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A Modified Approach to Maximize the Performance and Minimize Energy Consumption for Resource Allocation

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ABSTRACT: Cloud computing may be different from the various techniques and perspecitves. In the cloud given the opportunity to bring down everything can be done off-site.Necessary to know that the whole operating system can run in the cloud. Cloud environment is an environment in which it is necessary, on the one hand by a calculation can be outsourced to another party, and with the resources of the members of authentication or used as if the database access is by system. Cloud computing services are divided into three categories: infrastructure as-a-Service (IaaS) which was carried down to-a-Service (PaaS), and Software-as-a-Service (SaaS). Including clients, too,it is divided into five layers of the cloud computing, applications, platform, infrastructure and servers. Cloud computing virtualization does escalabilidad, trade, and service delivery models such as cloud of public and private categories.This paper focus on the technique to increase the user satisfaction level and giving the cloud designer a new approach for efficiency increase. The proposed work is done in the area of resource allocation for the virtual machines keeping in the aim of increase the energy efficiency.

KEYWORDS: Cloud Architecture, Cloud computing, Cloud computing issues, Distributed computing, Advantages, Disadvantages, Benefits

I. INTRODUCTION

Cloud Computing is evolving as a key technology for sharing resources. Cloud computing is everywhere either any tech magazine or IT website, there will be a discussion of Cloud Computing but not everyone agrees on what it is It means different things by different people. The burden of the CEO L. Ellison thinks that cloud computing is nothing more than offering 'in all things, which we now have to do ". According to the Berkeley RAD Lab, "a reference to the football office applications delivered over the Internet hardware and software systems in the data centers that provide services". [1] Cloud computing, which is a type of computing companion computing devices serving local or private resources profitable than drugs. Cloud computing says "Internet-based computing as a" Where things are delivered to the machine, by means of the different services of an organization of which the ministers of the eu lorem adipiscing medicine. That "a cloud," is from the world of the telecommunications providers to apply when they began, just as private virtual network VPN services for the communications needs of data [2] .Cloud computing the calculation, software, data access and storage services, the end-user does not require the knowledge of the body, the position of which can be The local deliver systems and services. The cloud computing is an IT's most recent trend that is moved by a portable PCs and in the desktop computing and large data centers of the data [3].

The main purpose of energy efficient algorithm is to maximize the network performance and decreasing the energy consumption. These algorithm is not just related to minimize the total energy consumption of the virtual machines but also to minimize the virtual machine migrations which ultimately decreases the time to fulfill the user request and thus achieving more user satisfaction. The user satisfaction is further increased by the overall performance of the system which is done by efficient resource allocation. Decrease in energy and migration time increases the system capacity to support more users which reduces the cost in the system aiming at the goal to provide the user with great experience and increase in productivity of the system.

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II. RELATED WORK

Jungsoo Kim Atienza, David Martino Ruggiero [1], provides the information and guides through the multiple cluster environment and utilization of datacenters. The work starts from the focus on server consolidation as it is playing a key role mitigate the continuous growth of datacenters. The recent arrival of-scale applications (eg, web search, MapReduce, etc.) necessitate revises existing server consolidation solutions due to distinctly different characteristics compared to traditional high-performance computing (HPC), ie, interactive user, latency crisis and divided by the number of large operations killed servers. The power saving solution for datacenters that particularly targets the distinctive characteristics of the scale-out applications is provided. More specifically, the correlation data between core utilization of virtual machines (VMs) for server consolidation actually lower the peak server utilization are taken into account. Therefore, the benefit of this reduction can be increased to achieve the operating voltage by means of the level of savings in hot anger at all events with safety, lowering the server-and the army. The effectiveness of the proposed solution is validated using 1) multiple datacenter cluster of real-life scale for application workloads in web based search and 2) utilization traces obtained from real datacenter setups.

