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OPTIMIZATION CRITERIA for ALLOCATION POLICIES in CLOUD COMPUTING ARCHITECTURE: a STUDY

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ABSTRACT
Cloud computing provides services to the customers as per their requirement as pay per use bases. The resources are distributed to handle different services like server, storage and application. Services are provided through the data centre to the end user. Now a day's more no of users' access cloud services and load on data centre increased. The data centers are geographically dispersed. However the increased the no of client applications serviced at same time and location reflects on data centre overloading data center overloading definitely decreased the QoS of distributed services. Measuring the user applications performance of various resources is challenging to overcome these problem different user applications may require different configuration and requirements. In this paper author studied various issues of different service broker policies and load balancing policies. These policies help to overcome the problem of data centre overloading and that will facilitate to improve response time and data centre processing time using cloud analyst tool architecture.

Keywords: *Cloud-Analyst, Data Centers, Service broker policy, Simulation and Modeling, response time, processing time, load balancing policies*

I. INTRODUCTION
Cloud computing is distributed computing paradigm. In distributed approach more than one user can access the different services of cloud data center through service providers. Cloud data center can provides different services and resources to the users at a same time ,same location . cloud computing has to face various challenges like fault tolerance ,availability ,flexibility, QoS, Load balancing and many more. One of the major issue of cloud computing architecture is QoS which is discussed in this research paper. One of the important parameter of QoS is response time. As cloud computing support distributed approach the services and resources are distributed all over the data center. Data centers are geographically dispersed and hence the cloud has to face the problem of load balancing due to large no of users access the services from data center from different location[1,2]. To overcome this problem different various load balancing algorithms are used. Cloud analyst is a simulation tool which is used for simulation and modeling of data.

Load balancing is nothing but distributing loads among various resources in any system. In cloud architecture load is distributed in equal no at any point of time. In cloud analyst different load balancing polices and service broker policies are used for public and private cloud for minimization of response time and processing time. In this research paper we had compare the results from same region and different region. Data center from same region considered as private cloud and from different region considered as public cloud. Cloud analyst is a tool used in cloud architecture for simulation and modeling of data. Comparing results of public and private cloud along with various load balancing policies and service broker polices results in variation in response time.

II. PROBLEM DEFINITION
In cloud analyst setup 6 user bases(UB1,UB2,UB3,UB4,UB5,UB6) are consider for different regions(0,1,2,3,4,5) respectively. 3 data centers (DC1,DC2,DC3) with different region (3,4,5) and service broker policy like closest data center, ORT and reconfigure dynamically with load balancing policies like RR, Throttled, Active monitoring. Regarding this configuration an author defined a problem statement to minimize

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response time ,processing time by distribution of load to various data center equally with the help of different load balancing policies.

III. EXISTING LOAD BALANCING ALGORITHMS

This section discusses the three fundamental, efficient and enhanced load balancing algorithms i.e. Round robin load balancing, Active monitoring load balancing and Throttled load balancing.

a. Round Robin Load Balancing

Tin this algorithm the subsequent requests are processed in circular manner. When user sent request to the data center controller it notifies the round robin load balancer to allocate a new virtual machine (VM) for processing. Round robin load balancer (RRLB) picks a VM randomly from the group and returns the VM id to Data Center Controller for processing .weighted RR policy is better than RR in which weight is assign to each VM so that if one VM is capable of handling twice as much load as the other then the former gets the weight of 2 whereas the later gets the weight of 1.[1]

b. Active Monitoring Load Balancing

This algorithm is also called as equally spread current execution load balancing. It uses active monitoring load balancer for equally spreading the execution of loads on different virtual machines.. Data Center Controller receives a new request from a client. When a request for allocation of new VM from Data Center Controller arrives at AMLB, it parses the index table from top until the least loaded VM is found [2]. When it finds, it returns the VM id to the Data Center Controller. If there is more than one found, AMLB uses first come first serve (FCFS) basis to choose the least loaded. Simultaneously, it also returns the VM id to the Data Center Controller. Then the Data Center communicates the VM identified by that id. The Data Center Controller notifies the AMLB about the new allocation. After that AMLB updates the allocation table by increasing the allocation count by 1 for that VM. When a VM suitably finishes processing the assigned request, it forwards a response to the Data Center Controller. On receiving the response it notifies the AMLB about the VM de-allocation. The AMLB updates the allocation table by decreasing the allocation count for that VM by 1[1,2].

