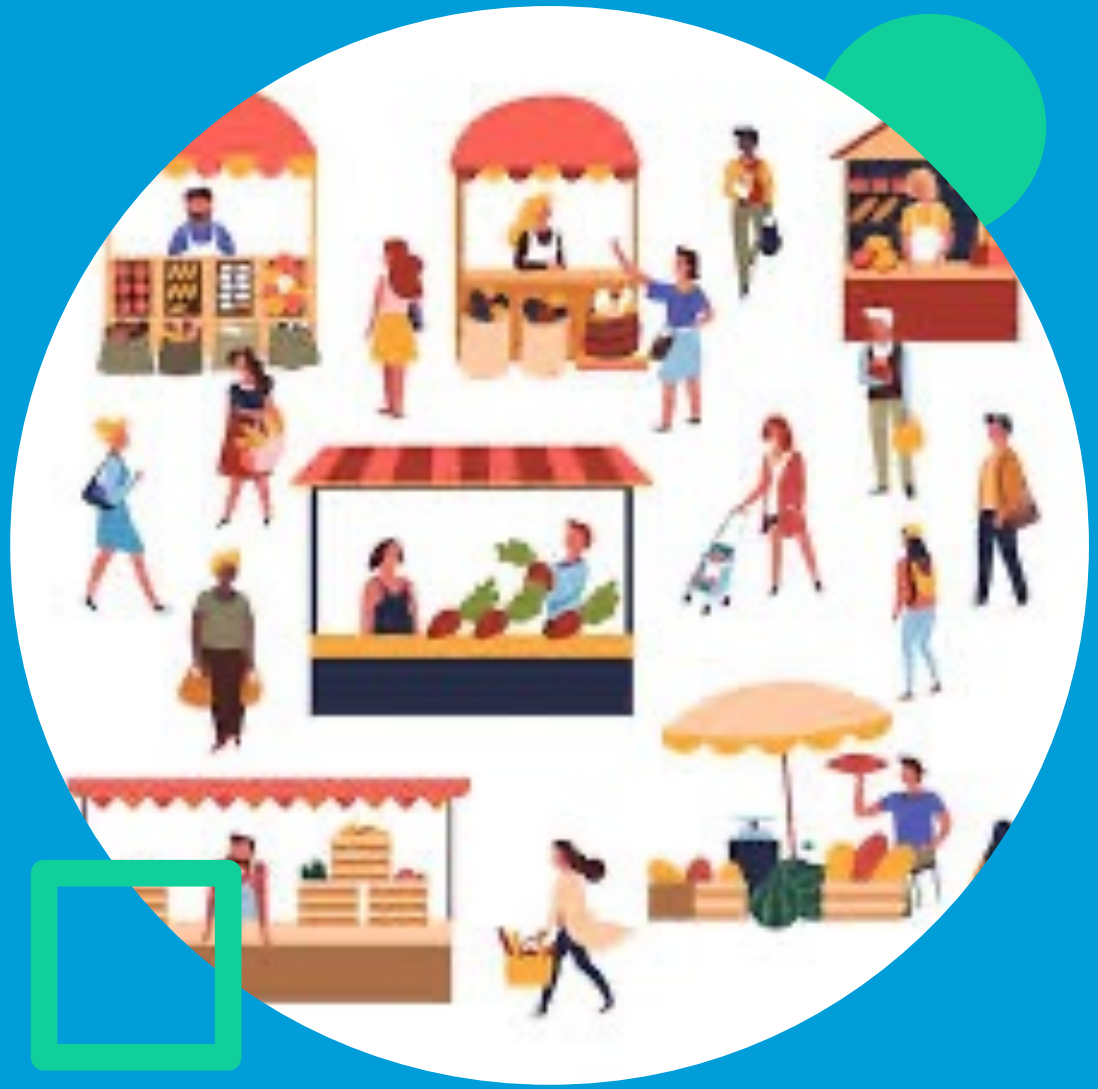
Software Framework – Ready for commercialisation
Dissemination & Communication

