Round Robin Selection of Datacenter Simulation Technique Cloudsim and Cloud Analsyt Architecture and Making it Efficient by Using Load Balancing Technique

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***Abstract*— Cloud Service Providers always offer Communication services that are flexible, on demand and measured. Multimedia services are used to be delivered through Cloud computing with severe QoS necessities. So there is a recent research is going on as a challenge between researchers, the QoS-aware, cost-efficient selection of data centers, due to these all necessities. Here in this work, there is an optimization approach to observe Cloud Data Center Selection Problem. The main feature of cloud computing is to achieve a high user agreement and enlarged resource consumption ratio by ensuring an well-organized and fair allotment of every computing resource is efficient load balancing. It helps to get appropriate load balancing aids in minimizing resource utilization, implementing fail-over, enabling scalability, avoiding bottleneck etc. In cloud computing situation load balancing is self-possessed of selecting data center for future demand and virtual machine organization at entity data center. Cloud computing resources have a variety of technology that make easy the implementation of big scale requirement. Therefore, the selection of appropriate data center for execution of a task is a significant feature to improve the performance of cloud computing. In this paper available policy for data center choice is Round-robin with simulation technique and also how CloudSim and cloud analyst help in selection of datacenter many more.**

Keywords—Cloud Computing; Region; Simulation; CloudSim Load Balancing;

I. INTRODUCTION

Since previous few years cloud computing is getting very popular. It gives many on demand application and services which are required for regular user as well as commercial application. In Cloud computing application are delivered over internet as a service and also those hardware and system software delivered are used as personal services stored at data center. In cloud resources are distributed among different users. Hence it gives permission to customer to use resources as per their requirement as well as their need. At hand there are numbers of problem related to services which can be seen in cloud computing are like how to load balance, how to make the virtual machine migration and how to decrease energy consumption etc [1]. To get high user satisfaction and to get better resource consumption we need to distributed the use workload of the cloud to all the nodes in cloud equally ,this is called load balancing techniques. To get the flexibility, & resourcefully we need a cloud based architecture that distribute the cloud workload and many other user requirements to the

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dedicated datacenter [2]. This is the main motive of cloud based architecture. Cloud computing is best for users who have the applications that are heterogeneous, dynamic, and challenging. These all applications are having changing performance, workload and vibrant application scaling necessities. But these properties, Service Models and Deployment models generate un-clear circumstances when the cloud is utilized by host applications. It creates difficult provisioning, symphony, Configuration and deployment necessities. By using Simulation we can scattered, virtualized, and flexible resources in a controlled manner to increase the application performance to gain imminent use [3].

Fig1. Data center expansion plans, Cloud Computing prompts worldwide expansion

II. AN OPTIMIZATION FRAMEWORK FOR COST EFFICIENT DATACENTER SELECTION

First of all the system model is introduced. The cloud infrastructure is reflected by all the N datacenters geographically scattered over a wide area specifically. In the cloud computing, Q mapping nodes at diverse locations are deployed over wide area to provide client requirements. There will a mapping of host nodes and these nodes are used in the equal manner. When the request is sent to the node, the requests are directed to the all subset of datacenters [4], which is determined by an appropriate datacenter selection algorithm. As we know that the traffic of request changes dynamically, the datacenter selection algorithm requires running infrequently to increase the performance of datacenter [2].

III. LOAD BALANCING TECHNIQUE IN CLOUD COMPUTING

When the discussion is done on load balancing, then it has been said that Load balancing is called a mechanism which distributes the work load of a particular host node to all other neighboring nodes to make the host node work faster and the goal is completed in very less time the goal is accomplished [10]. In this mechanism it will be thought to have a high user satisfaction and resource consumption fraction and it will be made sure to have no single node is skeptical, that the overall presentation of the organization will be surely increased. Appropriate load balancing technique can help in overriding the existing property in a efficient manner, hence the reduction of the resource utilization are being done [8]. It too supports in applying flop over, permitting scalability, avoid some drawbacks like the bottlenecks and over provisioning, sinking
retort time etc [13].

