Software Engineer - Ingénieur Expert

Title: Automatic Parallelization of Scilab for Embedded Many-Core Platforms

Laboratory: IRISA/INRIA – CAIRN project-team

Durée: CDD 12 mois renouvelable

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Current and future wireless communication and video standards have huge processing power requirements, which cannot be satisfied with current embedded single processor platforms. Most platforms now therefore integrate several processing core within a single chip (see ARM Cortex-A9 for example), leading to what is known as embedded multi-core platforms. This trend will continue, and embedded system design will soon have to implement their systems on platforms comprising tens if not hundred of high performance processing cores. Examples of such architectures are the Xentium processor from by Recore [1] or the Kahrisma processor, a radically new concept of morphable processor from Karlsruhe Institute of Technology (KIT) [2].

This evolution will obviously pose significant design challenges, as parallel programming is notoriously difficult, even for domain experts. In the context of the FP7 European Project Alma (Architecture oriented parallelization for high performance embedded Multi-core systems using scilAb) [3], we are studying how to help designers programming these platforms by allowing them to start from a specification in Matlab and/or Scilab, which are widely used for prototyping image/video and wireless communication applications.

In this context, we are looking for a software engineer to help us developing the ALMA compiler framework, which is based on the open-source Gecos infrastructure. The work will consist in experimenting and implementing semi automatic parallelization algorithm in the ALMA Scilab to C flow.

The applicant should have a Master Degree in Computer Science or Computer Engineering, and must have some background in compiler design and processor architecture. He/she should also have good programming skills and in C and/or Java. Some knowledge in automatic parallelization and/or signal processing could be a plus.