

**DETECTION OF MAC ADDRESS ON REMOTE COMPUTER**

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## **ABSTRACT**

Computer is an important asset in development of technology nowadays. We can assume that each person and at least each home have a personal computer because it is a needed to a person. The missing of personal computer can give a big effect to someone even an organization. Due to that case, to overcome this problem, a system had created for searching the lost computer according to the place of the computer. This system named as "Detection of MAC Address on Remote Computer (DEMARC)" had developed. The web base and database system can operate faster in resolving the missing of computer. Detection of computer which applied in this system according the detection of MAC (Media Access Control) Address which it is locates at every computer. This particular identity can be detect after the moment the computer can access to the internet whether wireless or cable.

## ABSTRAK

Komputer merupakan satu aset yang sangat penting dalam merencanakan perkembangan teknologi pada zaman kini. Boleh dikatakan setiap individu dan paling kurang setiap rumah mempunyai komputer peribadi kerana ia merupakan satu keperluan kepada manusia. Kehilangan komputer peribadi boleh memberikan kesan yang besar kepada seseorang malah kepada sesebuah organisasi. Justeru itu, bagi menangani masalah ini, satu sistem telah dicipta untuk mencari kembali komputer yang hilang berdasarkan lokasi komputer tersebut. Sistem yang dinamakan sebagai Pengesanan Alamat MAC di Komputer Jauh (PAMKJ) telah dibangunkan. Sistem yang berasaskan pangkalan data dan web ini dapat beroperasi dengan cepat dalam menyelesaikan masalah kehilangan komputer. Pengesanan komputer yang diaplikasikan didalam sistem ini dijalankan berdasarkan pengesanan alamat MAC (Media Akses Kawalan) yang dipunyai oleh setiap komputer. Identiti ini akan dikesan sejeurus selepas sesebuah komputer berjaya mencapai internet samada tanpa wayar mahupun yang berwayar.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Project Overview**

The usage of computer in completing any task is becoming very ordinary today. Peoples today using computer as their main asset to get, create and store information. It also used by student to search any information all over the world. The basic function of computer in completing task, assignment and project make the computer is very important to them.

However, there will be a big problem when they facing the missing of their computer. It will be problem also when it is too difficult to find back the computer just only look by the external view because there are many casing same with the other. This problem become more complicated when there are many people using the same type of computer whether desktop or laptop. The development of Detection of MAC Address on Remote Computer (DEMARC) software is to overcome this problem.

A remote computer is a computer to which a user does not have physical access, but which he or she can access/manipulate via some kind of network. It used to control a remote host over a local network or the Internet, including screen control, mouse and

keyboard simulation, File Transfer Protocol, and net phone. The client can also list all remote windows, processes, and loaded modules running on the server. It windows server environment, its convenient interface is a little like Windows Explorer. One client can control many servers, and one server can be controlled by many clients. The Remote Computer server can be protected by a password, and the client must input the correct password in order to control the remote server. [1]

In computer networking, a Media Access Control (MAC) address is a unique identifier assigned to most network adapters or network interface cards (NICs) by the manufacturer for identification, and used in the Media Access Control protocol sub layer. If assigned by the manufacturer, a MAC address usually encodes the manufacturer's registered identification number. It may also be known as an Ethernet Hardware Address (EHA), hardware address, adapter address, or physical address. [2]

## **1.2 Problem Statement**

The usage of computer is increasingly becoming popular and the number of lost computers in one organization such as company or university can create lots of issues. Some of the problems that been recognized are:

- i The lost of computer/laptop almost cannot be found.
- ii About 98% of lost laptop were reported cannot be found. Scenario on Universiti Malaysia Pahang(UMP) found that student missing of their laptop at least once a month and it can be imposible to find it back.
- iii There is no medium to resolve any missing of computer in UMP.

### **1.3 Objective**

The objective of developing DEMARC is to find the location of computer in the local area network by detect MAC address on the computer and matching with its IP address.

### **1.4 Scopes**

The scopes developments of this application are:

- i The development of this system can be used by anyone in local area network(LAN) in UMP only.
- ii All types of remote computer which are notebook, personal computer(pc) and recover all types of brand.
- iii The system will show the range location of the computer by list down the IP address together with MAC address and host name of each online computer in local area network.
- iv The software used in development this application is Visual Basic and using C# Language. Besides, the developement of web base system is using Adobe Dreamweaver and apply the PHP language.
- v However, there are also have constraint in developing this project. One of them, it is no suitable using in public IP Address such as TM hot zone because the ip configuration is same for all computer connected to the wireless.
- vi This system did not consist of find function to searching MAC Address among the list of result fond when the system is running. So, it is quite difficult to check one by one in the list to matchnig with the MAC address needed.
- vii Lastly, DEMARC system did not have the integration between the two development which are stand alone and the web base system.

