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Network Architectures and Services
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Establishment of bidirectional Communication in Wireless Sensor Networks

Motivation

The application range of wireless sensor networks rises together with the corresponding challenges (e.g. collection frequency, transmission limits). Depending on the application scenario the design of the network can vary concerning size, settings, and used hardware.

Sometimes it is useful to update values in the system during run time. Assuming a fire scenario it is essential to update the existing collection intervals perhaps from once a hour to every minute. The currently established network at our department works with an efficient data transmission protocol called TinyIPFIX but a bidirectional communication was not yet implemented. The only bidirectional communication is possible with aggregator nodes within the system in order to update the aggregation functionality. As described in the fire example this connection won't help. Thus we need a good bidirectional communication solution which allows basic functional updates of system components within a running system.

Your task …

…will be the evaluation of existing bidirectional communication solutions in wireless sensor networks following by an analysis of requirements for constraint hardware working under TinyOS 2.1.1. The implemented bidirectional communication solution should allow the following updates of the running system:

- Update of individual sensor nodes
- Update of all network components at the same time (e.g. multicast)
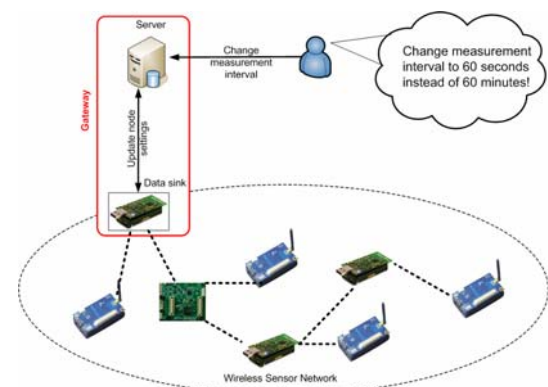
Afterwards the implementation is evaluated and integrated into the existing system including the graphical user interface.

Regulated by thesis type the complexity will be attached!

Requirements

- Knowledge of nesC and TinyOS a plus
- Integration into an existing implementation
- Knowledge of communication solutions a plus

Keywords

Wireless Sensor Networks, Standardization, Communication Solutions

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