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Covid-19 Testing Management System using PHP and MySQL.

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ABSTRACT

Technical meaning of cloud computingis distributed computing, storing, sharing and accessing data over the Internet. It provides lots of shared resources to the users available on the basis ofpay as you go service, means users pay only for those services which are used by him according to their access times. The data processing and storage amountis increasing very fast day by day in cloud environment. This leads to an uneven distribution of overall work on cloud resources. There are different scheduling algorithms which are already present in the cloud computing, and some of them include the Shortest Job First (SJF), First Come First Serve (FCFS), Round Robin (RR) etc. Though there are different parameters to consider when load balancingin cloud computing, make span (time difference between start time of first task and finish of last task on the same machine) and response time are the most important parameters. To get the better of load balancing problem this paper provides a summary of evolutionary and swarm based algorithms which will help to get control of such problem in different environment of cloud.

Keywords— Cloud computing, load balancing, swarm based algorithms, quality of services (QoS), distributed computing, ant colony optimization (ACO), artificial bee colony algorithm (ABC), resource allocation, computation energy, virtual machine (VM).

[1] INTRODUCTION

Cloud computing has become very popular in the last few years [1], [3]. Size of computation and demand for higher computation is growing very rapidly which is causing an uneven and heavy workload on cloud resources. Load balancing helps to distribute all loads among all the nodes [4]. This guarantees that each and every processing unit is dispersed well. Basically this technique helps in prevention of bottlenecks of the overall system which occurs due to load disparity [5]. One

Important issue associated with this field is dynamic load balancing [6]. From the above definition, we can conclude that cloud computing provides virtual infrastructure backed by software and hardware resources available on the internet. Cloud computing gives access to a user's shared pool of resources on demand of the user, to which the user subscribe and use for the time he wants to use and this all is achieved with the help of virtualization, which further helps in minimizing the cost of implementing or adding more hardware parts to achieve the requirements of the user [2]. Deployment model of Cloud computing has been categorized into four categories. Three categories are mainly used today. Public cloud is also known as a most common model of cloud computing to all clients that is an open cloud to model. In this model, cloud services are provided through virtualized environment developed using polled shared physical resources and share on public network such as internet. Same infrastructures shared by multiple clients [4]. Through this model , operations under cloud are performed optimally. Private Cloud is designed and developed under the needs of single organization. Private cloud service provider gives you access to its network in a more secure way assuring that anyone outside of your network won't be able to access it. Cloud platforms are highly scalable. It can be scaled up and scaled down any time as per user's requirements [7]. Such dynamic nature of cloud platforms demands efficient and effective load balancing across all machines to reduce makespan, the response time of a single task, energy consumption, and interruption of services. If load balancing is done properly among different cloud resources, then it also provides high availability of services, if any of the other resources are not responding properly. Many task scheduling techniques are present to schedule tasks in cloud computing. The main problem is that basic load balancing techniques do not use resources in an successful manner. Hence, it increases the overall

request's processing time in cloud computing [5]. The virtualization capacity of the cloud computing conceals the diversity of the resources which keeps it unique in relation to other progress presented already.

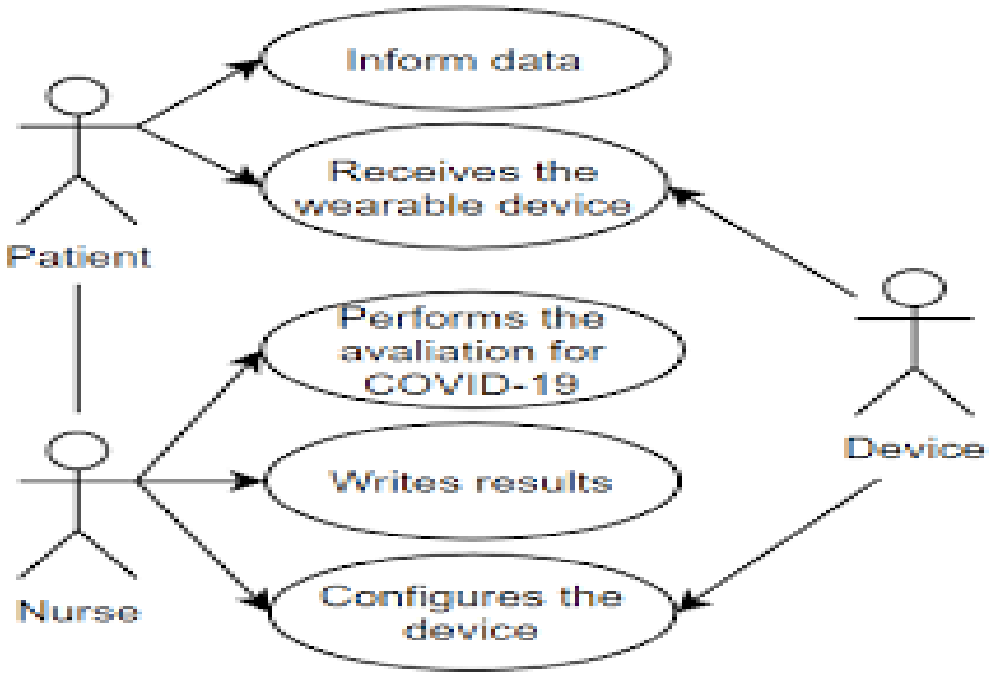

Figure 1: Use case diagram for CTMS [2].

