

To continue as an FP7-funded project

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HPC-Europa: Pan-European Research Infrastructure on High-Performance Computing

High-performance computing (HPC) is essential to many branches of science and technology, such as climate modelling and aircraft design, but the partners in the HPC-Europa project believe it has applications in many non-traditional fields too, from life sciences to knowledge management and discovery. The main function of HPC-Europa is to give the European research community access to first-class supercomputers and advanced computational services in an integrated way. Anyone whose work would benefit from HPC can apply for an all-expenses-paid visit, lasting up to three months and including training and local support. Through EU funding, HPC-Europa has hosted hundreds of people in this way.

● NUMBER-CRUNCHING FOR NEWCOMERS

The rise of powerful computers has been good news for scientists and engineers. Since the first supercomputers appeared in the 1970s, researchers have been able to replace some of their experiments with computer-based mathematical simulations of the real world, often saving time and money in the process. For many problems where real experiments remain essential, powerful computers also help to increase the amount of useful data that can be extracted from the results.

The original supercomputers were so-called 'vector' machines with single processors – essentially beefed-up versions of ordinary computers. By the 1990s, the focus had shifted to parallel computing, in which tasks are shared between many small processors, often similar to those found in desktop PCs. A further development is the technique known as clustering, in which several separate processors or multi-processors linked by fast interconnection networks cooperate to create a powerful and reliable system scaling up to thousands of processors. Grid

computing, which links computer systems, supercomputers and instruments through the internet, can also provide a collaborative environment to face complex and computation-intensive problems.

Supercomputers are used for tasks such as weather forecasting, climate research, modelling chemical compounds and biological molecules, simulating the aerodynamics of aircraft and road vehicles, particle physics, astronomy and code breaking.

The HPC-Europa project is improving Europe's competitiveness in R&D by making the best use of the MareNostrum supercomputer in Barcelona and other advanced supercomputers. HPC-Europa gives researchers across Europe access to HPC within a high-quality computational environment, including the necessary technical support and specialist training, and is also helping to improve HPC facilities generally.

● A COMPUTING GRAND TOUR

HPC-Europa's Transnational Access activity allows any researcher from an eligible country, whose work could benefit from HPC, to visit one of a number of supercomputing centres for up to three months, with all expenses paid. Over the course of the project, hundreds of European researchers, from postgraduates to senior professors, have been able to benefit from this opportunity.

Each visitor is guided by a host researcher, working locally in a related field, who provides office space. The supercomputing centres are BSC (Barcelona), CINECA (Bologna), EPCC (Edinburgh),

HLRS (Stuttgart), IDRIS (Paris), SARA (Amsterdam), GENCI (FR) and CSC (Espoo, FI).

HPC-Europa has two Joint Research Activities to improve the overall performance of HPC in Europe. The first of these deals with tools for measuring the performance of programs, especially those that have recently been 'ported' to a supercomputer through the project's Transnational Access activities. The second is creating new and simplified ways to access the HPC resources in a grid-computing environment.



EUROPEAN COMMISSION

Networking activities in HPC-Europa cover the management and evaluation of the project itself, a videoconferencing collaborative environment, and new tools and competences to ensure that complex data from computational science applications can be stored, retrieved and shared easily.

A new scheme of Joint Research Activities and Networking Activities is foreseen from 2009. This will include coordinating

activities between partners, increasing the user community, enhancing user support, improving infrastructure and developing additional applications - all with the aim of improving the quality and effectiveness of the project still further. Transnational Access activities will also continue to be an important part of the project.

● PAN-EUROPEAN RESEARCH INFRASTRUCTURE ON HIGH-PERFORMANCE COMPUTING IN SUMMARY

Project acronym: HPC-Europa/HPC-Europa++ (2008 interim continuation under FP7)

Funding scheme: Integrated Infrastructures Initiative (I3)

EU financial contribution (FP6): €13 million

EU project officer: Lorenza Saracco

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Completion date: 31 December 2008

Project webpage: www.hpc-europa.org

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