

Balancing of Cloud Services Capacity Using Optimization Techniques in Matlab Simulation Tool

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Abstract: Cloud computing is the latest technique needful for storage of the important data accessible simultaneously globally by the multiple users using the network structure. The cloud contains different types of services such as IaaS, PaaS and SaaS. The cloud computing's aspect to provide these real time services with highly accuracy and less downtime. The server's services are get in deadlocks due to providing of the services to the multiple users with different services offerings. The load balancing techniques has been invented for provide the services on time. We have been proposed the round-Robin algorithm for manage the loads by assigning the priority to the request services. The priority has been assigned to the services which needs less time to release the resources with similarly to other approaches. The practical work will be implemented in the MATLAB Simulation tool using MATLAB 10b version. The Results will be computed based on the algorithm designed with parameters and likely to give the best results as per the research.

Index Terms – Load Balancing, Cloud Computing, Server, IaaS,SaaS,PaaS.

1. INTRODUCTION

Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth. Cloud computing has started to obtain mass appeal in corporate data centers as it enables the data center to operate like the Internet through the process of enabling computing resources to be accessed and shared as virtual resources in a secure and scalable manner. The Cloud computing is a rapidly emerging distributed system paradigm that offers a huge amount of IT resources as utility services at a reduced cost and flexible schemes. The key of such flexibility is an efficient load balancer that offers better management and utilization of virtualized underlying cloud infrastructures.

A. Types of Cloud Services

Cloud computing offers a variety of ways for businesses to increase their IT capacity or functionality without having to add infrastructure, personnel, and software. There are seven different types of cloud computing and offer to businesses:

1. Web-based cloud services

These services provide the web service functionality, rather than using fully developed applications. For example, it might include an API for Google Maps, or for a service such as one involving payroll or credit card processing.

2. IaaS (Infrastructure as a Service)

This service provides access to computing resource in a virtualized environment across a public connection through the internet. In the case of IaaS the computing resource provided is specifically that of virtualized hardware i.e. computing infrastructure. This includes such offerings as virtual server space, network connections, bandwidth, IP addresses and load balancers.

3. SaaS (Software as a Service)

This provides a given application to multiple tenants (Users), typically using the browser. SaaS solutions are common in sales, HR, and ERP. SaaS is accessed by users using a thin client via a web browser.

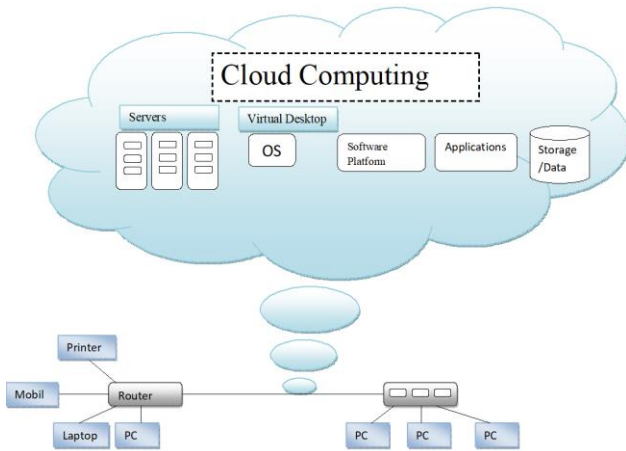


Figure 1: Scenario in Cloud Services

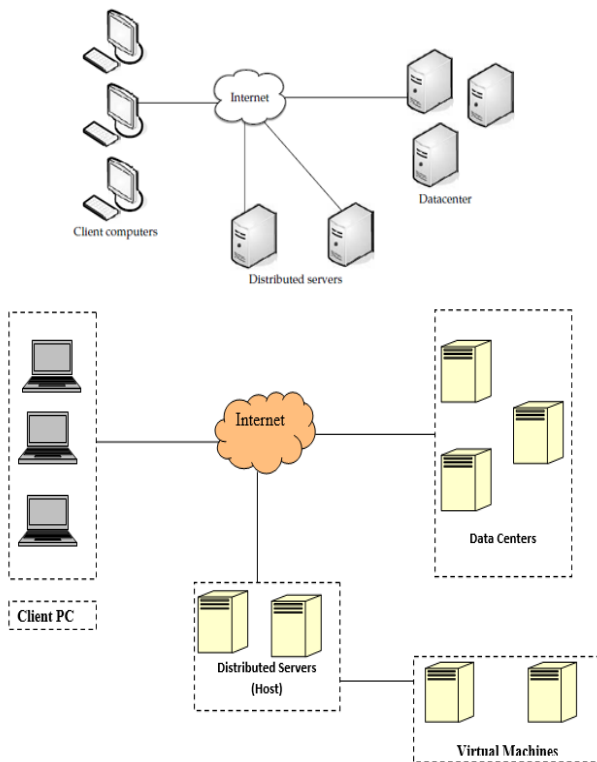


Figure 2: Server vs Virtualization in Cloud Environment

Load Balancing in Cloud Computing:

The load balancing algorithm is the core part of any web based services which is for management of service requests.

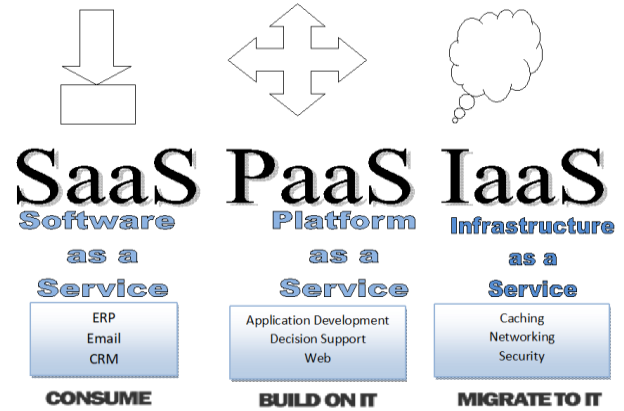


Figure 3: Services as a Provision

The load balancing algorithm will be able to decide whether the service request needs to remain in the queue or get service from the other service provider.

