

MECO

AN AUTONOMIC MANAGER FOR EDGE-COMPUTING PLATFORMS

INTRODUCTION

In the Cyber-Physical Systems (CPSs) and Edge-Computing world, the use of a hardware platform able to adapt itself to the changing environment is of fundamental importance to satisfy growing and heterogeneous requirements.

The necessity to adapt to changes of the physical world leads to consider FPGAs as a viable solution to manage this adaptivity, exploiting their ability to perform a Dynamic Partial Reconfiguration (DPR).

In this context, the presence of an autonomic manager that can support on providing a required quality of service, considering the use of DPR while keeping also into account its overhead, is of great importance.

OBJECTIVE

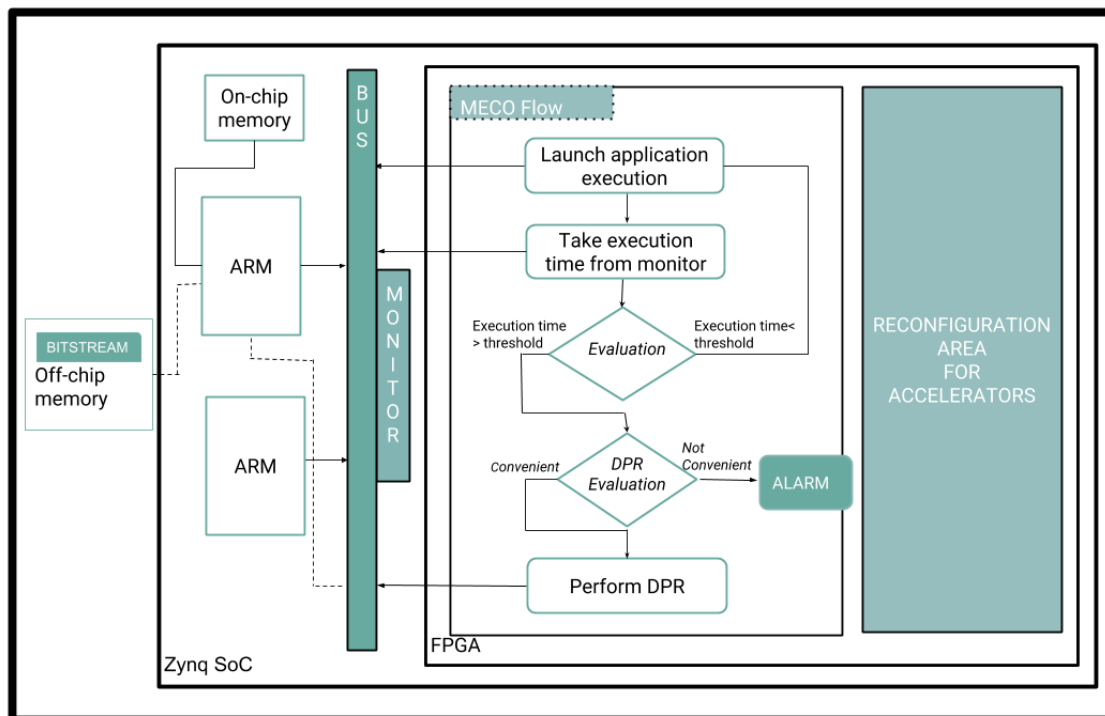
The main goal of this demo is to present an autonomic manager, named MECO, that manages the self-adaptivity of CPSs at the edge, evaluating the convenience of a DPR.

DEMO DESCRIPTION

This demo presents MECO implemented on the FPGA side of a Zynq7000 SoC. In particular, the considered system is composed of a dual-core ARM with its on-chip memory and an FPGA. It runs user applications while being monitored by a hardware monitoring system.

In particular, MECO carries-out a self-adaptive loop composed of three main steps:

- 1) Execution of the application on ARM Cortex A9.
- 2) Application monitoring by means of a hardware monitoring system.
- 3) When timing performance go under a given threshold (e.g., due to an unexpected extra-load coming from the environment), the manager decides whether it is convenient or not to perform a FPGA DPR to support the execution of the application.



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