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JUDUL: Peer-to-Peer Search Application

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Saya Sia Sook Kian

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✓	TIDAK TERHAD	

Sook Kian
(TANDATANGAN PENULIS)

Alamat tetap : No 61, Jalan Wira 6, Taman Wira, 84800 Bukit Gambir, Muar, Johor

Tarikh: 2/11/07

(TANDATANGAN PENYELIA)

ZULKIFLEE MUSLIM
Nama Penyelia

ZULKIFLEE BIN MUSLIM
Ketua Jabatan Sistem dan Komunikasi Kompu
Fakulti Teknologi Maklumat dan Komunikas
Universiti Teknikal Malaysia Melaka

Tarikh: 6/11/07

CATATAN: * Tesis dimaksudkan sebagai Laporan Akhir Projeck Sarjana Muda (PSM)

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PEER-TO-PEER SEARCH APPLICATION

SIA SOOK KIAN

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Computer Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MALAKA
2007

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DECLARATION

I hereby declare that this project report entitled

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is written by me and is y own effort and that no part has been plagiarized

without citations

STUDENT : Sia Sook Kian Date: 7/11/07

(SIA SOOK KIAN)

SUPERVISOR : Date: 6/11/07

(ENCIK ZULKIFLEE MUSLIM)

ZULKIFLEE BIN MUSLIM
Ketua Jabatan Sistem dan Komunikasi Komputer
Fakulti Teknologi Maklumat dan Komunikasi
Universiti Teknikal Malaysia Melaka

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DEDICATION

To my beloved parents and siblings, they had given me their blessings and encourage me in doing my degree study.

To my dearest lecturers who had assisted me by giving support and advices.

To all my lovely friends who had offered me friendly help and care.

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ABSTRACT

Nowadays information technology has become one of the most important tools in industrial. Controlling the activities and information flow will benefit the organization to operate efficiently and better manage their resources. Directly, we can see the increasing of computers use and information technology system becomes one of the most important parts in our life. Besides of these technologies, allows us to do our work faster and more efficient without any mistake and error. So, a project named "Peer-to-Peer Search Application" was proposed to complete it. This project is a java based project which builds a system in file searching. Hybrid Peer-to-Peer networking concept will apply in this system. In addition, this project was use in wireless environment since the availability of mobile device increase rapidly. In this system, only certain file type including .doc, .txt and .jpeg are used in testing the system. No systematic system use to search file among users within the same network and database management always ignore by people. It because all of this is bore some tasks. With this built system, information server used to accept connection, capture and provide file details to users. In the other hands, user connects to network, get file details from information server and download the file from user directly. Rapid Application Development is the methodology that will be using in this project. Simple, clear and user friendly are the must requirements in user interface and database design. As a final point, the project will include the implementation of a java based system use for file searching in peer-to-peer wireless networking environment.

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ABSTRAK

Teknologi maklumat sekarang telah menjadi satu alat-alat paling penting dalam industri. Mengawal aktiviti-aktiviti dan aliran maklumat dan memberi faedah kepada organisasi untuk beroperasi dengan cekap dan mengendalikan sumbernya dengan baik. Secara langsung, kita dapat melihat pertambahan penggunaan komputer-komputer dan sistem teknologi maklumat menjadi satu bahagian paling penting dalam kehidupan kita. Dengan teknologi-teknologi ini, membenarkan kita bekerja lebih cepat dan lebih cekap tanpa sebarang kesilapan. Sebab ini, sebuah projek dinamakan "Peer-to-Peer Search Application" adalah dicadangkan. Projek ini adalah satu java projek yang digunakan untuk membina satu sistem dalam pencarian fail. Peer-to-Peer terangkai konsep akan memohon dalam sistem ini. Tambahan pula, projek ini adalah penggunaan dalam alam sekitar wayarles sejak adanya peningkatan peranti bergerak dengan pesat. Dalam sistem ini, jenis fail tertentu sahaja termasuk iaitu .doc, .txt dan .jpeg digunakan dalam pengujian sistem itu. Guna cara yang tidak sistematik untuk mencari fail di kalangan pengguna-pengguna di dalam rangkaian yang sama dan pengurusan pangkalan data diabaikan oleh pekerja. Ia kerana keseluruhan ini adalah tugas yang rumit dan ambil masa panjang to selesaikan. Dengan ini dibina sistem, pelayan maklumat digunakan untuk menerima hubungan, menawan dan menyediakan butir-butir fail kepada pengguna-pengguna. Di samping itu, pengguna dihubungkan kepada rangkaian, dapat butir-butir fail daripada pelayan maklumat dan dapatkan fail daripada pengguna lain secara langsung. Rapid Application Development adalah kaedah yang akan menggunakan dalam projek ini. Mudah, jelas dan mesra pengguna adalah syarat-syarat perlu dalam rekaan antara muka pengguna dan reka bentuk pangkalan data. Sebagai satu titik penamat, projek itu akan termasuk terlaksananya satu java sistem untuk pencarian fail dalam alam sekitar perangkaian wayarles.

