INTEGRATING IPV6 FEATURES USING TUNNELING MECHANISM

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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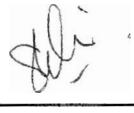

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DEDICATION

To my beloved parents, your care and your love give me the strength.

To my friends, it is for your continuous support and encouragement.

To my lecturer, for the guide and being critical, that gives me the challenge to be a better student.

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ABSTRACT

This project is actually network development for a new protocol. This project basically analysis about deployment for an IPv6 or known as internet protocol next generation. The internet protocol version 6 (IPv6) is designed by the IETF to replace the current version Internet Protocol, IP Version 4 ("IPv4"). It also adds many improvements to IPv4 in areas such as routing and network autoconfiguration. IPv6 is expected to gradually replace IPv4, with the two coexisting for a number of years during a transition period. IPv6 has a much larger address space than IPv4. This results from the use of a 128-bit address, whereas IPv4 uses only 32 bits. The new address space thus supports 2^{128} (about 3.4×10^{38}) addresses.

ABSTRAK

Projek ini sebenarnya adalah pembangunan rangkaian melalui protokol yang baru. Pada asasnya projek ini adalah untuk membina rangkaian protokol internet versi 6 (IPv6) atau dikenali sebagai internet protokol generasi baru. Ipv6 direka olef IETF untuk mengantikan protokol internet sekarang iaitu protokol internet versi 4(IPv4). Ia juga mempunyai banyak pembaharuan kepada IPv4 seperti "routing" dan configurasi automatik. IPv6 akan dijangkakan akan mengantikan IPv4 di dalam masa berberapa tahun ini. IPv6 mempunyai jumlah alamat yang besar daripada IPv4. keputusan ini memelalui pemakaian 128-bit alamat, dimana IPv4 mengunakan hanya 32 bit. Ruangaun alamat yagn baru menunjukan 2^{128} (sekitar 3.4×10^{38}) alamat.

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CHAPTER 1

INTRODUCTION

This chapter presents the background information of the research. It will discuss the overall aims of projects. This chapter will provide with problem statement, objective, scope, project significant and flowchart for this project.

1.1 Project background

It not easy to convert entire network to Internet Protocol version 6 (IPv6) at the same time, and since IPv6 and IPv4 are not directly compatible, this creates a potential problem with interoperability. As a solution to this issue, a number of IPv6 transition mechanisms have been created.

There are having 3 primary types of transition mechanisms, which are dual stack, translation and tunneling. But will primarily focus on how one of the mechanisms, tunneling, can be used to great advantage by agencies during their transition process.

Today, this is usually accomplished either natively or, more commonly, with an IPv6-in-IPv4 tunneling technique using either manual or automatic tunnel configuration

methods. The practical reality is that sites deploying IPv6 will not transition to IPv6-only, but transition to a state where they support both IPv4.

For this project, is to developing two IPv6 network and two IPv4 network in this University Technique Malaysia Melaka (UTeM) campus. The two of IPv4 network is developing between two IPv6 networks. The IPv6 network is completely create to been use by the user that mean it consist web server, DNS server and DHCPv6 server. This project is focuses on user requirements need. And this project gives use more knowledge in the new technology that been use.

1.2 Problem Statement

This project is more about developing an IPv6 network, main idea is come out from the problem that been propose by the student UTeM. The IPv6 is the new protocol and most of the science computer's student and lecturer interested to know this protocol.

Because of that some of the student from year three who takes a Final Year Project (FYP) is using the IPv6 network as their main scope. Some of them make an application that can function in IPv6 and there also some of them that make analysis for IPv6 protocol. Unfortunately UTeM still do not have IPv6 environment or network in campus. How there want to make their project running without presence of the IPV6 network, it will spoil their project, and make there project not running properly.

Because of IPv6 is one of new two or three lab in the science computer faculty is need in IPv6 enviroment, it give student and lecturer more easily to learn about IPv6 protocol. But now UTeM campus is still using IPv4 protocol, so each lab of IPv6 network is connected to one or more IPv4 network before it connected to another IPv6 network. That is not possible to create because IPv6 already created to have prevented to this problem. So by developing this project it will solve this entire problem.

