

## Comparison of load balancing algorithms in a Cloud

Jaspreet kaur

M.TECH CSE  
LOVELY PROFESSIONAL UNIVERSITY  
Jalandhar, punjab

### ABSTRACT

This paper presents an approach for scheduling algorithms that can maintain the load balancing and provides better improved strategies through efficient job scheduling and modified resource allocation techniques. The load can be CPU load, memory capacity, delay or network load. Load balancing is the process of distributing the load among various nodes of a distributed system to improve both resource utilization and job response time while also avoiding a situation where some of the nodes are heavily loaded while other nodes are idle or doing very little work. Load balancing ensures that all the processor in the system or every node in the network does approximately the equal amount of work at any instant of time. The simulated results provided in this paper based on scheduling algorithm ESCE (Equally Spread Current Execution) load .ESCE Scheduling algorithms handle the random selection based load distributed problem round robin , we have proposed ESCE scheduling algorithm and compared it with the round robin scheduling to estimate response time, processing time, which is having an impact on cost.

**Keywords-** cloud computing, virtual machine, round robin and ESCE algorithms, load balancing, simulation.

### INTRODUCTION

Cloud computing provide infrastructure, platform, and software as services. These services are using pay-as-you-use model to customers, regardless of their location. Cloud computing is a cost effective model for provisioning services and it makes IT management easier and more responsive to the Changing needs of the business [1]. The access to the infrastructure incurs payments in real currency in cloud environment. Today network bandwidth, Less response time, minimum delay in data transfer and minimum data transfer cost are main challenging issues in cloud computing load balancing environment .In this study based on clouds scheduling algorithms round robin, ESCE (Equally Spread Current Execution) algorithms and compare them. Cloud sim is simulation based approach. The Simulation based approaches provide significant Benefits, as it allows researchers to test their proposed algorithms and protocols in a repeatable and controlled environment free of cost, and to find solution to the performance bottlenecks before deploying in the real cloud. The rest of this paper is organized as follows. The Literature review is discussed in section 2. Section 3 tells the problem definition or Section 4 present the design model of ESCE scheduling algorithm. Section 5 describes the simulation setup and performance analysis result. Finally, Section 6 concludes this paper.

### LITERATURE REVIEW

Due to the recent emergence of cloud computing research in this area is in the preliminary stage. Jiyan et.al, (2010) have proposed a resource allocation mechanism with preemptable task execution which increases the utilization of clouds. They have proposed an adaptive resource allocation algorithm for cloud system with preemptable tasks but their approach does not pertain to cost optimization and time optimization [5].

Load balancing in cloud computing system[1] Ram Prasad Padhy, P Goutam Prasad Rao discussed on basic concepts of Cloud Computing and Load balancing and studied some existing load balancing algorithms, which can be applied to clouds. In addition to that, the closed-form solutions for minimum measurement and reporting time for single level tree networks with different load balancing strategies were also studied. The performance of these strategies with respect to the timing and the effect of link and measurement speed were studied.

A comparison is also made between different strategies. Toufik Taibi1, Abdelouahab Abid and Engku Fariez Engku Azahan The paper described the features of a simulator to compare the performance of three dynamic load balancing algorithms. [3]

Cloud Analyst: A Cloud Sim-based Visual Modeller for Analysing Cloud Computing Environments and Applications [2] Bhathiya Wickrema Singh all present how Cloud Analyst can be used to model and evaluate a real world problem through a case study of a social networking application deployed on the cloud. We have illustrated how the simulator can be used to effectively identify overall usage patterns and how such usage patterns affect data centres hosting the application.

### PROBLEM DEFINATION

The random arrival of load in such an environment can cause some server to be heavily loaded while other server is idle or only lightly loaded. Equally load distributing improves performance by transferring load from heavily loaded server. Efficient scheduling and resource allocation is a critical characteristic of cloud computing based on which the performance of the system is estimated. The considered characteristics have an impact on cost optimization, which can be obtained by improved response time and processing time.

### DESIGN MODEL

To handle the random selection based load distributed

problem, we have proposed a scheduling algorithm and compared it with the existing round robin scheduling to estimate response time, processing time, which is having an impact on cost .A Comparison of Dynamic Load Balancing Algorithms.

### SIMULATION SETUP AND PERFORMANCE ANALYSIS

Simulation setup and Performance analysis using the cloud analyst tool to evaluate the proposed algorithm carried out for a period of one hour the number of users, data centers. Set simulation according to table 1 and 2.