HEROES

A marketplace is organized : “The Mayor role”

Different “Vendors provide their Products or Resources”

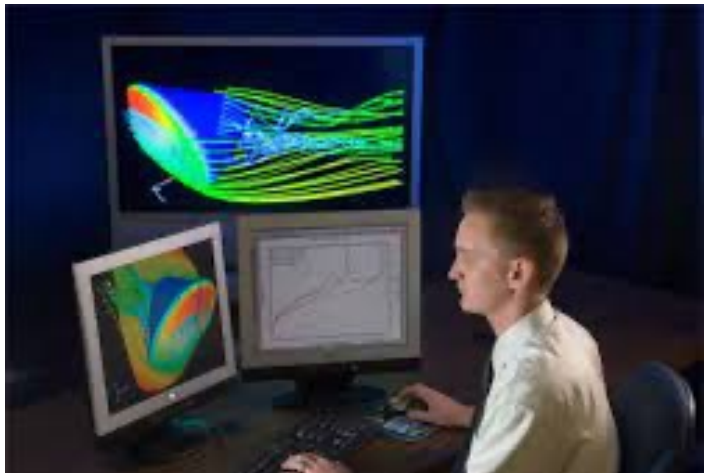
Clients choose products, negotiate prices and leave the market with the products.

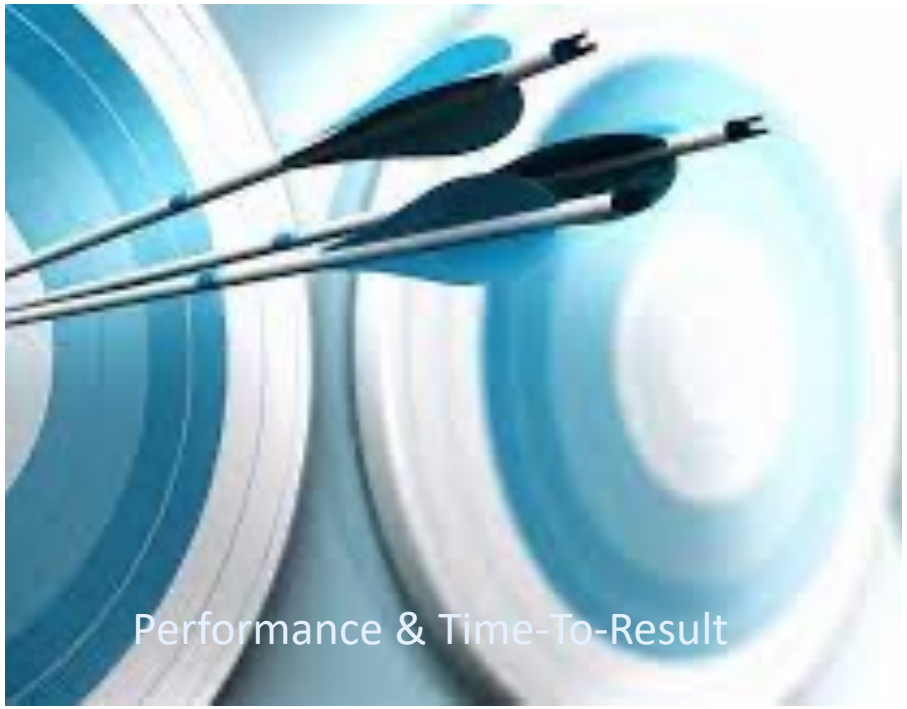


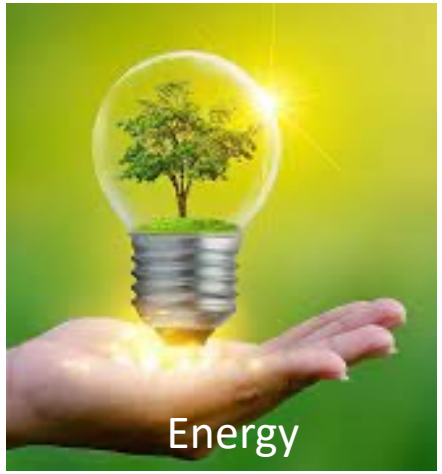
So… what would be an HEROES Marketplace ?

