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Implementation of Cloud Computing By Using Short Job Scheduling

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Abstract— "CLOUD COMPUTING" is one of the emerging research area that is been used effectively at the industry level. One of the major contribution of cloud computing is to avail all the resources at one place in the form a cluster and to perform the resource allocation based on request performed by different users. We will define the user request in the form of requirement query. Cloud Computing devices being able to exchange data such as text files as well as business information with the help of internet. Technically, it is completely distinct from an infrared. Using a new super-sensitive optical sensor(SSOS) .The transmission and storage of large amounts of information, and become propulsion of fiber-optic accelerating towards 40G/100G. Its foreground is to provide secure, quick, convenient data storage and net computing service centered by internet. In this paper we consider about cloud computing, its working, its architecture, principle ,different applications and future development of cloud computing.

Keywords— Cloud Computing,SSOS,Resource scheduling,Cluster.

I. INTRODUCTION

Cloud computing is a construct that allows you to acces applications that actually reside at a location other than your computer or other internet-connected device. It has become one of the most talked about technologies in recent times and has got lots of attention from media as well as analysts because of the oppurtunities it is offering[12]. Cloud computing is combination of two terms: Cloud & Computing. Cloud is the Network. A network is a bulk of thousands of users. These users may or may not be connected. The US National Institute of Standards and Technology (NIST) has developed a working definition that covers the commonly agreed aspects of cloud computing. The NIST working definition summarises cloud computing as[11]:

"a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

This definition describes cloud computing as having five essential characteristics, three service models, and four deployment models.

A. The essential characteristics are:

1) On-demand self-service
2) Broad network access
3) Resource pooling
4) Rapid elasticity
5) Measured service

II. Evolution of Cloud Computing

Cloud computing means different to different people, its benefits are different to different people. To IT managers, it means to minimize capital-expenditure by outsourcing most of the hardware and software resources. To ISVs, it means to reach out to more users by offering a SaaS solution. To end users, it means to access an application from anywhere using any device. The following diagram illustrates a high level overview.

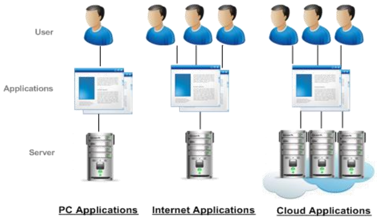


Fig. 1 : Evaluation of Clouds[5]

In the beginning of the computing era, the relationship between the user and the machine was one-to-one.Then came the Internet era. In the Internet era, the relationship between the user and the machine was many-to-one. Many users could access applications running on one machine. In cloud computing, the relationship between the user and machine are many-to-many. Many users can access an application that is served from many machines. Now, what was the reason of this evolution? What were the driving factors behind this? The reason for the evolution from PC-based application to nternet-based application was obvious. This happened ecause of the need of multiple users trying to access an application from their own machines. I believe that the most important driving factor behind the rise of cloud computing is – DATA.

III. Present Work

Cloud services can be a component of a system and different Cloud Servers that would provide different services. In this present work we have defined a multiple cloud environment. Each cloud server is defined with certain limits in terms of memory and the cpu specifications. Now as the users enter to the system, the user request is performed in terms of processes. To represent the parallel user requests, n number of requests are been generated by the users. All these requests are to be handled by the cloud servers in parallel by using the multiple cloud concept. A middle layer is defined between the cloud servers and the client requests that will perform the allocation of the processes to different clouds in under load and over load conditions. As user requests are performed, some parameters are also defined with each request. These parameters are the process time, deadline, input output specifications etc. Each process must be executed within the deadline limit.

IV. Motivation

There are an increasing number of Cloud services available in the Internet. Cloud Services would provide different services. To fit different requirements from different clients, different cloud servers are available to provide the relative cloud services to the users. To achieve this, an efficient process allocation algorithm is required. Several cloud are combined to a common environment to provide the effective allocation without delay. The presented work is capable to handle the over load condition. To handle the overload condition, the load distribution scheme is presented in this work.

