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Grid Computing

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***Abstract*— The Grid has the potential to fundamentally change the way science and engineering are done. Aggregate power of computing resources connected by networks—of the Grid— exceeds that of any single supercomputer by many orders of magnitude. At the same time, our ability to carry out computations of the scale and level of detail required, for example, to study the Universe, or simulate a rocket engine, are severely constrained by available computing power. Hence, such applications should be one of the main driving forces behind the development of Grid computing.**

Grid computing is emerging as a new environment for solving difficult problems. Linear and nonlinear optimization problems can be computationally expensive. The resource access and management is one of the most important key factors for grid computing. It requires a mechanism with automatically making decisions ability to support computing tasks collaborating and scheduling.

Grid computing is an active research area which promises to provide a flexible infrastructure for complex, dynamic and distributed resource sharing and sophisticated problem solving environments. The Grid is not only a low level infrastructure for supporting computation, but can also facilitate and enable information and knowledge sharing at the higher semantic levels, to support knowledge integration and dissemination.

***Keywords*— Grid Computing, Grid Computing Resources ,Advantages of Grid Computing,Disadvantages of Grid computing**

I. INTRODUCTION

The term Grid computing originated in the early 1990 as a metaphor for making computer power as easy to access as an electric power grid in Ian Foster and Carl Kesselmans seminal work, "The Grid: Blueprint for a new computing infrastructure".

The ideas of the grid (including those from distributed computing, object oriented programming, cluster computing, web services and others) were brought together by Ian Foster, Carl Kesselman and Steve Tuecke, widely regarded as the "fathers of the grid".
Grid Computing is a form of distributed computing based on the dynamic sharing of resources between participants, organizations and companies to by combining them, and thereby carrying out intensive computing applications or processing very large amounts of data. Such applications would not be possible within a single body or company. A well-known example of grid computing in the public domain is the ongoing SETI (Search for Extraterrestrial Intelligence) @Home project in which thousands of people are sharing the unused processor cycles of their PCs in the vast search for signs of "rational" signals from outer space.
Grid computing is applying the resources of many computers in a network to a single problem at the same time - usually to a scientific or technical problem that requires a great number of computer processing cycles or access to large amounts of data. Grid computing requires the use of software that can divide and farm out pieces of a program to as many as several thousand computers. Grid computing can be thought of as distributed and large-scale cluster computing and as a form of network-distributed parallel processing.
Grid computing appears to be a promising trend for three reasons:
(1) its ability to make more cost-effective use of a given amount of computer resources, (2) as a way to solve problems that can't be approached without an enormous

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amount of computing power, and (3) because it suggests that the resources of many computers can be cooperatively and perhaps synergistically harnessed and managed as a collaboration toward a common object.

II. Grid Computing Resources

A grid is a collection of machines, sometimes referred to as nodes, resources,Donors, clients, hosts, engines, and many other such terms.They all contribute any combination of resources to the grid as a whole.Some resources may be used by all users of the grid, while others may have specific restrictions.

A. COMPUTATION

The most common resource is computing cycles provided by the processors of the machines on the grid. The processors can vary in speed, architecture, software platform, and other associated factors, such as memory, storage, and connectivity. There are three primary ways to exploit the computation resources of a grid.

B. STORAGE

The second most common resources used in a grid is data storage. A grid providing an integrated view of data storage is sometimes called a data grid. Each machine on the grid usually provides some quantity of storage for grid use, Even if temporary . Storage can be memory attached to the processor or it can be secondary storage, using hard disk drives or other permanent storage media. Memory attached to a processor usually has very fast access but is volatile. It would be used to cache data or to serve as temporary storage for running applications.

C. COMMUNICATION

The rapid growth in communication capacity among machines today makes grid computing practical, compared to the limited bandwidth available when distributed computing was first emerging. Therefore, it should not be a surprise that another important resource of a grid is data communication capacity. This includes communications within the grid and external to the grid.

D. SECURITY

Security requirements are fundamental to the grid design. The basic security components are comprised of mechanisms for Authentication, authorization, and confidentiality of communication between grid computers. Without this functionally, the integrity and confidentiality of the data processed within the grid would be at risk. To properly secure your grid environment, there are many different tools and technologies available,

III. Advantages Of Grid Computation

1. The potential for massive parallel CPU is one of the most attractive features of grid computing. A CPU intensive grid application can be thought of as many smaller sub jobs, each executing on a different machine in the grid. It makes the application more scalable.
2. The additional resources other than CPU and storage can be provided. For example if a user needs to increase their total bandwidth of the internet to implement a data minning search engine, the work can be split among grid macine that have independent connection to the internet.
3. Jobs can be executed in parallel speeding performance. Grid environments are extremely very well useful to run jobs that can br divided in to smaller chunks and run concurrently on many nodes.

IV. Disadvantages Of Grid Computation

1. The CPU and local storage areas do not have high-speed connections.

2. Computers which actually perform calculations might not be trustworthy.
3. Due to the lack of central control over the hardware, there is no way to guarantee that nodes will not drop out of the network at random times.

V. Conclusion

At the end we can say that Grid computing is cooperation of different computers, for a specific purpose, so that the user acquires better performance for that specific task. All computing technologies have their own place so grid systems have a secure future. The developer is doing more efforts to reduce the cost of grid computing and to make them more secure must be increased.

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