Effective Pre-Migration Mechanism for Dynamic Load Balancing In Cloud Computing Environment

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Abstract—The effect of cloud computing has a huge preferences over all areas. The virtualization strategies made it conceivable to scale in all zones. This prompts the budgetary and prudent development in all nations. The clients frequently demand the cloud datacenters and workers for their cycle. It makes weighty traffic in both cloud worker and server farm. This weighty traffic prompts load imbalancing and furthermore the unpredicted disappointments may prompt execution debasement. Certain precautionary measures must be taken care of to distinguish the virtual machine disappointment. Anticipating the virtual machine disappointment is troublesome along these lines; our proposed work amasses in appropriate booking of the cloudlets thinking about the heap in the virtual machine. On the off chance that any chance of burden imbalancing happens when after the cloudlet is booked at that point utilizing pre movement calculation, the cloudlets are moved to another virtual machine. This paper joins the heap adjusting system with pre movement calculation for planning the cloudlet. The proposed work is actualized in the cloudsim in addition to apparatus.

Keywords— cloud computing, load balancing, virtualization, scheduling

1. Introduction
The computing resources like data storage, computation power and so on can be remotely managed by the user via network. This functionality is achieved by Cloud computing. Some of the Cloud computing services offered are Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) and Infrastructure as-a-Service (IaaS). Software as a Service is a service in which the software can be given as a service i.e., the software is accessed even in remotely through subscription. It eliminates the complexity in buying, installing and managing the software. Platform as a Service is also called as application platform as a service. It delivers the required platform on demand for developing, running and managing applications online. Infrastructure as a service gives the basic infrastructure for storing and computation is rented instead of implementing on own. All the 3 types of services together called XaaS, Everything as a Service.

2. Related Works
Bhandari A et al. [1] have proposed Load adjusting has been considered as one of the most significant part of cloud computing as of late. In this paper, a heap adjusting calculation is proposed.
dependent on the accessibility of the VM. Specifically, the Availability Index (AI) esteem is assessed for each VM over a given timeframe, and in this manner an errand is doled out to that machine dependent on the AI esteem. So as to approve the proposed model, it is contrasted and three well known burden adjusting calculations are looked at, specifically Round Robin, Throttled and Active Monitoring. The exhibition of every calculation was assessed utilizing Cloud Analyst.

Megha R. Desai et al. [2] have proposed virtual machines on single host. When the relocation cycle happens, the virtual machines moves from one host machine to the other host machine. Trademark Based Compression (CBC) calculation dealt with both the two elements viz. (i) complete relocation time and (ii) absolute personal time and made the movement highly feasible.

Pooja Gupta et al [3] have proposed the Virtual Machine movement methods on the Virtual cloud climate has just been investigated finally, yet not many examinations have zeroed in on partiality relations among virtual machines during relocation, subsequently the key target of this exploration paper, is to investigate the Affinity-mindful VM relocation in detail and propose Affinity-Aware VM relocation calculations for relocation of a gathering of VMs with proclivity to an objective Host with less limit than required. This paper likewise gives a concise audit of a few virtual machine relocation strategies.

Mohamed EsamElsaid et al [4] have proposed Live movement is a significant component in current programming defined datacenters and cloud computing conditions. Dynamic asset the board, load balance, power sparing and adaptation to internal failure are altogether subject to the live movement highlight. Notwithstanding the significance of live relocation, the expense of live movement can't be disregarded and may bring about help accessibility corruption. Live relocation cost incorporates the movement time, vacation, CPU overhead, organization and force utilization.

Dequan Tan, Fang Liu et al [5] have proposed a virtual machine live relocation technique in disseminated edge mists dependent on half and half memory. In this technique, we altered the pre-duplicate calculation to lessen the relocation time, which moving the virus pages before hot pages through the memory access include. The virtual diligent memory (VPM) is accustomed to planning the physical mixture memory to VM, and afterward the calculation will move cold and hot pages to the PM territory and DRAM region of the objective VM.