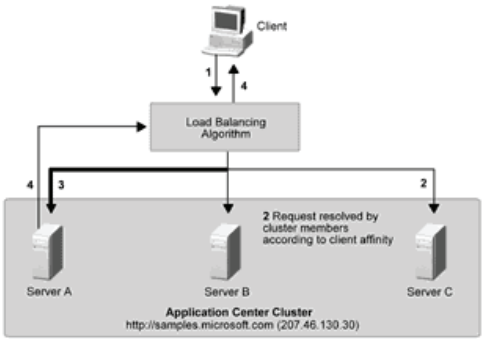

Fig 2. Load Balancing Algorithm

As this has already been discussed Load balancing has its main focus to distribute the load between nodes or we can say between different resources of an organization [8]. Cloud service provider are dependent on some mechanisms of automatic load balancing, that is with the improvement of demands, the customers will increase the no. of CPU's for their resources. These all fields are always dependent on the customer commercial requirements [11]. So there are two important needs of load balancing are, first is to support accessibility of Cloud resources and secondarily to support performance [8]. Some important objectives of load balancing algorithms are as follows:

- Cost efficiency: The load balancing algorithms should be cost efficient. The performance enhancement should be done at a rational cost [5].
- Scalability and elasticity: The algorithm that is to be applied may have some modification in size. So the algorithm must support the issues like scalability and elasticity in an enough manner, so that it can allow these types of changes to be easily controllable [14].
- Priority: The algorithm should do the prioritization of the resources on before hand for improved service. So that the high priority jobs may run with equal facility for all the jobs regardless of their origin [19].

IV. DISTRIBUTED LOAD BALANCING ALGORITHM

A. Round Robin

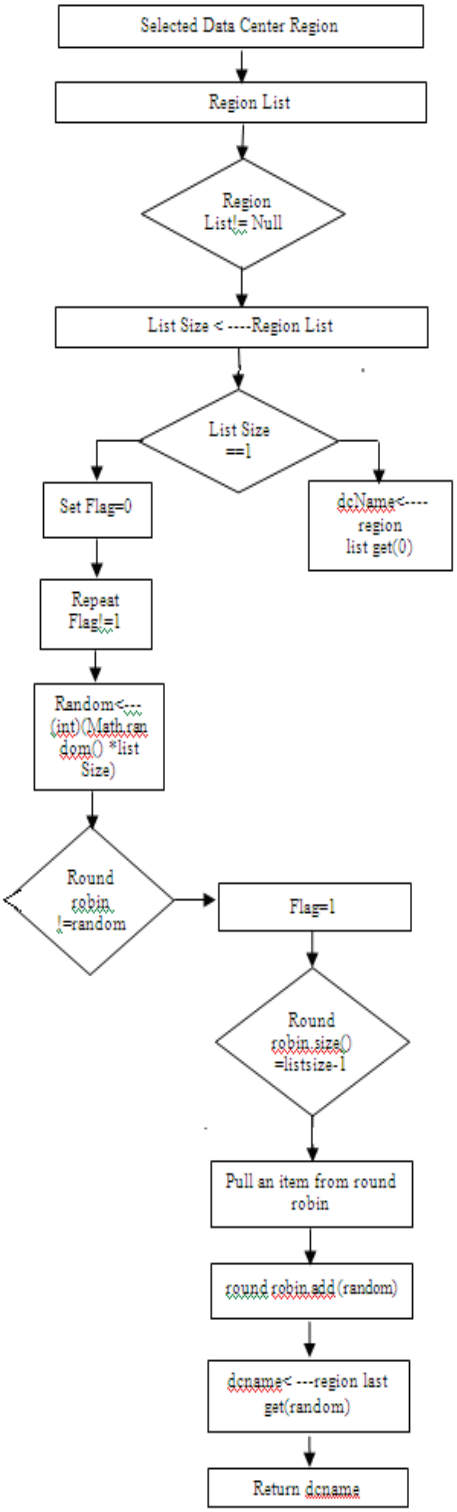

Figure 1Pseudo Flow Chart.

The one algorithm for load balancing is Round robin algorithm. That is based on the arbitrary examples. It means that it will balance the load between resources on arbitrarily in that case it can easily happen that some servers are greatly loaded or some are lightly loaded [8].

B. Throttled Load Balancing Algorithm

This algorithm is based on virtual mechanism fully. In throttled algorithm the user will first requests for the correct virtual machine, this will access that load effortlessly and execute all the operations which is give by the user [7].

C. VectorDot

This Vector Dot load balancing algorithm runs on the server and storage virtualization technology. In the agile data center this algorithm deals with the difficulty of the datacenter and multidimensionality of resource loads among servers, network switches, and storage [18]. To remove the overloads on the servers and switches, this algorithm uses dot product. This dot products has been used to differentiate nodes based on the item requests [16].

D. Compare and Balance

Some of the objectives of designing a load balancing model are to diminish virtual machines relocation time, to balance load amongst servers according to their workstation [20] and to continue virtual machines zero-downtime [23]. This compare and balance load balancing algorithm is based on the mechanism of sampling. This algorithm assures the objectives of designing the load balancing models [5].

