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FRAGMENTATION AND ENERGY LOAD DISTRIBUTION IN CLOUD

T.JEEVITHA[1], M.SANDHIYA[2], M.NAVANEETHA KRISHNAN[3]

[1,2] Department of Computer Science and Engineering, St. Joseph College of Engineering, Chennai, India.

jeevi.abarna@gmail.com

[3] Professor & HOD, Department of Computer Science and Engineering, St. Joseph College of Engineering, Chennai, India.

mnksjce@gmail.com

Abstract-We Present the energy consumption of the cloud servers are un-checked or undistributed hence it leads to some servers under-utilized and some servers are over-utilized. To address the energy consumption problem we propose a distribution process which efficiently distributed energy among the underutilized and over utilized servers to make them both to average and turning off the unnecessary so that the basic energy consumption of one full servers saved. First the critical points for a server to be classified as underutilized and average performance and over utilized as set, once the virtual machines has been distributed according to the load the distribution algorithm runs to find which servers are under-utilized and average performance. Once the servers are identified the virtual machines from under-utilized servers are transferred to average performance servers and the under-utilized servers are turned off. While the transfer of virtual machine is being done it also make sure that the average servers are not changed to over utilized servers to save physical damage to the servers.

Key words: Cloud computing, Load balancing, Network Security.

1. Introduction:

Cloud networking and (Cloud based networking) is a term describing the access of networking resources from a centralized third-party provider using Wide Area Networking (WAN) or Internet-based access technologies. Cloud networking is related the concept of cloud computing, in which centralized computing resources are shared for customers or clients. In cloud networking, the network can be shared as well as the computing resources. It has spurred a trend of pushing more network

management functions into the cloud, so that fewer customer devices are needed to manage the network.

In discussing network design with my clients, I talk about how routers, firewalls and other network gear can be interconnected to provide a scalable and redundant IP network. These foundations of network design apply to networks composed of tangible components or the virtualized infrastructure that extends corporate data centers to the cloud. I find that the networking aspects of cloud computing are frequently overlooked or addressed as an afterthought. In this article, I'll share my thoughts and experiences on data center/cloud integration and discuss the network ramifications of some services to the cloud.

The demand for cloud services continues to increase at a global scale, so does the energy consumption of the service providers' data centers and, ultimately, their negative impact on the environment. In computation-intended data centers, the workload gets essentially translated into a number of provisioned virtual machine (VM) instances. Dynamic VM consolidation continuously strives to reduce the energy consumption of the data center by packing. the running VM instances to as few physical machines as possible, and consequently switching off the unnecessary resources.

The process of moving a running VM instance between different physical compute nodes without disconnecting the client, VM consolidation has become feasible in terms of cost. The improve the energy footprint of cloud data centers. The provision of large numbers of VM instances, energy efficient load balancing through VM consolidation becomes a challenging task. Cloud service providers to select appropriate and scalable data center architecture in order to carry out the VM consolidation process in an efficient way. Understanding the properties and requirements of a new system is more difficult and requires creative thinking and understanding of existing running system is also difficult, improper understanding of present system can lead diversion from solution.

2. Purpose of the System:

At present the energy consumption of the cloud servers are unchecked or undistributed hence it leads to some servers under-utilized and some severs being over-utilized.

To address the energy consumption problem we propose a distribution which efficiently distributed energy among the under-utilized and over-utilized servers to make them both to average and turning off the unnecessary servers to make them both to average and turning off the unnecessary servers so that the basic energy consumption of one full server is saved.

First the critical points for a server to be classified as under-utilized and average performance.Once the servers are identified the virtual machines from under-utilized servers are transferred to average performance servers and the under-utilized servers are turned off.

While the transfer of virtual machine is being done it also makes sure that the average servers are not changed to over-utilized servers to save physical damage to the servers.Effectively self-organized in a highly scalable hypercube overlay network.

