

# Analysis of Various Virtual Machine Migration Techniques in Cloud Computing

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**Abstract-** The cloud computing is the technology which is used to store information over the servers virtually. The virtual machine are involved in the network which can process information in the network. The virtual machines have different configurations to process information of the network. In the network some uncertainties may happen, which leads to overloading of the virtual machines. When the virtual machines get overloaded it will imbalance the network load. The various techniques has been proposed for the load balancing in the network. In this paper, various load balancing techniques are reviewed in terms certain parameters

**Keywords-** Cloud computing, load balancing, virtual machine migration

## I. INTRODUCTION

A pool of on-demand services that were linked to different servers to provide services to large number of clients is known as cloud computing. To ensure the clients can access the required services as per their need, a direct access to the services is provided by the cloud providers [1]. To ensure that resources are provided to users as per their demands, the cloud providers are provided with direct access. The clients can extract and modify the data that is already stored in the clouds. To the user on demand, the "Cloud Service Provider" feature is provided [2]. For calculating the costs that are to be charged to the client after accessing certain services this feature is helpful. It only charges for the number of services accessed by the user for certain amount of time. Using cloud computing technology, highly complex applications can be provided with different topologies. Further, in each topology, there are few expert specialized services provided to clients. The cloud deployment models include three different kinds of cloud deployment models which are public, private and hybrid [3]. Most effective services are provided by the public clouds. All the models have their own characteristic properties. The services of these models can however, change as per the application in which they are deployed. For providing infrastructure and services at an offsite with the help of internet, the public cloud is used which is highly efficient. However, these clouds are highly vulnerable to the unauthorized services as compared to the private clouds. Third party is used to perform executions in the public clouds [4]. It is possible to maintain the services and infrastructure on a

private network through a private cloud. They also ensure utmost level of control and security. The cost of clients in these clouds at times when organizations require purchasing all the software and infrastructure that is necessary. A cloud service provider that includes internal as well as external services within one scenario is known as a hybrid cloud [5]. To the public cloud services, the transition is provided when several cloud service users are linked to one another.

The process which aims to improve the performance of a system by dividing the complete workload across several processors is known as load balancing. The overall processing time required by a machine for executing all the tasks aligned for it is known as its workload [6]. This technique helps in providing massive computing and storage resources in any cloud scenario. Multiple requests from clients are accepted and distributed across multiple network devices depending upon the availability of the network device to which services were sent is done by the load balancer.

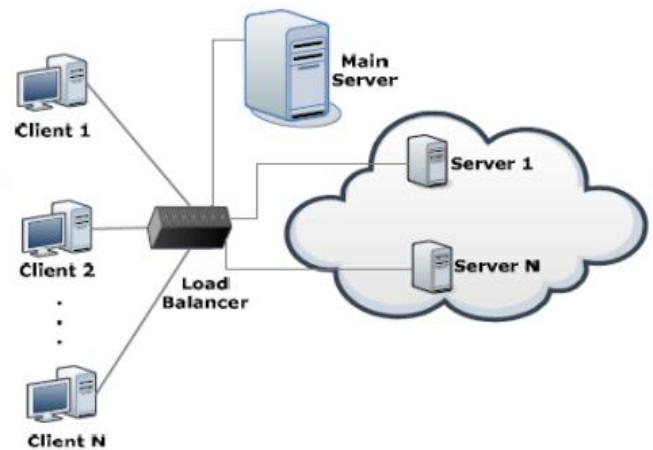


Fig.1: Load Balancing in Cloud Computing

A network device or server is prevented from being overloaded with requests and the load is distributed through load balancing. For instance, when the server is overloaded in another process and requests are sent to the application at that time, it is possible for the current process to wait for some time until the server is idle [7]. The usage of server is checked initially and then the client request is processed such that these problems can be avoided. Load balancing algorithm helps in performing efficient CPU utilization. The method which helps

in deciding which requesting client uses the virtual machine and which requesting machines are to be held, load balancing is applied. Further, the power consumption is reduced and user satisfaction is increased by offering services with load balancing as well. It is dynamic in nature and the previous state is not of concern. The present behavior of system is the major factor to be considered here [8].

