International Journal For Technological Research In Engineering
Volume 5, Issue 10, June-2018 *ISSN (Online): 2347 - 4718*

ENHANCED LOAD BALANCING AND SCHEDULING ALGORITHM FOR VIRTUAL MACHINES IN CLOUD COMPUTING

Lokendra Pratap Yadav[1], Ravi Rai Chaudhary[2]
[1]M. Tech Scholar, [2]Assistant Professor, Department of CSE, SRGI, Jhansi, India

Abstract: ***Various efficient load balancing approaches has been proposed and developed for efficient load balancing among data centres in cloud computing environments. Cloud computing has become new trends in global computing. Users want to access information from anywhere in worlds. Internet is popular for searching, storing and accessing information for user's interest. Word wide area network provides capability of storing and accessing and storing resources remotely. It is new approach to provide flexible on demand availability of data. It is cost efficient and scalable solutions. Cloud computing faces many problems. Inefficient resource utilization is prime concern among cloud services providers. It leads to performance degradation among services. Large amount of information causes more loads on data centres. So, efficient load balancing mechanism is requirement for cloud computing environments. This problem is important issue in cloud computing. It needs to address for enhanced performance of cloud computing services. Researchers have proposed different load balancing and job scheduling approaches in cloud computing. Still, load balancing and scheduling require enhancement in order to improve performance of existing cloud-based systems. In we have proposed a load balancing algorithm to improve the performance and efficiency of cloud computing environment. The algorithm includes the present resource availability information and user's requests parameter to achieve the objective. The proposed approach has been evaluated and compared with existing load balancing algorithms using Cloud Analyst simulator. The results outputs show enhancements on average response time.***

Keywords: Load Balancing, Cloud Computing, Virtual Machine, Virtualization, Cloud Analyst, Scheduling.

I. INTRODUCTION

Cloud computing is forthcoming technology that defines distributed computing and storage facility for servicing of the user's request with help of virtual machines. In cloud computing, users can access various applications and services. It provides data storage facility on online servers. Cloud computing-based services are hosted on data centres. These data centres are located on different remote locations. Sometimes these are situated in different geographical regions. Users can access these services by getting sending specific requests. Cloud based services is accessible to users faster and reliable way. Users require essential services in time with full reliability. Any kind of disruption is not tolerable. Users always want quality of services. Cloud based applications should satisfy quality of services requirements. Users are located in different parts of world and can send requests in large numbers. These requests are feed to data centres for processing. Large number of requests causes trouble for data centres due to their distributed nature. Data centres can be overloaded on some locations. Load balancing is applied for user's requests to support data centres performance by distributing workload among data centres. Non-efficient load balancing is result into performance degradation of services. Load balancing mechanism provides better management of resources among data centres for user's requests. It enhances performance of hosted services in cloud environments. Resources should be efficiently allocated among incoming requests on virtual machines.

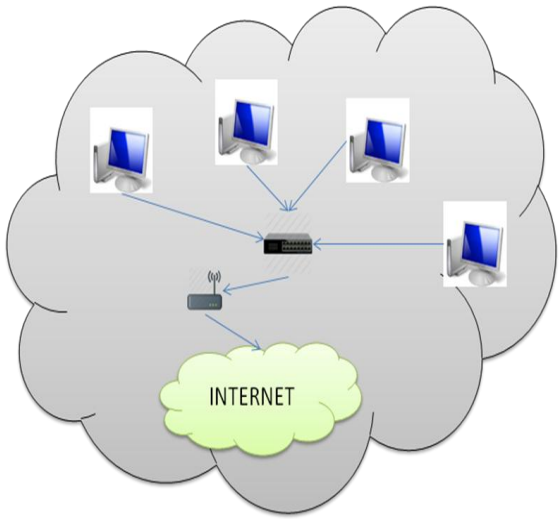

Figure 1: Overview of Cloud computing

On-demand services are provided to users through cloud computing environments. Theses on demand services include infrastructures resources and storage facility through internet. Internet is strength of spirit of cloud computing. Cloud services can't attain to users lacking Internet connectivity. Cloud computing host services on distant location servers which are accessible though network connectivity. Data centres are located at remote locations. They are used to stores services, informational den user's access patterns. They are remotely far location from each other. Network connections are used to provide connective solutions for these servers. The user's position also is different by their requirements and geographic locations. Users are associated from different geographical distances such as nearby countries. Cloud computing provides facility to users to access repaired services without setting up any infrastructures. It is a resource contribution platform. User does not require buying and installing any resources. Basic services are providing by using limited resources. These services rewire limited amount of infrastructure, software