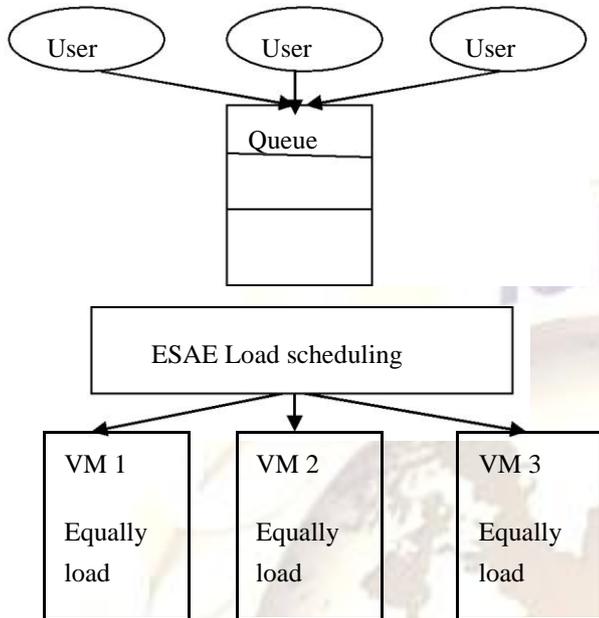


Figure 1. Equally spread Active execution load to the cloud system

The architecture model (figure 1) for which the proposed algorithm is implemented. Here the jobs are submitted by the clients to the computing system. As the submitted jobs arrive to the cloud they are queued in the stack. The cloud manager estimates the job size and checks for the availability of the virtual machine and also the capacity of the virtual machine. Once the job size and the available resource (virtual machine) size match, the job scheduler immediately allocates the identified resource to the job in queue. Unlike the round robin scheduling algorithm, there is no overhead of fixing the time slots to schedule the jobs in a periodic way. The impact of the ESCE algorithm is that there is an improvement in response time and the processing time. The jobs are equally spread, the complete computing system is load balanced and no virtual machines are underutilized. Due to this advantage, there is a reduce in the virtual machine cost and the data transfer cost.

#### ESAE LOAD ALGORITHM

##### ACTIVE VM LOAD BALANCER

[START]

- Step1:- find the next available VM
- Step2:- check for all current allocation count is less than max length of VM list allocate the VM
- Step3:- if available VM is not allocated create a new one in
- Step 4:- count the active load on each VM

Step5:- return the id of those VM which is having least load  
 [END]

Table 1:-user based configuration

User base	Region
UB1	0
UB2	1
UB3	2
UB4	3
UB5	4
UB6	5

Table 2:-Data centre configuration

Data center	VM m1	VM m2	VM m3	VM m4	VM m5	VM m6
DC1	1	10	25	50	75	100
DC2	1	10	25	50	75	100
DC3	1	10	25	50	75	100
DC4	1	10	25	50	75	100
DC5	1	10	25	50	75	100
DC6	1	10	25	50	75	100

#### PROFEMANCE ANALYSIS RESULT

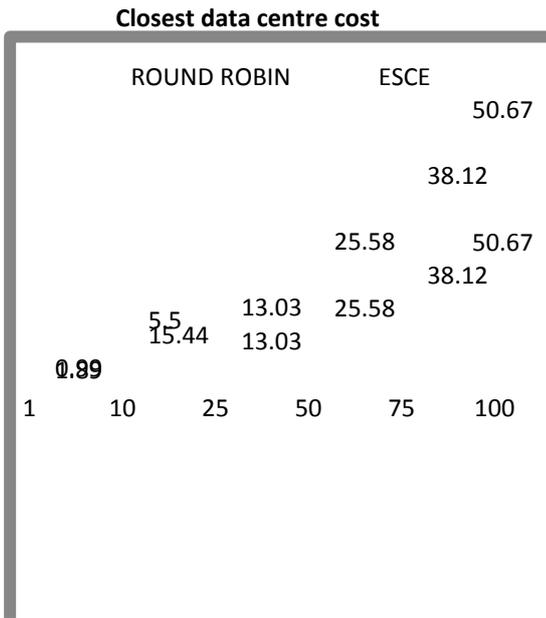


Figure2. Cost based comparison of LB algorithms.

