Comparison between (IP.v4) and (IP.v6) on Voice Over Internet Protocol (VoIP)

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***Abstract*— The transition from (IP v 4) to (IP v 6) provides a model of the advancement of technology. The transmission of protocol concentrated interests on the linked technologies performance. The VoIP significance is mutual between many contemporaneous Internet applications. This paper shows a performance test using (IPv.4&IPv.6). Using (OPNET) for simulating the protocols to check areas of performance failing .**

***Index Terms*— IPv6, IPv4, Performance, VoIP, VoIPv6,VoIPv4.**

I. INTRODUCTION

IP(v.6) is the following generation layer network protocol that was designed as a proxy for IP(v.4). No interest at this time in IPv6, except in Europe countries and Asia. While Supporting IPv6, there was no doubts over the changes (if any) needed to run applications over IPv6, the performance concerns and the resolutions for expanding the IPv4 address as (CIDR) and (NAT). The necessity to introduce IPv6 has compelled the computing world to look for the newfangled of IP. An extended research that relates to the transition from IP(v.4) to IP(v.6) has tested the behavior of applications that use IPv6. Since the movement from IP(v.4) to IP(v.6) is unavoidable, the preparation of the existing Internet concepts and its related applications have to work with the new version. The surrogate of IPv4 by IPv6 is unavoidable and so as the aptness of applications for IPv6. This presents the necessity to study the rendering of applications in IPv6 that are currently working with IPv4. The prominence of the study is twofold, it will provide the assistance to know the suitability of an existing application to be performed under IPv6 and the degree of completeness required for an application to be conformable. The prominence of (VOIP) is significant to consider the proportion of spreading the VoIP in IPv6 based networks.

This paper searches and studies the rendering of VoIP (version.6) and VoIP (version.4). Under a simulated environment, the quality parameters are spotted for VoIPv4 and VoIPv6 to establish the proportion and readiness of the VoIP for IPv6 and the grade at which VoIP be displays an impact from transition.

This paper presents an exploration of the comparison between the performance of IPversion4 and IPversion6. The previous part (part 1) shows the general concept of the paper, and Part 2 defines the technologies and methodology. Part 3 contains the OPNET simulation environment, the network topology and the configuration used in the study. OPNET is used as a simulation gadget to perform the test. This topology takes two screenplays : VoIP (v.4) and VoIP (v.6). The Selected Performance parameters for comparison between the results are explained in part 4. In part 5 the collected statistics from the simulation are analyzed to detect comparative performance directions between VoIPv4 and VoIPv6. The paper has been concluded with Part 6 which requires analysis and classifying the outcomes as long as the possible boundaries of the research.

While some researchers propose that VoIPv6 might have better performance in the VoIP, performance changes cannot be neglected. Additionally, the evolution of the network infrastructure participates in the quality of the IPv6 based on VoIP's deployment. Packet delay and (end - to - end) packet delay has a deep effect on the VoIP's QoS which makes it critical to monitor these parameters for IPv4 and IPv6. Security features are richer for the IPv6 than IPv4 and this supply greater trustiness for the protocol as well as more flexibility and lower maintenance overheads and extensibility.

The IPv6 gives major flexibility and security in deployment. in fact, both protocols of network layer based and cannot be violated. Studies show that the deployment of VoIP on IPv6 can get greater quality than the VoIP on the IPv4 deployment.

II. METHODOLOGY

Some studies require that any single performance result cannot be depended on the determination of the IP based on network performance and execution. For example, the audio coder-decoder (Codec) is important and it has a basic role in the application of VoIP and thus the rendering of audio Codec and the level of conjugation (higher or lower) has an influence on the quality and the user experiment.

Since some researchers have no doubts that the IPv6 will send the predictable perfection over IPv4 when the transition from IPv4 to IPV6 happens. Yet the IPv6 proved progresses, developments and a markedly higher (Q o S) than IPv4. VoIP is dependent on many factors, starting from the protocols used, to the kind of network and what is used for the deployment of VoIP. Above that , the basic algorithm to process speech (or audio) in VoIP has a deep effect on QoS.

