

APPLICATION OF THE UKRAINIAN GRID INFRASTRUCTURE IN JOINT PROJECTS OF KYIV NATIONAL TARAS SHEVCHENKO UNIVERSITY¹

O.O. Sudakov¹, A.O. Salnikov¹, I.A. Sliusar¹, O.V. Savytskyi², Yu.V. Boyko¹

¹ *Parallel Computing Laboratory, Information and Computer Center National Taras Shevchernko University of Kyiv, 64, Volodymyrs'ka St., 01601 Kyiv, Ukraine*

² *Institute of Molecular Biology and Genetics, National Academy of Sciences of Ukraine
150, Zabolotnogo Str., 03680, Kyiv - 143, Ukraine
savytskyi@moldyngrid.org*

Laboratory for Parallel Computing of the Information and Computing Center (ICC), National Taras Shevchenko University of Kyiv (KNU) performs development and application of ICC computing cluster and grid resources. Computing cluster has been working at the ICC KNU since 1999. This experience becomes the basis for creation of the first Ukrainian AliEn Grid resources in 2005 and Ukrainian Academic Grid (UAG) in 2006 under the initiative of the Bogolyubov Institute for Theoretical Physics, National Academy of Sciences of Ukraine (BITP) and KNU [1]. Since that time BITP has actively performed UAG organizational tasks and presentation of UAG in Europe. ICC is taking part in UAG practical application. Now Ukrainian Grid Infrastructure contains ~25 clusters: ~23 running Nordugrid ARC and ~4 – gLite; ~2 storage elements (SE). Most Ukrainian applied and scientific projects utilize ARC and correspond to different virtual organizations (VOs) [2].

Joint projects the ICC involves in, include development of grid infrastructure components (ARC NAGIOS tests, support of grid cites, auto-replicated VOMS and SEs, grid-sites and VOs web-portals etc.); application of grid infrastructure for molecular dynamics (VO MolDynGrid), non-linear dynamics (VO Networkdynamics), modeling of forest fires spread in Crimea (VO crimeaeco), grid storage for cardiograms and DICOM images (VO medgrid), access to computing resources via grid components (VO testbed.univ.kiev.ua) etc.. Virtual Laboratories MolDynGrid and Networkdynamics provide unique computing facilities to Ukrainian and European users and allowed to obtain interesting scientific results in the field of molecular biology [3] and non-linear dynamics [4]. VO medgrid is used by equipment manufacturers and in clinical practice in the fields of cardiology and computer-aided emission tomography.

Problems of UAG application now include organizational and interoperability issues, small number of storage elements, computing resources and end-user friendly interfaces to grid services. Solutions for some of these problems are planned in the 2012 year projects concerned with VOs MolDynGrid, Networkdynamics, medgrid and others.

- [1] *M. Zynovyev, S. Svistunov, O. Sudakov, Yu. Boyko. Ukrainian Grid Infrastructure: Practical Experience // Proc. 4-th IEEE Workshop IDAACS 2007, September 6-8, 2007, Dortmund, Germany. P. 165-169.*
- [2] *Ukrainian Grid Infrastructure VOMS <http://grid.org.ua/voms/> - cit. 04.06.12*
- [3] *S.O. Yesylevskyy, O.V. Savytskyi, K.A. Odynets and A.I. Kornelyuk. Interdomain compactization in human tyrosyl-tRNA synthetase studied by the hierarchical rotations technique. // Biophysical Chemistry, Vol. 154, 2011, pp. 90-98.*
- [4] *O. E. Omel'chenko, M. Wolfrum, S. Yanchuk, Y. L. Maistrenko, O. Sudakov. Stationary patterns of coherence and incoherence in two-dimensional arrays of non-locally-coupled phase oscillators // Phys. Rev. E 85, 036210 (2012)*

¹ Partially funded by “Ukrainian State Scientific and Technical Program on Development and Application of Grid Technologies in 2009-2013”