MODERN INFORMATION SYSTEMS FOR RESEARCH WORKS OF THE PUSHCHINO RESEARCH CENTER OF RAS

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ABSTRACT. The current state of information systems of the Pushchino Research Center of the Russian Academy of Sciences allows us to successfully solve the problems of computational biology.

Key words: information systems, computational biology, parallel processing system.

The Pushchino Research Center (PRC) of the Russian Academy of Sciences (RAS) includes 9 institutes of RAS focusing on microbiology, molecular biology and biophysics and the Radioastronomical Station of the Astrocosmic Center of the Physics Institute. On the basis of the institutes of the PRC two universities: Pushchino State Institute of Natural Science and a branch of Moscow State University are working. PRC is a unique formation of global significance and has around about half of Russia's potential in the field of Physical and Chemical Biology.

At present the solution of problems in biology, especially in computational biology: bioinformatics, structural and computational genomics, molecular modeling, is needed for the use of powerful computing and communications resources. To successfully conduct the research on a global level the modern biologist needs a high-speed access to information contained in the world databases via Internet, high-speed processing of large volumes of data, using supercomputers with the goal of computer modelling of biological systems and so on.

In recent years, a great amount of work to meet these requirements has been done. Now all the institutes of PRC as well as educational foundations, data storage and data processing systems are combined into a single local area network built on fiber optical channels. It has high-speed access to Internet via optical communication channel with data rate 10 Gbit/s. It allows not only to find necessary information in the world wide web but to work with supercomputing centers such as Joint Supercomputer Center of RAS, supercomputer Lomonosov of Moscow State University, other Russian and foreign supercomputer centers.

The powerful parallel processing system (cluster) are working in PRC RAS on the basis of the Institute of Mathematical Problems of Biology to meet the acute need of PRC researchers for highly efficient computational resources so that they might solve numerous computational problems requiring mass computer memory and high speed of operation. At the present time the overall cluster performance is about 900 Gflops. In the further plans of improvement of the performance of the cluster is considered to increase the number of computing nodes and upgrade the internal cluster network.

Due to the organization of GRID-infrastructure developing within the framework of funded by EU project EGEE, enormous computational capacities and huge information volumes will be reachable for all scientific community.

In Pushchino State Institute of Natural Science successfully conducted training and graduate students with advanced multimedia teaching computer classes.

A number of other projects for creation and development of modern information systems are made and continued.

The direct optical channel from tracking station RT-22 in Pushchino to Moscow processing center has been created and put into operation to transfer large amounts of data at the final stage of the establishment of ground infrastructure for the international space project "Radioastron". A separate backup system for processing and storing data is organized in Pushchino Radio Astronomy Observatory to eliminate data loss during communication sessions with the Space Telescope.