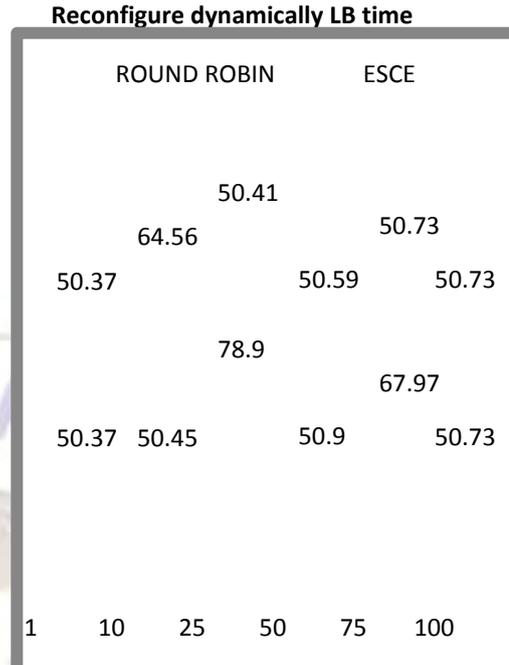


Figure4. Time based comparison LB algorithms

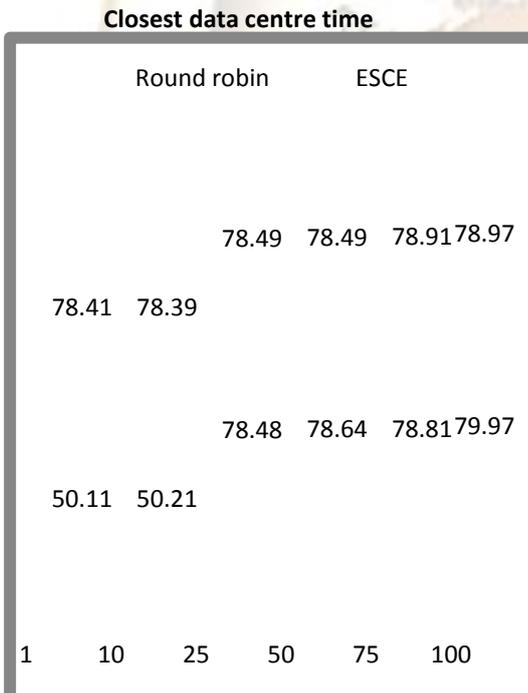


Figure3. Time based comparison of LB algorithms.

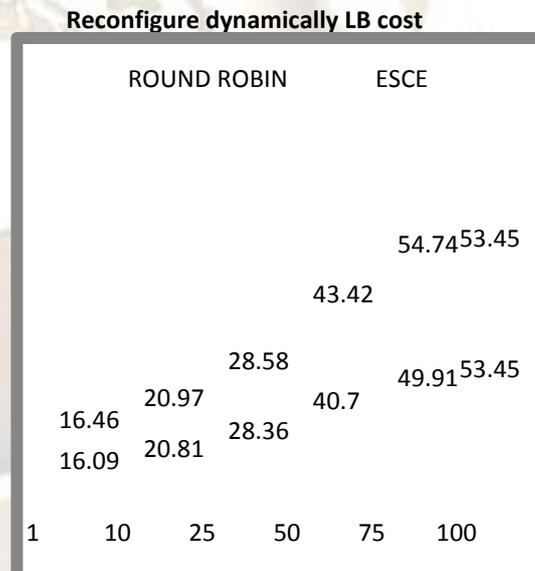


Figure5. Cost based comparison of LB algorithms.

