

EC FP7 STREP 2PARMA PROJECT: PARAllel PARadigms and Run-time MAnagement techniques for Many-core Architectures

2 PARMA

Project Coordinator
Prof. Cristina Silvano
 Politecnico di Milano
 silvano@elet.polimi.it

Project Technical Manager
Prof. William Fornaciari
 Politecnico di Milano
 fornacia@elet.polimi.it

Project website:
 www.2parma.eu

Partners:
 Politecnico di Milano (I)
 STMicroelectronics (I)
 Fraunhofer – HHI (D)
 IMEC (B),
 ICCS (G)
 RWTH Aachen Univ. (D)
 CoWare (B)

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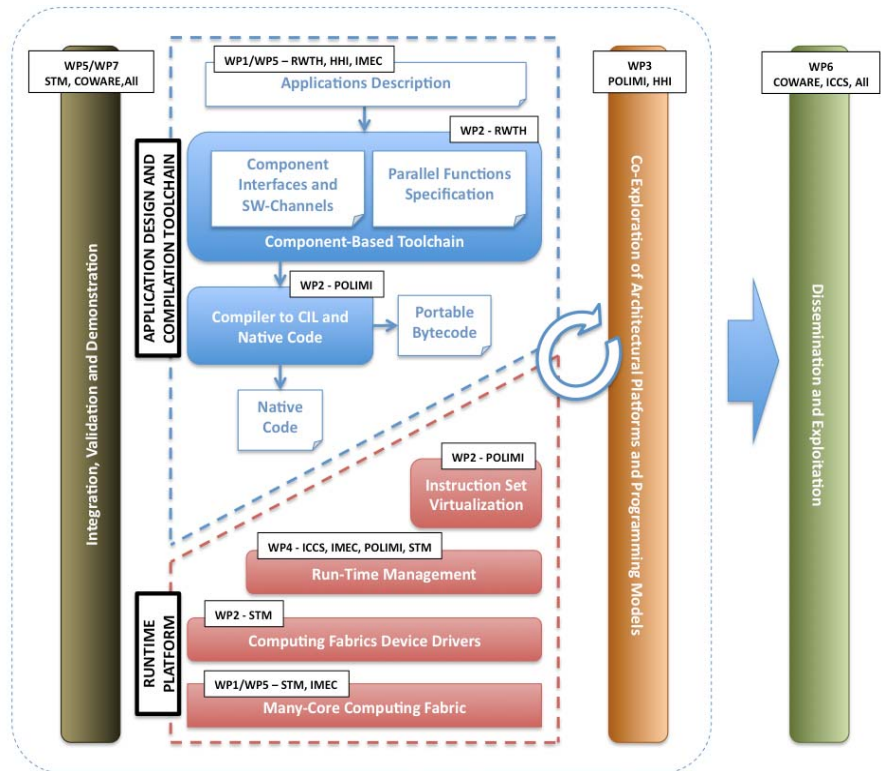
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Main Objectives

The number of cores to be integrated in a single chip is expected to increase rapidly in the coming years, moving from multi-core to many-core architectures. This trend will require a global rethinking of software and hardware design approaches.

This class of computing systems (*Many-core Computing Fabric*) promises to increase performance, scalability and flexibility if appropriate design and programming methodologies will be defined to exploit the high degree of parallelism exposed by the architecture. Other potential benefits of *Many-core Computing Fabric* include energy efficiency, improved silicon yield, and accounting for local process variations.



To exploit these potential benefits, effective run-time power and resource management techniques are needed. With respect to conventional computing architectures, *Many-core Computing Fabric* offers some customisation capabilities to extend and/or configure at run-time the architectural template to address a variable workload.

The 2PARMA project aims at overcoming the lack of parallel programming models and run-time resource management techniques to exploit the features of many-core processor architectures. To this purpose, a proper Consortium has been set up to gather the required expertise in the areas of system/application software and computing architectures.

The 2PARMA project focuses on the definition of a parallel programming model combining component-based and single-instruction multiple-thread approaches, instruction set virtualisation based on portable bytecode, run-time resource management policies and mechanisms as well as design space exploration methodologies for Many-core Computing Fabrics.

Technical Approach

The 2PARMA project will demonstrate methodologies, techniques and tools by using innovative hardware platforms provided and developed by the partners, including the "Platform 2012", an early implementation of Many-core Computing Fabric provided by STMicroelectronics.

To ensure a wide range of application scenarios comprising the typical computation-intensive workload of a general-purpose computing system, a set of industrial high performance demanding applications will be used and customized by using the techniques and methodologies developed in 2PARMA project. Applications' architecture, development and integration will leverage in particular from the acknowledged experience of three partners from the Consortium: HHI for Scalable Video Coding application, RWTH for Cognitive Radio, and IMEC for Multi View.

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Prof. Cristina Silvano
 Politecnico di Milano
 silvano@elet.polimi.it
 HiPEAC Member

