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Cloud Load Balance on the Basis of Free Space on Cloud and Packet Size

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ABSTRACT: Cloud computing is mainly used to share data and also provide many resources to users. Users can pay only for those resources as much they used. The aim of cloud computing is to stores the data and distributed resources in the open environment over the network, where the users can get data easily. The goals of cloud computing is to use the resources efficiently and effectively to gain maximum profit. Multiple users request for information at a time. Due to such a huge amount of data request from users, problem of load balancing is arises which becomes the main challenge in field of cloud computing. To handle such requests efficiently and effectively, various load balancing approaches have been proposed in the past years. There is big problem of scheduling the incoming users request in cloud computing, because a cloud provider has to serve many users in cloud computing. There is need of scheduling technique for proper and efficient utilization of the resources. This system designed with better scheduling technique. Here we also use the VMs for handling the user's requests. Scheduling is performed on the basis of available disk space and file size to be processed.

KEYWORDS: Virtual machines (VMs)

I. INTRODUCTION

Cloud computing is a new technology which provides online resources and online storage to the user's. Cloud computing provide all the data at a lower cost. In cloud computing users can access resources at any time through internet. They need to pay only for those resources as much they use. Cloud computing is easy way to share processing power, storage space, bandwidth, memory and software over the internet. Cloud computing have a several characteristics which are, on demand service, Broad Network Access, Resource Pooling, Rapid Elasticity [1].

Cloud computing is nothing but an outsourcing of computer program in which users can access the software and applications from wherever they are; the computer programs are being hosted by an outside party and reside in the cloud.

It is used to provides shared resources, information, software packages and other resources as per client requirements at specific time. Due to rapid growth in cloud computing and more users are attracted towards utility computing, better and fast service needs to be provided [2].

Cloud computing gives a flexible and easy way to keep and retrieve data and files. Especially for making large data sets and files available for the spreading number of users around the world. Handling such large data sets require several techniques to optimize and streamline operations and provide satisfactory levels of performance for the users [3].

Cloud computing, is a collection of computing software and services available from a decentralized network of servers. In field of cloud computing one of the most important issues is load balancing. As we know cloud computing stores the data and distributed resources in the open environment, hence the amount of data storage is increases quickly in open environment. Load balancing is nothing but the process of distributing workloads across multiple computing resources.

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Load balancing is used to improve the performance and reliability of applications, databases and other services. It distributes the workload across multiple servers instead of single one. There are thousands of users which have accessed a website at a particular time, so it's challenging for applications to manage the load that comes from all these requests at a time. Sometimes, it may result in a breakdown of entire system. Because of load balancing, workload is divided among two or more servers, network interfaces, hard drives and other and system response time. Load balancing allows enterprises to manage workload or application demands by allocating resources among multiple computers, networks or servers. Cloud load balancing involves hosting the distribution of workload traffic and demands that reside over the Internet. Due to use of load balancing technique work load is distributed among resources in such a way that no one resource should be overloaded and each resource can have improved performance [4][5].

Load balancing performs two main tasks, first is to make resources easily available on demand and second is Resources are competently utilized under condition of high/low load. Load balancing have a many challenges like Throughput, Associated Overhead, Fault tolerant, Migration time, Response time, Resource Utilization, Scalability etc. [6]

This paper is based on dynamic load balancing algorithm which will serve heterogeneous environments and will consider the resource specific demands of the tasks by using virtual machines. Here we designed the task scheduling process which handles the user requests and file processing the users demand efficiently and improves the performance of system by good utilization of disk space and file size.

II. RECENT CONTRIBUTIONS

This section have includes some recent contribution in the field of cloud computing. Many researchers use the different load balancing algorithm to solve the problems in area of cloud computing.

Radhika Pathak have presents a Survey of Load Balancing in Cloud Computing Challenges and Algorithms. Cloud computing provides shared resources, information, software packages and other resources as per client requirements at specific time. Load balancing is one of the main issues in cloud computing. The load can be a memory, CPU capacity, network or delay load. Load balancing have many challenges in field of cloud computing. Throughput is the total number of tasks that have completed execution. Associated Overhead is amount of overhead during the implementation of the load balancing algorithm. Fault tolerant defines ability to perform load balancing by the appropriate algorithm without arbitrary link or node failure. Migration time, response time, resource utilization, scalability, and performance are the challenges of load balancing [2].

