

Survey on Service Broker Algorithm for Data Center Selection in Cloud Computing

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Abstract— Load Balancing, in cloud computing is very big issue. Proper load balancing algorithm helps in achieving user satisfaction and good resource utilization. Data Center Selection Algorithms are used to assign data center for user base. User base is collection of user requests. There were overheads in earlier Data Center Selection algorithms. Some improvements are implemented in new service broker algorithms. In this survey we focus on the shortcomings of algorithms and improvements performed and future scope in this field.

Key words: Load balancing; Data Center Selection Algorithm

I. INTRODUCTION

Data Center Selection Algorithms are very crucial part of cloud environment. To study the behavior of cloud environment simulator, cloud analyst is used. With the help of cloud analyst behavior of cloud environment can be easily understood and new extension can be employed. Cloud computing relies the sharing of computing resources rather than having own servers and personal computers for applications. It believes on virtualization. If one of the existing servers fails then information can be retrieved from the other machine. One more advantage of cloud computing is, it is based on the pay on use. No extra amount is paid to cloud providers if you are idle as it was not in the earlier system. These benefits are sufficient for the rapid development of cloud computing and it is growing day by day.

II. CLOUD ANALYST

Cloud analyst is developed as new version of Cloud-Sim which was developed on the top of Grid-Sim. Some new extensions are added in cloud analyst [3].



Fig. 1: Cloud Analyst GUI

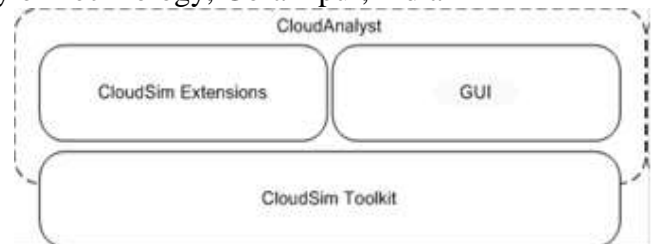


Fig. 2: Cloud Analyst Architecture

A. Application Users

It acts as traffic generator. Its behavior is reconfigurable.

B. Internet

This component is introduced to modal data transmission across Internet with network delays and bandwidth restriction.

C. Service Brokers

In Cloud-Sim Data Center Broker perform two functions first VM management within data center and second routing of traffic to appropriate data center but in Cloud Analyst these two responsibilities is separated and performed by Data Center Controller and Cloud App Service Broker [4].

D. GUI And Ability to Save Simulations and Results

With GUI user can simulate with abstraction. With the help of this simulation is easy and can be performed in repeatable manner. User can save simulation configuration and result for future use also.

III. MAIN COMPONENT

These are main component of Cloud-Analyst:

A. Region

Region is divided based six real world continents. User bases and data centers are belong to one of these regions.

B. User Base

User base modals a group of user requests to a single unit. Main responsibility of user base is to generate traffic for simulation. User base represents thousands of user requests. Modeler may choose number of users. But for efficient simulation number of users should be high.

C. Internet

It is abstraction for real world internet. It implements only those features which is important for the simulation. This component modals internet and implements traffic routing behavior.

D. Internet Cloudlet

It is a grouping of user requests. The number of requests grouped into a single Internet Cloudlet. It is having information such as the number of requests, the size of a request execution command, size of input and output files,

the originator and target application id used for routing by the Internet.

E. Data Center Controller

This component controls data center activities such as VM creation VM destruction. It does routing of user request coming via internet from user.

F. VM Load Balancer

Data Center Controller uses Load Balancer to decide which VM will serve cloudlet for efficient use of computing resources and good response time. There are two types of load balancing technique is available in Cloud analyst.

