INTEGRATION OF THE GRID INFRASTRUCTURE OF UKRAINE IN EGI

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Outline

• Ukrainian Grid Infrastructure
• Ukrainian National Grid and EGI.eu
• Installation of central services in NGI_UA
• Conclusion
Current state of UGI

Bogolyubov Institute for Theoretical Physics
Institute of Cell Biology and Genetic Engineering
Institute of Molecular Biology and Genetics
Institute of Cybernetics
Main Astronomic Observatory
Institute of Metal Physics
Institute of Physics
Research Space Institute
Pukhov Institute for Modeling in Energy Engineering
Institute of Mathematical Machines and Systems Problems
Institute of Software System
Taras Shevchenko Kiev National University
Kiev Polytechnic Institute
Institute of Mathematics
Institute of Mathematical Machines and Systems Problems
Institute of Software Systems
National University of Kyiv-Mohyla Academy
Pukhov Institute for Modelling in Energy Engineering
Institute of Applied Physics
Institute of Low Temperature Physics and Engineering
Institute of Scintillating Materials
Radioastronomical Institute
Institute of radiophysics and electronics
Donetsk Institute of Physics and Technology
Institute of Geotechnical Mechanics
Institute of Condensed Matter Physics
Tavrida Humanities-Ecological institute
IGTM, Institute of Geotechnical Mechanics

Resources: CPU ~ 2700, Storage ~ 200 TB
Capacity of fiber-optic lines between clusters – 100 Mbps
At the end of 2011 we had 30 clusters under ARC with total number of 2700 processors and available disk space about 200 TB.
Grid-monitor (http://gstat.egi.eu) and 3 clusters integrated in EGI infrastructure.
Basic Coordination Center

In order to ensure the integration of the Grid infrastructure of Ukraine with Grid infrastructure EGI.eu was established Basic Coordination Center (BCC) which performs functions of Resource Infrastructure Provider of grid-resources at technical and operational level of the Ukrainian National Grid project.

BCC is a nonstructural subdivision of the Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine, which is the basic organization for implementation of Ukrainian National Grid Project.

BCC serves as the Resource infrastructure Provider of UNG grid-resources in relation with the International grid-communities on technological and operational level.

BCC provides management and coordination of works on supporting the operation of the national grid-infrastructure and resource centers (grid-sites) and supporting core grid-services.
Ukrainian National Grid and EGI.eu

At the end of 2011 was signed “Memorandum of Understanding between EGI.eu and BCC. Resource Infrastructure Provider MoU“.

In this Memorandum of Understanding was defined a framework of collaboration between EGI.eu and Ukraine for accession to EGI on the operation level.

Memorandum of Understanding between EGI.eu and BCC

Resource Infrastructure Provider MoU

IN WITNESS WHEREOF, the Parties have caused their duly authorised representatives to sign two originals of this Memorandum of Understanding, in the English language.

The following agree to the terms and conditions of this MoU:

30-11-2011

Dr. Mykola Shevchenko
EGI.eu Director

Prof. Grzegorz Zioło
BCC – Chief

Date 23/12/2011

Date December 14, 2011
The beginning of the implementation of MoU may be considered the date 24.02.2012 when has been opened the ticket in GGUS to perform preliminary work on the technical integration of the Grid infrastructure of Ukraine in the EGI.
Ukrainian National Grid and EGI.eu

Features of integration:

• All grid sites in UNG are running under the middleware ARC. ARC has a fundamental architectural differences from the middleware gLite, which are used in EGI. It requires installation of additional services for integration.

• Three gLite sites UA-BITP, UA-KNU and Kharkov-KIPT-LCG2 were registered in ROC Russia and their availability should not be broken during the integration (participation in data processing in CERN should not be interrupted).

• At the initial stage of integration it is not possible to use central services (VOMS, TopBDII) which were registered in ROC Russia due to the features of the GOCDB.

• It was decided to use most central services of EGI and install the minimum number of central services NGI_UA.
Ukrainian National Grid and EGI.eu

NGI_UA central services :

- **Operations Portal** – decision to use the EGI Operation Portal.
- **GGUS** – decision to use EGI GGUS system. At this stage of the integration it was decided to install the simplest support system for administrators and ROD team members without integration with GGUS.
- **GOCDB** – decision to use the EGI system to leading a process of registration grid sites, with a members of MoU.
- **Accounting Repository, Accounting Portal** – decision to use APEL system of EGI and for other sites which are running under middleware ARC was decided to use the NorduGrid project experience for process of integration with APEL system.
- **Service Availability Monitoring Nagios** (including support for messaging) - decision to install own Nagios. It is important to have opportunity to test both gLite and ARC sites.
- **TopBDII, VOMS, WMS** – decision to install own NGI_UA central services. On the first step was decided to use EGI central services and then transfer services from ROC Russia and install new one.
Ukrainian National Grid and EGI.eu