Kundan Pagar, Sachin Patil et al. presents a Survey on Load Balancing Techniques in Cloud Computing. This paper includes the concept of load balancing which is the process of apportioning the load among various nodes of a distributed system to improve both resource utilization and job response time. Cloud computing have different environment i.e. static or dynamic environment. On basis of cloud environment load balancing algorithm is used in which traffic is separated evenly among the servers. In dynamic algorithm the lightest server in the whole network or system is searched and preferred for balancing a load. [6].

Klalthem Al Nuaimi, Nader Mohamed et al. presents a Study on Algorithm and Challenges on Load Balancing in Cloud Computing. This paper contains a survey of the current load balancing algorithms developed specifically to suit the cloud computing environments. Designing of a load balancing algorithm that can work for spatially distributed nodes is very challenging task because speed of the network links among the nodes, distance between the client and the task processing nodes, and the distances between the nodes involved in providing the service have taken into account. Replication, Algorithm Complexity, Point of Failure are challenging issues while designing the load balancing algorithm. Load balancing algorithms are classified into two types, static algorithms and dynamic algorithms. In static load balancing algorithm task is assign to the node which can process the new requests. Dynamic algorithm assigns the tasks and may dynamically reassign them to the nodes based on the attributes gathered and calculated. This paper

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conclude that, DDFTP(dual direction downloading algorithm from FTP servers) algorithm is more suitable for Cloud environments and more efficient in terms of storage utilization [7].

Surbhi Kapoor, Chetna Dabas et.al. have proposed Cluster Based Load Balancing in Cloud Computing. In cloud datacenter handling the billions of requests coming dynamically from the end users is the big problem. There are already existing the many traditional load balancing algorithm but they are work well with homogeneous VMs environment. In this paper the author have proposed the cluster based load balancing algorithm which works well in heterogeneous nodes environment, by considering resource specific demands of the tasks and reduces scanning overhead by dividing the machines into clusters. This algorithm divides VMs into with similar capacities into groups. This algorithm uses K-means clustering approach to divide VMs into cluster. Experimental results shows that, this clustering approach gives better results than throttled and modified throttled algorithms when compared on the basis of waiting time, execution time, turnaround time and throughput [8].

Sonia Sindhu et.al. have given approach of Task Scheduling in Cloud Computing. Author have introduced the scheduling is a critical problem in Cloud computing, because a cloud provider has to serve many users in Cloud computing system. So scheduling is the major problem while establishing Cloud computing systems. In this paper author have studying various scheduling methods. This paper includes task scheduling algorithm like Min-Min Algorithm, Max-Min Algorithm, Particle Swarm Optimization (PSO) Algorithm, Round Robin Algorithm, Genetic Algorithm, Priority based Job Scheduling Algorithm. Cloud computing is in infancy state, so the scheduling framework should be implemented to improve the user acquiescence along with the service providers. The scheduling metrics can be coupled to prepare a framework for scheduling and resource allocation in cloud computing [9].

Gajender Pal, Kuldeep Kumare et.al. have introduced A Review Paper on Cloud Computing. This paper provides the information about cloud computing and security architecture Of cloud computing. Web-based email clients like Gmail, Wikipedia and YouTube, Skype or Bit Torrent are the application of cloud computing. Security architecture contains Data Center Layer, Virtualization Layer, Service Provider Layer and User Layer. In this paper author have been addressed key security issues like Virtual Machine Security, Network Security, Data Security, Data Privacy, Data Integrity, Data Location etc. Cloud computing provides a large array of benefits, many challenges including automatic resource positioning, energy management, information security [4].

III. METHODOLOGY

As we studied the many load balancing algorithm in which incoming request is distributed evenly without considering current state of nodes which will process the user request and hence node is get overloaded or under loaded. This will affect the system performance.

In this system model we have used virtual machine to process the file. This system model evenly distributes the file across the processing nodes so that files are evenly distributed and overloading condition can be avoided.

The goal of this system is as follow:

- i) Assign the users request to VM node.
- ii) Check the file size to be processed.

This system uses the virtual machine to which particular request to be assigned. Virtualization provides everything like real though it is not exist in real. A virtual machine is actually an abstraction layer between hardware components and the end-user of system. It has an ability to run any operating systems on them.

