Reconfigurable Network Accelerator for Wireless Sensor Nodes

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***Abstract*—Power consumption is one of the most critical challenges in wireless sensor networks, as sensor nodes are powered by batteries in most situations. Wireless communication is the main source of power consumption in a sensor node. Many energy aware protocols and algorithms have been proposed in the past few years. The basic idea of these methods is to reduce the data that nodes exchange and the time that nodes work. These methods are mostly software based, so microcontrollers are responsible for performing them. However, they are not efficient enough to interact with the communication hardware. In this paper, a flexible network accelerator is proposed. It is hardware based and reconfigurable, so it can interact with the communication hardware more efficiently and reduce power consumption further. Three modes are designed for this network accelerator: Full Software Mode, Partial Acceleration Mode and Full Acceleration Mode. These modes are suitable for different application requirements. Design details are described for these modes. We prototype this network accelerator using a traditional mote and a CPLD board. Preliminary results show it is feasible and more than 90% energy consumption can be reduced.**

***Keyword*—Architecture, CPLD, Network Accelerator, Reconfigurable, Wireless Sensor Node**

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