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Proposed Model for Resource Management Using Auction Oriented Approach

Surbhi Sangwan

Department of CSE, UIET, MDU Rohtak, Haryana, India
surbhisangwan@gmail.com

Abstract
Grids are emerging as the infrastructure for next generation computing. In Grid environments, the resources are heterogeneous and geographically distributed with varying availability and a variety of usage and cost policies for diverse users at different times and, priorities as well as goals that vary with time. The management of resources in such a large and distributed environment is a complex task. In this paper a model has been proposed using auction oriented approach. This auction model allows bidders to bid on various attributes beyond the price. The auctioneer selects winners based on the price as well as on other attributes. Thus, the overall utility of a deal for the buyer must consider not only the price of the auctioning item, but also a combination of the different attributes. This model has also been implemented.
Keywords: *Grid computing, Resource management, Economic models, Auction Models and Proposed Model.*

1. Introduction

Grids are a form of distributed computing whereby a "super virtual computer" is composed of many networked loosely coupled computers acting together to perform very large tasks.

As defined by Ian Foster and Carl Kesselman [6]
"A computational grid is a hardware and software infrastructure that provides dependable, consistent, pervasive, and inexpensive access to high-end computational capabilities"

Grid computing is the federation of computer resources from multiple administrative domains to reach a common goal. The grid can be thought of as a distributed system with non-interactive workloads that involve a large number of files. What distinguishes grid computing from conventional high performance computing systems such as cluster computing is that grids tend to be more loosely coupled, heterogeneous, and geographically dispersed. Although a single grid can be dedicated to a particular application, commonly a grid is used for a variety of purposes. Grids are often constructed with general - purpose grid middleware software libraries [11].

Grid size varies a considerable amount. Grids are a form of distributed computing whereby a "super virtual computer" is composed of many networked loosely coupled computers acting together to perform large tasks. For certain applications, "distributed" or "grid" computing, can be seen as a special type of parallel computing that relies on complete computers (with onboard CPUs, storage, power supplies, network interfaces, etc.) connected to a network (private, public or the Internet) by a conventional network interface, such as Ethernet.

Grid Resource Management means identifying application requirements, resource specification, matching resources to applications, allocating/scheduling and monitoring those resources and applications over time in order to run as effectively as possible.
The auction model supports one-to-many negotiation, between a service provider (seller) and many consumers (buyers), and reduces negotiation to a single value (i.e., price). The auctioneer sets the rules of auction, acceptable for the consumers and the providers. Auctions basically use market forces to negotiate a clearing price for the service.[9] [10].
Most of the related work in Grid computing dedicated to resource management and scheduling problems adopt a conventional style where a scheduling component decides which jobs are to be executed at which site based on certain cost functions (Legion [3], Condor [8], AppLeS [1],Netsolve [2], Punch [7]).

Depending on various parameters, auctions can be classified into four types:
1. English Auction (first-price open cry)[5]
2. First-price sealed-bid auction
3. Dutch Auction [4]
4. Continuous Double Auction

This proposed auction model allows bidders to bid on various attributes beyond the price. This is basically an auction model. The auctioneer selects winners based on the price as well as on those various attributes. Thus, the overall utility of a deal for the buyer must consider not only the price of the auctioning item, but also a combination of the different attributes. This difference is a major change from the traditional basic auction

mechanisms which negotiate only on price. This model can be used in electronic procurement environments. A buyer first has to define his preference for certain goods in terms of various attributes in a form of a utility. The buyer has to reveal her utility to suppliers. A supplier should bid based on this. The mechanism selects the supplier who produces the highest overall utility for the buyer (i.e., the bidder who best fulfils the buyer's preferences).

2. Comparison of Existing and Proposed Auction Model

Proposed Auction Model 1 play a very important role in our economy:

(i) They are widely used in industry procurement

(ii) Many markets for services are organized in a form reminiscent of private multi-attribute auctions.

(iii) Recently many Internet- based markets adopted this structure.

Proposed Auctions Model 1 differs from standard low price auctions in that:-

(a) A buyer chooses a winner on the basis of several indicators instead of taking only a price quote into account.

(b) The exact weighting scheme that is used to determine the winner is not announced.

3. Implementation of Proposed Auction Model

Algorithm used:

- This Auction allows bidders to bid on various attributes beyond the price.
- The overall utility of a deal for the buyer must consider a combination of the different attributes.
- The generic procedures for Proposed Auction 1 is :

1. A buyer first defines her preference for certain goods in terms of various attributes as a utility function.
2. The buyer reveals her utility function to suppliers.
3. A supplier bids based on this utility function.
4. The mechanism selects the bidder who best fulfills the buyer's preferences.

Table for Proposed Auction Model

Attributes	Buyer 1	Buyer 2	Buyer 3
Price Minimal acceptable value-100 Weightage-25	120	111	**110**
Employee Strength Minimal acceptable value-100 Weightage-25	101	103	**200**
Location Minimal acceptable value-5 Weightage-25	6	7	**34**
Quality Minimal acceptable value-4 Weightage-25	5	6	**21**

4. Evaluations Results of Proposed Auction Model

The experiment considers a Proposed Auction Model. In this there are four attributes,eg- Price, Employee Strength , Location and Quality. For each attribute minimum acceptable value and weightage are given. The three buyers are buyer 1, buyer 2 and buyer 3.For each buyer bid for each attribute has been asked. The buyer 3 is the winner in the table shown below.

Proposed Auction Model:
Table for Proposed Auction Model 1

Attributes	Buyer 1	Buyer 2	Buyer 3
Price Minimal acceptable value-100 Weightage-25	120	111	**110**
Employee Strength Minimal acceptable	101	103	**200**

value-100 Weightage-25			
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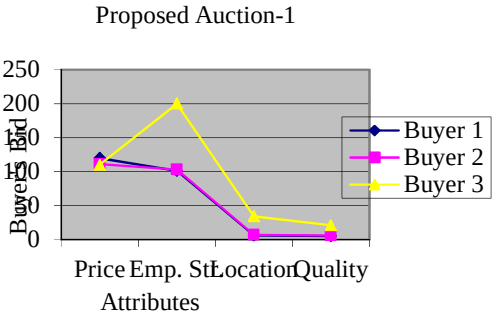
Quality Minimal acceptable value-4 Weightage-25	5	6	**21**

According to this table,graph has been plotted for this Auction.



5. Conclusion and future work

Proposed Auction Model 1 allows bidders to bid on various attributes beyond the price. The auctioneer selects winners based on the price as well as on those various attributes. Thus, the overall utility of a deal for the buyer must consider not only the price of the auctioning item, but also a combination of the different attributes.

In the future, it is possible to develop agents that can automatically choose one out of a set of auction protocols according to the requirements of the Grid environment.

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