[2] RELATED WORK

Workload distribution in a balanced manner is a key challenge of cloud computing. By distributing workload across multiple nodes, resources are properly utilized. This is an optimization problem and a good load balancer should be used for this strategy due to the types of tasks and dynamic environment. [9]. For the load scheduling problem and simple applications, many optimization approaches are presented. Kousik Dasgupta et al. (2013) [9] have proposed a Genetic Algorithm (GA) over load balancing strategy. Using this optimization technique, the load on the cloud environment can be balanced, minimizing the time it takes to complete a task. Cloud analyst simulator is used to model the load balancing strategy. Simulations use methods such as First Come First Serve (FCFS), Round Robin (RR) and Stochastic Hill Climbing (SHC). GA utilizes all the dedicated resources associated with it. The proposed technique provides better QoS than few existing techniques. A. Paulin Florence et al. (2014) [10] have developed a firefly algorithm for load balancing in cloud computing. The load will be balanced correctly using this algorithm. This algorithm always gives the best results. In a cloud computing environment, load balancing refers to how requests are distributed among resources to optimize results. In previous

load balancing algorithms, there have been many constraints. The FCFS algorithm is the simplest load balancing algorithm because it considers only the time it takes a task to reach the virtual machine. In Round Robin (RR), tasks are assigned the same time slots, whereas FCFS does not. Previous load balancing algorithms, such as Shortest Job First (SJF) and FCFS, did not improve throughput much. A RR load balancer is one of the simplest and most

common techniques used in cloud computing environments. It allocates tasks to different resources based on time units. Its load balancing technique ensures that all available cloud resources are utilized in RR fashion by randomly selecting any node and assigning it the first task. In cases where all nodes are occupied at the time of task allocation, the node with the smallest queue of tasks is assigned the task. The cut-off times for tasks vary. As RR allocates tasks to VMs, it does not take into account the length of the tasks, the processing power of the VM, or the priority of the tasks. Consequently, every node has equal weight during execution and will be allocated equally.

Hence, author in states that RR algorithm is based on random sampling i.e. it selects load randomly. In this execution, some nodes are heavily loaded while some are lightly loaded with tasks. Hence RR does not optimize resource utilization. Sheetal Karki et al. in 2018 explains that the data is stored in a centralized virtual machine called cloud and the cloud provider companies are responsible to assign the offerings to the end users. The end users get entry to the offerings primarily based on their needs and are to be paid for what's being served. As the number of requests grows so the need for load balancing arises to maximize the useful resource utilization and energy consumption. Threshold and Check Pointing algorithm help in task migration when the virtual machines get overloaded at the time of cloudlet execution. The tasks are migrated from one virtual machine to another or can be queued to be decided by threshold and check pointing algorithm minimizing the processing time, energy and resource consumption. According to Mayur S. Pilavare et al. in 2015, cloud computing is connected to servers via a network, so there are many issues to be resolved. Load balancing is the crucial issue over the cloud to be addressed. The Genetic Algorithm outperforms some existing load balancing techniques. As a result of giving the prioritized input to the genetic algorithm, the response time will be decreased, minimizing the duration of the given task set. The jobs here are assumed to have the same priority but that may not actually be the case, so it can be taken for further analysis and the various selection techniques for GA can be changed for better performance, and crossover and mutation techniques can be modified to get better performance.

[3] PROPOSED METHODOLOGY

All the free virtual machines available within the system are detected by improved genetic algorithm. The availability of free virtual machine is checked whenever a new task arrives. The task is allocated to the particular virtual machine in case when a virtual machine is available. However, in case no virtual machine is available, the machine whose task will be completed at the first is assigned the next task. Therefore, a proper utilization of all the VMs is done and an idle or over utilization condition is avoided here. Thus, with respect to cost and energy efficiency, the results gained here are better as compared to other existing techniques. Following are the various steps of Improved Genetic Algorithm:

A. Initialization

The initial populace of candidate solutions is normally generated arbitrarily across the search area. However, the domain-specific knowledge or other information can be easily incorporated.

B. Evaluation

As soon as the population is initialized or an offspring populace is created, the evaluation of the fitness values of the candidate solutions takes place.

C. Selection

Those proposed with better fitness values are given more copies of the selection and for this reason the survival-of-the-fittest mechanism is imposed on the candidate solutions.

Better selection is chosen over the worse one is the idea here and people have tried multiple strategies of selection theory to accomplish this idea, including stochastic universal selection there are others like roulette-wheel selection and ranking selection and few uncommon selections like tournament selection, these are well described in the following report.