and hardware requirements. Basic services can be storing data, accessing information, hosting applicators and developing applicators. Cloud provides support for failures of service. Services failures can be arousing form hardware failure, software failure or device failure. Cloud services are handling by efficient controller who take care of them in case of services failures by providing alternate and resurged services parameters. These failures of services are becoming things of past. Users should be assured by cloud-based services providers and cloud service providers take care of all services related issues. Users need not to worry and care about services amiability which is taken care in cloud commuting environments. Cloud services providers charges nominal amount for these services to users and provide reliable and efficient services at per their demands. Service providers provide full support for thru services to be available and accessible to users always.

II. RELATED WORK

Liang at. al., have studied exigent research issues that focuses in limiting the cost of accessing and storing user data online for dependable usability in a cloud computing environment. It is being developed for near-perfectly equilibrium the residual capacity of all virtual machines crossways the cloud system. It adds novel file and information. So, the predictable incident of ability extension can be delayed as much as possible. The challenges of solving this problem are double. New file blocks are additional to the cloud at the same time as by many computing servers. it has no message or organization surrounded by themselves. Each sender is efficient with information on disk occupancies. The information is uncommon and not coordinated. Fault-tolerance purposes a combinatorial restriction has to be content in distributing the blocks of each new file crossways the cloud system. They suggest a randomized approach, in which every sender separately samples a blocks-to-disks task according to a likelihood sharing on a set of coursework compliant to the abovementioned combinatorial requirement. it is shown that this algorithm allows a cloud system to near perfectly equilibrium the residual disk capacity as fast as hypothetically possible, when preliminary from any disturbed state that is correctable exactly. [1] Pooja et. al., have analyzed load balancing in Cloud computing environments. It is universal word for dispersed the user demand. It is spread work load above the unfilled virtual machines. The distributed system faces the inequity load over the virtual machines. It disgraces the performance of the cloud. Load balancing. Proposed work helps to get better the performance of cloud atmosphere. It divides the workload in surplus of virtual machines in well-organized mode using obtainable approaches. The Virtual machine load balancing algorithm provides a very balanced play role in load balancing of cloud computing environments. There are different classifications in which we can split the virtual machine varied dissimilar load balancing algorithm. They are providing analysis and discussion over various classifications virtual machine load balancing algorithm in their paper. [2] Baked et. al., have presented days cloud computing as one of the famous platform for offering storage of data. It provides it at very inferior cost. It is accessible and obtainable for every time through the internet. It has various sensitive subjects such as security, work load balancing, management and fault tolerance. Load balancing approach has been analyzed. Various kinds types of load anxiety with cloud such as similar to memory load, processor load and network load. Load balancing is the procedure of dividing load over the various cloud nodes. It offers better resource usage for nodes which are overloaded with user's requests. Load balancing has to tackle the load when one node is extremely work loaded. When node is filled to capacity at that time load is dispersed over the other perfect nodes. Various approaches are obtainable for load balancing. It includes static load balancing and dynamic load balancing. Load balancing in the cloud computing environment has a significant impact on the performance. Efficient load balancing provides cloud computing further efficient and enhances user fulfillment. Authors have proposed improved load balance model for the public cloud. It is based on the cloud dividing and partitioning idea by means of a switch method to decide diverse concept for various scenarios. [3] Vibha et. al., have studied cloud computing which has influences the idea of present age. It has been linked with diverse regions and has achieved development extremely. Resource distribution and effectual operation of resources is the input to its achievement in its voyage. Cloud has faced more than a few issues and challenge and has been overcome. Load balancing is one such issues immobile faced by cloud. The work load represents mechanism to attain load balancing. Hadoop and MapReduce are used to achieve load balancing. The division plan is used to attain load balancing. Hadoop is a Java based open source frame work. It is able to keep and dealing out big data. MapReduce is a programming concept which is used to achieve equivalent processing. [4] Hung et. al., have discussed quick enlargement of users on the cloud service. numeral services are lost on data centers due to the user increase the load on the servers at cloud datacenter. This subject is flattering an issue for the researchers. It requires efficiently a load balancing method not merely to equilibrium the resources for servers. It decreases the unenthusiastic impact to the end-user service. The present load balancing methods have given solutions the different troubles. These are load balancing after a server was filled to capacity and load balancing and load predict for the share of resources. Load balancing is affecting performance to load balancing parameters in cloud computing system. The analysis of enhancing these parameters has extended meaning to enhancing system performance from end to end load balancing. Authors can suggest more effectual approaches of load balancing and enhancing system performance. Few settings are affecting the performance of load balancing on the cloud computing. [5] Abdallah et. al., have analyses cloud computing. Cloud computing is a novel instance someplace data and services. Information technology-based services are offered through the Internet connection from remote locations. It is represented a novel method of deliver computing resources. It allows admission to the system on demand. Cloud computing includes various services. Each includes various targets. Scheduling in cloud