The Vendor

The Client




Performance & Time-To-Result


Energy

Costs

Where do I run my Workflow ?

”Mayor” : The HEROES Platform “Administrator”

“Client”: Users can bring their own workflow and if they agree on the terms, they launch the related jobs/steps

“Vendor” provides HPC Compute & Storage at their own Terms and Conditions which can vary over time

Some Vendors will provide HPC & AI Workflows

HEROES - Marketplace

HEROES

SME

Large Enterprise

Universities & Research

Get Access to HPC Resources

Enable Hybrid HPC

Get Access to HPC Resources
Publish Workflows & Software Code

HEROES Software Platform

Identification of the best Watts*€*Flops platform for the job

Improve HPC ROI

Simplify Resource Sharing

Develop New Revenue Streams

Develop New Market

On-Premises HPC Cluster

HPC Centre

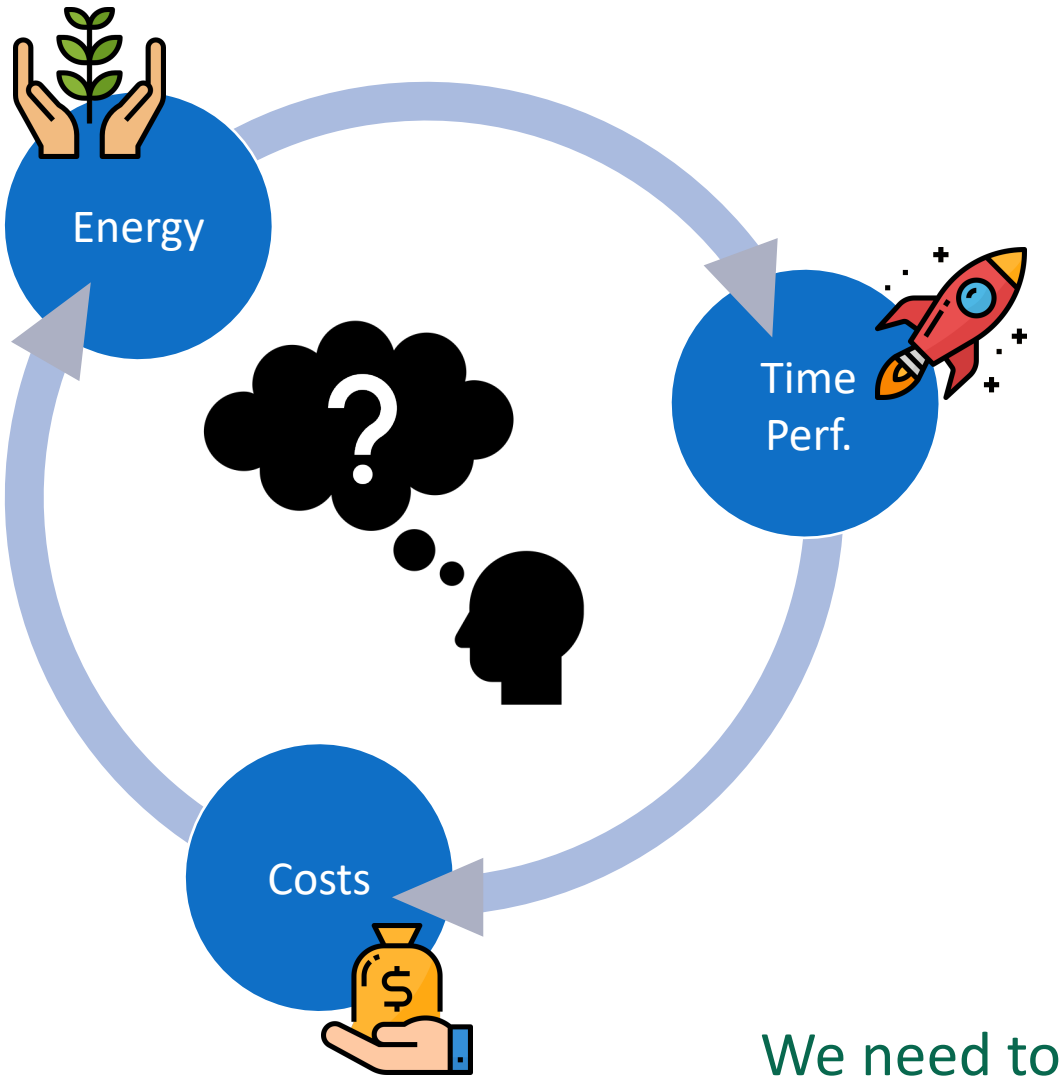
Cloud Service Providers

HEROES Goals

The project is aiming at **developing in a 2 years time frame** an innovative European **software framework** allowing industrial and scientific user communities **to submit easily complex Simulation and ML workflows to HPC Data Centres and Cloud Infrastructures** as well as being able to **take informed decisions** for selecting the best platform to achieve their goals in time, within budget and with the best energy efficiency.

There will be **multiple business models** to deploy an HEROES platform (Software Model, Subscription/Support Model, Service Provider model…) and configure the Decision Module and Energy related policies

Where should I run my jobs?



First the job need to be able to run

Time-to-Result

Do I have Performance / Time constraints?

When do I need my results?

Costs

Do I have budget constraints?

How do I express them? €? CPU*GB*Hours?

