International Journal of Engineering Research and General Science Volume 4, Issue 1, January-February, 2016
ISSN 2091-2730

Survey on Round Robin and Shortest Job First for Cloud Load Balancing

Manoj Kumar Bishwkarma *[1], Kapil Vyas[2]
[*1]Research Scholar, BM College of Technology Indore, M.P, India.
[2]Assistant Professor, BM College of Technology Indore, M.P, India.
*Department of Computer Science & Engineering
[*1]manojvishwkarma01@gmail.com , [2]vyasmtech@gmail.com

Abstract— Load Balancing is play import role in cloud computing related to performance. Cloud computing efficiency and performance depend of Load Balancer. Two type of load balancer used in cloud computing first is static load balancer in which number of recourse, cloudlet, VM, and datacenter are fixed, Second is dynamic load balancer in which number of recourse, cloudlet, VM, and datacenter are changed at run time. There are many loads balancing algorithm such as FCFS, Round Robin and Priority based. In This paper we used combination of Round Robin and Shortest job First algorithm. This combination improves efficiency and performance of load balancing in cloud computing environment. We implement proposed algorithm with the help of CloudSim 3.0 under VM scheduling policies.

Keywords— **Virtual** Machine, CloudSim, Load Balancing, Cloudlet, Task Scheduling, Round Robin, Shortest Job First

INTRODUCTION—

Cloud computing is surely an attracting technology in the field of computer science. In Gartner's report [1], it says how the cloud will bring changes towards the IT industry. The cloud can be changing our life by providing users with new types of services. Users get service from the cloud without paying attention to the details [2]. NIST gave some sort of definition of cloud computing being a model for which allows ubiquitous, convenient, on-demand network usage of a shared share of configurable computing resources (e. gray the gadget guy., networks, servers, storage space, applications, and services) which can be rapidly provisioned along with released with minimum management effort or service agency interaction[3]. More and more people look closely at cloud computing [4, 5]. Cloud computing can be efficient and scalable yet maintaining the stability of processing countless jobs in the cloud computing environment is usually a very complex dilemma with load managing receiving much awareness for researchers**.**

Considering that the job arrival pattern is just not predictable and the capacities of each and every node in your cloud differ, regarding load balancing difficulty, workload control is important to improve system performance and gaze after stability. Load balancing schemes based on whether the system dynamics are very important can be possibly static and dynamic [6]. Static schemes tend not to use the system information and therefore are less complex whilst dynamic schemes provide additional costs to the system but can transform as the system status changes. A dynamic scheme is utilized here for it is flexibility. The model includes a main controller and balancers to collect and analyze the information. So, the dynamic control has little influence around the other working nodes. The system status then gives a basis for deciding on the best load balancing.

Layers of cloud computing—

Cloud computing can be viewed as a collection of services, which can be presented as a layered cloud computing architecture, as shown in fig.. The services offered through cloud computing usually include IT services referred as to SaaS (Software-as-a-Service) which is shown on top of the stack. SaaS allows users to run applications remotely from the cloud.

Infrastructure-as-a-Service (IaaS) refers to computing resources as a service. This includes virtualized computers with guaranteed processing power and reserved bandwidth for storage and Internet access.

The data-Storage-as-a-service (dSaaS) provides storage that the consumer is used including bandwidth requirements for the storage.

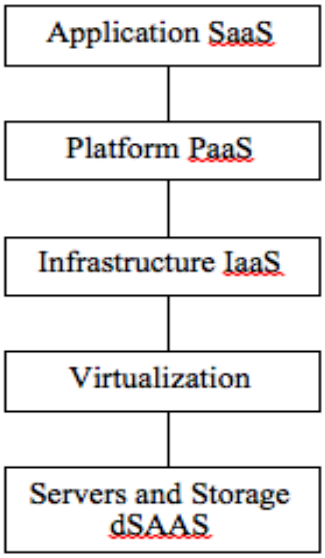

Figure1. Layered architecture of cloud computing

An example of platform-as-aService (Paas) cloud computing is shown in fig. the PaaS provides integrated development environment (IDE) including data security, backup and recovery, application hosting and scalable architecture.

According to Chappell there are three categories of cloud services, as illustrated in fig. Fig 2 shows the cloud services SaaS, where the entire application is running in the cloud. The client contains a simple browser to access the application. A well- known example of SaaS is salesfoorce.com.

