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HYBRID SCHEDULING ALGORITHM FOR PERFORMANCE ENHANCEMENT OF VM IN CLOUD COMPUTING ENVIRONMENT

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ABSTRACT

Distributed computing is thought to be a vital stage for logical applications since it gives a snappy help to on request benefits and is risen as a famous processing model. Presently we have web through which we would now be able to get to programming and the stage by utilizing the foundation given by distributed computing. We can state that there is a vital part of distributed computing for the execution of vast number of errands and the undertakings are being performed by tremendous number of gathering of clients. In this paper we will perform mixture planning of the virtual machines in view of our earlier booking approaches essentially known as time shared booking arrangement and the space shared booking strategy. The resultant arrangement will be the execution upgrade of half breed booking condition based on Throughput and other fundamental parameters.

Keywords: *Cloud Computing, Virtual Machine, Scheduling, CloudSim*

I. INTRODUCTION

Presently a days there is a more pattern of multicore(many-center) CPU in the PC framework in light of the developing preparing intensity of the PC frameworks. As we can check the handling intensity of the now a days PC is considerably speedier then the old ones. So by taking this as a positive outcome, we would now be able to join different separate PCs frameworks with the single equipment framework, By utilizing this we can diminish the cost of intensity and energize the equipment use. Virtualization innovation [1] is a decent method to achieve these benefits. Virtualization Classifications [2] likewise should remember. Idea of Modeling Services[3] and Virtualization space[4] is likewise utilized. In the Virtualized framework, the VMM is sandwiched between the equipment level and the working framework.

The National Institute of Standards and Technology characterizes Cloud Computing all the more appropriately as, "The distributed computing is display for on request access to the normal pool of system which is thought to be reasonable for clients. Normal pool gives access to the assets like applications, stockpiling, servers, administrations and systems. These required least Service Provider Interaction and in addition insignificant administration effort"[5].

Everything provided by cloud computing system is in the form of the services. So the resultant services will be any of these below:

1. First one is the Software as a Service (SaaS)
2. Second is the Platform as a Service (PaaS)
3. Last is the Infrastructure as a Service (IaaS)

In the first term which is known as Software as a Service (SaaS), demonstrate we have an application which is as of now pre-made and with that application there can be any required working framework, equipment, programming and additionally the system. In Platform as a Service (PaaS),Customers creates or introduce required programming are applications and alternate things which are equipment, programming and working framework will be given by the framework itself same as in SaaS. In Infrastructure as a Service (IaaS), the main gave things are the system and equipment and alternate things like the working frameworks, applications and the product all are created or introduce by the clients itself.

In the Cloud Computing worldview the majority of the analysts who had chipped away at the distributed computing planning, mulls over about the designation of the assets and assignments and so on. The cloud supplier who is in charge of giving the assets, needs to serve immense number of clients which are available in the distributed computing framework. So booking is thought to be the most major issue in the Cloud Computing paradigm[6]. For the production of the distributed computing framework we can view the planning as the most genuine or the essential issue for achieving greatest number of assets by considering that there will be least cost and additionally least execution time to finish this procedure. The greater part of the calculations that we will go produce should bring these things into consideration[7]. In this paper we will center around the booking of the virtual machines by taking the execution time as the best and least esteem. The Sections in this papers are sorted out in this way, the Section II will characterize the foundation of the work that we will taking while the execution. Segment III will at that point characterize the engineering of the planning in the distributed computing framework. In Section number IV we will characterize the sort of the booking approaches and their examination also and in Section number V we will give you the outcome and the correlation of the investigation of these three kind of planning strategies and in the last Section number VI will give you the finish of this paper and our extension for suture work.

II. RELATED WORK

K. Liu & J. Chen & Y. Yang X. Liu & D.[8]
They give calculation in which differentiation of execution time and also the cost with the info given by clients happens. They give a bargained time-cost scheduling(CTC) calculation which dependably takes the distributed computing measurements into the thought and accordingly by trading off the cost and in addition the execution time they contain occasion concentrated cost-obliged work process. By reduction of the mean execution time and additionally by meeting the client picked due dates, this calculation can achieve bring down cost than different calculations. SwinDeW-C (Swinburne Decentralized Workflow for Cloud) device is utilized for the recreation work.

