Load Balancing in Cloud Computing using Round Robin Algorithm

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Abstract*— Cloud computing is known as digital service delivery over the Internet by several applications which are carried out by computer systems in distributed datacenters. It supplies a high performance computing facilities which allow shared computation and storage over long distances. To properly manage the resources of the service provider we require balancing the load of the jobs that are submitted to the service provider. Load balancing is required as we don't want one centralized server's performance to be degraded. In this paper, we present Round Robin Algorithm for efficient load balancing in cloud Environment.

Keywords*— Cloud Computing, Load Balancing, Virtual Machine, Round Robin Algorithm.

I. Introduction

Cloud computing is an attracting technology in the computer science. In Gartner's report, it says that the cloud will bring changes to the IT industry [1]. The cloud is changing our life by providing users with new types of Services. Users get service from a cloud without paying attention to the details [2].NIST gave a definition of cloud computing as a model for enabling ubiquitous, 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 [3]. More and more people pay attention to cloud computing [4], [5]. Cloud computing is efficient and scalable but maintaining the stability of processing so many jobs in the cloud computing environment is a very complex problem with load balancing receiving much attention for researchers. Since the job arrival pattern is not predictable and the capacities of each node in the cloud differ, for load balancing problem, workload control is crucial to improve system performance and maintain stability. Load balancing schemes depending on whether the system dynamics are important can be either static or dynamic [6].

II. Related Work

Static schemes do not use the system information and are less complex while dynamic schemes will bring additional costs for the system but can change as the system status changes. A dynamic scheme is used here for its flexibility. The model has a main controller and balancers to gather and analyze the information. Thus, the dynamic control has little influence on the other working nodes. The system status then provides a basis for choosing the right load balancing strategy. The load balancing model given in this article is aimed at the public cloud which has numerous nodes with distributed computing resources in many different geographic locations. Thus, this model divides the public cloud into several cloud partitions. When the environment is very large and complex, these divisions simplify the load balancing. The cloud has a main controller that chooses the suitable partitions for arriving jobs while the balancer for each cloud partition chooses the best load balancing strategy.

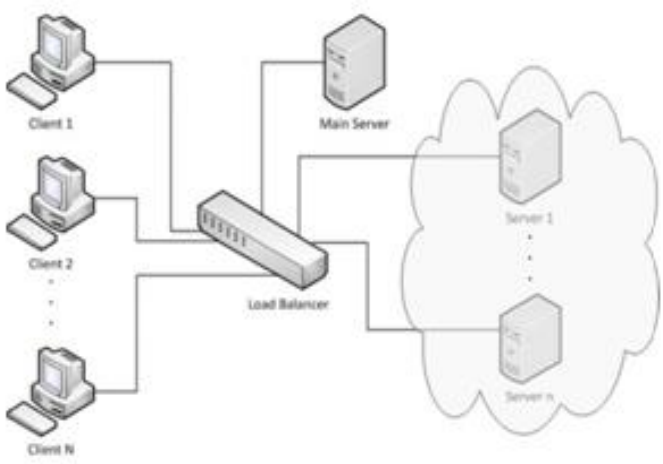

Fig1. Load balancing in Cloud Environment

There have been many studies of load balancing for the cloud environment. Load balancing in cloud computing was described in a white paper written by Adler who introduced the tools and techniques commonly used for load balancing in the cloud [7]. However, load balancing in the cloud is still a new problem that needs new architectures to adapt too many changes. Chaczko et

al. described the role that load balancing plays in improving the performance and maintaining stability [8]. There are many load balancing algorithms, such as Equally Spread Current Execution Algorithm, and Ant Colony algorithm. Nishant et al.[9] used the ant colony optimization method in nodes load balancing. Randles et al. gave a compared analysis of some algorithms in cloud computing by checking the performance time and cost[10] .

