2015 International Conference on Communication Networks (ICCN)

Implementing Service Broker Policies in Cloud Computing Enviroment

Dr. Hemant S. Mahalle
Department of Computer Science
P. N. College, Pusad (M.S)
Pusad, India
mahalle_hemant@yahoo.co.in

Prof. Sachin Tayde
Department of Computer Science
S.S.S.K.R. Innani College
karanja, India
setayde_24@rediffmail.com

Prof. Parag Ravikant Kaveri
Department of Computer Sciecne
P.G Department of Comp. Sci and
Tech. HVPM DCPE, Amravati
Parag_kaveri@yahoo.co.in

***Abstract*—Cloud is basically a service oriented model as everything in cloud is treated as services in cloud that to on demand. Paper directs in the area of implementing services broker policies for better utilizing the resources in cloud computing environment. It also address in the area of cloud computing and its resources. Cloud computing is an evolutionary technology changing the way for accessing computational resources over internet with extreme powerful, usable and functional model. Although cloud computing is services oriented model but resources in cloud are basic building blocks for constructing different cloud model. This paper focus on the resources in cloud computing with implementing broker polices for higher outcomes. The paper also defines cloud and some of its application.**

Keywords—availability; cloud analyst; cloudsim; broker; load balancing.

I. INTRODUCTION

Cloud computing is a pool of flexible resources which can be dynamically reconfiguring as per the user demand on real time. Clouds are made up of computing resources in the form of servers to the client and can be access remotely. The computing resources are available in flexible format and access by the client on demand [1].

These computing resources can be physical resources or virtual resources. The overall objective of cloud computing is to provide these resources to client in the form of cloud services. Some of the services offered by cloud computing is Software as a Service (SaaS), Hardware as a Service (HaaS), Infrastructure as a Service (IaaS), Application as a Service (AaaS), Desktop as a Service (DaaS), Backup as a Service (BaaS), Network as Service (NaaS). The services are provided according to the user requirements and users demand. Thus cloud computing provides computing resources to deploy and scale out quickly using some dynamic resource allocation. Cloud computing architecture is divided broadly in two parts one that runs on the server side and second that runs on the client end. The server controls the major task like resources allocation, data storage, and providing various services while in the other hand client computer ask for services offered by server and service provider.

The technology works totally in different manner, instead of booting up the hard disk and loading the operating system the client computer gets a log in windows to access the remote resources. Once you log in the operating system get started. The operating system is hosted by the remote servers. Cloud computing helps the user to easily upgrade his services, it not only support the software up gradation but also helps in hardware too. Cloud use large data centers and powerful server to provide the necessary interface [2]. It is very important to manage data center in cloud as they are the basic building blocks for cloud computing environment.

The primary requirement for accessing cloud application is internet connection and a standard hardware to run web browser software. The advantage about the architecture of cloud is that it helps in flexible resources sharing between the server and client. Cloud models are of three types' public cloud, private cloud and hybrid cloud. This cloud is introduced according to the users' requirement in the network, although functionally they work the same.

In the figure 1, this shows the layered diagram for accessing data center with user communication. It also shows about the role of broker where the policies to be implemented. The basic idea of implementing broker service policies in cloud data centers is to get better performance and outcomes form various resources in cloud computing paradigm, in further sections we implemented some of the basic broker policies using simulation and studied the result variation in the experimentation.

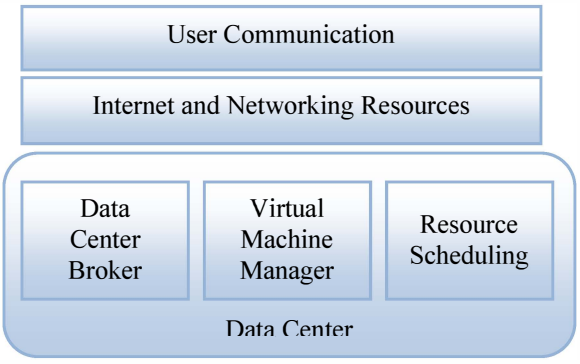

Fig. 1. Layer Diagram for Data Center Communication

978-1-5090-0051-7/15/$31.00©2015 IEEE
DOI 10.1109/ICCN.2015.37

II. Resource Utilization

Cloud computing is all about performance boosting, the basic idea behind inventing cloud computing is to provide a user friendly environment with optimum resources utilization as per request. Small company are not capable of buying hi configured resources for their organization, here the work start of cloud computing by providing such resources to the company via service. Many companies ask for software and hardware update annually this up gradation can be easily done using cloud computing technology. Cloud computing provide an interface for maximum resources utilization. The result for Resources utilization saves money & time.

Resources are little bit complicate to manage and isolate in any network, cloud computing creates a set of virtual and physical resources. These resources in cloud are managed by cloud resources management software's and allotted accordingly using cloud resources allocation applications.

