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Survey on Latency Issues of Asynchronous MAC
Protocols in Delay-Sensitive Wireless Sensor
Networks

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SURVEY ON LATENCY ISSUES OF ASYNCHRONOUS MAC PROTOCOLS IN DELAY-SENSITIVE WIRELESS SENSOR NETWORKS

Résumé: Energy-efficiency is the main concern in most Wireless Sensor Network (WSN) applications. For this purpose, current WSN MAC (Medium Access Control) protocols use duty-cycling schemes, where they consciously switch a node's radio between active and sleep modes. However, a node needs to be aware of (or at least use some mechanism to meet) its neighbors' sleep/active schedules, since messages cannot be exchanged unless both the transmitter and the receiver are awake. Asynchronous duty-cycling schemes have the advantage over synchronous ones to eliminating the need of clock synchronization, and to be conceptually distributed and more dynamic. However, the communicating nodes are prone to spend more time waiting for the active period of each other, which inevitably influences the one-hop delay, and consequently the cumulative end-to-end delay. This paper reviews current asynchronous WSN MAC protocols. Its main contribution is to study these protocols from the delay efficiency perspective, and to investigate on their latency. The asynchronous protocols are divided into six categories: static wakeup preamble, adaptive wake-up preamble, collaborative schedule setting, collisions resolution, receiver-initiated, and anticipation based. Several state-of-the-art protocols are described following the proposed taxonomy, with comprehensive discussions and comparisons with respect to their latency..

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