## **1.5 Thesis Organization**

This thesis is divided into 6 chapters and each chapter is devoted to discuss different issue in the project. Below is a summary of the content for each chapter:

### **Chapter 1 - Introduction**

This first chapter will be discussing on introduction to system and research. All things that have propose will discuss in this chapter which is introduction, objectives, problem statements, and scope of the project

### **Chapter 2 - Literature Review**

Literature Review is about discussing the research for project that has been chosen. The researches divide into two that are for current system or case study and research for technique that will be used to develop current system.

### **Chapter 3 - Methodology**

Discussing about the analysis, design and methodology that will be used, elaborating the sources from the research, and deciding the best tools that will be used to build the system which is System Development Life Cycle.

### **Chapter 4 - Implementation**

Discussing the whole process in the project development and implementation of the coding of the system is presented. Besides, it also will be explaining on documentation about all process that required in develop the system. If system develop use database, the technique of database need to be explain and the timetable that has been create need to insert via SQL instruction.

**Chapter 5 - Result and Discussion**

Exposed all the output of the system and detailed about the outcome, assumption and further research of this project. Besides, the result from the testing of the system is presented along with the user testing result and the developer testing.

**Chapter 6 - Conclusion**

This last chapter will be discussing on summary of the project that has been developed.

## **CHAPTER 2**

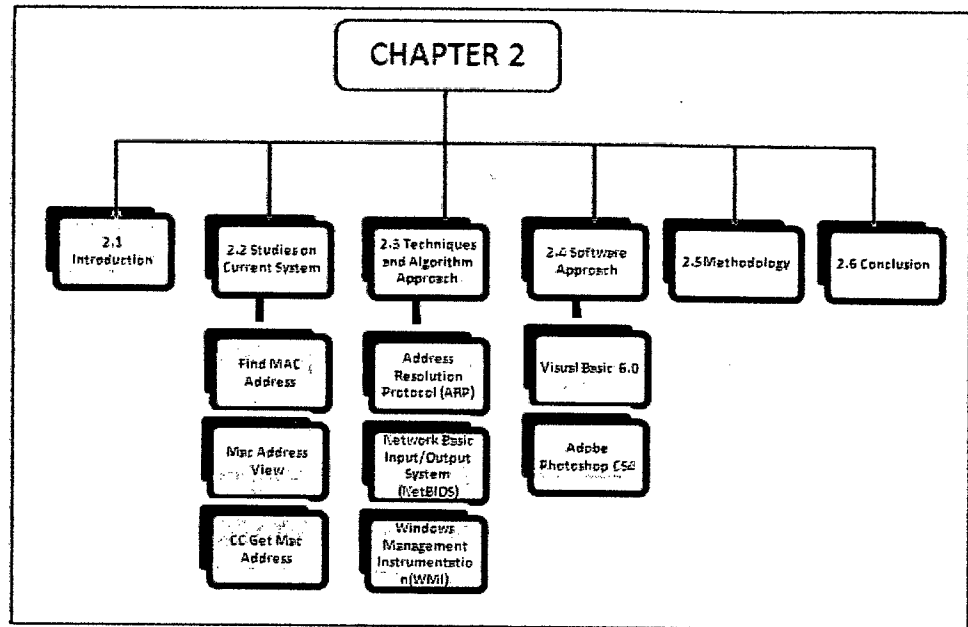
### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter is very important to select the proper way to detect MAC address, gather the information, and process it effectively. The chosen software must have ability to detect the MAC address efficiently and accurately. Other than that, this chapter elaborates on the 3 current applications. The chapter also describes the comparison between the current systems used by peoples today.

Refer to Figure 2.1, this project consist of 6 elements in the Literature Review's chapter. On the Studies on the Current System, I doing research on three past projects as look same as this project. They are Find MAC Address, MAC Address View, and CC Get MAC Address. Besides, three techniques used which are ARP, NetBIOS and WMI. Then, there are two softwares used which are Microsoft Visual C# using C# language to develop the system and Adobe Dreamweaver to develop the web page interface using PHP language.





