IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 20-24

Effective Inter-Operability between Ipv6 Networks through Tunneling and Dual Stack Mechanism

[1]S.Geetha, [2]B.Shivaranjani, [3]D.Sowbarnika, [4]Mrs.G.Latha,
[1,2,3] UG students, [4]Assitatnt professor, Department of ECE Apollo engineering College, Poonamalle.

Abstract : *This paper presents the performance analysis on IPv6 data networks and based on the migration mechanism from IPv4 to IPv6. IPv4 network has limitation in terms quality parameter address space, latency and throughput and these parameters is affecting the overall performance of application. In this project, IPv6 network with migration techniques are proposed to overcome these limitations and to improve the system performance. The entire project will be implemented through simulation tools GNS-3, VPCS 2.0 and Wire shark and these tools has excellent features in designing advanced concepts with complex networks and quality analysis. As a solution, Tunneling and Dual stack concept is proposed to transmit IPv6 packet through IPv4 network that achieves fully convergence in IPv6 network. QoS analysis will be made in terms of latency and throughput parameter.*

Keywords *- IPv4/IPv6 transition, tunneling, dual stack*

I. INTRODUCTION

Internet protocol version 4(IPv4) is being utilized on internet across the world today. The current internet is mostly based on IPv4, which was defined in 1981 at a time when developers could not imagine the scale of addresses required by the internet today. IPv4 is the basis of the TCP/IP communication protocols which are used to transport data, voice and video packets over the internet. Basic framework of IPv6 protocol was standardized by IETF (Internet Engineering Task Force) in 1990. While mobile IP was originally designed for IP version 4, IP version 6 makes life much easier. The IPv6 provides a significant improvement over IPv4 interms of scalability, throughput, latency, security, mobility and convergence. So migration from IPv4 to IPv6 is a requirement of time. There are three migration ways namely dual stack, tunneling and translation. This paper deals with tunneling and dual stack based IPv6 transition. Several mechanisms that had to be specified separately for mobility support come free in IPv6. During the gradual transition phase from IPv4 to IPv6, existing IPv4 applications must continue to work with newer IPv6 enabled applications.

II. EXISTING SYSTEM

In this existing system, IPv4 is a network that enables data sharing between two or more computer. It is currently the most widely used protocol in data communication over different kinds of network. It is a connectionless protocol used in packet switch layer protocols. IPv4 network has a 32bit address field and it is represented in Dotted Decimal Notation(DDN). Here this system is established in network and the performance can be utilized in people but the more number of people are accommodate within the network, the performance of IPv4 is decreased, because of lack of address space. There is low address space, so that the throughput is not efficiently reached to the people and the latency will be more in the IPv4 scheme. So we move to IPv6 transition mechanism.

III. PROPOSED SYSTEM

In this proposed system, to overcome the drawbacks of existing system, so we are going from IPv4 to IPv6 transition and it deals with this long-anticipated IPv4 address exhaustion. It has 128bit address field and it is represented in Colon Hexadecimal Notation(CHN). In this system the network will be achieved high throughput with the reference and proposed IPv6. The reference system is totally taking of IPv6 transition and the proposed system will be taken two types of protocols namely tunneling and dual sack mechanisms. It will be implemented through simulation tools GNS-3 and VPCS 2.0. Here to prove the reference system is greater or equal to the proposed system and tabulate the comparison of reference and proposed using two protocols with different nodes. Then to plot the graph of throughput and latency and ensures the QoS. We implement the two quality parameters of network design with the help of routers, switches and hosts respectively.

IV. NETWORK DESIGN AND TEST ANALYSIS

In this paper, we are going to designing a network for tunneling and dual stack mechanisms. Hence, the throughput and latency are tested by comparing reference and proposed systems and the throughput is high in proposed system is proved.

4.1Network design

Firstly we are taking tunneling mechanism and it is a virtual mechanism and it will be create only between source and destination. Types of tunneling are auto tunnel, manual tunnel, etc,.

4.2 Tunneling

Manual tunnel

Manually configured IPv6 over IPv4 tunnels. It is equivalent to permanent link between two IPv6 domains over an IPv4 backbone. Simple point-to-point tunnels that can be used within a site or between sites and it carries only IPv6 packets. Manually configured IPv4 addresses are assigned to the tunnel source and tunnel destination.

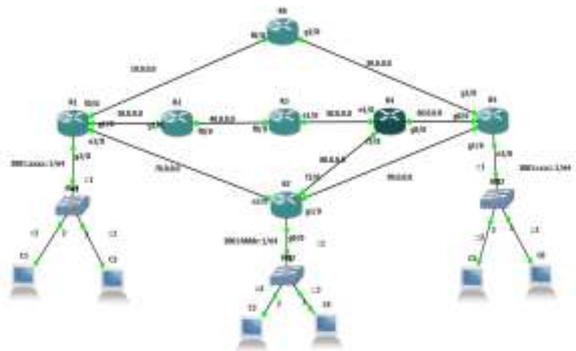

Fig. 1: design for manual tunnel

Auto tunnel

Auto tunnel support for IPv6 automatic IPv4 compatible tunnels and IPv6 addresses. The tunnel destination is automatically determined by the IPv4 addresses in the low order32bits of IPv4 compatibleIPv6 addresses. Here, no need of IPv6 addresses for locating the auto tunnel. The host or router at the each end of an IPv4 compatible tunnel must support both the IPv4 and IPv6 protocol stacks.