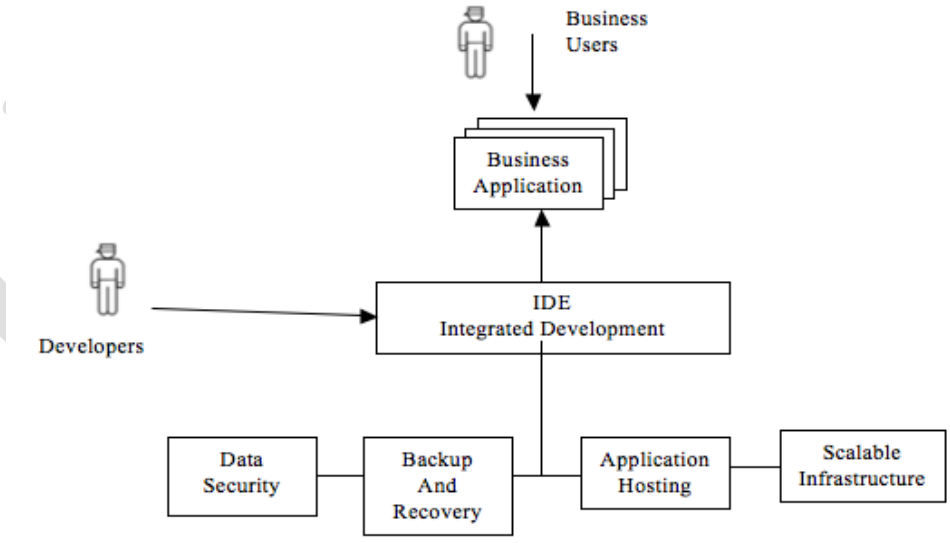

Figure 2. The concept of Platform-as-a-Service.

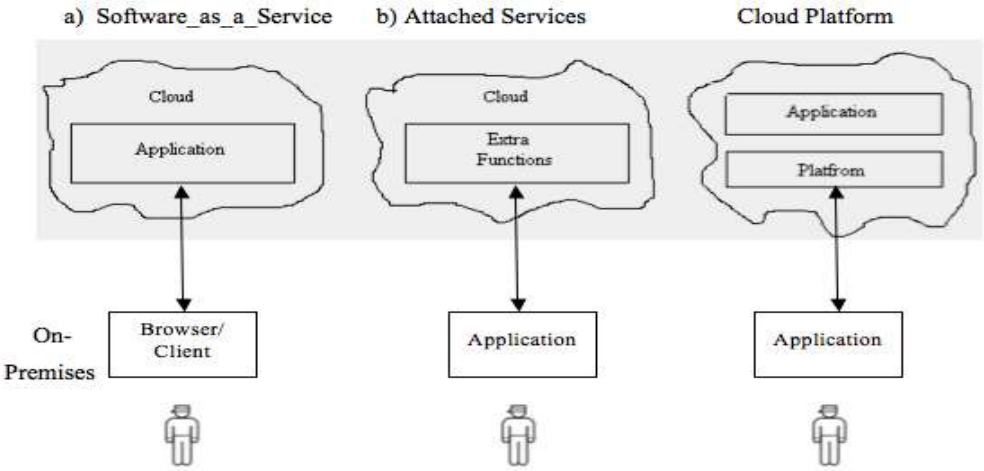

Figure 3. Type of CloudServices.

Fig. 3 illustrates other types of cloud service, where the application runs on the client; however it accesses useful function and services provided in the cloud. An example of this type of cloud services on the desktop is apple's iTunes.
Many load balancing algorithms, such as Round Robin, Both equally Spread Current Execution Algorithm, and Colony algorithm. Nishant et al. used the ant colony optimization method in nodes load balancing. Randlesgave any compared analysis involving some algorithms with cloud computing by simply checking the overall performance time and cost. They concluded that this ESCE algorithm in addition to throttled algorithm is greater than the Round Robin the boy wonder algorithm. Some of the classical load balancing methods act like the allocation method within the operating system, one example is, the Round Robin algorithm and also the First Come 1st Served (FCFS) rules. The Round Robin algorithm is used here because it truly is fairly simple.

Literature Review—

Two important problems proposed by Xiaoming Nan et al. [14] are: to minimize the response time and minimize the resource cost. Categorize resources on the basis of two pricing schemes: the Reservation Scheme and the On-Demand Scheme; Charges in the Reservation Scheme being lower than the latter. The authors in [14] thus try to optimize the cost by selecting the best type and no. of resources depending on the basis of above price schemes. Also the author tries to minimize the response time by proposing an Optimal Analytical solution for it. The Resource Cost Minimization problem is a NP-Hard problem and thus a greedy algorithm is proposed for it which gives a close to optimal solution.