**Figure 2.1: Flow Chart**

## 2.2 Studies on Current System

There are existing systems that have the related function as this project. Several studies have been conducted to know how the applications are operated. The applications are:

- i Find MAC Address.
- ii MACAddressView
- iii CC Get MAC Address 2.2

### 2.2.1 Find MAC Address

This system is an easy way to find the MAC address of a local or remote computer on the network. Select the target and method and find the MAC address of a remote computer on the network. The software can not only find the MAC address of a

computer, but also detect the manufacturer of its network card. With Find MAC Address, it will easily find the MAC address of any computer on the network.

Find MAC Address is a tool for finding the MAC addresses of computers on the network. With Find MAC Address, user can find the MAC address of their computer or a remote computer or any computer within a specified range of IP addresses. Unlike similar software, Find MAC Address can find the MAC addresses of computers using four methods Address Resolution Protocol (ARP), Network Basic Input/ Output System (NetBIOS), Network Application Programming Interface (NET API) and Windows Management Instrumentation (WMI). After select one of the four methods and specify the target, will get all possible information about the MAC addresses. [3]

Following are the key features of this system:

- i Getting the MAC address of the local computer.
- ii Getting the MAC address of one remote computer either by its name or IP address.
- iii Getting the MAC addresses of all computers on the network.
- iv Getting the MAC addresses of all computers within the specified range of IP addresses.
- v Four methods for finding MAC addresses (ARP, NetBIOS, WMI and NET API).
- vi Detecting the manufacturer of the network card by its MAC address.
- vii Detecting the names of network devices (only if WMI is used).
- viii Searching the scan results.
- ix Saving the scan results to and loading them from a file in the XML format.
- x Exporting the network scan results to text files or a Web document.

Platform: Windows XP, Windows 2003, Windows 2000, and Windows Vista

Figure 2.2 shows the use of Find MAC Address software. User must entered the IP range at the start and stop space. Beside, user can choose four methods in searching the MAC address.

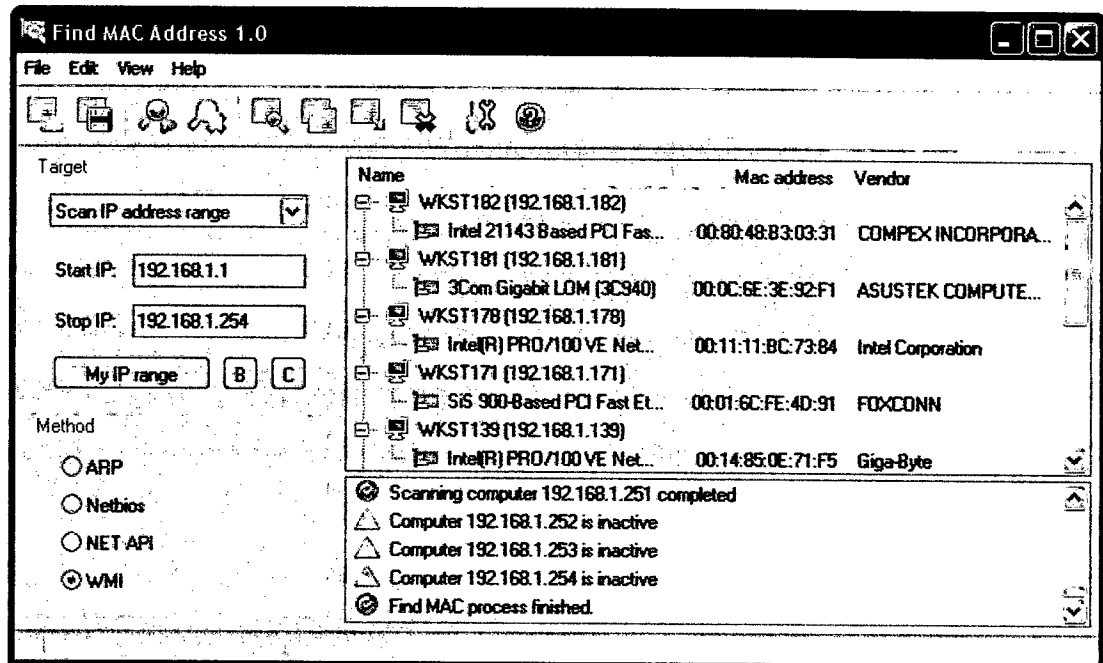


Figure 2.2: The Interface of Find MAC Address Software

### 2.2.2 MACAddressView

MACAddressView is MAC address lookup software that allows us to easily find the company details (company name, address, and country) according to the MAC address of a product. MACAddressView also allows us to find MAC address records according to the company name, company address, or country name. After finding the desired MAC address records, user can save them into text/xml/HTML/csv file or copy them to the clipboard and paste them into Excel or other applications. MACAddressView does not send any request to a remote server. It simply uses the internal MAC addresses database stored inside the .exe file. [4]

Here are some details about the application.