Abirami S.P & Shalini Ramanathan[9]
In this the expansion of the chose QoS parameters happens by the portion of the assets among the requesters. Both assignment and the assets are considered and the scheduler is utilized for the count of the dynamic edge and in addition for planning. In this calculation, the principle purposes of the changes are the asset utilization which is thought to be as 'R' and additionally enhance upgrade of framework throughput too.

R. Santhosh & T. Ravichandran[10]
They for the most part utilize "Infrastructure as a Service" demonstrate offered by the distributed computing and the fundamental focal point of this paper this is booking of the constant errand or we can see the answer for the internet planning issues. The aggregate utility and productivity is augmented while the booking of the ongoing undertaking. this calculation additionally center around the change of the proficiency of the errand and also the reaction kind of the undertaking. at whatever point an assignment is missed or it's over it's due date then the undertaking are relocated starting with one virtual machine then onto the next virtual machine. So it enhances the general execution of framework and furthermore boosts the aggregate utility of the framework.

Xiaomin Zhua & Kenli Li & Chuan & Xiao Qin Hea[11]
They show that the connector voltage controller and in addition the continuous controller dependably cooperates and keeping in mind that cooperating they need to likewise check if there is another confirmation of any arriving undertaking in the Global line or not. At that point the second period of this technique begins with the handling of the scheduler, which works for the task of the voltage level at whatever point any undertaking is acknowledged. For the execution reason on the hubs, there is an assignment of the undertaking in the neighborhood line at whatever point there is another affirmation of errand which is kept up as single hub of the bunch. Then again, the voltage level of the undertaking which are as of now conceded is limited by the nearby voltage controller in each and every hub that outcomes in diminishment of the general vitality utilization.

III. SCHEDULING ARCHITECTURE

The two fundamental things which ought to be mulled over while we are discussing the scheduler are the minimization of the time taken to process all the assignment and additionally the boost of the use of the assets. So toward the end space controller here is known as the scheduler it is in charge of the apportioning or the requesting of the undertaking. While requesting the errand the two things that ought to be considered are decency among the assignment distribution and in addition the change of the nature of the administrations that will be given to the users[12]. The accommodation of the assignment according to the due date which can be expert by limiting the reaction time and the booking procedure dependably objectives to achieve this previously mentioned two criterias. Toward the end the execution upgrade of distributed computing framework straightforwardly corresponding to the clients which are submitting assignment in the distributed computing system[13].

While discussing the scheduling architecture we can partition it into number of steps, the primary fundamental advance under the planning design usage is the accommodation of the assignment of the tasks to the data centre brokers and this progression can be performed by the clients which will present their undertaking. The term data centre brokers here is a sandwich layer between the data centre and the clients and the intermediary is for the most part utilized for the virtual machines planning. So the data centre brokers is essentially utilized for the planning of the virtual machine by utilizing some known scheduling approaches which can be actualized on the host and on the virtual machines. We can likewise say that there are number of host in the data centre and on these host the planning of the virtual machines happens by the data centre broker. The clients of the distributed computing framework can likewise be thought to be an indistinguishable number from the data centre broker. The errands which are presented by the clients can be scheduled by the data centre broker by communicating with the cloud controller too next to each other.