C.H.Hsu and T.L.Chen et al. [13] categorize various services in different QoS classes. The incoming requests are then processed on the basis of these QoS classes. The scheduling of these requests is done in the FCFS and priority method with the conclusion of the priority method outperforming the FCFS.

Jaspreet Kauret al. [8] divides the cloud service into three consecutive phases: schedule, computation and transmission. Improper resource assignment in the phases will result in resource wastage and decreased QoE/QoS. Authors in proposed the concept of optimizing the resource allocation based on the concept of single class service case and the multiple-class service case in the queuing model. Authors in further refine the concept studied in by embedding priority service scheme in the basic queuing model studied in . In each case authors in [andformulate and solve the resource allocation optimization problems to minimize the mean response time and minimize the resource cost, respectively

Problem Domain—

In Current Scenario, with an environment of cloud the task is divided and disseminated into same size of small jobs i.e. Cloudlets. These Cloudlets as well as Virtual Machines are scheduled according to the various scheduling policy for e.g. FCFS, Round Robin etc. Generally in Cloud Computing scenario user submit the task to be performed / executed. Cloud Coordinator (CC) [2] divides the task

into equal sized cloudlets and passes it to Data Center (DC).Normally it takes a lot of time because the cloudlets are processed one at a time in FCFS manner as and when they reach to VM. VM executes the cloudlets present in the queue as they reach the VM's. Basically this default job scheduled policy is extremely Time- Consuming, Cost insensitive and inefficient.

Existing System—

Round Robin Algorithm for Load Balancing:

1. *Creates same size of Cloudlets.*
2. *CC divides the assigned Cloud task into same size of cloudlets.*
3. *Create Broker and User assigns the task to Cloud Coordinator (CC).*
4. *CC sends cloudlets to VMM and VMM sends the list of the needed resources to the RsP.*
5. *Request for the execution of the Cloudlet is sent to the VM by VMM from the Host.*
6. *Cloudlet scheduling is done in VM according to FCFS scheduling policy.*
7. *Sends the executed job as Cloudlets in a wrap file to the VMM.*
8. *VMM further passes the executed Cloudlets as wrapped file format to CC.*
9. *CC combines all executed Cloudlets in wrapped file form combine to form the whole task.*
10. *CC sends the executed task in authenticated file format to the user/client.*
11. *PRINT the Result.*

Figure 4. Round Robin algorithm

FCFS Algorithm for Load Balancing:

1. *Creates same size of Cloudlets.*
2. *CC divides the assigned Cloud task into same size of cloudlets.*
3. *Create DataCenters(DC).*
4. *Create Broker and User assigns the task to Cloud Co-ordinator(CC).*
5. *CC sends the cloudlets to VMM and VMM sends the list of the needed resources to the RsP.*
6. *RsP requests the resources from RP.*
7. *RP provides the access to use resources of DC.*
8. *RsP grants the access to VMM.*
9. *VMM creates the VM on the basis of resources and parameters.*
10. *VMM sends the cloudlet ID list to VM by BindCloudletToVmId ().*
11. *VMM sends the actual cloudlet to VM.*
12. *VM matches the Cloudlet ID with the sequence of Cloudlet list.*
13. *If both ID matches then, VM sends the acknowledgement to VMM. Or, VM sends Retransmitmessage or shows SUCCESS.*
14. *Request for the execution of the Cloudlet is sent to the VM by VMM from the Host.*
15. *Cloudlet scheduling is done in VM according to FCFS scheduling policy.*
16. *VM sends the executed job as Cloudlets in a wrap file to the VMM.*
17. *VMM further passes the executed Cloudlets as wrapped file format to CC.*
18. *CC combines all executed Cloudlets in wrapped file form combine to form the whole task.*
19. *CC sends the executed task in authenticated file format to the user/client.*
20. *PRINT the Result.*

Figure 5. First Come First Serve algorithm

CloudSim—

CloudSim [12] is the many efficient tool you can use with regard to modeling regarding Cloud. during your current lifecycle of an Cloud, CloudSim allows VMs for you to be managed coming from hosts that will inside turn are usually managed by datacenters.