Table 1. Attributes and Values

Attribute Type	Attribute Used
Signaling Protocol	S I P
Queuing	W F Q (Weighted Fair
Mechanism	Queuing)
Audio Codec	G.711 (P C M)

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III. SIMULATION

The study used the OPNET as a simulating tool as follows: The first scenario is done with IPv4 and the second with IPv6. (in Figure 1 The substructure of the network used in the study has been explained).

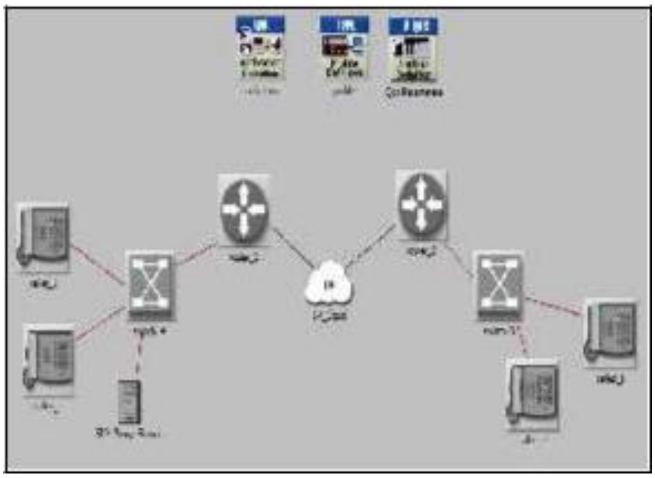

Fig 1. Network Topology

Regardless of the network infrastructure the great technical aspect of the two scenarios for (IPv4 & IPv6) is shown in table(1)

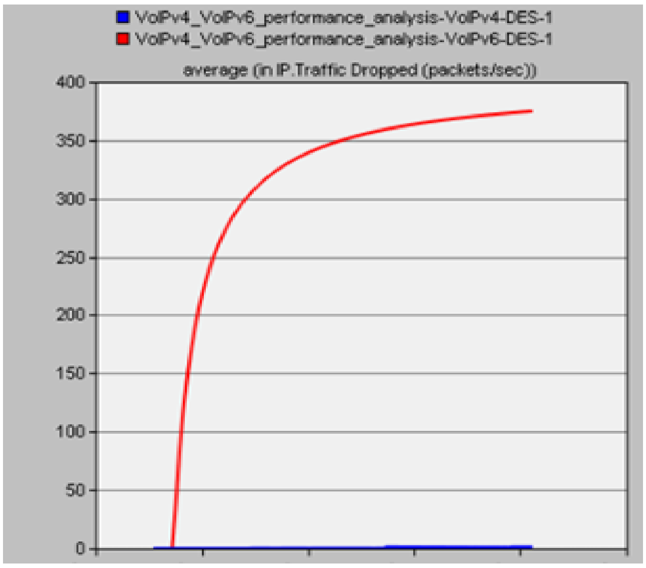

Fig 2. IP Traffic Droppe

IV. RESULTS

The results from the statistics of performance and the quality of service related to the (traffic packet delay),(traffic packet dropped), (packet delay), Mobile Operating System (MOS) and (jitter) . The results of the simulation are integrated to make it simple to compare the results of both scenarios for VoIPv4 and_VoIPv6. For any given observed parameter and collected statistics the consequent direction is observed by using a graph for both VoIPv4 and VoIPv6 scenarios from a result of the great standards of efficiency for VoIPv4 & VoIPv6. The jitter is explained in Figure6, the study shows the jitter for VoIPv6 is near zero or very little. However, for VoIPv4 it is consistently demonstrates that jitter and random flux increase in frequent progressive

