A Novel VM Placement framework for Dynamic Load balancing Strategy in Cloud Environment

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Abstract— Cloud computing become the new era of computing these days. Using the cloud computing environment users can pool various IT resources as per their requirements in an efficient manner. In recent years, cloud computing has become a popular paradigm for hosting and delivering services over the internet .Server virtualization is one of the important point when we think about cloud computing, only because of this the dynamic sharing of physical resource becomes possible. Opposite to this benefit of virtualization it creates the issue related to placement of virtual machine as well increases the overheads in load balancing. If enough attention not taken for VM placement strategy then its result in load balancing issues as well provides poor allocation of available resources. Another issue arises when most of the time VM place on partial loaded physical machine that creates fragment and due to this fragmentation it become difficult to place new VM on PM because of insufficient resources. To solve above mentioned issue we purpose a scheme which not only solve the problem of load balancing for VM placement it also decrease the number of fragment on the PM which improve the utilization of resources.

Keywords —Cloud Computing, Virtualization, Dynamic sharing , Resource allocation, VM placement strategy, Fragmentation

INTRODUCTION

Cloud computing is a method of providing a set of shared computing resources that includes applications, computing, storage, networking, development, and deployment platforms as well as business processes. "Cloud computing refers to the web-based computing, providing users or devices with shared pool of resources, information or software on demand and pay per-use basis". It allows end user and small companies to make use of various computational and distributed resources like storage, software and processing capabilities provided by other companies such as Amazon or Microsoft. Cloud Services provided by the clouds are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).

Infrastructure as a service (IaaS) : In the IaaS model computers are offered as physical or as virtual machines, and other resources.

Platform as a service (PaaS) : In the PaaS model, cloud providers offers computing platform including operating system, programming language execution environment, database, and webserver. Without buying and managing hardware and software on a cloud platform.

Software as a service (SaaS) : In the SaaS model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients.

Load balancing strategy configure a load balancing strategy to use in a site balancing Configuration to distribute the load between multiple backend target servers. The load Strategies currently available are header based and round robin load balancing. The Load balancing settings are optional and only available if more than the one target is Listed for a site.

RELATED WORKS

Author at[1] proposed a model where they focus on the allocation of resources should consider various parameters like quality of service parameters like response time, performance, availability, reliability, security, throughput. In the throughput work there are going carried out two main problems reallocation of virtual machines and allocation of virtual machines. The VMP(Virtual Machine Placement) problem has been extensively studied in cloud computing literature and several surveys have already been presented.This author proposed the novel Best Fit decreasing with Minimum Migration Time (BFDMMT) adaptive heuristics that are based on an analysis of historical data on the resource usage for energy and performance efficient dynamic consolidation of VMs. The best fit decreasing based algorithm equipped with the minimum migration time VM selection policy significantly outperforms other dynamic VM consolidation algorithms.

In this paper [2] Author says that the performance of the proposed algoriithm and the load is kept constant and increased the number of virtual machines also increased according to data size per request.Cloud data center due to unequal distribution of load in cloud environment. In proposd algorithm they avoid two situations by distributing the load among the virtual machines in an appropriate manner based on their priority, state and memory utilization. with the help of the proposed algorithm the load of the user requests can be distributed among the virtual machines efficiently.The proposed algorithm is efficient for user requests load distribution among the virtual machines but it does not consider the virtual machines reliability and energy awareness focuses on load distribution of users request along with VM Reliability and VM energy awareness.

Author [3] in this Honey Bee Behavior inspired load balancing algorithm was proposed, which aims to achieve well balanced load across VMs to maximize the throughput and to balance the priorities of tasks on the VMs. Hence, the amount of waiting time of the tasks in the queue is minimal. Using this algorithm average execution time and reduction in waiting time of tasks on queue were improved. This algorithm works for heterogeneous type of systems and for balancing non pre emptive independent tasks.
This Paper Author [4] In this it is an enhanced scheduling in weighted round robin for the cloud infrastructure services was proposed, which considers job length and resource capabilities. This type of algorithm minimizes the response time of the jobs by optimally utilizing the participating VMs using static and dynamic scheduling by identifying the length of the jobs and resource capabilities and effectively predicting the underutilized VMs and avoiding the over load on any of the VMs. The multilevel interdependent tasks have been considered. Load balancing in the heavily loaded scenarios for the task migrations has not been considered. author [5] In the generic algorithm is VM placement for placing the virtual machines and considers CPU, Memory and Power. It is uses the previous history and current demand of virtual machines in placement decisions. This algorithm is power can be minimized and utilizing the physical machines efficiently. The Virtualization makes the reducing the workload of the server. Through virtualization, a cloud service provider can ensure quality of Services delivered to the user while achieving higher server utilization and energy efficiency. The Ant Colony Optimization algorithm is in VM placement thereby reducing the resource wastage and reduces the power consumption.

