

Web Laboratory UniHUB in the Scope of Program «University Cluster»

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The innovative Program «University Cluster» («UC») has been founded on September 4th 2008 by “ISP RAS”, “JSCC RAS”, the companies HP and "Synterra". The program is directed at increasing the knowledge level of using technologies for parallel and cloud computing in higher education and research activity, and also at their accelerated introduction to the Russian industry. One of the activities of the «UC» was the participation in the international project «OpenCirrus». The «OpenCirrus» project was founded by HP, Intel and Yahoo, with the support of National Science Foundation, USA. It aims to spur the innovation in systems' and application research and catalyze the development of an open source service stack for the cloud computing. The computing infrastructure of the program «UC» has the distributed structure and represents a virtual private network VPN «UC» in which "Cloud" or other services providing access to computing resources, data storage systems, test beds and appendices take place.

In the scope of Program «UC», the technological platform UniHUB (www.unihub.ru) for research and formation in the field of the parallel and cloud computing is developed. The system program stack of platform is based on Linux/Debian, Joomla, PHP, MySQL, OpenVNZ, Globus Toolkit and other software. In particular the platform allows to create the subject Web-laboratories. Thus, the technological platform of the program «UC» provides an effective integration of education, science and industry at a new technological level.

One of the projects works aims to achieve the integration of open source codes (SALOME, OpenFOAM, ParaView) into the infrastructure, providing a full cycle for numerical modelling of problems for Computational Continuum Mechanics.

The work in the Web laboratory is carried out through a thin client on whom any of the most widespread browsers connected to Internet should be established. The different HPC resources are used as the computing resources. In laboratory the users created the groups entitled “Aerodynamics”, “Turbulence and Combustion”, “FSI” and others. A number of test cases have been executed: calculation of supersonic jet, calculation of a flow around space vehicle, modelling of unsteady turbulent flame, calculation of the industrial valve, atomization of liquid fuel, and others. The different solvers (simpleFoam, pisoFoam, sonicFoam, fireFoam, interFoam, buoyantPimpleFoam) have been used.

On the basis of the Web laboratory the courses “Introductory course” and “Advanced course” of using SALOME, OpenFOAM, ParaView are prepared, on which a series of trainings for representatives, both universities and the industrial companies, are spent.

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