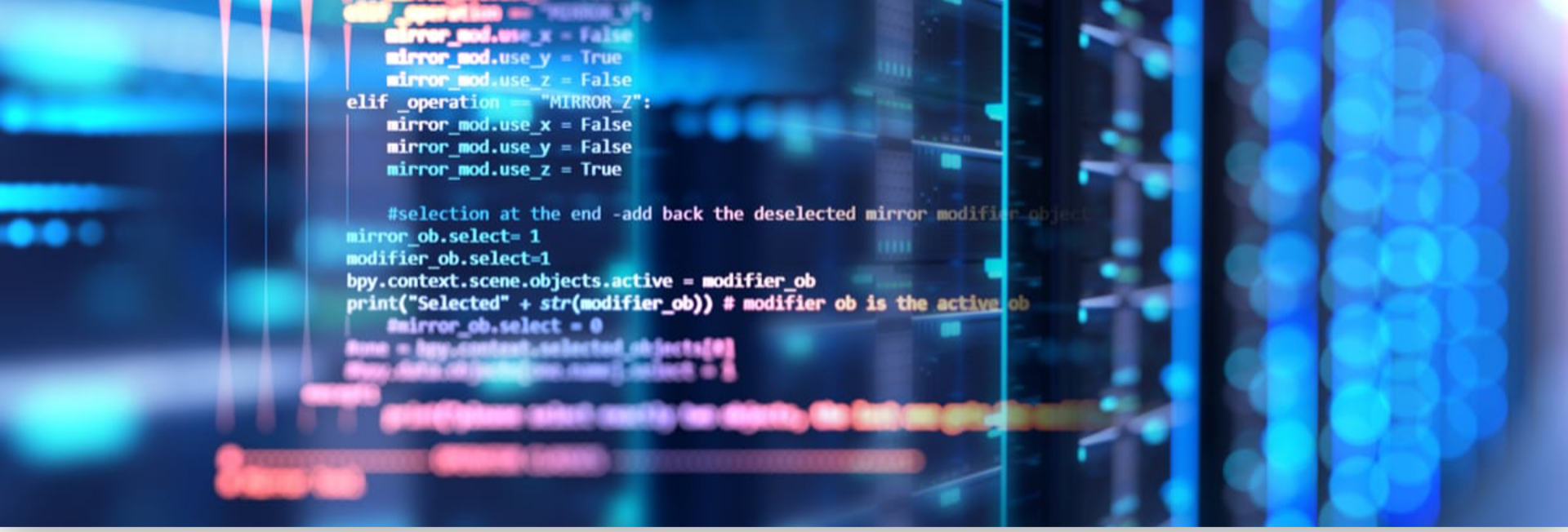


BigHPC

A Management Framework for Consolidated Big Data and HPC

BIG HPC HIGH PERFORMANCE COMPUTING

Cofinanciado por: COMPETE 2020 Lisb@20 20 PORTUGAL 2020 UNIÃO EUROPEIA Fundo Europeu de Desenvolvimento Regional FCT Fundação para a Ciência e a Tecnologia UTAustin Portugal

Context

- HPC distributed infrastructures and specialized hardware are increasingly desirable for running:
  - parallel modeling and simulation applications
  - big data and machine learning workloads
- The support for the latter is still emerging and can be crucial for:
  - speeding up scientific breakthroughs in different fields (e.g., health, IoT, biology, chemistry, physics)
  - increasing the competitiveness of companies

Challenges

- Efficient support of both parallel computing and Big Data workloads
- Efficient management of available computational and storage HPC resources
- Transparent application access to such resources
- Performance isolation and fairness across

BigHPC will address these challenges with a novel management framework for Big Data and parallel computing workloads