In our approach will introduce a thorough analysis of the evolution of the

3. Related Work:

Through VM consolidation is a relatively new research topic,however, consider the two types of system like underutilized and over-utilized system .which is perform to minimize the system enhancement.it leads to increase the energy efficient and power consumption of our system portability, technological progress in computer world and rapid developments of distributed systems over last few years caused that load balancing problem were took into consideration as an main challenge more than ever in these systems. This section presents some important concepts and approaches of load balancing mechanism.

Load balancing is the process of redistributed the general system work load among all nodes of the distributed system (network links, disk drivers, central processing units.

In order to avoid system failure, load balancing is often used by controlling the input traffic and stop sending the workload to resources which become overloaded and non-responsive. This is an inherited feature from grid-based computing which has been transferred to cloud computing cloud computing platform right from the origination of the initial distributed computing system. a distributed computing system enables the sharing, selection and aggregation of distributed heterogeneous computational and storage resources.

There are some important goals of load balancing mechanism which have been mentioned in different researches: appropriate physical machine based on the variant number of the client requests overtime.

3.1 Virtual Network performance:

Future internet will be based on the network virtualization. In the network virtualization the virtual network (VN) is the key component. The virtual network consists of virtual nodes and virtual topologies and Virtual links. These topologies are mapped on the substrate network SN. The main challenge of network virtualization is the problem of embedding virtual networks (VNE) in a substrate network.
The VNE can be classified into different categories
1. *Static vs. Dynamic*
2. *Centralized vs. Distributed* .

Still, in the presence of enterprise clouds consisting of hundreds to even thousands of physical machines utilized for the provision of large numbers of VM instances, energy efficient load balancing through VM consolidation becomes a challenging task. Indeed, the problem of VM consolidation is an applied form of bin packing, which is by nature a combinatorial

compute when large numbers of physical machines andthousands of VM instances are involved.Mappings based on periodically collected information.Relies on the use of a centralized cloud manager that carrier, Out the VM to PM The recently developed Green Cloud computing through VM is widely utilized,but a data center.

4. Existing System:

Thephysical machines as possible the aim is to reduce the consumed.The algorithms are implemented by a Green Cloud for decentralized approaches. Dynamic consolidation of VMs in Physical machines are used, is to reduce the consumed energy of a private cloud without compute nodes reliability.

Yetginer et al in 2009 [2] advocated optical WDM network. The WDM is used in terms of the power consumed by individual light paths. The author proposed a model which uses an ILP (Integer Linear Programming). The ILP is used for the formulation of the grooming problem which Rahman et al in 2010 [6] suggested a solution for survivable virtual network embedding (SVNE). This problem is developed by hybrid policy heuristic to solve it. The suggested policy uses a fast re-routing using the reserved physical links and pre-reserved quota for backup authors suggested to extend the proposed approach to multiple node failures and node migration in case of substrate network failure. The result has shown that proposed approach heuristic for SVNE outperforms in comparison of baseline heuristic. The suggested approach outperforms in terms of proved to be energy efficient for small networks. The authors suggested using a heuristic approach for the power efficient grooming of large networks. The power consumption of the individual line path is formulated in terms of network. The function of the number of line paths is used to consumption of total power. The total amount of electronically switched traffic is also used for this. The Fig.3 shows the optical WDN network and grooming. ILP is expressed by the corresponding optimization problem. The grooming problem is solved to using ILP. To minimize the number of line paths.

- The Business profit is used for the Inp.
- The Acceptance ratio is considered.
- The Bandwidth efficiency
- The Response time.

Arif *et al* selected the topic of cloud computing and its environment. The paper presented the different strategies adopted to control the problem of cloud computing. The authors utilized the virtualization techniques. The techniques used to control the problem of the techniques based on virtualization are as follows:

- It is used in Live migration of VM

- It is used in dynamic resource allocation of different resources.