COMPARISON OF VARIOUS RESEARCH SCHEMES

The table below shows a short comparison about the various schemes proposed by a researcher by taking different parameters. The table gives the description about the basic technique used with the benefits that researcher gets the limitations found in schemes.

	Cloud computing	Virtualization	Dynamic sharing / Resource allocation	VM placement strategy	Physical resources	Virtual machine/physical machine	Load balancing	Fragmentation
[1]	√	√	√	√	√	√	√	√
[2]	√	√	X	X	X	X	X	√
[3]	√	√	X	X	X	X	√	X
[4]	X	√	X	√	√	X	X	X
[5]	X	X	√	√	X	√	X	X
[6]	X	√	X	X	X	X	X	X

Table 1. Comparison study

Proposed Methodology

- Related work that is the based on get request queue that calculate the threshold and then go to check the mips of VM queue and placement of the virtual machine. Threshold have generated the how much virtual machines are available and calculate the average of available virtual machines.
- The average of virtual machine then calculate the total usage of virtual machine and then recalculate the average of the virtual machines are provided for short life and long life. Then prepare for the virtual machine placement before placement we find the available of physical machines.
- Then calculate the virtual machines are utilized on to the physical machine. And find the how much fragments are generated then get monitor details and separated the virtual machine in to the short as well as long life.
- When the fragment is suitable it is go to the assignment process another else its check more segment of the virtual machines. So this is the whole process of the proposed work.

Flow chart

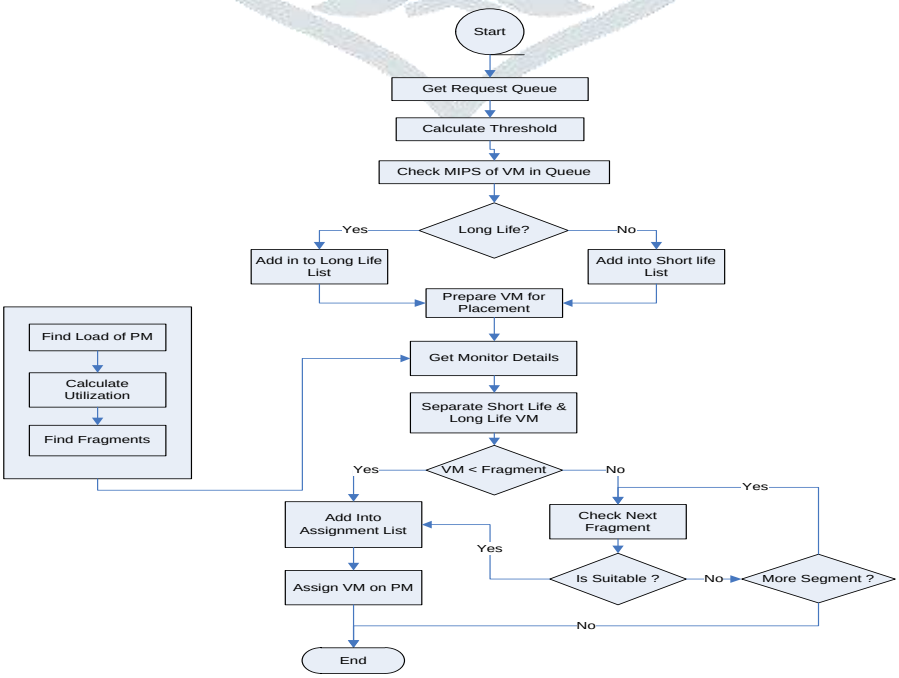

Figure : Proposed methodology

Algorithm

Step-1: Start

Step-2: Get request queue

Step-3: Calculate threshold

Step-4: Check MIPS of VM queue

Step-5: IF VM have long life then its go to the add in to long life list. Else VM add in to short life list.

Step-6:Prepare VM for placement.

Step-7: Find total load of physical machine

Step-8: Calculate the total virtual machines are utilized.

Step-9: Find the how much fragments are generated.

Step-10: Get monitor details

Step-11: Separate the virtual machines in to the short and long life.

Step-12: If VM are less than the fragments then continue else goto step 15

Step-13 : add in to assignment list

Step-14 : assign VM on PM.

Step-15: check next fragment.

Step-16: If its suitable then go to step-13 else continue

Step-17: if check more segment then go to step-15 else continue

Step-18: End.

CONCLUSION

From all the above analysis we can conclude that the proposed framework...

- Provide the effectively virtual machines for shared the workloads.
- Reduce the number of fragment on physical machine.
- Better resource utilization.

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