Volume 5, Issue 4, 2015 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

A Review on Load Balancing in Hybrid Cloud Computing

Swapna D. Lokhande, Aarti Wagh, Rupesh Wagh
Computer Technology & RTMNU
India

Abstract— Cloud Computing is considered as the largest platform which provides storage of data in very lower cost and available for all time over the internet. Hybrid Cloud computing is one of the uprising technology accessing for both the benefits of private and public cloud where load balancing in the cloud is the most interesting and important research area. Load balancing are used to increase capacity (concurrent users) and reliability of computer applications. In this paper we discuss various concepts to resolve the issue of load balancing among the servers in hybrid cloud computing.

Keywords: Cloud computing, Load balancing, task scheduling, Hybrid, servers.

I. INTRODUCTION

1.1. CLOUD COMPUTING

Cloud computing is a computing platform, where various chattels such as compute clout, storage space, arrangement and software are vague and services are provided on the internet in a remotely accessible fashion. On-demand accessibility, ease of provisioning, dynamic and virtually unlimited scalability is some of the key attributes of cloud computing. Cloud networking is an service which serves on demand in which every communal assets, data, software and other devices are provided at specific time as per the customer requirement. Capital and operational costs can be cut using cloud computing. Cloud computing architecture has necessary abstract layers beginning at bottom and working upwards. A five layers cloud architecture that constitute cloud computing. The bottom layer is the physical hardware (Haas). Customers who use this layer of the cloud are usually big corporations who require an extremely large amount of subleased Hardware as a Service. As a result, the cloud-provider lope, supervise and raising its subleased hardware for its customers. The abstraction layer above the software kernel is called software infrastructure. This layer renders basic network resources to the two layers above it in order to facilitate new cloud software environments and applications that can be delivered to end-users in the form of IT services. The services offered in the software infrastructure layer can be separated into three different subcategories: computational resources (IaaS), data storage, and communication.

Infrastructure as a Service (IaaS):
The potential provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications.

Data-Storage as a Service (DaaS):
It allows users of a cloud to store their data on servers located in remote locations and have instant access to their information from any site that has an Internet connection. This technology allows software platforms and applications to extend beyond the physical servers on which they reside.

Communication as a Service (CaaS):
CaaS to perform services like network security, real-time adjustment of virtual overlays to provide better networking bandwidth or traffic flow, and network monitoring. Through network monitoring, cloud-providers can track the portion of network resources being used by each customer.

Platform as a Service (PaaS):
PaaS provides services to the consumer so as to organize into the cloud communications consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.

Software as a Service (SaaS):
The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. This applications are handy from various client devices through either a thin client interface, such as a various web browser (e.g., web based email), or a program interface.

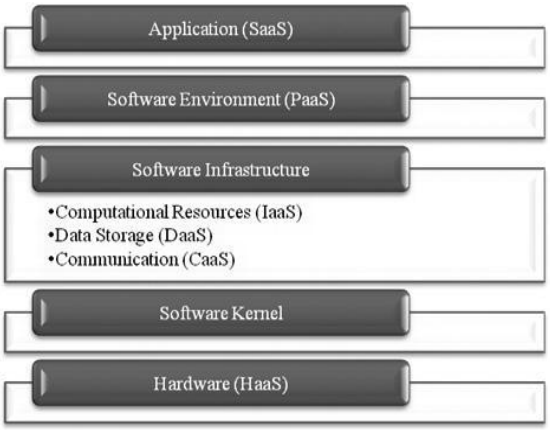


Figure.1. Architecture of Cloud Computing.

1.2 CLOUD COMPONENTS:

A Cloud system consists of 3 major components which includes clients, datacenter, and distributed servers. Each element performs an specific duty. Three components make up a cloud computing solution (adopted from).

