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# BEST VM ALLOCATION AND MMT BASED UPON DAVMM WITH MINIMUM SLAV

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ABSTRACT. Cloud computing brings a great insurrection in the domain of computing, enhancing every aspect of computing. In general, cloud computing is defined as the platform used for providing services to the users through the internet. As all countries are now considering green computing in order to save our environment, cloud is no exception. The term green cloud computing is given to the latest updated type of cloud computing. This work finds the best Virtual Machine allocation. In this paper, we proposed our technique based upon minimization of migrations of virtual machines and compared it with various state-of-the-art techniques in order to show the updations.

## 1. INTRODUCTION

The main aim of green computing is to develop computing which helps in responsible use of computers and related resources thereby making system energy efficient and environment friendly, [1]. It has been globally accepted that energy consumption increases day by day and hence exhausting natural resources which posed adverse effect on energy consumption and in turn on environment, [2]. Therefore, it becomes essential to reduce the electricity consumption for environment sustainability, [3]. The solution to above problem is to reduce the energy consumption that can be done by using the concept of overloading and underloading the physical hosts within the data centre, [4]. In cloud computing, virtualization plays a significant role and entire performance of cloud

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depends on Virtual Machine (VM) Allocation, [5] and Virtual Machine Migration (VMM). Virtualization is defined as the technique that allows several users to share a single physical machine virtually. According to the existing work, the VM [6] is used when Physical Machine (PM) is overloaded, [7]. In cloud computing, a cloud provider creates multiple VM instances on a single physical machine, thus improving resource utilization and decreasing Service Level Agreement (SLA) violation become the main motive, [8]. A higher value of SLA means that the services offered by the service provider to their users meet the user's requirement, [9]. Every PM in cloud comprises a number of VMs. Every task required to utilize a number of VMs during a given period, [10]. To overcome these problems, the number of researchers have proposed efficient algorithms for minimizing SLA violation with the Quality of Service(QoS) at a satisfaction level. Virtual machine consolidation is considered as a technique that guarantees energy-QoS trade-off.

The paper is divided into five parts, first part provides introduction related to green cloud, second part discusses various related researches, third part briefs the implementation strategy, fourth part deals with result analysis and finally fifth part is conclusion and future scope.

## 2. Literature Survey

Masood Anwar et al. (2013) discussed various advantages and disadvantages for each green computing strategy in addition to its friendly approach towards atmosphere. The authors also discussed that how green computing can facilitate us to provide a safe, secure and healthy environment all across the globe.

Nidhi Kansal et al. (2016) proposed a firefly based VMM technique. This technique provides a method of virtual machine migration from heavily loaded to lightly loaded physical machines, thereby maintaining the performance and energy efficiency of the data-centres. They achieved an enhancement in the average energy consumption of about 44.39% and also reduced an average of 72.34% of migrations and saving 34.36% percent of physical machines and hence makes data-centre more energy aware.

Zhen Xiao et al. (2012) proposed the idea of "skewness" to calculate the inequality in the multi-dimensional utilization of resources of a server. Various types of heuristics have been developed and applied in order to prevent the system to become overloaded and hence effectively saving energy used.

Anton Beloglazov et al. (2012) in [12], conducted a survey in the energy-efficient computing. They proposed: (a)Energy-Efficient Management of Clouds (b) Energy-Efficient Resource Allocation; taking care of the aspects of QoS expectations along with characteristics of power usage of devices; and (c) various open research challenges, which results in benefits to both resource providers and customers.

Gurpreet Singh et al.(2019) in [14], targets to minimize the operating cost of the Physical Machines. The authors used Modified Best Fit Decreasing (MBFD) algorithm in order to verify the availability of resources. To optimize the MBFD performance by fitness function, Genetic Algorithm (GA) has been used.

The aim of study is for minimizing the SLA violation, energy consumption with number of migrations, MBFD algorithm and ANN technique would be used for energy optimization using VM migration, [11].

