Techniques used For Workload Distribution in Virtualized Data Centers

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ABSTRACT
To build the efficiency of system in the server, consolidation techniques are utilized however because of this performance of system can degraded. So consolidation and migration methods are utilized to enhance workload execution in virtualized data center. In consolidation method number of physical machine (PM) decreases and create number of virtual machine. VMWARE is utilized to make different number of VM (Virtual Machines) .it produce numerous VM on single PM. For this reason two modules are utilized consolidation, which gives set of workload, minimize the number of PM by a integer programming model, Migration module which gives workload from consolidation module to VM by Polynomial time calculation. LSAP(Linear sum assignment problem) method used to solve problem during migration that problem called migration planning problem (during migration from source VM to destination VM it took much time and increases number of migration because the VM which will be migrated is already associated with other workload) for this problem Hungarian algorithm in LSAP method to solve this problem.

Keywords
Migration, Consolidation, Physical Machine (PM), Virtual Machine (VM) etc

1. INTRODUCTION
To keep up the efficiency of the system infrastructure become serious problem Because if infrastructure turn out to be large utilization of energy additionally increments. due to this costing of handling also increases. To handle such a huge framework additionally repetitive employment it make multifaceted nature. As indicated by overview of the New York time in 2012 on vitality utilization on server infrastructure. They observed that exclusive 6 to 12 percent of power used to perform processing on server infrastructure other remaining power was completely wasted on base of server infrastructure.

In cloud framework same issue arrives to handle large data extensive large foundation require. It consequently expands the costing. The disservice of this it drives high energy bills, additionally builds the high cooling cost; floor space cost and in light of the fact that the unfriendly effect on the environment.

Virtualization can support server consolidation. The principle way to deal with enhance efficiency of system it is better to minimize number of physical machine. In any case, server consolidation and VM migration bring two challenges :

1. Consolidation can bring about degradation in performance due to co-location VMs because of race in shared resources.
2. Moving virtual machines with various workloads, which will degrade the execution of workloads.

The issue is the way to minimize the quantity of PMs with server consolidation without execution loss of every workload. In the migration planning module, we represent another issue is to achive minimum number of migration on VM .

2. RELATED WORK
"The case for energy-proportional computing," [3] in this strategy Energy-corresponding outlines would empower huge vitality investment funds in servers. author think about different gadget and their part and recommend which gadget is more productive for energy saving. The active low power mode recommend processor running at a lower voltage-recurrence mode can at present execute directions without execution loss.

"Xen and the art of virtualization,"[4] in this method Xen, and x86 virtual machine monitor which permits various commodity operating system to share hardware equipment in a safe and resource management style, however without giving up either execution or usefulness. Xen machine can focused on facilitating of up to 100 virtual machine at a time on an advanced server , due to this cost of communication can minimize. Creator additionally presents paravirtualization which enhanced execution, and overcome from disadvantages of expense of expanded unpredictability and decreased execution of framework. author additionally propose that full virtualization is not some portion of X86 for that VMM (virtual machine monitor) gave.

"Live migration of virtual machines," [5] in this method Migrating on operating system occasions crosswise over particular physical hosts is a helpful device for administrator of data center and cluster: It permits partition amongst software and hardware, and encourages issue fault management, load adjusting, and low-level system maintenance. author takes a shot at working on operating system so it is surely understood as live movement. migration (Relocation) done in various stages from source host to destination host. In this paper pre-copy migration, in this stage it act like the push message stage from source host to destination host these system works in iterative way that is message sending strategies keeps running in various rounds . Each VM will have a few (ideally little) arrangement of message(pages) that it redesigns regularly .performance degradation will happen on the grounds that aggregate data transmission are devour by source and destination amid exchange and get message. Subsequent to getting messages or pages to focused host movement of pages done yet issue happens how to exchange system gadgets in this way group are utilized as a part of this NAS are utilized for relocation.

"A mathematical programming approach for server consolidation problems in virtualized data centers, [6]" in this strategy Server consolidation depicts the procedure of joining the various workloads of a few distinct servers on set of target servers. This paper presents decision models to ideally assign source servers to physical target servers while considering true imperatives. Subsequently, other than a definite arrangement technique, a heuristic is exhibited to address extensive scale server consolidation. author likewise clarify static server allocation problem (SSAP) because of this expense of equipment which is useful to keep up IT infrastructure. author additionally specify to monitor wellspring of workload in light of the fact that the workload can be change.