**Group Object 105504**

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<tr>
<td>Description</td>
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<tr>
<td>Email</td>
<td><a href="mailto:ngi-us-operations@grid.org.ua">ngi-us-operations@grid.org.ua</a></td>
</tr>
<tr>
<td>OGIS SU</td>
<td></td>
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<td>OGIS Rod Email</td>
<td><a href="mailto:ngi-us-rod@grid.org.ua">ngi-us-rod@grid.org.ua</a></td>
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<td>Helpdesk Email</td>
<td><a href="mailto:ngi-us-ticket@grid.org.ua">ngi-us-ticket@grid.org.ua</a></td>
</tr>
<tr>
<td>Security Email</td>
<td><a href="mailto:ngi-us-security@grid.org.ua">ngi-us-security@grid.org.ua</a></td>
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**Users and Contacts**

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<tr>
<th>Name</th>
<th>Role</th>
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<th>Actions</th>
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<tr>
<td>Sergiy Svistunov</td>
<td>NGI Operations Manager</td>
<td><a href="mailto:svistunov@btib.kiev.ua">svistunov@btib.kiev.ua</a></td>
<td>+380446213110</td>
<td>View</td>
</tr>
<tr>
<td>Ievgen Silusar</td>
<td>NGI Operations Deputy Manager</td>
<td><a href="mailto:slu@grid.org.ua">slu@grid.org.ua</a></td>
<td>+380 67 500-81-24</td>
<td>View</td>
</tr>
<tr>
<td>Oksana Shadura</td>
<td>Regional Staff (RCD)</td>
<td><a href="mailto:oshadura@btib.kiev.ua">oshadura@btib.kiev.ua</a></td>
<td>+360685913414</td>
<td>View</td>
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<tr>
<td>Roman Zubatruk</td>
<td>Regional Staff (RCD)</td>
<td><a href="mailto:roman@ray.isc.kharkov.com">roman@ray.isc.kharkov.com</a></td>
<td>+360630577212</td>
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<tr>
<td>Oleksandr Sobolev</td>
<td>Regional Staff (RCD)</td>
<td><a href="mailto:sobolev@isma.kharkov.ua">sobolev@isma.kharkov.ua</a></td>
<td>+36057 7515299</td>
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<tr>
<td>Mykola Ilin</td>
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<td><a href="mailto:mykola.illin@ptl.kpi.ua">mykola.illin@ptl.kpi.ua</a></td>
<td>+360019020311</td>
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<tr>
<td>Vladimir Pelyh</td>
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<td><a href="mailto:pelyh@grid.orgt.kiev.ua">pelyh@grid.orgt.kiev.ua</a></td>
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<tr>
<td>Andrii Sahrikov</td>
<td>Regional Staff (RCD)</td>
<td><a href="mailto:rmarf@grid.org.ua">rmarf@grid.org.ua</a></td>
<td>+380 98 500-17-80</td>
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<tr>
<td>Oksana Shadura</td>
<td>NGI Security Officer</td>
<td><a href="mailto:oshadura@btib.kiev.ua">oshadura@btib.kiev.ua</a></td>
<td>+360685913414</td>
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Installed and certified site for central services - NGI_UA_SERVICE

NGI_UA_SERVICE services:

- ngi.SAM (mon-ua.bitp.kiev.ua) – Service Availability Monitoring Nagios,
- TopBDII (topbdii.bitp.kiev.ua) – information system of NGI_UA,
- SGAS (vobox1.bitp.kiev.ua) – Accounting Repository for ARC sites.

WMS and VOMS services are located in UA-BITP and UA-KNU sites.
Installed and certified NGI_UA central service - ngi.SAM

It should be noticed that Ukrainian Nagios system uses the EGI tests to check availability of grid sites running both middleware gLite and ARC-EMI. This is the main difference (and complexity) from other national initiatives that lead for a process of uniformity middleware.
UA-ISMA, UA-BITP, UA-KNU and Kharkov-KIPT-LCG2 sites

• Installation gLite and certification of grid site in Institute for Scintillation Materials NAS of Ukraine (ISMA)

Ukrainian specialists was fully implemented certification gLite site UA_ISMA and had prepared operating instructions for acceleration this process for other sites. For carrying out certification procedures were additionally installed WMS and TopBDII services for non-certified Grid sites.

• Transfering UA-BITP, UA-KNU and Kharkov-KIPT-LCG2 sites from ROC Russia to NGI_UA

With help of EGI experts was carried out the transfer Ukrainian sites from ROC Russia to the NGI_UA without violating their work in data processing at CERN.
Installed and certified site UA-BITP-ARC

This is a new grid site of the Bogolyubov Institute for Theoretical Physics which is running under middleware ARC-EMI. The main difficulty in the certification process was realization of correct information system data representation to the TopBDII.