## 3. Implementation strategy

Proposed Work is implemented as below:

Step1: Input number of Virtual Machines and number of Hosts and Generate VM List and Host List with their properties like CPU utilization, power, and resources.

Step 2: Sort VMList in descending order according to CPU utilization and allocate VMs if host resources are available for VMs. Allocate VMs to host machines according to MBFD algorithm and apply ANN technique on the hosts and save training data.

Step 3: Classification of over-utilized and under-utilized hosts and Migrate VM to suitable host. When the energy consumption of the hosts get balanced, calculate the performance parameters like energy consumption [12], SLA violation, and number of migrations.

## 4. Result analysis

The parameters such as Energy Consumption, Job Completion Ratio (JCR), [13], and Time Consumption for SLA-V have been analysed. For computation, HVR [14], has been considered. When so ever the service provider fails to

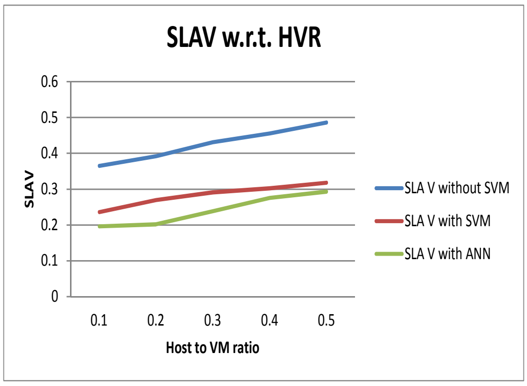


FIGURE 1. SLA V w.r.t HVR

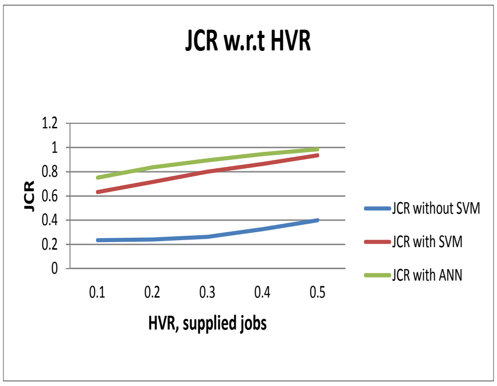


FIGURE 2. JCR w.r.t HVR

provide the committed services, it violates the service terms and it is termed as Service Level Agreement Violation (SLA-V). The next evaluation parameter is the job completion rate. The proposed algorithm considers 1000 to 10000 jobs. 1000 jobs are incremented with iteratixon.

**SLA Violation:** Service Level Agreement is an assurance to the service provider to the user. SLA can be known as violation e.g. if the job ought to be scheduled and it is non-scheduled.

$$SLA_v = \sum_{i=1}^{p} SLA_v(host, VM) \tag{4.1}$$

**Energy Consumption:** It is defined as the total energy consumed by each server within the system. Mathematically, it can be represented as:

$$\text{Energy Consumption (EC)} = \sum_{i=1}^{n} VM_e + \sum_{i=1}^{k} host_e, \tag{4.2}$$

where $VM_e$- Signifies energy of VM, $Host_e$- Signifies energy of host.

Figure 1 describes the outcome of SLA-V with and without SVM. The average value of SLA-V without SVM is 0.42, SLA-V with SVM is 0.28 and SLA-V with ANN is 0.24.