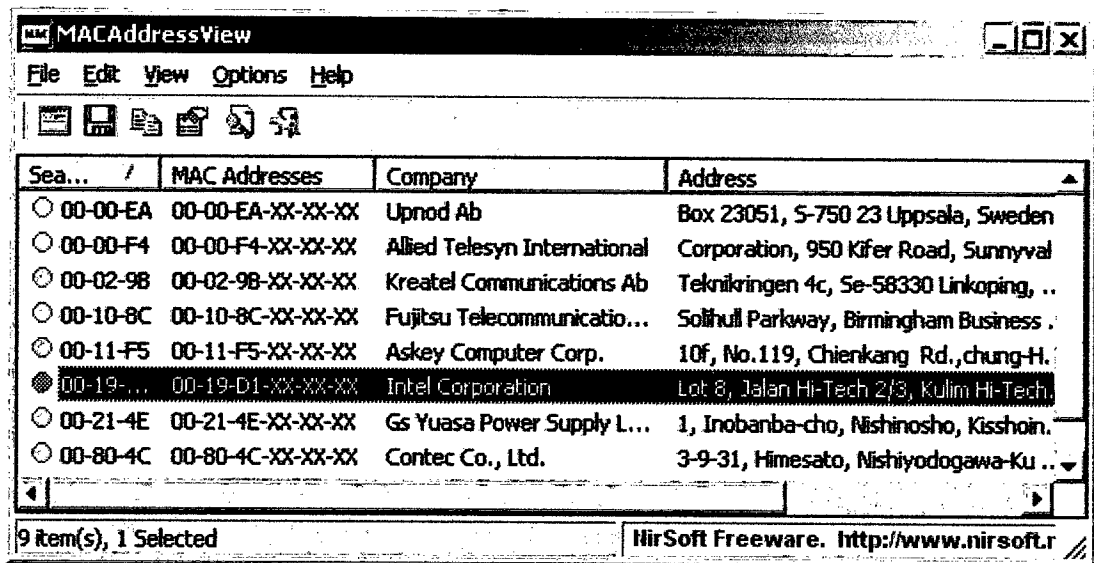
**View:** screenshot

**Size:** 0.54 MB

**License:** Freeware

**OS:** Win98, WinME, Windows2000, WinXP, Windows2003, Windows Vista Starter, Windows Vista Home Basic, Windows Vista

Figure 2.3 shows the list of information on using MACAddressView. User did not find the range IP to know location of computer. It is the weaknesses of the software.



**Figure 2.3:** Interface of MACAddressView

### 2.2.3 CC Get MAC Address

CC Get MAC Address is a handy tool for getting MAC address and computer name from IP address. Users can use it to get MAC address of a computer in or out of local area network range. It's based on Microsoft Net bios technology. CC Get MAC Address also can be used for Wake on LAN. User can use it wake up a computer on

Local Area Network remotely. [5]

- i Get MAC address from IP address.
- ii Get computer name from IP address.
- iii Wake On LAN
- iv Auto scans MAC address of referred IP range.

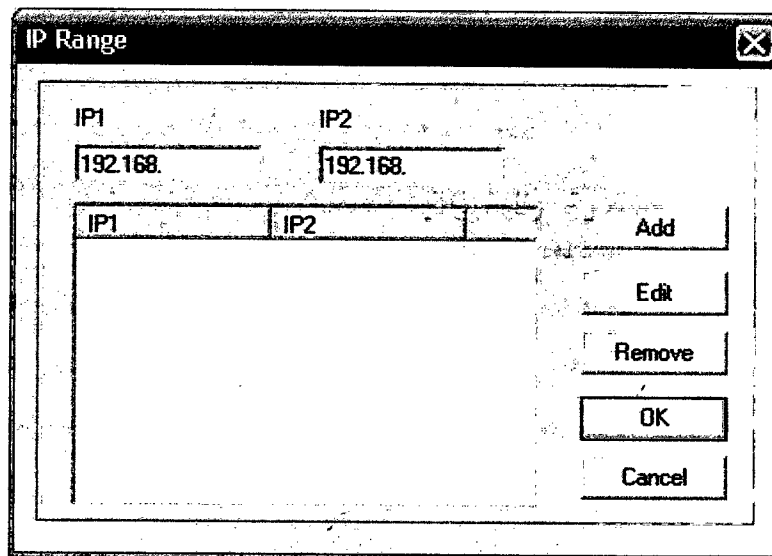
Here are some details about the application.

