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AN EVALUATION OF NETWORK LOAD BALANCING THROUGH ANT COLONY OPTIMIZATION (ACO) BASED TECHNIQUE

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

This project works on developing an efficient network load balancing mechanism based on the Ant Colony Optimization (ACO) algorithm. The main objectives of the ACO algorithm in this project are to achieve a balanced overall distribution of tasks across the nodes within the network and to reduce the execution time. In order to achieve these objectives, there are two priority of the ACO load balancing algorithm. The first priority is to ensure that the number of tasks assigned to each of the node within the networking environment are as uniform as possible. The second priority is to select a node with the best capabilities to execute a certain task which is assessed according to the node's current pheromone value. The simulations and output for the performance of the ACO algorithm was done in the Cloudsim Plus Toolkit and the Eclipse software. Based on the results, it indicates that the ACO algorithm is effective to achieve proper network load balancing and guarantee a high network performance. This is because the ACO algorithm is capable of distributing the tasks evenly to all nodes and at the same time reduce the total computational time of all tasks. The results also show that the ACO algorithm was able to outperform the Randomized and Round Robin algorithm in all simulation configurations.

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TABLE OF CONTENTS