Title:EGEE

The European Union Flagship e-Science Project

The Enabling Grids for E-sciencE (EGEE) is the flagship Grid infrastructure project of the EU. The project brings together experts from over 32 countries with the aim of integrating current national and regional Grid programs. Building on the WLCG infrastructure and the middleware (gLite), EGEE extends Grid technology to applications from various scientific fields. In response to the growing global demand for scientific research, the project provides researchers in academia and industry with a common market of computing resources, enabling universal, consistent, round-the-clock access to Grid services and e-Science application areas.

EGEE began work by concentrating on three core areas:
- Building a reliable, robust and secure Grid network that will attract additional computing resources.

- Improving and maintaining the middleware, specifically intended to be used by many different scientific disciplines.

-Attracting new users from science and industry, and ensure they receive the high standard of training and support they need.

Funded by the European Commission, the EGEE project community has been divided into 12 partner federations, consisting of over 100 contractors and non-contracting participants from a wide range of scientific and industrial application areas. The work being carried out in EGEE is organized into 3 subprojects with 11 activities in total. Each activity has performed specific tasks that help facilitate the operation of the large-scale international collaboration project.

From April of 2002 to March of 2004, the first phase project (EGEE I) involved partners from 179 sites in 39 countries worldwide. Expanding from two scientific fields, high energy physics and life sciences, EGEE has integrated grid applications from many other scientific fields, such as high energy physics, biomedicine, earth sciences, computational chemistry, astronomy and physics. During the first phase, the EGEE grid combined more than 17,000 CPU and 5 Petabytes of storage available to over 800 users, which made EGEE the world’s largest multi-disciplinary grid infrastructure. Through a uniform access mechanism and user interface, EGEE not only comprised a computational workload that greatly exceeded what any single institution or country can offer, but also provided a wide-ranging distributed computational environment where scientific collaborative research was able to be conducted and shared across user communities, independent of their geographical locations. The outstanding success of the first EGEE has proven the significant contribution from the large Grid system to applications in specific scientific fields, which serves as a basis for attracting a greater research community of users. EGEE, while expanding its scope to include more application environments, has continued to capitalize on the accumulated experiences of various scientific domains operating the EGEE Grid system.

The second phase project (EGEE II) started in April 2006, with a refocus on establishing a multi-disciplinary grid infrastructure in support of a wider variety of application fields, and on increasing collaboration among all industry partners. The EGEE’s consistent and effective grid infrastructure helps integrate individual service grids used by various research fields, with a goal of promoting the development of a universal computational platform for global grid resources. In order to facilitate international cooperation, EGEE has strived to expand the global grid environment

by extending its services to America and the Asia-Pacific region. The present EGEE II development framework includes:

Networking Activities, NA

 NA1: Overall management of the project.

 NA2: Information Dissemination and Outreach, including tasks such as running the external website, organizing conferences and managing the distribution of publications.

 NA3: User Training and Induction, including tasks such as organizing on-site training and producing training and course material.

 NA4: Application Identification and Support, including tasks such as supporting applications and identifying new users.

 NA5: Policy and International Cooperation, including tasks such as liaising with parties interested in the EGEE project on an international level.

Service Activities, SA

 SA1: European Grid Support, Operation and Management, including tasks such as grid monitoring and control, resource and user support.

 SA2: Networking Support, including tasks such as policies and service level agreements.

 SA3: Integration, Testing and Certification.

Joint Research Activities, JRA

 JRA1: Middleware Re-engineering, including tasks such as re-engineering existing middleware, integrating middleware, testing and validation.

 JRA2: Quality Assurance, including tasks such as ensuring that processes, products and operation services conform to project requirements, standards and procedures. TWGrid

In order to build the next-generation of information technology infrastructure, and keep up with the world’s leading academic research, TWGrid continues to actively participate in the global Grid project. Since 2002, Academia Sinica Grid Computing (ASGC) has taken part in the world’s largest high energy physics LCG project (LHC Computing Grid), and was invited in December 2005 to become the major Regional Operation Centre (ROC) in Asia and the Global Grid User Support (GGUS). Taiwan, under the endorsement of its technological position and capabilities from the international organizations, has maintained good cooperation with EGEE on a global scale. The common task is to deploy the global Grid throughout Europe, America, and Asia, and provide monitoring and technical support. Recently, Taiwan has formally participated in the EGEE II project and taken on the position as the Asia Pacific Federation coordinator. Acting as the bridge between the EGEE project and the Asia-Pacific region, ASGC has facilitated the participation of Asia-Pacific countries in global Grid infrastructure and collaboration between e-Science domains.

