UNIVERSITI TEKNOLOGI MARA

CLOUD COMPUTING LOAD BALANCING TECHNIQUE WITH VIRTUAL MACHINE MIGRATION

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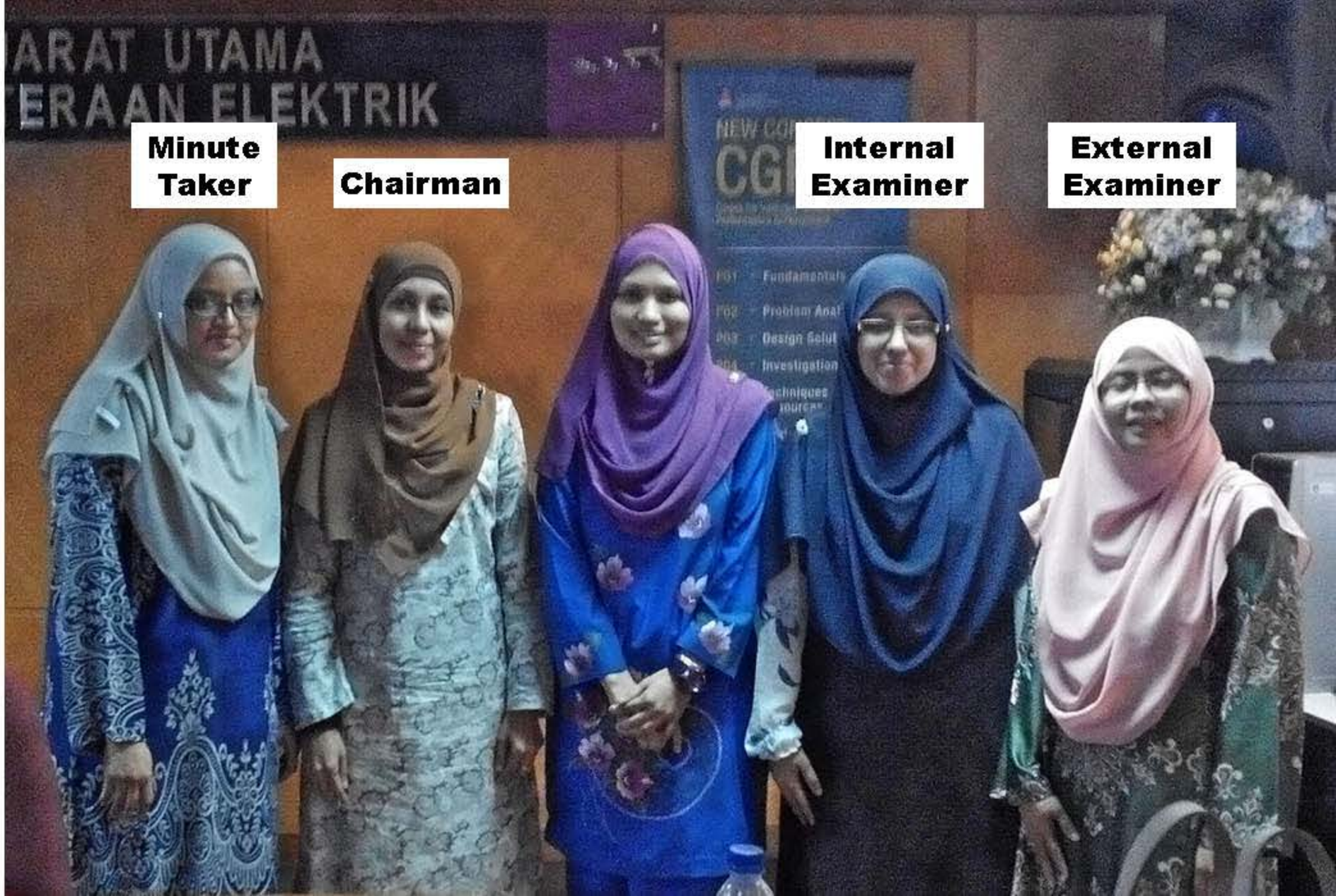

ABSTRACT

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.