1.3 Objective

1.3.1 Phase 1

- To learn IPv6 protocols
- To allow user using the IPv6 network through IPv4 network.

1.3.2 Phase 2

- To allow user using IPv6 network through several IPv4 network.
- To allow user access Web server in IPv6 network through several IPv4 network.

1.4 Scope

- Collecting the data to deploy IPv6 network

All the data collected uses several technique.Data collection techniques that using in this report includes screening records reports, and direct observation of behavior.

In this project the main information is collecting is about the transition of the packet from IPv6 over IPv4 network that was tunneling mechanism. And also find the equipment that available for deploy the IPv6 network as router and IOS that support IPv6 protocol and Operating System with the right specification for this project.

The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, to pass information on to others. Primarily, data is collected to provide information regarding a specific topic. The data that been collect is base on the network and the project needs. The data is one of the guideline to deploy the network environment and for creates the analysis.

- User target - Staff and Student UTeM

The user for this network created is purposely for staff and student in UTeM. Using IPv6 network there will can done there project that involving the IPv6 network. They also can learn more about this IPv6 environment. This network will give more advantage to user in UTeM. This network will give many benefits and advantages to users in UTeM.

- IPv6 network environment

This is environment that allow user to using the IPv6 as a protocol. That meant every user for this environment can get 128-bit address. To create this environment it need several guide to configure every device in the environments. Each device have there own configuration in IPv6, it will be same as IPv4 or maybe not.

- Tunneling mechanism

This project consist of IPv4 environment, it meant the packet that travel along the network both IPv6 is need some mechanism to analyze the packet. In IPv6 protocol that have a few mechanisms can act as transition but in this project is using the tunneling mechanism to make the packet from IPv6 travel along the IPv4 environment.

- Routing

Routing is the process of selecting paths in a network along which to send network traffic. So it can allowed packet across different path of network. The data that been send will route until it finds the right destination

In this project, it used two type of routing protocol for ipv4 protocol which is Routing Information Protocol (RIP) version 2, it is a dynamic routing protocol used in local and wide area networks. RIP version 2 included the ability to carry subnet information and better that version 1. And for IPv6 network it use the static routing to route the tunneling packet.

- Servers Application

The project also allows users to use the system which mean the networks need another server to complete the network requirements.

Another server which will be install is Web server that can allow user to surf the web application and lastly is the DNS server is use to publish the web server without typing the IP addressing of the web server if the user want to view it, just use the domain name that was created and automatically the user from another network IPv6 can view the web.

1.5 Project Significant

This project is so useful for me and the entire user in UTeM. From this project, I can learn more detail about IPv6 protocol, because it is one of the new experiences and also gives more knowledge especially in Internet Addressing protocol.

Most people still do not know what IPv6 is, and how does it works. So we can get one upper level from other people who did not analyze this Internet Addressing protocol. Beside that the user of UTeM also can get more advantage from this project. There did not need have to worry about how to create an IPv6 lab in UTeM. All this was developed in this project.

1.6 Expected Output

The result of this project is one of the solution for the problem statement which been stated before. The user in UTeM campus can use and learn this network and user from both IPv6 environments side can communicate with each other, the user also can surf the web browser from another IPv6 network since they provide the web server at the other side.

1.7 Conclusion

This chapter will describe about the basic of the project, the objectives which is the gold for this project and the scope that need to be create. This project basically appears when the problem statement proposed from student and lecturer in UTeM itself, this is one of the solutions for that problem statement.

By creating the IPv6 network that can across the several IPv4 network with the basic server and the successions of it, it means the analysis that has been studied was successful. The progress of this report will be continuing in the next chapter.

CHAPTER 2

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In this chapter we did a literature review and segment critical analysis of the published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles. We also did both summary and explanation of the complete and current state of knowledge on a limited topic as found in academic books and journal articles.

This chapter will explain about methodology that will help to describe the detail activities in each stage of the project. And the methodology that been use commonly choose accordingly from the previous research. It will determine the requirement, performance, and behavior during the project will be held.

2.2 Literature Review

Literature review is a body of text that aims to review the critical points of current knowledge on a particular topic. This section is use to describe the detail about the project.