**Size:** 397.04 KB

**License:** Shareware

**OS:** Win95, Win98, WinME, WinNT 3.x, WinNT 4.x, Windows2000, and WinXP

Figure 2.4 and 2.5 show that the software is very easy to use by entering the IP range and users can find the MAC address in the specific IP range. It will result the information of IP address, MAC address and together with computer name.



**Figure 2.4:** CC Get MAC Address

| No. | IP Address      | MAC Address  | Computer Name   |
|-----|-----------------|--------------|-----------------|
| 4   | 202.106.187.164 | 0030481130c1 | SINA-035GB9WBQ0 |
| 5   | 202.106.187.144 | 00d0b789b818 | SINA-E9RCB578BV |
| 6   | 202.106.187.50  | 00d0b765d272 | INet~Services   |
| 8   | 202.106.184.82  | 00c04f72b28c | INet~Services   |
| 9   | 202.106.184.66  | 000874b1add6 | DELL            |
| 10  | 202.106.184.3   | 00e04cbb00d6 | NETEASE         |
| 11  | 202.106.182.213 | 00105a772a3c | SINA-L6WTDHDLST |
| 12  | 202.106.182.119 | 00d0b7c85d56 | WATCH-89        |
| 13  | 202.106.182.118 | 00d0b7c85c44 | GL-WATCH-118    |
| 14  | 202.106.182.62  | 00065bf7da94 | CHAT3           |
| 15  | 202.106.182.55  | 00065bf8049d | BBN-CHAT123     |
| 16  | 202.106.182.20  | 00065be2e83e | CNC-VTHAARTADUT |
| 17  | 202.106.182.7   | 00065bf7dc73 | RAINBOWLAND     |

Figure 2.5: CC Get MAC Address 2

### 2.3 Techniques and Algorithm Approach

Based on the case study on earlier system, there are many choices in using several techniques according to the different software.

The software can also detect the manufacturer of its network card in the computer. After user select one of the three methods and specify the target, they will get all possible information about the MAC addresses. With Find MAC Address, will easily find the MAC address of any computer on the network as long the computer has the network card and connected to internet.

This software used 3 methods for finding MAC addresses which are:

- i ARP
- ii NetBIOS
- iii WMI

### **2.3.1 Address Resolution Protocol (ARP)**

The address resolution protocol (ARP) is a protocol used by the Internet Protocol (IP), specifically IPv4, to map IP network addresses to the hardware addresses used by a data link protocol. The protocol operates below the network layer as a part of the interface between the OSI network and OSI link layer. It is used when IPv4 is used over Ethernet.

The term address resolution refers to the process of finding an address of a computer in a network. The address is "resolved" using a protocol in which a piece of information is sent by a client process executing on the local computer to a server process executing on a remote computer. The information received by the server allows the server to uniquely identify the network system for which the address was required and therefore to provide the required address. The address resolution procedure is completed when the client receives a response from the server containing the required address.

An Ethernet network uses two hardware addresses which identify the source and destination of each frame sent by the Ethernet. The destination address (all 1's) may also identify a broadcast packet (to be sent to all connected computers). The hardware address is also known as the Medium Access Control (MAC) address, in reference to the standards which define Ethernet. Each computer network interface card is allocated a globally unique 6 byte link address when the factory manufactures the card (stored in a PROM). This is the normal link source address used by an interface. A computer

sends all packets which it creates with its own hardware source link address, and receives all packets which match the same hardware address in the destination field or one (or more) pre-selected broadcast/multicast addresses.

The Ethernet address is a link layer address and is dependent on the interface card which is used. IP operates at the network layer and is not concerned with the link addresses of individual nodes which are to be used. The address resolution protocol (ARP) is therefore used to translate between the two types of address. The ARP client and server processes operate on all computers using IP over Ethernet. The processes are normally implemented as part of the software driver that drives the network interface card.

There are four types of ARP messages that may be sent by the ARP protocol. These are identified by four values in the "operation" field of an ARP message. The types of message are:

- i ARP request
- ii ARP reply
- iii RARP request
- iv RARP reply

To reduce the number of address resolution requests, a client normally caches resolved addresses for a period of time. The ARP cache is of a finite size, and would become full of incomplete and obsolete entries for computers that are not in use if it was allowed to grow without check. The ARP cache is therefore periodically flushed of all entries. This deletes unused entries and frees space in the cache. It also removes any unsuccessful attempts to contact computers which are not currently running.

Table 2.1 shows the use of ARP when a computer tries to contact a remote computer on the same local area network using the "ping" program. It is assumed that