

Benchmarking MAC protocols for WSNs and IoT

Introduction:

We are working on MAC (medium access control) protocols for WSNs (wireless sensor networks) and research how to make them more reliable, timely and energy-efficient etc. So far, most of our protocols have only been simulated using OMNeT++, however, we plan to implement them on real hardware. To this end, we have purchased 26 TelosB nodes equipped with an MSP430 microcontroller and a CC2420 wireless transceiver. The tasks of this thesis are to implement our protocols together with a test bench to evaluate these and compare them to other state-of-the-art approaches such as CSMA and TDMA.

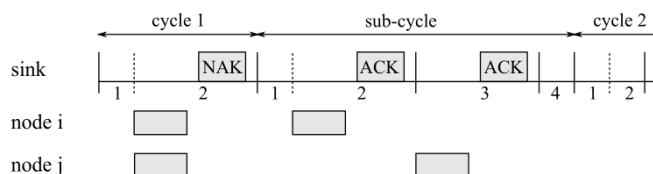


Fig: Exemplary communication cycle in s2TDMA [1] (left)
TelosB node (right)



Content:

- Develop a test bench that allows evaluating different wireless MAC protocols
- Implement our MAC protocols (particularly [1] and [2])
- Perform different experiments on hardware and generate results similar to the ones described in [1]
- Programming language will be in C within the Cooja IDE, nodes will run the operating system Contiki OS

Requirements:

- Good programming skills in C/C++
- Basic knowledge in wireless communications and embedded programming
- self-reliance, ability to work in a team

Contact:

If you are interested, please send a CV and a transcript of grades to: philip.parsch@cs.tu-chemnitz.de



References:

- [1] P. Parsch and A. Masrur. *“A Slot Sharing TDMA Scheme for Reliable and Efficient Collision Resolution in WSNs.”* In Proceedings of the ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM), 2016.
- [2] P. Parsch and A. Masrur. *„A Reliable MAC for Delay-Bounded and Energy-Efficient WSNs.”* In Proceedings of the 23rd IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA), 2017