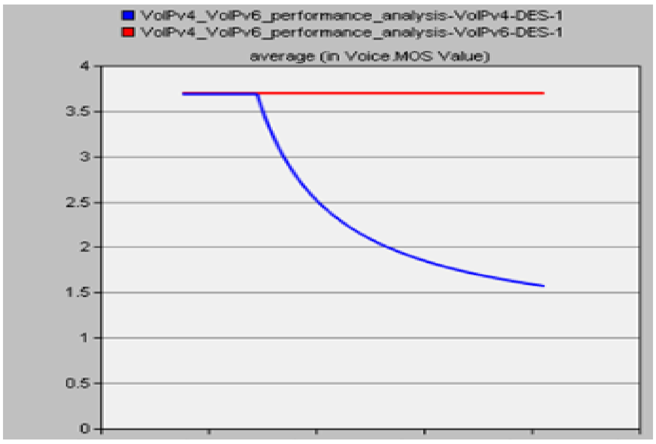

Fig 3. MOS Value

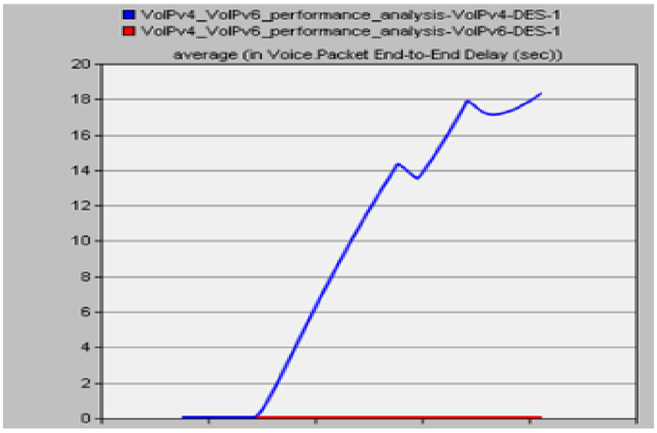

Fig4. End-To-End packet delay

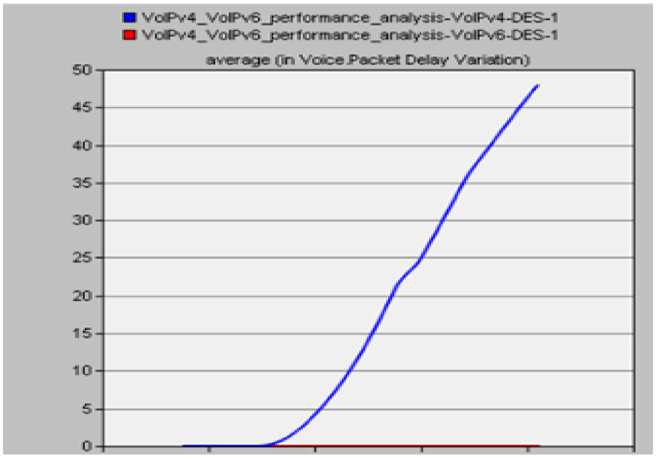

Fig 5. Packet Delay divergence

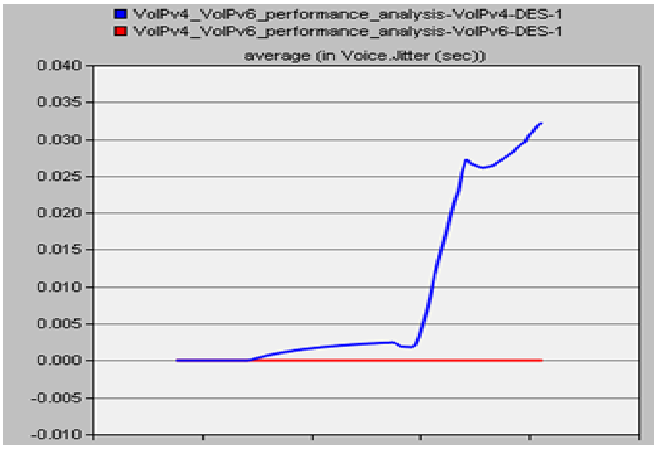

Fig 6. Jitter

V. ANALYSIS OF RESULTS

The scale of MOS efficiency is defined by the scale of 1 to 5 where 1 is the minimum efficiency and 5 is the maximum efficient performance of a communication network. The MOS values spotted for the study that shown in Figure 3 and explained the cohesion in MOS values for VoIPv6, it's around 3.8. As time passes in this communication scenario with the on-going communication request, or voice calls for VoIP networks, the IPv4 deployment is gradually lowering the MOS values from 3.8 to 1.6 (Figure 3).

The VoIPv4 displays a higher packet delay with a great rising in variation (Figure 5) while the_VoIPv6 presents no performance issues. The correspondence of advantages is shown in Figure 4 for (End -to- End) packet delay. The results between Figure4 and Figure5 are identical. From (Table:2&3) we obtained these results of the simulation which show the QOS and the parameters of delay.

