

Advanced Computing Software Solutions for Simulation of Flows in Deformable Porous Media

HPC-Competence Center

The Institute of Information and Communication Technologies of Bulgarian Academy of Sciences (IICT-BAS) hosts the Bulgarian largest HPC center and provides knowledge, expertise and services to businesses and researchers to develop innovative applications and products. In 2015 the centre was expanded with new multifunctional high performance computing complex "AVITOHOL", which is 388th place in the TOP500 list (November 2015).



Enterprise

PPResearch Ltd. (founded in 2011) is a start-up company with ~2-3 employees dedicated to creating the best ever Geomechanical Reservoir Simulator and to developing of software solutions for computer simulation of industrial flows. The founder, Dr. Peter Popov, is a lead mathematician and developer of GeoFlow and deep expertise in Fluid Flow Modelling (fracture media, upscaling), aeronautical engineering, large scale numerical modelling (advanced solvers, parallelization, adaptive meshing).

How HPC makes the difference

PPResearch Ltd. needed to develop new algorithmic software solutions for computer simulation of industrial flows. The faster solvers are needed to overcome a bottleneck of the existing commercial software systems when the size of the discrete system increases. In the context of two contracts with IICT-BAS:

"Adaptation of Algorithms and Software Implementation of Algebraic Multigrid for Solution of Linear Systems Arising After FEM Discretization of Flows in Deformable Porous Media", 2014-2014 and "Development of Software Implementation of Algebraic Multigrid for Solution of Linear Systems Arising After FEM Discretization of Flows in Deformable Porous Media", 2015, the company had access to expertise and computing equipment of IICT-BAS and successfully solved the problem under consideration and expanded its product portfolio. The new software showed good scalability and accuracy. As a result of these developments the company is now integrated into another SME "MP Geomechanics" Ltd.