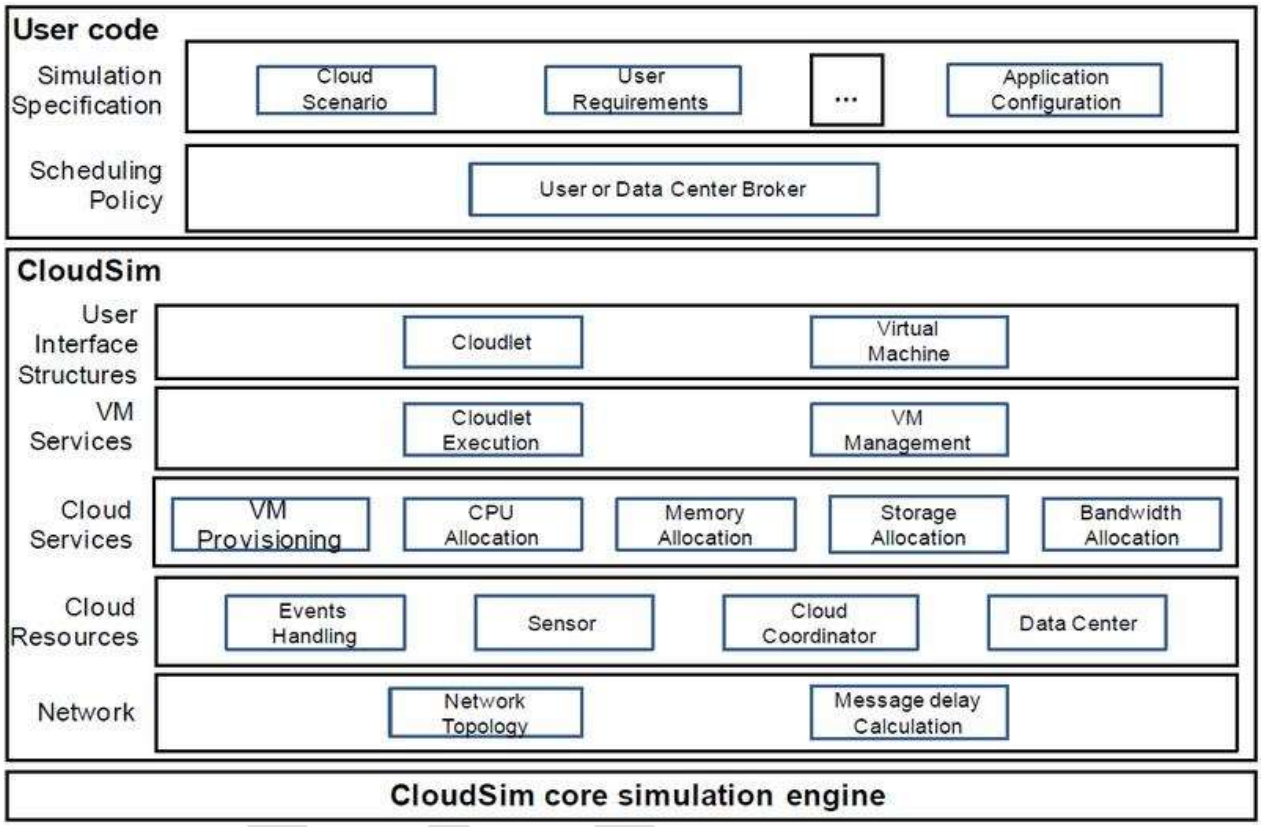

Figure 6. CloudSim Architecture

CloudSim offers architecture inside four uncomplicated entities. These types of entities offer consumer to set-up the basic cloud computing environment as well as measure your effectiveness involving fill up balancing algorithms. Datacenters entity features the responsibility of providing Infrastructure level solutions for the Cloud Users. They act as a home to help a lot of Host Entities or maybe a lot of instances hosts' entities aggregate to help application form the solitary Datacenter entity .Hosts with Cloud are usually Physical Servers .

Proposed System—

We will implement combination of load balancing algorithms like Round-Robin and less resources first. And will produce better result with existing system because in round robin algorithm not consider priority factor or less resources first at the time of load balancing. And also compare proposed algorithm with existing load balancing algorithm like FCFS, Round Robin and central queue.

Our aim is implement FCFS, Round Robin and Round Robin with Priority scheduling policy for VM using Cloudsim3.0.we will also implement combination of load balancing algorithms like Round-Robin with priority and less resources first . This synopsis aims towards the establishment of performance qualitative analysis on existing VM load balancing algorithm and then implemented in CloudSim and java language.

We also consider the following parameter in our Result

- User
- Cloudlet

- Datacenter
- Virtual Machine Manager (VMM)
- Virtual Machine (VM)

ACKNOWLEDGMENT

I especially thank to Mr. Kapil Vyas for stimulating and helpful discussion on Survey on Round Robin and Shortest Job First for Cloud Load Balancing and helping me to clarify my ideas.

