

PRACE Future Technologies Evaluation Results

Wednesday, November 14th, 5.30 – 7.00 pm

Location: 250-AB



Torsten Wilde, 

Hot Water Cooled Prototype at LRZ



Alex Ramirez, 

ARM-based HPC Prototypes at BSC



Radek Januszewski, 

Evaluation of AMD GPUs

Chair: Seán Delaney,  **ICHEC**
Irish Centre for High-End Computing



PRACE Future Technologies Evaluation Results BOF Session Outline

Torsten Wilde, LRZ: Hot water cooled prototype

HPC centers are facing the challenge of balancing the compute power of new supercomputers with increasing energy costs. One possible way of reducing the total cost of ownership (TCO) is the move from air cooled systems to direct-water cooled ones. LRZ is investigating the possibility of using year-round “free” cooling (just passive heat exchangers) instead of water chillers and is evaluating the possible power efficiency of such a system and its effect on TCO. This presentation discusses the energy consumption of the LRZ prototype in relation to different cooling parameters. It concludes with an overview of different re-use possibilities and a short discussion on re-use via adsorption.

Alex Ramirez, BSC: ARM-based HPC prototypes

We describe the architecture of the ARM-based HPC prototypes deployed at Barcelona Supercomputing Center: first, an homogeneous ARM multicore cluster, and second an accelerated ARM + GPU cluster, their system software stack, and the applications currently deployed there.

We discuss the initial performance, scalability, and energy-efficiency measurements of both systems, and the lessons learned by these deployments, future projections, and guidelines on how to design and built future ARM-based systems.

Radek Januszewski, PSNC: Evaluation of AMD GPUs

We describe the results of the research on employing hybrid CPU-GPU processors for the HPC, done in Poznan Supercomputing and Networking Center. We focus on how merging the GPU and CPU on a single silicon die may help to solve or, at least, alleviate the problems that make the GPU-enabled computations a difficult task. The most important topics are: the evolution of the programming models reflecting the changes in the hardware and how hybrid processors could improve real-life energy efficiency of the GPU based systems. We discuss the performance results we were able to gather using the first generation AMD APU, in terms of both computational performance and energy efficiency. On the software side, we present our lessons learned in using OpenCL as a portable, highly efficient language and present our first experiences with the HSA libraries as an alternative way of programming hybrid systems.