"Server consolidation with migration control for virtualized data centers,"[7] in this procedure relocation i.e migration control strategy are recommended .This paper proposes a LP (linear programming) formulation and heuristics to control VM movement, which organize virtual machines with consistent limit. author clarifies issue of mapping in movement in both cases 1)static combination - in which no relocation i.e migration done 2)dynamic movement –in which movement done these two issue are unraveled by utilizing LP(linear programming)in which number of physical machines are minimize and number of virtual machines are maximize. second arrangement is heuristics changes the grouping as indicated by first-fit decreasing (FFD), best-fit decreasing (BFD), worst fit decreasing (WFD), and almost worst fit decreasing(AWFD).Author performed tests utilizing TU-Berlin and Google data center workloads to look at movement control methodology against existing willing migration based arrangements.

"Pmapper: Power and migration cost aware application placement in virtualized systems, [8]" in this procedure author suggest the power aware application framework called pMapper. In this technique different procedure are accommodate energy and execution by utilizing virtualization. Pmapper fundamentally utilized for energy minimization under some calculation i.e execution requirement. In pmapper the power administration activity handle soft activities like CPU idling in the hypervisor, (ii) hard activities like throttling and (iii) consolidation technique (reduced number of PM). Working Architecture of Pmapper include 3 manager that are performance manager that take about execution must meet with quality of service, power manager that works in regards to control related works and , migration manager works in virtualized environment.

"Priority based consolidation of parallel workloads in the cloud,"[9] In this system , propose a priority based strategy to consolidate parallel workloads in the cloud system. due to parallelism performance of system degraded so author decided to divide computing capacity of each node in two levels, the frontal virtual machine (VM) level (with high CPU need) and the background virtual machine (VM)level (with low CPU need) and calculate by using scheduling algorithm parallel job to make productive utilization of the two level VMs to enhance the responsiveness of these task.

3. PROPOSED SYSTEM

In our Existing system when workload arrived as input to migration phase it can allocate terminal sequentially according to size of workload due to this migration mapping problem can arrived. In existing system single terminal can only allocate single workload so, number of migration can increase automatically and it leads to time as well as energy consuming .To overcome from this drawback in proposed system best VM (exact size of VM) allocate to workload. for allocating best VM first of all VM are arrange in descending order i.e the VM which have maximum load baring capacity comes first. Due to this one VM can allocate multiple workload so, time can reduce and number of migration also become less. In proposed system clustering technique can be used in which number of workload can be allocated by single VM are group together.

As shown in following diagram our proposed system shows which is combination of static as well as dynamic consolidation.

In proposed system energy consumption problem also solved.

As shown in following figure 1 two modules are present one is consolidation module and other one is migration module .basically consolidation module insist to run whole system on best physical machine which have maximum load baring capacity. Migration module can take input as consolidation output i.e migration can done on only single physical machine (PM) and workload which are to be migrated. migration is nothing but placement of data from source to destination VM. Following figure shows one physical machine in migration phase which has capacity of 1000kb. That physical machine can contain three virtual machine .size of 300kb,500kb,100kb respectively .According to proposed system these VM are arrange in descending order hence VM which have 500kb comes first and rest all. So, arrived workload can be allocated to that VM terminal respectively.

In proposed system LSAP i.e linear sum assignment problem method is used to solve the migration planning problem which is arrived when migration module run. The Lsap method can also implement Hungarian algorithm to allocate terminal for workload.

3.1 LSAP Method

The Lsap method basically suggests equal number of item must be assigned to equal number of machines in best way. in migration planning problem first of all whole problem divided in sub problem and after that it can construct S*S cost matrix. This matrix form problem provided to Hungarian algorithm as input and after solving matrix will get output.

3.2 Algorithm

Input:

1) Source consolidation scenario

2) Target consolidation scenario

Output:

A set of VM migration with Minimal number of migration on it

Begin:

1) If s>t, add s-t empty cases to the target scenario

2) Construct an LSAP with s× s cost matrix C

3) Call Hungarian algorithm to solve LSAP

4) Solve migration mapping problem

End

3.3 Hungarian Algorithm

Above algorithm suggest that Hungarian algorithm can be used after Lsap method .This algorithm basically used to solve matrix S*S i.e cost matrix and distribute single workload to

single terminal. Following steps are used solve this cost matrix.

