

Co-Existence Between BLE and IEEE 802.15.4 Networks

Master Thesis project at RISE SICS Kista.

Description of the units

The Networked Embedded Systems (NES) group at RISE SICS is a part of the Computer Systems Laboratory. The current research focus is on the Internet of Things. Among the group's key technologies are the Contiki operating system, uIP stack, ContikiRPL, SICSLoWPAN, SICS th Sense, and lightweight implementation of IPsec and DTLS. The NES group conduct projects together with industry and academic partners from Sweden and across the world.

Thesis description

IoT networks involve multiple low-power wireless technologies, designed independently but often sharing the 2.4 GHz spectrum. As more devices are deployed, networks see their performance degrade due to interference. In this thesis, you focus on three wireless technologies: IEEE 802.15.4 NBE, IEEE 802.15.4 TSCH, and Bluetooth Low Energy (BLE). The first goal in this thesis is to gain understanding of how the different technologies interfere, e.g. in terms of performance degradation and fairness. The second goal is to devise mitigation strategies such as channel blacklisting or cross-technology synchronization.

You will be required to:

- Study the state-of-the art in low-power wireless co-existence, identify evaluation methods and metrics
- Design an evaluation methodology suited to the thesis context
- Measure experimental performance and fairness properties (implementation of the technologies is provided)
- Propose new mitigation strategies, implement and evaluate them
- Document the results as a thesis document

Competence

We are looking for a good student with good embedded

programming skills, and with interest in IoT, who have fulfilled the course requirements. Good skills in spoken and written English are required.

Applications should include a brief personal letter, CV, and recent grades. In your application, make sure to give examples of previous programming or other projects that you consider relevant for the position. Candidates are encouraged to send in their application as soon as possible. Suitable applicants will be interviewed as applications are received.

Start time: As soon as possible

Where: RISE SICS Kista, Stockholm

Contact person

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