CHAPTER I
INTRODUCTION

1.1. Background

Each telecommunication device requires a connection to a calculation node, the connection between the calculation nodes requires a protocol, the number, the name, the origin of each packet, as each can define. The number of version 4 of the IP address, which is an update of the limited process of IP address requests. Internet bases (CIDR) are not protocol known as Internet Protocol version 4 (IPv4) that uses a cline wrapper without 32 bits: this protocol can cover around 4.3 million nodes in the world. The technology used is close to the IPv4 limit, which is the services and devices using 3G and 4G systems: Internet services (ISP) do not have enough IP to meet customer demand. Knowledge, problems, information, knowledge, knowledge, information and knowledge (VLSM), information and communication (CIDR), the existence of various problems in the field of translation. port addresses (PAT) and so on. However, all these technologies cannot recover the problem of not having an IP address. For this reason, the new version of IP can be important for manufacturers of the Internet's pace of development. Due to the limitations of IPv4 addresses, autonomous technologies have emerged: Internet Protocol version 6 (IPv6). IPv6, developed by IETF, is considered to be sufficiently efficient in terms of scalability, reliability, speed and security for IPv4. IPv6 is designed for the address space that is actually requested for Internet growth. IPv6 increases the IPv4-32 bit IP address layout to 128 bits [1]. In addition, the size for IPv4 is possible because it uses 128 bits, which encompasses all nodes, and any service must require IP both now and in the future.

Access the new generation IP to launch China, India and Japan. IPv6, 340 trillion, trillion, trillion nodes, IPv4 contains only 4.3 billion nodes. This will contribute to the construction of the necessary infrastructure for future development. IPv6 does not correspond to NAT as IPv4 because it provides security. IPv4 uses NAT as security, but its functionality is not primarily for security. Flow control gives high priority to some traffic to prevent congestion and connections with IPv6 will be end-to-end. In addition, IPv6 headers are simpler than IPv4. Growing, but with a higher-performing reflection, contains less space on which the data is processed. Failure to do with IPv6 is CRC because the package has been checked in the lower layer and therefore it is not necessary to check the upside errors. As a result, the processing time is reduced.

Switching from IPv4 to IPv6 requires a uniform method of disconnections and errors in the network. This requires a significant management of the main nodes, devices and systems for new IP generation. However, IPv6 addresses still work with IPv4 addresses; This means that IPv6 networks will join future IPv4 networks. However, IPv4 does not support the new network criteria. The current IPv4 network is large and complex, because IPv4 cannot be changed with IPv6. Switching from one technology to another is very difficult, because IPv4 and IPv6 are not the same set of communications. Three well-known transition mechanisms are known as Dual Stack, tunneling and translation [2].

A comprehensive study of the IPv4 transition to IPv6 has been carried out. When comparing Dual Stack, Tunneling, and Translation mechanisms, it has been found that Dual Stack provides better efficiency in terms of throughput and UDP results. Dual Stack is capable of implementing IPv4 and IPv6 on the same device, unlike Tunneling and also does not require additional address translators, such as when dealing with network translations. But Dual Stack costs are more because it is necessary to support IPv4 and IPv6 addresses.

Tunneling mechanisms generally tend to cause excessive load on ISPs and are more difficult to implement when compared to the other two mechanisms. Translation mechanisms on the other hand tend to have less feasibility and also require a separate device called Network Address Translator (NAT) to do address translation. To improve the efficiency of the

Tunneling mechanism, techniques for IPv6 header compression have been applied. In this process the size of the header of an IPv6 packet decreases mostly from about 40 bytes of IPv6 headers to 6 bytes to provide better network results. The Dual Stack and Tunneling mechanism can be implemented using the RIP and OSPF routing protocols. By implementing the RIP and OSPF protocols can make it easier for devices on the network to find a better routing path. Based on information collected from changes in dynamic link status, modifications can be made in the network in the event of a failure. In finding the best routing path, it is also possible to simultaneously reduce traversal costs.

1.2. Problem Statement

Based on the description in the background above, the formulation of the problem of the research is the performance of Dual Stack, Tunneling and Translation between IPv6 Network and IPv4 Network using emulation system more than simulation system are analyzed:

1. How the performance of dual stack, tunneling, and translation are analyzed?
2. How the performance of dual stack, tunneling, and translation in emulation system?

1.3. Objectives of the Research

As stated before, three eminent transitional components are widely known as Dual Stack, Tunneling and translation using emulation system more than simulation system. The purpose of this research is:

1. To analyze the mechanism dual stack, tunneling, and translation performance mechanism between IPv6 Network and IPv4 Network which is analyzed using GNS3 and JPerf.
2. To analyze the performance of dual stack, tunneling, and translation performance mechanism between IPv6 Network and IPv4 Network which is analyzed using GNS3 and JPerf in emulation system.

1.4. Thesis Contribution

By analyzes the performance in dual stack, tunneling, and translation, deeply understanding of comparative perform between IPv6 Network and IPv4 Network are describes.

1.5. Limitation of Works

Limitation of a problem is used to avoid the existence of irregularities and broadening the subject matter so that the research is more directed and facilitates discussion so that the research objectives will be achieved. Some of the limitations of the problem in this study are as follows:

Analyze dual stack, tunneling, and translation performance mechanism between IPv6 Network and IPv4 Network which is analyzed using GNS3 and JPerf in emulation system.

1.6. Research Originality

The difference between this research and the previous studies is that the previous studies used simulation tools that produce unreal results such as Packet Tracer and Opnet tools, but in this research were use emulation tools. These tools produce real time results at variance the tools which used in previous studies.

1.7. Outline Thesis Organization

To understand this thesis in order to obtain an overview of its contents, it is compiled by outlining in systematics as follows:

CHAPTER I INTRODUCTION

This chapter contains background, problem statements, objectives of the research, purpose of the research, thesis contributions, scope of works and outline thesis organization.

CHAPTER II LITERATURE REVIEW AND THEORY

This chapter contains literature review and theory about dual stack, tunneling, IPv4, and IPv6.

CHAPTER III RESEARCH METHODOLOGY

This chapter contains of general research model, proposed system model, performance analysis, simulation process, and summary.

CHAPTER IV RESULTS AND DISCUSSION

This chapter contains a discussion of the performance mechanism of Dual Stack, Tunneling and Translation between IPv6 Network and IPv4 Network

CHAPTER V CONCLUSION

This chapter is a conclusion of the discussion of the problems obtained from the research, besides that in this chapter also contains suggestions that are expected to be useful for the community.