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LIST OF ABBREVIATIONS

ACRONYM	WORD
AMT	Advanced Manufacturing Technology
ANSI C	American National Standards Institute for the C programming language
API	Application Programming Interface
DBMS	Database Management System
DFD	Data Flow Diagram
DHCP	Dynamic host configuration protocol
DNS	Domain Name System
ERD	Entity Relationship Diagram
ICT	Institute of Computer Technology
JAD	Joint Application Development
JIT	Just-in-Time
JVM	Java Virtual Machines
ODBC	Open Database Connectivity
PDA	Personal Digital Assistants
PMP	Project Management Plan
P2P	Peer-to-Peer
RAD	Rapid Application Development
RAM	Random Access Memory
RDBMS	Relational Database Management System
SDLC	System Development Life Cycle
TCP/IP	Transmission Control Protocol/Internet Protocol

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CHAPTER I

INTRODUCTION

1.1 Project Background

One of the most significant features of the Internet is that it enables to users to share files with another user anywhere in the world without requiring an intermediary, that is, without requiring an intermediate server. In the client server model, one system acts as a server and caters to request sent and the other server acts as a client and sends requests to server for services. There is one server and many clients connected to the server requesting for services and the server acts as an intermediary if the clients want to communicate with each others. The emergence of internet computing and applications, however, have made prominent some of the model's inherent weaknesses: the requirement of central control of information and processing at specialized computing nodes (the servers) is too stringent and limiting for a variety of rapidly emerging internet computing application classes.

As a result, the peer-to-peer (P2P) paradigm use to build distributed systems is recently becoming increasingly popular. Peer-to-Peer systems consist of a set of peers, which are nodes of equal stature, which have autonomy and which can collaborate with each other, pulling together their resources, in order either obtain services or jointly tackle large computing jobs. Within this application the Peer-to-Peer networking concept

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is used to share files, example the exchange of MPEG Layer3 (mp3) compressed audio files. However, Peer-to-Peer is not only about file sharing, it is also about establishing multimedia communication networks based on Peer-to-Peer concepts or resource sharing.

Classification of peer-to-peer networks is pure peer-to-peer and hybrid peer-to-peer. In pure peer-to-peer, peers act as equals, merging the roles of clients and server and there is no central server managing the network. In the other hand, hybrid peer-to-peer has a central server that keeps information on peers and responds to requests for that information. Peers are responsible for hosting available resources (as the central server does not have them) for letting the central server know what resources they want to share and for making its shareable resources available to peers that request it.

In this project, the main target is to develop a file sharing system for small peer-to-peer networks. It does have to have a central information server that holds all the file locations and the IP address's of all the users. Thus, all the shared files information is in server side database. Users are sharing their files in a default share folder/directory and file details will capture by information server when the connection was established. All users within same network can search file information from information server. After obtained the file information, user (request) is allowed to download the file from the user (respond). The environment is informal and conducive to candid communication. File download will store in user's specify folder/directory. In addition, the database which used to store file details should update time-by-time by users in a way of improving shared file management and ensuring short searching times to user requests. At least three or more nodes were recommended to use this application. It because one became information server and the rest machines became users. This system can be use in any workstation, anywhere and anytime as long as the machines have wireless capacity.

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1.2 Problem Statement

Traffic congestion on the network has been an issue since the inception of the client/server paradigm. As the number of simultaneous client requests to a given server increases, the server can become severely overloaded. Contrast that to a peer-to-peer network, where its bandwidth actually increases as more nodes are added, since the peer-to-peer network's overall bandwidth can be roughly computed as the sum of the bandwidths of every node in that network. Meanwhile, the client/server paradigm lacks the robustness of a good peer-to-peer network. Under client/sever, should a critical server fail, client's requests cannot be fulfilled. In peer-to-peer networks, resources are usually distributed among many nodes. Even if one or more nodes depart or disconnect from network, the remaining nodes still share file to fulfill other client's request.

For the traditional idea, file searching always is bore some and burdensome job in the peer-to-peer network. This because no systematic system is uses for file searching, files record no capture and arrange properly in the database. Furthermore, files are not really flexible to allow user to download. Certain computers are request administrator permission, thus block the search and download accesses among users in the same peer network.

In addition, database does not update frequently and file management always neglect by people. In critical time to search the file, it will waste time and cause network traffic within nodes. To overcome this kind issues, this project proposing to update database by user when user add new file in share folder or directory. This is an efficient way to improve database management.