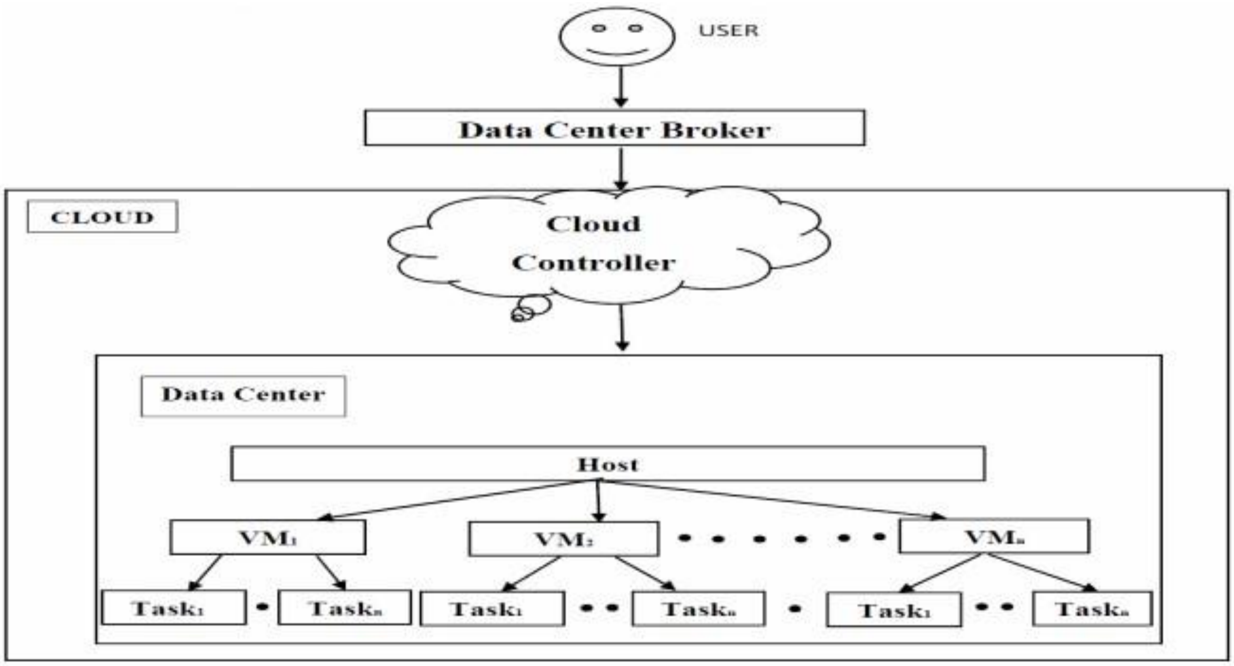

Figure 1. Scheduling Architecture

IV. SCHEDULING POLICIES

In the scheduling architecture we have a lot of different scheduling approaches, the two main approaches which are considered to be the most known are as below:

1. Time-Shared scheduling policy
2. Space-Shared scheduling policy

the first come first serve algorithm (FCFS) [13] criteria is used in the space-shared scheduling policy, all the tasks are alloted in first come first serve manner and scheduled one by one and one after another. The second task will be scheduled only after the completion of the first task and for scheduling the virtual machine on the host the same first come first serve approach is used.

Steps to define space-shared policy
Step 1:- Organization of the all the accepted tasks takes place in a queue.
Step 2:- First of all first task is scheduled on the provided virtual machine.
Step 3:- After completion of the first task the next presented task from the queue will be then taken into consideration for scheduling purpose.
Step 4:- This process goes on until the queue is unfilled and afterward it checks for new task from the provided queue.
Step 5:- After that rehashes step number 1.
Step 6:- At the end the approach that taken into consideration is the Time-Shared planning approach, in the meantime this approach plans all tasks on virtual machine. The timing criteria is shared with all the tasks and timetable all the while on the virtual machine. For the planning of the virtual machines, this same arrangement is likewise used on the host. This part of approach always use the round-robin (RR) planning calculation [14] for the scheduling purpose.

Steps to define time-shared policy
Step 1:- Organization of the all the accepted tasks takes place in a queue.
Step 2:- The tasks are scheduled on the same time not waiting for another task to complete.
Step 3:- This process goes on until the queue is unfilled and afterward it checks for new task from the provided queue.
Step 4:- After that rehashes step number 2 whenever a new task entered the queue.
Step 5:- End.

