

CHAPTER 1

INTRODUCTION

1.1 Background

Computer networking has become an essential part of today's computing technology. The way computers communicate contributes to the evolution of communications technology. The idea of two or more computers communicating gives birth to new concepts and technologies. In this information era, the need for efficient and fast way to gain information is increasing. Individuals, groups, and companies make daily use of networking technology, especially the Internet. Sending and receiving emails, chatting using online instant messages, completing an online order on an online store, are just a glimpse of the benefits of computer networking. Companies have offices that have an automated system use computer network, the board of directors of a company can do a Teleconference using voice over IP, Military use network prioritization for security, and many more. It is shown that networking technology is well used in different areas and expertise.

Two or more computers can form a network using network cables. They are connected to a Local Area Network (LAN). This case is the most simple network setup. To name a few, there is Personal Area Network (PAN), Wide Area Network (WAN), Metropolitan Area Network (MAN). All of them are based on the scale of computers or networks connected. WAN connects several networks nationwide, which provide broader area of network. Wireless LAN provides us new capabilities of computer networking. As defined by Kevin Chaplin [1], wireless LAN is a local area network that allows user to connect without using a network cable. Convenience, mobility, and productivity are a subset of benefits using wireless LAN.

As defined by Umit Burak [2], Wifi is a certification mark for equipment based on a different set of IEEE standards from the 802.11 working group for wireless local area networks. The standards provide interoperability between devices using wireless LAN. Computers, laptops, and mobile devices are now equipped with Wifi technology. People can bring devices such as laptops and connect to a Wifi network in home, campuses, offices, malls, and other areas. User can access data without having to use modem or network cable. Thus mobility and convenience is enhanced. However, the need for more enhancements is increasing. Wifi has limitations such as coverage area and bandwidth. This has become a problem. With the growing need for Wide Area Network, A new technology standard is needed to provide an upgrade to the existing technology. Wimax is a new wireless networking standard. It is an 802.16 network which provide wireless network coverage larger than 802.11. Wimax can be used as an alternative for cable or DSL in delivering last mile broadband access.

It is important to gather information about Wimax. The technology, specification, advantage and disadvantage and also compare them with information about Wifi. Therefore the author will analytically compare two wireless network standards that are 802.11 (Wifi) and 802.16 (Wimax). The author will also gather the state-of-the-art information related to those two technologies. The author will also find the benefits, drawbacks, capabilities and features of each standard and conduct an analysis on advantages and disadvantages of each standard that can be useful information for the consideration of implementing Wimax.

The goal of this thesis is to compare two technology standards in order to conclude whether one standard is better than the other. The advantages and drawbacks will also be discussed to strengthen the conclusion of the research.

1.2 Scope

Wifi and Wimax are both wireless LAN standards of IEEE. The technologies for the two standards 802.11 and 802.16, has been on development in recent years. The thesis will compare in the terms of the usage of each standards, technical aspects, and the advantage and disadvantage of Wimax and Wifi. Research will be conducted by searching reading materials, books, papers, and more. The author also wishes to interview several people who have knowledge on the two technologies. In January 2009, it is announced that Wimax will be developed and later be implemented in Indonesia. Therefore it would be a good opportunity for the author to do a research on this development.

To limit the scope of the thesis, there will be several limitations on the technical specification of both technologies. General technical information will be provided, however not the detailed technology structure of each standard. The research is mainly focused on the usage and implementation on network architectures. The author will compare the two technologies in terms of metrics. The comparison metrics are performance, cost, scalability, coverage, security, mobility, and quality of service (QoS). The analysis will also cover a feasibility study on the deployment of Wimax from network operator point of view.

1.3 Aims and Benefits

The aim of this thesis is to compare Wifi and Wimax technology and to analyze the benefits and disadvantages of those technologies. The analysis will also focus on whether Wimax can actually provide solutions to the limitations of Wifi, and will Wimax become a substitution for Wifi technology.

1.4 Structures

The thesis will be written in seven chapters as listed below:

- Chapter 1. Introduction
 - This chapter describes thesis' background and brief description of the research of the two wireless Network Standards, including scope and the goal to be achieved by the thesis.
- Chapter 2. Theoretical foundations
 - This chapter explains the theory about network in general and about Wireless network theories and focuses on Wimax and Wifi.
- Chapter 3. Problem Analysis
 - This chapter provides the reason behind the comparative analysis of the thesis
- Chapter 4. Comparative Analysis and Solution Design
 - This chapter describes the comparative analysis and steps of designing the solution for the problem
- Chapter 5. Results Analysis
 - This chapter identifies the results gained from the researched
- Chapter 6. Discussion
 - This chapter will evaluate and clarify the most important results.

- Chapter 7. Conclusion and Recommendation
 - This chapter concludes the thesis through explanations on each procedures carried out and also the result of the analysis.