The term resources usability totally addresses in the area of finding the ratio of using these resources, these resources can be basic computing resources as describe in the paper about network resources, storage resources and the computer resources. Cloud computing provides an interface through which these computing resources can work in more appropriate manner, the cloud model not only helps in making resources flexible and dynamic but also helps in making computer resource more usable with load balancing [3]. Cloud computing uses some dynamic mechanism for resources allocation this mechanism helps in increasing the resource more usable with load is balanced in cloud environment[4].

The resources are isolated according to the type which helps in using the computer resource more and more usable, the usability of resources multiple time result in multiplying the maximum throughput.

III. Broker Policies

A. *Closest Data Center (CDF)*

In this service broker policy, the closest data center is selected and then virtual machines are deployed on that closet data center first. The policy helps the broker to find the closest broker and easy deployment of virtual machines in cloud environment. This also helps in increasing the elasticity within resources.

B. *Optimize Response Time (ORT)*

This policy works in terms of response time, finding the time by calculating virtual machine to respond and then optimize these response time for different virtual machines. The virtual machines respond to users request in terms of higher respond and help to provide much faster end to end communication.

C. *Reconfigure Dynamically with Load (RDL)*

This policy works in terms of dynamic workload, as it is important to balance the load in cloud computing environment it help for load balancing and that to in dynamic mode, the dynamic configuration helps to increase the performance of the system with adjusting the varying load in it. For the experimentation we user simulation tools cloud Analyst based on cloudsim [5], [6].

IV. Experimental Setup

The experimental work is performed using simulation software named as cloud analyst [7]. Interface is shown in figure2.

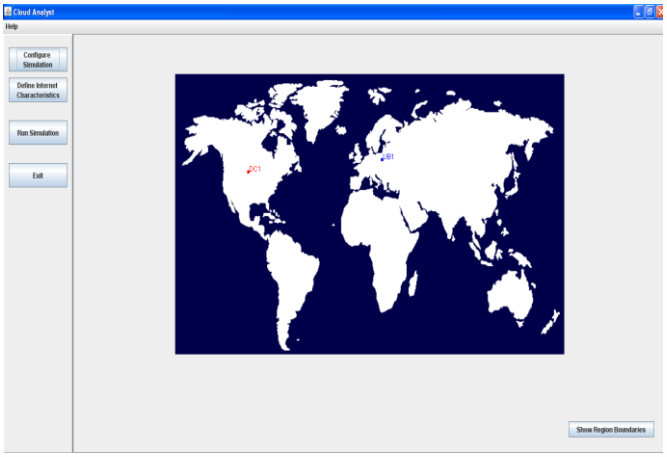

Fig. 2. CloudAnalyst GUI Screen

The configuration window for setting up the algorithm is shown in the fig 3. The configuration window of cloud analyst is simple and easy to use.

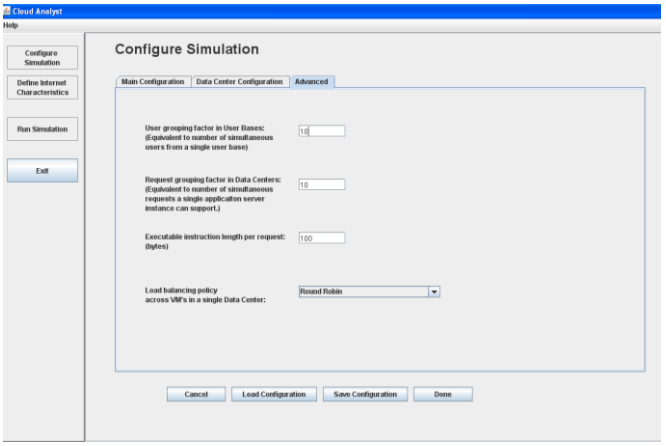

Fig. 3. Cloud Configuration Screen

TABLE I. Data Center Configuration

Data center	Arch	OS	VMM	PU
DC1	X86	Linux	Xen	1
DC2	X86	Linux	Xen	1
DC3	X86	Linux	Xen	1
DC4	X86	Linux	Xen	2
DC5	X86	Linux	Xen	2
DC6	X86	Linux	Xen	2
DC7	X86	Linux	Xen	1
DC8	X86	Linux	Xen	1
DC9	X86	Linux	Xen	2

The simulation is based on the cloud sim simulator; cloud sim is based on java and consist of a GUI interface which helps in easy configuration of attributes required for experiment [8].

The above diagram shows the environment of the cloud analyst simulation tool. The simulation comes with three important menus, configure simulation, define internet characteristics and run simulation .This menu are for configuring the experiment and setting up the load balancing algorithms. Simulation tool is having options to switch algorithm according to the requirement. The fig 2 shows the GUI interface of the simulator.

