GRIDECON

Scope

The concept of computer Grids is based on the principle of sharing computing resources. Utilising Grid technology, Small-and-Medium-sized Enterprises (SMEs) can access resources that would otherwise only be available to larger organisations. Achieving the "Green IT" objective and rising energy costs are additional incentives to use computer Grids. However, despite these obvious benefits, there has been no widespread exploitation of computing Grids.

Gridecon is a project that not only explores the perceived economic barriers to the adoption of Grid Computing but also suggests a technology to overcome these issues. Gridecon technology makes the concept of utility computing Grids (i.e. sharing of computing resources between all computer owners) realizable.

Utilising the Gridecon technology, commoditized computing resources can be traded on a market place, which allows any company to sell their virtualized, commoditized computing resources. Since a large number of companies is expected to participate in the market place, each market participant has a low market power. The low market power of the participant ensures that the price for utility computing resources remains highly competitive. It will be below the price of the current market price for utility computing resources, which is determined by a few players (HP, IBM, SUN, Amazon, Google, and Microsoft).

The Gridecon technology will break this oligopoly market structure. It makes the access to utility computing resources affordable for everyone. The possibility of selling computing resources at competitive market price allows any company (especially, SMEs) to sell their unutilized computing resources, therefore, reducing their cost for computing resources. Assuming that the price for selling spare capacity on the market place equals the price for owning resources, any company can seamlessly increase and decrease their capacity of computing resources to its actual demand.

Advances

Based on extensive business and economic modelling performed by Gridecon, the Gridecon Testbed has been developed. The Gridecon Testbed allows testing and validation of behaviours of different market mechanisms (i.e. algorithms for matching user requests for computational power and provider offerings) and different economic-enhanced, value-added services. Within the testbed, the interaction between those value-added services and the market place can also be investigated.

Based on these services, new business models (i.e. a combination of the value-added services) can be tested. The basic services that the Gridecon Testbed provides are services for insuring failure of computing resources (performed by the insurance broker), services for managing the risk of fluctuating market prices of computing resources (performed by the risk broker), services for monitoring the execution of trades, and services for planning the computing resource purchases on the Grid and from hardware vendors (performed by the capacity planner).

In particular, Gridecon delivers a specific solution for trading commoditized computing resources. The solution is based on a market place that runs a unique market mechanism for matching asks and bids for computing resources. The value-added services on top of the market place help buyers to trade risk, insure themselves against failure of resources, and make economically efficient IT capacity planning decisions.

Positioning in global context

The Gridecon technology potentially facilitates access to the world's largest pool of computing resources while also providing competition to the leading utility computing providers. For the very first time in history, it enables Europe to become a worldwide player for providing computing resources (besides the USA-based companies of HP, IBM, SUN, Amazon, Google, and Microsoft).

Contribution to standardization and interoperability issues

While embracing existing standards during the development work performed within the Gridecon project (Web Services), we also communicate our own findings to the relevant standards bodies and organizations to ensure interoperability and advance the development of standards. In particular, we interact with the Open Grid Forum (OGF) for standardizing the negotiation of contracts (Service Level Agreements).

Target users / sectors in business and society

The specifications and software that have been developed within Gridecon are intended for entities that want to become service providers. Those entities can become market place providers, risk brokers, insurance brokers, and capacity planners.

The Gridecon Testbed, which is an application of the Gridecon software, can be used for potential service providers to test their economic-enhanced services and their interactions with other value-added services.

Overall benefits for business and society

The Gridecon marketplace has a significant advantage over existing utility computing services in that it allows companies not only to buy computing resources on a per-usage basis, but also to **sell spare computing resource on a per usage basis**. Therefore, it is possible for companies possessing "little computing power" to compete with large utility computing service providers. Another advantage of the Gridecon marketplace is the possibility of **reselling utility computing resources** that have been purchased earlier. SMEs can buy resources on the market for a longer time period and resell those resources that are not needed at a short time scale.

Examples of use

The business scenario comprises a group of SMEs that want to share their computing resources in an economically efficient way. If a particular SME is not fully utilising their own internal computing resources, the SME offers them on the market place. In times of higher internal demand, the same SME goes to the marketplace for Grid resources in order to buy the required capacity. Examples of such SMEs are IT companies that sell software services on a per-usage basis or animation production companies.

In order to enable this exchange of computing resources, a market place provider comes into life that is owned by all SMEs. The market place provider offers the following services:

- Manages the SMEs' free pool of resources using smart virtualization technology;
- Classifies the resources offered in terms of quality (type), using services for performance measurement;
- Offers SME computing services in a transparent way using a simple interface;
- Hides details on where their jobs run;
- Uses redundancy to offer reliability in case some resource providers turns to dishonour their commitment;
- Introduces extra resources to ensure a fluid market at times where demand is not matched by supply;
- Offers price-quoting services for customers that do not like uncertainty.

However, it is anticipated that in the fullness of time new business models will be defined around the Gridecon value-added services, complementary existing services. The entities, which run these services, might act as brokers to other companies.

Achievements

So far, **Economic models** for analyzing Grid markets have been developed and analyzed. A draft document about the specification of the **GRIDECON market place** and the value-added services has also been generated. Finally, a first prototype of the **Gridecon Testbed** (software, documentation, and validation) is available.