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Research Article

Resources Centralization System for Grid Resources

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Abstract: The increasing expansion of communications that is characterized by quality and availability led to interest on grid computing paradigm. The grid computing solves large-scale scientific problems, by providing the feature of sharing and selecting of various resources accessibility and utility. These resources solve intensive problems by increasing the computation and storage power. This study focuses on system with centralized resources for managing the grid resources. The proposed idea will create a resource list, which includes the resource history that will help the user to search for resources. The proposal resources list system will improve the resource serving by showing the most resources used and will save the time search time for the job request, by these points we will improve the quality of the user jobs execution and the quality type of the used resources.

Keywords: Centralized resources, grid computation, grid resources, resources management system

INTRODUCTION

Grid is a collaborative problem solving environment, its jobs can be submitted and executed by the available resources that exist in the environment. It is an important way to transparently harness distributed computing power to meet the demands of computation-intensive applications, it consists of multiple parallel computing systems, which represent computing sites, different institutions, or separated geographically. Grid computing provides different resources management systems. In contrast, distributed computing manages resources within a single administrative domain. It can interconnect and share a massive computing resources, aggregated from a number of computing sites and distributed them over a wide area network (Internet), it allows a high participate with many computing sites (Rashida *et al*., 2010, Shu, 2007).

Grid computing can be used in variety ways to address kinds of application requirements. Often, grids are categorized by solutions that are best addressed with. As shown in Fig. 1 the Clubby Analytics categorizes the grids into many types. Looking at another example, Sun Microsystems has classified it into three types, based on the geographical dispersion of the servers. The IBM's has three types of the grids and most researchers seem to prefer to define girds loosely into two types (Muhsen, 2012).

The problem of allocating resources in grid environment is a challenge and it is unsolved problem in many studies. The key question is how quickly to identify and reserve resources specified by the users? And how to balance workloads among all computing sites? Motivation by these problems we have introduced a resources list system to centralize the resources that been provided by many organizations for users at Internet. The proposal resources list system will improve the resource serving by showing the most resources used and will save the time search time for the job request, by these points we will improve the quality of the user jobs execution and the quality type of the used resources.

LITERATURE REVIEW

Grid computing holds many topics for the researchers such as resource management, job scheduling, security problems, information management and others. Finding resources is an important action at the grid system. Using the right resources will lead to the success of the grid systems. Searching for these resources are a time consuming for the users which will decrease the performance of the system. Several methods proposed a solving way for this discovery; Deniz *et al*. in Cokuslu *et al*. (2010) and Hameurlain *et al*. (2008) have classified these methods into three main categories, as shown in Fig. 2.

Shu (2007), designs a model to solve the problem of optimal allocating resource to maximize the grid service reliability. He certifies that his model is to find a near optimal solution but it may not guarantee the optimum every time. The model has a good convergence rate and the initial population is mostly surrounding the average value or in equivalence often

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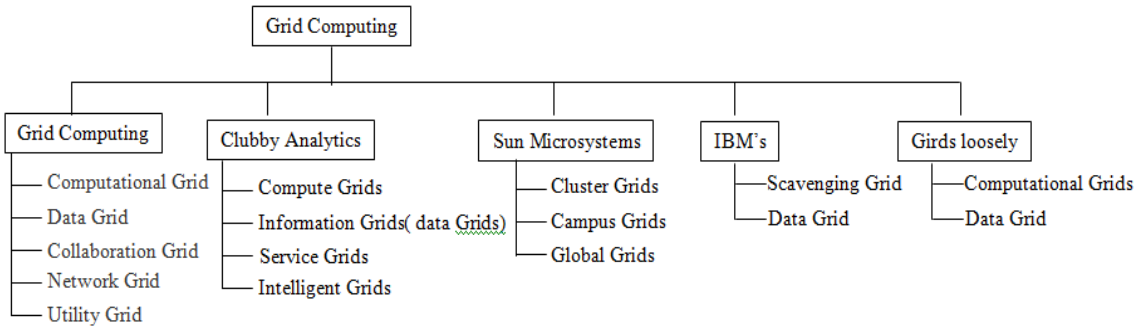

Fig. 1: Grid computing classification (Farzi, 2009)