D. Recombination

Recombination merges the components of two or more parental solutions to create new, possibly better solutions (i.e. offspring). There are many approaches of carrying out this and competent overall performance depends on a well-designed recombination mechanism. The offspring beneath recombination will not be same to any particular parent and will alternatively combine parental developments in a novel manner. The process of implementation can be applied in following steps: Step1: In the very first step, the cloud network is

Deployed with the finite number of virtual machines.

Step 2: In the second step, the best virtual machine is selected for the cloudlet execution and when the fault occurs in the network the next step is executed.

Step 3: The improved genetic algorithm is executed which reassign the task to some other virtual machine when the fault occurs and further execution takes place.

[4] FUTURE SCOPE

In upcoming future, the proposed algorithm can be further merged and compared with other algorithms of virtual machine migration and enhacement can be done by using hybrid approach of meta- heuristic algorithm.

[5] PROPOSED WORK

After analyzing current tools, a proposed scheme for network monitoring and analysis is designed, in this scheme first packets are captured and capturing is done on real time. After packet capturing, packets are stored in memory for analysis task. This type of analysis can be performed for finding critical issues by administrator. Content of packets can be converted in the readable format which helps the administrator to understand information very easily. Packets are filter on the basic of protocol for reducing traffic. Filtering can be done on the basic of various protocols like IP, TCP, UDP, ICMP and IGMP. Capturing can be done on high-speed LAN contain GBPS data rate. Attacks can be detected for suspicious activities and after detecting suspicious user we can close all work done by user at that time. Network traffic volume and packet loss can be determined using this captured information.

[6] CONCLUSION

The cloud computing has the dynamic nature and due to which cloud network has various issues like security, quality of service and fault occurrence etc. The load balancing is the major concern of cloud network which minimises its efficiency. The algorithm that is imposed on existing work in cases when faults are detected to perform virtual machine migration is known as enhanced genetic algorithm. Many different approaches are suggested by researchers and scientists to implement load balancing in cloud computing. However, no one of them have addressed all the problems of load balancing. As stated in earlier sections of

this report, load balancing in cloud computing takes into account different parameters and tries to improve the performance of cloud systems based on those parameters. Some of these parameters are response time of machine to users' requests, make span of VM, resource optimization, etc. Load balancing is used for efficient usage of cloud resources and helpful for sharing computing workload across multiple regions. Automatic scaling listener monitored the network traffic and spread the dynamic load equally across multiple cross-region for better computing load. Exploring efficient proposed load balancing algorithms that can find IP through API hub to achieve improved access time in different regions. In restaurants revenue method the use of Elastic Load Balancing minimizes the operational overhead and monitors the network traffic for the different domain- oriented restaurants for many order taking and revenue sharing purposes.

REFERENCES

[1] Srinivas.J, K. Venkata Subba Reddy, Dr. A. Moiz Qyser, "Cloud Computing Basics", International journal of advanced research in computer and communication engineering , 2012, pp. 343-347.
[2] Soumya Ray and Ajanta De Sarkar, "Execution Analysis of Load Balancing Algorithm in Cloud computing Environment", International Journal on Cloud Computing: Services and Architecture (IJCCSA), October 2012, Vol.2, No.5.
[3] HU Baofang, SUN Xiuli, LI Ying, SUN Hongfeng, "An Improved Adaptive Genetic Algorithm in Cloud Computing", 13th International Conference on Parallel and Distributed Computing, Applications and Technologies, 2012.
[4] Rajiv Ranjan, Liang Zhao, Xiaomin Wu, Anna Liu, Andres Quiroz and Manish Parashar, "Peer-to-Peer Cloud Provisioning:Service Discovery and Load Balancing", Cloud computing: Principles, Systems and Applications,computer communications and networks, Springer, 2010, pp. 195-217 .
[5] Borja Sotomayor, Ruben S.Montero, Ignacio M. Llorente, and Ian Foster, "Virtual infrastructure management in private and hybrid clouds", IEEE Internet Computing, 2009, pp. 14-22 .

[6] Ali M. Alakeel " A guide to dynamic load balancing in distributed computer systems", International Journal of Computer Science and Network Security, VOL.10 No.6 , 2010 ,153-160.
[7] Thilina Gunarathne, Tak-Lon Wu, Judy Qiu and Geoffrey Fox, "MapReduce in the Clouds for Science" 2nd IEEE International Conference on Cloud Computing Technology and Science, 2010, pp.565-572 .
[8] A. Nuaimi , N. Mohamed, A. Jaroodi, "A survey of load balancing in cloud computing: challenges and algorithm", in Proc - IEEE 2nd Symp. Netw. Cloud Comput. Appl .NCCA, 2012, pp. 137–142 .
[9] X. Shao, M. Jibiki, Y. Teranishi, N. Nishinaga , "Effective load balancing mechanism for heterogeneous range queriable cloud storage", presented at IEEE 7th Int. Conf. Cloud Computing Technology, 2015, pp. 405–412
[10] H. Sun, T. Zhao, Y. Tang, X. Liu, "A QoS-aware load balancing policy in multi-tenancy environment", Proc. - IEEE 8th International Symposium on Service Oriented Syst. Engineering, 2014, pp. 140–147.