Thesis Title: On-the-fly upgrade of network stacks in resource constrained devices

Description of the Unit
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, 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
Deployed sensor nodes and other embedded IoT devices are expected to run for years in the field often where they can not easily be accessed. Over-the-air updates are commonly used to address software issues and introduce new features during the product lifetime but sometimes it is necessary to do larger software updates and even changing the entire network stack while still being backward compatible with old devices. With potentially thousands of devices deployed in the field, backward compatibility is very important and devices can even be in inventory for years before activated at which time they are expected to join the IoT network. We are investigating how to efficiently upgrade networking stacks on the fly using over-the-air updates with devices with too few resources to fit multiple network stacks, and will evaluate the cost of being backward compatible (program size, bytes over radio, etc). The devices are running the Contiki-NG operating system, which is developed partly by RISE, and used world wide in academia and industry. Experiments will be performed in a local testbed at RISE.

Competence
We expect the student to have very good embedded programming skills in C and a strong interest in working with real hardware platforms.

Application
Applications should include a brief personal letter, CV, and recent grades. 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
Location      RISE SICS Kista, Stockholm

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