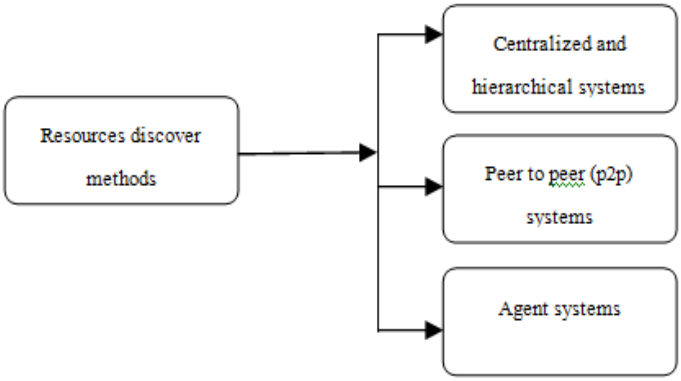

Fig. 2: Resources discover methods classification

near the best solution out of all experiment that been done at the model. He concludes that the resources in grid computing were load balancing with the optimal model.

Job scheduling is a fundamental issue in achieving high performance at the grid, however it's a big challenge for efficient scheduling algorithm in design and implementation. The following researches Farzi (2009), Miyagi *et al*. (2007), Khanli *et al*. (2010a), Lopez and Kasmir (2009), Zhang *et al*. (2011), Dai and Wang (2005) and Khanli *et al*. (2010b) have studied and introduced many algorithms to solve the problems of allocating resources which are unsolved problems. They try to solve the problem by quickly finding the resources and identifying resources and also how to balance workloads among all computing sites.

The efficiency of grid resources had been studied by Rashida *et al*. (2010), they have proposed an algorithm to give solution to ensure the end-to-end QoS. Their work aims to minimize make-span and decreases the number of missed task, but this algorithm doesn't always move directly towards to a solution with better function directly.

METHODS OF GRID RESOURCES

The computational grids enable sharing services, selection and aggregation of geographically distributed computational resources and present them as a single unified resource. This single unified resource will solve a large-scale compute such as computationally intensive scientific, mathematical and academic problems through volunteer computing. It also contributed in the field of commercial enterprises applications such as drug discovery, molecular modeling for drug design, brain activity analysis, high energy physics, economic forecasting, seismic analysis and back office data processing in support for e-commerce and Web services. The idea of this environment comes from the electric power network where power generators are distributed, but the users do not know the source of energy and its location. Development and advancement of this technology can be provided by the site of Grid Computing Information Centre, which aims to promote the seamless and scalable access to wide-area distributed resources (http://www.gridcomputing .com).

Grid computing concerned with working in the virtual organizations to coordinate the resources sharing. It also concerned with the problem of allocating organizations resources, which are shared under locally defined policies. The locally policies specify what is shared, who is allowed to access what and under what conditions? (Miyagi *et al*., 2007; Dai and Wang, 2005).

Grid provides the user jobs with many types of resources, these types could be computers, supercomputers, mainframe, memories, instruments

(such as telescope), cluster, cpu-hours, bandwidth, software applications, workstations, networks, databases, compute clusters, storage systems, data sources, instruments, people and data. Dai and Wang (2005) and Shu (2007) present the challenges that face the resources in this environment as follow:

- Grid does not enforce absolute control over resources or the resource management.
- Divergent organizational administrative policies.
- User does not know where the resources are or even who own the resources.
- Multiple applications may require numerous resources which often are not available for them.
- In the computational grid resources are vastness and separation.

Resources guide centralization system: The outlook of the proposed Resources Centralization System (RCS) is illustrated in Fig. 3. The RCS has three components: job, Resources List (RL) and grid resources. First the job is submitted by the user to the system and then the RL is arranged and created during the process. The information of gird resources are saved and allocated at RL at each submission process. Each user will submit his jobs to RCS to find if he could be served by the available resources that been allocated in RL.

The system started with receiving a job from the user, the job will find different offers to execute the job and then the job will be submitted to the selected resources which based on the best offer to improve

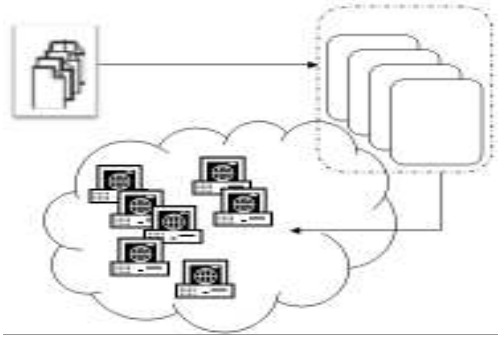

Fig. 3: Resource list guide for the grid resources

resource and user benefit. The information history that been saved in RL, will help in saving time and reducing the selection probability of the resources with less fault occurrence resources and this will lead to a resources reliability and user satisfaction.