CONCLUSION

Proposed algorithm will improve performance and efficiency of Datacenters. Cloud simulation will be used effective cloud simulator. This approach can be easily implemented in the cloud simulator. A virtual machine is a virtual form of computer hardware within software. Virtual machine is a software implementation that executes programs as if they were actual physical machines. We also give the detailed review on existing scheduling algorithm. The proposed Round Robin VM Load Balancing and existing Round Robin algorithm implemented Java language for implementing VM scheduling algorithm in CloudSim toolkit. Assuming the application is deployed in one datacenters having virtual machine.

REFERENCES:

[1] Soumen Santra and Dr. Kalyani Mali "A New Approach to Survey on Load Balancing in VM in Cloud Computing: using CloudSim" IEEE International Conference on Computer, Communication and Control (IC4-2015).
[2] RituKapur "A Cost Effective approach for Resource Scheduling in Cloud Computing"IEEE International Conference on Computer, Communication and Control (IC4-2015).
[3] Kaur s and SupriyaKinger, "Analysis of Load Balancing Techniques in Cloud Computing", International Journal of Computers & Technology, volume 4, No. 2, March- April 2013, pg 737- 741.
[4] Poojaand Mishra, "Analysis of Variants in Round Robin Algorithms for Load Balancing in Cloud Computing", (IJCSIT) International Journals of Computer Science and Information Technologies, Volume 4 (3), 2013, pg. no. 416- 419.
[5] KunalMahurkar, Shraddha Katore and SurajBhaisade, Pratikawale, "Reducing Cost of Provisioning in Cloud Computing", International Journal of Advance in Computer Science and Cloud Computing, Volume- 1, Issue- 2, nov.- 2013, pg. 6- 8.
[6] Dr. RakeshRathi1, Vaishali Sharma and Sumit Kumar Bole, "Round Robin Data Center Selection in Single Region for Service Proximity Service Broker in Cloud Analyst" , International Journal of Computer & Technology, Volume 4 no. 2, March- April 2013, pg. no. 254- 260.
[7] BhatiyaWickremansinghe, Rodrigo N. Calheiros and Dr. RajkumarBuyya, "CloudAnalyst: A CloudSim- based Visul Modeller for Analysing Cloud Computing Environments and Applications", IEEE Computer Society, 2010, pp. 446-452.
[8] Jaspreet Kaur, "Comparison of load balancing algorithm in a Cloud", International Journal of Engineering Research and Applications (IJERA), vol. 2, Issue 3, May- June 2012, pp. 1169- 1173.
[9] Syed Tauhid Zuheri1, Tamanna Shamrin2 and Rusia Tanbin3, Firoj Mahmud4, "An Efficient Load Balancing Approach in Cloud Environment by using Round Robin Algorithm", International Journal of Artificial and Mechatronics, volume 1, issue 5, 2013, pp 96-99.
[10] B. Santosh Kumar1 and Dr. Latha Parthiban2, "An Implementation of Load Balancing Policy for Virtual Machines Associated with a Data Centre", International Journal of Computer Science & Engineering Technology (IJCSET), volume 5 no. 03, March 2014, pp. 253- 261.
[11] Sonika Matele1, Dr. K James2 and Navneet Singh3, "A Study of Load Balancing Issue Among Multifarious Issues of Cloud Computing Environment", International Journals of Emerging Technolog Computational and Applied Science (IJETCAS), volume 13- 142, 2013, pg. 236- 241.
[12] J.Li, M. Qiu and X.Qin, "Feedback Dynamic Algorithms for Preempt able Job Scheduling in Cloud Systems", IEEE, 2010.
[13] C.H.Hsu and T.L.Chen, "Adaptive Scheduling based on QoS in Heterogeneous Environment", IEEE, 2010.
[14] X.Nan,Y.He,andL.Guan,"OptimizationofWorkloadSchedulingfor Multimedia Cloud Computing", in theProc. IEEE International Symposiumon Circuits and Systems (ISCAS), pp. 1–4, 2013.
[15] X. Nan, Y. He, and L. Guan, "Towards Optimal Resource Allocation For Diffentiated Multimedia Services in Cloud Computing Environment", in theProc. IEEE International Conferenceon Acoustic, Speech and Signal Processing (ICASSP), pp. 1–5, 2014.
[16] B. R. Raman, R. Calheiros and R.N., "Modeling and Simulation of Scalable Cloud Environment and the CloudSim Toolkit: Challenges and Opportunities'', IEEE publication, pp. 1-11, 2009. October, 2014.
[17] X. Nan, Y. He, and L. Guan, "Optimal resource allocation for multimedia cloud based on queuing model", in theProc.IEEE International Workshopon Multimedia Signal Processing (MMSP), pp. 1–6, 2011.