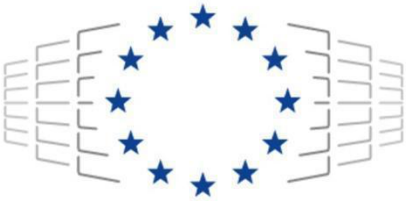
Open Research Data Pilot

Month 36





EuroHPC
Joint Undertaking

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1. Document info

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Author(s)	KU Leuven

2. Version history

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4. Overview of Time-X and work package objectives

4.1. Overarching aim of Time-X

Bringing together experts in numerical analysis, applied mathematics, computer scientists and scientists from four selected application domains with direct high-level impact on society, TIME-X aims at **advancing parallel-in-time integration from an academic methodology into a widely available technology**, delivering exascale performance for a wide range of scientific and industrial applications.

To achieve the overarching aim, we define five main objectives, split into two categories: (A) scientific progress and development, and (B) long-term synergy and impact. The objectives are elaborated in work packages, to which we already refer here. Here, we repeat the objectives that were stated in the Grant Agreement Annex.

Objective A.1: (WP2) **Enhancing scalability and robustness of application software** implementations for future exascale HPC systems with PinT, ensuring that the expected technical challenges of exascale systems (increased concurrency and hardware failures, decreased memory and memory bandwidth, and energy constraints) are integrated in the algorithms.
Objective A.2: (WP3) Delivering a series of necessary **methodological advances** to propel PinT from an approach with a formulated concept and isolated successes to a technology with demonstrated potential to enable exascale performance for a wide range of applications.
Objective A.3: (WP4) **Demonstrating efficacy of PinT** methods in four diverse and challenging applications of high societal relevance (medicine, electromagnetics, drug design, weather/climate). We aim at speedups of (at least) a factor 10 over current state-of-the-art HPC simulation software, increasing recognition and creating momentum to bring the approach to widespread use after the action.
Objective B.1: (WP1) To **unify the European parallel-in-time research community**, foster a strategic research approach that exploits synergies between the complementary expertise of the Partners, and cement European leadership in this field, contributing to the ETP4HPC Strategic Research Agenda.
Objective B.2: (WP5) To **maximize impact by educating stakeholders** about parallel-in-time integration and raise visibility to facilitate widespread adoption of PinT integration.

4.2. Note on software development

To enhance clarity of the formulated objectives, we use the following terminology with respect to software development when describing our key realizations:

Prototype software: these are software libraries implementing a method that can be used by application developers.
Proof-of-concept software: these are software implementations, potentially in a high-level language, that illustrate an algorithm's behaviour. These implementations serve an input for developers of prototype software, who can integrate these algorithms in their libraries. This software is not aimed directly at users.
Application software: these are specific software implementations that are used to obtain scientific results in specific application domains. Some of this software uses software libraries developed in WP2, but in some cases it is much more convenient to re-implement the prototype software directly into an existing application software package.

5. Open Research Data Statement

As this project dealt purely with software development, no data in the strict sense was collected and no datasets have been published.

Some source code has been distributed in open repositories, as documented in the Technical Report and on the project website, which will remain accessible after the project ends.