For the execution of the time-shared and space-shared scheduling strategies the term used is known as CloudSim. Figure 2 demonstrate a simple scheduling approach with effect on the application execution and distinction between two strategies procedure. For the hosting process of two virtual machines takes place, the host with two CPU cores receives the request and facilitating these virtual machines, and these two as a single unit requires two cores and four tasks as well. We can setup the task list as t1, t2, t3 and t4 for the virtual machine number 1 and remaining t5, t6, t7, and t8 for the virtual machine number 2.

This scenario is described as below:
a. Virtual Machine is Space shared and Task(Cloutlet) is Space shared.
b. Virtual Machine is Space shared and Task(Cloutlet) is Time shared.
c. Virtual Machine is Time shared and Task(Cloutlet) is Space shared.
d. Virtual Machine is Time shared and Task(Cloutlet) is Time shared.

In Figure 2(a), here we have two virtual machines and the mentioned list of the task units and both the outlets and the virtual machines works under the space shared scheduling approach. Every single Virtual Machine have two cores and only one Virtual Machine can run at a given time period and assignment of the virtual machine 2 always takes place after the completion of the virtual machine 1 task units.

In Figure 2(b), for the allocation of the task units we are using the time shared approach and for the location of the virtual machine we are using the space shared approach. the context switching off the task takes place dynamically during the whole lifecycle of the processing system of the Virtual machine.

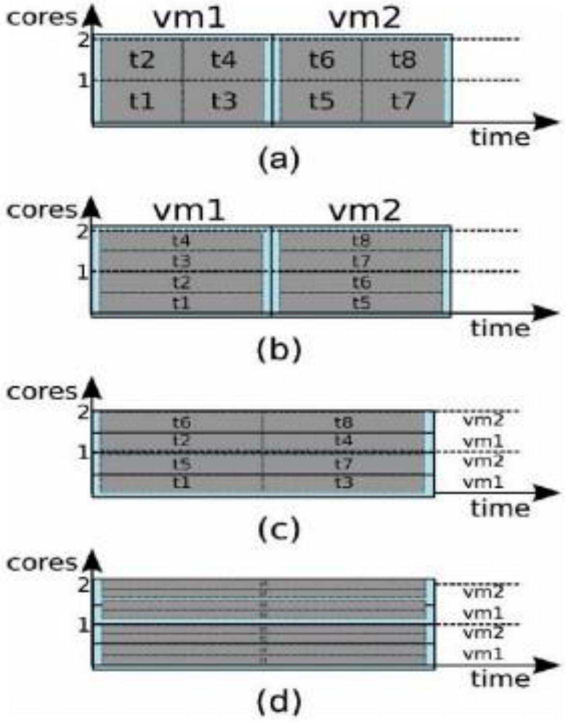

Figure 2. Scheduling strategies impact on task execution: (a) Space-shared scheduling strategy for both Cloutlets and as well as Virtual Machines, (b) Time-shared scheduling strategy for Cloutlets and Space-share scheduling strategy for Virtual Machines, (c) Space-shared scheduling strategy for Cloutlets and Time-shared scheduling strategy for Virtual Machines, and (d) Time-shared scheduling strategy for both Cloutlets and Virtual Machines[15]

In Figure 2(c), Describe the scheduling approach in which the virtual machines are schedules in the time shared scheduling approach and the task are scheduled in the space shared scheduling approach.

At the end, in Figure 2(d) The scheduling criteria for this is as both the virtual machines and as well as the task share their time-shared scheduling approach. In this approach the virtual machines are sharing the preparation powers and each virtual machine is considered to be isolated as an output for the individual task for every isolated virtual machine. So for both virtual machines and the task there is no queuing process in this scheduling approach. [15]

V. PROPOSED ALGORITHM AND IMPLEMENTATION

For the preparation of the components in the virtual machines below is the algorithm which is well defined in the form of steps and as well as define the calculations which are going to be used and assessed by the host and as well as the Random Access Memory.

Proposed Algorithm

1. In the very first time we will be in a defining the common variables.There is an introduction of the users or clients which are going to be interacting with the broker count.
2. In the second step we will be now first of all creating the datacenters and then afterwards creating the hosts as well with the required attributes. RAM, bandwidth, size etc are considered under the term attributes of the host.
3. Creation of the data centre broker takes place in this step. The brokers are sandwiched between the tasks and the data centres so they play important role Hindi scheduling process.