The results demonstrate the QoS and following performance are solid for the VoIPv6. However, performance grades for the VoIPv4 are conflicting and that provides a considerable issue for the flowing communication applications at real - time. When we take the MOS and the_ jitter in the consideration in the_VoIP the IPV6 gains the preferable performance. For all other operators, the gradual delay in performance on IPv4, which is impacting the QoS for the VoIP, is unwanted. With a very low rate of dropped traffic and poor experience of jitter, the IPv6 is appropriate for VoIP deployment. Then, the VoIP (v. 6) gives higher Quality than VoIP (v. 4).

The effect of delay for real time applications like VoIP makes the_earnest consideration for the result of delay related parameters is important. For the VoIPv4, the gradually increasing delay spotted for all parameters is a possible indicator of gradual performance drop and lower quality of experiment for users.

	MOS	**Jitter**	**IP Traffic Dropped**
VoIPv4	3.8 – 1.6 (Progressively Decreasing)	Progressively Increasing	Progressively Increasing
VoIPv6	3.8	Importantly	Very low

Table 2. Comparison of QoS parameters

	End-to-End Packet Delay	**Packet Delay Variation**
VoIP v4	Progressively Increasing	Progressively Increasing
VoIP v6	Very low	Very low

VI. CONCLUSION

The VoIP transitions from IPv4 to IPv6, as our conclusion has shown with a good reason, _that the VoIPv6 is more effective than VoIPv4. However, the status of the IP based on communication network extends to a far range of study.

The result of testing the competence of the VoIP doesn't carry other factors under consideration because that may affect the results. And thus, after time it will improve VOIPv4 and VOIPv6 techniques In each of the efficiency and performance and provides the opportunity for expanding studies. When a study is done in a simulated environment, the competence of the simulation tool may be a problem because the output is related to the competence of the simulation of the OPNET as known, and it saves the solidity and robustness of the results gained from the study.

The performance varies between VoIPv4 and VoIPv6 if some factors vary like signaling protocol, queuing mechanism and audio Codec. As a result, further study needs to address these variables and note that the values obtained from the parameters are based on standard values.

REFERENCES

[1] Bi, J., Wu, J. and Leng, X. IPv4/IPv6 Transition Technologies , International Journal of Computer and Science of Network Security, 2007. 7(1): p. 232-243. [2] Ali, A.N.A.
[2] Ali, A.N.A. 2-Ali, A.N.A., Comparison study between IPV4 & IPV6, International Journal of Computer Science , Sustainable
[3] Dutta, C. and Singh, IPv4 to IPv6 Transition. International Journal of Advanced Research in Computer Science and Software Engineering.
[4] Ali, K.M.I., Sandeep, B. and Ravi, T. Importance Reddy, P.V.P., International Journal of Scientific and Research Publications, 2012. 2 (12): p. 1-2.
[5] Dey, S and Shilpa, N., Issues ,International Journal of Computer Applications in Engineering Sciences
[6] Karim, A. VoIP Performance, Australian Journal of Basic and Applied Sciences
[7] Ayokunle, O.O. Integrating Voice over Internet Protocol (VoIP) Journal of Information and Communication Technology Research,
[8] M.S. Al-Ani, and Haddad, R.A.A., IPv4/IPv6 Transition. International Journal of Engineering Science and Technology, 2012. 4 (12): p. 4815-4822.
[9] Abusin, A.A., Alam, M.D.J. and Abdullah, J., Testing and Analysis of VoIPv6 , International Journal of Communications, Network and System Sciences
[10] Chen, W.,, Lin, Y. and Lo, Y. Wu, Misra, I.S., 2004. 5 (2): p. 147-154 Q.. Journal of Internet Technology, Design of SIP Application Level Gateway for IPv6 Translation.
[11] S.K. and Bhunia, Kundu, A.,Sanyal, S., VoIP Performance over Broadband Wireless Networks
[12] Falk, T.H. and Chan, W., Performance Study of Objective Speech Quality Measurement for Modern Wireless VoIP Communications. EURASIP Journal on Audio
[13] Sharma, A., Varshney, M., Singh, N.K. and Shekhar, J. , Performance Evaluation of VoIP: QoS Parameters. VSRD, International Journal of Computer Science & Information Technology