Hung Nguyen Quang-Nam Thoai [2], provides the information and knowledge on the global scheduler for the future user applications. Cloud computing has become more popular in the provision of computing resources under virtual machine (VM) abstraction of high-performance computing (HPC) users to run their applications. The HPC cloud, a cloud computing environment. One of the challenges for the energy-efficient resource allocation of a trade-off between the VMs in the cloud to minimize the total energy consumption of the body HPC machines (PMs), and filling them up with the enmity of Quality of Service (eg in performance). On the one hand, and the clouds want to providers to maximize their own benefit by reducing the power of the cost (eg using the number of the least of the people running PMs). On the other hand a cloud of the same (the users) the greatest power is the sight of their reasons. In this work, in order to focus on the mission of global scheduler knows jobs data user / user applications in the future. Users will ask the intermittent short-term resources, and the start-at certain times of duration. Therefore propose a new allocation heuristic (the Energy Performance-per-Watt oriented and aware of Best-Fit (EPOBF)), which uses performance-per-watt metric to choose the most energy-efficient PM destined for each VM (eg a maximum of MIPS / watt) . Using data from the International Feitelson's HPC Workload Archive invent jobs, we compare the proposed EPOBF to state-of-the-art Heuristics on PMs heterogeneous (PM Everyone has a multicore CPU). Simulations show that the total energy consumption in comparison with the significant EPOBF can reduce the status-of-the-art the allocation of Heuristics.

Anton Beloglazov and Rajkumar Buyya [3],provides the information on a novel adaptive below Heuristics for dynamic consolidation of VMs based on the analysis of historical data from the VMs resource usage. Rapid growth in demand for computational power of modern applications driven service combined with the shift to Cloud computing model led to the establishment of large-scale virtualized data centers. Such data centers consume vast amounts of electrical energy resulting in high operating costs and carbon dioxide emissions. Dynamic consolidation of virtual machines (VMs) using live migration and switching nodes idle sleep mode to allow Cloud providers to optimize resource usage and reduce energy consumption. However, in the case of the power of the office of their ministry is essential to the quality of the elit-performance trade-off, in order to the consolidation of the irascible power shall be a performance degradation. Due to the variability of workloads is the experience of modern applications, the placement of VM should the painful tale takes place continuously in an online mode. To understand a proverb, and thanks to the competitive nature of the problem and its implications for the online analysis of deterministic algorithms for optimal ways to prove a competitive online VM migration and dynamic VM consolidation problems. The proposed algorithms significantly reduce the energy consumption, but a high level of adherence to the course of the same Level Agreements (SLA). The high efficiency of the proposed algorithms through extensive simulations using real-world workload traces more than a thousand planetlab VMs is also validated.

III. PROPOSED ALGORITHM

A. *Design Considerations:*

- Theoretical analysis is done to obtain theoretical performance estimates and insights into designing of algorithm.
- Based on the insights from the conducted competitive analysis and derived system model.

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- Evaluate the proposed algorithms is done through discrete-event simulation using the CloudSim simulation. Conducting repeatable large-scale experiments on a real infrastructure is extremely difficult. Therefore, to ensure the repeatability and reproducibility of experiments, as well as carry out large-scale experiments, discrete event simulation has been chosen as the initial way to evaluate the performance of the proposed algorithms.
- Implement a system prototype as an add-on to an open source Cloud platform.

B. *Description of the Proposed Algorithm:*

In cloud computing, Resource Allocation (RA) is the process of assigning available resources to the needed cloud applications over the internet. Resource allocation starves services if the allocation is not managed precisely. Resource provisioning solves that problem by allowing the service providers to manage the resources for each individual module. The Proposed Algorithm can be described in following steps:

Step 1: First and crucial step is the configuration of the scenario which includes all the configuration parameters including datacenter size , its host available virtual machines and types of virtual machines. These configuration parameters are utilize to have the real time situation and performance measures.

Step 2: Design and code the proposed algorithm to follow the strategy as proposed and include this development in the existing cloudsim code. The integration is done after that it is able to interact with the other modules of the cloud sim and provide the validation of the proposed algorithm.

Step 3: Collect the results of the proposed algorithm and other algorithms for comparison. Make the required performance graphs and validate.

