Networks, computing, computational physics

Key questions for 2008-2017 are:

- Development and maintenance of the network infrastructure and high-speed data links;
- Development of the Central Information and Computing Complex;
- Development of modern mathematical and computing methods for analysis of experimental data and numerical solution of problems in theoretical and experimental physics.

Development of the networking, information and computing infrastructure

JINR telecommunication data links

- Upgrade of the Dubna – Moscow link up to 10 Gbps in 2007, 40 Gbps in 2010, and 100 Gbps in 2015;
- Participation of JINR in the programme for development of a new-generation research network;
- Participation in work on creation of the international segment within the projects GEANT2 and GLORIAD and in work on increasing the bandwidth of the international channels.

JINR local network

- Transition to 10 GB Ethernet technology to provide high-quality service for various data types including multimedia and real-time systems;
- Provision of wireless and mobile access to all services and resources;
- Realization of new decisions for control, management and protection of the network.

JINR Central Information and Computing Complex

- Increase of the performance of the JINR Central Information and Computing Complex (JINR CICC) and of the data storage systems to meet the demands of data processing for LHC experiments and other experiments with JINR participation; development and maintenance of middleware;

	2007	**2008**	**2009**	**2010**
CPU (kSI2k)	1000	1250	1750	2500
Disk systems (TB)	150-200	400	800	1200
Mass storage(TB)			100	200

- Development of the program environment for information, algorithmic and software support of the research under way at JINR and Member State institutes on the basis of the JINR CICC;
- Development and introduction of distributed and parallel computing technologies.

Grid-technologies

- Development of the JINR Grid-segment as part of the global Grid-infrastructure with a full functioning set of services. Development of the technologies of "gridification" of software for application within the Grid-environment.

Mathematical methods, algorithms and programs

- Development and creation of mathematical methods of data modelling and data processing;
- Increase of the efficiency of application software for the solving of problems of computational physics with the use of paralleling by MPI package and development of new tools that allow one to effectively use multi-core PCs;
- Creation of numerical algorithms and software for simulation of complex physical systems;
- Further development of methods, algorithms and software of computer algebra;
- Development of new-generation computing tools.

Mathematical methods in particle physics, relativistic nuclear physics, and nuclear physics

- Development of new and improvement of the existing mathematical methods to solve large-scale problems in the field of particle physics, relativistic nuclear physics, and nuclear physics;
- Elaboration of methods and interfaces for processing enormous amount of distributed data;
- Creation of the middleware providing effective high-performance computations for the solving of scientific problems in particle physics, relativistic nuclear physics, and nuclear physics.

Educational activity

- Further development of training facilities in the field of IT for students and post-graduates from the JINR Member States, in particular of the opportunities offered by two LIT-based MIREA faculties. Further improvement of the "Grid-Lab" and the testbed of metacluster and Grid-computing for students to become familiar with Grid-technologies.