



COMPARATIVE ANALYSIS OF RETRANSMISSION IN SYNCHRONOUS AND ASYNCHRONOUS MEDIUM ACCESS CONTROL PROTOCOLS IN WIRELESS SENSOR NETWORKS

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ABSTRACT

Wireless sensor networks (WSNs) are application specific and energy constrained. So, for the fulfilment of the requirements of an application, an extended network lifetime is the major issue of concern. Duty cycled Medium Access Control (MAC) protocols are an approach to efficiently utilize constrained energy supplies as they put sensors to sleep periodically. Duty cycled MAC protocols can either be synchronous or asynchronous. Synchronous duty cycled MAC protocols use 'SYNC' packet to synchronize all the nodes within a network. This causes the nodes to sleep and wake at the same time. Asynchronous MAC protocols are classified with arbitrary offset to start their sleep-wake up cycle. This removes the overhead caused due to synchronization packet unlike synchronous duty cycled MAC protocols. Since, wireless sensor networks are application specific, certain applications as event based demand that the packets are received whenever an event occurs. However, this is not always possible because network cannot be 100% efficient as the packets may drop due to collision or network saturation. To overcome this inefficiency, data packets need to be retransmitted to ensure that complete information reaches the destination node. This paper presents a two dimensional Markov queuing model and proposes an algorithm to support retransmission in duty cycle MAC protocols with application to SMAC (synchronous MAC protocol) and XMAC (asynchronous MAC protocol). The paper discusses and comparatively analyses the effects of retransmission on synchronous and asynchronous MAC protocols for event driven applications in wireless sensor networks.

Key Words: *Wireless sensor networks, Retransmission, Synchronous MAC protocols, Asynchronous MAC protocols, SMAC, XMAC.*