

# 2PARMA: PARallel PARadigms and Runtime Management Techniques for Many-core Architectures



## Main Objectives:

- Programmability of Many-core Computing Fabrics
- Virtualisation and Continuous Adaptation
- Integrated Compiler Toolchain and OS Layer
- Design Space Exploration
- Runtime Resource Management
- Design toolset for supporting the HW/SW co-exploration

## Architectures:

- Platform P2012 / STM
- ADRES-based COBRA Platform /IMEC
- Many-core Virtual Architecture Platform / Synopsys

## Applications:

- Scalable Video Coding
- Cognitive Radio (Physical Layer, MAC Layer and Reconfigurable Radio)
- Multi-view Image Processing

### 2PARMA at a glance

<http://www.2parma.eu>

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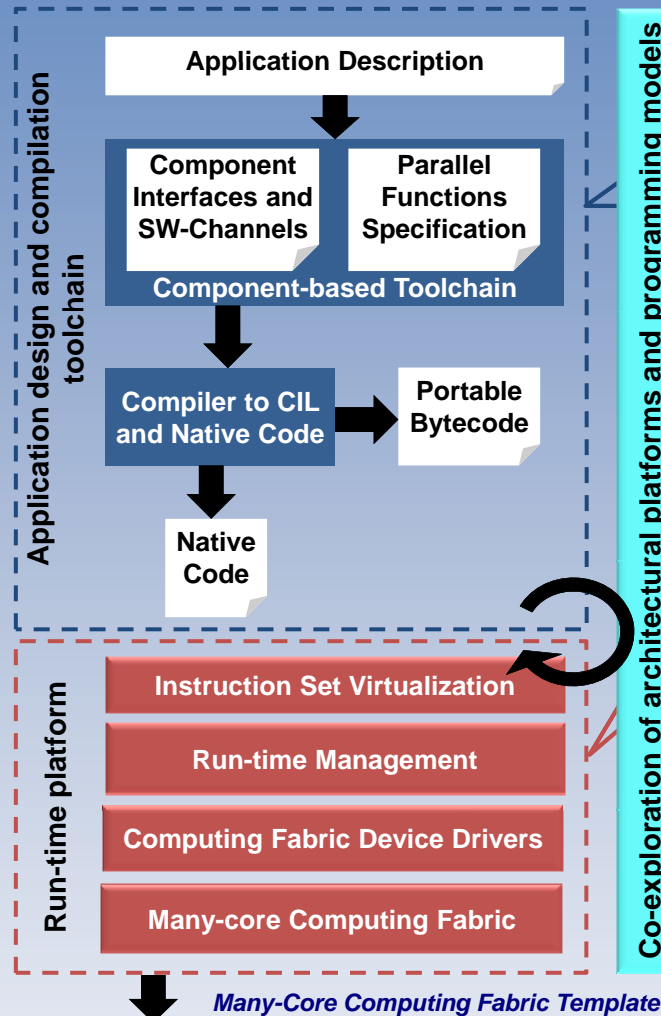
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STMicroelectronics (IT)  
Fraunhofer – HHI (DE)  
IMEC (BE)  
ICCS (GR)  
RWTH Aachen University (DE)  
Synopsys (BE)

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## 2PARMA Design Flow



Starting from a componentised application source code (C-based) to be semi-automatically parallelised into an OpenCL program and then compiled to bytecode and further dynamically translated to machine code. Then the machine code execution and deployment will be supported by an OS layer to provide isolated logical devices efficiently communicating.

A set of techniques to manage at run-time the system resources. Based on the set of operating points given by the DSE tool at design time and the info collected at run-time on system workload and resource utilization, the run-time management techniques will optimise data allocation and data access scheduling, task mapping and scheduling and power consumption.

Starting from a configurable architecture and parallelised application description (coming from the compilation toolchain) the toolset will explore the HW/SW design space by generating:

- A bottleneck analysis and optimisation of the target architecture with respect to the parallel application;
- Robust tuning of the design-time (static) configurable parameters with respect to run-time (dynamic) system behaviour;
- A set of operating points for the run-time configurable parameters to be used for dynamic management of system resources.