V. INTRODUCTION TO CLOUD ANALYST & CLOUD SIM

CloudSim is used to allow modelling, simulation and testing of cloud computing infrastructures and application services. The modelling and simulation that is done through cloudsim is faultless [21][19]. Suppose an application package has been developed and we as a developer or researcher want to check its performance in a controlled environment, then we can use cloudsim as a widespread framework [2]. CloudSim framework is built on top of GridSim framework also developed by the GRIDS laboratory [1].

Fig3. Architecture of Cloud Analyst

The important features offered by CloudSim are:

- A wide range of cloud computing applications are modelled and simulated using cloudsim these days.

- Data centers that are on a single physical computing host can also be simulated using cloudsim [1].
- Cloudsim is having an autonomous policy for modelling different parameters of data centers, service brokers, scheduling, and allocation technique.
- Cloudsim has the accessibility of virtual machine (VM), which manages the numerous, autonomous, and co- hosted virtualized services on a single data center node.
- Flexibility to switch among space shared and time-shared distribution of processing core to virtualized services [22].
- CloudAnalyst [1], built on CloudSim, accepts information of geographic position of customers creating traffic and location of data centers, and number of resources in each data center as parameter and produce results in the form of XML files so the experiment can be continual [1].

A. Service Broker

The service broker selects as to which data center should be nominated to deliver the services to the requests from the customer base [3].

Service proximity depend on routing policy: It basically follows the nearby data center approach. This strategy routes the requests to the data center which has the greatest response time between all data centers. Primarily traffic is routed to the DataCenterController nearby to the requests initiating Customer Base in form of network latency. At that time if the CloudSim Toolkit the GUI response time achieved by the Data Center starts by declining, that service broker examines for the data center with the finest response time at that time and dividends the load among the closest and the firmest data centers [1]. In our paper, we have proposed the improvement in this policy to accomplish improved resource utilization by distributing data centers in Round-Robin method when numerous data center subsists in particular region [2].

B. *Working Of Service Proximity Based Routing*

This methodology is modest among all routing [3]. This methodology selects the region on the basis of highest region in the list. Then it selects the data centre randomly of a particular region to process the request of the user [6]. The internet requests the service broker of service proximity when it caches the message from base of customer [25]. The service broker requests for the region proximity list to the Internet Features based on the region of the Customer Base[14]. Based on the latency of the region, the proximity is done orderly [3]. Random choice of data center causes incompetent usage of the data center resources when more than one data center in the similar region. Request processing is not controlled correctly [2].

B. Prototyped Enhancement In Service Proximity Based Routing

We have introduced an design that is used to allocate load among datacenters on a uninterrupted round robin selection basis as part of usual processing. Our purpose is to develop strategy that, distribute requests uniformly between all the Data Centers by means of this new proposed round robin process within single region. This is implemented in the service broker strategy [13]. Proximity Based Routing strategy always enables the service broker when we have to decide a data center that is closer to the user section from where the user request is originate exclusive of considering other parameters such as cost, response time, etc., If more than one data center is present in the similar region, the data center is selected arbitrarily [4]. At times, this mode of choice may lead to congestion of the nearby data center. With overloading, there is a chance of SLA violation

C. Prototyped Data Center Selection

This policy gives well-organized data center selection method. It leads to supplementary resource usage than unsystematic selection. Following is the procedure followed to select data center in round robin manner. Here is the Pseudo flowchart for the same[3].

D. Simulation Scenarios

Following scenario represent that when there are numerous Data Centres inside single region and number of consumer needs fluctuate then how the requirements are processed by those Data Centers with user requirements being dispersed in equal percentage to all Data Centers accessible in single region [3].

E. Simulation Configuration

1) User Base Configuration: The design model uses the user base to symbolize the single user but ideally a user base should be used to symbolize a great numbers of users for effectiveness of simulation. Table I shows the user base configuration [6].

TABLE I USER BASE CONFIGURATION IN SIMULATION

User base name	Region	Request per User per hour	Data size per request(bytes)	Peak hours (GMT)	Avg	Avg.-off-Peak User
UB 1	2	60	100	3:00-9:00	1000s	100

TABLE II. DATA CENTER CONFIGURATION

DC Name	Region	VM per DC	Cost($) per VM hour
DC 1	0	5	0.1
DC 2	0	5	0.1
DC 3	0	5	0.1
DC 4	0	5	0.1

VI. CONCLUSION AND FUTURE WORK

It can be concluded from results of implementation that proposed round robin selection of data centers in service broker policy works efficiently when it comes to resource utilization. It can also be observed that the total cost is same for all data centers when proposed policy using round robin distribution is used in experimentation when compared to conventional data center selection algorithm. In future, we can implement more effectual policy to select data center with maximum number of resources required for processing of user requests and to process requests based on priorities. From the results of simulation it can be concluded that proposed algorithm works efficiently when it comes to resource utilization, processing time of the data center and response time of user base.

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