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Survey Paper on GRID Computing

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ABSTRACT

In this paper, we studied about the grid computing, benefits and applications of grid computing. Grid computing is still a developing field. Grid computing is used to solve complex problem in a simple manner by sharing resources with each other

Keywords : Grid Computing, Typical View of Grid Computing, Grid Architecture, Advantages and Disadvantages of Grid Computing

I. INTRODUCTION

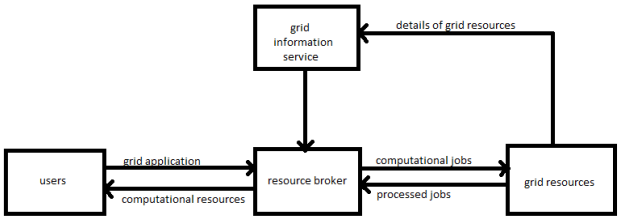
Grid computing is introduced by Ian Foster and Carl Kesselman in 1970. Ian Foster define the grid as ”a system that co-ordinates resources which are not subject to centralised control, using standard, open, general purpose protocols and interfaces to deliver nontrivial qualities of service. Grid computing is a data management type for storing and sharing data. It focus on dynamic, cross virtual organisational resource sharing. In grid computing all computers share their resources with each other. Resources like memory, processing power and data storage etc. It turn computer network into supercomputer by sharing every resource in the network. It works on the principle of pooled resources. It share the load across the multiple computers to complete tasks more efficiently and quickly. It links the computer in a way that someone can use one computer to access and leverage the collected power of all the computers in the system. All grid computing systems are working with a unique set of protocols and tools, and two different systems may not be compatible with each other. Grid computing is applied by NASA’s Information Power grid, National Science Foundation National Technology Grid. A grid computing system requires

1. Atleast one computer usually a server which handles all the administrative duties for the system.
2. A network of computers running special grid computing network software.
3. A collection of computer software called middleware.

In 2002, Ian Foster define a checklist to determine whether the system is grid. A system is grid if it satisfies the following features:

1. Coordinates resources that are not subject to centralised control.
2. Using standard, open, general purpose protocols and interfaces.
3. To deliver non-trivial qualities of service.

Figure 1. Typical View of Grid Computing Environment



i)USER- a user sends computation or data intensive application to global grids in order to s0peed up the execution of the application.

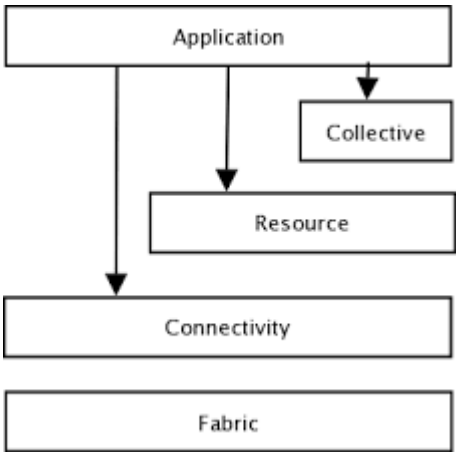
ii)RESOURCE BROKER – a resource broker distributes the jobs in an application to the grid resources based on users quality of server requirements and details of available grid resources.

iii)GRID RESOURCES- grid resources in global grid execute the user jobs. Grid resources can be cluster, personal computer, supercomputer, database, instruments etc).

iv)GRID INFORMATION SERVICE- grid information service system collects the details of the available grid resources and passes the information to the resource broker.

GRID ARCHITECTURE

Grid s provide protocols and services at five different layers. Layers are fabric layer, connectivity layer, resource layer, collective layer and application layer.



FABRIC LAYER- This is the lowest layer of grid architecture. This layer provide access to resources which is shared by controlled grid protocols. Resources may include physical and logical entities such as compute, storage and network resource, code repository etc.

CONNECTIVITY LAYER- This layer defines the core communications and authentication protocols required for grid specific network transactions. These protocols enables the exchange of data between fabric layer resources.

RESOURCE LAYER- This layer define protocols, Application programs interfaces and Software Development kit for secure negotiation, payment of sharing resources, control and monitoring of resource sharing.

COLLECTIVE LAYER-This layer co-ordinates interactions across multiple resources. It coordinates sharing of resources like directory services, co-allocation, scheduling, brokering services, monitoring and diagnostic services, data replication services.

APPLICATION LAYER- This is the top most layer of grid architecture. This consist applications which will be implemented by the user. It provides the interface to the user and the administrative to interact with the grid.

TYPES OF GRID

COMPUTATIONAL GRID- computational grids provide the secure access to the computational resources. It is suitable for high throughput applications and computation intensive computing.

DATA GRID- Data grid provide the support for data storage other than data related services like data recovery, handling and publication.

NETWORK GRID- Network grid provides high performance communication using data caching between there nodes. Each cache nodes acts as a router to speed up the communication.

UTILITY GRID- Utility grid shares CPU cycles, softwares and special peripherals like sensors.

COLLABORATION GRID- Collaboration grid fulfil the desired collaboration by providing network hardware resources and internet services.

USES OF GRID COMPUTING

Grid was primarily used for the scientific work like system designs,data analysis, climate research and so on. Now grids can be used for:

1. High throughput computing
2. Distributed supercomputing
3. Data-intensive computing
4. Utility computing
5. Collaboration within and among organisations
6. Data sharing between various offices and partners

7. Virtual enterprises and virtual markets could be developed easily using grids
8. Providing virtual services
9. To connect and shares heterogeneous distributed resources

Advantages of Grid Computing

1. It can solve large and complex problems in shorter time.
2. Easier to collaborate with other organisations.
3. Make better use of existing hardware.
4. Increased user productivity
5. Jobs can be executed parallely

Disadvantages of Grid Computing

1. Grid software and standards are still evolving
2. Learning curve to get started
3. Non-interactive job submissions
4. Need to have fast interconnect between the computer resources

II. CONCLUSION

In this paper, we have studied about the grid computing. Grid computing is still a developing field. The prime requisite of using grid is high-speed internet. Grid computing is used for climatology, astronomy, biological science, military and much more. There are lot of scope for grid computing.

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