World Applied Sciences Journal 21 (3): 351-359, 2013
ISSN 1818-4952

DOI: 10.5829/idosi.wasj.2013.21.3.2698

Knowledge-Based Scheduling Resource into Grid System by Second-Price Auctions with Best Response Dynamics

[1]Seyedeh Yasaman Rashida and [2]Hamidreza Navidi

[1]Department of Computer Engineering, Shirgah Branch,
Islamic Azad University, Shirgah, Mazandaran, Iran
[2]Department of Mathematics, Shahed University, Tehran, Iran

Abstract: In recent years, grid computing systems have become popular for the resolution of large-scale complex problems in science, engineering and industry. In order that grid computing focus on scalability of high system and also on large-scale resource sharing, an effcient resource management system is crucial for the efficacy of the system. However, providing effective scheduling and resource allocation mechanisms in grid is a complex undertaking due to their scale and the fact that resource owners and consumers may have different goals, preferences and policies. This paper proposed a knowledge-based scheduler that unifies the advantages of the systems for benefiting both consumers and owners. The scheduler is able to infer for defining resource behavior and managing them in an autonomic manner using management policies and Best Response Dynamics approach. The inference ability helps to make decision about happened status accurately and maps jobs to suitable distributed resources using Second-Price Sealed Auction with common valuations. Here we present inference model for our scheduler. The approach outperforms other scheduling schemes in optimizing incentives for both consumers and providers, leading to highly successful job execution and fair profit allocation.

Key words: Inference • Utility • Grid Computing • Second-Price Sealed Auction • Best Response Dynamics • Bayesian

INTRODUCTION

With the rapid development of networking technology, grid computing [1], which enables large scale resource sharing and collaboration, has emerged as a promising distributed computing paradigm. In a grid environment, resources are dynamic, autonomous, heterogeneous and wide area distributed. Due to these unique characteristics, resource scheduling in grid systems is significantly complicated and particularly challenging.

A considerable amount of work has been devoted to tackling the problem of scheduling for grid computing. Unfortunately, the majority of the previous work [2-9] has focused on optimization with respect to systemcentric or applicationcentric performance metrics. In grid systems, resources belong to respective administrative domains and every domain has full control over usage of their own resources.

Recently a few research projects [2, 7] have taken profit into account and applied economic methods in grid resource scheduling. As viewed from economics, there are two parties in grid systems: resource provider and resource consumer. It is individual economic behavior of all the participants that accomplishes the resource scheduling. Most related research projects share the common problem that their scheduling only considers the performance objectives for resource consumers, such as shorter response time or less payment, but neglects the performance objectives for the other important party in the market. Actually, resource providers also have their expectation of benefits. Once their expectation fails to be realized, they may quit the market. To build a practical grid, it is important to guarantee every participant with enough incentive to stay and play in it.

Since Matching demand to supply is one of the key features of smart grid infrastructure, researchers have been investigating the usefulness of game theory in

Corresponding Author: Seyedeh Yasaman Rashida, Department of Computer Engineering, Shirgah Branch, Islamic Azad University, Shirgah, Mazandaran, Iran.