



UT Austin Portugal | 2019 Strategic Research Projects

ADVANCED COMPUTING

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Duration: 36 months

Operation Code: 45924

BigHPC

A Management Framework for Consolidated Big Data and HPC

BigHPC ambition is to simplify the management of HPC infrastructures supporting Big Data and parallel computing applications. The project will have a direct impact on science, industry and society, by accelerating scientific breakthroughs in different fields and increasing the competitiveness of companies through better data analysis and improved decision-support processes.

Keywords: Big Data, High Performance Computing, High Performance AI



Main challenge/problem the project seeks to address

HPC infrastructures are increasingly sought to support Big Data applications, whose workloads significantly differ from those of traditional parallel computing tasks. However, coping with the heterogeneous hardware of these large-scale infrastructures and the different workload requirements raises new research and technological challenges. Namely, it becomes increasingly difficult to efficiently manage available computational and storage resources, to provide transparent application access to such resources, and to ensure performance isolation and fairness across the different workloads.

Proposed solution

A novel framework to efficiently manage parallel and Big Data workloads that:

- combines new monitoring, virtualization and software-defined storage components;
- can cope with HPC's infrastructural scale and heterogeneity;
- supports different workload requirements while ensuring holistic performance and resource usage;
- can be seamlessly integrated with existing HPC infrastructures and software stacks;
- will be validated with pilots running in both MACC and TACC supercomputers.

Innovative Potential

Nowadays there are not alternatives in the market offering a solution, such as the one to be developed in BigHPC, that enables companies and institutions to easily deploy and manage HPC and Big Data workloads in a consolidated fashion. This solution will be crucial for taking full advantage of the next generation of exascale HPC supercomputers.

Target beneficiaries

The BigHPC platform will be useful for companies and research centers aiming at supporting Big Data and traditional HPC applications on their infrastructures. A better and simplified management of HPC applications and infrastructural resources will have a direct impact in society, by accelerating scientific breakthroughs in different fields (e.g., healthcare, IoT, biology, chemistry, physics), and increasing the competitiveness of companies through better data analysis and enhanced decision-support processes.

Consortium

PORTUGAL

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Laboratory of Instrumentation and Experimental Particle Physics (LIP)

USA - UT AUSTIN'S PRINCIPAL INVESTIGATORS

Vijay Chidambaram (College of Natural Sciences)
Todd Evans (Texas Advanced Computing Center)

PARTNER: MINHO ADVANCED COMPUTING CENTER

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