Grid4All
democratize the grid

NEWSLetter

Editorial

Grid4All, an IST project launched in June 2006, embraces the vision of a 'democratic' Grid as a utility whereby domestic users, small organisations and enterprises may draw on resources on the Internet without having to individually invest and manage computing and IT resources.

Internet and its services are central to European life — at work and at home, in all situations. Peer-to-peer services such as file sharing are highly popular, even considered as a powerful incentive to purchasing broadband access subscription. The next logical step is to securely extend personal computing capacity through the **managed** sharing of IT resources over the Internet.

Grid4All will help to bring global computing to the broader society beyond that of academic institutions and large enterprises by providing an opportunity to small organisations and individuals to reap the cost benefit of resource sharing without, however, the burdens of management, security, and administration.

This will enable Grid services to evolve from high-performance computing niche markets to a multipurpose service for anybody to access or propose IT resources. To this end, Grid4all tackles the issue of operating virtual marketplaces where computing resources and in general any Grid service may be traded.

Democratic grids: the Grid4all approach

We address grids for collaborative and on-demand computing in the Internet, where communities appear in an ad-hoc way. The objectives are therefore to foster take-up for a Grid technology in society by reducing the complexity of Grid-based systems. Four aspects are crucial:

- societal behaviours with churn and high volatility,
- address non-professional users, that is, ease management and administration,
- need to offer appropriate incentives to make the system spread and thrive,
- support different styles of collaboration.

To address these aspects, Grid4all will develop/apply specific methods:

- Churn and volatility: ad-hoc, dynamic collaborative and social networks are built using self-configuring overlay services.
- Non-professional users: minimise manual intervention through an autonomic and self-managing middleware. We use the well known component model Fractal to implement self-managing services and applications.
- Incentives: pricing-based allocation of resources and services in an open marketplace.
- Collaboration and in particular address access to shared and mutable data in a volatile environment.

G4A: Use scenarios and applications

The *first scenario* targets **small institutions** and focuses on the use of distributed computing and educational resources within an aggregated virtual e-learning environment. Consider a virtual university (there is no physical room) operating higher-learning courses for working network engineers. The classroom execution may use resources brought in by the university and also from external providers. Computational resources on which students run applications such as network simulation software or play/edit documents may be leased and multimedia contents may be provided by partners (technical libraries, research institutions, industrial teaching partners) of the virtual classroom.

The *second scenario* addresses **domestic users**. Home movies are becoming popular. Encoding movies from a native to MPEG-4 format in a reasonable time requires computational power that may not be available at home. This need could be satisfied through the leased usage of idle computational and storage resources on the Internet in exchange for a small payment. Conversely, the same user should be able profitably to provide his/her idling resources. We use market mechanisms to achieve fair resource sharing among users where the prices of resources are decided by balancing demand and supply.

Both scenarios illustrate similar aspects: the need for ad-hoc and democratic grids, autonomic configuration and management and on-demand computing in a volatile environment.

CONSORTIUM

The project is being developed by a consortium of 8 institutions (stated below) from four countries (France, Greece, Spain and Sweden), and providing atypical expertise (component architecture, structured overlay, data consistency and conflict management etc.) within many grid projects. This fresh approach should bring innovations in Grids particularly for large-scale and dynamic-community grids.

FT- France Telecom (France)

Leading Research & Development centre in Europe in the telecom sector, France Telecom Research & Development is one of France Telecom's assets for its worldwide strategy of expansion and consolidation in all major markets of the telecom sector.

I.N.R.I.A. - Institut National de Recherche en Informatique et en Automatique (France)

The national institute for research in computer science and control, operating under the joint authority of the Ministries of Research and of Industry, is dedicated to fundamental and applied research in information and communication science and technology (ICST).

K.T.H. – The Royal Institute of Technology (Sweden)

KTH conducts top-notch education and research of a broad spectrum - from natural science to all branches of technology, including architecture, industrial economics, urban planning, work science and environmental technology.

KTH is responsible for one third of Sweden's capacity for engineering studies and technical research at post-secondary level.

S.I.C.S – Swedish Institute of Computer Science (Sweden)

The Swedish Institute of Computer Science (SICS) is an independent non-profit research organization. The mission of SICS is to contribute to the competitive strength of Swedish industry by conducting advanced and focused research in strategic areas of computer science, and to actively promote the use of new research ideas and results in industry and in society at large.

I.C.C.S - Institute of Communication and Computer Systems (Greece)

The National Technical Univ. of Athens (NTUA) is the leading and most prestigious Technical University in Greece. The Institute of Communication and Computer Systems (ICCS) is a Research Institute (private law body) associated with the School of Electrical and Computer Engineering (SECE) of the National Technical University of Athens.

U.P.R.C. - University of Piraeus Research Center (Greece)

The University of Piraeus Research Center (UPRC) has as its primary purpose to meet the needs of enterprises and organizations of the private and public sector on subjects concerning designing, programming and effective control of net-centric systems with the aim of improving their efficiency and development.

UPC – Universitat Politècnica de Catalunya (Spain)

The Technical University of Catalonia (UPC) was created in 1971 to teach and do research on science and engineering. The Computer Architecture Department (DAC) is doing research and lecturing on computer structure and organization, computer architecture, operating systems, communication networks, computer evaluation and VLSI design.

Antares (Spain)

A company specialized in the development of communication and training solutions. Antares offers a wide range of self-developed applications and a multidisciplinary team of professionals, covering from content creation to design, development and production of communicational and learning objects.