OPTIMA

Optimizing Industrial Applications for Heterogeneous HPC systems

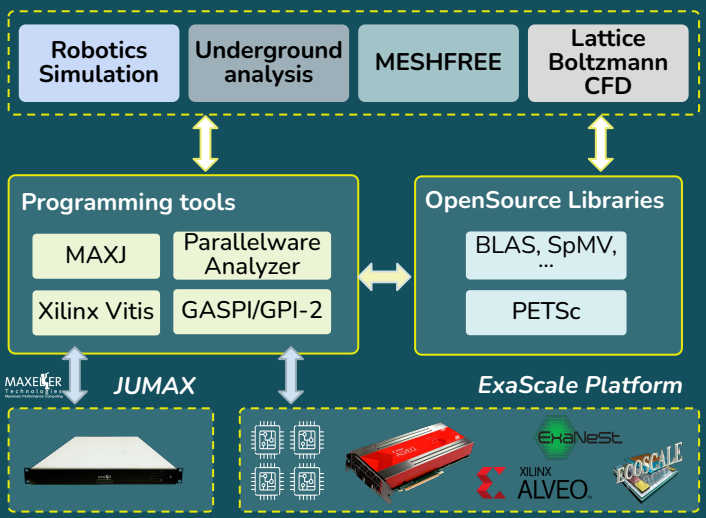
OBJECTIVE

In order to support the growing demands for processing power from emerging HPC applications, within a pragmatic energy envelope, future HPC systems will incorporate accelerators. A promising approach, to this end, is the use of FPGA boards. These devices can be reconfigured at will, to tailor application accelerators, and their principal advantage is their energy efficiency and/or performance, which, in most cases, is far superior to that of CPUs and GPUs.

The applications and libraries are expected to run on these heterogeneous HPC systems with significantly greater energy efficiency, as described by the Energy Delay Product (EDP) metric. In particular, the EDP of OPTIMA applications and libraries running on targeted FPGA-based HPC systems is expected to be more than ten times greater than those on CPU-based systems, and more than three times higher than those on GPU-based systems.

INNOVATION

OPTIMA will provide the efficiency of FPGA-based technologies in several industrial applications; thus, the European industry shall benefit from a new class of HPC resources strongly characterised by advancing State-of-the-Art and delivering truly innovative solutions. These solutions shall take advantage of the novel heterogeneous HPC systems and commoditise the access and utilisation of such resources transforming them into a service that can be accessed by everyone from SMEs to large organisations.



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PROJECT SUMMARY

OPTIMA is an SME-driven project aiming to port and optimize several industrial applications as well as a set of open-source libraries. These will be used in at least three different application domains on two, novel HPC systems populated with field-programmable gate array (FPGA) integrated circuits and using several innovative programming environments.

OPTIMA's main outcomes will be:

a) that participating SMEs will gain a significant advantage from being able to run their applications much more efficiently than their competitors;

b) to further demonstrate that Europe is at the forefront of developing efficient FPGA-based HPC systems and the applications/libraries leveraging them;

c) the development of open-source libraries and applications that will allow third-party application developers to easily port to FPGA-based HPC systems;

d) an open-to-use HPC infrastructure supported by a specially created sustainability body.

PARTNERS

- Telecommunication Systems Research Institute *(Coordinator)*
- Cyberbotics SARL
- EXAPSYS
- Fraunhofer
- Institute of Communications and Computer Systems
- M3E
- Maxeler IoT
- Forschungszentrum Jülich
- EnginSoft
- Appentra

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