Efficient provisioning of resources and scheduling of resources as well as tasks and goals will ensure:

- a. Improve the performance
- b. Maintain system stability
- c. Build fault tolerance system
- d. Accommodate future modification.
- e. Resources are efficiently utilized under condition of high/low load.
- f. Energy is saved in case of low load i.e. when usage of cloud resources is below certain threshold.

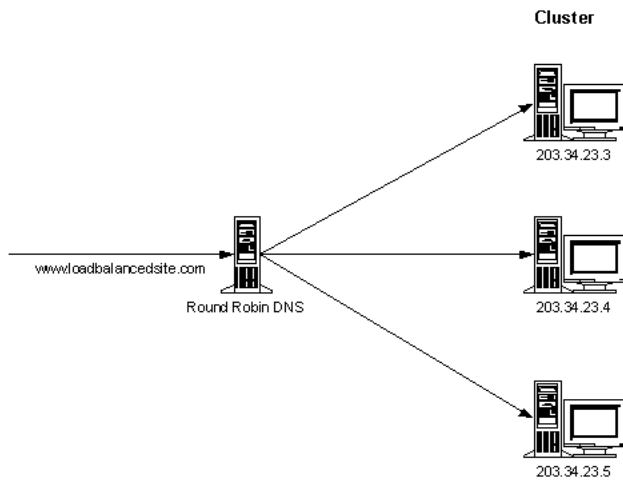
Load Balancing Algorithms

a. Random

This load balancing method randomly distributes load across the servers available, picking one via random number generation and sending the current connection to it. While it is available on many load balancing products, its usefulness is questionable except where uptime is concerned – and then only if you detect down machines. The system builds an array of Servers being load balanced, and uses the random number generator to determine who gets the next connection.

b. Round Robin

Round Robin passes each new connection request to the next server in line, eventually distributing connections evenly across the array of machines being load balanced. Round Robin works well in most configurations, but could be better if the equipment that you are load balancing is not roughly equal in processing speed, connection speed, and/or memory.



II. LITERATURE REVIEW

Author [1] has been explained the concept of the Network bandwidth and hardware technology used for resulting in the vigorous development of the Internet. A new concept, cloud computing, uses low-power hosts to achieve high reliability. The cloud computing, an Internet-based development in which dynamically scalable and often virtualized resources are provided as a service over the Internet has become a significant issue. The cloud computing refers to a class of systems and applications that employ distributed resources to perform a function in a decentralized manner.

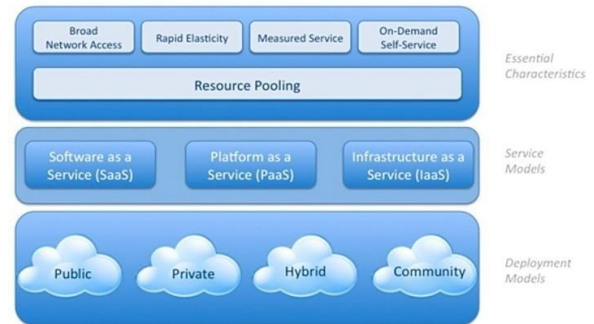
Author [2] has been assimilated the knowledge about the current virtual machine (VM) resources scheduling in cloud computing environment which mainly considers the current state of the system but seldom considers system variation and historical data, which always leads to load imbalance of the system. In view of the load balancing problem in VM resources scheduling, this paper presents a scheduling strategy on load balancing of VM resources based on genetic algorithm.

Author [3] has been assimilated the knowledge about the Virtualization aims to provides the services with the concepts of cloud Environment. Virtualization technology is currently becoming increasingly popular and valuable in cloud computing environments due to the benefits of server consolidation, live migration, and resource isolation. Live migration of virtual machines can be used to implement energy saving and load balancing in cloud data center.

Author [4] explained the Services of Cloud and With the expansion of cloud-based services, the question as to how to control the workload among a large virtual machine (VM) cluster has become increasingly important. One of

the most popular way to achieve load- balancing is migrating VMs from high-load machine to light- load ones.

Author [5] has been explained the benefits of cloud computing in business growth and explained the resource allocation with load balancing algorithms. They explained that the rapid development of Internet has given birth to a new business model, i.e. Cloud Computing.



The cloud computing is large distributed systems that employ distributed resources to deliver a service to end users by implementing several technologies. Hence providing acceptable response time for end users, presents a major challenge for cloud computing.

III. OBJECTIVES

The load balancing provides the facility to handle the faults that appear in typical Cloud computing infrastructures and faults impact user's applications. These faults can be handled in an efficient and cost-effective manner.

1. Analysis of the cloud computing service and resource issues.
2. Study and select the best algorithm for load balancing in cloud Environment.
3. Implement the algorithm in any of language.
4. Analyze results.

IV. PROPOSED METHODOLOGY

1. Study of existing load balancing Algorithms in Cloud.
2. Identify and analyze the benefits of load balancing techniques.
3. Research on the load balancing real time issues.
4. Choose the reliable load balancing technique in Cloud.
5. Flow Development of new research and its Implementation in any of the language for making it understandable steps.
6. Analyze the results in MATLAB 2010b Simulation tool.

V. CONCLUSION AND FUTURE WORK

In the Proposed work, our research explained the concept of the cloud services with provisions of real time services to the users with concept of load balancing and specified algorithms.

In Future, the virtualization concept can be as add-ons with the algorithms for provide the services using effective load management and high rate of availability.

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