On the Performance Enhancement of Wireless LAN — A

A. IEEE 802.11/.11e

In 1997 IEEE adopted Std. 802.11-1997, the first WLAN standard. This standard defines the MAC and *physical*

the BSS, thus instead of relying on self-view (for example, back-off algorithm) of the network, all STAs should trust the PC and use the information provided by the PC to conduct any action. Simple-poll frames reflect the PC's view of BSS about whether the channel is idle, while both back-off time [6] and time interval [2] decrement are based on STA's self view of the BSS, therefore, hidden terminal problems are eliminated. On the other hand, it reduces the overhead of 802.11e because piggyback polling is appropriate now since STAs know their position in polling list hence explicit polling is not necessary anymore.

A. Basic Idea

In this subsection the basic idea of hidden terminal fre 0 -11(F.96 T11.95 TD[(smultiolling)-349(is)-319(s)ummarize,)-369(and)-519(s)us
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Fig. 3. Flowchart for the proposed multipolling scheme

frame control field). The STA starts transmission when the simple-poll counter reaches zero. Since each STA has different SIV value and counter is decremented according to global information — the simple-poll sent by AP, hidden terminal problems are eliminated. On the other hand, AP is capable to detect the end of the transmission from a STA either through TXOP limit or the reception of QoS-Null frame transmitted by the STA. Thus AP sends Simple polling message/piggybacked with ACK addressed to the STA that just transmits the packet(s) given that frames are received without error. Otherwise, AP will send simple polling message addressed to the next STA in the polling list. When the poll list is empty, the AP sends out CF-End frame to terminate the CFP.

IV. Performance Comparison

In this section, the performance of proposed multi-poll scheme is compared with legacy 802.11e and the contention-based multipoll scheme from [6]. Only CFP is studied in this analysis, packet size is fixed while the number of STAs in the BSS and data rate are varied to compare the performance with legacy 802.11e under different configurations. Parameters used by the analysis are summarized in Table-II.

will collide at AP. STA3 is able to hear all the transmission