

A Virtual Machine Resource Management Method with Millisecond Precision

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Abstract - Cloud computing provides on demand access to heterogeneous resources (compute, memory, network, storage etc.). It allows customers to scale up and down their resource usage based on the needs. The resources should be efficiently and reliably managed by the service provider to deliver such services. In this project, a resource management method is proposed for efficient resource utilization. The proposed method handles the request in real time and guarantees high resource utilization. The proof for the efficient working of the proposed approach shall be given by running application with and without proposed method and comparing the results.

Key Words: Load jobs ,Load Scheduling, Resource Utilization, Graphical Representation

1. INTRODUCTION

The National Institute of Standards and Technology (NIST) defines 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”. These resources can be accessed using three service models, Software as a Service (SaaS) , Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). There are numerous advantages of cloud computing, the most basic ones being lower costs, re-provisioning of resources and remote accessibility. Cloud computing lowers cost by avoiding the capital expenditure by the company in renting the physical infrastructure from a third party provider. Due to the flexible nature of cloud computing, more resources can be accessed from cloud providers when there is need to expand the business. The remote accessibility enables users to access the cloud services from anywhere at any time. To gain the maximum degree of the above mentioned benefits, the resources should be managed optimally to the applications running in the cloud. In the pursuit for flexibility in resource management, virtualization plays an important role. Virtualization “means to create a virtual version of resource such as storage, server, network or even an operating system where the framework divides resource into one or more execution environment”. The software which makes the virtualization possible is known as Hypervisor, also known as virtualization manager. The virtual machine (VM) is an

efficient, isolated duplicate of a physical machine. Most widely used hypervisors are VMware ESXi, Citrix Xen Server, and Microsoft Hyper-V, VMware Workstation, Oracle Virtual Box, VMware Fusion, etc.

In cloud environment, resource management is a process of efficiently planning and deploying resources to meet customers demand. Virtualization makes it possible to run multiple operating systems with different configurations on a physical machine at the same time. The resources are partitioned into set of resource slots known as Virtual Machines (VM). A job is a collection of one or more tasks, running on the cloud resources and can either refer to a batch process, known as batch job or user interactive service, known as service job.

2. LITERATURE SURVEY

Distributed computing is ostensibly a standout amongst the most noteworthy advances in data innovation (IT) benefits today. A few cloud specialist organizations (CSPs) have offered administrations that have created different transformative changes in figuring exercises and displayed various promising mechanical and financial open doors. Notwithstanding, many cloud client’s hesitant to Technology needs the cloud, primarily because of their worries. The CSPs in a roundabout way heighten their worries. Mass of their mists that among others frustrates computerized examinations. Distributed computing has as of late developed as another processing worldview in numerous application ranges involving office and undertaking frameworks. It offers different answers for give a dynamic and adaptable framework to host processing assets and convey them as an administration on request. Since modern robotization frameworks without bounds must be versatile and dexterous, distributed computing can be considered as a promising answer for this territory. Be that as it may, the necessities of mechanical robotization frameworks contrast fundamentally from the workplace and endeavor our world [3]. Distributed computing has as of late developed as another processing worldview in numerous application zones containing office and venture frameworks. It offers different answers for give a dynamic and adaptable framework to host processing assets and convey them as an administration on request. Since mechanical robotization frameworks without bounds must be versatile and light-footed, distributed computing can be considered as a