Project

Mission

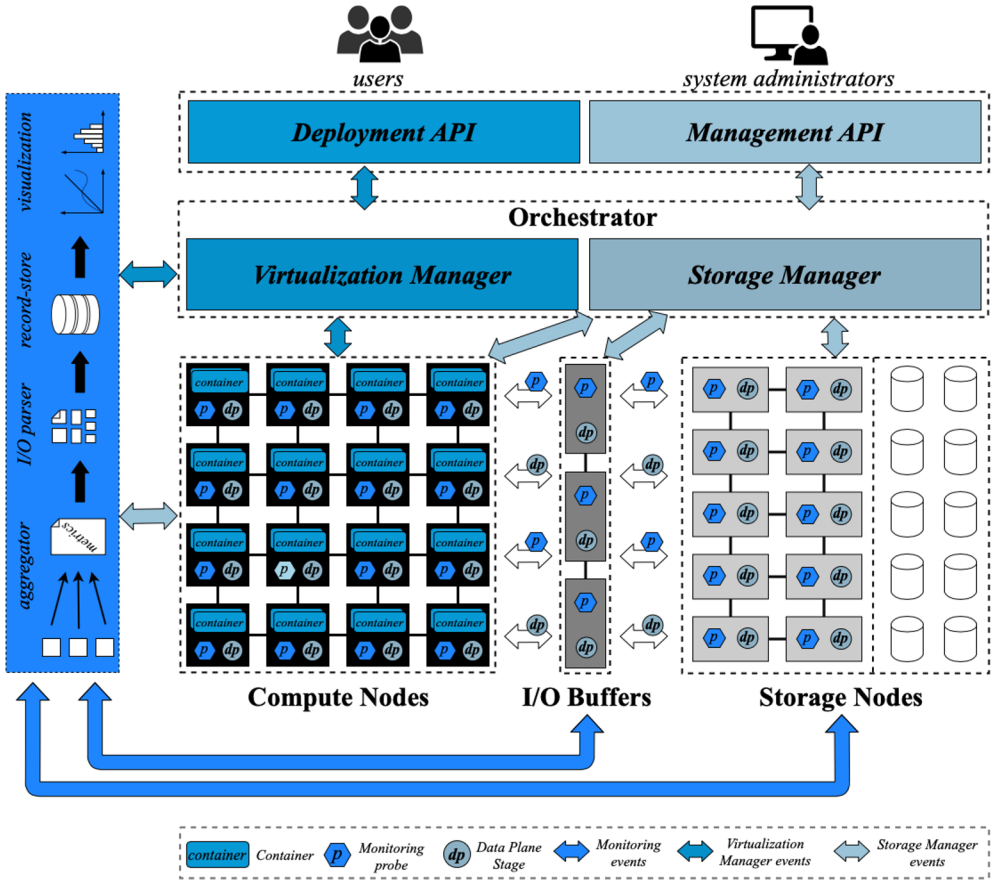
- Simplify the management of HPC infrastructures supporting Big Data and parallel computing applications
- Have a direct impact on science, industry and society, by accelerating scientific breakthroughs in different fields
- Increasing the competitiveness of companies through better data analysis and improved decision-support processes
- Advance the state of the art and develop new monitoring, virtualization and storage management technologies
- Integrate these three components into a full-fledge management platform for HPC supercomputers

Goals

The BigHPC project has three main goals:

- Improve the monitoring of heterogeneous HPC infrastructures and applications
- Improve the deployment of applications and the management of HPC computational resources
- Improve storage performance and management for HPC services

Design


users
system administrators
Deployment API
Management API
Orchestrator
Virtualization Manager
Storage Manager
visualization
record-store
I/O parser
aggregator
metrics
container
p
dp
Compute Nodes
I/O Buffers
Storage Nodes
Container
Monitoring probe
Data Plane Stage
Monitoring events
Virtualization Manager events
Storage Manager events

Outcomes

Expected Outcomes

An innovative solution to efficiently manage parallel and Big Data workloads

- ➔ provides novel monitoring, virtualization and software-defined storage components
- ➔ can cope with HPC's infrastructural scale and heterogeneity
- ➔ efficiently supports different workload requirements while ensuring holistic performance and resource usage
- ➔ can be seamlessly integrated with existing HPC infrastructures and software stacks

Pilot

- The software components developed in BigHPC will be integrated into a single software bundle that will be validated through real use cases and a pilot deployed on both MACC and TACC supercomputers
- The project's outcomes will be exploited commercially by Wavecom that will provide the devised software framework as a service