IV. PSEUDO CODE

```
Step 1:  Initialization
Get the number of virtual machines available.
Step 2: List Vm id and count
Here the id is of virtual machine present in the system e.g. it can be from 0 to n.
Step 3: Initialize the control count to 0.
Step 4: If task initiated by the user is denoted by T and is present in the queue
        For i=0 to n-1
                For j= i+1 to n-1
                        If(for Allocation Get(i).count<= j.count)
                        Assign task T to virtual machine having id i
                        Allocate with (I, count+1)
                End
        End
End
Step 5: If any task is completed , make the count variable for that machine equal to zero.
Step 6: Repeat step 4,5  untill the tasks present in the system or initiated by the user to allocate to the virtual machines present.
```

V. SIMULATION RESULTS

- **Energy Consumption**

Table 1 Comparison of Energy consumption for different allocation policy

Allocation Policy	Energy Consumption(KWh)
Inter Quartile Range VM allocation	19.41
Least recently used(Proposed)	13.73
Median Absolute Deviations	18.08
Threshold Based allocation	16.46

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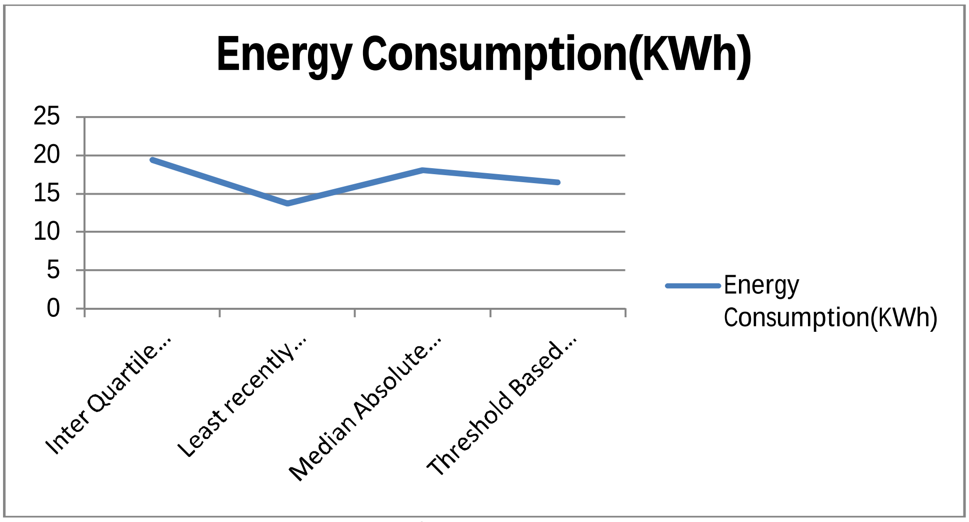

Fig 1: Plot for Energy consumption

Energy consumption measured in KWh and it is measured for the four algorithms Inter Quartile Range VM allocation, Least recently user(Proposed algorithm), Median Absolute Deviations and Threshold Based allocation. The four algorithms are run under same simulation environments. The difference between the energy consumption becomes clear from the graph.

- **Number of VM migrations**

  Number of VM migrations deals with the number of migrations done for the fulfillment of the user request and performs their tasks. The number of migrations done is a major of the efficiency as smaller this number is more efficient will be the system. VM migration costs in terms of energy as well as time.

Table 2 Comparison of Number of VM migrations for different allocation policies

Allocation Policy	**Number of migrations**
Inter Quartile Range VM allocation	2009
Least recently used (Proposed)	575
Median Absolute Deviations	2021
Threshold Based allocation	1881

