UNIVERSITE DES SCIENCES ET DE LA TECHNOLOGIE HOUARI BOUMEDIENE (USTHB)

FACULTE D'ELECTRONIQUE ET D'INFORMATIQUE

DEPARTEMENT INFORMATIQUE

RÉSUMÉ DU MÉMOIRE

Présenté pour l'obtention du diplôme de :

MAGISTER

Filière : Informatique
Option : Informatique Mobile

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Sujet :

LES PROTOCOLES MAC POUR LES APPLICATIONS TEMPS-RÉEL DANS LES WSNs

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2012-2013

ABSTRACT

Recently, Wireless Sensor Networks (WSNs) grow to be one of the dominant technology trends; new needs are continuously emerging and demanding more complex constraints, such as the real time communication. The MAC layer plays a crucial role in these networks; it directly controls the communication module and manages the medium sharing. Real time MAC protocols should respect the constraints of WSNs, respond to the applications requirements, resolve the classical wireless problems, and ensure meeting all deadlines.

In this work, we describe the Real Time Hybrid MAC (RTH-MAC) protocol for WSNs. It combines the advantages of both TDMA and FDMA in order to offer a soft real time communication to a converge-cast WSN randomly deployed. It minimizes the required delay, since it schedules nodes communication in a central manner that eliminates collisions, minimizes interferences, maximizes parallel transmissions, and deals with topological updates. Moreover, it improves the end-to-end reliability by using a redundant free contention period, and it minimizes the effect of the traffic fluctuation problem on the network by offering the possibility of transmitting several samples and packets in the same super-frame.

Simulations have confirmed that RTH-MAC protocol outperforms the HyMAC protocol in term of the number of required time slots and channels. Moreover, experimentations have proved that it surpass HyMAC in term of reliability, congestion resistance, and the end-to-end latency.

SUMMURY