The glite-info-provider script checks cluster data in the GIIS and after using ldapsearch command selects information about cluster, local task queue from GRIS:

nordugrid-cluster-location
nordugrid-cluster-support
nordugrid-cluster-name
nordugrid-cluster-runtimeenvironment
nordugrid-cluster-contactstring

Then script are preparing template *.lgif files and convert data to the Glue 1.3 (2.0). On the last step data records in Site-BDII.
Instalation of support system for administrators and ROD team members

Site contains instructions for preparing ARC-EMI site for process of certification.
NGI_UA accounting system using SGAS server and gLite-APEL client

Вариант работы с Апелем который реализован в NGI_UA как временное решение.

Сервер который будет использован для сбора информации о задачах всех сайтов ARC

Специальный модуль для анализа ARC задач

База данных используемая для сбора информации о задачах грид-кластера, который интегрирован в EGI

Временное решение, реализованное в NGI_SI
EGI Accounting Portal - Normalized CPU time for NGI_UA

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<th>SITE</th>
<th>alice</th>
<th>atlas</th>
<th>cms</th>
<th>lhcb</th>
<th>Total</th>
<th>%</th>
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<td>0</td>
<td>1,591,415</td>
<td>0</td>
<td>1,591,415</td>
<td>84.36%</td>
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<tr>
<td>UA-BITP</td>
<td>294,696</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>294,696</td>
<td>15.62%</td>
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<tr>
<td>UA-ISMA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
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<tr>
<td>UA-KNU</td>
<td>2</td>
<td>349</td>
<td>0</td>
<td>12</td>
<td>363</td>
<td>0.02%</td>
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<tr>
<td><strong>Total</strong></td>
<td>294,698</td>
<td>349</td>
<td>1,591,415</td>
<td>12</td>
<td>1,886,474</td>
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<tr>
<td><strong>Percentage</strong></td>
<td>15.62%</td>
<td>0.02%</td>
<td>84.36%</td>
<td>0.00%</td>
<td></td>
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Click here for a CSV dump of this table
Click here for XML encoded data

NGI_UA Normalised CPU time (kSI2K) per SITE

![Pie chart showing normalized CPU time distribution]
Central Operation Portal EGI - current state of the NGI_UA

- Kharkov-KIPT-LCG2: NSC Kharkov Institute of Physics and Technology - 90% available, 98% released last 30 days
- NGI_UA SERVICES: NGI_UA core services - N/A available, N/A released last 30 days
- UA-BITP: Bogolubov's Institute for Theoretical Physics - 96% available, 96% released last 30 days
- UA-ISMA: Institute for Scintillation Materials of the National Academy of Sciences of Ukraine - N/A available, N/A released last 30 days
- UA-KNU: Taras Shevchenko National University of Kyiv - 88% available, 88% released last 30 days
- UA_BITP_ARC: Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine (BITP) - N/A available, N/A released last 30 days
# EGI Availability and Reliability Report for May 2012

**NGI_UA are represented in May 2012 Report**

<table>
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<th>Region</th>
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<tr>
<td>FMPh-LJUNIBA</td>
<td>60 240 2,326</td>
<td>100% 100% 0%</td>
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<tr>
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<tr>
<td>IRSAS-Bratislava</td>
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<td>99% 99% 0%</td>
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<tr>
<td>TU-Kosice</td>
<td>4 3 49</td>
<td>97% 100% 0%</td>
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<td><strong>NGI.TR</strong></td>
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<tr>
<td>TR-01-ULAKBIM</td>
<td>448 5,379 45,320</td>
<td>75% 75% 0%</td>
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<tr>
<td>TR-03-METU</td>
<td>156 312 2,122</td>
<td>92% 92% 0%</td>
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<tr>
<td>TR-05-BOUN</td>
<td>32 64 435</td>
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<tr>
<td>TR-10-ULAKBIM</td>
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<td>98% 98% 2%</td>
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<tr>
<td>UA-BSMA</td>
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<tr>
<td>UA-IGNI</td>
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<td><strong>NGI_UK</strong></td>
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<tr>
<td>EFDA-JET</td>
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<td>69% 99% 0%</td>
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<tr>
<td>RAL-RC2</td>
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<td>100% 100% 0%</td>
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VO “Infrastructure” - http://infrastructure.kiev.ua

http://www.egi.eu/community/collaborations/BCC-UNG.html
Conclusion

At this moment we can state that the National Grid Initiative of Ukraine (NGI_UA) works as a member of the international Grid community. It is an opened way for unification use of infrastructure and integration at the level of research communities and organizations for the benefit of joint research.
Thank you for your attention!