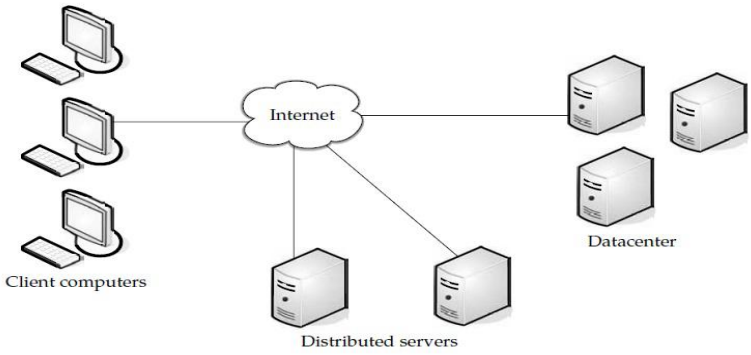


Figure:2. Cloud Components

1. Clients

Everything ends with the client. The client uses all the hardware components, the application and everything else developed for cloud computing. Nothing is possible without the client. The client could come in two forms: the hardware component or the combination of software and hardware components. Although it's a common conception that cloud computing solely relies on the cloud (internet), there are certain systems that requires pre-installed applications to make sure that there is smooth changeover. The hardware on the other hand will be the platform where everything has to be launched. Optimization is based on two fronts: the local hardware capacity and the software security. Due to optimized hardware along with security, the application will launch flawlessly.

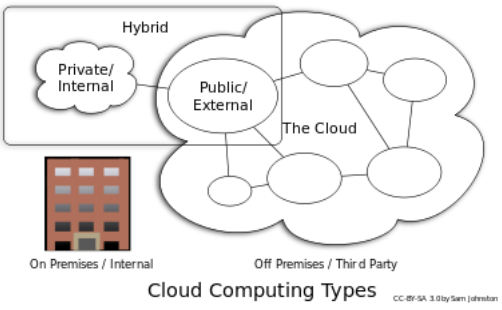
2. Datacenter

Datacenter is nothing but a collection of servers hosting different applications. A end user connects to the datacenter to subscribe different applications. A datacenter may subsist at a huge reserve from the clients. Now-a-days a concept called virtualization is used to install software that allows multiple instances of virtual server applications.

3. Distributed Servers

Distributed servers are the parts of a cloud which are present throughout the Internet hosting different purposes. But while using the request from the cloud, the customer will experience that he is using this application from its own machine.

1.3 TYPES OF CLOUD:



1) Public cloud:

Public cloud relevance, cargo space, and other assets are made available to the general public by a service provider. All the services on these are free or offered on a pay-per-use model. Some of the public cloud service providers like Amazon AWS, Microsoft and Google own and operate the infrastructure and offer access only via Internet (direct connectivity is not offered).

2) Community cloud:

Community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether supervise within or by a intermediary and hosted internally or externally. The costs are stretch over some customers than a public cloud (but more than a private cloud), so only fewer of the outlay reserves prospective of cloud computing are appreciate.

3)Private cloud :

Private cloud is cloud infrastructures operated solely for a single organization, whether supervise within or by a intermediary and hosted internally or externally. Activity of an private cloud venture requires a significant level and degree of appointment to virtualized the business environment, and requires the institute to revaluate decisions about obtainable assets.

4)Hybrid cloud :

Hybrid cloud is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together, contribution the benefits of multiple deployment models. By utilizing "hybrid cloud" structural design, corporation and folks are able to obtain degrees of fault tolerance combined with locally immediate usability without dependency on internet connectivity. Hybrid cloud structural design requires both on-premises assets and off-site (remote) server-based cloud transportation.

II. LOAD BALANCING

2.1. Introduction:

It is a process of reconvening the total load to the individual nodes of the collective system to make resource utilization effective and to progress the retort time of the work, simultaneously take away a condition in which some of the nodes are over laden while some others are under laden. A load balancing algorithm which is dynamic in nature does not consider the previous state or behavior of the system, that is, it depends on the present behavior of the system. The vital things to consider while mounting such algorithm are : estimation of freight, comparison of freight, evenness of diverse association, recital of system, dealings between the nodes, nature of work to be relocate, selecting of nodes and many other ones. This load considered can be in stipulations of CPU load, quantity of memory used, delay or Network load.

2.2. Goals of Load balancing:

- To improve the performance substantially
-To have a backup plan in case the system fails even partially
- To maintain the system stability
- To accommodate future modification in the system

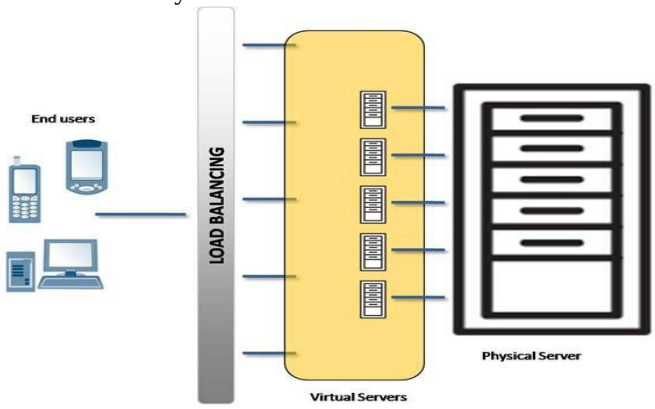


Figure 3: Load Balancing in Cloud Computing

III. LOAD BALANCING ALGORTIHM

There are various load balancing technique. Some of them are discussed below.

