



ACROSS PROJECT

HPC, BIG DATA, AND ARTIFICIAL INTELLIGENCE CONVERGENT PLATFORM



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OVERVIEW

Proposal number: 955648

Total cost: 8.815.845,00 Euros

EU contribution: 3.999.115,88 Euros

Coordination: LINKS Foundation (Olivier Terzo)
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<https://www.acrossproject.eu/>

- 2 Supercomputing Centers: CINECA, IT4I
- 1 Research Infrastructure: ATOS
- 2 Large Enterprises: AVIOAERO, ATOS
- 2 SMEs: MORFO, NEUROPUBLIC
- 6 Research Organization: LINKS, INRIA, CINI, SINTEF, MPI-M, DELTARES
- 1 International Organization: ECMWF



IMPLEMENTATION

WP	Work Package Title	Leader
1	Project Management	LINKS
2	Cross stack convergence & Co-Design for HPC and Data driven HPDA software environment	IT4I
3	Heterogeneous Hardware & Acceleration Support	BULL
4	Multi-level Orchestrator Towards Heterogeneous Exascale Computing	LINKS
5	Greener Aero-engine Modules Optimization Pilot	AVIO Aero
6	Weather, climate, hydrological and farming Pilot	ECMWF
7	Energy and Carbon Sequestration Pilot	SINTEF
8	Enabling integrated Validation and Value Creation Adoption	NP

- Overall platform co-design and integration through *WP2*
- Specialised hardware accelerators through *WP3*
- Workflow management and orchestration with an energy efficiency perspective through *WP4*
- Clear value creation in key applications areas validated across complex workflows and large datasets through *WP5*, *WP6* and *WP7* in the **Aeronautics, Weather and Climate, Energy and Carbon sequestration sectors**, exploiting high performance data analytics (HPDA), artificial intelligence (AI) and numerical simulation

ACROSS PLATFORM

OVERALL OBJECTIVES

Foundation and co-design of energy efficient and HPC/BD/AI cross-stack platform:

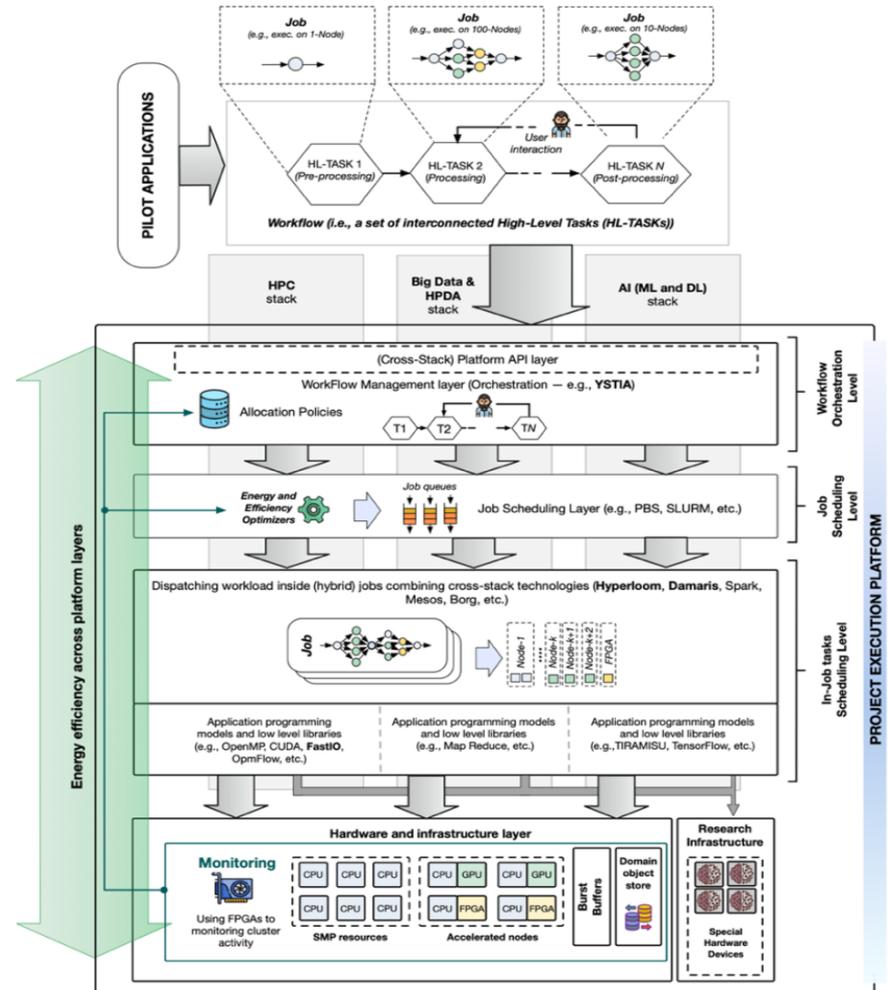
- Platform supporting cross-stack workflows combining (HPC, BD and AI)

