

Press release  
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## PRACE hosted a Seminar on CUDA and HMPP

*12 HPC (High Performance Computing) experts from 6 PRACE countries met end of April near Paris for an intense four day training on the latest GPGPU (General-purpose computing on graphics processing units) programming languages.*

The participants got a deep insight into CUDA, a language developed to enable general purpose computing for NVIDIA graphic cards. The first two days were dedicated to CUDA, addressing problems from the basics of memory allocation and transfer to more elaborated stuff like mixing OpenMP and MPI with CUDA to allow for multiple levels of parallelization. Hands-on sessions on the newly installed GENCI-CEA PRACE prototype enabled the participants to test their knowledge on the latest high-end Tesla cards.

After the first two days, the main focus of the lessons switched to the HMPP workbench from CAPS enterprise. HMPP (Hybrid Multicore Parallel Programming) is a collection of tools, compilers and a runtime that allows portable programming for various multi- and manycore architectures. HMPP uses a set of compiler directives embedded in either FORTRAN or C-Code that allow automatic compilation to CUDA or SSE instructions for x86-CPU's. HMPP simplifies programming for Brook-enabled GPUs from ATI/AMD and potentially for the Cell processor by the preparation of so called "codelets". The participants learned how to use HMPP to easily port their applications to GPUs (namely a NVIDIA Tesla), how to influence the code generation to get maximal performance and how to use the codelet generation.

The high level of expertise within the group well reflected how many talented people work together within the PRACE project. They managed to complete the set of hands-on labs well in time so that enough time was left to present and discuss their own projects. These fruitful discussions led to many good suggestions and ideas, not only from the experts from CAPS enterprise but also from their peers. They are now able to either port old applications with the help of CUDA or HMPP or create new ones from the start. We expect them to continue practicing on the GENCI-CEA PRACE prototype so that they can give feedback on this kind of machine used under real conditions.

This seminar was jointly organized by CEA and GENCI and took place at the Ter@tec site next to CEA Bruyères-le-Châtel from April 27 to April 30, 2009.

**About PRACE:** The Partnership for Advanced Computing in Europe (PRACE) prepares the creation of a persistent pan-European HPC service, consisting of several tier-0 centres providing European researchers with access to capability computers and forming the top level of the European HPC ecosystem. PRACE is a project funded in part by the EU's 7th Framework Programme. The PRACE project receives funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° RI-211528.

**About CAPS Entreprise:**

Founded in 2002 by members of an INRIA research team, CAPS develops and commercializes innovative software for high performance application tuning in the domains of HPC and embedded systems. Built on over five years of advanced research and development, CAPS provides high quality and cost effective programming tools that leverage the computing power of evolutive manycore hybrid platforms.

CAPS mission is in keeping with the innovative and fast moving multicore market and helps industries with high level HPC issues such as oil and gas, defense, finance and life sciences to allow their software developers to take the most of multicore processors while preserving their legacy source.

Leading innovator in parallel programming tools, CAPS is also actively involved in many French and European Research and Development projects around the development of multicore compiling technologies and optimization methods.

The company is headquartered in Rennes, France. Further information is available at [www.caps-entreprise.com](http://www.caps-entreprise.com).

**About GENCI:** GENCI, Grand Equipement National de Calcul Intensif, is a legal entity taking the form of a «société civile» under French law, owned for 50 % by the French State represented by the Ministry for Higher Education and Research, for 20% by the CEA, 20% by the CNRS et 10% by the Universities.

Created in January 2007, GENCI has the following mission:

- ▶ promote the use of modeling, simulation and high performance computing in fundamental and industrial research;
- ▶ promote the organization of European high performance computing and participate to its actions;
- ▶ set in place and coordinating the major computer equipment for the French computer centers for civilian research, by providing for their financing and assuming their ownership;
- ▶ perform all research required for developing and optimizing the utilization of computing equipment
- ▶ open the equipment it owns to all interested scientific communities, academic or industrial, national, European or international.

**About CEA:** The CEA: A key player in technological research

A major player in research, development and innovation, the CEA

intervenes in three main fields: energy, information and health technologies, and Defence.

Through the diversity of its programmes, it carries on two major objectives: to become the leading European technological research organization, and to guarantee the continuation of the nuclear deterrent.

Its advantages to achieve this: a crossed engineers/researchers culture, favouring synergies between fundamental research and technological innovation; exceptional installations (super-computer, research reactors, large physics instruments, power lasers, etc); finally, real involvement in the industrial and economic fabric.

Established in 9 centres spread throughout France, the CEA benefits from strong regional presence and solid partnerships with other research organizations, local institutions and universities. In order to

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encourage the transfer of knowledge, the CEA attaches particular importance to education and information to the public.

Recognised as an expert in its fields, the CEA is a full part of the European research area and has increasing presence at the international level.

**Notes for editors:** GPGPU stands for “General-purpose computing on graphics processing units” and refers to using a GPU to perform computation in applications traditionally handled by the CPU.



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