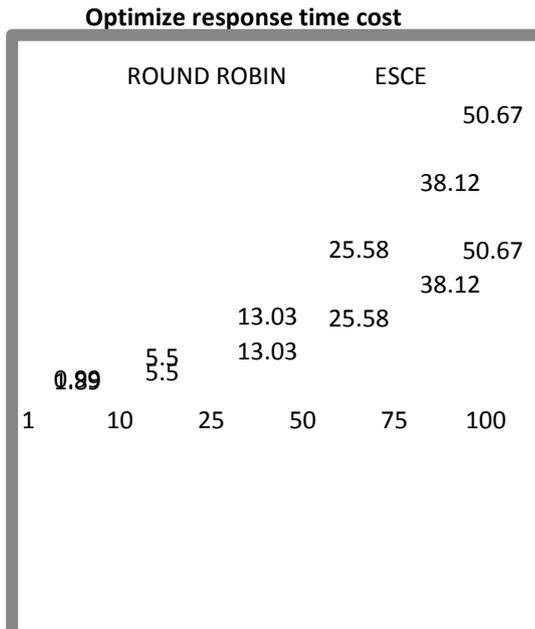


Figure6. Cost based comparison LB algorithms

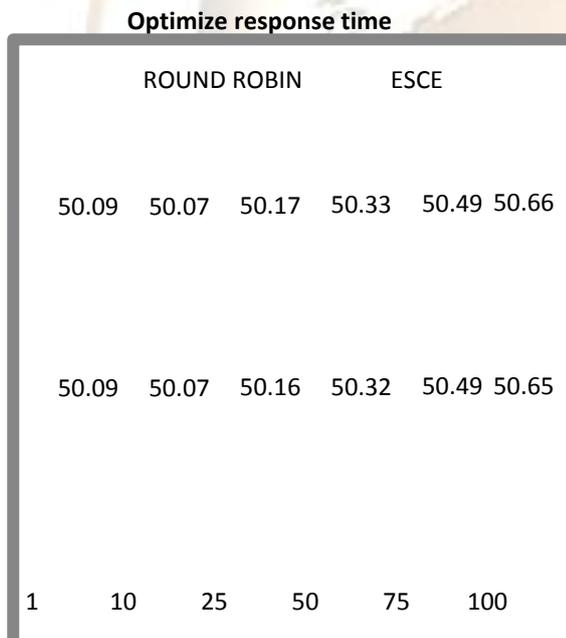


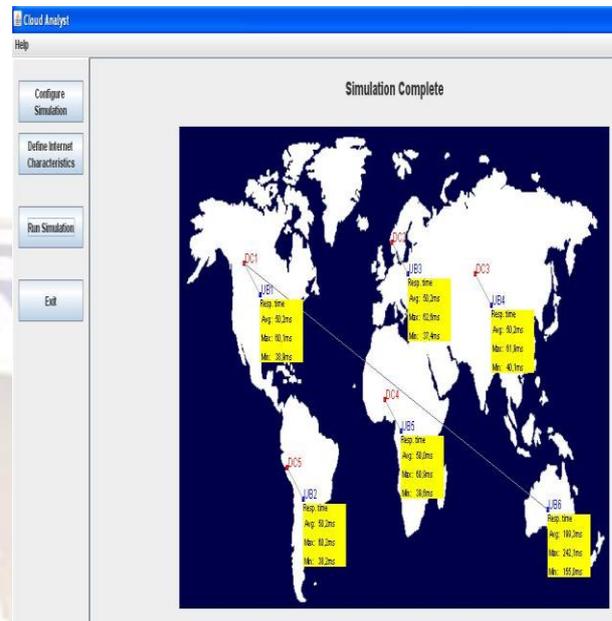
Figure7. time based comparison LB algorithms.

### Description

Simulation setup and Performance analysis using the cloud analyst tool to evaluate the proposed algorithm carried out for a period of one hour the number of users, data centres.

Step how can find your result value and compare it.

1. Setup the all data value than save it.
2. Then load configure, load configuration result window will be appear on screen.



3. Then explore the result.
4. Save result on PDF, then save all result value.
5. Compare all data value using chart.
6. Finally your result is show.

### CONCLUSION

Cost and time are the key challenge of every IT engineer to develop products that can enhance the business performance in the cloud based IT sectors. Current strategies lack efficient scheduling and resource allocation techniques leading to increased operational cost and time. This paper aims towards the development of enhanced strategies through improved job scheduling and resource allocation techniques for overcoming the above-stated issues. Here, Equal Spread Current Execution Load algorithm dynamically allocates the resources to the job in queue leading reduced cost in data transfer and virtual machine formation. The simulation results show overall time and cost results and comparison of load balancing algorithms

