



ROLE OF GRID COMPUTING IN COMPUTATIONAL ENVIRONMENT: AN INTRODUCTION

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Abstract

Grid computing is the ultimate framework that provides a high performance computing environment to meet growing and larger scale computational demands. Resource management and job scheduling are critical tasks in grid computing. Resource selection becomes challenging due to heterogeneity and dynamic availability of resources. This paper gives brief introduction of grid computing and its various applications. The main focus is to awareness in the area of grid computing. Little bit information also given about experimental tool kit like Gridsim.

Keywords: Job Grouping, Resource Scheduling, Grid Computing.

1. INTRODUCTION

Grid computing is the solution of large and complex computational problems. The aspiration to share processing resources between many organizations to resolve large scale problems has provoked computational grids [1]. Aggregation of computational power is the aim of grid computing [2]. A lots of cluters collected together to form Grid Computing. It is a Virtual Organisation. Virtual computing refers to the system having features of choosing a resource in some specific manner and submits job on it. Whereas cluster means more than one node connected to each other either within a cabinet or over a LAN, giving users a single system image [3] and having various important facilities as scalability, high throughput, and high performance. Grid computing facilitates large scale resource sharing resulting in high speed job execution with less cost.

This paper is organized as follows. In section II, Basics of Grid is discussed. Section III,

Describes the Resource and Job scheduling. Section IV provides information about simulation and experimental work with help of GridSim tool kit and lastly references.

II BASIC GRID SYSTEM

Basically Grid computing is used to share resources in heterogeneous environment. It is a network of various computers. In Grid user can share the resources like memory, Bandwidth, Computational power etc. User, Grid portal, Scheduler and GIS are the main parts of Grid environment. If a Single system cannot able to do large task, that time grid can be used for completing the task using the sharing concept of resources. Grid computing environment can complete the task approximate ten times faster than single system.

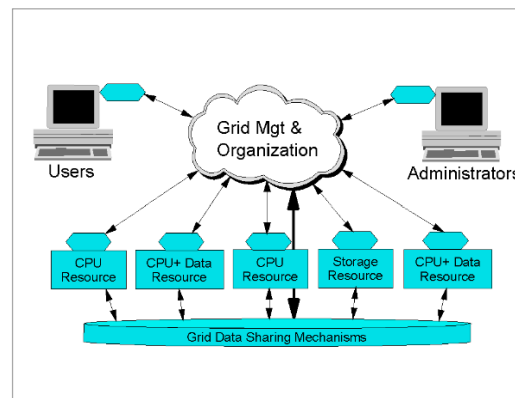


Fig 1: A simple Grid [4]

Grid Applications [4]

1. General application considerations
2. Data considerations
3. CPU-intensive application considerations

Grid Computing Logical Levels[5]:

Cluster Grid:

- Simplest Grid deployment
- Maximum utilization of departmental resources

- Resources allocated based on priorities

Campus Grid:

- Resources shared within the enterprise/organizations
- Gives multiple groups seamless access to enterprise resources

Global Grid:

- Resources shared over the Internet
- Global view of distributed datasets
- Growth path for enterprise Grids

BENEFITS OF GRID COMPUTING

There are various advantages [4] of Grid as :

Access to additional resources: At whatever point there is a need of extra Resources for processing, framework gives the extra one. it appears us Grid, as an expansive accumulation of Resources.

Exploiting under utilized resources: Network registering gathers the computational power from unutilized Resources and utilized them for computational purpose. The Resources which are out of gear state, computational energy of that Resources are utilized as a part of Lattice Processing.

Parallel CPU capacity: In Grid Jobs are executed parallel so it dramatically reduces the total execution time of jobs. Jobs are first distributed in to various available resources and then executed parallel.

Virtual resources and virtual organizations for

Collaboration: In Grid computing environment, Virtual organization indicated the user of the grid. In Grid ,resources can be shared virtually to virtual organization.

Resource balancing: In Grid figuring condition, Virtual association demonstrated the client of the grid. In Grid ,Resources can be shared practically to virtual association. Every Resource should enroll in matrix for handling. Network has data of accessibility of Resources. According to the limit and accessibility of the Resource, Jobs can be conveyed to different Resources.

Reliability: Grid is profoundly solid as far as failure. Jobs in framework can consequently resubmit to different Resources if there is any sort of disappointment occur at one area.

Management: As the Grid figuring condition is heterogeneous condition so better administration is fundamental. Lattice give a superior administration for employments as well as for Resources.

III SCHEDULING IN GRID COMPUTING :

Resource and Job Scheduling are the two main part of Grid environment.

Resource Scheduling: In this resources are selected for the submission of jobs. various factors are considered for resource selection as MIPS, Memory size etc.

Job Scheduling: Job scheduling is another part of Grid where jobs are selected for submitting to resource. Here also various factors considered as file size ,MI bandwidth etc.

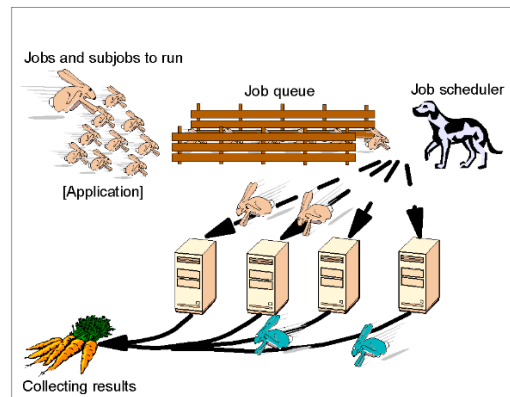


Fig.2: An application is one or more jobs that are scheduled to run on grid[4]

IV. EXPERIMENTAL WORK

Grid Sim tool kit is popularly used for simulation purpose of Grid Computing. The GridSim toolkit allows

Overview of GridSim functionalities[6]:

- incorporates failures of Grid resources during runtime.
- new allocation policy can be made and integrated into the GridSim Toolkit, by extending from AllocPolicy class.
- has the infrastructure or framework to support advance reservation of a grid system.
- incorporates a functionality that reads workload traces taken from supercomputers for simulating a realistic grid environment.
- incorporates an auction model into GridSim.
- incorporates a datagrid extension into GridSim.
- incorporates a network extension into GridSim. Now, resources and other entities can be linked in a network topology.
- incorporates a background network traffic functionality based on a probabilistic distribution. This is useful

for simulating over a public network where the network is congested.

- Incorporates multiple regional Grid Information Service (GIS) entities connected in a network topology. Hence, you can simulate an experiment with multiple Virtual Organizations (VOs).
- adds ant build file to compile Grid Sim source files.

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