Quality of Service Analysis for VoIP over IPv4 and IPv6

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Abstract: Today Voice over IP (VoIP) is one of the fastest growing Internet application protocols. This paper presents a comparative approach to study the Quality of Service of VoIPv6 and VoIPv4 of IEEE 802.11, g using OPNET 14.5 Simulation tools. The parameters taken in this study are: end-to-end packet delay, packet delay variation, jitter, and throughput.

Keywords: IEEE 802.11 g, Quality of Service, VOIP, IPv4, IPv6, OPNET

1. Introduction

The new version of the Internet Protocol IPv6, is a solution designed to overcome the limitations of IPv4 (increasing of the devices, numerous internet service and applications) and fill the future needs in the Internet. IPv6 solving a major obstacle for the further growth of the Internet. This paper takes a comparative approach to study the Quality of Service of VoIPv6 and VoIPv4 Under a simulated environment. Quality of Service parameters are observed for VoIPv4 and VoIPv6 to establish the suitability and readiness of VoIP for IPv6 and the level at which VoIP be shows an impact from the transition [1].

The Internet constitutes one of dominating methods of communication in contemporary world [2]. Unfortunately, the Internet was not originally designed to transfer data in the real-time. This fact has a huge impact on the quality and efficiency of multimedia transmissions that dominate the Internet. In order to provide reliability of the VoIP [3], the Quality of Service is a critical issue, because real-time applications are very sensitive to delay [4].

2. Network Modeling

The network in this paper is infrastructure WLAN IEEE 802.11g Standard, where AP are connected using Ethernet links. The network has one AP, workstations, two routers, one server and three clients shown in figure1. The parameters are shown in following table.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical characteristic</td>
<td>802.11g</td>
</tr>
<tr>
<td>Data rate</td>
<td>54Mpbs</td>
</tr>
<tr>
<td>Number of scenarios</td>
<td>2 scenarios</td>
</tr>
<tr>
<td>Duration</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

3. Simulation and Test

The study is a simulation where OPNET 14.5 Simulation tools. Two network scenarios are developed with exactly same configuration and elements except for the IP address.

4. Results and Analysis

One of the scenarios has been configured with IPv4 and the other with IPv6. Fig. 1 shows the network topology used in the study.

Figure 1: Network Model using OPNET simulator

Figure 3: Packet Delay Variation
IPv6, The graph in (figure5) shows that IPv4 has the higher throughput compared to IPv6.

5. Conclusion

This paper presents Quality of Service of VoIPv6 and VoIPv4. Under a simulated environment Using OPNET 14.5 Simulation tools, the results are derived from statistics about certain Quality of Service related parameters that have been carefully selected. Governing factors that directly and significantly relate to the Quality of Service of VoIP networks are delay, jitter and throughput. We found IPv4 has the highest throughput and packet delay variation compared to IPv6, IPv6 has higher jitter and end-to-end packet delay than IPv4. Which indicates that IPv4 is better for heavy traffic and real time applications similar to VoIP which needs high bandwidth, performance, small delay and jitter.

References