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PLGrid PLUS: Toward Domain-Specific Infrastructure for Supporting International Research Collaboration

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Description of the Work

The main objective of the PLGrid PLUS project is to increase potential of the Polish Science by providing the necessary IT services for research teams in Poland, in line with European solutions.

The presentation will outline the current status of the basic IT infrastructure and plans for the future –federated, domain-specific solutions of the extended PL-Grid platform.

These domain-specific solutions will be created for 12 groups of users, representing the strategic areas and important topics of the Polish and international science: Astrophysics, High Energy Physics, Nanotechnologies, Acoustics, Life Science, Ecology, Synchrotron Radiation, Power Systems, Bioinformatics, Health, Materials Science and Chemistry.

Specific tasks of PLGrid PLUS that will be developed in domain grids are highly diverse and include:

- provision of the appropriate, specialized software and platforms enabling its effective use (e.g. in chemical science, nanotechnology, material science, or energetics),
- mechanisms to ensure computing facilities and data storage for important scientific experiments (e.g. Synchrotron, experiments related to the Large Hadron Collider and Astrophysics),
- development of specific new platforms and integration of new types of tools so that they can be useful in study of important aspects of social life (including support for medical diagnostics, environmental studies, research related to the spread of noise or computational chemistry).

To accomplish these tasks, the project relies on a broad cooperation with representatives of various disciplines, often grouped in domain consortia. Direct cooperation with them guarantees matching of computing, software, databases and storage services to actual needs.

The new services, planned to be developed within PLGrid PLUS, will provide a significant extension of the Polish computing infrastructure, which has been built since 2008 within the PL-Grid project.

Conclusions

The presented project fits well with the need of the development of the advanced IT infrastructure designed for the implementation of modern scientific research, and providing Polish academic units with capability for collaboration with international research organizations. Consortium members and cooperating research units have the necessary skills both in the operation of infrastructure and its use in research, while international cooperation provides contemporary solutions and their innovative character. Organizational experience of all project partners allows for high scores of realization of the Project aims.

Pilot introduction of 12 domain grids opens the scope of use of the Project results by various research communities. However, the scope is not limited to the selected domains. By using the developed general services and experience in building the domain ones, the integration of new groups will proceed smoothly and at lower cost.

Impact

Current technologies enable integration of computing resources, data storage systems, unique scientific instruments, applications and databases. An important factor is the virtualization of resources and adoption of methodology of Service Oriented Architecture (SOA), whereby it becomes possible to create a system of services for e-Science. The current level of development of the computing infrastructure in Poland, will result in creation of a universal, well tuned, production platform at the national level.

At the international level there are many ongoing projects supporting computing infrastructures for e-Science. One example is the EGI-InSPIRE one, therefore the PLGrid PLUS project has been elaborated in such a way that it is consistent finally with the assumptions of the pan-European structure, which development is coordinated by the EGI.eu organization.

At the creation of the concept and during subsequent stages of development of the Polish computing infrastructure, one can take advantage of many experiences on both, the organization of projects and technical solutions adopted. The primary objective of such infrastructure should be to provide the scientific community with unified computing services enabling implementation of the e-Science model in various fields of science.

This will be achieved within the PLGrid PLUS project through the actions like:

- extending and maintaining the computing infrastructure fully compatible and interoperable with worldwide solutions,
- provision of a common infrastructure for the development of domain grids,
- the use and promotion of standards for generic and domain services,
- integration, testing, assembly and installation the software from leading Polish and international projects in the PLGrid PLUS infrastructure.

Overview (For the conference guide)

The e-infrastructure requirements of the scientific community working on Big Science problems are highly diversified and depend on the scientific field. To harmoniously support, in terms of IT, both, the development of scientific research in the various problem areas and researchers, it is necessary to fit the characteristics of the IT infrastructure to problems being the subject of research. Preparation of specific computing environments – so called domain grids – i.e., solutions, services and extended infrastructure (including software), tailored to the needs of different groups of scientists, is the most important task implemented within the 3-year project “PLGrid PLUS: Polish Roadmap toward Domain-Specific Infrastructure for Supporting Computational Science in European Research Area”. The project, funded by the European Regional Development Fund under the Innovative Economy Program, is being carried out by the PL-Grid (Polish NGI) Consortium, coordinated by the ACC Cyfronet AGH.

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