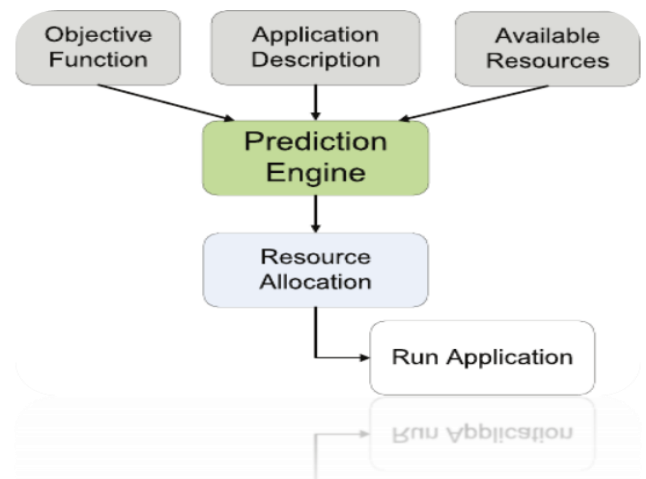
promising answer for this range [4]. In spite of value decrease and get to ease to High Performance Computing (HPC) stages, they are as yet out of reach for most colleges and some organizations. Then again, distributed computing provides access to offices, for example, stages, administrations and applications, permitting the utilization of extra computational assets when vital, and evacuating them when they are at no time in the future required dodging the misuse of assets [5]. In Recent years implanted world. has been experiencing a move from conventional single-center processors to processors with different centers. Be that as it may, this move represents a test of adjusting heritage uni processor-arranged on going operating framework (RTOS) to abuse the ability of multi-centre processor [9].

3. PROBLEM STATEMENT

The main focus is real-time performance of virtual machines (VMs) since it is important to guarantee a time-critical feature of industrial systems. However, there is another important issue that how much computing resource (CPU, memory, etc.) should be allocated to each VM which runs processes of an industrial system. The CPU utilization will be less and performance will be slow in existing conventional methods. We are proposing Resource Management method which manages VM resources with millisecond precision. In the proposed method, resource usage is measured and predicted, considering several microseconds allocation delay of Xen. Our experimental results show that the proposed method can guarantee 99% operation timing with higher CPU utilization in comparison with conventional resource management methods.

4. ARCHITECTURE

The parameters like CPU utilization, memory utilization, and throughput etc, should be taken into consideration to offer maximum service to all the customers. A0020scheduling algorithm named Linear Scheduling of Tasks and Resources (LSTR) is designed to schedule tasks and resources. The scheduling algorithm in LSTR mainly focuses on the distribution of the resources among the users which is able to maximize the chosen Quality of Service (QoS) parameters. The scheduling algorithm designed considering the jobs and the total available virtual machines together. It is named as LSTR scheduling strategy Topological aware resource allocation architecture (TARA) optimizes resource allocation in cloud system [3]. The architecture of topological aware resource allocation system is shown in figure 2.1. TARA uses a prediction engine and a light weight simulator to estimate the performance of the given resource allocation and a genetic algorithm to find optimized solution in the large search space. TARA reduces the job completion time of the applications by up to 59% when compared to application independent allocation policies.



5. IMPLEMENTATION

A computer implemented method for resource management comprising:

5.1. SERVER MONITOR

A Job resource health monitor, it displays the resources used by each job. The resources such as CPU, memory etc. are monitored. It also gives information about different task running, importance of the task.

5.2. LOAD JOBS

A transaction application created and loaded on the virtual machine. The customers are allowed to submit the request. Each request is monitored using the job health monitor.

5.3. RESOURCE UTILISER

A resource management service checks the jobs running. The tasks which are idle are de-provisioned. It reduces the wastage of resources by de-provisioning the idle tasks. These resources can be given to other job which is waiting for the resource.

5.4. LOAD SCHEDULER

A job scheduling service is used to schedule the jobs based on the priority. The jobs which use fewer resources are scheduled first. The job which has to be serviced first is also considered for scheduling. If any job uses more resources for simple tasks then those jobs are made to wait in a queue.

6. CONCLUSION

We have displayed the essential thought and execution of the VM resources administration technique mechanical frameworks. Our experimental outcomes demonstrate that overseeing CPU asset with millisecond accuracy adds to ensuring operation timing of mechanical procedures

.Additionally ,Our technique accomplished high CPU usage contrasted and traditional strategy. because of usage of CPU estimation postpone accepting portion. Additionally ,We will assess it with mechanical procedures which don't gather sensor information additionally control physical gadgets.

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