

**UNIVERSITI TEKNOLOGI MARA**

**CLOUD COMPUTING LOAD BALANCING  
TECHNIQUE WITH VIRTUAL MACHINE  
MIGRATION**

**RABIATUL ADDAWIYAH BT MAT RAZALI**

Thesis submitted in fulfilment  
of the requirements for the degree of  
**Master of Science**

**Faculty of Electrical Engineering**

March 2017

## ABSTRACT

The demand for cloud computing usage is speedily increasing day by day due to the facilities and advantages it offers. Such rapid growth of the large-scale computing systems usage will lead to an instant increase of Power consumption and emission of carbon by cloud platforms. In this context, a major concern of cloud computing operation is in achieving a load balanced system which can improve the platform for more efficient operations towards realizing a green cloud computing environment. The load balancing process normally emphasizes on optimal resource utilization, maximum response time, maximum throughput, and prevention of overload. In this scope of research, our study explores on the integration of load balancing process with virtual machine migration across multiple hosts which were determined by CPU utilization was implemented in this paper. There are two different types of resources, specifically low-powered and high-powered resources, which are based on Million Instructions per Second (MIPS) metrics. The minimal process execution time can be achieved if both types of resources are being evenly and efficiently matched and deploy onto suitable types of processing; i.e. low-powered or high-powered. Besides that, for a more efficient load balancing, the migration of virtual machines can be determined based on the current CPU utilization by following the thresholds where when the CPU usage reaches its 90% and 10% thresholds marker. Based on this idea, an algorithm in activating and deciding on the virtual machine migration operation is proposed, in which the overall load balancing process could be improved. Besides that, the performance of this technique is analyzed by using a Cloudsim simulator. Based on the analysis, positive results of the proposed algorithm are demonstrated, which shows the load balancing process is shown to have improved based on the distribution of virtual machines onto matching-type of resources, while a more efficient migration of virtual machines can be seen based on the defined CPU usage thresholds. Having a combination of these load balancing and migration techniques offers benefits that can avoid a long wait, make full use of resources and avoid idle resources. Minimal power consumption throughout the cloud platform will definitely lead to an efficient green cloud computing system.

## ACKNOWLEDGMENTS

In the name of Allah, the Most Gracious The Most Merciful

Alhamdulillah, all praises to Allah for His blessings, for the wisdom He bestowed upon me, the strength and good health in completing this thesis. It is tough at times and it feels like eternity, however I have gained a lot and I am very happy that I have a chance to go through this opportunity with all my might, Alhamdulillah, Subhanallah.

First of all, I would like to express my deepest appreciation to my supervisor, Associate Professor Ruhani Ab Rahman, for her constant supervision, endless support and also the time to consult my research work. Her sincere guidance and suggestions throughout the work and thesis have contributed to the success of this research. In addition, my appreciation goes to my co-supervisor, Dr Norliza Zaini for her support, provided with invaluable guidance and advised with persistent help regarding this topic.

I would like to express my appreciation to the Ministry of Higher Education, Universiti Teknologi MARA and Research Management Institute for the scholarship and grants to support my work. I also would like to thank fellow lab mates for their continuous support and co-operation.

Lastly, my heartily deepest gratitude goes to my parents, umi Rosnani Ghawi and abah Mat Razali Mat, my father and mother in laws, Mama Zaliha Haron, papa zulkifli and also the siblings, Mohd Syah, Zulaikha Eliya, Ahmad Ariff and Izyan Nasuha who never stop praying and supporting me to go on completing this thesis. Many thanks to my beloved husband Mohd Syazimie Zulkifli for his unstoppable moral support, helping me a lot and taking care of our lovely daughter, Dhia Syaza Aleesya Bt Mohd Syazimie. Finally, to those who indirectly contributed in this research especially Nor Bariah and Nur Nabila, your kindness means a lot to me.

Thank you very much.

Rabiatul Addawiyah Bt Mat Razali  
UiTM, Shah Alam  
January 2017

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