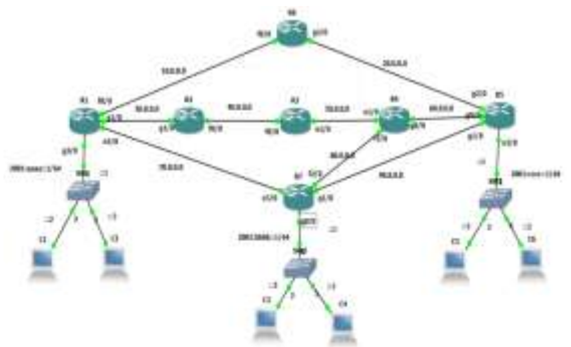

Fig. 2: design for auto tunnel

Secondly we taking dual stack mechanism and it is also one of the transition mechanism in IPv6.

4.3 Dual stack

Dual stack is one of the most widely adopted techniques for IPv6 migration. A dualstack node hassupport forboth protocol versions and is referred to as an IPv6/IPv4 node.It involves running IPv4 and IPv6 at the same time. Quality of Service (QoS) of IPv6 packets will be retained.

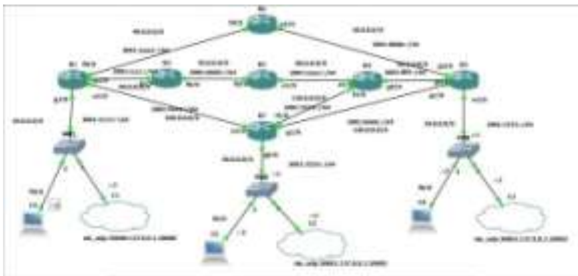

Fig3: design for dual stack

4.4 Test analysis

In testing analysis, the throughput and latency are tested with different nodes in reference and proposed systems.

Throughput

Throughput is defined as the amount of data moved successfully from one place to another in a given time period. The throughput is calculated by T=P/L where T represents throughput, P represents packet size and L represents latency of given node.Here we using different packet size from 500 to 1400 to be calculated each node.

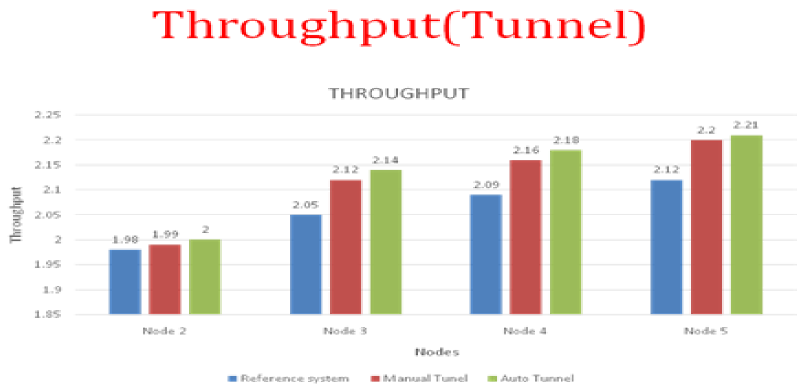

Fig. 4: throughput for manual and auto tunnel

In fig4 shows the throughput test for reference and proposed system which means reference andtunneling with manual and auto tunnels. Hence, the throughput is high in proposed system than the reference system.

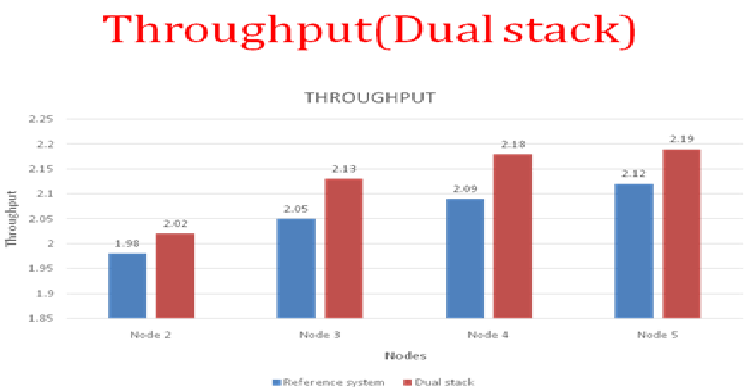

Fig. 5: throughput for dual stack

In fig5 shows the throughput analysis of reference and proposed system of IPv6 transition. Here alsoweproved the throughput is high in the proposed system.

2. Latency

Latency is defined as how much time it takes for a packet of data to get from one designated point to another. The latency is calculated from the round trip time (RTT) and the half of the RTT is latency. It is calculated by taking average of RTT and divide the half is getting latency and the values are noted and to plot the graph.

