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JUDUL: SECURE PEER-TO-PEER WIRELESS LAN DATA SHARING

SESI PENGAJIAN: 2008/2009

Saya LEE HUI LIAN

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(TANDATANGAN PENULIS)

Alamat tetap : 44, Jln Poh Leng Kong,
Batu 19 Sengkang, 84800 Bukit Gambir.

Tarikh: 30/6/09

(TANDATANGAN PENYELIA)

KHADIJAH WAN MOHD GHAZALI

Nama Penyelia

Tarikh: 30/6/09

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

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SECURE PEER-TO-PEER WIRELESS LAN DATA SHARING

LEE HUI LIAN

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 MELAKA
2009

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(LEE HUI LIAN)

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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. By using these technologies, our work can be done faster and more efficient without any mistake and error. So, a project with named "Secure Peer-to-Peer Wireless LAN Data Sharing" was proposed to complete it. This project is a java based project which builds a system to allow client and administrator to upload, download and search file. 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. Unsecure data sharing system cannot secure data that want to share and allow anyone in the same subnet to download the file. With this built system, user need to login first to enter information server. An information server will accept connection, capture and provide file details to users. In the other hands, user can connects to network, get file details from information server and download the file. Besides that, user also can upload file to information server. 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 data sharing in peer-to-peer wireless LAN networking environment.

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ABSTRAK

Pada zaman moden ini, teknologi maklumat telah menjadi suatu alat paling penting dalam industri. Ia dapat berfungsi dalam mengawal aktiviti-aktiviti, aliran maklumat, mengendalikan sumbernya dengan baik dan memberi faedah kepada organisasi untuk beroperasi dengan cekap. Secara langsung, kecenderungan pertambahan penggunaan komputer-komputer dan sistem teknologi maklumat telah menjadi satu bahagian yang penting dalam kehidupan kita. Dengan teknologi-teknologi ini, ia membenarkan kita bekerja lebih cepat dan lebih cekap tanpa sebarang kesilapan. Sebab ini, projek yang bernama "Secure Peer-to-Peer Wireless LAN Data Sharing" telah dicadangkan. Projek ini adalah satu projek java yang dibangunkan sebagai satu sistem untuk berkongsi fail dalam rangkaian yang sama. Oleh sebab itu, konsep "Peer-to-Peer" telah digunakan untuk meyempurnakan sistem ini. Tambahan pula, projek ini adalah penggunaan dalam persekitaran tanpa wayar kerana berlakunya peningkatan peranti bergerak dengan pesat. Dalam sistem ini, jenis fail tertentu sahaja termasuk iaitu .doc, .txt dan .jpeg digunakan dalam pengujian sistem ini. Sistem yang tidak mempunyai isu keselamatan, ia tidak dapat menjamin keselamatan informasi yang dihendaki dan mengakibatkan isu-isu pengaliran informasi kepada luaran atau pihak ketiga. Dengan kewujudan sistem ini, masalah-masalah diatas dapat ditangani dengan sempurna. Setiap pengguna sistem perlu mendapat kebenaran dari pihak berkuasa sebelum berkomunikasi dengan pelayan maklumat. Pelayan maklumat digunakan untuk menerima hubungan, menawan dan menyediakan butir-butir fail kepada pengguna-pengguna. Di samping itu, pengguna dapat berhubung dengan rangkaian untuk mendapatkan butir-butir fail daripada pelayan maklumat dan memuat turun fail. "Rapid Application Development" adalah kaedah yang akan digunakan dalam projek ini. Mudah, jelas dan mesra pengguna adalah syarat-syarat yang perlu berada dalam reka bentuk sistem dan pangkalan data untuk pengguna. Sebagai titik penamat, projek ini akan termasuk terlaksananya satu java sistem untuk perkongsian fail dalam alam sekitar perangkaian tanpa wayar.

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LIST OF ABBREVIATIONS

ACRONYM	WORD
AMT	Advanced Manufacturing Technology
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
JDBC	Java Database Connectivity
JIT	Just-in-Time
JVM	Java Virtual Machines
ODBC	Open Database Connectivity
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
UML	United Modeling Language

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WLAN	Wireless Local Area Network
BITC	Bachelor of Information and Communication Technology

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CHAPTER 1

INTRODUCTION

1.1 Project Background

Network security is a most important significance for the secure peer-to-peer network sharing that is enables user access the network by specifies username and password. Once authenticated, a firewall enforces access policies such as what services are allowed to be accessed by the network users. Furthermore, communication between two hosts using the network could be encrypted to maintain privacy.

Another significant feature of the project is that it enables to users to share files with another user anywhere in the area of wireless LAN without requiring an intermediary. Any computer network consists of a minimum of a couple of workstations, at least one shared resource, and a medium by which to connect the computers or called client/server networks. 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.

Nowadays, peer-to-peer network is widely being in the world. It is consists a pairs of peer which uses diverse connectivity between participants in a network and the

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cumulative bandwidth of network participants rather than conventional centralized resources where a relatively low number of servers provide the core value to a service or application. An additional, peer-to-peer network has one equal node only and does not have the notion of clients or servers, 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 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.

To distinguish peer-to-peer networks with a central entity from those without any central entities, it is general practice to split the peer-to-peer networking definition into two sub-definitions which is hybrid peer-to-peer and pure peer-to-peer. Hybrid peer-to-peer which allows the existence of central entities in its network, and the pure peer-to-peer networking concepts act as equals, merging the roles of clients and server and there is no central server managing the network.

In this project, the main target is to develop a secure peer-to-peer wireless LAN networking sharing in a small group. To establish a connection to server, the clients require getting permission or authenticating such as username and password to maintain privacy and avoid access by strangers. After authenticated, the user was able to search and download file from file server. 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. 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

Network security is a complicated subject, historically only tackled by well-trained and experienced experts. Unauthorized access is a very high-level term that can refer to a number of different sorts of attacks. The goal of these attacks is to access some resource that machine should not provide the attacker. To overcome this issues, this project is require to set up a security system with authenticate person only allow to connect to server.

The second problem statement is if a database in server does not update frequently and always neglect by user. It will cause a waste time for user and cause network traffic within node. As the number of simultaneous client requests to a given server increases, the server can become severely overloaded.

Furthermore, file searching will became 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.

An additional, file is not flexible to download or upload since the server was overloaded. To make the system can run smoothly, 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 to avoid server overload.

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1.3 Objective

- To develop a secure wireless LAN peer-to-peer networking
  - Require username and password to establish a connection and access server.
  - To avoid unauthorized access server and maintain privacy of the data

- To provide a wireless LAN data sharing
  - Many clients in same network
  - Once established a connection, user able download shared file in server

- To upload file and download file from server
  - User able to update file in specific directory, all the file capture into database
  - User able to download file from file server

- To search file
  - Users are allows to search shared files from file server's database

1.4 Scope

The purpose of this project is to design a secure wireless LAN peer-to-peer data sharing which is ad-hoc network. Each time a register user wants to access server, there need to require permission such as username and password to authenticate identity after establish a connection to server.

Once authenticated, users are able share resource and improve usage of file searching such as in .txt, .doc and .jpg format. IP address and port is default setting to make sure all users are located in same network.

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