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Video Streaming over IEEE 802.11e

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Abstract: ***Now a days all are mainly focusing on video and audio based applications. At medium access layer the video has to be served in a very effective way since video transmission is critical in the mac layer. The Quality of service (QoS) aimed IEEE 802.11e follows FIFO mechanism for different frames (I/P/B) of video. This degrades the performance of video for the applications like video streaming etc. The queuing mechanism should not be FIFO to support the QoS requirements for the video. This paper aims for a video type awarded mechanism to map the packets to the queues in IEEE 802.11e. This mapping mechanism is aimed to improve the QoS for video.***

Keywords: IEEE802.11e protocol, QoS, Queue mapping, Video Conferencing.

1. Introduction

In today's world video usage increasing exponentially. The QoS should be provided to video application users. The Medium Access Control (MAC) protocol in wireless network has a main role to enable the successful operation of the network. One main task of the MAC protocol is to avoid collisions so that two nodes cannot transmit at the same time. The MAC protocol allows stations to access the channel to interact with other stations. The MAC sub layer transfer address and channel to access control mechanisms that make it possible for many stations within a multiple access network that integrate a shared medium.

The standard 802.11 is aimed to access the channel by avoiding collisions but this standard doesn't give any importance to any specific traffic. This treats every traffic has same priority. Time sensitive applications like video streaming ,video conferencing are not been served well by 802.11.In order to give some preferable services to any traffic the 802.11e is proposed.802.11e uses four queues like VO (voice),VI (video),BE (best effort),BK (background).802.11e serves video in FIFO manner that is not enough to improve the Qos for video. There are I/P/B frames in video; these frames should be managed in a well organized way. 802.11e use two functions, they are EDCF and HCCF. In this paper HCCF is not addressed. Whereas the EDCF's appearance was slightly better for all types of services taken simultaneously and with the increasing of wireless services, users of wireless networks are now expecting more quality of service and better performance comparable to what is available from fixed networks. The MAC protocol should provide an efficient use of the available bandwidth while satisfying the QoS requirements of both data and real-time applications. To provide QoS for such kind of application, service variation is must between proposed and existing system. In this paper a method to improve the quality of service for video is proposed. This paper is organized as follows: Section II describes the related works about video streaming. In section III analyses the performance of proposed work regarding about 802.11 and the 802.11e EDCF in supporting Real-time and in section IV describes about the result and finally section V concludes the paper.

2. Related work

L.Fratta [1] proposed the medium access control (MAC) layer and the physical (PHY) layer of 802.11 [1] are designed for best effort data transmissions, the original 802.11 standard does not take QoS into account. Hence to provide QoS support IEEE 802.11 standard group has specified a new IEEE 802.11e standard.

J.M.Lopez-Vega [2] EDCF protocol that promise to provide the QoS. The 802.11 MAC works with a single first-in-first-out (FIFO) transmission queue but it is not enough to work so we used new mechanism and MAC based on a local assessment of the channel status, i.e. whether the channel is busy or idle.

G.Bianchi [3]Media Access Control (MAC) protocol in wireless networks controls and manages the access and packet transmission through the shared channel in a distributed manner, with minimum possible overhead involved.

Liljana Gavrilovska [4] proposed In order to evaluate feedback based quality of service (QoS) scheduling in IEEE 802.11e WLANs; an analytical model is presented in this paper to calculate the rate of packet losses as a consequence of violation of their delay limits.

J. Sanchez-Monedero[5] proposed a Real-time service such as streaming voice and video require a certain quality of service such as low packet loss and low delay to perform well.

3. Proposed System

In video there are different frames I/P/B.I frame, followed by a number of P and B frames it is intra code frame. P frames are single directional predicated based on prior I or P frames and B frames are bidirectional predicted frames based on appearance and positions it require less data than p frames.

In proposed method the frames are mapped to different queues and represented in figure 1 as follows,

- I frame is mapped to Voice(Queue 1)
- P frame is mapped to Video(Queue 2)
- B frame is mapped to BE (Queue 3).

Evaluation of queue length and P frames:

1) To improve the QoSfor video, queue length should be smalland good enough .Otherwise it leads to packet drops. So the queue length is set to maximum 50.
2) The approximate time is calculated based on the flow of bits per second to find the queue length of I frames.
3) The Threshold is 50 for video queue length.
4) If queue length is greater than are equal to maximum threshold then map I frame to Queue 1.
5) Let P frames be in Queue2 and map B frames to Queue 3.
6) If Queue Length is greater than threshold then map I frame to Queue1.

Let transmit P and B frames in queue Q2.The above mechanism is shown in figure 1.

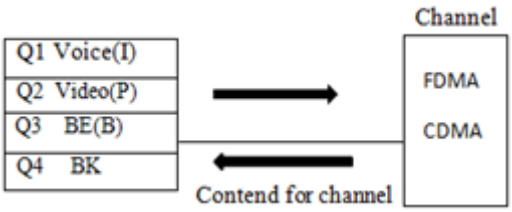

Figure 1: Working procedure of EDCF

TCL script it is tool command languagescript is used to create wireless network environment with five nodes. All nodes are moving randomly. The MAC protocol is set 802.11e. The remaining layers set to default protocols. All nodes can generate video data. In NS2, Evalvid tool is integrated for video streaming transmission. The output is generated as trace file.

