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MANAGING COMPUTER LAB – MOBILE AGENT APPROACH

A Thesis submitted to the Graduate School in partial fulfilment of the requirements for the degree of Master of Science (Information Technology)
Universiti Utara Malaysia

by
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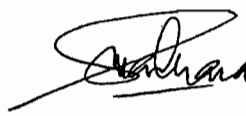
(Signature) : 

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ABSTRACT

Mobile agent is a potential method and approach in addressing many issues and problems in managing and maintaining computer labs. In educational institutions, a computer lab consists of many computers used by students and staff, and each institution has many computer labs. Maintaining these public computers is the task given to a few personnel such as computer technician. The technician has to move from one computer to another to do routine task such as running antivirus. The task is tedious and tiresome. Mobile agent has the potential and capabilities to perform the task, where mobile agent can be programmed to do task which is usually done by computer labs' technician. The mobile agent will move from one computer to another in the lab via computer network to execute the maintenance task in each computer autonomously. This work attempts to use mobile agent as a tool to manage computer labs in many aspects including reliability, security, technology and effectiveness. The results from this research show that mobile agents can be an efficient tool for managing computer labs.

ABSTRAK

Mobile Agent adalah satu kaedah dan pendekatan yang berpotensi untuk menyelesaikan banyak isu dan masalah dalam menguruskan dan menyelenggara makmal-makmal komputer. Di institusi-institusi pendidikan, makmal komputer digunakan oleh pelajar dan kakitangan di mana setiap institusi mempunyai banyak makmal komputer. Tugas-tugas penyelenggaraan komputer-komputer yang digunakan umum ini diserahkan kepada segelintir kakitangan seperti juruteknik komputer. Juruteknik komputer tersebut perlu bergerak dari satu komputer ke satu komputer yang lain untuk melakukan tugas-tugas rutin seperti menjalankan antivirus. Tugasan seperti ini adalah leceh dan memenatkan. M*obile agent* mempunyai potensi dan keupayaan untuk melakukan tugasan tersebut yang mana *mobile agent* boleh diprogramkan untuk melaksanakan tugas yang sering dilakukan oleh juruteknik makmal komputer. *Mobile agent* akan bergerak dari satu komputer ke satu komputer yang lain di dalam makmal komputer tersebut melalui rangkaian komputer untuk melaksanakan tugas penyelenggaraan di setiap komputer secara kendiri. Kertas kajian ini cuba menggunakan *mobile agent* sebagai pendekatan dalam penyelenggaraan makmal komputer di dalam banyak aspek seperti keboleh harapan, keselematan, teknologi dan keberkesanannya. Hasil kajian yang diperolehi menunjukkan *mobile agent* boleh menjadi peralatan sokongan untuk menguruskan makmal komputer.

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LIST OF ABBREVIATIONS

AOSE	Agent-Oriented Software Engineering
API	Application Programming Interface
ASDK	Aglet Software Development Kit
AUML	Agent Unified Modelling Language
DFS	Distributed File System
FIPA	Foundation for Intelligent Physical Agents
IP	Internet Protocol
JDK	Java Development Kit
JRE	Java Runtime Environment
JVM	Java Virtual Machine
LAN	Local Area Connection
MASIF	Mobile Agent System Interoperability Facility
RMI	Remote Method Invocation
RPC	Remote Procedure Call
UML	Unified Modelling Language
UniMAP	Universiti Malaysia Perlis

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CHAPTER 1

INTRODUCTION

1.1 Preface

Computer lab is a place where many computers are installed in such a way so that a class can be conducted in the lab. Instructors and students can use the computers in the lab during or after class time. Many academic departments have their own computer lab to meet their specific needs (David 2005). Because of the high number of computers in the lab, maintenance of the computers will consume a lot of time to complete. Typical maintenance jobs for a computer lab are running anti virus software, installing software updates and installs new software as needed by the class instructor. In order to do the maintenance, the technician of the computer lab has to move from one computer to another for all computers. To make it worse, in a case learning institutions, some of the institutions afford to hire only a few people to manage a large number of computers in many labs.

In modern day's computer lab, almost all computers are connected to the network. This leads to the idea to do this research. This research's idea is to make use of the interconnected computers as a medium to do computer lab maintenance. Network connections allow connected computers to be managed centrally and resources to be shared by all computers (Colin 1976). Resource sharing allows users of physically distributed computers to share data and storage by using a common file system (Eliezer and Abraham 1990). This motivated the ideas of keeping software updates in a repository. During the maintenance, the updates will be copied to the client's machine, and then the clients will run the updates. This creates a question of how to copy the

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