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Integration, sharing and exploitation of national and international e-Infrastructures

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Overview

The DEGISCO infrastructure support project inherited a production-level and hybrid distributed computing infrastructure (DCI) from the successfully completed EDGeS project based on a generic grid-to-grid bridging technology.

The main aim of DEGISCO is the further extension and exploitation of the DCI in terms of

- involved service, desktop, and volunteer grids,
- ported applications,
- supported user communities,
- number of volunteers.

The work is in progress with several achievements in strong collaboration worldwide with several ICPC partners, such as Russian Federation, China, and Brazil.

The operated DCI consists of more than 150.000 PCs from more than 15 global volunteer and local Desktop Grids, which have been connected to gLite based European VOs from EGI and SEE-GRID, and recently from national infrastructures, e.g. Russian Data-Intensive Grid and TWGRID. More than 25 applications have been ported to the combined DCI using the EADM application development methodology.

Impact

The project supports the creation of new Desktop Grids in ICPC (International Cooperation Partner Countries) countries and the connection of these Grids to European DCIs and existing Service Grids in ICPC countries by employing 3G Bridge technology.

Moreover, building on the solid expertise of the DEGISCO partners, the project provides recommendations on best practices and define joint roadmaps for ICPC countries and Europe. Thus, the presented work reinforces the global relevance and impact of European distributed infrastructures.

The well-established application related activities of DEGISCO help use the already more than two dozen ported applications on new connected DCI's in ICPC countries and support new applications.

The dissemination and training activities promote via various channels the interoperation between Desktop Grid and Service Grid infrastructures on a global scale, which leads to more awareness under the general public of computational science and distributed computing co-funded by the EC. As a result more citizens, students, and companies are expected to donate resources to scientific purposes.

Description of the work

Traditional Desktop Grids consist of computers and other devices, including desktop PCs and notebooks that are used for general purposes but having unused computational (CPU/GPU) and storage capacities.

These DCIs can be formed inside institutes and universities (local Desktop Grids) or by citizens that voluntarily donate spare computing time to science (volunteer Desktop Grids). Both types of Grids collect large number of underutilized resources and can offer them for scientific applications and users.

To be more useful for researchers, Desktop Grids have been integrated into scientific workflows on a regular basis; the elaborated generic bridge between Desktop Grids and traditional service Grids together with the appropriate application development methodology and transparent access mechanisms/tools foster the convergence of distributed computing infrastructures.

The recently launched DEGISCO project transfers the knowledge concerning this combined DCI towards new communities by supporting the creation, integration, and operation of new Desktop Grids for e-Science worldwide.

As the result of the current activities; the project members provide best practices and well-organized assistance in application porting, as well as trainings about the Grid and its usage.

Several popular and generic applications are already available: e.g. Autodock, Blender, MOPAC, or ISDEP, but several new applications have been ported as well, e.g. for solving optimizations problems.

In order to enhance further the exploitation of the infrastructure, DEGISCO is searching potential new applications and users that benefit of the research infrastructure. For the newcomers the International Desktop Grid Federation (IDGF) can provide efficient help; IDGF has been set-up to exchange experience about the usage of Desktop Grid technology, to expand scientific infrastructures, and in order to bring together Grid operators, application developers, and other key players.

URL

http://www.degisco.eu
http://desktopgridfederation.org

Conclusions

The presented efforts of DEGISCO project show the feasible ways and best practices of exploitation of the nationally and internationally integrated service/desktop/volunteer DCI particularly from the application developers'and users'point of view. In order to broaden the existing user communities, which are particularly from various areas of bioscience and physics, several steps have been performed; best practices and enhanced support services are provided by the project, and the application developers and users can join and benefit from the International Desktop Grid Federation.

In case of DEGISCO project the role of ported applications is extremely crucial and two-folded; new generic applications with high social impact would attract both volunteers (more resource providers for the infrastructure) and scientists (more users with more research results). Therefore, the key element of the exploitation plan in DEGISCO is to reach and keep these potential communities.

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