V. Objectives

A. The proposed system will achieve the following objectives :

1) Create An Intermediate Architecture that will accept the user request and monitor the cloud servers for their capabilities.
2) Scheduling of the users requests is performed to identify the order of allocation of the processes.
3) Performing the effective resource allocation under defined parameters and the cloud server capabilities.
4) Define a dynamic approach to perform the process migration from one cloud to other.
5) Analysis of the work using graph under different parameters

VI. Research Design

The proposed system is a middle layer architecture to perform the cloud allocation in case of under load and overload conditions. The over load conditions will be handled by using the concepts of process migration. The middle layer will exist between the clouds and the clients. As the request will be performed by the user this request will be accepted by the middle layer and the analysis of the cloud servers is performed by this middle layer. The middle layer is responsible for three main tasks :

A. Scheduling the user requests
B. Monitor the cloud servers for its capabilities and to perform the process allocation
C. Process Migration in overload conditions

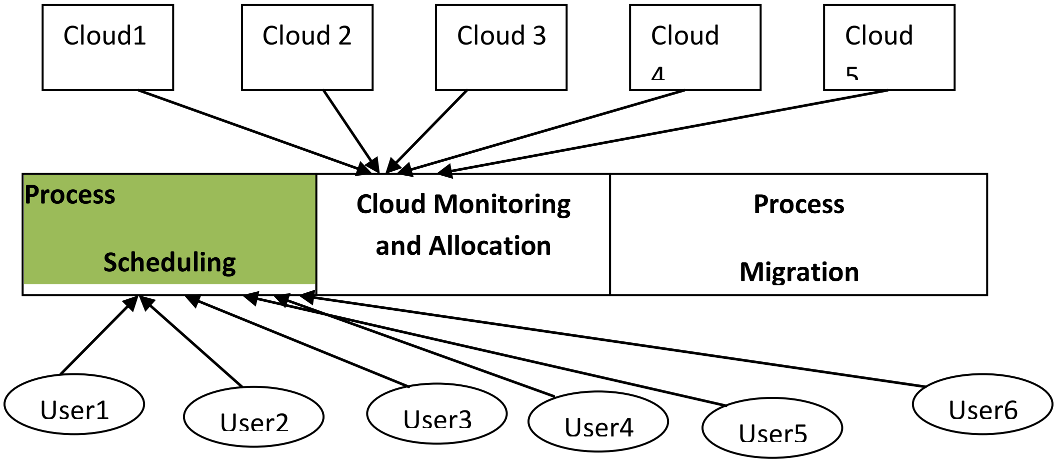


Fig. 2 : Process Scheduling

VII. Algorithm

```
Input the M number of Clouds with L number of Virtual Machines associated with Each cloud.
Define the available memory and load for each virtual machine.
Assign the priority to each cloud.
Input N number of user process request with some parameters specifications like arrival time, process time, required memory etc.
Arrange the process requests in order of memory requirement
For i=1 to N
{
    Identify the priority Cloud and Associated VM having AvailableMemory > RequiredMemory(i)
    Perform the initial allocation of process to that particular VM and the Cloud
}
For i=1 to N
{
    Identify the Free Time slot on priority cloud to perform the allocation. As the free slot identify, record the starttime, process time, turnaround time and the deadline of the process.
}
For i=1 to N
{
    If finishtime(process(i))> Deadline(Process(i))
    {
        Print "Migration Required"
        Identify the next high priority cloud, that having the free memory and the time slot and perform the migration of the process to that particular cloud and the virtual machine.
    }
}
```

VIII. Implementation Tool

The whole information will be collected over the network from the work done by the earlier researchers. We can obtain the scenario information from these work.

MATLAB Editor is used for writing the code to implement our algorithm.

The result will be shown in the command window of MATLAB.

A. *An overview of matlab environment*

MATLAB is a high-level language and interactive environment that enables you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and Fortran. **[Matlab Toolbox]**

1) Introduction and Key Features
2) Developing Algorithms and Applications
3) Analyzing and Accessing Data
4) Visualizing Data
5) Performing Numeric Computation
6) Publishing Results and Deploying Applications

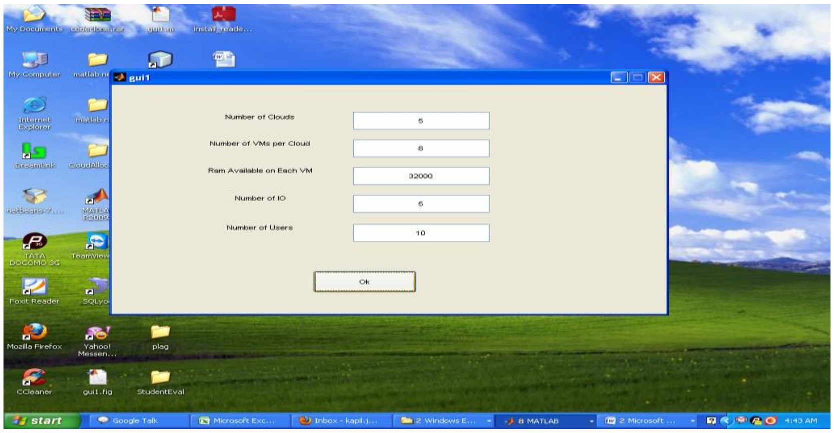
Using the MATLAB product, you can solve technical computing problems faster than with traditional programming languages, such as C, C++, and Fortran.We can use MATLAB in a wide range of applications, including signal and image processing, communications, control design, test and measurement, financial modeling and analysis, and computational biology.

