

Abstractions for Data Management in Heterogeneous Systems

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Abstract

Heterogeneity is one of the key problems for application developers aiming to efficiently exploit emerging exascale HPC systems. Memory subsystems are becoming increasingly complex, from NUMA concerns in traditional cache hierarchies to the growing number of accelerator or coprocessor devices with on-board memory, and on- and off-node intermediate storage for data staging. The EPiGRAM-HS H2020 project aims to address such concerns from a programming environment perspective with intertwined efforts focusing on Network, Memory, and Compute combined with a set of pilot applications from a variety of scientific domains. We will present our ongoing efforts in the memory-focused work package on the Mamba library, an array-based abstraction for application programmers to transparently allocate, move, and access data efficiently on heterogeneous memory systems.

Bio

Tim Dykes is a Research Engineer working in the HPE HPC & AI EMEA Research Lab, which he joined in 2018. He leads the memory-focused work package of the EPiGRAM-HS project funded by the EC H2020 initiative. His research interests include heterogeneous high-performance architectures, software and compiler optimization, application coupling, computer graphics and scientific visualization. He holds a Ph.D. in Scientific Visualisation from the University of Portsmouth, UK.