ISSN 2277 – 5528
Impact Factor- 4.015

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES &MANAGEMENT

GRID COMPUTATION : A REVIEW

Sushila Ekka*
*Lecturer, CSE Department GWP Ranchi.

ABSTRACT

In today's Internet world everyone prefers to enjoy fast accessto the Internet. Chance are there that the system hangs up or slows down the performance that leads to the restarting of the entire process from the beginning due to multiple downloading. This is one of the serious problems that need attention of the researchers.For fast internet access a layout of proposed grid model has been provided.Depending on the number of systems employed in the Grid easy download of files can be made very fast. The standard Globus Architecture is the onlyGrid Architecture currently used worldwide for developing the Grid.Grid computing, emerging as a new paradigm for next generation computing, enables the sharing, selection, and aggregation of geographically distributed heterogeneous resources for solving large scale problems in science, engineering, and commerce. The resources in the Grid are heterogeneous and geographically distributed. Depending on the particular user, time, priorities and goals varies the availability, usage and cost policies. In such a large scale distributed environment the management of resources and application scheduling is a complex task. It proposes anarchitectural framework that supports resource trading and utility of services based scheduling.

***Keywords**: Introduction of grid computing, characteristics, architecture, types of grid, application of grid computation.*

I. INTRODUCTION

Grid computing is achievement of a common goal by collecting computer resources from multiple locations. The **grid** can be thought of as a distributed system with non-interactive workloads that involve a large number of files. Grid computing is distinguished from conventional high performance computing systems such as cluster computing in that grid computers have each node set to perform a different task/application. Grid computers also tend to be more heterogeneous and geographically dispersed (thus not physically coupled) than cluster computers. Although a single grid can be dedicated to a particular application, commonly a grid is used for a variety of purposes. Grids are often constructed with general-purpose grid middleware software libraries. Grid sizes can be quite large.

A "**super virtual computer**" is composed of numerous networked loosely coupled computers acting together to perform large tasks Grids are a form of distributed computing whereby. For certain applications, distributed or grid computing can be seen as a special type of parallel computing that relies on complete computers (with onboard CPUs, storage, power supplies, network interfaces, etc.) connected to a computer network (private or public) by a conventional network interface, such as Ethernet. This is in contrast to the traditional notion of a supercomputer, which has many processors connected by a local high-speed computer bus.

II. GRID CHARACTERISTICS

Theessential characteristics that a grid is supposed to haveare as follows:

- Large scale: a grid should have the ability to deal with a number of resources ranging from justa few to millions.As the grid size increases it raises a problem of avoiding potential performance degradation.
- Geographical distribution: location of grid should be placed at distance resources.
- Heterogeneity: a grid is host for both software and hardware resources that can be very varied ranging from data, files, software components or programs to sensors, personal digital organizers, display devices, computers, scientific instruments, super-computers and networks.
- Resource sharing: In a grid resourcebelong to various organizations that allow other organizations (i.e. users) to access them. Thus Nonlocal resources can be used by applications, promoting efficiency and reducing costs.

 ISSN 2277 – 5528
Impact Factor- 4.015

- Multiple administrations: each organization may establish different security and administrative policies under which their owned resources can be accessed and used. As a result, the already challenging network security problem is complicated even more with the need of taking into account all different policies.
- Resource coordination: In order to provide aggregated computing capabilities resources must be coordinated in a grid.
- Transparent access: a grid should be seen as a single virtual computer.
- Dependable access: a grid must give the delivery of services assured under established Quality of Service (QoS) requirements. The need for dependable service is fundamental since users require assurances that they will receive predictable, sustained and often high levels of performance.
- Consistent access: a grid must be built with standard services, protocols and inter-faces thus hiding the heterogeneity of the resources while allowing its scalability. Without such standards, application development and pervasive use would not be possible.
- Pervasive access: the grid must grant access to available resources by adapting to a dynamic environment in which resource failure is commonplace. This does not imply that resources are everywhere or universally available but that the grid must tailor its behaviour as to extract the maximum performance from the available re-sources.

III. TYPES OF GRIDS

Grid have been divided into a number of types, on the basis of their use:

Computational Grid: These grids provide secure access to huge pool of shared processing power suitable for high throughput applications and computation intensive computing.

Data Grid: Data grids provide an infrastructure to support data storage, data discovery, data handling, data publication, and data manipulation on large volumes of data actually stored in assorted heterogeneous databases and file systems.