4. Now creation of the virtual machines takes place in this step and attributes of the virtual machines are considered to be same as the attributes of the host .
5. The submission of the virtual machines towards the broker takes place in this step.
6. Specification of the tasks take place after the successful submission of the virtual machines. The parameters such as bandwidth, MIPS requirements are also specified while the creations of the tasks are the cloudlets.
7. Get the present use of Random Access Memory.
8. In the event that free RAM is not as much as preparing component in utilize then assign handling component for virtual machine generally again return to past advance.

The abilities of the Space shared scheduling approach afterwards the Time shared scheduling approach, in the practical form are examined in this section. We will firstly create configuration using time shared scheduling manner and then using both time shared and space shared approaches as a hybrid manner and then we will make some modifications in the system configuration for the enhancement of the scheduling criteria and throughput using the Cloudsim.

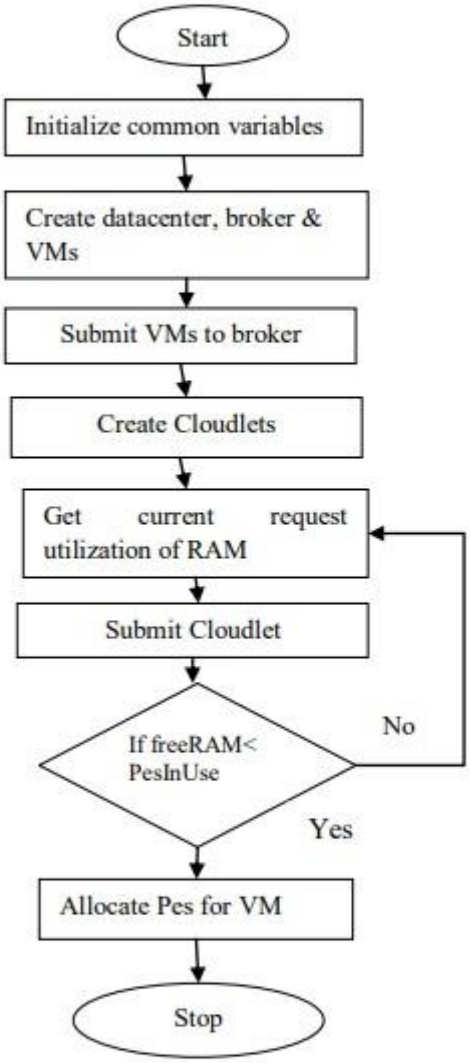

Figure3. Flowchart of Proposed Algorithm

Scenario for the three system configurations and testing with performance enhancement as well. It will follow below four results:

1. Virtual Machine is Time shared and Task(Cloutlet) is time shared.

The average throughput using this configuration is considered to be : 320

Table 1. Host Configuration for Virtual Machine is Time shared and Task(Cloutlet) is time shared

Parameter	Value
Virtual Machine Size	5
Datacenter Size	2
Cloutlet Size	25
Data Center Operating System	Linux
Data Center Virtual Machine Manager	Xen
Random Access Memory (RAM)	512 MB
Data Center Virtual Machine policy	Time Shared
Server Broker Policy	Space Shared
MIPS	250

```
HostList.add(
        new Host(
                HostId,
                new ram,
                new bw,
                Storage,
                PeList1,
                new VmSchedulerTimeShared(peList1)
        )
  ); // This is our first machine

HostId++;

HostList.add(
        new Host(
                HostId,
                new ram,
                new bw,
                Storage,
                PeList2,
                new VmSchedulerTimeShared(peList2)
        )
  ); // Second machine
//create VMs
VM[] VM = new VM[VMS];
```

```
for(int i=0;i<VMS;i++){
        VM[i] = new VM(IDShift + i, UserId, MIPS, pesNumber, RAM, BW, SIZE, VMM, new
        CloudletSchedulerTimeShared());
        list.add(VM[i]);
}
```