B. *Key features*

1) High-level language for technical computing
2) Development environment for managing code, files, and data
3) Interactive tools for iterative exploration, design, and problem solving
4) Mathematical functions for linear algebra, statistics, Fourier analysis, filtering, optimization, and numerical integration
5) 2-D and 3-D graphics functions for visualizing data
6) Tools for building custom graphical user interfaces
7) Functions for integrating MATLAB based algorithms with external applications and languages, such as C, C++, Fortran, Java, COM, and Microsoft Excel

IX. GUI

To present the work effectively and to accept the user input, a graphical interface is presented in this work in matlab language. The graphical user is here to accept the input parameters related to the clouds as well as to define the number of users. The graphical screen of this work is shown in figure 3.1.



gui1

Number of Clouds: 5

Number of VMs per Cloud: 8

Ram Available on Each VM: 32000

Number of IO: 5

Number of Users: 10

Fig. 3.1 : Graphical Interface

A graphical interface is presented to accept the main input parameters to build the cloud environment and to input the user requirement. The input taken here includes the number of clouds in the environment, number of VMs supported by each cloud, memory availability, IO availability for each virtual machine. By using these parameters the clouds server is configured. Some parameters are taken on the random basis to show the dynamic processes. These parameters include the priority assignment to each process.

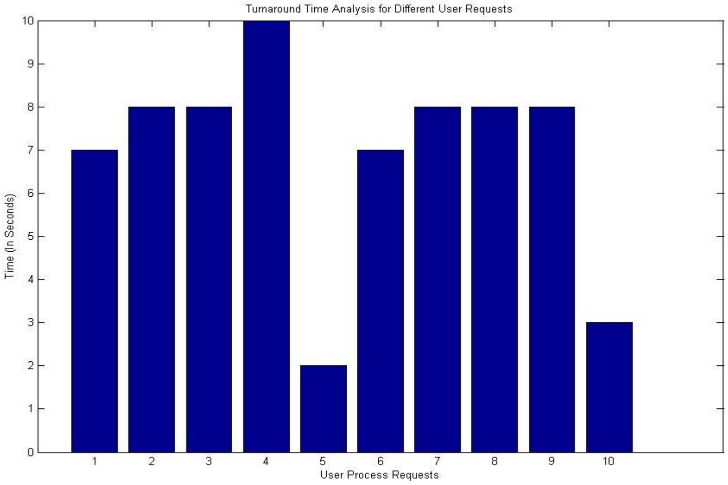
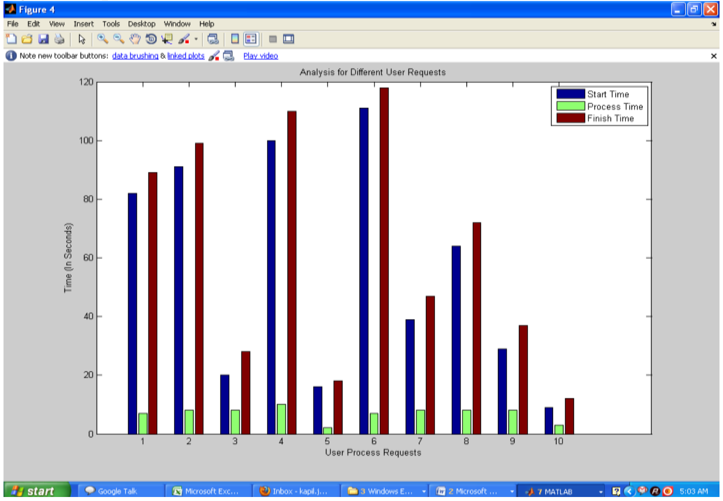


Fig. 3.2 : Turn Around Time Analysis

Here figure 3.2, is showing the turnaround analysis for 10 processes. Here x axis represents the number of user requests and y axis represents the time taken by these process in seconds.



Note new toolbar buttons: data brushing & linked plots Play video

Fig. 3.3 : Process Analysis

Here figure 3.3, is showing the Process analysis for all 10 processes. Here x axis represents the number of user requests and y axis represents the time taken by these process in seconds for all three parameters called process time, finish time and the start time.. The figure is showing the these three vectors collectively.

