



## Europe-China Grid InterNetworking: innovative work promising a more efficient Grid

Europe and China join their forces in research activities for Grid computing infrastructure optimizations, namely the network layer. **EC-GIN** (Europe-China Grid InterNetworking, <http://www.ec-gin.eu>) is one of the very first research projects co-founded by the E.U. under the Framework Programme 6 (FP6) which puts Europe and China together to work on improving the network ability to better support Grid applications and services.

The Internet communication infrastructure (the so-called TCP/IP protocol stack) is designed for broad use; as such, it does not take the specific characteristics of Grid applications into account. This one-size-fits-all approach works for a number of application domains, however, it is far from being optimal. Thus, it cannot be as efficient as customized solutions. While the Grid and its services are slowly emerging, its network infrastructure is still in its infancy.

The **EC-GIN** project, based on a number of properties that make Grids unique from the network perspective, aims at developing a tailored network technology in dedicated support of Grid applications. These technical solutions will be supplemented with a secure and incentive-based Grid Services network traffic management system, which will balance the conflicting performance demand and the economic use of resources in the network and within the Grid.

Technically, **EC-GIN** will make Grids work, operate, and communicate better. By appropriately utilizing the underlying network, Grid resources in general will be used more efficiently and amplify the impact of Grid computing on the society and economy of Europe and China.

The duration of the project is 36 months (November 2006 - October 2009)

## EC-GIN Outcomes

EC-GIN will work towards achieving the four major objectives above; along the way, a number of tangible outcomes will be produced. The four most significant ones are:

1. Mathematical models for generating Grid-like traffic in network simulators, and Grid traffic generation code for the "ns-2" network simulator.
2. Prototype implementations of network management enhancements for the Grid along with performance evaluation reports.
3. A well-focused implementation of key mechanisms developed in the project; this will take the form of an extension to an open source operating system such as Linux.
4. Improved research collaborations between China and Europe in GRID computing.

EC-GIN identifies and fills a research gap; it will parallel previous efforts that were made in the domain of real-time multimedia applications, where many network enhancements have been proposed, standardised and deployed. The intention is not to replace a protocol such as TCP, but to enrich the TCP/IP protocol stack with new functionalities. While such enrichment has already taken place for multimedia applications, with protocols like RTP, RTCP, SIP and DCCP (among many others) that were added to the standard, no such enhancements exist for Grid applications – they will be developed in EC-GIN. The research gap and the step that will be taken in this project is illustrated in the following figure.

