

International Conference on Intelligent Computing, Communication & Convergence

(ICCC-2015)

Conference Organized by Interscience Institute of Management and Technology,

Bhubaneswar, Odisha, India

ORT Broker Policy: Reduce Cost and Response Time Using Throttled Load Balancing Algorithm

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Abstract

Cloud computing is simply define as “cloud” is delivery of demand services resources everything from application to data centers over the internet on a pay for use basis. In cloud computing load balancing is a technique to distribute the workload for balancing between two or more cloud server. Load balancing technique is defined some cases which are defining as guarantee continuity of the service provided manage, high traffic levels and always be ready for sudden peaks in traffic. Load balancing aims to optimize resource use, maintain the cost of data center and virtual machines, maximize throughput, minimize response time and avoid overload of any single resource. The main objective of this research paper is to reduce cost and response times using throttled load balancing policy across VM's in multi data center and optimise response time service broker policy. This study has evaluated throttled load balancing algorithm and their scheduling criteria like overall response time, Data center processing time and total cost of Virtual Machine and data transfer cost.

Keywords: Load balancing, cloud analyst, response time, virtual machines, data center, cost.

1. Introduction

Cloud computing is simply define as “Cloud” is delivery of demand services resources everything from application to data centers over the internet on a pay for use basis. Cloud computing describe a new class of network based on computing that takes place over the internet.

The main three components of cloud are:

- Distributed Server
- Datacenter
- Client computers

The definition of cloud computing provided by National Institute of Standards and Technology (NIST) says that: "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." So by the help of cloud computing there is no need to store the data on desktops, portables etc. In cloud computing the main objective control the load over

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the network. Load balancing is define as the distributes workloads across several computing resources such as network links, central processing units, disk drives. Load balancing main objective to optimize resource use minimize response time, avoid overload, maximize throughput and bypass overload of any single resource.

2. Load Balancing Policy

Load balancing policy in cloud computing are:

- a) Round Robin: Round robin policy is technique that takes the advantage of time slice. Time is divided into multiple slices and each node is given a particular time sliced or time interval. In round robin policy each process is provided a fix time to execute called quantum and once a process is executed for given time period. Process is preempted and other process executes for given time period. The context switching is used to save states of preempted processes.
- b) Equally spread current execution location: This policy defines as a process handle with priorities. It distributes the load randomly by checking the size and transfer the load to that virtual machine. The load balancer looks over the queue frequently for new jobs and allots them to free virtual server.
- c) Throttled load balancing policy: Throttled policy defines the work to finding the applicable virtual machine for assigning an individual job. The job distributor is having a list of several virtual machine, using this list of VM it assign the desire job to the appropriate virtual machine. If all the virtual machine is not free for the job then the job manger waits for the client request and places the job in queue for the fast processing. This load balancing policy is begin experimentally implemented using the cloud analyst simulation which define the testing the outputs with respects to the virtual machine.

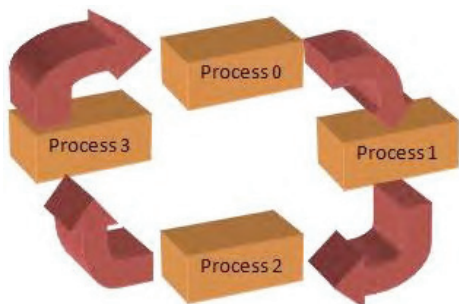


Figure 1. Round Robin Scheduling

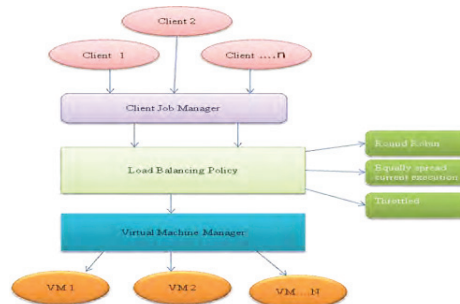


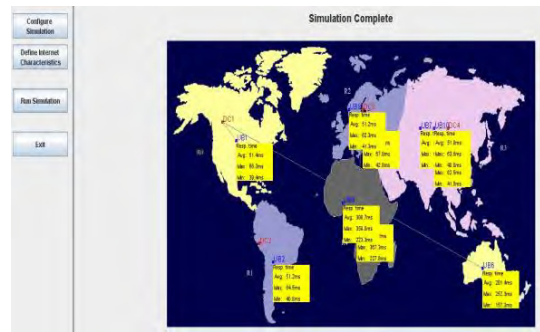
Figure 2. Load Balancing Policy

3. Experimental setup and Results

In this paper the experimental work define by the cloud analyst simulator. Cloud analyst is based on the java programming language and consists of a GUI interface which helps in easy configuration of attributes required for the experiments. It is a service model in which one or more key elements of data analytics is provided through a public and private cloud. Cloud simulator used for managing load over the network with the help of different load balancing policy. Cloud analyst define the four main important simulation configure simulation, define internet characteristics, run simulation and show region boundaries. The region boundaries are (R0, R1, R2, R3, R4, and R5) which define the six different regions.