Srikantaiah et al. [11] have studied the problem of requestsscheduling for multi-tiered web-applications in virtualizedHeterogeneous systems in order to minimize energyConsumption, while meeting performance requirements. Tohandle the optimization over multiple resources, the authorshave proposed a heuristic for multidimensional bin packingProblem as an algorithm for workload consolidation. However, The proposed approach is workload type and applicationdependent, whereas our algorithms are independent of theworkload type and thus are suitable for a generic Cloud.

Benefits and drawbacks:

One of the main benefit of the micro services-based architectures. The module independence. Each component represents a single function of the application and can be independentlydeveloped and deployed. Each development team works. In autonomy and can choose the preferred or most appropriated platform and language.

This means that microservices can be spread across heterogeneous infrastructures, composed of completely different platforms, run-time environments and hardware architectures. Further, each module is fully replaceableand upgradable, easing application maintenance.

Managing a large set of distributed components has its. Issues. First of all, service distribution has a negativeImpact on the performance that is caused by the time fortransferring data and the time to process requests. This latencyis worsen by the asynchronous communication mechanismsused to exchange information.

5. The Propose Approach:

The proposed approach implements dynamic VM consolidation and relies on live VM migration.

- Specifically, the physical machines of the data center that are used to host the VM instances are effectively.
- Self-organized in a highly scalable hypercube overlay network.
- We plan to implement and integrate our decentralized workload manager in an open-source cloud operating system.
- The power consumptions inflicted by other resources of the data center, such as the compute nodes disk, RAM memory, and network, even though those are usually overruled by the CPU power consumption.

Load balancing in cloud computing datacenters has been a main challenge and an active area of research in recent years.

In this paper we have presented a survey on recent load balancing techniques and implementing scheduling algorithms which have proposed only for cloud computing environments.

Generalalgorithm-based, architecturalbased,artificial intelligence – based load balancing approaches.In addition,our survey on the current proposed cloud load balancing approaches has been

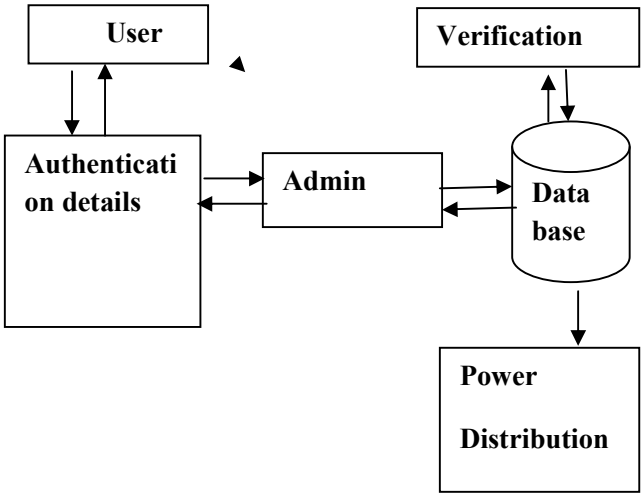
contribution of this work has been listed below, A new classification of cloud load balancing and Decentralized approach for designing perspective on this paper. To solve the load distributing problem on various nodes of a distributed system to improve system utilization and job response time and same time.

All the processor in the system or every node .does on scheduling algorithm based on load balancing for distribution system in cloud environments.Proposed some most known GAL-based load balancing algorithm and represents a good comparison of their performance with one another because the represented load balancing algorithm is a centralized algorithm and therefore dealing with bottleneck problem.A private enterprise cloud data center typically consist of one or more physical controllernodes, whose propose is to maintain the overall cloud OS and a farm of physical compute We have to introduce two types of algorithm like load balancing and scheduling algorithm which is reduce power consumption and energy efficiency.

The proposed system experiments aimed at examining the following main aspects: 1) 1.Elasticity: adapting to random workload changes.

2) Eradication: of under/over-utilized nodes: balancing underutilized and over utilized physical machines.

