

Special Session on Programming models and methods for heterogeneous parallel embedded systems

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For long time, it has been known that heterogeneity for specialization is the key for energy efficient computing in embedded systems. Yet, mainstream embedded platforms have only mildly embraced heterogeneity, for example with big-little processor configurations. One of the major challenges for truly enabling heterogeneity remains providing good programming models and tools. One needs models that provide abstraction, so that application code is independent of whether it will run on a scalar core or on a digital signal processor. Compilers that lower the high-level specification to the actual hardware have to be aware of the heterogeneity in the platform. This requires fast performance estimation methods, from source code, that serve as cost models for optimization engines. Finally, the optimization engine itself and the information available to it are key to produce quality implementations (in terms of performance and/or energy consumption). The quality of the generated code is a deciding factor for the adoption of the methods in the long run, specially in resource constrained embedded systems.

This special session brings together experts on models and tools for programming heterogeneous embedded systems. Programming frameworks with around 10 years of development will be presented, both giving an overview and delving into the details of recent achievements. Examples are the MAPS Framework (now commercialized by Silexica Software Solutions GmbH), the Sesame Framework and the California Actor Language (CAL). This session will therefore serve as a forum for exchanging ideas, identifying differences and potentially building new synergies.