1. Round Robin Algorithm:

Round Robin is a very famous load balancing algorithm, in which the processes are divided between all processors. The process allocation order is maintained locally independent of the allocations from remote processors. In Round Robin, it send the requests to the node with the least number of connections, so at any point of time some node may be heavily loaded and other remain idle this problem is reduced by CLBDM.

2. Central Load Balancing Decision Model (CLBDM):
CLBDM is a central load balancing decision model, which is suggested by Radojevic and Mario Zagar, it's based on session switching at the application layer. The improvement is that, in the cloud it calculated the connection time between the client and the node, and if that connection time exceeds a threshold then connection will be terminated and task will be forwarded to another node using the regular Round Robin rules.

3. Map Reduce-based Entity Resolution:
Map Reduce is a computing model and an associated implementation for processing and generating large datasets. Map task and reduce task two main task in this model which written by the customer, Map takes an input pair and produces a set of intermediate value pair and Reduce task accepts an intermediate key and a set of values for that key and merges these values to form a smaller set of value. Map task read entities in parallel and process them, this will cause the Reduce task to be overloaded.

4.Ant colony optimization (ACO):
Kumar Nishant suggested an algorithm of ant colony optimization. In ACO algorithm when the request in initiated the ant start its movement. Movement of ant is of two ways*:*
***Forward Movement*:** Forward Movement means the ant in continuously moving from one overloaded node to another node and check it is overloaded or under loaded ,if ant find an over loaded node it will continuously moving in the forward direction and check each nodes.
.***Backward Movement*:** If an ant find an over loaded node the ant will use the back ward movement to get to the previous node, in the algorithm [11] if ant finds the target node then ant will commit suicide, this algorithm reduced the unnecessary back ward movement ,overcome heterogeneity, is excellent in fault tolerance.

IV. PROPOSED SYSTEM

- In this we are using Hybrid cloud which is an combination of private and public cloud.
- Hybrid cloud uses both benefits of public and private cloud.
- In this system we are using various servers which are working or developed in public and private cloud or any infrastructure.
- We then build an hybrid cloud between these clouds and servers workload is adjusted between the servers.
- To build a hybrid cloud the stepwise process is follows:

Step 1 – Know What You're Working With
Of course, not all cloud offerings are the same. Some providers make hybrid cloud easy while some are much more difficult—and some don't offer the solution at all. But as long as you are working with a provider that offers hybrid cloud, the basic steps is as follows:

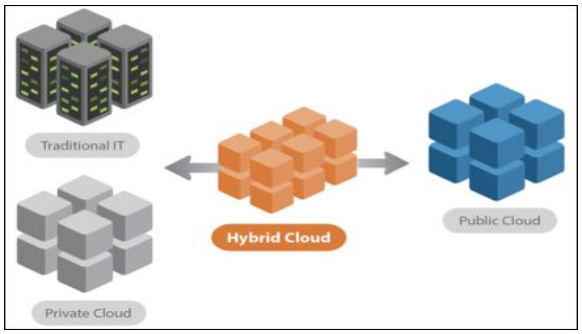


Figure 4 - Hybrid Cloud Basics

The primary concept here is that you are connecting your datacenter to a public cloud using a network connection. You don't have to be using virtualization, or have a private cloud in your datacenter. You also don't have to be a cloud expert or virtualization guru. You are simply making a connection between your datacenter and a provider. Typically this is done over a secure IPsec VPN connection (i.e., a VPN tunnel) from your datacenter to the provider using your existing Internet connection. This option is normally used because these connections don't trigger additional costs if you already have Internet access and a VPN device

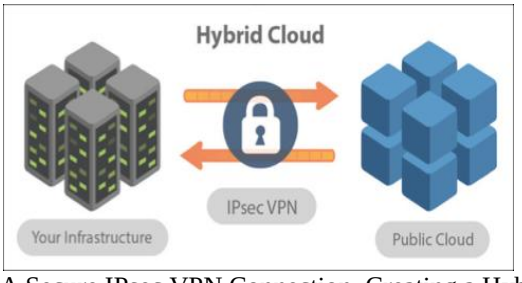


Figure 5 - A Secure IPsec VPN Connection, Creating a Hybrid Cloud

Another option is to use a private WAN circuit, which does offer some benefits, but will cost much more and take longer to implement.

