Thesis Title: *Orchestration of Virtualized Internet of Things Baseband Functions*

**Description of the Units**

This project will be hosted in Ericsson Research and co-supervised by Ericsson Research and RISE SICS. The group in Ericsson Research is specialized in radio processing, RAN design and architecture. The group in RISE SICS focuses on research on the Internet of Things.

**Thesis Description**

Radio Access Network (RAN) virtualization is a concept that focuses on moving telecommunication functions from hardware to software in order to decrease cost and improve scalability of the network. The low data rates and relatively low latency requirements of IoT communication stacks makes the RAN approach suitable for virtualizing and cloudifying low-layer functionality such as the baseband; Something that is difficult to realize for high performance telecommunication standards such as 5G.

Currently, an SDR (Software-Defined Radio) based testbed has been built. We have IEEE 802.15.4 and partly NB-IoT baseband functions implemented with container-based virtualization. One next step is to add orchestration features into the testbed to manage and automate virtualized IoT functions, e.g. initiation, termination, scaling, migration and load balancing. The announced thesis will build on this testbed and focus on virtualization of the IoT functions using Docker. It should run K8s (Kubernetes) to orchestrate the Docker containers and appropriate orchestration use cases should be proposed and implemented.

You will be required to:

- Study the state-of-the-art of IoT virtualization and orchestration
- Understand, run and improve an SDR-based virtualized implementation of NB-IoT and IEEE 802.15.4
- Install and configure K8s and integrate Docker images of IoT functions
- Propose, implement and evaluate relevant orchestration use cases with NB-IoT and 802.15.4 running in K8s
- Evaluate implemented use cases
- Provide implementation and usage documentation
- Document the results as a thesis document

**Competence**

We are looking for a student with good programming skills and understanding of telecommunications. Experience with virtualization (especially Docker), orchestration, RESTful APIs, and IoT is a great merit. Good skills in spoken and written English is a must.

**Application**

Applications should include a brief personal letter, CV, and recent grades (transcripts). Relevant experience is highly valued so please list projects and programming tasks that are 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** January 2019 (earlier is also possible)

**Location** Ericsson Research, Kista, Stockholm

**Contact**

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