

Distributed Training and Testing Grid Infrastructure for JINR Member States

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Grid-technologies have already become standard tools used by scientists in different fields and first of all in high-energy physics. The associated steep learning curve may be alleviated within a dedicated education and training process. To this purpose, a distributed training and testing grid-infrastructure (t-infrastructure for short) has been set up with core services at Laboratory of information technologies (LIT) of JINR and integrating resources of several organizations from the JINR member states. It is used for educating and giving practical tutorials to students of the JINR University Centre (UC), University “Dubna”, JINR and its member states colleagues as well as for performing obligations in different Grid related activities of local and international projects (see [1, 2]).

One of the main purpose of t-infrastructure is to disseminate a knowledge and skills in grid-technologies across scientific, research and educational organizations of JINR member states to help them build the national grid infrastructure what can become a part of the global one (e.g. WLCG).

For that purpose during the last two years the t-infrastructure has been intensively used for system administrators trainings from the following organizations:

- Bogoliubov Institute for Theoretical Physics - BITP (Kiev, Ukraine),
- National Technical University of Ukraine ”Kyiv Polytechnic Institute” – KPI (Kiev, Ukraine),
- B.Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine – ILTPE (Kharkov,Ukraine),
- Institute of Physics of Azerbaijan National Academy of Sciences – IP ANAS (Baku, Azerbaijan),
- L.N. Gumilyov Eurasian National University – ENU (Astana, Kazakhstan),
- National university of Mongolia – NUM (Ulaanbaatar, Mongolia),
- School of Information and Communication Technology of Mongolian University of Science and Technology – SICT of MUST (Ulaanbaatar, Mongolia).

Most of these trainings included a hands-on tutorials on how to deploy a set of gLite services to

setup a grid site. For that purpose a set of virtual machines are installed and each of trainees get a bunch of them with root access what are used to deploy a gLite services of local grid site as a part of t-infrastructure.

Upon return to their home organization, trained administrators are able to deploy a local grid site and integrate it into one of the global grid infrastructures if it matches a certain requirements in internet connectivity, computational and storage resources, ability to provide a required rate of reliability and availability. If the grid site does not match at least one of the requirements mentioned above and hence can not be a part of global grid infrastructure, then it can be integrated into the t-infrastructure what does not have any of such demands.

So for the moment the grid sites of BITP, KPI, ILTPE and ENU have already integrated into gLite-based t-infrastructure which schema of the current state is shown on Figure 1. There is ongoing work in the grid site deployment at NUM and IP ANAS.

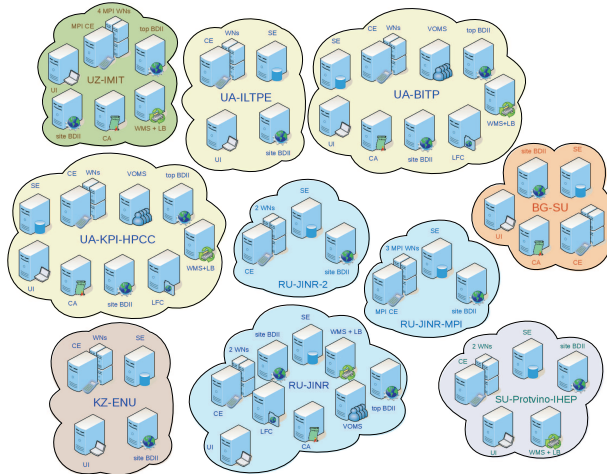


Figure 1: The schema of the gLite-based distributed training and testing grid infrastructure

Currently this gLite based t-infrastructure consists of the grid sites and services listed in Table 1.

Apart from trainings for system administrators, an introduction lectures and courses for participants of different international schools from the JINR

Table 1: The List of the gLite based t-infrastructure services and hosting organizations

site name	hosting organization	services
RU-JINR	JINR	User Interface (UI), LCG Computing Element (LCG-CE) with two Worker Nodes (WNs), Disk Pool Manager Storage Element (DPM SE), LCG File Catalogue (LFC), Workload Management System (WMS), Logging&Bookkeeping Service (LB), site BDII (sBDII), top BDII (tBDII), Virtual organizations management service (VOMS)
RU-JINR-2	JINR	LCG-CE + 2 WNs, DPM SE, sBDII
RU-JINR-MPI	JINR	MPI enabled LCG-CE + 3 WNs, MPI enabled CREAM based CE + 3 WNs, DPM SE, sBDII
BG-SU	Sofia University "St. Kliment Ohridski", Sofia, Bulgaria	UI, LCG-CE + 4WNs, DPM SE, sBDII
SU-Protvink-IHEP	Institute of High-Energy Physics, Protvino, Moscow region, Russia	UI, LCG-CE + 2 WNs, dCache SE, WMS, LB, sBDII
UZ-IMIT	Institute of Mathematics and Information technologies of Academy of Science of Republic of Uzbekistan, Tashkent, Uzbekistan	UI, MPI enabled LCG-CE + 4 WNs, WMS, LB, sBDII, tBDII
UA-BITP	Bogolyubov Institute for Theoretical Physics, Kiev, Ukraine	UI, LCG-CE + 8 WNs, DPM SE, LFC, WMS, LB, sBDII, tBDII
UA-KPI-HPCC	National Technical University of Ukraine "Kyiv Polytechnic Institute", Kiev, Ukraine	UI, LCG-CE + 8 WNs, DPM SE, LFC, WMS, LB, sBDII, tBDII
KZ-ENU	L.N. Gumilyov Eurasian National University, Astana, Kazakhstan	UI, CREAM + 4 WNs, sBDII, DPM SE
UA-ILTPE	B.Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Kharkov, Ukraine	UI, CREAM + 2 WNs, sBDII

member states are held as well (for more information see [3]).

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References

- [1] Korenkov V.V., Kutovskiy N.A. "Distributed training and testing Grid infrastructure" // Proceedings of the 4rd International conference "Distributed Computing and Grid-Technologies in Science and Education" (GRID'2010), Dubna, 2010. P.148-152.
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- [3] <http://gridedu.jinr.ru>