Latency(Tunnel)

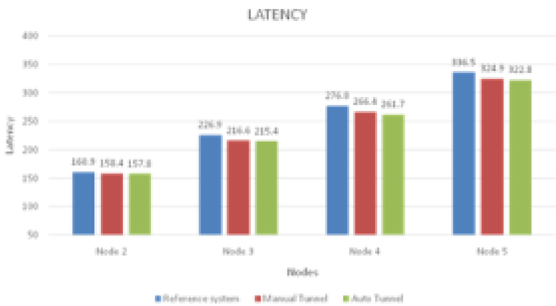

Fig. 6: latency for manual and auto tunnel

In fig6 shows the latency for tunneling with manual andauto tunnels and it is proved that the latency of proposed system is low than the reference system.

Latency(Dual stack)

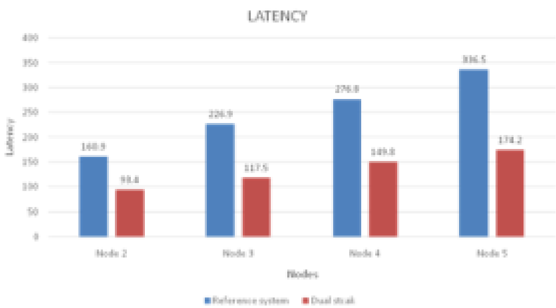

Fig. 7: latency for dual stack

In fig7 shows the latency for dual stack mechanism. Here also we achieved the low latency in proposed system than the reference system.

4.5 Comparison between reference and proposed systems

Reference system			Manual Tunnel		Auto Tunnel		Dual Stack	
Nodes	Latency	Throughput	Latency	Throughput	Latency	Throughput	Latency	Throughput
2	160.9	1.98	158.4	1.99	157.8	2.00	93.4	2.02
3	226.9	2.05	216.6	2.12	215.4	2.14	117.5	2.13
4	276.8	2.09	266.4	2.16	261.7	2.18	149.8	2.18
5	336.5	2.12	324.9	2.20	322.8	2.21	174.2	2.19

Fig. 8: table for reference and proposed

In fig8represents the comparison of tunneling and dual stack with the reference system.In thatclearly noted that the proposed system is greater than or equal to the reference system.

V. CONCLUSION

The proposed system will be implemented with dual stack and tunneling mechanisms which capable to transmit IPv6 packets through IPv4 network. Since the proposed system has elasticity in natures, it may have capability to coverage IPv6 networks through IPv4 network by ensuring the quality of IPv6 packets. The tunneling and dual stack mechanisms can be used as migration techniques that paves the path for implementing IPv6 network without affecting the performance.

REFERENCES

[1]. Pyung Soo Kim, "Analysis and Comparison of Tunneling based IPv6 Transition Mechanisms", International Journal of Applied Engineering Research, vol.12, no.6, 2017.
[2]. SheetalBorse et al and Sheryl Radley et al, "A detail Comparative Review on IPv4/IPv6 Dual Stack Coexistence Technique", International Journal of Innovative Research in Computer and Communication Engineering, vol.80, June 2016.
[3]. Farouk Abdul Jalin, Nor Effendy Othman, "A Review of Mobile IP Protocol for the implementation on Dual Stack Mobility Management", Journal of Theoretical and Applied Information Technology, vol.87, no.3, 31st May 2016.
[4]. FebbyNurFatch et al, M. Mehran Arshad Khan et al, "Enhancing Data Dissemination in Dual-Stack Enterprise Hybrid Networks through Link State Routing Protocols", International Journal of Innovative Research in Computer and Communication Engineering, vol.4, Issue 6, June 2016.
[5]. Mohammad Mirwais Yousafzai, Nor Effendy Othman, Rosailah Hassan, "Toward IPv4 to IPv6 Migration within a Campus Network", Journal of Theoretical and Applied Information Technology, 20th July 2015, vol.77.
[6]. Dr. Muzhir Al-Ani and RolaA.A.Haddad, "IPv4/IPv6 Transition", International Journal of Engineering Science and Technology, vol.4, no.12, Dec 2012.
[7]. Hanumanthappa.J and Dr. Maniaish.D.H, "IPv6 an IPv4 Threat reviews with Automatic Tunneling and Configuration Tunneling Considerations Transitional Model", International Journal of Computer Science and Information Security, vol.3, no.1, 2009.
[8]. SheetalBorse and Mrudul Dixit, "Migration of Internet protocol IPv4 to Internet protocol IPv6 using Dual-Stack Technique", International Journal of Industrial Electronics and Electrical Engineering, vol.2, Issue 7, 2007.
[9]. I Kullayamma and Sai GururajuGoud, "Scenarios in Migration Networks from IPv4 to IPv6", International Journal of Latest Trends in Engineering and Technology, vol.8, issue 1, 2001.
[10]. R. Gilligan, E. Nordmar, "The Migration from IPv4 to IPv6", Dec 1997.