1. Find smallest entry from each row and subtract that value from all rows.
2. Find smallest entry from each column and subtract that entries from all column.
3. Draw minimum number of lines on rows and columns which cover zero value.
4. Test for Optimality:
   i. if number of lines and size of matrix are equal number then we are finished
   ii. if number of lines is less than size of matrix then goes to step 5
5. find out smallest entry which is not covered by any line subtract that entry from each uncovered row , and then add it to each covered column .follow step 3

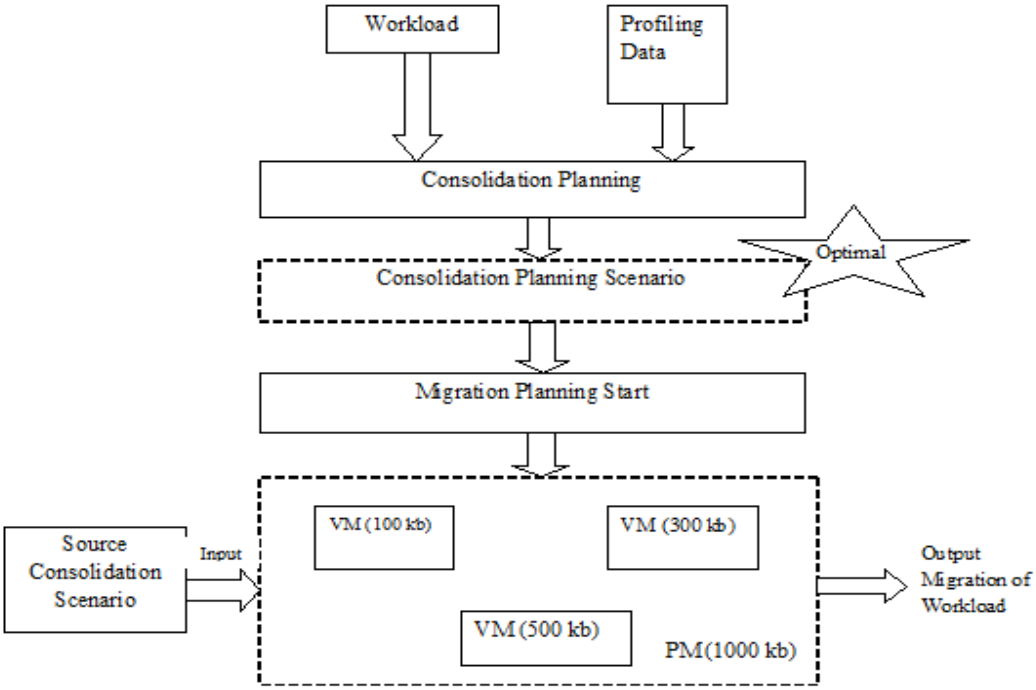

Figure 1: Proposed System

4. RESULT AND DISCUSSION

If we consider existing system it required more time to execute. it means source consolidation took more time to migrate on target consolidation. And in proposed system source consolidation took less time as compared to existing system to migrate on target consolidation in virtual system. Following graph shows time required for existing as well as proposed system. it shows values of time in millisecond .

Table 1: Comparison of Existing and Proposed System in time Parameter

Sr.No	Proposed System	Existing System	Difference
1	11.235	15.04	3.808
2	13.01	51.88	38.87
3	12.533	31.22	18.667

Following figure 2 shows graph of exiting system and proposed system in which existing system require 31220 ms and proposed system require 12533 ms time. Table 1 can include values in time parameter.

Second graph shows number of services which are to be migrated on target services. Following figure 3 shows number of services which are migrated. existing system can only migrate 21 services and proposed system can migrate 170 services

