Chapter 8.3
Scenarios of Next Generation Grid Applications in Collaborative Environments:
A Business–Technical Analysis

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ABSTRACT

The Grid has the potential to make a significant advance beyond the Internet, by turning it from a passive information medium into an active tool for creating and exploring new knowledge. Nowadays, this potential is becoming a reality and is emerging to Next Generation Grids (NGG) thanks to the far more cost-effective and universally applicable technology. Taking into consideration that Grids started delivering benefits to their adopters, this book chapter focuses on providing a business–technical presentation of two potential NGG applications, from two competitive and highly dynamic markets, including complex collaborations, which have shown rapid growth over the past decades; the supply chain management and the Cargo Transportation Logistics. The authors present a set of NGG components, the adoption of which in the aforementioned application domains addresses efficiently a set of technical issues ranging from performance to dynamic negotiation, and tackle the main trends and challenges in the corresponding business sectors.

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INTRODUCTION

Although initially designed to cover the needs of computational-intensive applications (Foster, Kesselman, & Tuecke, 2001; Leinberger & Kumar, 1999), Grid technology of nowadays aims at providing an infrastructure that can also service the needs of the business domain. Advanced infrastructure requirements combined with the innate business goals for lower costs and higher income are driving key business sectors such as multimedia, engineering, gaming, environmental science, among others towards adopting Grid solutions into their business. The various entities in the value chains pose different requirements with each one benefiting in a different way. Software vendors and solution integrators need to proceed with the "gridification" of their current applications so that the integration of them in Grid environments is feasible. Service providers pose strict requirements ranging from manageability to accounting and billing. The final success of this business orientation of Grid technology however will primarily depend on its real adopters; the end users who demand transparency, reliability, security and easiness-to-use. Especially in the case of business collaboration systems, the main focus of all parties involved in the collaboration is on lowering the costs and automating and standardizing communication as well as making the upgrade and maintenance processes less complex.

This shift from Science Grids to Business Grids resulted in advanced requirements in Service Level Agreement (SLA) management, data management, Grid portals (as interfaces) and Virtual Organizations (VO) management among others combined with re-prioritization of the non-functional requirements of the systems with security, reliability and scalability climbing the higher stairs in the hierarchy.

In the meanwhile, collaborative business processes nowadays are still being conducted through traditional means of communication such as fax, phone and e-mail. Even strategic partners with a significant market share and a complex network of partners rely on these means for a part of their transactions. And although electronic communication methods offer some form of automation and have proven to comprise much faster and cheaper ways for information exchange, they still require manual processes on both ends and they are far from providing automated and standardised communication among partners. In fact they suffer from a number of problems including human errors in manual entry of information, information loss, delayed information exchange, complex or limited information sharing, high cost of infrastructure (especially when offering improved reliability through replication mechanisms and supporting duplicate systems and providing security and complex collaborations) and the great effort required to integrate their internal systems to existing solutions.

The vision of Next Generation Grids (NGG) is mainly the development of an infrastructure for enabling new businesses and offering new business opportunities and new ways of work and collaboration through the support of three important business needs posed by the globalization of the world markets; agility, flexibility and robustness (Next Generation GRIDs Expert Group, 2006). More specifically, NGG focuses on delivering an economically viable and efficient infrastructure which will offer the commercially effective use of resources to participating organisations, simplicity of access to and use of Grid technologies and underlying Quality of Service (QoS) mechanisms (Tserpes, Kyriazis, Menychtas, & Varvarigou, 2008) and the levels of security and privacy required for confidence boosting. The aforementioned mechanisms are expected to allow the wider adoption of the proposed infrastructure both to the business and industry world as well as to the government domain, the consumers and the public.

Following the evolution in the Grid domain and the current approaches in NGG, as it is presented in this chapter the adoption of Grid solutions in