computing for targets are NP-complete problem. The job organization can be a significant constituent in the expertise of cloud computing. Scheduling is important for optimizing performance of virtual machines. Various scheduling approach has been proposed for optimize the performance of virtual machines. These are located in cloud computing environments. Authors have analyzed and proposed an approach to provide solution to the problem. Optimally and the QoS constraints are taken into account based on the diverse user requests. The proposed approach is based on the Branch and Bound algorithm. It allows allocating jobs to various virtual machines. It also assures optimized load balance and an improved allocation of resources. [6] Mendoza et. al., have analyzed cloud computing which is influential economic motivation and extensively being adopted by a lot of companies. Though, the organization of cloud infrastructure is a demanding job. Some important issues are reliability, security, quality of service, and cost-efficiency in these cloud systems. They require resource optimization at multiple layers of the infrastructure and applications. The complexity of cloud computing systems makes infeasible the optimal resource allocation, especially in presence of uncertainty of very dynamic and unpredictable environment. Hence, load balancing algorithms are a fundamental part of the research in cloud computing. We formulate the problem of load balancing in distributed computer environments and review several algorithms. The goal is to understand the main characteristics of dynamic load balancing algorithms and how they can be adapted for the domain of VoIP computations on hybrid clouds. [7]

Load balancing is a foundational function of datacenter infrastructures and is critical to the performance of online services hosted in datacenters. As the demand for cloud services grows, expensive and hard-to-scale dedicated hardware load balancers are being replaced with software load balancers that scale using a distributed data plane that runs on commodity servers. Software load balancers offer low cost, high availability and high flexibility, but suffer high latency and low capacity per load balancer, making them less than ideal for applications that demand either high throughput, or low latency or both. In this paper, we present DUET, which offers all the benefits of software load balancer, along with low latency and high availability – at next to no cost. We do this by exploiting a hitherto overlooked resource in the data center networks – the switches themselves. We show how to embed the load balancing functionality into existing hardware switches, thereby achieving organic scalability at no extra cost. For flexibility and high availability, DUET seamlessly integrates the switch-based load balancer with a small deployment of software load balancer. We enumerate and solve several architectural and algorithmic challenges involved in building such a hybrid load balancer. [8]

Cloud Computing Infrastructure and System Model:

Cloud computing is intended to offer advanced computing platforms. These platforms are distributing computing, virtualization, grid computing and serve-oriented-architecture. Its services are on-demand and satisfy as per user required resources. Users can send request for more resources. These resources are arranged by cloud service providers. Service providers charge nominal amount for these extra resources. Users can feel that it does not wants extra resources then services providers stop charring them for extra resources. It means cloud computing environment offers pay per use model. Users need to pay only services they have eased. Its cost-effective eparch makes it more favourable among business, academics and researchers. It is a very speedy adapting technology by academics, industry and many more. Cloud commuting depends on communication on internet and support large quantity of user requests. It causes various challenges for cloud-based services. It is also facing various technology issues. Fault tolerant is faced by cloud-based services in case of hardware failures. Users are not bale to access some parts of services. Load blanking us prime concerns among developer of applications. Load management need s efficient utilization of resources among data centres to effectively manage all users' requests. Cloud supports various data security features but sill it is prone to attacks for staling sate. Callous supports important and useful data on servers which cost users too much. So efficient secure mechanism is must for cloud-based service. Security of data on clouds is a difficult issue faces by cloud services provider. Cloud computing is emerging as a new paradigm of large-scale distributed computing. It has moved computing and data away from desktop and portable PCs, into large data centers. It has the capability to harness the power of Internet and wide area network WAN) to use resources that are available remotely, thereby providing cost-effective solution to most of the real-life requirements. It provides the scalable IT resources such as applications and services, as well as the infrastructure on which they operate, over the Internet, on pay-per-use basis to adjust the capacity quickly and easily. It helps to accommodate changes in demand and helps any organization in avoiding the capital costs of software and hardware. Thus, cloud computing is a framework for enabling a suitable, on-demand network access to a shared pool of computing resources (e.g. networks, servers, storage, applications, and services). These resources can be provisioned and de-provisioned quickly with minimal management effort or service provider interaction. This further helps in promoting availability. Due to the exponential growth of cloud computing, it has been widely adopted by the industry and there is a rapid expansion in data-centers. This expansion has caused the dramatic increase in energy use and its impact on the environment in terms of carbon footprints.

