Bachelor’s Thesis

Basic Network Layer Functionalities for VCP

Description:
This bachelor thesis complements our work on the BATS project. The goal of the project is to support biologists with their studies by monitoring the group dynamics of bats in their natural habitat. The idea is to equip bats with ultra-low power sensor nodes that monitor contacts between individuals and to track their routes with the help of a stationary ground network. This network has the task of collecting and storing the sensor nodes’ data in a fully self-organised and energy-efficient way. The Virtual Cord Protocol (VCP) with its shortest-path routing and DHT storage functionality is proposed as network layer protocol. However, the existing implementation of the VCP lacks specific properties needed for the deployment in the BATS project. These shortcomings should be overcome within the scope of this bachelor thesis.

Tasks:
The goal of this thesis is the adaption, improvement and extension of our current VCP implementation (Linux-Daemon implemented in C++) for the practical usage in the BATS project. First, the student has to get familiar with the protocol specification and the current implementation. Then, the shortcomings of the implementation for the actual deployment have to be analyzed. Among these shortcomings is the lack of supporting multiple application layer programs. Furthermore, the location of a dedicated central node has to be advertised to all nodes as efficiently as possible. Finally, the handling of node failures should be improved. Within the course of this bachelor thesis solutions for all shortcomings have to be developed, integrated and evaluated, so that the implementation is ready for the final deployment.

Requirements:
Proficient in C++, basic knowledge of Linux are helpful

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