

Aphirak Jansang 2012: IEEE 802.11e Wireless LANs Enhancement for Supporting Variable Bit Rate Transmission. Doctor of Engineering (Computer Engineering), Major Field: Computer Engineering, Department of Computer Engineering. Thesis Advisor: Associate Professor Anan Phonphoem, Ph.D. 112 pages.

Wireless LAN has been currently improved to maintain quality of service. However, the variation of VBR (Variable Bit Rate) transmission is still not properly supported. In this research, the mechanism for enhancing a VBR transmission over IEEE 802.11e HCCA has been proposed. The mechanism composes of two parts: 1) developing an analytical model for expected frame waiting time evaluation 2) designing a TXOP adjustment mechanism to support the variation of VBR traffic.

The proposed analytical model based on IEEE 802.11e HCCA standard transmission mechanism, targets for studying the effect on expected frame waiting time when applying different accepted mean data rates. The results confirm that by accepting each session with requested mean data rate of the standard admission control process cannot guarantee the bounded delay of frame waiting time. Moreover, the model can be applied for suggesting a suitable accepted data rate for VBR session in admission control process.

To support the data rate fluctuation of VBR session during the transmission period, the adaptive TXOP adjustment mechanism based on a finite state machine and feedback queue size has been proposed. The mechanism aims for quick serving for burst arrival packets and also minimizing the packet delay. The mechanism is verified on ns2 by using Evalvid toolset for received video quality evaluation with three video categories. The results reveal that the mechanism can vigorously support for rapid movement category and sufficiently support for other video categories.

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Student's signature

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Thesis Advisor's signature