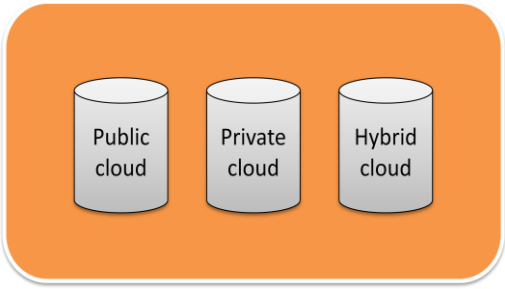

Figure 2: Modes of cloud systems.

Cloud is cost effective and it removes common problems of IT such as purchasing and maintenance. Cloud increases productivity as it allows organizations to focus their human resources on production driving activities instead of IT infrastructure upkeep. These notable points translate into the business value of cloud, thus, the economics of cloud. Understanding the true economics of cloud is unquestionably critical to a well-informed cloud strategy and overall success. Cloud is at the heart of this understanding. The business value of cloud, economic or otherwise, created and captured through understanding Cloud is used in this study to argue for the adoption of cloud in different organizations. Cloud standardizes and pools IT resources and automates them to ensure that there is limited or no need for human intervention. Mel and Grace introduced the NIST model that defines cloud as a model for allowing universal, on-demand network access to a shared pool of managed IT resources that are made available to a client with little human effort. The NIST model comprises of five essential characteristics of cloud together with three service models and four deployment models.

Issues & Challenges in Cloud computing:

Cloud Computing can be delivered through such delivery models as follow. Infrastructure as a Service (IaaS) model of Cloud computing provide Hardware as a Service via Internet such as storage, CPU and other. There are many IaaS providers such as Amazon Elastic Cloud Compute (EC2), Rackspace. Platform as a Service (PaaS) provide a platform as a service that required for building application, where user using tools and libraries for Cloud service providers, and also consumers deployed their applications without costing of hardware where providers of services provide the network, storage. There are many PaaS providers such as Google App Engine, Windows Azure. Software as a Service (SaaS) focus on providing different software hosted on the Cloud and usually referred to as on demand- software, where in this type of service, consumer will have to pay for usage of software. Usually consumer access to the software via the Internet, therefore, user uses the software don't need any integration with other system. There are many SaaS provider such as Google Apps, Sales Force.