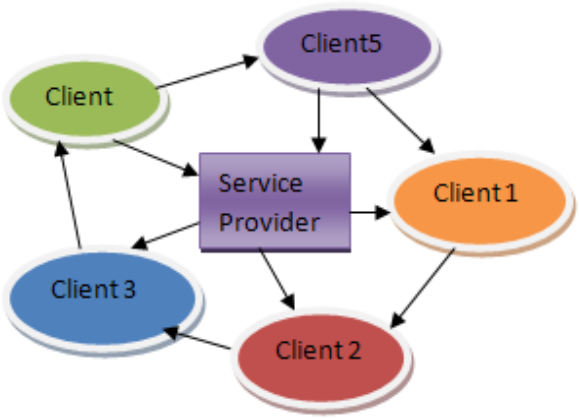

Fig 2. Assigning jobs to the cloud partition

When a job arrives at the public cloud, the first step is to choose the right partition. The cloud partition status can be divided into three types:

1. Idle
2. Normal
3. Overload.

The job allocation strategy is described in figure 3.

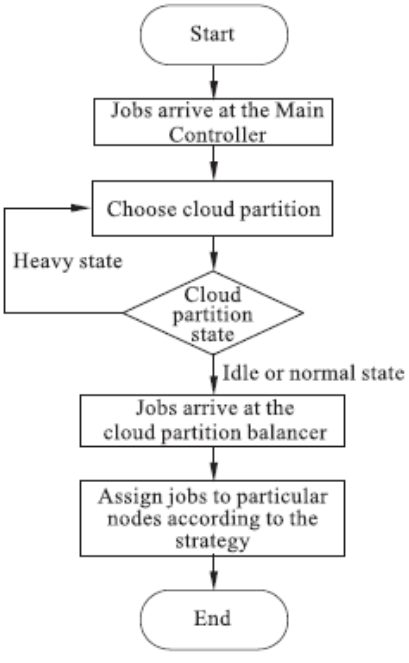

Fig 3. Job Assignment Strategy

III. Proposed Algorithm

Our proposed algorithm is Round Robin to reschedule the CPUs. Here we use this because it is simple and it is a dynamic algorithm i.e. it can be adapted according to the changing system environment. Here at first consumer's request submitted into the SA and SA search for free VM s. When it finds one it starts to serve the services to those VMs using RR (Round Robin) Algorithm .In Round Robin algorithm the time is divided into multiple slices and each node is given a particular time slice or time interval.

Function Boolean TVM (Request_for__Checking_of__Virtual_Machine)
Procedure GUIC (service)[11]
Begin
Boolean flag
flag <- SA(services)
if (flag = 0)
then
write ("Request Service cannot be carried out")
else
write ("Request Service is accepted")
End
Function Boolean SA (service)
Begin
Boolean flag.
flag <- TVM(Request for checking of availability of
If (flag =0)
Return (false)
else
Return (true)
End
The decision of a service acceptation or rejection is taken by the service accepter. So it can be solved by the following flowchart.

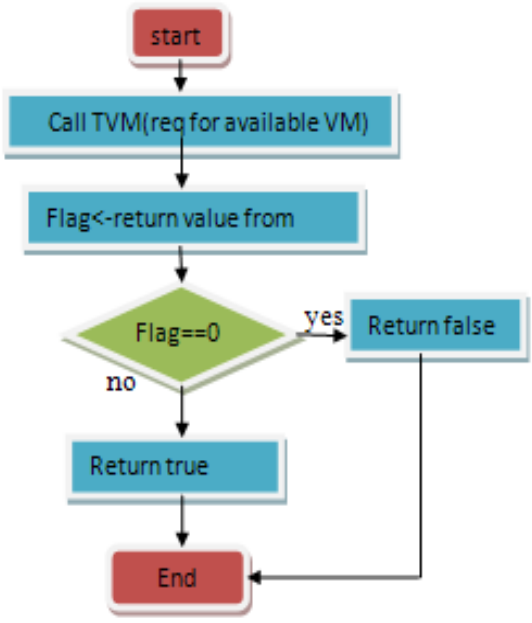

Fig 4. Flow Chart of Service Accepter.