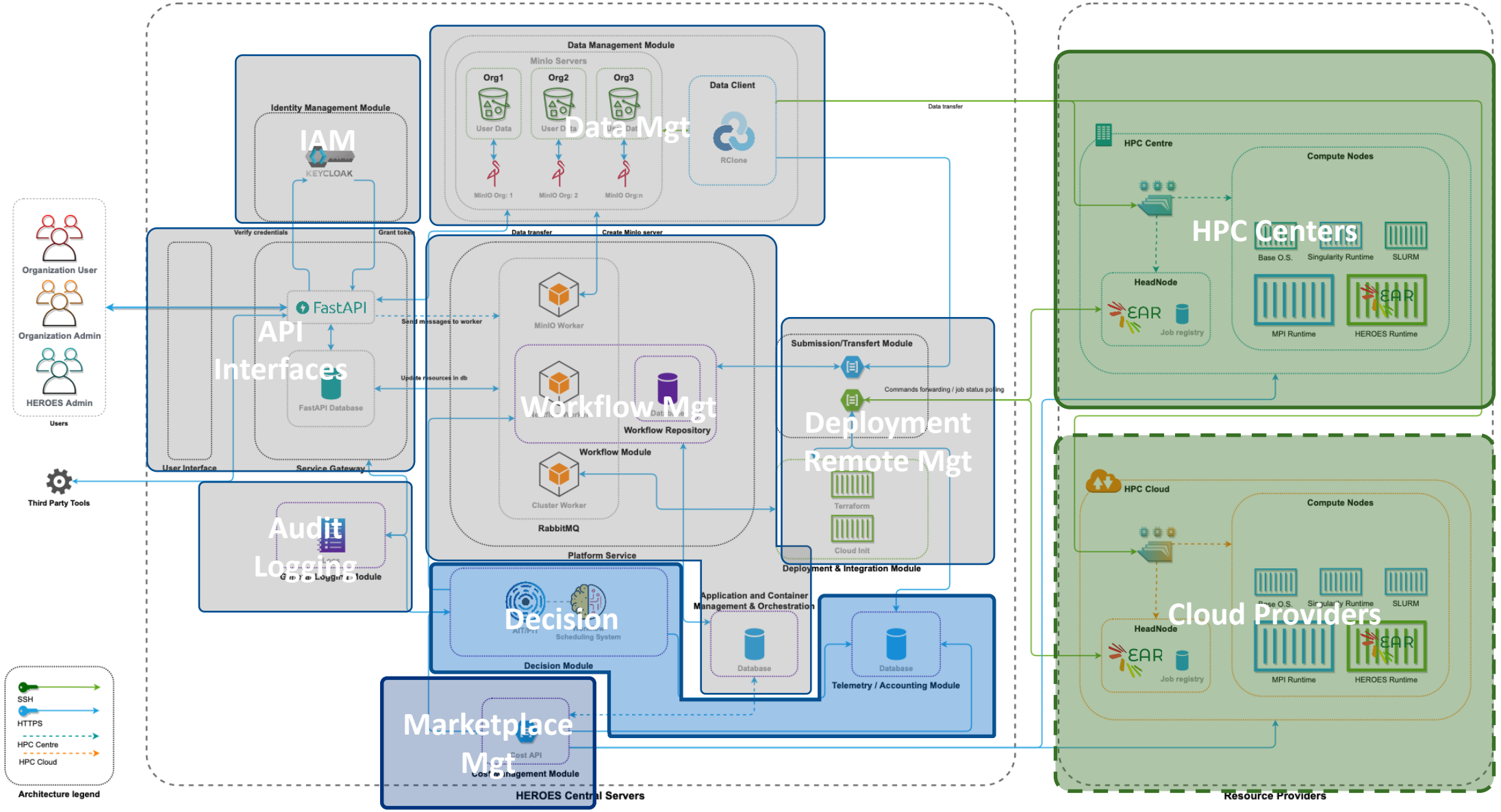
Energy/Carbon Footprint

Is it important to me?

What is it? How can I improve it?

We need to evaluate resources along these dimensions

HEROES Architecture: What about Energy ?