Depending upon the type of configuration of cloud demanded by the cloud provider, the cloud computing can be of different types. Some of these are mentioned below:

a. Sender Initiated: The request is sent by the client until a receiver is assigned that can receive the workload in this type of load balancing algorithm. The process is initiated by the sender.

b. Receiver Initiated: A request is sent by the receiver such that a sender can be acknowledged about any provider who is ready to share the workload through this load balancing algorithm. This process is initiated by the receiver.

c. Static Environment: The system is designed or implemented through this approach. Only after its creation, the tasks can be assigned to the processors and at the time of execution, the task cannot be shifted to another machine to balance the load which is a disadvantage of this algorithm.

d. Dynamic Environment: The current state of the system when making load balancing decisions is considered in this approach. For the largely distributed systems, this approach is considered as appropriate [9]. Depending upon the current state of system, the decision for balancing the load is made. The load is thus migrated dynamically such that the overall performance of the system can be improved.

e. Centralized Load Balancing: One single node is used in the centralized load balancing technique such that all the allocation and scheduling decisions can be made. The knowledge base of the complete cloud network is stored by the node. Load balancing is performed by applying either static or dynamic method. The time required to analyze various cloud resources is minimized here. However, a great overhead is generated on the centralized node.

f. Distributed Load Balancing: The resource provisioning or task scheduling decision is generated by no single node in the distributed load balancing method [10]. To monitor the cloud network, no single domain is responsible. The accurate load balancing decisions are made instead, by the multiple domains which monitor the network.

g. Hierarchical Load Balancing: Various levels of clouds are involved in load balancing decision through hierarchical load

balancing method. Within the master slave mode, most of such operations are performed. The provisioning or scheduling decision is made here based on the information gathered by parent node.

## II. LITERATURE REVIEW

Sukhpreet Kaur, et.al (2017) proposed a new approach through which the tasks could be assigned to VMs [11]. Increasing the resource utilization as well as preserving the least power expenditure was the major aims of this method. The task resource utilization was also maximized here. It was ensured that the VMs could be neither underutilized nor over utilized With respect to power effectiveness and cost, the performance of proposed algorithm was known to be better. Through load balancing, a proper usage of tasks among all VMs was provided. In comparison to other GAs, the performance of proposed algorithm was known to be better as per the graphical outcomes.

Sheetal Karki, et.al (2018) studied that in the cloud, the data was saved in the central VM. To assign the client's help, the cloud supplier companies were responsible. Mostly based on the requirements, the assistance of clients was achieved. For the services they were using, the clients had to pay [12]. The need of load balancing was mainly shown with the increase in number of requests. To support the task migration two algorithms threshold and check pointing algorithm were applied. To increase the valuable resource exploitation and power usage, it was important to include load balancing. From one to another VM, migrating the tasks was important. The processing time, resource usage and power were reduced using the check point algorithm.

T. Deepa, et.al (2017) studied that the most important reason behind popularity of cloud computing was its ability to provide services. For the cloud networks, an important concern was load balancing [13]. Depending upon the demands of clients, a competent load balancing algorithm must provide them resources. The resources could be used effectively here. For assigning the priority to clients scheduling algorithm was applied. Based on the response and waiting times, the performances of load balancing algorithms were ensured. Within the cloud environments, accessible load balancing algorithms could be provided as a major objective such that organized comparative analysis could be achieved.

Pramod Kumar, et.al (2018) studied that the major technique in the conjunction with distributed computing was the parallel computing [14]. The service requests could be handled difficultly as per the growth in requirement of protecting the privacy of data in cloud computing. One of the most important challenges in cloud computing was performance analysis. Accessing the information that was stored in clouds was not possible for the users due to the excessive load available in

these systems. Therefore, to provide dynamic performance analysis, load balancing was provided in these systems. The request and response time were improved here. It was seen that the security of systems was improved in this method.

