

## **Exploiting Platform Heterogeneity in Wireless Sensor Networks by Shifting Resource-Intensive Tasks to Dedicated Processing Nodes**

Reference:

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Abstract:

Platform heterogeneity in wireless sensor networks is often seen as a major challenge for application development. Once embedded systems with different processor architectures, computational power, and memory are part of the same network, algorithms and applications must be adapted to this additional degree of complexity. As a result, current sensor network deployments are (with exception of the sink node) commonly comprised of devices of identical make and model. In this paper, we show how device heterogeneity may be exploited to improve the energy efficiency of the sensor network by shifting resource-intensive processing tasks to other nodes within the network. To this end, we analyze the energy demand for representative processing operations and wireless communications on six heterogeneous state-of-the-art sensor platform types. Based on the created models, we assess the achievable energy savings when tasks are shifted to more powerful processing nodes. Our results show that platform heterogeneity, although often being perceived as a hindrance to the easy deployment of applications, also serves as an enabler for increased energy efficiency of the network.