2018-00668 - Development of a Simulator for Performance Evaluation of Low Power Wide Area Networks in IoT

Contract type: Public service fixed-term contract
Level of qualifications required: Graduate degree or equivalent
Fonction: Temporary scientific engineer

About the research centre or Inria department

Located at the heart of the main national research and higher education cluster, member of the Université Paris Saclay, a major actor in the French Investments for the Future Programme (Idex, LabEx, IRT, Equipex) and partner of the main establishments present on the plateau, the centre is particularly active in three major areas: data and knowledge; safety, security and reliability; modelling, simulation and optimisation (with priority given to energy).

The 450 researchers and engineers from Inria and its partners who work in the research centre's 31 teams, the 100 research support staff members, the high-level equipment at their disposal (image walls, high-performance computing clusters, sensor networks), and the privileged relationships with prestigious industrial partners, all make Inria Saclay Île-de-France a key research centre in the local landscape and one that is oriented towards Europe and the world.

Context

This offer is within the framework of a partnership, funded by a DigiCosme grant, supporting jointly the LRI Laboratory of the University of Paris Saclay and INRIA Saclay.

The teams INFINE-POST (Saclay) and ROCS (LRI, UPS) have research activities in Internet of Things (IoT). In this area, recently, Low-Power Wide Area Networks (LPWAN) have recently gained considerable attention. The key objective of these wireless technologies is to connect low-power devices over very large areas, with low data rates. LPWANs are promising for various emerging IoT applications, complementing the traditional cellular and short-range technologies.

Assignment

Assignments:

With the help of Cedric Adjih (Inria) and Steven Martin (ROCS), the recruited person will be taken to develop a simulator for LPWAN that will be the basis on research in that area. The simulator will be implemented in MATLAB, and will include some of the most relevant parts of the LoRaWAN specifications and 3GPP NB-IoT standard. It will include the following software modules: radio propagation model, interference model, channel access method, and scheduling. Using object oriented programming in MATLAB, the simulator will enable to simulate a network deployment with multiple antennas or cells and multiple IoT devices. The objective is to study the performance of LPWAN networks (including different scheduling strategies, improvements and variations at the MAC level,) and to release a final version of the simulator in open source.

For a better knowledge of the proposed research subject:


Main activities

The main activities are as follow:

- Develop the simulator in MATLAB, also integrating various pre-existing modules
- Write documentation
- Manage the simulator as an open-source project

Skills

Technical skills and level required: Good proficiency in programming

Languages: French, English

Benefits package

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration

In regards to diplomas and experiences.