The Performance Evaluation of Voip for a Mobile User

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ABSTRACT

Broadband Wireless Access (BWA) technology has developed rapidly and it has dominated the advancement of technology especially in wireless networks. This paper studies the performance evaluation of VoIP for a mobile user and how the QoS parameters vary for different speeds. The purpose of the study is to examine the effect of mobility of a user on the performance of VoIP. In the meanwhile, it is evaluating the simulation and emulation method for its validity to be used for any new upcoming technology. However, the results of the simulation need to be verified and assessed by emulation tested results, hoping that both results match closely with each other.

Keywords — WiMax, IEEE802.16, evaluation VoIP

1   Introduction

In one aspect, WiMAX is a new technology which leads re-searchers to do more research in order to cover most facilities provided by this technology. It is originated from IEEE 802.16 family. WiMAX has been developed based on IEEE 802.16e standard, which in particular has been found to overcome operability of microwave access for mobile users, provided setting up Quality of Services parameters probably for different data traffics [1] . In addition, WiMAX is considered to be a reliable technology because it is a connection oriented system. On the other hand, VoIP cost is low com-paring to the classical telephony racks which in turn can be a better alternative of the old one. However, this technology needs to be examined in order to be deployed. Two modes of operations are used for this technology which is Point to Multi Point (PMP) and Mesh Mode. This paper investigated is focusing on PMP and in this mode the transmission be-tween the Multiple Subscriber Stations (MSS) is arranged by Base Station (BS) [2]. Two way communications is be-tween different uplink MSS to BS and downlink BS to MSS. Subscribe Station and MSS were replaced regularly for each instance of the test. The application used to carry a real time voice data over the internet is VoIP which has a sever delay and needs extra attention to its priority transmission. There-fore a set of QoS parameters such as jitter, delay and mean opinion score MOS are needed in order to achieve transfer-ring the voice between the sender and receiver in a broad-band wireless access network (BWA). The method used is simulation and emulation in EXata 2.0.1 [3].

BWA technology has developed rapidly and it has dominated the advancement of technology especially in wire-less networks. The next generation technology that fulfills the demand of enhancing quality of services requirements is WiMAX Worldwide Interoperability for Microwave Access [4] . The challenging part in this research is how to make use of the bandwidth and meet the requirements of Quality of

Services in BWA. WiMAX is based on OFDM and OFDMA technology. Interestingly, it accepts various modulation and coding systems. Because the scheduling algorithm plays an important role for managing the resource and bandwidth distribution among the users so there is a need to specify the QoS requirements [5]. Therefore, it is necessary to value and assess the performance of any new systems with variable network parameters. It would help in designing a new system effectively and also help in developing new protocols and schedulers. As it has been noticed, the fact that related work in this area of research has mentioned it, this topic has been roamed in different research in which researchers have implemented several methods to enhance an efficient way to make use of the bandwidth and reduce the delay [6]. The MAP overhead reduction results in overall system VoIP capacity increase of 15 percent [7]. This resulted in using different methods that lead to the increase use of bandwidth. The proposed hybrid approach significantly increases down-link TCP throughput as well as uplink bandwidth efficiency. They used a different approach to make efficient use of the bandwidth [8]. Other research focused on reducing the problem of packet delay over which media WiMAX mesh mode is used. It was designed QoS classifier to make the packets to reorganise based on different classes of QoS, introduce a dynamic hold off advocate technique to decrease governor sub-frame delay, and suggest a NBMA tool to decrease data sub-frame delay [9]. On the other hand, it seems that they have not extended the research in which the obtained results were experienced.

2   Methodology

The method used in this paper is based on simulation and emulation studies. In mobile WiMAX a user is defined as a mobile and the condition of a channel is varying. Basically, [10], observation is the performance of different application for different speed. The simulation carried out in the first two scenarios whereas emulation carried out in the last purely real-time scenario where both ways have used EXata 2.0.1 as the platform. [11] Reported that deductive research moves from general to specific. Hence, it tends to involve an experimental research which in turn it associated with quantitative research. This paper is implemented three scenarios, all of the three scenarios have fixed time for five minutes and EXata 2.0.1 is used as the platform for both the simulation and emulation. However, the parameters and tools are varying in the three scenarios. For example, in the first scenario, the author has used three SSs, a single BS and an Mss and the performance has been evaluated by choosing the codecs G711, G723.1 (5.3kbps) and G729. In general, this document has described the method used in the research broadly, which can be helpful for other researchers to take over a further research where most instances in this method have been covered. As it has been mentioned earlier about different methods used in the same area, there have been different approaches that used the same concepts. This technology is a cutting edge technology, so there is still a long time to cover most areas in this technology or at least improving the outcome which may help to make life much easier for new researchers.

