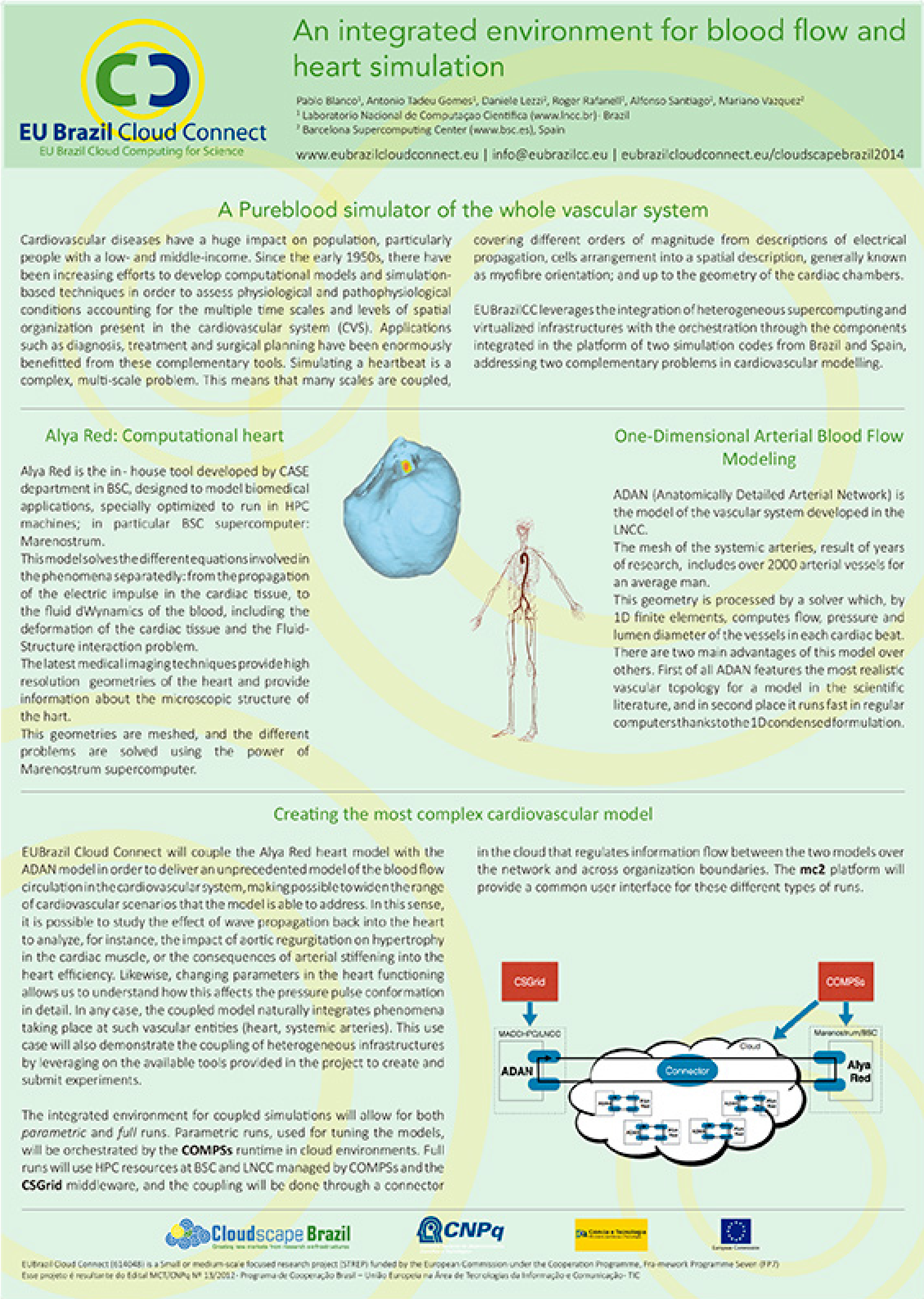
BSC contributes to intercontinental federated e-infrastructure for scientific use between Brazil and EU



From 2013 until earlier this year, Barcelona Supercomputing Center (BSC) formed part of EUBrazilCC, a project aimed at promoting cooperation between Europe and Brazil while supporting a scientific and knowledge-based society as the key to sustainable and equitable socioeconomic development. At the centre of this partnership were three use cases requiring cooperation between Brazil and Europe in the areas of data provision, services and expertise.

BSC's role was to provide support and development for the cardiology use case (Cardiovascular Simulation Services) and its subsequent implementation in two HPC systems. The goal of this use case is to analyse different working conditions of the cardiac muscle.

To this end, EUBrazilCC used the Alya System, BSC's simulation tool. Alya is fully developed in-house, from numerical methods all the way to parallel implementation, including mesh-generation and visualisation. The Alya Cardiac Computational Model (CCM) heart model was used in conjunction with the ADAN model (developed at LNCC) in order to provide an unprecedented model of blood flow in the cardiovascular system.

Mariano Vázquez, High Performance Computational Mechanics Group Manager at BSC, explains that "we are very excited about the potential that such a unique and complex model has for cardiovascular biomedical research. Once completely deployed and in production, hopefully before the end of the year, it will become not only the most comprehensive computational cardiovascular model in the world but also a great example of what research collaboration between Europe and Brazil can bring to the community."

The final results of the simulations are stored in the cloud database, ready to be retrieved by hospitals and laboratories as new data to be provided to the end-users, i.e. medical doctors.

The real breakthrough is EUBrazilCC's combination of these simulation tools under a cloud computing umbrella, including software coupling and access to both input and output data.

For EUBrazilCC the hope is that, in the relatively near future, doctors will use the results of this tool in the same way that they currently use imaging and radiology. A simulation will be run under specific conditions and these results will then be transferred to the doctor, rather as radiologists take X-rays before passing on the results. At the same time, the expectation is that medical researchers, depending on their expertise, will use these tools independently.

As part of the project, BSC also adapted the programming model COMPSs and the PMES framework to the necessities of several usage scenarios.

Rosa M. Badia, Workflows and Distributed Computing Group Manager at BSC, explains that "in EUBrazilCC we have demonstrated the features of the COMPSs programming model with real scientific use cases. Also, we have integrated the PMES/COMPSs framework on the project's open-source integrated platform, which features a whole software stack for the development and deployment of applications in distributed cloud federated infrastructures".

Strengthening the relations EU - Brazil

The EUBrazilCC (614048) was a small or medium-scale focused research project (STREP) funded by the European Commission under the Cooperation Programme (FP7). BSC is also member of the consortium of other EU-Brazil projects, such as HPC4E, EUBRA-BIGSEA and EuBrazilOpenBio.

www.eubrazilcloudconnect.eu | www.facebook.com/EUBrazilcloudconnect
www.linkedin.com/in/eubrazilcloudconnect | www.twitter.com/EUBrazilCC

Further information:
dissemination@bsc.es - +34 93 401 58 37 (Núria Masdéu)

Nota en català (pdf) Nota en castellano (pdf)
Barcelona Supercomputing Center - Centro Nacional de Supercomputación

---