Funding

Funding

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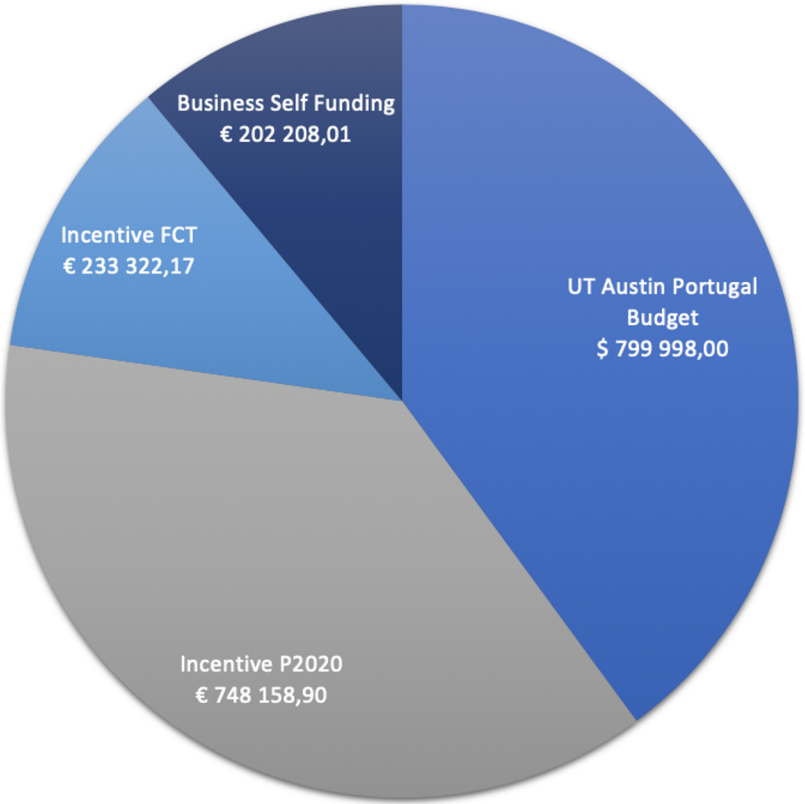
Funding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€ 202 208,01
Incentive FCT
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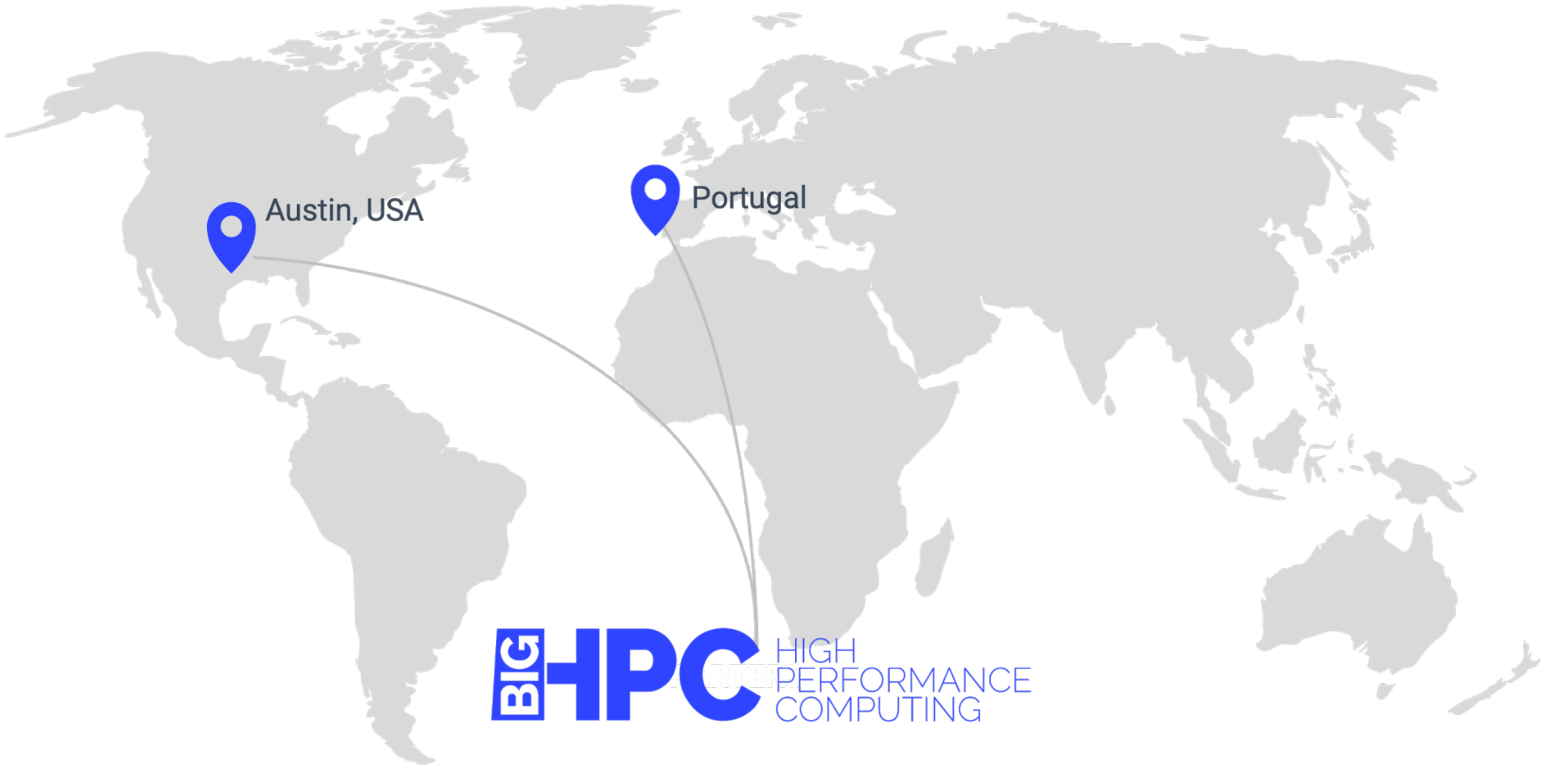
UT Austin Portugal
Budget
$ 799 998,00
Incentive P2020
€ 748 158,90

Team

Where



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Thank you!

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BIG HPC HIGH PERFORMANCE COMPUTING

Partners:

INESCTEC

LIP

TEXAS The University of Texas at Austin

MACC Minho Advanced Computing Center

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