The tables are plotted in terms of experimentation. Table I shows the basic data centre configuration. Table II is about User Base (UB) station setting and shows different users for different stations. Table III is virtual machines configuration for each data centre (DC). In our experiment we considered 9 Data centre with 5 virtual machines deployed on each data centre. Each virtual machine comes with 512 RAM and single Processing Element (PE). The load balancing policy implemented is Round Robin. Table IV shows the calculation for response time by region in terms of Closest Data Centre policy. V shows the calculation for Request serving time for Closest Data Centre policy. VI shows the calculation for response time by region in terms of Optimize Response Time. VII shows the calculation for Request serving time for Optimize Response Time policy. VIII shows the calculation for response time by region in terms of Reconfigure Dynamically with Load. IX shows the calculation for Request serving time for Reconfigure Dynamically with Load.

TABLE II. USER BASE SETTING

Name	Region	Request per User per hour	Data size
UB1	0	60	100
UB2	1	60	100
UB3	2	60	100
UB4	3	60	100
UB5	4	60	100
UB6	5	60	100
UB7	1	60	100
UB8	2	60	100
UB9	5	60	100

TABLE III. VIRTUAL MACHINE CONFIGURATION

Name	RAM	PE	Load Balancing
VM1	512	1	Round Robin
VM2	512	1	Round Robin
VM3	512	1	Round Robin
VM4	512	1	Round Robin
Vm5	512	1	Round Robin

TABLE IV. RESPONSE TIME BY REAGION FOR CDF

User Base	Avg (ms)	Min (ms)	Max (ms)
UB1	49.81	38.27	59.61
UB2	199.97	155.11	249.12
UB3	500.89	397.64	602.64
UB4	501.79	410.14	602.64
UB5	200.01	155.14	259.1
UB6	199.78	165.14	261.13
UB7	300.49	225.12	363.12
UB8	200.57	152.11	243.11
UB9	299.83	238.62	360.11

TABLE V. DC REQUEST SERVING TIME FOR CDF

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.26	0.02	0.88
DC2	0.28	0.02	0.88
DC3	0.28	0.03	0.88
DC4	0.26	0.02	0.86
DC5	0.23	0.01	0.85
DC6	0.26	0.02	0.85
DC7	0.28	0.02	0.88
DC8	0.29	0.02	0.88
DC9	0.26	0.02	0.86

TABLE VI. RESPONSE TIME BY REAGION FOR ORT

User Base	Avg (ms)	Min (ms)	Max (ms)
UB1	49.93	37.88	62.88
UB2	198.89	157.14	243.09
UB3	497.68	380.14	605.11
UB4	499.68	390.14	602.62
UB5	200.85	162.12	251.11
UB6	200.62	157.14	243.14
UB7	300.59	226.57	366.11
UB8	200.21	150.14	242.14
UB9	300	238.65	370.64

TABLE VII. DC REQUEST SERVING TIME FOR ORT

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.28	0.02	0.88
DC2	0.26	0.02	0.88
DC3	0.28	0.02	0.88
DC4	0.25	0.02	0.86
DC5	0.26	0.02	0.85
DC6	0.24	0.02	0.85
DC7	0.27	0.02	0.88
DC8	0.28	0.02	0.88
DC9	0.25	0.02	0.86

TABLE VIII. RESPONSE TIME BY REAGION FOR RDL

User Base	Avg (ms)	Min (ms)	Max (ms)
UB1	56.34	38.28	3781.51
UB2	200.47	156.01	249.19
UB3	501.48	390.14	620.11
UB4	501.69	410.54	603.11
UB5	200.49	155.54	259.62
UB6	216.33	165.54	10401.02
UB7	301.04	225.57	363.15
UB8	204.14	152.46	2118.51
UB9	300.59	238.87	360.91

TABLE IX. DC REQUEST SERVING TIME FOR RDL

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	16.21	0.05	10185.01
DC2	0.98	0.02	3.45
DC3	3.99	0.09	1912.51
DC4	0.55	0.02	1.96
DC5	0.52	0.03	1.43
DC6	0.55	0.02	1.68
DC7	0.97	0.02	3.53
DC8	7.15	0.07	3728.01
DC9	0.55	0.03	2.38