3   Research process and outcome

The outcome was clearly encouraging where the graphs have shown the expected results that are mentioned in the beginning. For example, in the first scenario which is observed that G711has more in and out data because of the high bandwidth consumption and the codec G723.1 has the best MOS value whereas in the second scenario the plotted figures show that codec G723.1 experienced the least delay. Unlike the last scenario which introduces emulation tested for a WiMAX using NetMeeting utility and it is entirely real time voice over an IP traffic captured using Wire shark analyzer tool which is possible in EXata

using the gateway inter-net configuration. With the help of the graphs, it is clearly noticed that codec G723.1 performs well under the scenario which was interesting experience for this paper at the emulation time. With the help of the tools supported by the graphs, it can be noticed that the answers for the author's questions are found. On top of that the expected results have been verified. It is admittedly that the researchers have stunned by the way that the research has been conducted and looking forward to doing something similar to this research. It is noticed that the author's paper has not mentioned ethical issues; however, the conducted research has a density of quality which indicate a footprint of ethical concerns.

4   Conclusion

To sum up, apart from the technical results that have been retrieved in the previous section, the methods used in this paper research which are the concern of the paper's author both simulation and emulation have proved their validity to be used in upcoming new network technology.

REFERENCES

[1]   Haider H,T,(2010) ,Wireless Communication using WiMAX technology, Journal of Engineering and Development,14(3), pp 142-161

[2]   Al-bzoor, Manal and Elleithy ,Khaled , (2011),wimax basics from phy layer to scheduling and multicasting approaches, International Journal of Computer Science and Engineering Survey (IJCSES) , 2(1), pp 1-17

[3]   Kulkarni, Sandhya, Thontadharya, H and Devaraju, J , (2011) ,Performance Evaluation of VoIP in Mobile WiMAX; Simulation and Emulation Study, International Journal on Computer Science and Engineering (IJCSE), 3 (3), pp 1124-1130

[4]   Singh, Gurjeet , ,(2015),Performance Analysis of Quality of Service Stability Methods in WiMax Networks, international Journal of Advanced Engineering Research and Applications ,1(8) ,pp 337- 344

[5]   Ko ,Hyeonmok , Oh, Seungyoul , Kim, Bongsu and Kim, Cheeha , , (2009), Simple bit allocation algorithms with BER-constraint for OFDM-based systems, IEEE conference on Wireless Communications and Networking Conference, IEEE Press Piscataway, Pages 1074-1078

[6]   Malik, Aqsa and Qadir, Junaid and Ahmad, Basharat and Yau, Alvin Kok-Lim and Ullah, Ubaid, (2015),QoS in IEEE 802.11-based wireless net-works: A contemporary review, Journal of Network and Computer Applications, 55. pp. 24-46

[7]   Fong M , Novak, R, Mcbeath , S and Srinivasan ,R, ,(2008),Improved VoIP Capacity in Mobile WiMAX Systems Using Persistent Resource Allocation, IEEE Communication Magazine, 46 (10), 50-57

[8]   Park, Eun-Chan and Kim, Hwangnam, ,(2010),TCP-aware bidirectional bandwidth allocation in IEEE 802.16 networks Wireless Networks, springer, 16(8), Page 21-23

[9]   Lin, Wei-Ching and Jang, Hung-Chin, ,(2010),Effective Bandwidth Allocation for WiMAX Mesh Network, International Institute of Informatics and Cybernetics, IIIC, 8 (2), pp 36-40

[10]   Frigyes Istvn, Bito ,Janos and Bakki ,Pter , ,(2008),Advances in Mobile and Wireless Communications: Views of the 16th IST Mobile and Wire-less Communication Summit, Germany , spring

[11]   Kanire , George, (2012)Social Science Research Methodology: Concepts, Methods and Computer Applications, USA, Grin,