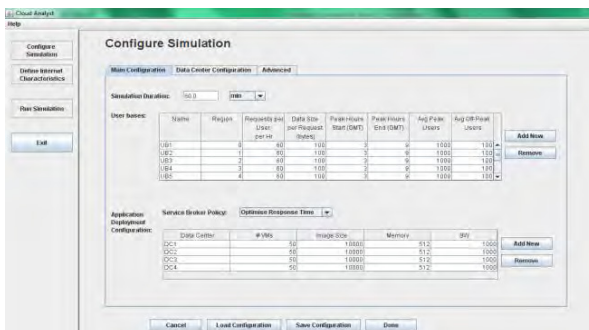
Snapshot-1. Different number of Regions



Snapshot-2. Data Centers

The proposed modified throttles algorithm is implemented with the help of cloud analyst simulator. In this paper throttled load balancing policy define the minimum processing time and total cost of virtual machine used on the particular data center. In each data center contain the number of virtual machine cost is increase if the number of virtual machine increases. In this works define the cost of virtual machine and total processing time of simulation on each user base. Cloud analyst is graphic user interface based tool which is developed on cloud-Sim architecture. To analyse the throttled load balancing policy configuration of the various components of the cloud analyst tools need to be set. In this simulation the parameters are user base configuration, data center configuration and advanced configuration. In this figure the numbers of users are ten (UB1 to UB10).

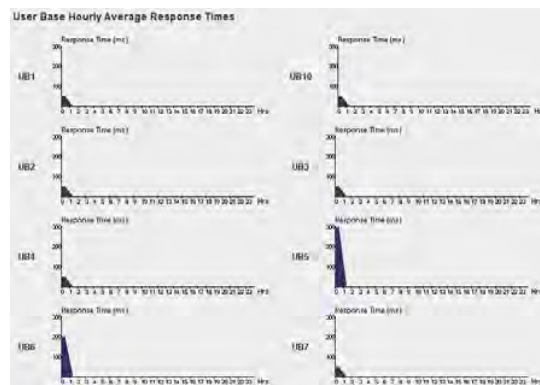
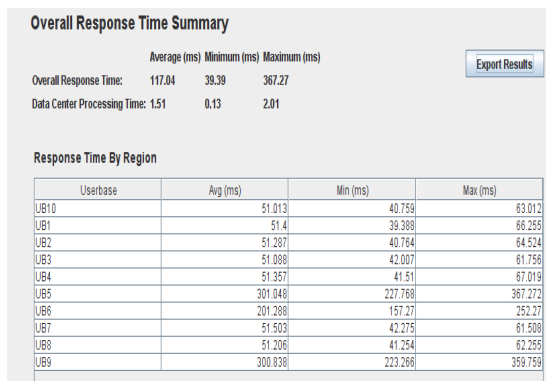
For every user base is defined in different region. The location of user base has been defined in six different regions and the total data center is four to handle the request of the users. The data center are placed DC1 placed in region R0, DC2 is placed in region R1, DC3 is placed in R2 and DC4 is placed in region R3. Each data center contains the 50 number of virtual machine. The image size of every VMs in 1000 which contain the memory 512 MB and the Bandwidth for each VMs is 1000. We used the ORT service broker policy for the simulation. The total time duration of simulation is 60.0 min.



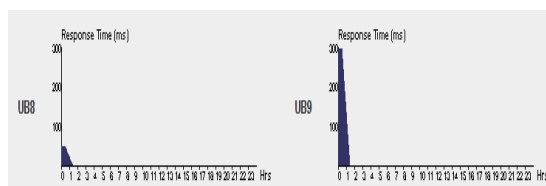
Snapshot-3 This configure simulation define the data center with different region having the operation system linux and also define the cost of every virtual machine.



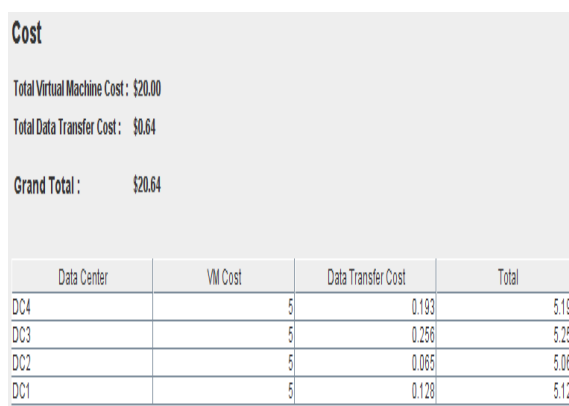
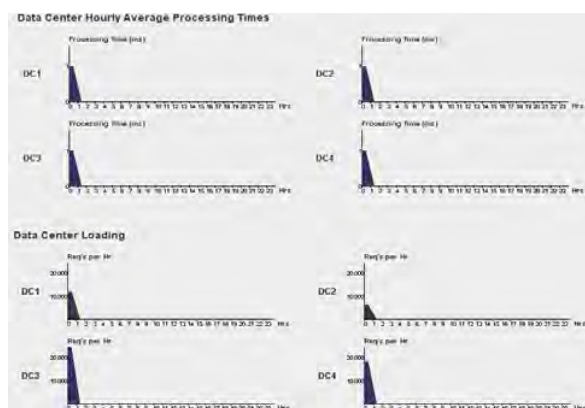
Snapshot-4 This snapshot define the advance configure in which we used throttled load balancing policy for better result. Internet characteristics define the delay matrix and also bandwidth matrix.



Snapshot-5 The final simulation result define the total response time summary in which the overall response time with average (ms), minimum (ms) and maximum (ms) defined.



Snapshot-6 In this snapshot every user base is define with the overall response time.



Snapshot-7 Total virtual machine cost and data transfer cost.

4. Conclusion

The main challenges in cloud computing is to reduce cost and response times using throttled load balancing policy across VM's in multi data center and optimise response time service broker policy. The Simulated result has evaluated throttled load balancing algorithm and their scheduling criteria like overall response time, Data center processing time and total cost of Virtual Machine and data transfer cost. The grand total cost is \$20.64. The result is inferred that the throttled load balancing policy provides the best overall response time summary and data center processing time with small processing cost by using the ORT service broker policy and some change parameters as compared to other load balancing algorithm.

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