Since the start of EGEE II, ASGC has played its role dutifully as the chief coordinator for the

Asia-Pacific region, and participated in a great number of activities including:

I. Engaging in the coordination of e-Science efforts in the Asia-Pacific region for EGEE to promote regional cooperation and resource integration, and increase the participation of research communities around Asia in the project through ASGC’s international network.

 A.To assist in information dissemination and user training, ASGC has promoted the deployment of e-science infrastructure and the cooperation among various fields of application in the Asia-Pacific region.

 B.To boost the pragmatic development of e-science applications, ASGC has coordinated regional and international collaboration. Coordination efforts include conducting the second phase of trial simulation of potential drug components against the avian flu using the Grid infrastructure, promoting related applications concerning the long-term preservation of digital archives, and developing application tools to lower the threshold for integration.

II. Participating in various EGEE II activities

 A.Middleware Reengineering (JRA1):EGEE uses the global Grid, WLCG, as a major e-science infrastructure. Therefore, conducting research and development activities of WLCG middleware is essential to forming part of the EGEE core team. At present, ASGC has already participated in the research and development of core middleware (e.g. gLite, ARDA). One of ASGC’s current tasks is to collaborate with Swiss and Italian research teams in reengineering and developing gLite and ARDA, in order to achieve greater applicability, standardization, and consistency of the middleware required by multi-disciplinary grid applications. Another task is to join the testing and validation work concerning the next-generation middleware by carrying out the projects such as researching and developing the standardization and application of the acquisition interface for distributed heterogeneous information, integrating the heterogeneous mass storage and management systems, facilitating integration of Grid systems and information sharing, and establishing the global test bed.

 B. Grid Infrastructure and Service Support, Operation and Management (SA1):Since 2004, Academia Sinica Grid Computing has acted as the Core Infrastructure Centre (CIC) and the Regional Operation Centre (ROC) to assist the other Asian countries (Japan, China, Korea, India, Pakistan, Singapore, New Zealand, and Australia) in the operation and management of the global Grid infrastructure and its application environment. In addition, ASGC and the CIC/ROC based in Europe and America have monitored the global Grid system in rotation, providing services such as informing local system administrators of any malfunctions detected by different monitoring systems and suggesting possible remedies. The other services include:

  1.Evaluating the newly-developed middleware and set up the test bed, including tasks such as organizing a set of systematic working procedures that can lead the EGEE system administrators or the other interested parties to complete system establishment soon.

 2.Supporting the research units in upgrading to the latest version of the EGEE system.

 3.Guiding the initiate scientific research units to complete a series of function testing.

 4.Coordinating and managing the security of grid operations in the Asia-Pacific region.

C. Networking Support (SA2):The focus of this area is on setting up the web application environment required by EGEE collaboratively, integrating GEANT with the domestic academic networks of the involved parties, and attending to the individual application requirements of other fields by referring to the uniform quality regulations of operation and management. Taiwan is heavily involved in the operation of academic networks in the Asia-Pacific region. In order to fulfill the missions given by the WLCG Tier-1 Centre and the EGEE around Asia, it is important to have robust worldwide Internet connections for Taiwan to participate substantially in the global e-science research and oversee the cooperation and support activities in the region. These regional missions can also be used as a basis for strengthening our collaboration with the international academic backbone networks, thus increasing more opportunities for international cooperation through the global network.

D. Grid Integration, Testing, and Certification (SA3): Beginning in 2002, ASGC has been participating in the integration testing and validation work for the WLCG system. This area is directly related to the success of subsequent induction of grid systems and services, and their consistency and applicability. The tasks involved have enabled ASGC to fully understand the technical details and development of each system component, the knowledge of which can help facilitate the induction of systems and the expansion of applications in other scientific fields.

