Exploring LoRaWAN Technology – A Comparative Analysis of Network Features, Coverage, and Security (Internship/Bachelor/Master Thesis)

Background

LoRaWAN (Long Range Wide Area Network) technology is a rapidly growing protocol designed for low-power, wide-area networks (LPWANs). It is increasingly utilized in applications requiring long-range communication with minimal power consumption, such as environmental monitoring and industrial IoT deployments. This results in a growing need to study and compare different LoRaWAN networks to better understand their strengths and weaknesses in different application scenarios.

Objectives

This internship/thesis provides an opportunity for students to gain hands-on experience with LoRaWAN technology through the following activities (varying complexity, depending on the type of thesis):

- Comparative Network Analysis: Evaluate existing LoRaWAN networks based on features, coverage, security measures, and support for various packet types, including custom sensor data and telemetry. This will involve both reviewing network documentation and standards and conducting practical experiments using provided hardware.
- Network Implementation: Build and deploy a basic client-server LoRaWAN network using provided hardware. This includes configuring and setting up LoRaWAN gateways and end devices to create a functional model of a LoRaWAN communication network.
- Application Development: Work on prototyping IoT applications that utilize LoRaWAN's unique features, such as long-range capabilities and low power consumption.
- Documentation and Reporting: Document the research process, experimental setups, findings, and challenges encountered during the internship.

Requirements

Candidates should possess basic programming skills (C/C++ or Python) and have an interest in networking and wireless communication technologies. Although prior knowledge of LoRaWAN technology or IoT networks is beneficial, it is not mandatory. Familiarity with wireless communication protocols, network security principles, and basic hardware interfacing is advantageous.

Application Process

All applications must be submitted through the application website INTERAMT:
https://www.interamt.de/koop/app/trefferliste?partner=339
(Abschlussarbeiten Bachelor / Master; Pflichtpraktika)
Carefully note the information provided on the site to avoid any issues with your application.
Your application should include

- a short CV
- a current transcript of records
- the keyword "T3-SC-LORAWAN" as a comment

For any questions or further details regarding this thesis and the application process, please feel free to contact ZITiS T3 (t3@zitis.bund.de) or PD Dr. Corinna Schmitt.