3) Power consumption: energy costs per hour for the data center.



SYSTEM ARCHITECTURE

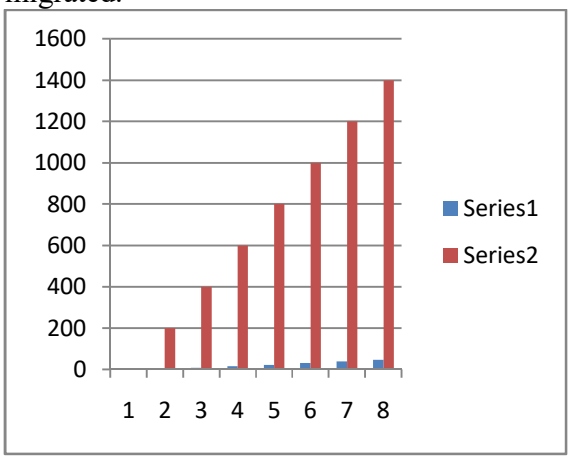
6. Load Balancing Migration:

The VM reallocation problem can be divided in two:
Selection of VMs to migrate and determining new placement of these VMs on physical hosts. The first part has to be considered separately for each optimization stage. The
Second part is solved by application of a heuristic for semi online multidimensional bin-packing problem.

At the first optimization stage, the utilization of resources is monitored and VMs are reallocated to minimize the number of physical nodes in use and thus minimize energy consumption by the system. However, aggressive consolidation of VMs may lead to violation of performance requirements.

We have proposed several heuristics for selection of VMs to migrate and investigated the trade-off between performance and energy savings. To simplify the problem for the first step we considered only utilization of CPU. The main ideaof the policies is to set upper and lower utilization thresholdsand keep total utilization of CPU created by VMs sharingthe same node between these

thresholds. If the utilization exceeds the upper thresholds, some VMs have to be migrated.

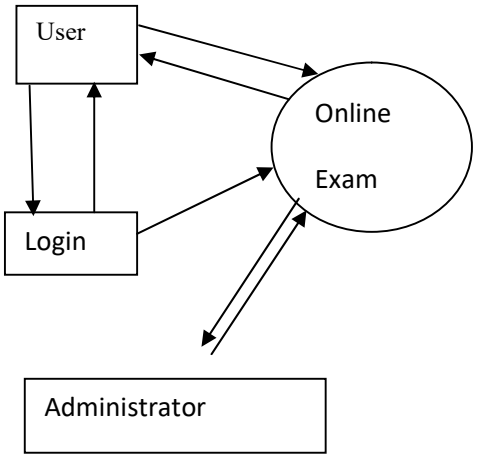


Simulation time (2)

7. Modules Description

7.1. Online Examination

In the beginning of the management of the energy we must first decide the number of the systems used so we propose and preliminary exam in which the candidates write the exam and go to the main exam based on the percentage of marks taken in sample exam hence the avoid the unwanted allocation of the main recourse and filter them in minimal energywastage.



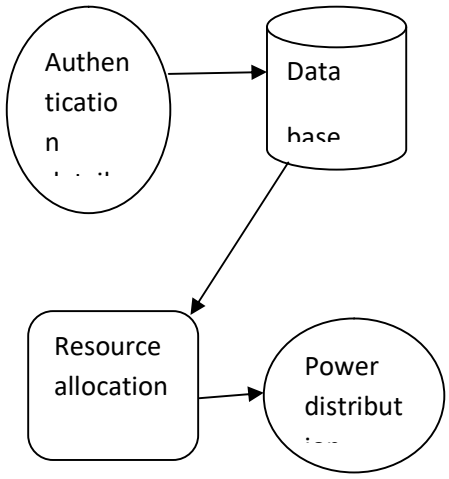
7.2 Allocation of Resources

Once the primary exam has been completed they are changed to the main exam in which they are connected to the servers and they start writing the main exam and each candidate are given separate set of questions and are connected to different servers for allocation of the space in cloud. This is how the primary allocation of the servers is done so as to reduce the Authentication details or the candidates as more is not feasible it is done in traditional way.