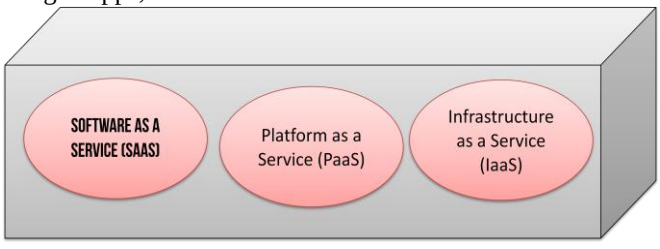

Figure 3: Services provided by Cloud computing

There are many issues and challenges emerged from cloud computing and are required to be addressed properly as following Security. It is clear that the security issue has played the most important role in Cloud computing. Security issues such as data loss, phishing, privacy and other threats, whether at the enterprise level or individual level that use the pooled computing resources in cloud computing, has introduced new security challenges. So, we need novel techniques to reduce the impact of the endless dangers in the cloud computing environment. It is the second issue in cloud computing. Poor performance can be caused by lack of resources such as disk space, limited bandwidth, lower CPU speed, memory, network connections etc. The data intensive applications are more challenging to provide proper resources. Poor performance can result in end of service delivery, loss of customers and reduce revenues. Performance can be based on different methods, tools and simulations for cloud environments such as fuzzy systems and a tool like Cloud Analyst. There is a series of factor that affects the performance such as security, recovery and fault tolerance. Cloud computing services are becoming the primary source of computing power for both enterprises and personal computing applications. A cloud computing platform can provide a variety of resources, including infrastructure, software, and services, to users in an on-demand fashion. To access these resources, a cloud user submits a request for resources. The cloud provider then provides the requested resources from a common resource pool (e.g., a cluster of servers), and allows the user to use these resources for a required time period. Compared to traditional "own-and-use" approaches, cloud computing services eliminate the costs of purchasing and maintaining the infrastructures for cloud users and allow the users to dynamically scale up and down computing resources in real time based on their needs. Several cloud computing systems are now commercially available, including Amazon EC2 system, Google's App Engine, and Microsoft's Azure. In modern days cloud computing is one of the greatest platform which provides storage of data in very lower cost and available for all time over the internet. But the cloud computing has more critical issue like security, load balancing and fault tolerance ability. In this paper we are focusing on Load Balancing approach. The Load balancing is the process of distributing load over the different nodes which provides good resource utilization when nodes are overloaded with job. Load balancing is required to handle the load when one node is overloaded. When the node is overloaded at that time load is distributed over the other ideal nodes. Many load balancing algorithms are available for load balancing like Static load balancing and Dynamic load balancing.

Load Balancing and Scheduling in Cloud Computing:

Load balancing is measured important challenges in cloud computing environments. It important to get better performance of the applicators in cloud computing. Developing cloud load balking approach is not easy task. A load balancing approach should need to take care of various factors in cloud counting environments. The present load balancing algorithms in cloud computing environment is not very resourceful. Load balancing in cloud computing environment is very difficult task due to various reasons. Users rearrested are generated from various geographic location in various numbers. It is not easy to prediction of user request arrivals on the server. Cloud computing environments are made from various data centres and virtual machines. Each virtual machine has dissimilar requirement.

It is very challenging and difficult to plan job scheduling and balance the load among servers. In recent times, many research works have been carried out. These research works are done on load balancing in cloud computing. These include Round Robin, Equally Spread Current Execution and Throttled Load Balancing Algorithm. The load balancing is procedure of distributing the future user's requests amongst a variety of virtual machines of data centres to reduce the reply time. The load balancing method is intended to present effective assets management. Services are provided to users from distributed locations of data centres. These services are accessible to users form any where any time. Its prime motive of cloud computing environments. Cloud computing environments host various services from different types. Infrastructure can be provided to users for specific requirements. Software's can be accessible though online platform for performing specific operations. Services in cloud computing is provided as per sage of users. Users are charged for their usages. It works on pay per use policy. Users form different domains are provided cloud-based services. Its distributed technologies are able to provide hardware resources and software resources to uses. Hardware and software resources are shared among users as per their usage policy.

Internet is main requirement at user ends. Users can access hardware and software resources on their terminal using internet connectivity. System establishment, operation and maintenance cost is reduced. Cloud computing is implemented by resource sharing technology which makes it more affordable. The cloud-based services are flexible to adapt to systems performance. It makes system's consistency by providing increased average processing time. Cloud based services should be adopted as per future requirements of systems and users. Systems are designed for future ready and fool proof. So, cloud-based services are designed to adopt tow wards changes into futures. The future compliance is also significant concept which should be considered while providing the cloud-based services. It is planned to provide support for future requirements related to user's requests. User requests could require more resources in terms of hardware and software's. User's requests can be increased with time and should be provided more resources as per third increasing requirements. Cloud based services should support scalability which means that system should be able to support increased user's requests. Could based systems is work on distributed environment which is prone faults. These faults can be caused by any reason and anywhere. Services should not be suffered from faults and cloud-based system should support all this services fault tolerant requirements. Sometimes business needs to shift their servers from different; locations to earlier on positions. So, cloud computing must support system reallocations without affecting the user's requests.

Optimized Load Balancing and Scheduling algorithm for Virtual Machines

Business owners do not need to invest more money for updating. They just request cloud services providers for enhancement in required services and cloud services providers provide extended capability. These features charge very minimal amount which is very less in compare to amount required for setting up their own infrastructures. Maintenance is costly for some services which includes hardware and software cost. In cloud commuting environment, users need not to worry about maintenance. These is taken care by cloud service providers. Data are stored in data centres which are form of computer servicers. Users do not need to store date into their desktop, laptop and personal storages. It reduces cost of owing and worrying about storage devices. Resources are situated at remote locations. These resources are used to provide cloud-based services. Internet technology is used to collaboration among resources to provide required services. Intent and wide area network is used to remotely access clouded resources for applications. Users can ace services more cost effectively for most of thru problem' solutions. The National Institute of Standards and Technology's (NIST) define a Cloud computing as "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".

