



## Bachelor Thesis

# Porting IEEE 802.15.4 Model from INET Framework to MiXiM Framework

### **Description:**

IEEE 802.15.4 is a standard which specifies the physical layer and medium access control for low-rate wireless personal area networks (LR-WPANs). It is the basis for various wireless sensor protocols. It offers 2 modes of operation; beaconless and beacon-enabled. The beaconless mode employs unslotted CSMA-CA for medium access, while the beacon-enabled mode uses beacons for synchronization among nodes and a superframe structure that allows for contention-based access and time-slot reservation for critical data.

In order to measure the performance of 802.15.4, it can be modeled and simulated by simulators such as OMNeT++. Two frameworks, i.e., INET and MiXiM can be used in conjunction with OMNeT++ in providing the skeleton for the implementation of various protocols. Generally, INET framework caters mainly for implementations involving the IP networks and the MiXiM framework focuses on wireless and mobile networks.

Currently, a working beacon-enabled 802.15.4 model is only available for use in OMNeT++ 3.x simulator and is supported by the INET framework. On the other hand, MiXiM framework only includes the 802.15.4 beaconless mode. As the beacon-enabled mode is more widely-utilized, the availability of the beacon-enabled mode in OMNeT++ 4.1 and with the MiXiM framework is highly needed.

### **Task:**

As part of the bachelor thesis, the student is required to understand 802.15.4 standard, especially the beacon-enabled mode, and familiarize him/herself with the OMNeT++ simulator, and subsequently understand the INET and the MiXiM frameworks. Following that, the student is required to port the 802.15.4 model from the INET framework to fit the MiXiM framework.

### **Requirements:**

Programming experience in C++. Familiarity with simulations would be very useful.

### **Contacts:**

Noorsalwati Nordin <noorsalwati.nordin@student.uibk.ac.at>

Christoph Sommer <christoph.sommer@uibk.ac.at>