7.3. Power Distribution

Once the initial allocation has been done and all has been completely allocated we take into account the efficient allocation of the servers so we calculate the number of students connected to each servers and the

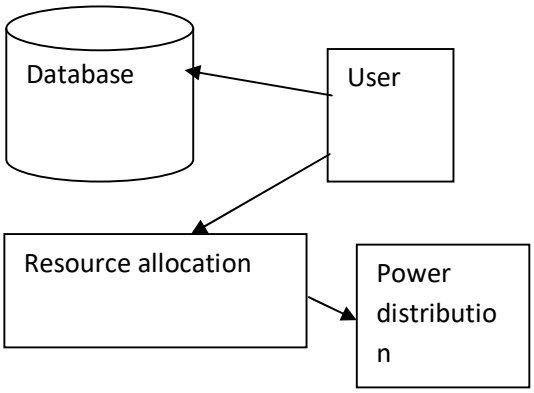
energy consumption of the each student and the total energy consumption is calculated .



Once it is calculated we check which server has the highest consumption of the energy and which server has least power consumption. We call it most utilized server and underutilized server respectively.

7.4. Save Power Consumption

Once the most utilized and the underutilized servers are found we efficiently move the user connection between the server so as to make sure that no servers is moved to the over utilized zone and no server is left in underutilized zone.We move the connection such that the connection once allocated and established not lost as it will interrupt the exam process.When all the underutilized servers are made to normal capacity a few servers are left connection less which is then turned off to save the power consumption hence reducing the total pollution caused by it.



7.5. Load Balancing Algorithm

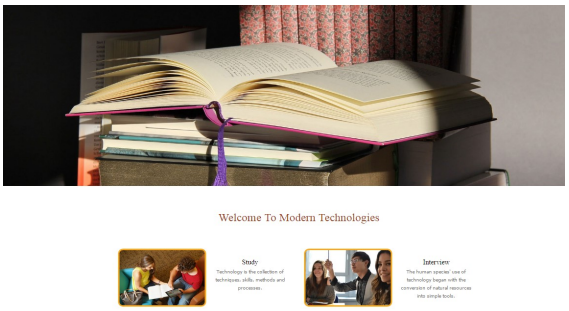
Load balancing refers to efficiently distributed incoming network traffic across a group of backend servers, also known as a server farm or server pool. Different load balancing algorithms provide different benefits the choice of load balancing method depends on your needs.The load balancing algorithms consist of Round Robin, Least Connections,IP Hash.

- Round Robin : Requests are distributed across the group of servers sequentially.
- Least Connections: A new request is sent to the server with the fewest current connections to clients.The relative computing capacity of each server is factored into determining which one has the least connections.

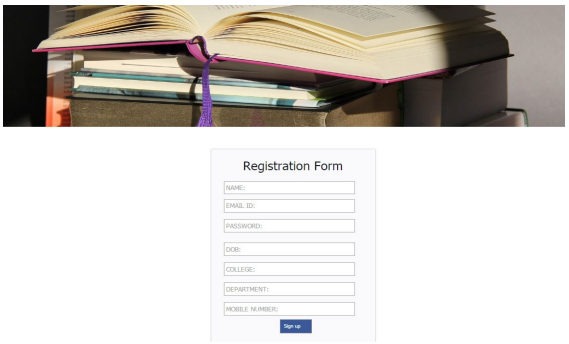
- IP Hash : The IP address of the client is used to determine which server receives the request.
- It is the process of exercising software with the intent of ensuring that the software system meets its requirements and user expectations and does fail.

