Grid Computing - An Overview

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Abstract: This paper presents about the grid computing technology. It deals with its prime advantage and disadvantage in the field of computer technology. It also gives some of the common difference between the grid computer and conventional super computers, evolution of the grid computing and its types.

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I. INTRODUCTION

Grid Computing is a technology which is used to solve a single large problem by using several computers. A technical problem which requires a great number of data access or computer processing is processed with the help of grid computing. It is a form of distributed computing [3]. A very large task can be performed by a cluster of networked loosely coupled computers like super and virtual computers.

II. EVOLUTION OF GRIDS

Grid computing has evolved from the following systems:

- The parallel processing systems of the 1970.
- The large-scale cluster computing systems of the 1980.
- The distributed processing systems of the 1990.

Grid computing can make a more cost-effective use of computer resources. It can be applied to solve problems that requires large amount of computing power of uses a software to divide a program into many sub-programs among several computers, sometimes up to many thousands for their execution the computing resource are not administered centrally open standards are used.

III. TYPES OF GRIDS

Grids are categorized into three types. They are:

- Departmental grids.
- Enterprise grids.
- Global grids.

A departmental grid refers to the usage of computer resources within a single group that is an engineering department connecting desktop machines, clusters, and equipment within that department.

Enterprise grids are the progression of departmental grids. Here, the computing resources of non-technical staff can be used for storage and cycle-stealing.

Global grids refers to the combination of departmental and enterprise grids which are used in commercial or collaborative manner.

IV. DIFFERENTS BETWEEN GRID AND SUPER COMPUTER

- Grid computing is a special type of parallel computing which relies on complete computer that is with on board CPU, storage, power supply which is connected to a network by a conventional network interface. Whereas the super computer has many processor connected by a local high-speed computer bus.
- In distributed computing, each node is purchased as commodity hardware. This hardware when combined can produce similar computing resources like multiprocessor super computer but at a lowest cost. [1] This is due to the economies of scale of producing commodity hardware, compared to the lower efficiency of designing and constructing a small number of custom super computers.
- It can be costly and difficult to write programs to run in supercomputer, which has custom operating system and requires the program to address concurrency issues. Whereas it is possible to write and debug the program in the grid infrastructure at lowest cost.[1]

A. Advantages

Grid computing offers several benefits in the field of technology and to meet a set of business requirements. Some of the benefits are as follows;

- Exploiting under the utilized resources: grid computing is used to run an existing application on a different machine. It offers better balance resources utilization.
- Parallel CPU capacity: algorithms are used for splitting the application among many CPUs. A perfectly scalable application is achieved in this.
- It provides an environment for collaboration among a wider audience and it also enables

heterogeneous systems to work together to form a large virtual computing system offering a variety of resources.

- It helps in enforcing security rules and implement policies, which can resolve processing resources and users.[6]
- Grids are also used to access to the other additional resources.
- Grids can offer a resource balancing by scheduling grid jobs on machine with low utilization.
- It uses expensive hardware to increase reliability but at high cost.
- The virtualization of the resources on the grid and uniformly handle heterogeneous systems will create opportunities to better management of larger and more distributed IT infrastructure.[2]

B. Disadvantages

Though the grid computing is a evolved feature, it has some of the drawbacks in it. It has great potential but some features are missing in it.

Immaturity of the grid concept is arising here. The non-defined standards and software is considered as important features in respect with absent features. [5] The biggest disadvantage of grid computing though, concerns processes and their results. More specifically, the results of all processes are sent first on all nodes within the grid, and then collaboratively assessed. The applications that are not suitable for MPI (Message Passing Interface) have to use SMP (Symmetric Multi-Processing) and grid computing relies mainly on dispersed data management. [4] Connectivity errors may occur unexpectedly.

For sensitive projects, it is not possible to make the final outcome before the final assessment is made.

CONCLUSION

The grid computing is an evolving feature which is on its development stage. It is being used by the European countries for nuclear research. Despite of some disadvantages, the grid computing is more beneficial technology for business circle especially for biomedical, industry, financial research, chemistry and medicine.

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