Figure 4 describes the required steps for serving one user job. RCS started by the user searching process for a resource. The specific user job will be submitted and checked for any available information resources that exist at RL. If the job find a resource it will be allocated for this job and RL will save the information about this job with its resource used. If the resource is found but was been used by another job, the new job will be waited in a resource queue to be served later. If the requested resources are not found at LR the RCS will save the information of this resource to be searched for it. The main features of the LR structure and the description of each feature are explained in Table 1.

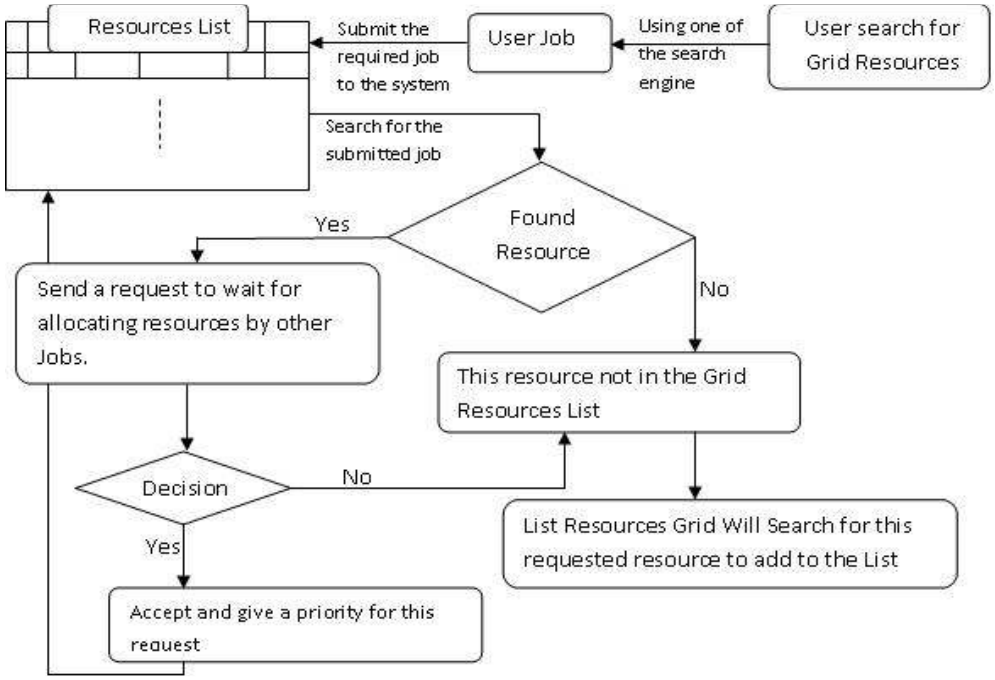

Fig. 4: Job access at the resources list

Table 1: Resources list information

Resources features	Description
ID	This field will content the types of the resources and the identification number for each one.
Organization information	Fees, site, company, will be saved at this field.
Queue	For each resource there will be a queue to save the waited job sequences.
Request priority	An indicator to which resources has a high request.
Used	A pointer to show if this resource is in used or not.
Time	It is a dynamitic feature to indicate the time execution for using this resource.

RESULTS AND CONCLUSION

The availability and the performance of resources are unpredictable in large scale grid system and are difficult if not impossible; however, the RCS will have the responsibility to find these resources. RCS aims are to guarantee the quality of service of a job's execution; it also allows many computing sites to participate. It will provide the grid environment to identify and reserve resources and balance the workloads among all computing sites. It will also provide features of sharing and selection of accessibility and utilization of various resources.

Searching for resources is a time-consuming and this will decrease the performance of any system, so for this the proposed idea tries to solve this problem of searching resources by introducing a resources management. RL will help in the problem of requesting a resource at a specific time which is a challenge criterion for many grid users. RL will improve the resource serving; it also will show the most used resources. With these features we will improve the quality of the time execution of user jobs and the types of the used resources.

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