Validation of ACROSS platform through industrial applications and fostering societal applications adoption:

- Use cases, using innovative technological approaches to decrease execution times for data-intensive/deep learning-alike HPC simulations and modelling

Ensuring ACROSS platform interoperability, adaptability and security:

- Building an execution platform integrating hardware and software components



TECHNOLOGY OBJECTIVES

(TECHNOLOGY) SPECIFIC OBJECTIVES

HW/SW INTEGRATION

Co-designing HW/SW integration for creating Exascale-ready services and ensuring compliance with the future EPI initiative

HPC/BD/DL WORKFLOW & ACCELERATORS

Efficient execution of mixed HPC/BD/DL workflows through hardware accelerators

ORCHESTRATION STRATEGIES

Optimizing workflow execution through the development of improved orchestration and workflow management strategies

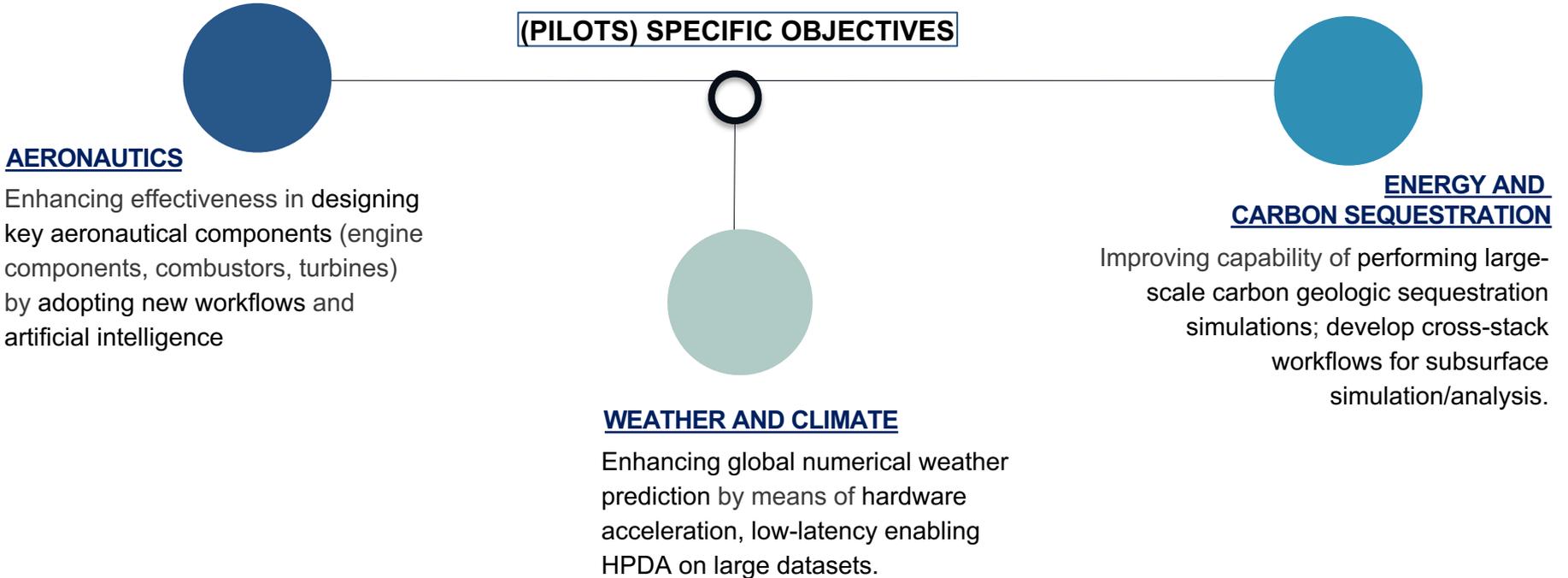
PLATFORM

Building a platform supporting the execution of large-scale HPC simulations along with exploitation of Big Data and deep learning techniques

DATA STREAMS PROCESSING

Enhancing HPC performance for data stream processing, using in-situ/in-transit techniques, in support of extreme-scale applications

PILOTS OBJECTIVES



IMPACT

- **Regarding HPC Competence Centres** – (Training & Skills) ACROSS will organize specific dedicated workshops and training sessions for pilot communities through the HPC centres.
- **Regarding 2021-2027 EuroHPC second phase activity** – ACROSS will have a direct impact on emerging computing architectures with heterogeneous hardware and acceleration support using neuromorphic processing architectures (ACROSS intends to be a precursor on that!).
- **ACROSS Platform: final version is foreseen in June 2023.**

ACROSS will validate its HPC, Big-Data, Artificial Intelligence cross stack platform targeting complex industrial use cases (with complex workflow) supporting greener aero-engine modules design, societal challenges such as climate simulations in the context of earth science and smart farming, energy and carbon sequestration.

ACROSS solutions will be closely adopted in production environments by all pilots.



PROJECT COORDINATOR

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