Figure 2 describes the outcome of JCR with and without SVM. Redline describes the result of JCR with SVM whereas blue line describes the result of JCR without SVM and grey line describes the result of JCR with ANN. The average value of JCR without SVM is 0.29, the average value of JCR with SVM is 0.78

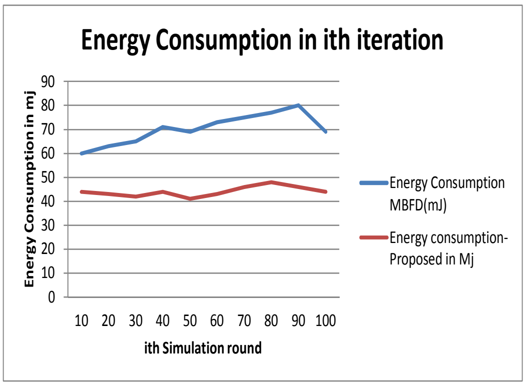


FIGURE 3. EC

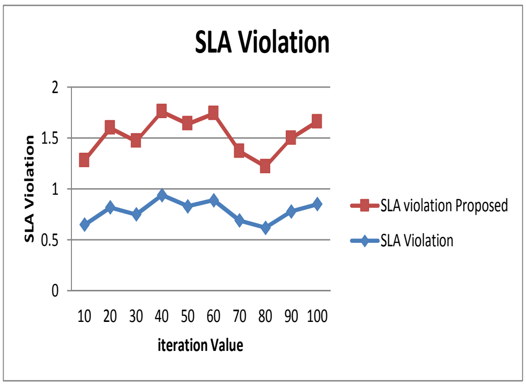


FIGURE 4. SLA Violation

and the average value of JCR with ANN is 0.88. There is one drawback with this architecture, with every increase in the VM, the energy consumption also increases and hence the violation increases with the increase in the HVR.

Figure 3 defines the obtained values of energy consumed with respect to the ith iteration measured with and without optimization and classification algorithm. The average value for MBFD is 70.2 whereas the energy consumption in case of proposed work is 44.1. There is a reduction of 37.17% in energy consumption in proposed work than the existing one.

Figure 4 represents the SLA Violation of the proposed and previous model. The proposed algorithm shows percentage improvement as 15% as compared to previous work. In addition to all the comparisons which is made till data, the proposed work is also compared with some recent research articles on the base of the following Quality of Service Parameters.

Figure 5 shows the improvement against the failed VMs. The proposed work is compared with [1] approach, and demonstrated a failure rate varying from 14% to 25% against a maximum of 50 testing VMs. The proposed research work implemented the work article for 300 VMs to check the failure ratio.

The percentage improvement in the failure rate is observed to be 10-15% as shown in Figure 6. To test the performance of the article gregariously, the VM count is increased to 300 as shown in Figure 5.

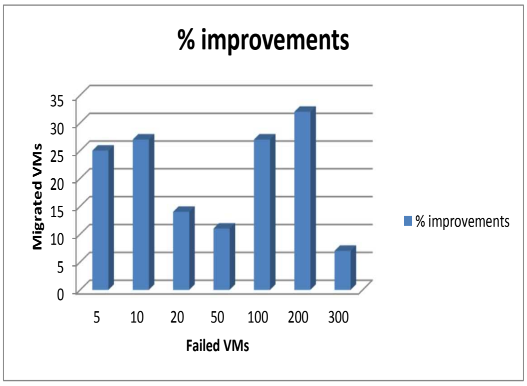


FIGURE 5. ECI %

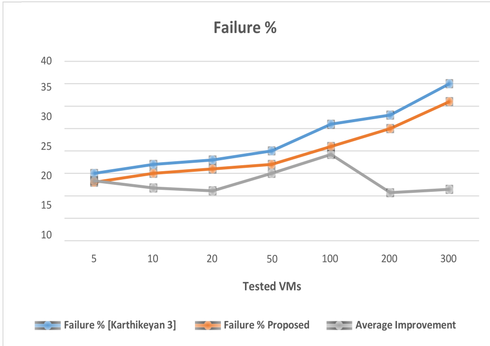


FIGURE 6. Failure %

## 5. CONCLUSION AND FUTURE SCOPE

We suggested an approach which not only considering the VM migrations but also consider the cost involved in allocation based upon distance. The approach suggested is compared and proved better as compared to the existing techniques. However work can be done on improving the distance calculation cost and further reducing failure% as well as SLA-V.

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