

Chapter 7.12

Adopting the Grid Computing & Semantic Web Hybrid for Global Knowledge Sharing

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ABSTRACT

The purpose of this chapter is to examine the requirements of Knowledge Management (KM) services deployment in a Semantic Grid environment. A wide range of literature on Grid Computing, Semantic Web, and KM have been reviewed, related, and interpreted. The benefits of the Semantic Web and the Grid Computing convergence have been investigated, enumerated and related to KM principles in a complete service model. Although the Grid Computing model significantly contributed to the shared resources, most of KM tools obstacles within the grid are to be resolved at the semantic and cultural levels more than at the physical or logical grid levels. The early results from academia, where grid computing still in testing phase, show a synergy and the potentiality of leveraging knowledge, especially from voluminous data, at a wider scale. However, the plethora of information produced in this environment will result in a serious information overload, unless proper standardization, automated relations, syndication, and validation techniques are developed.

DOI: 10.4018/978-1-4666-0879-5.ch7.12

INTRODUCTION

Grid Computing is a significant transformation in the global computing which is expected to bring unprecedented benefits on leveraging of Knowledge Management (KM) processes and procedures to globalized levels. The essences of grid physical network are to continuously speed information flow through improved processing, storage, discovery, retrieval, acquisition, and sharing within expansive colossal social networks. Grid Computing synchronizes computer resource sharing and effective deployment, which help in faster assimilation, representation, and mobilization of knowledge. Grid Computing has shown a notable success, however, this success is still limited to scientists and researchers in the e-Science community. Consequently, this early implementation of the Grid Computing focuses on computational capabilities and pattern recognition, but very little has been achieved in the enterprise ecosystem relations and federated databases for sharing knowledge. As a result, the relationship between Grid Computing concepts and KM principles is still blurred. For instance, it is not obvious how Grid Computing can amalgamate collaborative machine semantics with human cognitive activities. The clarification of such complex relationship may qualify this intergalactic network to minimize difficulties in transferring tacit knowledge across communities for creating authentic global business ecosystem.

GRID COMPUTING

In its historical progression computer network ameliorate to emulate social networks overtime. The mainframe, then client/server and presently the Grid Computing came as a result of this developmental succession. Cabbly (2004) reports that “IBM defines Grid Computing as a standards based application/resource sharing architecture that makes it possible for heterogeneous systems

and applications to share, compute and storage resources transparently”. Unlike traditional client-server architecture, Grid Computing activates dormant micro-processing power to perform parallel processes, and utilize massive storage facilities around the globe. However, constructing such network as its predecessor client/server is not trouble-free. De Roure et al. (2003) report that the traditional client-server model can be a performance bottleneck and a single point of failure, but it is still prevalent, because decentralization brings its own benefits.

To mitigate the risk of global operations catastrophes during climax computing demand, the grid offers better performance load balancing and fault tolerance through failover on a massive scale. The processing and storage determination is not required prior to the disaster, because they are inherently available in the system. The main benefits of Grid Computing for many companies will be the ability to integrate systems and to dynamically allocate resources, and manage risk. In addition, Grid Computing improves Return-On-Investment (ROI) through maximizing the performance/cost ratio and minimizing the Total Cost of Ownership (TCO). In conclusion, these features result in solving problems in less time with less cost and through using the exact same computing machinery, but with more power that is dynamically added.

SEMANTIC WEB

Berners-Lee (2001) the pre-eminent thinker of the Internet world, state that Semantic Web is not a separate Web, but an extension of the current one, in which information is given well-defined meaning, better enabling computers, and people to work in cooperation. In view of that, Daconta et al. (2003) report that Tim Berners-Lee has a two-part vision for the future of the Web. The first part is to make the Web a more collaborative medium. The second part is to make the

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