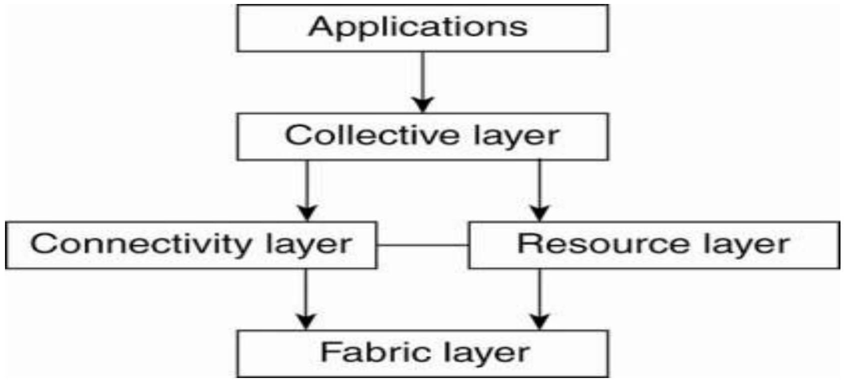
Collaboration Grid: With the advent of Internet, there has been an increased demand for better collaboration. Such advanced collaboration is possible using the grid. For instance, personscan work on different components of a CAD project from different companies in a virtual enterprise without even disclosing their proprietary technologies.

Network Grid: A Network Grid provideshigh-performance communicationand fault-tolerant services. Each grid node works as speed booster in communication by providing a data router between two communication points, data-caching and other facilities.

Utility Grid: This is the ultimate form of the Grid, in which not only data and computation cycles are shared but software or just concerning resource is shared. The main services provided through utility grids are software and special equipments. For instance, the applications can be run on one machine and all the users can send their data to be processed to that machine and receive the result back.

ISSN 2277 – 5528
Impact Factor- 4.015

IV. ARCHITECTURE



The Grid infrastructure as resources may come from different administrative domains, which have bothlocal andglobal resource usage policies, different hardware and software configurations and platforms, and vary in availability and capacity. Grids provide protocols and services at five different layers as identified in the Grid protocol architecture.

- The Application layer comprises whatever user applications built on top of the above protocols and APIs and operate in VO environments.
- The Collective layer captures interactions across collections of resources, directory services such as MDS (Monitoring and Discovery Service) allows for the monitoring and discovery of VO resources, Nimrod-G and Condor-G are examples of co allocating, scheduling and brokering services, and MPICH for Grid enabled programming systems, and CAS (community authorization service) for global resource policies
- Connectivity layer defines easy and secure network transactions for core communication and authentication protocols. The GSI (Grid Security Infrastructure) protocol underlies every Grid transaction.
- The Resource layer defines protocols for the publication, monitoring,negotiation, discovery accounting and payment of sharing operations on individual resources. The GRAM (Grid Resource Access and Management) protocol is used for allocation of computationaland on those resources, and GridFTP for data access and high-speed data transferfor monitoring and control of computationresources.
- At the Fabric layer, Grids provide access to different resource types such as compute, storage and network resource, code repository, etc. Grids usually rely on existing fabric components, for instance, local resource managers. General-purpose components such as GARA (general architecture for advanced reservation) ,and specialized resource management services such as Falkon

V. APPLICATION

An optimized use of resources like, utilizing the CPU cycles which otherwise would have been wasted has been made by grid. With the help of this one can get extra computation resource and thus can process their large-scale computational problems which mean solving a complex problem to the computational level of a supercomputer. A long litany of usages has made from small academic project requirement to scientific laboratories used for extra-terrestrial activity, with this fundamental work scenario of Grid computing. After the four important procedures are performed in a distributed computing system then it is called The Grid. These are the Authorization, Authentication, Resource Access and Resource Discovery. These four vital procedures lead to the idea of Virtual Organizations of collaborators who share resources over a Grid. Above mentioned four procedures are the series of steps too from task submission to the grid and getting task executed over grid. Major benefits which can be utilized by application of grid are the following

- Reduced time of result.
- Optimized utilization of underutilized resources.

- Improved efficiency/reduced costs
- Virtual resources and Virtual Organization (VO)
- Increase capacity and productivity
- Exploiting underutilized resources.
- Resource balancing
- Heterogeneous system support
- Parallel processing capacity

Grid computing provides a way for computation of high data intensive problems like financial modelling, climate/weather modelling, protein folding, image rendering, earthquake simulation, etc. The various domains in which grid computing is utilized are the following:

- **Engineering Design and Automation**: Computational aerodynamics, artificial intelligence and automation, finite-element analyses, remote sensing applications, pattern recognition, computer vision, image processing, etc.
- **Medical, Military and Basic Research:** Polymer chemistry, medical imaging, nuclear weapon design, problem of quantum mechanics, etc.
- **Predictive Modelling and Simulation:** Flood warning, socio-economic and government use, numerical weather forecasting, astrophysics (Modelling of Black holes and Astronomical formations), semiconductor simulation, Oceanography, human genome sequencing, etc.
- **Energy Resource Exploration:** Plasma Fusion power, seismic exploration, nuclear reactor safety, reservoir modelling, etc.
- **Visualization:**computer-generated graphics, films and animations, data visualization, etc.