8. System Implementation:

8.1 Home Page:



8.2 Registration Page:

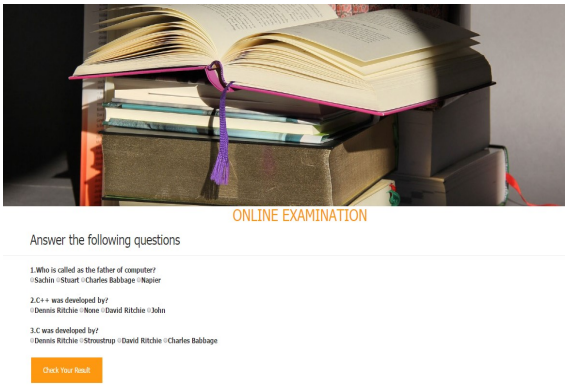


8.3 Registration Details:

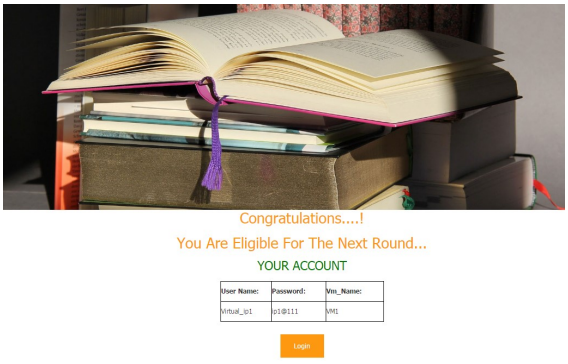
energyefficient.energyefficient: 29 rows total (approximately)

id	NAME	EMAIL_ID	PASSWORD	DOB	COLLEGE	DEPARTMENT	MOBILE_NUMBER
1	gayathri	gayathri@gmail.com	gayu@123	04/10/1995	paavai engineering college	cse	9876543210
2	priya	priya@gmail.com	priya@123	17/09/1991	rtt engineering college	it	8976506752
3	hi	hi@gmail.com	123	12/12/1992	paavai engineering college	cse	9876543211
4	hema	hema@gmail.com	hema@123	08/12/1998	ks engineering college	civil	9876543210
5	raj	raj@gmail.com	123	22/11/1992	mahendra engineering college	cse	8978675645
6	ganesh	ganesh@gmail.com	123456	13/06/1887	ravi institute of technology	mech	9078563412
7	elaa	elaa@gmail.com	elaa@123	22/09/1992	elaa ingineering college	mech	9078765645
8	riya	riya@gmail.com	123456	03/12/1995	riya engineering college	cse	9876543210
9	jeevarathinam	jeevarathinam@gmail.com	jeeva	16/12/1993	mahendra engineering college	mech	9876783452

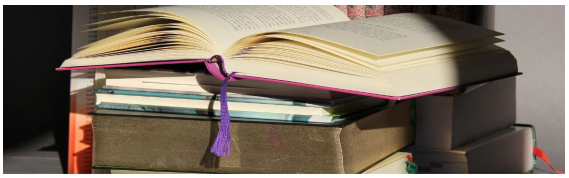
8.4 Online First Exam:

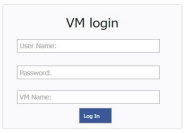


8.5 Virtual Machine Account:



8.6 Virtual Machine Login





8.7 Online Main Exam

ONLINE EXAMINATION

Answer the following questions

1.Given a method in a protected class,what access modifier do you use to restrict access to that method to only the other members of the same class?
○final ○static ○private ○protected ○volatile

2.You want a class to have access to members of another class in the same package. Which is the most restrictive access that accomplishes this objective?
○public ○private ○protected ○default access

3.Which class or interface defines the wait(), notify(),and notifyAll() methods?
○Object ○Thread ○Runnable ○Class

4.What is the numerical range of char?
○0 to 32767 ○0 to 65535 ○-256 to 255 ○-32768 to 32767

