Run-Time Resource Allocation Using Virtualization in Cloud Computing

[1]Kunal Rane, [2]Niket Deore, [3]Aaqib Mulani, [4]Pradeep Pawar, [5]Pramod Patil

[1] Information Technology, NMIET Talegaon Dabhade , Savitribai Phule Pune University, India
[2] Information Technology, NMIET Talegaon Dabhade , Savitribai Phule Pune University, India
[3] Information Technology, NMIET Talegaon Dabhade , Savitribai Phule Pune University, India
[4]Information Technology, NMIET Talegaon Dabhade , Savitribai Phule Pune University, India
[5] Professor Information Technology, NMIET Talegaon Dabhade , Savitribai Phule Pune University, India

Abstract-Cloud computing is a new emerging technology with large number of resources (virtual machines) which are handled dynamically over the internet. Now a days cloud computing is used widely and there is a need for achieving better performance, optimization, reduction of migration time, efficient computing and better resource utilization. So, resource allocation using virtual machines plays a vital role in cloud environment. In this paper we propose various sets of resource allocation process such as skewness algorithms and their importance in cloud computing.

Index Terms- Cloud computing;   skewness;   resource allocation; virtual machines

1. INTRODUCTION

There has been a lot of discussion over the advantages of the cloud computing model and various services provided by cloud computing in which there are some problems encountered like how can we map the various virtual machines with the physical machines so that the performance is improved with minimum usage of resources. Virtual machines monitors (VMMs) map virtual machines to physical resources. This process of mapping is unknown to end users. The cloud provider has to make sure that the need of virtual machines is fulfilled by the physical resources. It is made possible by the virtual machine's live migration technology by using which it is possible to change the mapping between virtual machines and physical machines. However it is very difficult to map the resources with the virtual machines adaptively so that the requests of the virtual machines are fulfilled by the minimum number of physical machines. This task is very challenging. To achieve this task, two goals must be achieved

- **Overload Avoidance**-The resource needs of all the Virtual machines must be satisfied by the physical Machines with sufficient capacity . If there is an Overload in the capacity of physical machines there will be a degradation in the performance of all the virtual machines.
- **Green Computing-**The quantity of physical machines should be minimized such that they can still satisfy the needs of virtual machines.

In this paper we introduce the concept of skewness which we use to measure the variable and uneven utilization of physical resources by virtual machines. By minimizing this metric of skewness we can improve the performance of virtual machine. We also design an algorithm for load prediction that can predict the future usage of resources by the virtual machines.

2. RESOURCE ALLOCATION

Dynamic resource allocation has proved to be useful in handling large number of workloads efficiently. However the techniques for dynamic resource allocation in previous works are not flexible and effective in delivering the services. In cloud computing there are some tasks to be executed by the resources which are available in run time to achieve reduction of migration time, optimal utilization of servers and efficient usage of resources. Because of these different requirements we need to design, propose some resource allocation algorithms that are used for allocation of resources to virtual machines dynamically. There are some algorithms proposed by researches for dynamic allocation of resources to the virtual machines like skewness algorithms, Vector-dot algorithm, load balancing algorithm,etc.
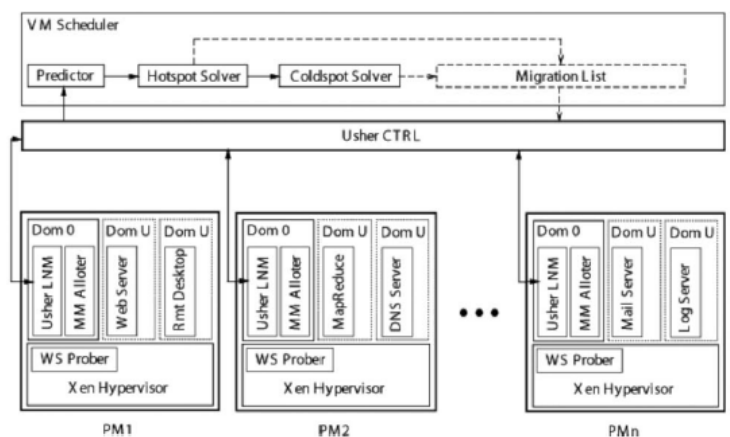

Fig 1.System Architecture

3.RESOURCE ALLOCATION AND ALGORITHMS

The resource allocation to virtual machines in cloud computing is based on set of concerns, for mapping between physical machines and virtual machines .To achieve these efficiently with minimum amount of resources we introduce two threshold values , they are

- **Hotspot**- By using hotspot value ,migration of the virtual machines to different resources is possible when the machine gets overloaded.

- **Coldspot**- Coldspot is used for the migration of virtual machines to various resources when the machine gets under flown. The cold spot value plays a key role to maintain green computing to reduce usage of servers.

In resource allocation the end user may request for different resources as per his needs, by using scheduling algorithms the allocation of resources can be scheduled .By using load prediction algorithm the work load can be allocated to physical machines which have no virtual machines mapped to it. The various algorithms for the resource allocation are:

A. Skewness Algorithm

In this paper we use the concept of skewness to measure the unevenness of multiple resource utilization. Let 'n' be the number of resources we consider and 'ri' be the utilization of the 'i'th resource. We define the resource skewness of a server 'p' as where 'r' is the average utilization of all resources for server 'p'.

$$skewness(p)=\sqrt{\sum_{i=1}^{n}[(ri/r)-1]^2}$$

Skewness algorithms consists of three steps :

1:Load   Prediction

2:Hostspot Migration

3:Green Computing

B. Vector-dot Algorithm

In this scheduling algorithm, HARMONY is used to virtualize the system. HARMONY gives and end to end view of san including usage and performance. The optimization of the utilization of the resources consists of network bandwidth and input/output of physical servers and data centers. In this instead of virtual machine migration, virtualized storage migration is done. To measure the current utilization of resource the extended vector product is used.

C. Green Scheduling Algorithms

Green scheduling is used to determine which server which should be in the running state. Base on load and virtual machine

is allocated it will turn on and off the servers. Here there are four states of srevers: OFF,ON,SHUTTING,RUNNING. Any of this state is triggered based upon the platform.

D. Benchmark Algorithm

This algorithm is used to compare the performance of different resource allocation algorithms. It can perform based on cpu utilization ,which monitors virtual machine migration and utilization of threshold values.

E. Control Algorithm

In this algorithm various techniques are used to predict non Stationary workloads on the systems.Here,there are two sets of processes Markov Host Overload Detection(MHOD) and Optimal Markov Host Overload Detection (MHOD-OPT).

4. CONCLUSION AND FUTURE SCOPE

Complex set of tasks in cloud computing can be solved in shorter time by proper resource utilization. Best resource allocation strategies have to be employed to make the cloud work efficiently. Utilization of resource is important task in cloud computing were User's jobs are scheduled to different machines. In this paper, various strategies and their features have be studied and classified. The future work will be concerned with the development of better allocation algorithms enrich works in dynamic environment using virtual machines and which is heterogeneous

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