Domestic hardware products for HPC market, their tuning and examples of deployment

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The current status of foreign and domestic science indicates that the methods of numerical simulation on high-performance multiprocessor computing systems (supercomputers) are used in almost all works. However, supercomputer is not a set of servers with a high-speed network and unified storage system, it is extremely specific equipment, requiring special exact settings, and the system should be formed based on user applications. The efficiency of parallelization depends on many different factors determining the complexity of the interaction between the software and hardware components of supercomputers. The main factors that determine the performance of the supercomputer are the architecture, mathematical models, finite difference schemes and algorithms of their implementation, the dimensionality of the problem, decomposition of the computational domain, I/O operations, data exchange etc. Multiplicity of these mutually dependent factors is a makes it difficult to analyze the efficiency of the supercomputers and applications, especially for inexperienced users.

The formation of an effective use of computer hardware can be based on two types of optimization:
the optimization of the problem formulation;
the optimization of computing equipment.

Having huge experience of using supercomputers for solving clients' problems and own needs, our company designs and introduces supercomputers to enterprises, taking into account the described factors and many others.