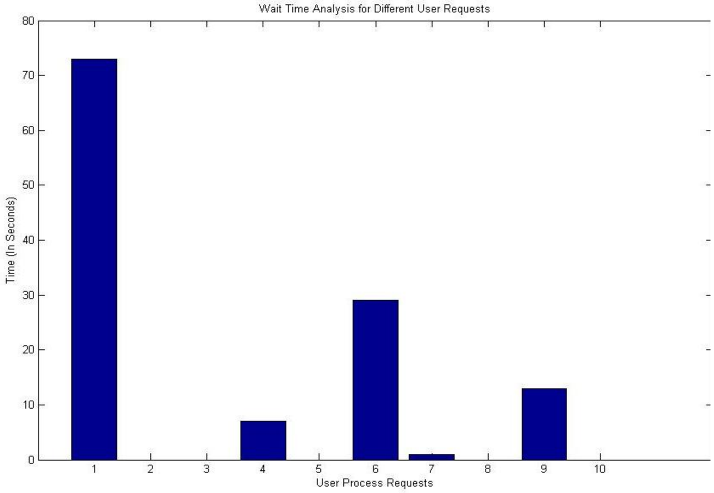


Fig. 3.4 : Wait Time Analysis

Here figure 3.4, is showing the Wait Time analysis for 10 processes. Here x axis represents the number of user requests and y axis represents the time taken by these process in seconds. The figure is showing the wait time of each process. As we can see, most the processes are executed without any wait. And some are having the nominal wait time.

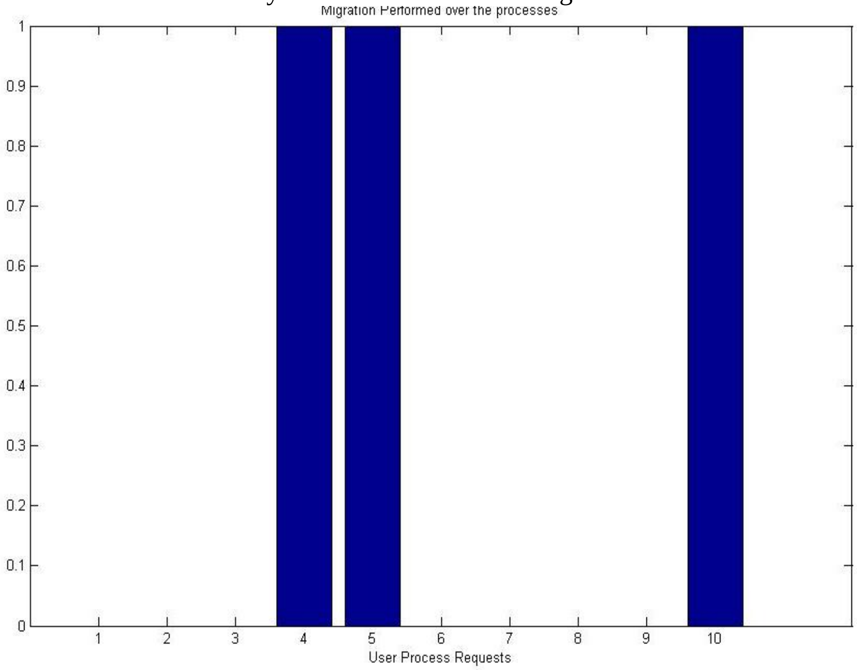


Fig . 3.5 : Migrated Processes

Here figure 3.5 is showing the list of migrated processes over the work. As we can see, three processes 4,5 and 10 get migrated over the work.

X. Conclusion and Future Scope

A. Conclusion

In this present work, a resource allocation scheme on multiple clouds in both the under load and the over load conditions. As the request is performed by the user, certain parameters are defined with each user request, these parameters includes the arrival time, process time, deadline and the input output requirement of the processes. Each cloud is here defined with some virtual machines. To perform the effective allocation, we have assigned some priority to each cloud. The virtual machines are here to perform the actual allocation. These are defined with certain limits in terms of memory, load etc. As the allocation begin, at first the scheduling of the processes is performed respective to the memory requirements. The migration of the processes is here defined in case of overload conditions. The overload condition is defined in terms of simultaneous processes that are required to execute at particular instance of time. The obtain results shows the successful execution of all the processes within time limit.

B. Future Work

The presented work is about to perform the scheduling and the allocation of the processes to the clouds in case of under load and overload conditions. In case of over load condition, the migration of the processes is performed from one cloud to other. The Future enhancement of the work are possible in the following directions

1) The presented work is defined the overload conditions in terms of deadline as well as the memory limit of the clouds. In future some other parameters can also be taken to decide the migration condition.
2) The presented work is defined for the public cloud environment, but in future, the work can be extended to private and the hybrid cloud environment

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