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**INFRASTRUCTURE FOR THE
NATIONAL SUPERCOMPUTING INITIATIVE**

“Recognizing the strategic role of high–end scientific computing in research and development, and the growing need for the creation of leading edge European supercomputing facility, as well as considering the needs of the Serbian research community, the Ministry of Science and Technological Development of the Republic of Serbia has decided that Serbia should join and support European efforts in the field of supercomputing.”

“The Ministry appoints the Institute of Physics Belgrade to be the referent institution representing Serbia in European initiatives aimed at the creation of the pan–European high performance computing service.”

Božidar Đelić
Deputy Prime Minister, and
Minister of Science and Technological Development
October 2008

Project overview

ICT is one of the priority areas of modern R&D, and a key step for building a knowledge economy and bridging the intra-European developmental gap in this field (digital divide).

The successes of IPB R&D units in European ICT projects have shown that Serbia has a realistic chance to become competitive in this field.

The proposed project aims to set up a High Performance Computing (HPC) infrastructure at the IPB, opening up new computing-intensive areas of research, reinforcing key human resources, and paving way for future high-tech spin-offs.

Scientific Computing Laboratory, IPB



Project plan

The proposed project is stage one of Serbia's National Supercomputing Initiative (NSI). The current 3 year project will set up the infrastructure for NSI through:

- × Creation of the National Supercomputing and Data Storage Facility (NSDSF) at the IPB.
- × Procurement and installation (in three phases) of the Blue Danube supercomputer at the NSDSF.
- × Training for users, developers, and administrators.
- × Development and implementation of user support services for accessing Serbia's HPC infrastructure.
- × Integration of NSDSF into EU supercomputing and Grid e-infrastructures.
- × Growth of NSDSF into a regional HPC hub.

Project outcomes (1)

- × State-of-the-art supercomputing services set up and integrated into EU e-Infrastructures
 - × NSDSF housing Blue Danube supercomputer
 - × Preconditions for Serbian Supercomputing Network at 12 institutions throughout Serbia
- × Human resources reinforced
 - × New positions for 30 leading experts at NSDSF. Additional 50 positions opened by end of NSI
 - × Training for HPC users, developers, and administrators creates critical mass of experts in the field
- × Enhanced competitiveness of R&D sector
 - × Access to leading computing resources for researchers
 - × User assistance services for efficient utilization of the national supercomputing infrastructure

Project outcomes (2)

- × New computer-intensive areas of research opened up
 - × Regional level climate change simulations
 - × Meteorological modelling applied to agriculture
 - × Analysis of the integrity of constructions and times of exploitation for capital engineering objects (e.g. bridge constructions, pressurized vessels and pipelines)
 - × Physical sciences and material sciences applications
 - × Biomedical and pharmaceutical applications
 - × Storage and efficient manipulation/visualization of large data sets (e.g. medical imaging, digitalization of national cultural heritage)
- × Preconditions set up for the development and implementation of cutting-edge industrial applications

NSDSF in brief (1)

- × The National Supercomputing and Data Storage Facility is a 3200 m² facility that will represent the focal point for HPC.
- × The ground floor of the NSDSF houses the machine room and administrator facilities.
- × The first and second floors are dedicated to office space for 40 HPC experts, 30 students, and 10 computer admins.
- × The NSDSF user facility is part of the Institute of Physics Belgrade, and it will be located at the New Belgrade campus in proximity to the new Nano-science user facility and the Center for popularization and promotion of science. .

NSDSF in brief (2)

- × Blue Danube will grow in three phases. By the end of phase three the Blue Danube's planned performance will put it among the top 100 supercomputers in the world.
- × By the end of 7 year National Supercomputing Initiative NSDSF will find itself at the hub of distributed network of HPC facilities located at 12 institutions throughout Serbia.
- × Funding of 10M EUR provided from the Serbian budget and a loan from the European Investment Bank
 - + Broad investment in Serbian science, overall 200M+200M EUR
 - + In 2011, 50M EUR for research infrastructure and equipment

Human resources

- × The current project will create new jobs in a key field at the forefront of modern ICT. Access to competitive HPC resources will be of immense help in stopping brain drain in ICT and related key areas of scientific and technological expertise. The intense training and dissemination will further reinforce this effect.
- × The main indirect result of the proposed project and the wider National Supercomputer Initiative is that it gives an explicit and realistic procedure for reintegrating many HPC experts currently working at leading R&D institutions abroad.
- × The hiring and training of 80 HPC experts will result in the creation of the critical mass in this competitive field, and will further attract young researches to ICT.

Conclusions

- × The development of national HPC infrastructure is a key ingredient for achieving scientific and technological excellence
- × Serbia is strongly committed to participating and contributing in distributed research infrastructures through national and international initiatives:
 - + Blue Danube – National Supercomputing Initiative
 - + HP-SEE, PRACE-1IP, PRACE-2IP, agINFRA, ...
 - + AEGIS, EGI-InSPIRE
- × This will provide a competitive environment for R&D, create new jobs, stimulate reintegration of experts, and attract young students to ICT