5. Which of the following are Java keywords?
○throw ○void ○private ○All of the above

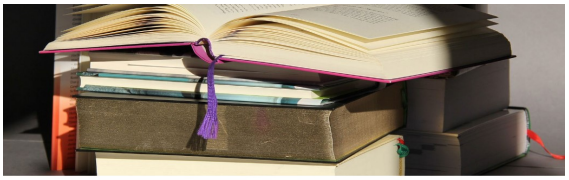
6.A lower precision can be assigned to a higher precision value in Java. For example a byte type data can be assigned to int type?
○True ○False

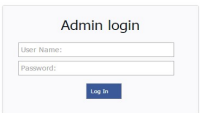
7.The class Hashtable is used to implement which collection interface. Select the one correct answer.
○List ○Set ○Map ○SortedSet

8.TreeMap class is used to implement which collection interface. Select the one correct answer.
○Set ○SortedSet ○Tree ○SortedMap

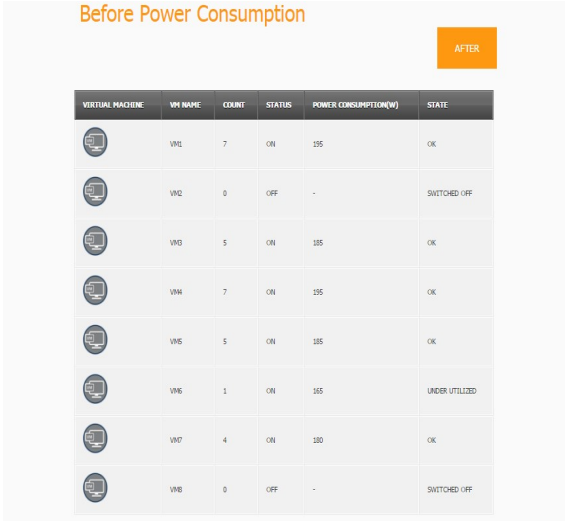
Check Your Result

8.8 Admin Login Page:

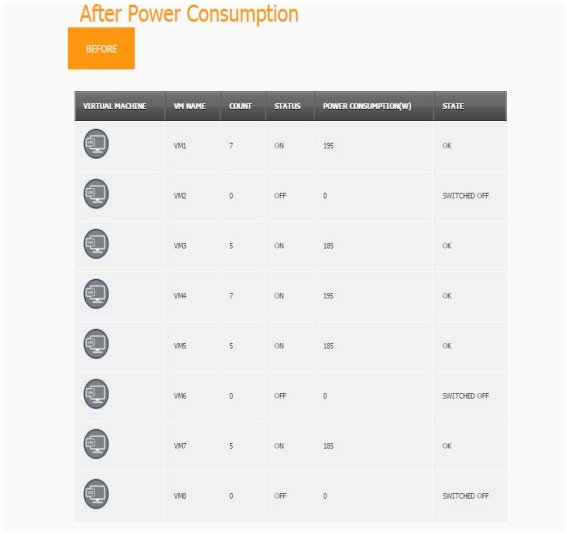




8.9 Before Power Consumption:



8.10. After Power Consumption:



9. Conclusion

We presented a fully decentralized approach for managing the workload of large, enterprise cloud data centers in an energy-efficient manner. Our approach comprises a hypercube overlay for the organization of the data center's compute nodes, and a set of distributed load balancing algorithms, which rely on live VM migration to shift workload between nodes minimize the active resources of the data center, and thereby its energy consumption, and avoid overloading of compute nodes.

We conducted a series of simulation-based experiments in order to evaluate our proposed approach. The results suggest that our decentralized load balancer is scalable, as it operates in a similar way regardless of the data center size, and energy-efficient. Moreover, it enables automated elasticity as the data center's compute nodes are switched on and off on demand, in response to the changes in the data center's overall workload. Our experimental results also showed that the cumulative cost of live VM migrations along with that of switching on and off compute nodes is insignificant compared to the energy savings attained by our approach.

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