EAR in the HEROES ecosystem

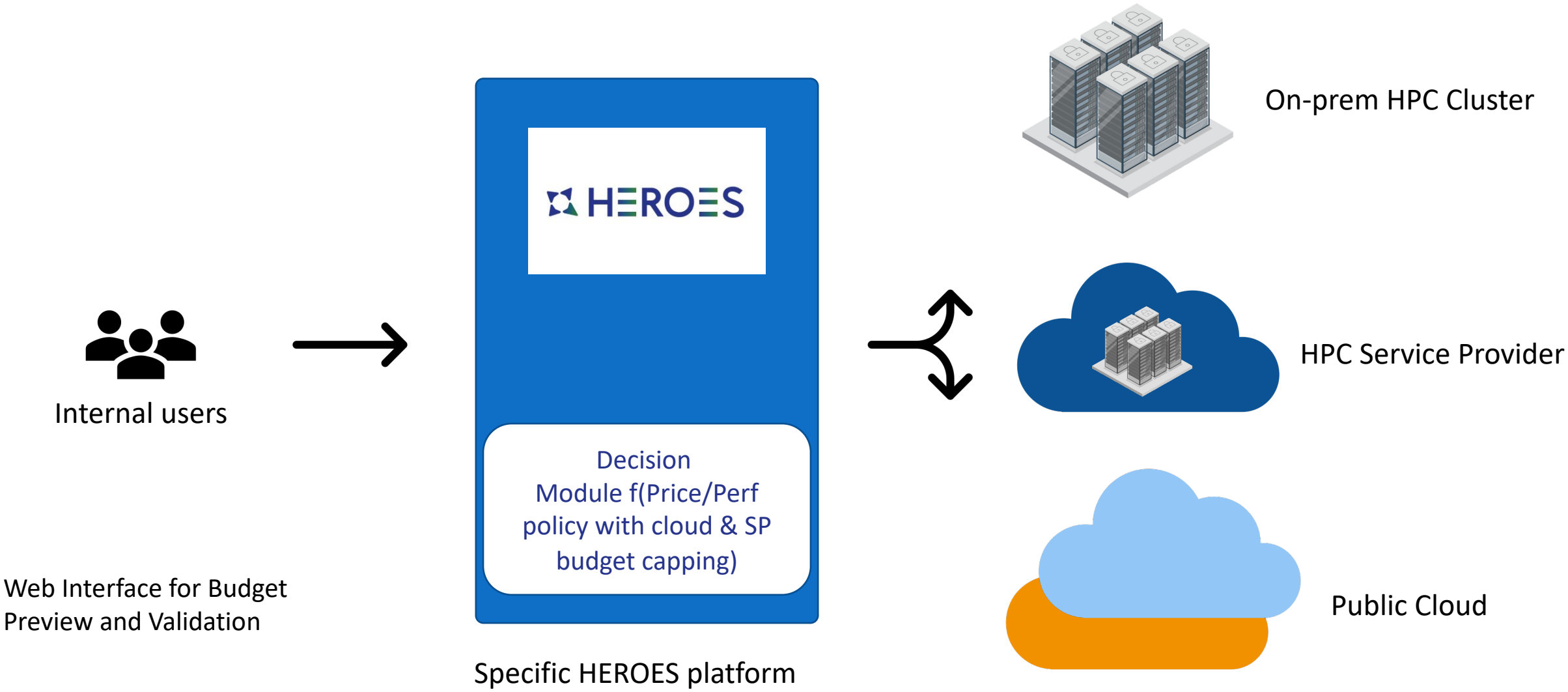
EAR architecture is being extended

- **Lightweight EAR deployment**
  - Support for Data Centers security limitations (no-root installation, no daemons...)
  - Runtime only
  - Execute seamlessly in constrained environment
  - Support for virtualized systems
  - Job monitoring only
- Provide additional **data for energy-efficient workflow scheduling**
  - Power and energy
  - Cycles, instructions, gflops, cache misses...
  - GPU usage...
- Modular and pluggable **accounting mechanism** for OKA integration

2 deployment options

- EAR "Full", with runtime optimization of energy