DeafallahAlsadiea et al [6] have suggested that the dynamic limit based fluffy methodology (DTFA) for recognizing over-burden in the virtual machines. The Lowest Interdependence Factor Exponent Multiple Resources Predictive (LIFE-MP) approach for Virtual Machine arrangement, considers the multiple agents that are less utilized in the cloud.

Meneguette et al [7] have proposed e a choice approach dependent on various ascribes to move VM in a vehicular cloud situation. Along these lines, the proposed strategy permits to choose all the more rapidly if a VM movement ought to be completed and to which cloudlet this machine ought to be moved. Reproduction results demonstrated that the proposed strategy diminished in 2% the measure of VM relocation in the organization, diminished in 3% the blockages of the movement demands, just as a decrease in the deduction season of around 5 ms.

Qinghan Yu et al [8] have suggested that the internet planning way to deal with manage dynamic VM relocations in multicast TSN. In this methodology, we devise a novel internet planning outline work (MDTC-HB) containing an offline booking stage and a web based rescheduling stage. While the offline stage presents a negligible separation tree (MDT) to increment reusable booking results, the online stage proposes a heuristic planning way to deal with reuse the aftereffects of the offline stage however much as could be expected to quicken the rescheduling cycle. Tests show that our system can give a quick reaction to dynamic VM movements contrasted and the current methodologies where the measure of control information doesn't surpass half of the transfer speed.

The literature survey shows that the cloud environment behaves well for without indefinite and unpredictable failures. But when sudden load of the virtual machine fluctuates and if any problem occurs due to load then the cloudlets processing is also affected. So, the virtual machines must concentrates on the load and also some migration strategy must be used to rescue the submitted cloudlets. The proposed work mainly emphasis on the current load, migration.
3. Environmental Setup

The proposed framework is to move virtual machine starting with one host then onto the next host utilizing First in First out (FIFO) scheduling on demand. The fundamental steps mandatory to execute the proposed flow follow below.

- Creation of Host
- Creation of Cloudlet
- Creation of Datacenter
- Creation of Virtual Machine

3.1 Creation of Host

The host creation contains a few parameters. The parameters required are, Host Id, Storage, RAM, Bandwidth, Processors, and Speed. The host id can be numeric or text which is simply utilized for distinguishing proof as it were. The capacity subtleties and RAM are numeric qualities with MB limit. The transfer speed detail is numeric detail with transmission capacity. Processor detail is the tally of processor. Speed detail is MHz of the processor.

3.2 Creation of Cloudlet

The Cloudlet Creation involves some specific parameters. They are Id, Length, Filesize, Output size and Pes Number. The Id can be numeric or text which is simply utilized for recognizable proof as it were. The Length can be numeric worth. The Filesize can be numeric worth. The Output size can be numeric worth.

3.3 Creation of Datacenter

Creation of data center needs the parameters such as Os, VMM, Cost, Timezone, costpermem, Costperstorage and Costperbw. The Cost can be numeric worth, the expense of utilizing preparing in this asset. The Costpermem can be numeric worth, the expense of utilizing memory in this asset. The Cost per storage can be numeric worth, the expense of utilizing stockpiling in this asset. The Cost per bw can be numeric worth, the expense of utilizing data transmission in this asset.

3.4 Creation of Virtual Machine

The Virtual machine creation involves the parameters such as VM id, SizeofVMImage, RAM, Bandwidth, ProcessorCount. The VM id (Virtual Machine Id) can be numeric or text which is simply utilized for distinguishing proof as it were. The SizeofVMImage subtleties are numeric qualities with GB limit. The RAM subtleties are numeric incentive with MB limit. The data transmission detail is numeric incentive with transfer speed. Processor detail is the check of processor.

3.5 Formation of cloud setup

1. Create two Datacenters with their appropriate parameters.
2. Then, create the required number of Virtual Machines and add all the virtual machine to VMList. At this point, Submit VMList to the cloud broker.
3. Then, create cloudlets (approximately 20 -30) and add them cloudlet to cloudletlist.
4. Next cycle is to submit Cloudlet rundown to the resource broker.
5. Then, create two hosts with all necessary parameters mentioned above.