The proposed algorithm is experienced in a cloud computing environment. We have two choices to examination it; the primary option is to use a real test such as Amazon EC2. The moment is to use simulation equipment to replicate a cloud environment. In our work we favour to use a simulator, because using real test limits the experiment to the extent of the communications and makes the copy of results an extremely difficult responsibility. It is tremendously hard and occasion irresistible to gauge performance in genuine cloud environment. In adding, access to the genuine infrastructure causes spending in genuine money. The simulation structure has a figure of type and bear for model and instantiation of big scale. Cloud computing communication is including data centres, virtual machines, service brokers, scheduling, and allocation policies. Virtualization is such aids in formation and organization of many, self-governing, and co-hosted virtualized services on a data centre and elasticity to toggle among space-shared and time-shared share.

The proposed algorithm has two main segments. In the first segment the expected waiting time of each virtual machine is computed. The expected response time of each virtual machine is computed with the help of the following formulae:

Expected Response Time = FTUR – ATUR + TD

Where

FTUR – Finish Time of User Request

ATUR – Arrival Time of User Request

TD – Transmission Delay

The TD (Transmission Delay) is computed as follows:

TD = NL + TDSD

Where NL is network latency & the TTSD is the time required to transfer the user data from the source to the destination.

In the subsequent phase, when a data centre controller sends the request for the allocation for a new virtual machine then

the virtual machine with least load and the minimum expected response time is identified. At the end the Id of that virtual machine is sent to the data center controller. After receiving the Id of the VM the data centre controller send the request to the concerned virtual machine. The data centre controller also sends this virtual machine allocation details to the load balancer. Once the user request has been finished by the virtual machine, the data centre controller receives the response from that virtual machine. Then the data center controller sends a notification to the load balancer to reallocate that particular virtual machine.

III. EXPERIMENTAL EVALUATION

The testing of proposed work is performed using the Cloud Analyst simulator. We describe the simulator parameters for experiments. These parameters are users customized configuration, data centres organization, VMs arrangement. We have recognized quite a few customizations. The experiment is implemented using the customization configuration. In the initial steps we have analysed the issues and challenges without the outcome of network delay. We have performed test the proposed approach in diverse environment of hosts. Each virtual machine has dissimilar amount of processing powers and data speed. Proposed approach have been tested the result of taking into consideration the capability of CPU aspect. Ultimately, we have evaluated the permanence and outcome of response time on the proposed approach with taking into consideration the capability of CPU and with mixed environment of hosts. We have coded some of existing load balancing algorithms into simulators. These include Round Robin, equally spread current execution, Random and Greedy algorithms. Then we have implemented the proposed approach. Cloud Analyst is a graphical simulation tool based on Clouds for modelling and analysing behaviour of cloud computing environments, which supports visual modelling and simulation of large-scale applications that are deployed on cloud Infrastructures.

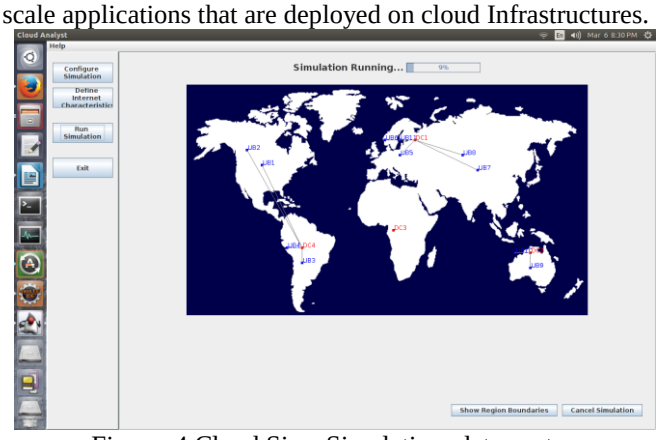

Figure 4 Cloud Sims Simulation: data centre communication.

