

Commodity embedded technology and mobile GPUs for future HPC systems

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Around 2005-2008, (mostly) economic reasons led to the adoption of commodity GPU in high-performance computing. This transformation has been so effective that in 2013 the TOP500 list of supercomputers is still dominated by heterogeneous architectures based on CPU+coprocessor. In 2013, the largest commodity market in computing is not the one of PCs or GPUs, but mobile computing, comprising smartphones and tablets, most of which are built with ARM-based System On Chips (SoCs). This leads to the suggestion that, once mobile SoCs deliver sufficient performance, mobile SoCs can help reduce the cost of HPC. Moreover mobile SoCs embed GPUs that are in many cases OpenCL/CUDA capable, therefore most of the computing experience gained over these years can be highly beneficial.

Since the end of 2011 the Mont-Blanc project is tackling the challenges related to the use of mobile SoCs in an HPC environment, developing a prototype, evaluating heterogeneous CPU+GPU architectures and porting libraries and scientific applications to ARM based architectures. In view of the experiences within the Mont-Blanc project at the Barcelona Supercomputing Center, this contribution will show preliminary results about performance evaluation of heterogeneous CPU+GPU computation on mobile SoCs and will describe possibilities and challenges involved in developing high-performance computing platforms from low cost and energy efficient mobile processors and commodity components.

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