Grid is becoming a culture among researchers and people in academia changing the way they collaborate to make scientific discoveries

VI. CONCLUSION

So far we have been describing and walking through overview discussion topics on the Grid Computing discipline that will be discussed , including the Grid Computing evolution, the applications, and the infrastructure requirements for any grid environment.In addition to this, we have discussed when one should use Grid Computing disciplines, and the factors developers and providers must consider in the implementation phases. With this introduction we can now explore deeper into the various aspects of a Grid Computing system, its evolution across the industries, and the current architectural efforts underway throughout the world.we have outlined in detail an architecture for an e-learning grid which integrates core grid middleware and functionality appropriately. we have indicated how an e-learning grid could be realized on the basis of suitably designed grid learning objects. Future issues to be studied include, for transactional guarantees for service executions over a grid such as atomicity, redundancy andrecovery that help restore an operational state after a grid failure. In applying knowledge-based techniques to make Grid computing more transparent and accessible has led to interesting results and an encouraging response from the user community.

REFERENCES

1) *Amin, K., Nijsure, S., and von Laszewski, G. Open Collaborative Grid Services Architecture (OCGSA). In Proc. Euroweb'02, Oxford, UK, pp. 101–107, 2002.*
2) *Asensio, J.I., Dimitriadis, Y.A., Heredia, M., Mart´ınez, A., Alvarez, F.J., Blasco, ´ M.T. and Osuna, C. From collaborative learning patterns to component-based CSCL application. In Proc. ECSCW'03 workshop "From Good Practices to Patterns", Helsinki, Finland, 2003.*
3) *Crook, C. Computers and the Collaborative Experience of Learning. Routeledge, London, UK, 1994. 4. DeFanti, T., Foster, I., Papka, M., Stevens, R., Kuhfuss, T. Overview of the I-WAY: Wide Area Visual Supercomputing. Int. J. Supercomp. App., 10(2):123–130, 1996.*
4) *Dillenbourg, P. Collaborative Learning: Cognitive and Computational Approaches. Elsevier Science, Oxford, UK, 1999.*

5) *Foster, I. Computational Grids, pp. 15–52. In [10], 1998.*
6) *Foster, I. What Is the Grid? A Three Point Checklist. Grid Today, 1(6), 2002.*
7) *Foster, I. and Kesselman, C. Globus: a Metacomputing Infrastructure Toolkit. Int. J. Supercomp. App., 11 (2):115–128, 1997.*
8) *Foster, I. and Kesselman, C. The Globus Project: a Status Report. In Proc. IPPS/SPDP'98 Workshop on Heterogeneous Computing, pp. 4–18, 1998.*
9) *Foster, I. and Kesselman, C. The Grid: Blueprint for a Future Computing Infrastructure. Morgan Kaufmann, San Francisco, CA, 1998.*
10) *Foster, I., Kesselman, C., and Tuecke, S. The Anatomy of the Grid: Enabling Scalable Virtual Organizations. Int. J. Supercomp. App., 15(3):200–222, 2001.*
11) *Foster, I., Kesselman, C., Nick, J., and Tuecke, S. Grid Services for Distributed System Integration. Computer, 35(6):37–46, 2002.*
12) *Foster, I., Kesselman, C., Nick, J., and Tuecke, S.. The Physiology of the Grid: an Open Grid Services Architecture for Distributed Systems Integration. Global Grid Forum technical report, 2002. 14. Grimshaw, A. What is a Grid? Grid Today, 1(26), 2002.*
13) *Grimshaw, A. and Wulf, W. The Legion Vision of a Worldwide Virtual Computer. Comm. of the ACM, 40(1):39–47, 1997.*
14) *Grimshaw, A., Weissman, J., West, E., and Loyot Jr., E. Metasystems: an Approach Combining Parallel Processing and Distributed Heterogeneous Computing System. Parallel and Distributed Computing, 21(3):257–270, 1994.*
15) *Kapadia, N., Figueiredo, R., and Fortes, J. PUNCH: Web portal for running tools. IEEE Micro, 20(3):38–47, 2000.*
16) *Krauter, K., Buyya, R., and Maheswaran, M. A taxonomy and survey of grid resource management systems for distributed computing. Int. J. of Software Practice and Experience, 32(2):135–164, 2002.*
17) *Lyster, P., Bergman, L., Li, P., Stanfill, D., Crippe, B., Blom, R., and Okaya, D. CASA Gigabit Supercomputing Network: CALCRUST Three-Dimensional RealTime Multi-Dataset Rendering. In Proc. Supercomputing'92, Minneapolis, 1992.*
18) *Ramamurthy, M., Wilhelmson, R., Pea, R., Louis, M., and Edelson, D. CoVis: A National Science Education Collaboratory. In Proc. American Meteorological Society 4th Conference on Education, Dallas, TX, 1995.*
19) *Smarr, L. and Catlett, C. Metacomputing. Comm. of the ACM, 35(6):44–52, 1992.*
20) *Stevens, R., Woodward, P., DeFanti, T., and Catlett, C. From the I-WAY to the National Technology Grid. Comm. of the ACM, 40(11):50–60, 1997.*
21) *Wasson, B. Computer Supported Collaborative Learning: an Overview. Lecture notes IVP 482, University of Bergen, Norway, 1998.*