There are a variety of parameters have been used to evaluate various approaches. In this section we have used two parameters to evaluate the working and performance for response time. Response Time is the time gap between transport a request and acceptance its response. We should reduce the response time to improve the system performance. Processing time is equal to average processing time and quantity of time really required to process a job. In this section we have performed the experiments. Results are evaluated into this research work. We have got the results by evaluating proposed approaches with existing load balancing algorithms. We have performed analysis using Cloud analysis simulator as implementation. We have analysed and studying the problem related to load balancing. We have evaluated the proposed approach into varying environment of hosts and user requests. Each data centres have various quantities of processing and bandwidth. We have performed experiments the existing approaches for performance with varying workloads. Experiments are performed by analysing the effect by considering varying the capacity of CPU. At last we have analysed the performance of effect of user's requests. In the heterogeneous environment of data centres, each virtual machine has varying quality of processing capacity and data speed. We have analysed the proposed work with Round robin and ESCE. We defined the varying numbers of virtual machines in the data center and the size used to host applications in the experiment is 500MB or more. Virtual machines have 2GB or more of RAM memory and have limited of available bandwidth. Simulated hosts have Intel machine architecture, virtual machine monitor Linux ubuntu operating system. The data center hosts 1 to 5 virtual machines dedicated. The hosts have 2 GB of RAM and varying of storage. Each machine has different number of CPUs and speed, first host have 2 to 4 core processor, second host have 2 to 5 core 5000 MIPS, third host have dual core with 9000 MIPS, fourth host dual core with 10000 MIPS, and fifth host dual core with 15000 MIPS. Users are grouped by a factor of 1000, and requests are grouped by a factor of 100. Each user request requires 250 instructions to be executed. The simulation duration took one day. We used the response time and processing time metrics to compare the algorithm with other current algorithms. There are various metrics used to evaluate different techniques. In our work we used two metrics to measure the performance as follow. Response Time is the time interval between sending a request and receiving its response. We should minimize the response time in order to enhance the system performance. The total response time can be obtained as follow. Total response time is equal to the users request processing delay and Network delay. Processing time is average processing time. It is the amount of time actually needed to process a task.

Table 1: Load balancing algorithm comparative analysis

Parameters Used	Load Balancing Algorithms		
	RR	ESCE	Proposed Throttled
Data Centre	2	2	2
UB	5	5	5
VM	20	20	20
Avg (ms)	0.28	0.28	0.28
Min (ms)	0.02	0.02	0.02
Max (ms)	0.64	0.64	0.64
Cost	1.83	1.83	1.82

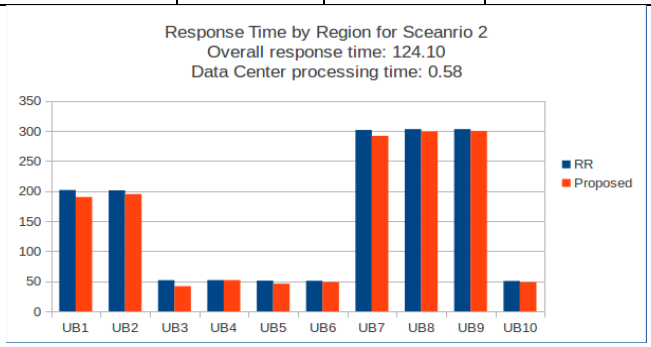

Figure 5: Cloud Sims simulation result for scenario 1.

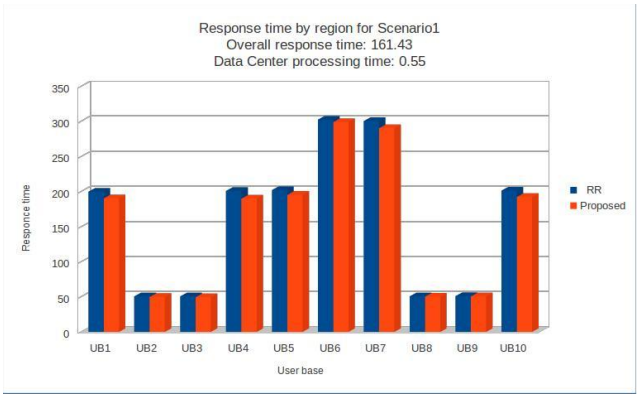

Figure 8: Cloud Sims simulation result for scenario 2.

IV. CONCLUSIONS AND FUTURE WORKS

This research work proposes a load balancing approach. In this approach algorithm has been developed to overcome disadvantage of existing load balancing algorithms. It mainly concentrates on deficiency for existing approaches. Proposed approach provides better performance in experimental analysis. The limitations of this research work are not considering various factors. In proposed approach, processing capacity is considered and other parameters are out of extent. It focuses on normal arrival rate; other arrival rates are out of our scope. It is a dynamic non-distributed load balancing algorithm. It focuses only on improving scheduling performance in heterogeneous of a processors power in cloud computing environment. It is a local algorithm considers only one data centre in one location. The performance of the proposed algorithm will be measured using simulator (cloud analyst), but not real experiments.