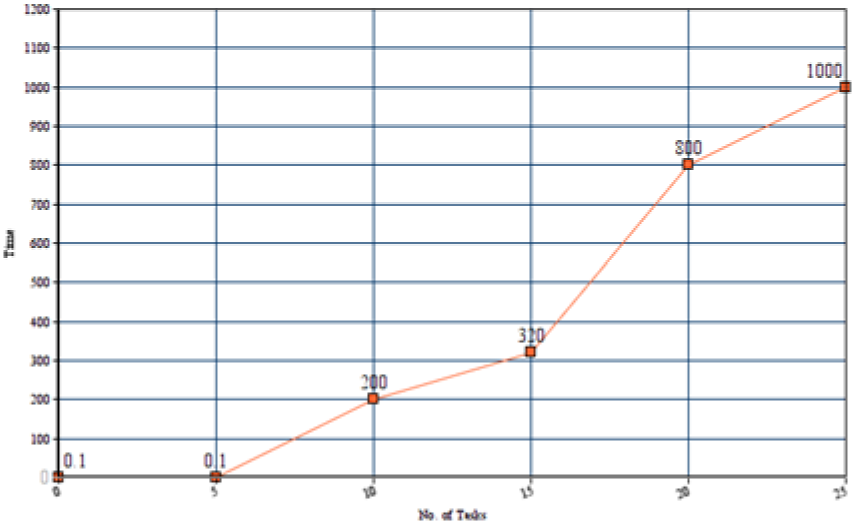

Figure4. Virtual Machine is Time shared and Task(Cloutlet) is time shared

Task size is byte per unit & Time is MIPS(Millioon Instructions per second)

2. Virtual Machine is Time shared and Task(Cloutlet) is Space shared.
The average throughput using this configuration is considered to be 160.

Table 1. Host Configuration for Virtual Machine is Time shared and Task(Cloutlet) is Space shared

Parameter	Value
Virtual Machine Size	5
Datacenter Size	2
Cloutlet Size	10
Data Center Operating System	Linux
Data Center Virtual Machine Manager	Xen
Random Access Memory (RAM)	1024 MB
Data Center Virtual Machine Policy	Time Shared
Server Broker Policy	Space Shared
MIPS	250

```
HostList.add(
        new Host(
                HostId,
                new ram,
                new bw,
                Storage,
                PeList1,
                new VmSchedulerTimeShared(peList1)
        )
  ); // This is our first machine

HostId++;

HostList.add(
        new Host(
                HostId,
                new ram,
                new bw,
                Storage,
                PeList2,
                new VmSchedulerTimeShared(peList2)
        )
  ); // Second machine
//create VMs
VM[] VM = new VM[VMS];

for(int i=0;i<VMS;i++){
        VM[i] = new VM(IDShift + i, UserId, MIPS, pesNumber, RAM, BW, SIZE, VMM, new
        CloudletSchedulerSpaceShared());
        list.add(VM[i]);
}
```

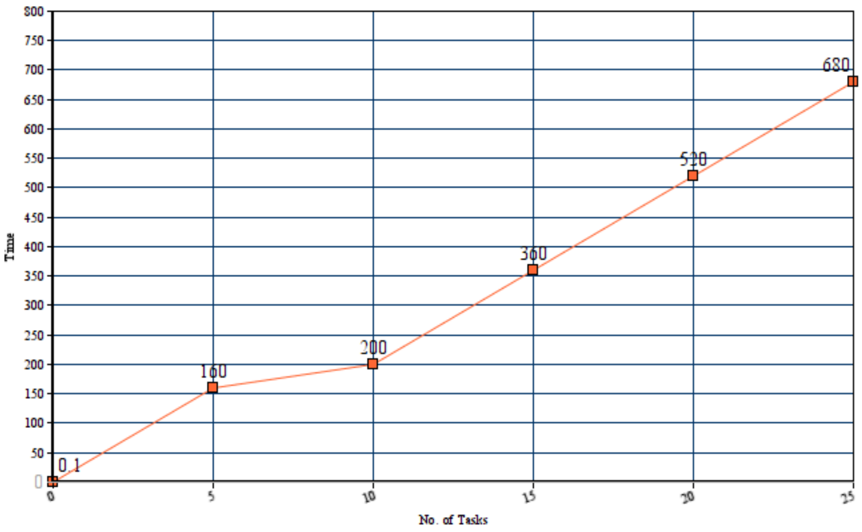

Figure5. Virtual Machine is Time shared and Task(Cloutlet) is Space shared

Task size is byte per unit & Time is MIPS(Millioon Instructions per second)