Step 2 – Make the Connection

As illustrated above, what creates a hybrid cloud is when your infrastructure and the public cloud can work together using a VPN network connection. The best public cloud providers have made creating that security connection between data centres easy through self service. While the interface may look different between providers, the basics are that you provide the configuration parameters needed to make the VPN connection. Those typically include:

- IP addresses
- Security parameters (such as encryption algorithms)
- Pre-shared security keys

These parameters will be paired up in the provider's interface as well as on your side of the connection, in your VPN device. If you have ever used a VPN client on a remote laptop or desktop to connect to a VPN server at the office, making this connection is very similar. With the configuration made, you should be able to press a button to test the VPN connection.

Successful results should look something like this:

Test	Result
Overall	Pass
Phase 1:	Pass
Phase 2:	Pass
Ping remote address:	Pass
Connect to remote port:	Pass

Keep in mind that you aren't limited to just a single connection. You could have many VPN connections from your numerous company sites, all connected to the hybrid cloud, so that users at all company sites can utilize your public cloud infrastructure.

Step 3 – Infrastructure: Working in Harmony

With the secure connection created between your company and the cloud provider, you can bring up new virtual machines and applications in the hybrid cloud, all securely accessible through the hybrid cloud VPN connection that you created. Within minutes, you can create a new virtual machine from a shared template/catalogue offered by the cloud provider and your employees can access the application. Keep in mind that these servers and applications brought up in the cloud are servers that you didn't have to order, inbox, install, and provide power or cooling for. All the traditional server provisioning and maintenance is eliminated with hybrid cloud.

Step 4 - In the End

For large enterprises looking to divert critical applications or bring up large elastic hybrid cloud infrastructures, hybrid cloud planning, testing, and proper configuration is critical and extensive. However, for medium to small enterprises that want to test hybrid cloud for proof of concept, bringing up a hybrid cloud really can be done more easily than ever before thanks to public cloud provider advancements in self-service related to the hybrid cloud configuration, testing, and monitoring. Hybrid cloud doesn't have to be just for massive enterprises. Today, hybrid cloud has become a common sense IT tool that can be used by companies of all sizes to make life easier and business more productive.

- In this systems the servers are linked with each other and is synchronised with each other .That is the servers can view each other's contain by using a system of activation where when the user wants to view any data in another servers he can activate that server and can communicate within the servers .
- The work of load balancing comes when any users wants to store data or wants to download and all this is done only one servers then it is overloaded.
- To minimize the load we are using load balancing technique
- In this proposed system we are using round robin and ant colony optimization technique.
- In this system every server will be controlled with under an admin and every server is allotted size and time so whenever admin notice that any servers is about to cross its size limit of storage he will shift its remaining work at another server.
- And as the servers are synchronised the user can view his data at a time.
- The load is first balance by using round robin algorithm and linked with each other by using ant colony optimization.
- The security is maintained by using encryption technology which is used in the form of password as every user has to login first to use cloud systems.

REFERENCES

[1] Gaochao Xu, Junjie Pang, and Xiaodong Fu, A Load Balancing Model Based on Cloud Partitioning for the Public Cloud, IEEE TRANSACTIONS ON CLOUD COMPUTING YEAR 2013

[2] K. Nishant, P. Sharma, V. Krishna, C. Gupta, K. P Singh, N. Nitin, and R. Rastogi, Load balancing of no design cloud using ant colony optimization,Proc. 14thInternational Conference on Computer Modelling and Simulation (UKSim), Cambridgeshire, United Kingdom,Mar. 2012.

[3] M. Randles, D. Lamb, and A. Taleb-Bendiab, Acomparative study int distributed load balancing algorithms for Cloud computing, in Proc. IEEE 4th International Conference on Advanced Information Networking and Applications, Perth, Australia, 2010,pp.551-556.National institute of standards and Technology computer security

[4] Fei Hu, Meikang Qiu, Jiayin li, Travis Grant, Draw Tylor,Seth McCaleb, Lee Butler and Richard Hamner,"A Review on Cloud Computing:Design Challenges in Architecture and Security" journal of Computing and Information Technology-CIT 19, 2011.

[5] LizheWang,Jie Tao, Marcel Kunze"Scientific Cloud Computing:Early Definition and Experience"The 10th IEEE International Confrrence Computing and Communications 2008.