Begin
Boolean flag
If (available VM)
then RR scheduling Algorithm
else
Return (False)
End

In the following flowcharts we will explain the whole work of this thesis. The first one is describing the process of scheduling and rescheduling

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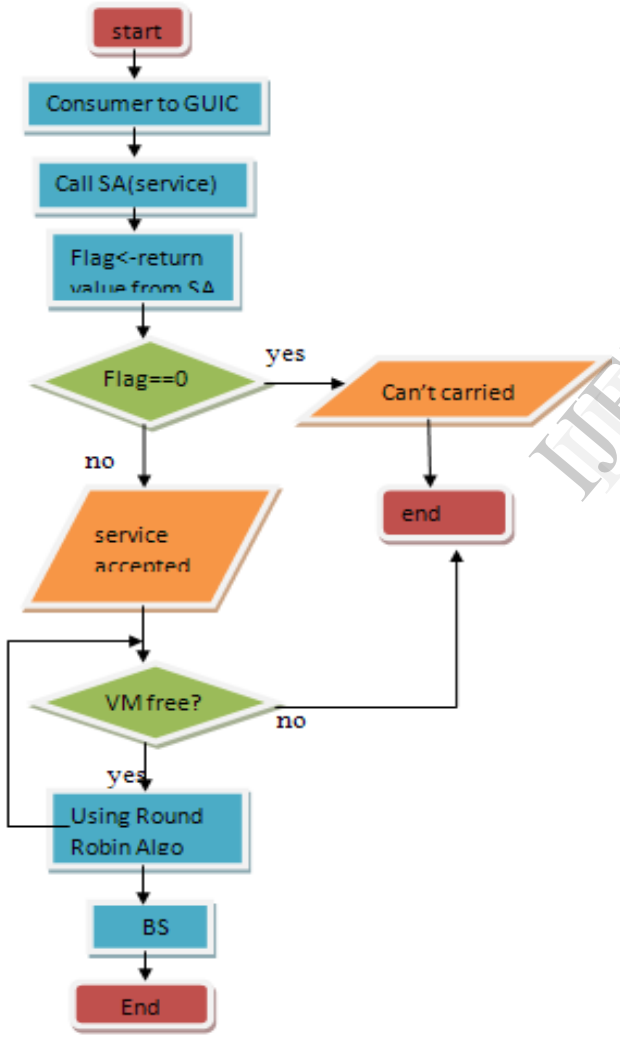

Fig 5. Flow Chart of Load Balancing

Begin
Boolean flag
flag <- SA(services)
if (flag = 0)
then
write ("Request Service cannot be carried
out")
else
write ("Request Service is accepted")
End
Function Boolean SA (service)
Begin
Boolean flag.
flag <- TVM(Request for checking of availability of
Virtual Machines)
If (flag =0)
Return (false)
else
Return (true)
End

The decision of a service acceptation or rejection is taken by the service accepter. So it can be solved by the following flowchart.

Begin
Boolean flag
If (available VM)
then RR scheduling Algorithm
else
Return (False)
End

In the following flowcharts the TVM is explained.

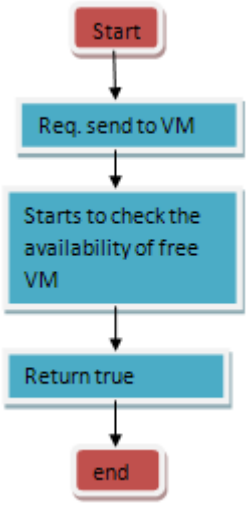

Fig 6. Flow chart of TVM

IV. Conclusion

The purpose is to focus on one major concerns of cloud computing i.e.; Load Balancing. The goal of Load Balancing is to increase client satisfaction and maximize resource utilization and substantially increase the performance of the cloud system. Also the purpose of load balancing is to make every processor or machine perform the same amount of work throughout which helps to increase in throughput, minimizing the response time and reducing the number of job rejection. Here, to achieve Load Balancing, we have used Round Robin algorithm technique.

V. Acknowledgment

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