- EAR "Lightweight", embedded in HEROES runtime

Example for a HEROES implementation
Software infrastructure at a large client



Example for a HEROES implementation
Which EuroHPC Resources is the more Eco-Responsible

Users @orgA

Users @orgB

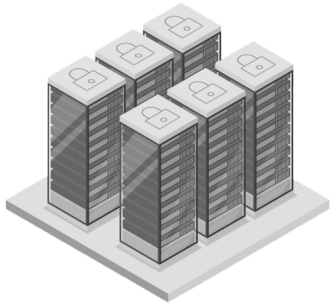
Users @orgC

HEROES

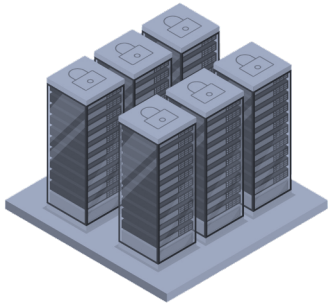
Decision
Module : Minimized
Carbon Footprint Only

Centralized HEROES platform

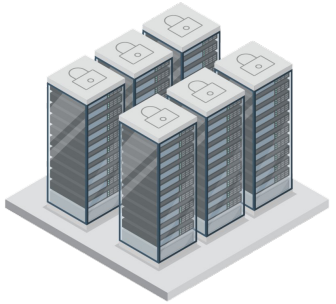
HPC Center #1



HPC Center #2



HPC Center #3



HPC Center #4

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HEROES

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