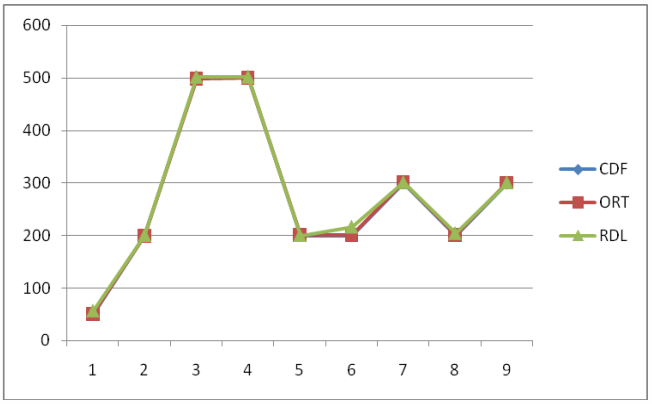

Fig. 4. Policies Comparison in term of Response Time

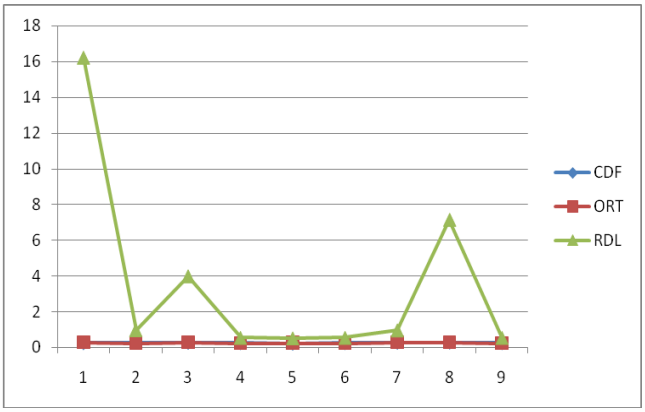

Fig. 5. Policies Comparison in term of Request Serving Time

V. RESULTS AND CONCLUSION

After analyzing the graphs plotted for response time and request severing time it is found that all the three polices work quite similarly in terms of the response time as shown in Graph 1. But when compared with request severing time that is request processing time form different regions it is found that Closest Data Center, Optimize Response Time work effectively in compare to Reconfigure Dynamically with Load balancing. Closest Data Center and Optimize Response Time work efficiently with low processing time. The paper studied the basic of different polices implemented in cloud computing environment and suggested the methods for improving the implementation of broker polices for data center, which further extends in the to produce much more higher outputs for cloud computing environment. The results calculated shows the comparative study of different broker policies which can be further implemented in the real world clod computing environment.

VI. FUTURE WORK

After analyzing the existing polices development of new service broker policy is required for improving performance and optimizing the present cloud system. The new policy will work in the way by optimizing the performance and reducing the time taken for serving similar number of request and reducing the response time. The policy will be based on finding the closet data center with load balancing mechanism, which helps the system to get maximum output. This is proposed policy is based on closest data center strategy with load balancing in which the fundamental Service Broker that maintains index table of all data centers indexed by their region is used to create new index based on finding nearest datacenter. When the Internet receives a message from a user base it queries the Service Broker for the destination of Data center Controller. The Service Broker retrieves the region of the sender of the request and queries for the region list for that region from the Internet Characteristics. This list orders the remaining regions in the order of lowest network latency first when calculated from the given region. The Service Broker picks the first data center located at the earliest/highest region in the list. If more than one data center is located in a region, one is selected based on the amount load it is processing. This load is calculated and evaluated and datacenter with minimum load will be assigned for executing.

REFERENCES

[1] Judith Hurwitz, Robin Bloor, and Marcia Kaufman, "Cloud computing for dummies" Wiley Publication (2010), [Book]

[2] Wei-Tek Tsai*, Xin Sun, Janaka Balasooriya "Service-Oriented Cloud Computing Architecture" Computer society 2010.

[3] Zenon Chaczko, Venkatesh Mahadevan, Shahrzad Aslanzadeh and Christopher Mcdermid," Availability and Load Balancing in Cloud Computing" IPCSIT vol.14 (2011).

[4] Jasmin James, Dr. Bhupendra Verma "Efficient VM load balancing algorithm for a cloud computing environment" IJCSE, 2012

[5] Bhathiya Wickremasinghe ,Rodrigo N. Calheiros, and Rajkumar Buyya "CloudAnalyst: A CloudSim-based Visual Modeller for Analysing Cloud Computing Environments and Applications" IEEE Computer Society, 2010.

[6] Tanveer Ahmed and Yogendra Singh"Analytic Study Of Load Balancing Techniques Using Tool Cloud Analyst", International Journal of Engineering Research and Applications, April 2012.

[7] Sunil Kumar and Manish Kumar Pandey, "Comparison of Dynamic Load Balancing Policies in Data Centers" International Journal of Computer Applications (0975 – 8887) Volume 104 – No 17, October 2014

[8] Shipra Gupta and Indu Kashyap, "Cost and Time Evaluation of Load Balancing and Service Broker Strategies in Multiple Data Centers" International Journal of Computer Applications (0975 – 8887) Volume 103 – No 17, October 2014

[9] http://www.cloudbus.org/cloudsim