Load balancing well thought-out as one of the generally issues and challenges in cloud computing environments. It is the main issue to improve the performance of the cloud computing applications. We have analysed on getting better performance on data centres. There are various approaches given by researchers. These approaches are applied to equilibrium the workload into clouds computing environment. So, we are implementing an enhanced load balance approach to enhance the response time of cloud computing services. We tested only the effect of considering CPU capacity but there are other factors such as memory, bandwidth and storage. And we can also consider other parameters for efficient utilization of resources such as consider cost, failover etc. We studied the load balance in a normal state but there are still other state can be studied such as burst load state. We are going to study on how we can overcome the problem of deadlocks and server overflow

REFERENCES

[1] L. Liu, Y. Wang, L. Fortnow, J. Li, and J. Xu, “Randomized Algorithms for Dynamic Storage Load-Balancing,” Proc. 2016 ACM SIGMETRICS Int. Conf. Meas. Model. Comput. Sci., pp. 381–382, 2016.

[2] E. Pooja and E. V. Thapar, “Survey of VM Load Balancing Algorithm in Cloud Environment,” IN International Journal of Computer Science Trends and Tech nology (IJCS T), vol. 4, no. 2, pp. 123–129, 2016.

[3] K. G. Bakde, “SURVEY OF TECHNIQUES AND CHALLENGES,” in International Journal of Technical Research and Applications, vol. 4, no. 2, pp. 279–290, 2016.

[4] M. B. Vibha and R. Rajugondkar, “Smart Load Balancing Algorithm towards Effective Cloud Computing,” in International Journal of Computer Networks & Communications (IJCNC), vol. 5, no. 4, pp. 543–547, 2016.

[5] T. C. Hung and N. Xuan Phi, “Study the Effect of Parameters to Load Balancing in Cloud Computing,” Int. J. Comput. Networks Commun., vol. 8, no. 3, pp. 33–45, 2016.

[6] A. IDRISSI and F. ZEGRARI, “A New Approach for a Better Load Balancing and a Better Distribution of Resources in Cloud Computing,” Int. J. Adv. Comput. Sci. Appl., vol. 6, no. 10, pp. 266–272, 2015.

[7] J. M. Cortés-Mendoza, A. Tchernykh, A. Y. Drozdov, P. Bouvry, A. M. Simionovici, and A. Avetisyan, “Distributed adaptive VoIP load balancing in hybrid clouds,” CEUR Workshop Proc., vol. 1482, no. 218, pp. 676–686, 2015.

[8] R. Gandhi, H. Harry, L. Y. Charlie, and H. Guohan, “Duet : Cloud Scale Load Balancing with Hardware and Software,” Sigcomm 2014, pp. 27–38, 2014.

[9] J. Doyle, R. Shorten, and D. O’mahony, “Stratus: Load balancing the cloud for carbon emissions control,” IEEE Trans. Cloud Comput., vol. 1, no. 1, pp. 116–128, 2013.

[10] A. Gupta, O. Sarood, L. V. Kale, and D. Milojicic, “Improving HPC application performance in cloud through dynamic load balancing,” Proc. - 13th IEEE/ACM Int. Symp. Clust. Cloud, Grid Comput. CCGrid 2013, pp. 402–409, 2013.

[11] Z. Khayyat, K. Awara, A. Alonazi, and D. Williams, “Mizan : A System for Dynamic Load Balancing in Large-scale Graph Processing,” EuroSys, Prague, Czech Republic, pp. 169–182, 2013.

[12] S. Jain and D. Sharma, “Elastic Load Balancing in Cloud Storage,” in International Journal of Engineering Research and Applications (IJERA), vol. 3, no. 2, pp. 1605–1610, 2013.

[13] M. Mesbahi and A. M. Rahmani, “Load Balancing in Cloud Computing: A State of the Art Survey,” I.J. Mod. Educ. Comput. Sci. Mod. Educ. Comput. Sci., vol. 3, no. 3, pp. 64–78, 2016.

[14] N. S. Ghumman and R. Sachdeva, “AN EFFICIENT APPROACH FOR LOAD BALANCING IN CLOUD COMPUTING USING COMPOSITE TECHNIQUES,” vol. 6, no. 2, pp. 145–149, 2016.