4. Results

Throughput

Throughput is a measure of how many units of information a system can process in a given amount of time.It is applied broadly to systems ranging from various aspects of computer and networks systems to organizations.

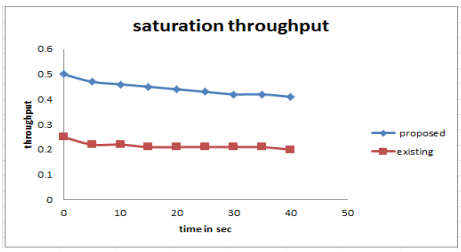

Figure 2: Saturation throughput of proposed system

In Figure 2, shows Throughput of video for proposed and existing methods. Throughput for Access category means that throughput for applications and Video conferencing. Proposed method provides maximum throughput for video by mapping them to other queues.

Delay

The sum of time taken to transfer the data through the network and delay is an important to performance of a telecommunications network. The delay of a network specifies how long it takes time per second for a bit of data to travel across the network from one node to another node. It is measured in multiple fractions of seconds.In Figure 3, some other source shows Media Access Delay for video is less among all Access categories. Delay for video which is round about seconds less than AC. It means that the medium is assigned to the application according to the priority. The mapping mechanism provides lower delays for video applications. This is shown in figure 3.

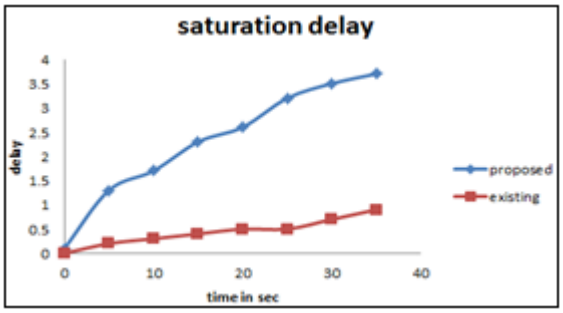

Figure 3: Saturation delay for proposed system.

An interesting observation is that both throughput and delay remain constant for traffic BE and BK. This delay is caused from the lower priority when compared to other traffic.

5. Conclusion

In this paper we have mainly concentrated on a performance of video, by using IEEE 802.11e with FIFO mechanism for different frames (I/P/B). This treatment degrades the performance of video for the applications like video streaming, video conferencing etc., the queuing mechanism should not be FIFO in order to support QoS for the video. In this project video type awarded mechanism is to map the packets to the queues in IEEE 802.11e. The result shows that the better performance is noticed.

References

[1] L. Fratta, and M. Oliveti, "Performance evaluation and enhancement of the CSMA/CA MAC protocol for 802.11 WirelessLANs," Proc. PIMRC 1996, Taipei, Taiwen 1996, pp. 392-396.
[2] J. M. Lopez-Vega, J. Povedano-Molina, and J. M. Lopez-Soler, "QoS policies for audio/video distribution over DDS middleware," in Proceedings of the Real-time and Embedded Systems Workshop, 2008.
[3] G. Bianchi, IEEE 802.1d-1998, Part 3: Media Access Control (MAC) bridges, ANSI/IEEE Std.802.1D, 1998 edition, 1998.
[4] LiljanaGavrilovska, Ramjee Prasad, "Ad hoc networking towards seamless scommunications", Published by Springer, 2006. M. Barry, A. T. Campell, and A. Veres, "Distributed Control Algorithms for Service.
[5] J. Sanchez-Monedero, Differentiation in Wireless Packet Networks," Proc. IEEE INFOCOM 2001.IEEE 802.11e/D11.0, Draft Supplement to Part 11: Wireless

Medium Access Control(MAC) and physical layer (PHY) specifications: Medium Access Control (MAC) Enhancements for Quality of Service (QoS), October 2004.

[6] J. Weinmiller, H. Woesner, and A. Wolisz, "Analyzing and Improving the IEEE 802.11-MAC Protocol for Wireless LANs," *Proc. MASCOTS '96*, SanJose, CA, Feb. 1996, pp. 200–6.

[7] J. Shin, J. G. Kim, J. Kim, and C.-C. J. Kuo, "Dynamic QoS mapping control for streaming video in relative service differentiation networks," *Eur. Trans. Telecommun.*, vol. 12, no. 3, pp. 217–230 May/Jun. 2001.

[8] D.Wu and R. Negi, "Effective capacity-based quality of service measuresfor wireless networks," *ACM Mob. Netw. Appl.*, vol. 11, no. 1, pp. 91–99, Feb. 2006.

[9] B. Girod, M. Kalman, Y. Liang, and R. Zhang, "Advances in channeladaptivevideo streaming," *Wirel. Commun. Mob. Comput.*,vol. 2, no. 6,pp. 5–552, Sep. 2002

[10] S. Vasundra, Professor, Department of CSE, JNTUACEA, Published a paper**on** Performance enhancement to WCMDA Multimedia Network using MAC Protocol, pp:71-78, Oct – dec2006, vol.1 no.2.