This developed model contains the cloud controller, load balancer, virtual machine unit to process the incoming request from users. First all VMs are initialize with resource type and capacity. On incoming request of user for any file handling load balancer get the all available information from all VMs with allocated data on it. Load balancer maintain the list of VMs with their status whether available or busy is maintained by the load balancer. Load balancer first check

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the status of VM then compare the data size that was allocated to VM. Load balancer select the VM that is least used means it has a suitable available space to process the file. When it found the VM which can process the file then that VM is selected for further processing and space on VM is allocated on VM. Database is maintained for indexing files with respect to location and size. The Figure 1 shows execution flow of system.

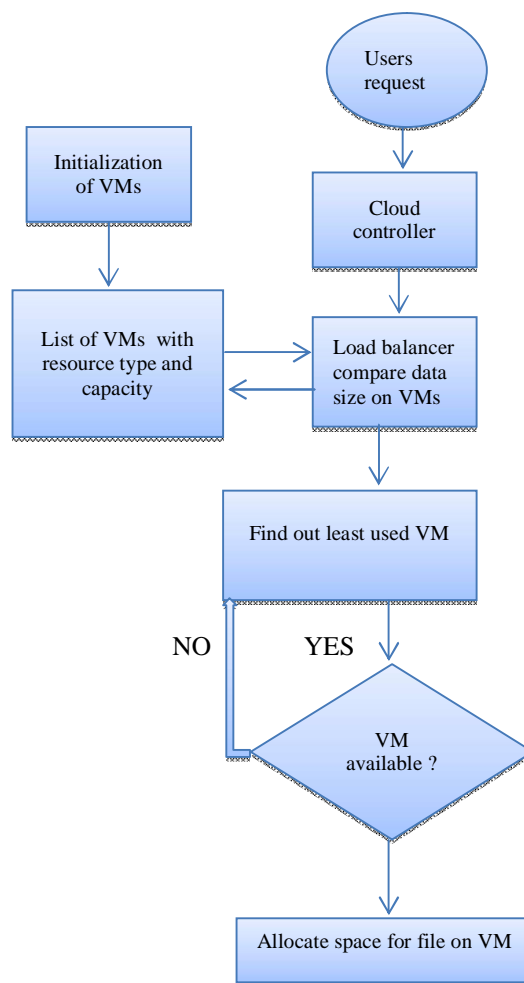


Fig 1: MOSFET based solar converter main circuit

The step-wise procedure of the algorithm is given as follows:

- Step 1: Initialization of VMs with resource type and capacity.
- Step 2: User request for file handling.
- Step 3: Get available resource information from all VMs with allotted data on it.
- Step 4: Compare allotted data size on VMs.
- Step 5: Select least used VM for storage
- Step 6: Allocate space for file on selected VM.
- Step 7: Maintain database for indexing files with respect to location and size.

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IV. EXPERIMENTAL RESULTS

Following table 1 shows the experimental results with existing system and table 2 gives the result with our propose approach. We can see that in existing system files are allocated to Node A and Node B without considering the file size and space on VM, where in proposed system while allocating the file on VM node file size is considered.

Table 1: Experimental Results on Existing Approach

File Number	File Size	File Allocate	Node A 100 Gb Size	Node B 100 Gb size
File 1	5 GB	Node A	95 GB	
File 2	30 GB	Node B		70 GB
File 3	10 GB	Node A	85 GB	
File 4	14 GB	Node B		56 GB
File 5	5 GB	Node A	80 GB	
File 6	10 GB	Node B		46 GB

Table 2: Experimental Results on Propose Approach

File Number	File Size	File Allocate	Node A 100 Gb Size	Node B 100 Gb size
File 1	5 GB	Node A	95 GB	
File 2	30 GB	Node B		70 GB
File 3	10 GB	Node A	85 GB	
File 4	14 GB	Node A	71 GB	
File 5	5 GB	Node A	66 GB	
File 6	10 GB	Node B		60 GB

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V. CONCLUSION

This system model uses the VMs in order to maintain the load on all the VMs. There are many load balancing algorithm but they are not suitable for heterogeneous VMs environment and also have additional overhead of scanning the entire list of VMs. This system makes good utilization of disk space. Files are also allocated to VMs which have enough space for file processing so overload condition can be avoided. So, this system improves the performance of system by making better use of resources.

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