Using a Practical Architecture to Prosper Grid Development

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Abstract

The proliferation of grid application in society is a good way to prosper grid development just like the experience of Internet development. Current grid application is only improvement of general distributed system, rather than a real social infrastructure. In this poster we propose a practical architecture for building a real social infrastructure with grid technology. This architecture can attract more grid constructors and users because we believe profit-driven is a huge motivity.

1. Introduction

There are many grid instances in the world today [1], but most of them are in the laboratories and some organizations, in other words, not open to any users. In other ways most grid instances are special purpose oriented rather than general purpose oriented. Therefore the current grid application can not be used by most people. Referred to the experience of Internet development, it is necessary to improve the usability of grid computing, which is crucial for any new technology.

The success of Internet originates from its profit pattern and good usability. Grid middleware is helpful for building a grid but for profit pattern and usability. We introduce a practical architecture for building such a grid. There are two aspects in our architecture: first, giving the grid a good profit pattern to attract people to construct and use grid; second, containing as far as possible more types of grid services to make a general purpose grid.

2. Architecture

There are some basic terms within our architecture, which are listed below:

- Registered resource provider: the resource provider registering in a grid service provider.
- Free resource provider: the resource provider does not register permanently in any grid service provider and can choose arbitrarily the time and which grid service provider to register in.
- Grid service provider (GSP): provide users the services it can support and encapsulate the resource into various kinds of grid services.
- Registered user: the user registering in a grid service provider.
- Free user: the user does not register permanently in any grid service provider and can choose arbitrarily which grid service provider to use.
- Primary market: the market for user, resource provider, and grid service provider. There are two kinds of trades: the trade between user and grid service; the trade between resource provide and grid service. This market is a local service.
- Secondary market: the market for the trade among grid service providers. This market is a distributed service.

The main body of our architecture consists of GSPs. We can look a GSP as a cell. Users pay for the use of one or more services provided by GSP. GSP buys the access right of shared resources provided by resource providers. If any resource is accepted by GSP, it will be encapsulated into a grid service. The three parts of the primary market can make their own price policies, for example users select one or more services in terms of the ratio of performance to price from service pool through broker, and meanwhile GSP can sell its services to the user with highest payment. Broker collects eligible resources for user request firstly from local service pool, and if there are no eligible resources or user can not afford all the prices of resources in local service pool, broker will look for eligible

resources from the secondary market. The agent of secondary market in a GSP is either a vendor or a vendee in the secondary market. The agent buys and sells on behalf of GSP with the only one objective, profit. Thus GSPs can make profit by offering services for users, and resource providers can benefit from sharing parts of resources with GSPs. What mentioned above is shown in Figure 1.

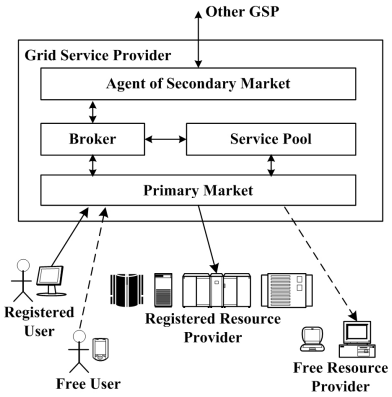

Figure 1: Architecture of GSP

GSPs are connected with networks. GSPs scattering over the world can contain enough services, no matter classes of services or performance of services. Virtual Organization (VO) can be composed of one or more services in one GSP or more. The secondary market and the communication among GSPs need some protocols and management. We believe some nonprofit organizations, such as GGF and IEEE, will take charge of this in the future. What mentioned above is shown in Figure 2.

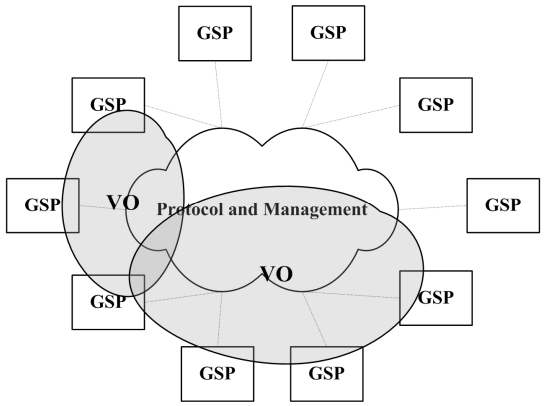

Figure 2: Relationship among GSPs

Currently we have enough knowledge and technologies to realize this architecture. Globus [2, 3] provides the toolkit to enable resource into grid service. WWG [4] provides the experience of building a grid across the whole world. Economic-based grid [5] provides the scheme to build simulated market for grid.

Certainly there is a long way to achieve our ideal grid. How to improve and integrate the current technologies and how to build such a grid is our current research. We think a communication company or an Internet service provider is suitable to act as a GSP. According to our survey most resource owners want to make profit on their idle resources, only if security is guaranteed. Don't worry about users, if there are enough services and tempting prices.

3. Conclusion

In this poster we propose a practical grid architecture, which can proliferate easily and support several profit patterns. We believe our grid architecture can abstract more grid constructors, resource owners, and users. This will prosper grid development in the future just like the history of Internet.

4. References

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