1) Static Load Balancing Algorithm:

This type of algorithm does not make any changes during the execution of request. This is more applicable in homogeneous system for the system which is less changing. Example of this type of algorithm is Randomized algorithm, Round Robin algorithm and Threshold algorithms. Default load balancing strategy is Round Robin. Threshold load balancing policy limits number of requests being processed to each virtual machine to a throttling threshold. If requests are received causing this threshold to be exceeded in all available virtual machines then requests are queued until a virtual machine becomes available.

2) Dynamic Load Balancing Algorithms:

In this type decision of load balancing is taken during run time. No prior knowledge of system is needed. Advantage of this type of algorithm is if one system fails then whole system does not fail. If this type of algorithm is implemented then performance is increased. In distributed system load balancing can be done in two ways distributed and non-distributed.

G. Cloud Application Service Broker

A service broker decides which data center serve to the request coming from the user base. Thus, service broker controls traffic routing between user base and data center. There are three types of service broker algorithms are implemented in cloud-analyst [12].

1) Service Proximity Based Routing:

In this type of routing algorithm data center is selected which is in nearest reason. If more than one data center is in nearest reason then data center is selected in random order. Here problem come why to select data center in random order what if selected data center is less effective than data center which is not selected. One of the proposed solutions is based on the cost of the virtual machines. But in this solution response time is not considered.

2) Performance Optimized Routing:

In this type of algorithms service broker monitors the performance of the all data centers continuously and when a request comes it directs traffic to the data center which performs best. Load balancing is also performed within VM. In this type of routing active monitoring is very necessary because if monitoring stops then service broker directs traffic to the same data center again and again.

3) Dynamically Reconfiguring Router:

Its responsibility is scaling the application deployment depending on the present load it faces. It increases and decreases the number of virtual machines allocated in data center. In this type of routing increment and decrement is

performed on the basis of present response time and performance and best performance ever achieved.

IV. ROUTING OF USER REQUEST

How routing of user request is takes place is shown in the fig.

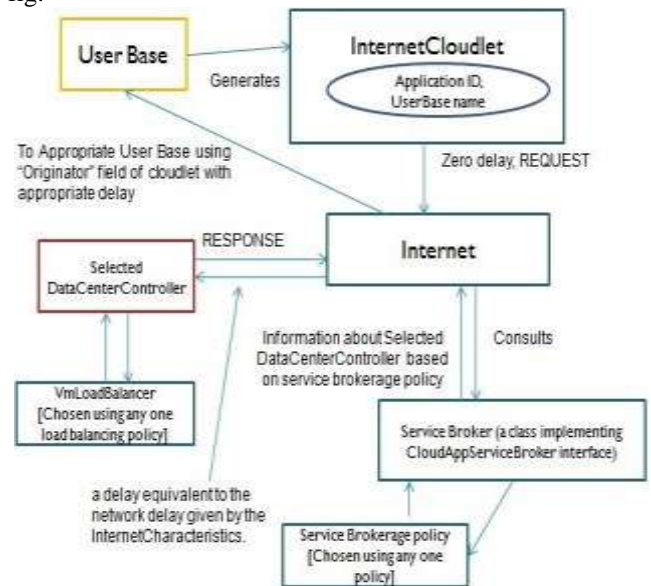


Fig. 3: User Requests Routing

- User base generates the cloudlet and sends it to internet with application id and name of the user base. Name of the user base is added to get the response from the internet [3].
- When request is received by internet it consults the service broker for the data center selection.
- Service broker selects the data center on the basis of the request information and sends data center information to the internet.
- Using the information internet sends request to data center controller.
- Now selected data center after processing sends response to internet.
- Now internet adds appropriate network delay and sends response to user base as it is in originator field.

V. CONCLUSION

Most simple among service broker algorithms is proximity based algorithms. Shortcoming in these algorithms is random selection when more than one data center is available in the same region. Some research is done related to this issue but they merely focus on the cost of the VM. And algorithms proposed in their work increase response time. Response time is very crucial in cloud environment. Future work can be done to reduce response time with avoid random selection and taking under consideration VM cost also

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