P. Geetha, et.al (2016) studied that in the improved version of cloud computing, green cloud computing was recognized [15]. The achievement and effectiveness were provided by this approach. Further, the mobile and cloud computing were integrated to perform mobile cloud computing. The data-intensiveness was provided by transforming the computational science. Thus, load balancing was applied such that the overall load could be distributed among green cloud and general cloud networks. For the load balancing algorithms, the detailed structure was provided by proposed method. With respect to the quality parameters, comparisons against existing and proposed methods were performed by this study which showed improved outcomes for new method.

Snehal A. Narale, et.al (2018) studied that cloud service providers of the cloud computing approach provided their users the cloud data hub. Across the worldwide data, users could get desired access [16]. To distribute the workload such

that the load across two cloud servers could be balanced, load balancing was applied. Advancing the resource utilization, reducing the data center's cost and increasing the throughput were few objectives of this research. The major concern of this research was to reduce the cost of center transmission, time of hub processing, and overall virtual machine. This research helped in assessing the throttled load balancing and their improvement criteria. The processing time of data center and outlay were reduced through this process.

Guilin Shao, et.al (2016) designed a new method based on load balancing. The correlation of data present in cloud environments helped design this strategy [17]. There were certain issues related to data correlation which were inclined by the virtual machines. Because of the migration of an individual VM in the cloud environment also several issues were raised. Based on the relevancy among data and VMs, migration module was discovered by the proposed strategy. To perform an absolute migration, the load-intensive data suite was built by VMs. It was shown that the contact cost could be minimized when the load balancing plan was employed. Up to a certain level, the load balancing plan proved to provide improved resources.

**Table 1: Table of Comparison**

| Authors' Names  | Year | Description  | Outcomes   |
|---|------|--|--|
| Sukhpreet Kaur, Dr. Jyotsna Sengupta                  | 2017 | A new approach was proposed through which the tasks could be assigned to VMs. Increasing the resource utilization as well as preserving the least power expenditure was the major aims of this method. | In comparison to other GAs, the performance of proposed algorithm was known to be better as per the graphical outcomes.  |
| Sheetal Karki, Anshika Goyal                          | 2018 | To assign the client's help, the cloud supplier companies were responsible. Mostly based on the requirements, the assistance of clients was achieved.  | The processing time, resource usage and power were reduced using the check point algorithm.  |
| T. Deepa, Dhanaraj Cheelu                             | 2017 | Depending upon the demands of clients, a competent load balancing algorithm must provide them resources. The resources could be used effectively here.   | Within the cloud environments, accessible load balancing algorithms could be provided as a major objective such that organized comparative analysis could be achieved. |
| Pramod Kumar, Dr. Mahesh Bunde, Mr. Devendra Somwansi | 2018 | The service requests could be handled difficultly as per the growth in requirement of protecting the privacy of data in cloud computing.   | The request and response time were improved here. It was seen that the security of systems was improved in this method.  |
| P. Geetha, C.R. Rene Robin                            | 2016 | In the improved version of cloud computing, green cloud computing was recognized. The achievement and effectiveness were provided by this approach.  | With respect to the quality parameters, comparisons against existing and proposed methods were performed by this study which showed improved outcomes for new method.  |
| Snehal A. Narale, P.K. Butey                          | 2018 | To distribute the workload such that the load across two cloud servers   | This research helped in assessing the throttled load balancing and their   |

|                          |      |   |   |
|--------------------------|------|---|---|
|                          |      | could be balances, load balancing was applied.  | improvement criteria. The processing time of data center and outlay were reduced through this process.  |
| Guilin Shao, Jiming Chen | 2016 | A new method was proposed based on load balancing. The correlation of data present in cloud environments helped design this strategy. | It was shown that the contact cost could be minimized when the load balancing plan was employed. Up to a certain level, the load balancing plan proved to provide improved resources. |

### III. CONCLUSION

In this paper, it is concluded that virtual machine migration is the major challenge of the cloud computing. The various techniques are designed so far for the virtual machine migration in the cloud computing. The virtual machine migration techniques are proposed so far which increase efficiency of the network. In future, novel approach will be designed for the virtual machine migration which optimize network parameters

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