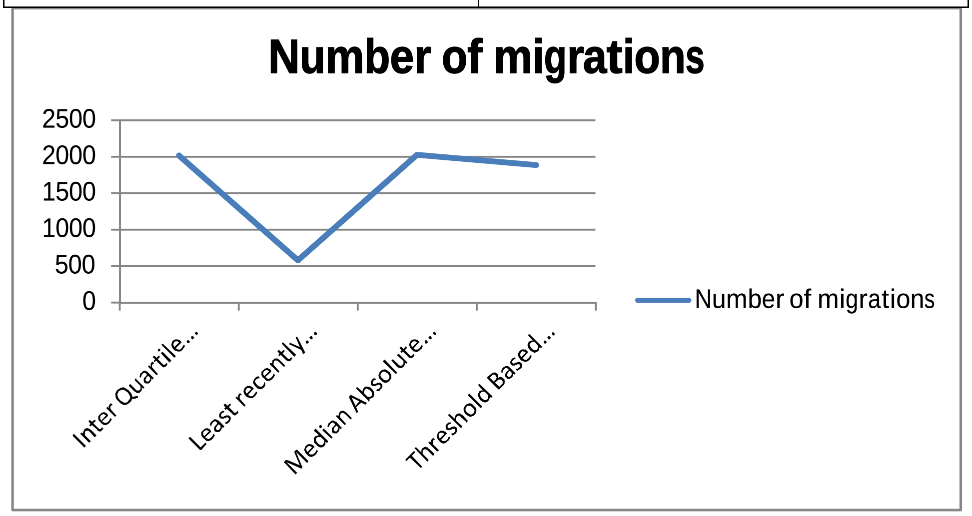

Fig 2 Plot for VM migrations

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Out of four algorithms analyzed the Proposed algorithm, i.e. Least recently used algo. performs the tasks with the least number of VM migrations required. This proves it to be more correctly fulfills the user requirements efficiently than the other algorithms.

- **Mean time before VM migration**

Table 3 Comparison of Mean time before VM migration for different allocation policies

Allocation Policy	Mean time (VM migration)(Sec)
Inter Quartile Range VM allocation	19.67
Least recently used(Proposed)	20.07
Median Absolute Deviations	19.99
Threshold Based allocation	19.93

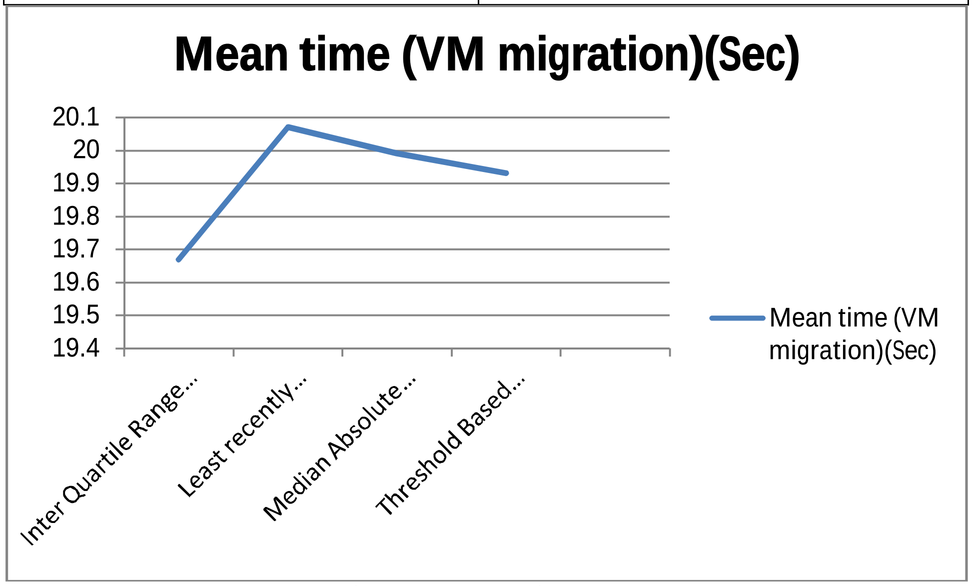

Fig 3 Plot for Mean time before VM migration

Mean time befor Virtual machine migration provides the information about the time required for the decision making about the selection of Virtual machine to migrate it further. Mean time before VM migration depends on the selection process of the candidate virtual machine for the task in hand. For the proposed algorithm , it go through the list of virtual machine until it find the suitable virtual machine. This selection results in efficient selection of virtual machines as the number of Virtual machine migrations are small but for selection it takes more time than the other three compared algorithms.

VI. Conclusion and Future Work

Cloudsim simulation is performed in the scenario set for the evaluation and comparision of different allocation algorithms along with the proposed algorithm. The scenario takes scheduling interval as 200 sec and six types of virtual Machines are designed having different powers and ram. Simulation takes a total 20 hosts and 10 seeds, which on simulation with Static Threshold (THR) VM allocation policy, Median Absolute Deviation (MAD) VM allocation policy, Inter Quartile Range VM allocation policy and the proposed VM allocation policy gives the best results in case of proposed policy.

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BIOGRAPHY

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