A-LOOP

***A**MP system: 2-cores ARM Cortex A9/Linux OS and 4-cores **L**eon3/Linux **O**S, **O**penMP library and Hardware **P**rofiling system*

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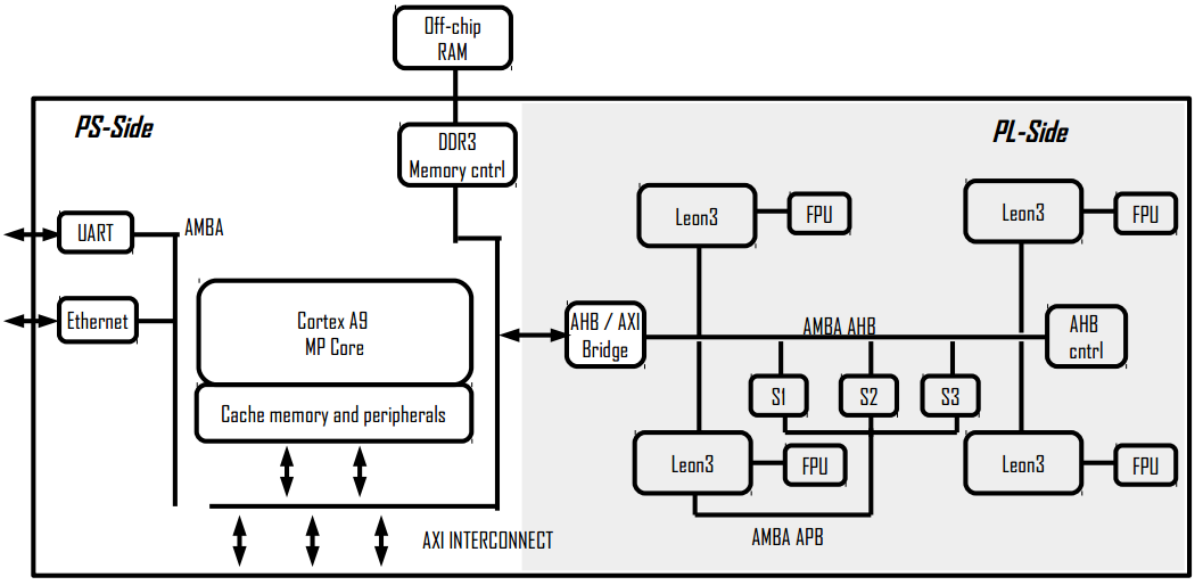
Introduction: Embedded systems development is driven by basic functional specifications, enriched with a set of non-functional requirements, such as constraints on execution time, power dissipation, etc. In this context, one of the techniques that can be exploited is to develop *Isles of computational elements* (*Modules*) with different characteristics, each one able to satisfy some non-functional specifications. This can drive to the realization of smart *System On Modules* (*SoM*). In such a context, *SoC* with FPGA can be viewed as platforms useful to prototype these architectures.

Objective: The main goal of this demo is to present a *System On Module* (*SoM*) prototype, called *A-LOOP*, for aerospace applications developed starting from *Zynq7000*, with 2 *Modules*, focusing on the interactions between these 2 *Isles of computational elements*.

Demo Description: This demo presents *A-LOOP,* a *SoM* prototype composed of dual-core ARM Cortex A9 with *SMP* Linux operating system (*Isle#1*), able to interface with external data, and quad-core Leon3 with *SMP* Linux operating system (*Isle#2*), able to execute parallel applications based on *OpenMP* library. These 2 *Modules* share an external *DDR* memory, so that *Isle#1* can provide data and collect results from *Isle#2*. Moreover, *Isle#1* is able to monitor performance of *Isle#2* without introducing software overhead (i.e. no *SW* instrumentation) by using a hardware profiling system. The whole system that executes a *MANET* localization algorithm will be presented.

In detail, the proposed demonstration shows:

- the more relevant steps, with related development environments and tools, needed to implement such a system;
- the running system executing an OpenMP-based application, consisting in a MANET localization algorithm (derived from the T*hales Italy case study,* developed in the context of the Artemis-JU CRAFTERS project).



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