

**ENHANCING MARKET-BASED SCHEDULING ALGORITHM ON
GLOBALLY DISTRIBUTED WEB SERVERS USING LEAST SUITABLE
SEALED BID TECHNIQUE**

By

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**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirement for the Degree of Master of Science**

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Dedication

To my family in Palestine for their patience and encouragement

To my friends in Malaysia for their standing with me all the time

Abstract of theses presented to the senate of University Putra Malaysia in fulfillment of the requirement for the Master of Science

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Scheduling of a multiple distributed servers is considered as a complex problem. considered as NP-complete problem, where no single efficient algorithm guaranteed to produce optimal results. This thesis investigates on how to find optimal solution for distributed system, by implementing market based scheduling Algorithm (MBSA).

On implementing the MBSA, a new auction technique which is the least suitable sealed bid auction will be introduced. It is found that least suitable sealed bid technique will give the close-to-optimum solution.

In the implementation, cooperative agents were used as a middleware between web servers and stand-alone schedulers. Each of these agents is connected directly to a different scheduling server. These agents work cooperatively with each other through the Internet using message exchanging.

An improved algorithm was implemented to decrease the amount of message exchanging between agents, which increased the performance of the system.

Abstrak tesis yang dibentangkan kepada senat Universiti Putra Malaysia dalam memenuhi keperluan untuk ijazah Master Sains

**PENAMBAIKAN PENSKEDULAN ALGORITMA BERDASARKAN
PASARAN PELAYAN WEB TERAGIH GLOBAL MENGGUNAKAN
KAEDAH LELONGAN TERTUTUP**

Oleh

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Februari 2006

Pengerusi : Rozita Bt. Johari, PhD

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Penjadualan beberapa pelayan teragih dianggap sebagai masalah yang kompleks. Masalah ini dikategorikan sebagai masalah NP-complete, di mana tiada satu pun algoritma yang cekap menjamin hasil yang optima. Tesis ini menyelidik bagaimana untuk penyelesaian optima ke atas sistem teragih dengan melaksanakan Penjadualan Algoritma Berasaskan Pasaran ke atas Pelayan Web Teragih (MBSA).

Dalam melaksanakan MBSA, satu teknik lelongan baru yang berasaskan bida tertutup yang paling tidak sesuai akan diperkenalkan. Didapati teknik ini akan memberi penyelesaian yang hampir optima.

Di dalam perlaksanaan agen-agen kerjasama telah digunakan sebagai perantara di antara pelayan web dan penjadualan tunggal. Setiap agen-agen ini disambungkan

secara langsung kepada pelayan penjadualan yang berbeza. Agen-agen ini akan bekerjasama antara satu sama lain melalui internet dengan menggunakan pertukaran mesej.

Algoritma yang telah ditingkatkan ini telah dilaksanakan untuk mengurangkan jumlah bilangan pertukaran mesej antara agen-agen, di mana ianya telah meningkatkan keupayaan sistem.

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I certify that an Examination Committee has met on 16th of February 2006 to conduct the final examination of Mahmoud Al-Ewiwi on his Master of Science thesis entitled “Least Suitable Sealed Bid Technique for Market Based Scheduling Algorithm on Distributed Web Servers” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follow:

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DECLARATION

I hereby declared that the thesis is based on my original work except for quotations and citations which have been duly acknowledge. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

MAHMOUD AL-EWIWI

Date: 24 APR 2006

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