3.6 Cloud Environment Creation

Host

A cloud’s host make easy administrations, to clients by means of numerous associated workers that include a cloud.
Datacenter
Datacenter does locating and system administrating to group, put missing, preparing, and conveying admission to a lot of resource information.

Cloudlet
A cloudlet is a simple or complex process to be done for users. Since it is submitted in cloud, it is called as cloudlets.

Virtual Machine
A virtual machine (VM) is an imitated PC framework made utilizing programming. It utilizes physical framework assets, for example, the CPU, RAM, and circle stockpiling, yet is segregated from other programming on the PC. These applications permit you to run various VMs on a solitary PC.

Load Balancing and Virtual Machine Migration
Cloud load adjusting is characterized as the strategy for parting outstanding burdens and figuring properties in a cloud computing. Utilizing CPU usage is primary factor for load adjustment in virtual machine. If the CPU utilization reaches 80%, at that point move that work onto the next host. This is Load adjusting and planning. Each time before allocating cloudlet to vm’s in the host, load in the VM is checked. At any time a situation like overload in vm occurs in between the execution then, the execution time will be affected adversely. So, it is very much better to do load checking in VM. Figure 3.1 shows the illustration of load balancing.

Virtual Machine Migration
Virtual machine migration is the duty of moving a virtual machine starting with one physical host onto the next physical host machine. It happens if any problem occurs at the host. The virtual machines can be pre migrated based on the load of the virtual machine. Figure 3.2 depicts the migration between 2 virtual machines.
Cloudlet Execution

The Cloudlet will be effectively submitted to Virtual Machine (VM). The Virtual Machine will execute all the cloudlet according to first in first out planning calculation. At that point in the wake of executing the cloudlet effectively the cloudlet status will be allocated as progress. Likewise, every cloudlet will be executed in each virtual machine. After the effective execution of all cloudlets the yield will be shown.

Cloud Information Service (CIS)

A Cloud Information Service (CIS) is a maintenance center that gives cloud asset enlistment, ordering and disclosure administrations. The Cloud hostList advise their status to handle Cloudlets by enlisting themselves with this element. Figure 3.3 depicts the working of CIS.

![Figure 3.3 Cloud Information Service (CIS)](image)

4. Methodology

The Figure 3.4 shows the flow of working of the effective pre-migration algorithm with load balancing. The following points illustrate the current scenario considered for the experimental process.

1. User submits cloudlets to Broker.
2. Select a Host from a Datacenter and redirects the cloudlets to it.
3. If the cloudlet requirement is satisfied by any virtual machine in the host then submits the cloudlets to the same Host for execution.
4. Else virtual machine migrated between Hosts to create a new virtual machine for meeting the cloudlet requirements.
5. Cloudlet submission and execution.
6. Results are returned back to broker from virtual machine.
7. Broker redirects the request to user.
5. Experiment Results
Figure 4.1 shows the creation of virtual machine, host, datacenter and broker. The 30 cloudlets are created with their characteristics. Figure 4.2 shows the submission of cloudlets to the broker. Now, these cloudlets are available in the broker. Figure 4.3 shows the status of the presence of cloudlets in the broker. This also shows the received status of all cloudlets one by one in the broker.
Figure 4.2 Sending cloudlet to Broker

Figure 4.3 CloudletReceived
Since all the cloudlets are allotted to the virtual machines based on the current load. The cloudlets are executed successfully. After the execution, all the virtual machines can be destroyed. Figure 4.4 shows the destroying of virtual machines after completing the cloudlet execution. Figure 4.5 shows all the processed information of each cloudlet with starting time, finishing time and MIPS.

![Figure 4.4 Destroying Virtual Machine after completing cloudlet execution](image1)

![Figure 4.5 Information about processed cloudlet](image2)
6. Conclusion
Load balancing algorithms, virtual machine migration, cloudlet scheduling are considered as very important techniques to improve the cloud’s performance. The effective pre migration helps in earlier analysis based on the load of the virtual machine. The proposed work yields better results during simulation. All the cloudlets are successfully executed and show the result about their completion status. In future work, the security risks faced by the cloud can be addressed. They play a major threat in network.

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