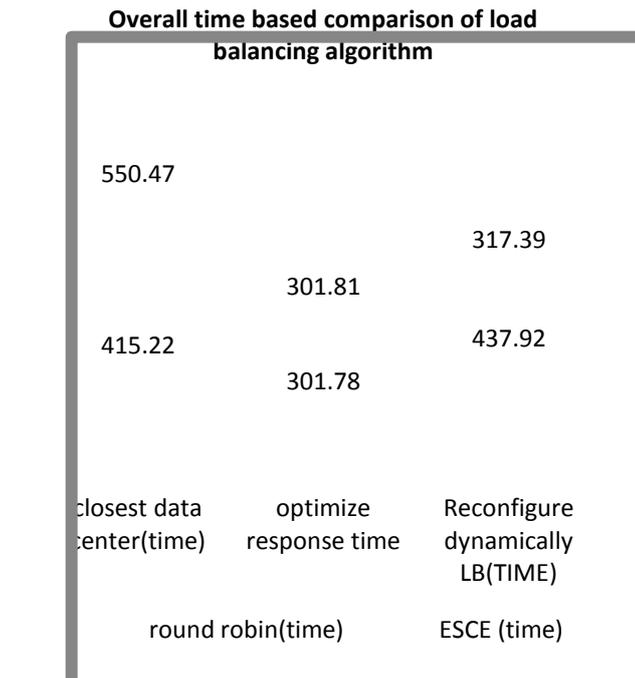


Figure8. Overall Comparison analysis load balancing algorithms based on time.

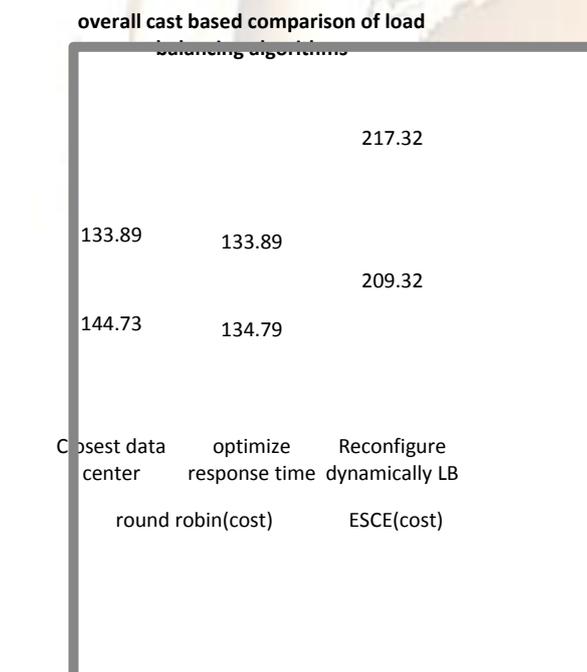


Figure9. Overall Comparison of load balancing Algorithms based on cost

Both figure 2 and 3 provide overall comparison result of ESCE and round robin load balancing algorithms. ESCE load balancing provide the best result as compare to round robin based on closest data centre, optimize response time and reconfigure dynamically load balancing .

### Future work

This time my paper work solve the load distributing problem on various nodes of a distributed system to improve both resource utilization and job response time while also avoiding a situation where some of the nodes are heavily loaded while other nodes are idle or doing very little work. Load balancing ensures that all the processor in the system or every node in the network does approximately the equal amount of work at any instant of time. The simulated results provided in this paper based on scheduling algorithm ESCE (Equally Spread Current Execution) load .ESCE Scheduling algorithms handle the random selection based load distributed problem round robin , we have proposed ESCE scheduling algorithm and compared it with the round robin scheduling to estimate response time, processing time, which is having an impact on cost. My future work is based on overloading server or overflow server load. In future overcome the server overflow problem using algorithm and improve the load distribution performance.

### REFERENCES

- [1] Ram Prasad Padhy (107CS046), PGoutam Prasad Rao (107CS039).”Load balancing in cloud computing system” Department of Computer Science and Engineering National Institute of Technology, Rourkela Rourkela-769 008, Orissa, India May, 2011.
- [2] Bhathiya, Wickremasinghe.”Cloud Analyst: A Cloud Sim-based Visual Modeller for Analysing Cloud Computing Environments and Applications”
- [3] Jiyin Li, Meikang Qiu, Jain-Wei Niu, YuChen, Zhong Ming “Adaptive Resource Allocation for Preeemptable Jobs in Cloud Systems”. IEEEInternational Conference on Intelligent Systems Design and Applications, pp. 31-36, 2010.
- [4] Sivadon Chaisiri, Bu-Sung Lee, and Dusit Niyato “Optimization of Resource Provisioning Cost in Cloud Computing” IEEE TRANSACTIONS ON SERVICES COMPUTING, 2011
- [5] G. Khanna, K. Beaty, G. Kar, and A. Kochut, “Application Performance Management in Virtualized Server Environm,” in Network Operationsand Management Symposium, (2006). NOMS (2006). 10th IEEE/IFIP, 2006, pp 373–381.
- [6] Toufik Taibi1, Abdelouahab Abid and Engku Fariez Engku Azahan,” A comparison is also made between different strategies” J.J. Appl. Sci: Natural Sciences 9 (2): 125-132