Measuring the Performance of VoIP over Wireless LAN

Brief Description:

Tools Used: OPNET MODELER

The main feature of the paper is to compare the performance of VOIP over Wireless local area network. Considering the fact that, WLAN has become popular in our society, the usage has been immensely increased. Voice over internet protocol (VOIP) created a huge buzz and become so popular in the recent years. So, it has become essential to measure the performance of VOIP over Wireless networks. So here, we are comparing Voice over internet protocol in both Local area network (LAN) and Wireless LAN (WLAN) and the results are compared using a analyzer called OPNET modular.

The main features of VOIP is that it can save lot of time and energy especially in a corporate field. Now a days, small business groups are drastically using WLAN infrastructure and VOIP. For eg: Now a days, In corporate field ,the officials use video calls, voice calls to communicate with their clients and during peak hours(when servers are busy) they might not be able to speak or watch without any disturbance,, that time the quality of service (QOS) will a big question mark. So, the possibilities of threats and traffic will be more especially in a business arena. To overcome and identify the possible issues we need to measure the performance of VOIP over Wireless LAN. If we implement real time traffic such as VOIP in Wireless LAN it demands for a dependable Quality of service (QOS).

Here, the concept VOIP over WLAN is projected using Frame relay and it is compared against VOIP using Wired LAN. By doing this we can come to one conclusion and also explore the threats and issues when using VOIP using wired LAN. This will also help us to enhance VOIP over WLAN. The 802.11e (Enhancement of quality of service in WLAN) enhances the DCF (distributed coordination function) and the PCF (point coordination function), through a new combination function: the hybrid coordination function (HCF). Within the HCF, there are two methods of channel access, HCF Controlled Channel Access (HCCA) and Enhanced Distributed
Channel Access (EDCA). Both EDCA and HCCA define Traffic Categories (TC). For example, emails could be assigned to a low priority class, and Voice over Wireless LAN could be assigned to a high priority class, by doing this we can send or receive the data without much delay. “The QoS guarantee of HCF is based on negotiation of service level agreement between Access point (AP) and wireless nodes.

As early mentioned, the performance of VOIP over WLAN is analyzed using a modeler called OPNET. The quality over WLAN is determined by, measuring the packet loss, delays and throughput. During the simulation there are certain parameters which should be used such as voice payload size, packet per seconds, packet duration. Packet loss is the main reason for degradation in the voice quality. Apart from this various performance metrics are measured in different scenarios like Frame relay, Jitter, Wireless LAN.

The performance are measured in two different scenarios to show which is the best method. First, the “Base line” method in a Wired network, where there is no Quality of Service implemented. Next method QoS (Quality of service) implemented in a Wireless Network and compared the two scenarios to measure the traffic in peak time and down time. The topology used in two scenarios is Star Topology. The model is designated with a random name and the traffic is passed over both the networks and the result is captures in OPNET Modeler. To enable QoS the first thing to be done is to configure the access point (AP). When the voice traffic is more on a particular network we can specify the maximum Contention window (CW), by doing this we can prioritize the voice access, by default the CW rate is set as 15. Different scenarios are compared by using appropriate parameters and results are shown using diagrams, this makes us much more easier to understand between VOIP over WLAN and Wired LAN. First, using frame relay in a WLAN environment the traffic is measure and also replacing frame relay with Point to Point (PPP) connection using a T1 cable in a QoS scenario the traffic is measured.
My View on this Paper:

In recent years the use of VOIP over Wireless LAN immensely increased and this makes the users difficult to talk or videos without any interruption because of huge traffic generated over WLAN. The author is practical and tested different protocols in different scenarios to know which suitable protocol is best inside WLAN.

When we compare the simulation analysis of PPP (point to point) and Frame relay, the PPP has an edge over frame relay but the only factor which makes PPP less effective is the cost and the speed of connection. Today people are much worried on speed and cost, in that case the frame relay is much better than PPP. Personally I am convinced using PPP in Quality of service the average voice jitter is very less to be precise less than .0001 sec.