Thesis Title: **Concurrent Internet of Things Protocol Stacks**

**Description of the Units**

ASSA ABLOY is the global leader in door opening solutions, dedicated to satisfying end-user needs for security, safety and convenience. ASSA ABLOY has 2 years in a row been listed by Fortune Magazine as one of the world’s 100 most innovative companies. Shared Technologies is the Group's shared global innovation organization. We currently consist of around 190 employees. You will be working in the Pre-Product Innovation (PPI) division of ASSA ABLOY Shared Tech. Here we apply different wireless technologies (Z-Wave, WiFi, proprietary 802.15.4, ZigBee, etc.) to new products aimed for large-scale deployments in real buildings.

The Networked Embedded Systems (NES) group is a part of the RISE SICS unit at RISE Research Institutes of Sweden. The current research focus is on the Internet of Things. Among the group’s key technologies are the Contiki and Contiki-NG operating systems, low-power IPv6 stacks and a plethora of software for resource-constrained IoT devices. The NES group conduct projects together with industrial, academic, and governmental partners from Sweden and across the world.

**Thesis Description**

The student will work towards the ambitious goal of running two concurrent protocol stacks on a single low power radio chip. We aim at building novel IoT applications that are both ultra low power and user-friendly, by combining low-power mesh sensor networks and Bluetooth. The first part of the project involves porting the open-source, low-power Contiki IPv6 stack to Silicon Labs’ Mighty Gecko System-on-chip. The second part involves developing a firmware solution that dynamically switches between the ported Contiki stack and the Bluetooth Low Energy stack supplied by the vendor, leveraging the radio access interface layer (RAIL) API and time-slicing radio scheduler. We will apply workloads characteristic of a real-world use case, e.g., a digital lock authenticated with owner credentials over BLE and collecting data from a wireless mesh of sensors. Measurement of protocol performance, network stability along with memory size and power consumption will reveal key trade-offs and evaluate the feasibility of this type of dynamic protocol switching solutions.

**Competence**

We are looking for a good student that has experience in C programming, and an interest in the IoT. The student must have fulfilled the course requirements to start the Master’s thesis project. Good skills in spoken and written English are required.

**Application**

Applications should include a brief cover letter, CV, and grade transcript. Please provide examples of software that you have written as well. Suitable applicants will be interviewed as applications are received.

**Start Time** As soon as possible

**Location** RISE SICS in Kista and Assa Abloy Shared Technologies in Liljeholmen, Sweden.

**Contact**

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