3. Virtual Machine is Time shared and Task(Cloutlet) is Space shared with Performace enhancement. The average throughput using this configuration is considered to be 80.

Table 1. Host Configuration for Virtual Machine is Time shared and Task(Cloutlet) is Space shared with Performace enhancement

Parameter	Value
Virtual Machine Size	5
Datacenter Size	2
Cloutlet Size	10
Data Center Operating System	Linux
Data Center Virtual Machine Manager	Xen
Random Access Memory (RAM)	1024 MB
Data Center Virtual Machine Policy	Time Shared
Server Broker Policy	Space Shared
MIPS	500

```
HostList.add(
        new Host(
                HostId,
                new ram,
                new bw,
                Storage,
                PeList1,
                new VmSchedulerTimeShared(peList1)
        )
  ); // This is our first machine

HostId++;

HostList.add(
        new Host(
                HostId,
                new ram,
                new bw,
                Storage,
                PeList2,
                new VmSchedulerTimeShared(peList2)
        )
  ); // Second machine
//create VMs
VM[] VM = new VM[VMS];

for(int i=0;i<VMS;i++){
        VM[i] = new VM(IDShift + i, UserId, MIPS, pesNumber, RAM, BW, SIZE, VMM, new
        CloudletSchedulerSpaceShared());
        list.add(VM[i]);
}
```

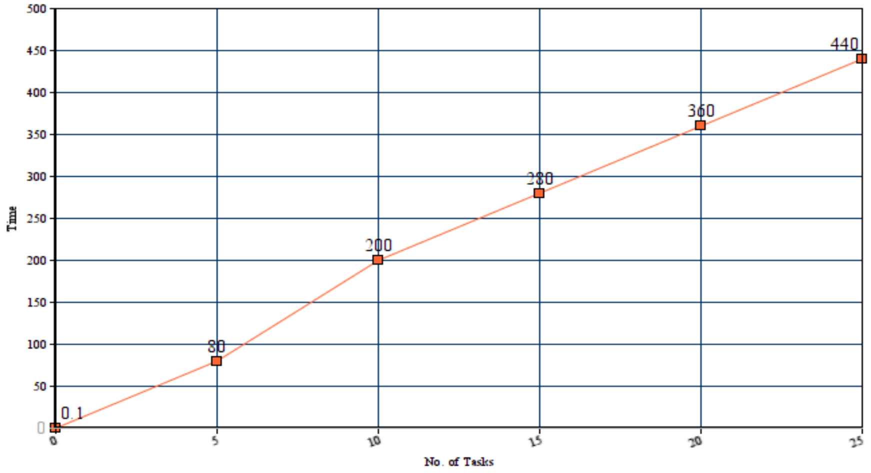

Figure5. Virtual Machine is Time shared and Task(Cloutlet) is Space share

Task size is byte per unit & Time is MIPS(Millioon Instructions per second)

VI. CONCLUSION AND FUTURE SCOPE

This paper analyzes that when we have Virtual Machines as Time Shared and Task as Space Shared system then the output Throughput is considered to be lesser as compared to the other policies. When we increase the MIPS to 500 and increased the RAM size to 1024 MB then the performance of the system increased by talking lesser start time and throughput.

In additionally research should be possible for upgrading the proficiency scheduling arrangement calculation for hitter comes about by lessening planning complexities.

For enhancing of the performance of the virtual machines we have introduced a system with above mentioned configurations and with the hybrid scheduling criteria with time and space scheduling approaches one for Virtual Machine scheduling and other for Task scheduling purposes.

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