

EPiGRAM-HS: Programming Models for Heterogenous Systems at Exascale

Tuesday, 25 September 2018 14:15 (30 minutes)

The quest towards the Exascale is having a profound impact on the design of future supercomputers. We are particularly seeing increased heterogeneity, both in the compute and memory subsystems. This heterogeneity makes efficient programming however a very challenging task. We need mature and efficient programming environments and the EPiGRAM-HS project, a recently funded EC exascale project, has the aim of providing such a programming environment.

The overall objective of EPiGRAM-HS is the development of a new validated programming environment for large-scale heterogeneous computing systems, including accelerators, reconfigurable hardware and low-power microprocessor together with non-volatile and high-bandwidth memories. EPiGRAM-HS will extend the programmability of large-scale heterogeneous systems, by introducing new concepts in MPI and GASPI and developing runtime systems for automatic data placement and code generation. The EPiGRAM-HS programming environment will be integrated into and validated against HPC scientific applications, among which the IFS mini-application. Most importantly, EPiGRAM-HS will provide a migration path for applications to use large-scale heterogeneous systems.

In this talk, we will discuss the motivation for the EPiGRAM-HS project, present its overall vision and describe our planned work for winning the challenge of programming heterogenous systems at exascale for maximum performance.

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Track Classification: 18th Workshop on high performance computing in meteorology