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1.3 Objective

- To develop a system use in wireless peer-to-peer network
  - One information server and many users within the same wireless network
  - Once connection between user and information server established, shared file details in user's share folder will capture by information server and store into database

- To search file
  -User is allows to search shared files details from information server's database

- To download file
  - After obtained file details, user (request) can directly download file from the user (respond) of file within the same peer-to-peer network. It is without requiring an intermediate server to download a file.

- To update database
  - When user add new file in share folder/directory, user should update information server and data will add into database
  -Database should update time by time to enhance database management

1.4 Scope

This project was analysis on hybrid peer-to-peer network. The purpose is to benefit users within same wireless network to share resource and improve usage of file search application. This system does not request any authentication because information server to user and user to user are in candid communication to share file resource and download file. IP address and port number of information server was default setting and make sure users connected were within the same network. Three type of the file

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included .txt, .doc and .jpg are use in the application because server cannot automatically capture and differentiate type of file. The system does not provide notification when one user disconnect from the network. Thus, download process sometimes will fail because file is downloading from the user (respond) share folder/directory. Furthermore, content of file cannot read by user unless it downloads the file. Only user side has GUI (Graphic User Interface) when using the system while information server run as a background in common prompt. The system was suitable use with at least three or more computers, these computers must have wireless capacity.

1.5 Project Significance

Peer-to Peer Search Application system has certain mechanisms that provide the means for speedy data retrieval, download and as well as update operations in wireless peer-to-peer network. User's share folder/directory contain shared file and file details will upload into database when connection between user and information server was established. Data constitute the building blocks of information. Information is produced by processing data. Good relevant and timely information is the key to good decision-making. Meanwhile, good decision-making is the key to organizational survival in a global environment. Thus, this database is designed for the purpose managing file details accurately. Furthermore, less time consuming and reduce workload are important concerns to produce better system's performance. This eventually will replace the traditional way of searching files through centralize server's storage, which will take a lot of time due to network traffic and inconvenient to search for wanted files. Lastly, this system does not request any permission or authentication to user when use the search and download application. User always update information server's database when add new file in share folder/directory.

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1.6 Expected Output

At the end of the project, a java based system use for file searching and download file in peer-to-peer network has been produce. The system is expected to be use at least three or more nodes connected in the same wireless network. One of the node acts as information server and the rest nodes are act as users. Database was located at information server side. Only user side has Graphic User Interface (GUI). All the nodes must have wireless capacity.

1.7 Conclusion

This is the first part which is contains briefing on the whole system has been done. It presents an introduction of the project including project background, problem statement, objective, scope, project significance and expected output. With this, hopefully it will offer some benefit to users in peer-to-peer network doing file searching and retrieving files within peer nodes.

The next chapter will cover literature review and project methodology. It will contain reviews and researches about related issues such as peer-to-peer network, develop searching application system using java programming and others. The methodology to use for project development will be stated in next chapter. Software and hardware requirements also included to show and explained the project requirement.

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CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

According to Cooper (1989), a literature review uses as its database reports of primary or original scholarship and does not report new primary scholarship itself. A literature review discusses published information in a particular subject area and sometimes information in a particular subject area within a certain time period. A literature review can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization, or a reshuffling, of that information. It might give a new interpretation of old material or combine new with old interpretations. Or it might trace the intellectual progression of the field, including major debates. And depending on the situation, the literature review may evaluate the sources and advise the reader on the most pertinent or relevant.

A project required a project methodology for development process which is have principle of method, rules or set of procedures. Every kind of project used different type's project methodology. Different methodologies are inevitable, stemming directly from the questions of what constitutes a methodology and what are a methodology's underlying principles. Projects differ according to size, composition, priorities, and criticality. The people on a project have different biases based on their experiences,

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principles, and fears. These issues combine so that what is optimal differs across projects.

2.2 Facts and Findings

This section is about the facts and finding which will discuss and review the related approach or passed research, reference, case study, existing system and other findings related the system. In this case, facts and finding will cover domain of the peer-to-peer system, investigate on existing through online journal, reference books and etc. All related fact and findings was important in further the progress of project.

2.2.1 Domain

The project is to develop a peer-to-peer search application system. It led to the domain of ICT in Advanced Manufacturing Technology (AMT). Advanced Manufacturing focuses on developing technologies in manufacturing and productivity improvement. In this case, the system built is to be implemented on workstations. The application indirectly improves communication, file sharing and file searching among peer nodes. So, productivity in workstation will be improved. The functionality and features of the proposed system is rarely found in this domain and not widely used in the current system application. Normally, client-server application is used. But, if the server is down then, the clients will fail to get all the resources of data, file and so on. This will definitely affect the performance and productivity. Therefore, this project is to overcome the client-server limitation and to contribute to the domain of Advanced Manufacturing Technology.

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