PERFORMANCE EVALUATION OF CLUSTER TREE TOPOLOGY BASED WIRELESS SENSOR NETWORKS

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ABSTRACT

Time-sensitive Wireless Sensor Network (WSN) applications require finite delay bounds in critical situations. WSN is the accepted technologies for emerging wireless communications standards. The activities in many wireless standardization bodies and forums, for example IEEE 802.15.4/ZigBee WSNs, attest to this fact. Evaluating the performance of sensor nodes in worst-case conditions (i.e. no sink) could make or mar the opportunities in these networks. It is essential to seek outstanding performance benchmarks to which various modeling schemes can be compared. Therefore, this paper provides a comprehensive cluster-tree WSNs with a mobile sink with Logical ZigBee tree topology in a way to ensure closed-form recurrent expressions for computing the worst-case end-to-end delays, buffering and bandwidth requirements in any network path in the cluster-tree assuming error free channel. In contrast, it has been observed that the performance of IEEE 802.15.4/ZigBee WSNs with its theoretical results in different sink node conditions. Out system results are accurate compared with its experimental results here we validate the theoretical results through experimentation.

KEYWORDS: Wireless Sensor Networks (WSNs), Worst Case Network Dimensioning, Network Calculus, IEEE 802.14.8/ ZigBee, Cluster Tree Topology