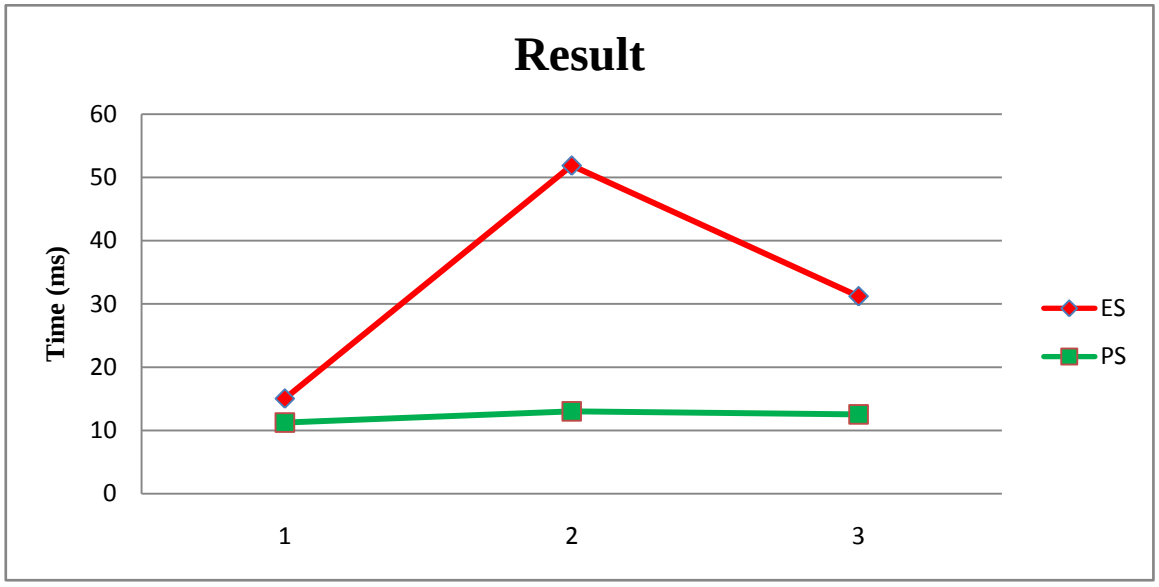

Figure 2: Comparison of existing system and proposed system for time parameter

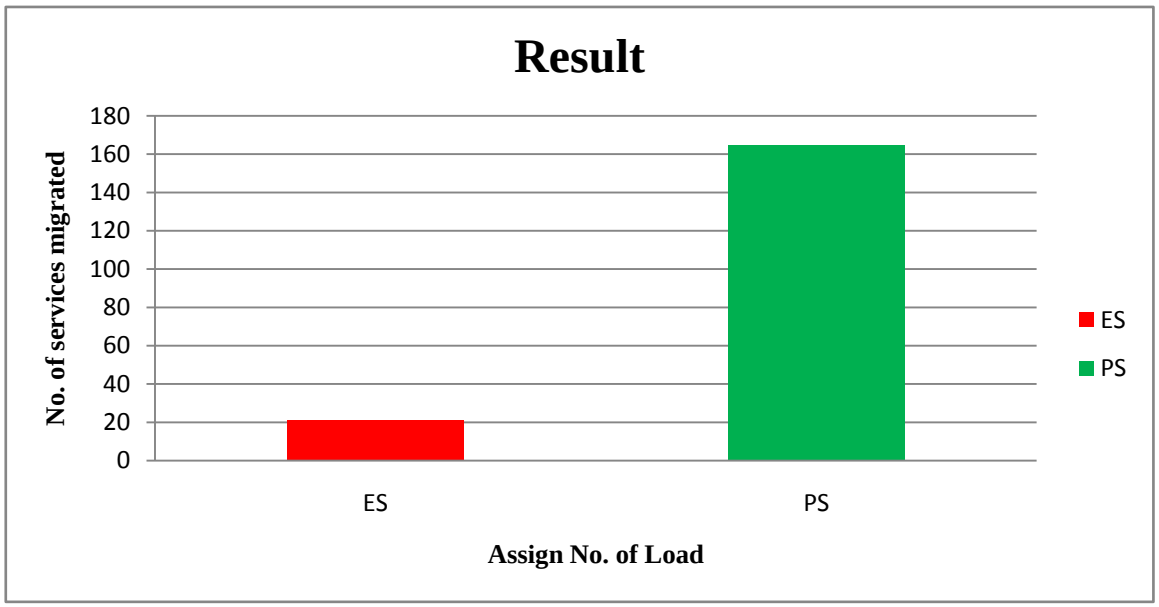

Figure 3: No. of Processes to be migrated

5. CONCLUSION

The main approach of this system is to distribute workload by using two modules Consolidation which promote to run system on single physical machine. And second module is migration module in which placement of workload can be done. Main purpose of this two module is increase efficiency of system in face of time.

System also gives solution for solving migration planning problem which arrived during migration. For this Lsap method can be used which construct cost matrix and after that it used Hungarian algorithm to solve that matrix.

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