E.Development of Application Fields (NA4):One of the goals of EGEE II is to further develop existing grid technology as to create a genuine e-science platform worldwide. Three years ago, ASGC introduced WLCG e-infrastructure as the new research and application framework, and since then has extended its grid and e-science application to the other research fields. The current collaboration work has involved efforts from Atmospheric Sciences (National Central University, National Taiwan University, National Taiwan Normal University), Digital Archives (e.g. in-house researches in Academia Sinica, National Digital Archives Program), Earthquakes (Institute of Earth Sciences in Academia Sinica), Geo-Grid (The Centre for Remote Sensing in National Cheng Kung University), and Astronomy (National Central University, University of Hawaii, the Astronomy Observatory in Hawaii). To accommodate the project, ASCG will continuously apply related programs to fields such as high energy physics, life sciences, earth sciences, astrophysics, computational chemistry, and fusion. Therefore, the project has invited the Institute of Biomedical Sciences in Academia Sinica, National Yang Ming University, and Taipei Medical University to participate in the EGEE II. The tasks in this area focus on the information analysis of individual fields, the common management of large databases and application interfaces, the long-term information preservation, the infrastructure for system integration, and the participation in integration research, development, and testing.

F. Information Dissemination and Outreach (NA2)ï¼šFor EGEE II, Taiwan has been appointed as the Asia Pacific Federation Coordinator. The goal is to coordinate and integrate local application requirements, foster regional cooperation and support infrastructure establishment. On the one hand, the primary job is to provide the region with the e-science application environment through various means and virtual organizations mechanism, and with need analysis and client services. On the other hand, through regular meetings, ASGC coordinates various aspects of regional e-science development, such as the information sharing patterns, the standards of infrastructure, cooperation and allocation mechanism for application development, the priority order for support services. Based on the schedules made by the European Union and the EGEE Project Office, ASGC reports the project results periodically in grid-related academic conferences in the Asia-Pacific region and around the world.

G. User Training and Induction (NA3):Because the Grid is the requisite infrastructure for e-science development, the project offers various training courses and workshops on grid-related technology

outside the country, while the domestic training is carried out through co-hosting seminars on grid technology with universities in the country and conducting educational training sessions, with the purpose of developing the grid applications that correspond to the domestic requirements.

III. Promoting Domestic Participation, Results Sharing, and User Training:

 A. Provide user training and result sharing activities for the domestic industries and academia in hope of increasing both grid applications and participation in e-infrastructure projects.

 B. Participating in conferences of EGEE actively where the grid development results and cooperation achievements in our country and the Asia-Pacific region can be publicized.

 C. Sending project staff to the quarters of EGEE (CERN) to attend the activities mentioned above, and to serve as a liaison between our country and EGEE.

Currently, Taiwan has risen to a position of prominence in the global Grid development. Taiwan continues to devote efforts to developing related application programs, with the aim of meeting rising demand of global multi-disciplinary scientific research. One of our achievements was the computational simulation of drug components against the variant of the avian flu virus. Originally held by ASGC and the Genomics Research Center (GRC) of Academia Sinica, this simulation was conducted in April 2006 through the cooperation with the French and Italian research teams with EGEE. In this project, Europe used over 2,000 computers to produce a computational load equivalent to 137 CPU years in 4 weeks. This project not only gained global media coverage, but also became the world’s largest collaboration project on international drug design simulation, as well as an important collaboration case in biomedicine that used the most amount of CPU through the grid computing platform.

The efforts made by TWGrid in recent years have helped bring about the establishment of good communication channels among countries, worked out new cooperation patterns for academia to connect with the European Union and the world, and enhanced its own international status. Owing to its job responsibilities concerning the latest global Grid technological development, the deployment of systems, and infrastructure establishment and services, TWGrid will be able to use these grid-related experiences to offer more advanced services to high energy physics and the other scientific fields in the country.   Website
-EGEE: http://public.eu-egee.org

-EGEEII: http://www.eu-egee.org