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### **Title**

Privacy-Aware Collaboration Among Untrusted Resource Constrained Devices

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Computer Science

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## Abstract

Individuals are increasingly encouraged to share private information with service providers. Privacy is relaxed to increase the utility of the data for the provider. This dissertation offers an alternative approach in which raw data stay with individuals and only coarse aggregates are sent to analysts. A challenge is the reliance on constrained devices for data collection. This dissertation demonstrates the practicality of this approach by designing and implementing privacy-aware systems that collect information using low-cost or ultra-low-power microcontrollers. Smart meters can generate certified readings suitable for use in a privacy-preserving system every 10 s using a Texas Instruments MSP430 microcontroller. CRFIDs-batteryless devices that operate on harvested energy from RF-can generate encrypted sub-aggregates in 17 s to contribute to a privacy-preserving aggregation system that does not rely on a trusted aggregator. A secure communication channel for CRFID tags via untrusted relays achieves a throughput of 18 Kbps.

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