c. Throttled Load Balancing

Throttled algorithm implements a throttled load balancer (TLB) to monitor the loads on each VM. The difference between throttled and other is allocation of virtual machine. Here each VM is assigned to only one task at a time and can be assigned another task only when the current task has completed successfully [2].

d. Servie broker policy

Cloud analyst used various service broker policies like closest data center in which VM is allocated to the nearest data center. second policy is ORT which consider optimum response time and third is equally distributed in which the load is equally distributed among the data center.

e. Response Time and Processing time

The time spent by a request in the waiting queue till it gets the first time to use the CPU. Processing time is a time which is required to finish that process

IV. SIMULATION SETUP AND COMPARISON OF EXPERIMENTAL RESULTS

The optimization criteria for analysis of response time of public and private cloud one thing should be remember that is Balance the workload of all servers to avoid server saturation and performance slowdown. VMs should be evenly distributed among the available servers.[3]

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Fig 1: GUI of cloud analyst setup

In order to analyze response time we use the tool called cloud analyst Basically cloud analyst is a cloudsim based GUI tool used for modeling and analysis of large scale cloud computing environment. Fig 1 Shows the GUI interface of cloud analyst tool. It comes with three important menus: configure simulation, define internet characteristics and run simulation [4,5] .These menus are used for setting of the entire simulation process. The tool provides us the feature of switching algorithms according to our requirement. In this research paper different use cases are considered for the analysis of response time and processing time through various load balancing policies [6]. The other parameters are fixed according to Table 1.

TABLE I. ***PARAMETERS OF CLOUD ANALYST***

Parameter	**Value passed**
VM-image size	1000
VM-memory	1024
Bandwidth	1000
Service broker policy	ORT,Dynamically Configured, Closest Data Center
Data center architecture	X86
Data center -OS	Linux
Data center-VMM	Xen
Data center- No of VMs	DC1,DC2 25,10,50 VM
Data center-memory per machine	2 GB
Data center-storage per machine	1 TB
Data center-available bandwidth per machine	1000000
Data center-processor speed	10000
Data center-VM policy	Time shared

TABLEII: analysis of overall rsponse time & dcpt using closest data center and rr scheduling

No. of Cases	Over all response time	Data center processing time	No. of VM
Case 1	266.99	0.52	25
Case2	266.75	0.39	10
Case 3	267.43	0.95	50

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Table II describes three cases are consider for the experimental evaluation of the cloud analyst parameter like overall response time & data center processing time (DCPT). While evaluating these three cases we have measured 2 DC, 6 user bases and 25,10 and 50 VM for each data center with closest data center service policy and Round robin scheduling policy.

Table III: analysis of overall rsponse time & dcpt optimum response time, throttled load balancing

No. of Cases	Over all response time	Data center processing time	No. of VM
Case 1	267.27	0.53	25
Case 2	267.11	0.40	10
Case 3	267.66	0.95	50

Table III also describes three cases are which analyses overall response time & data center processing time (DCPT) with optimum response time service broker policy and Throttled load balancing policy.

Table IV: analysis of rsponse time & dcpt with 2dc equal no of allocation of virtual machine

No. of Cases	Over all response time	Data center processing time	No. of VM
Case 1	158.87	0.54	25
Case 2	158.82	0.41	10
Case 3	159.09	0.74	50

Table IV illustrate three use cases which are evaluated in cloud analyst simulator. In this table which evaluated overall response time and data center processing time with 25, 10 and 50 no of virtual machines? This table exemplify that the overall response time is reduced by adding more no of data center in cloud analyst. Overall response time is reduced if we choose throttled load balancing scheduling policy is used along with optimum response time as service broker policy.

V. CONCLUSIONS

From the above use cases it is conclude that if considered two data center with equal no of virtual machine by selecting closest data center service broker policy along with Round Robin load balancing policy we get high response time for public as well as private cloud as compared to throttled load balancing along with optimum response time service broker policy in public cloud and private cloud. In this research paper we have considered three use cases one for equal 25 VM for two data center. In another case equal 10 no of virtual machine with two data center. In third case 50 VM are considered for the two data center [7] . In all cases the results are compared by using closest data center and optimum response time as service broker policy and RR , throttled as load balancing policy. If the results are compared then it will be concluded that as compared to RR ,throttled load balancing policy get less response time with optimum response time. One more thing that has to be analyze in all cases it is concluded that as more no of data center are added in private or public cloud the overall response time and data center processing time is reduce. As if less no of data center it affects on overall response time and data center processing time[7].

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