Polymorphic network protocol suite in heterogeneous wake-up IoT networks

Context

While low power communication has evolved towards multi-kilometer ranges and low bit-rate schemes in recent years, triggering increasing interests, a trade-off must still be made between power consumption and latency. Pure-asynchronous communication allowed by emerging Ultra-Low-Power (ULP) Wake-Up Receivers (WUR) enables the design of low latency and energy efficient network architecture composed of heterogeneous radio nodes (long-range communication and ULP short-range WUR) with dedicated access and network protocols. Such architecture is the fruit of joint reflections of French research groups on Systems-on-chips (GDR Soc-Sip) and on Networking (GDR RSD) that made indeed emerged the wake-up radio as the technology that will surely change network paradigm for the next decade. A two-way cross layer optimization is envisaged, since on the one hand these heterogeneous network higher layers will take into account the specificities of the wake-up radio to optimize energy and latency, and on the other hand some recurrent application constraints will lead to specific wake-up radio designs.

Subject

This PhD student position is part of the effort to design such network architecture using heterogeneous radio nodes (long-range communication and ULP short-range WUR). The work will focus on defining a polymorphic network protocol suite, i.e. that it will need to conciliate different communication paradigms and wireless IoT technologies. The main properties should be flexibility, modularity and extensibility to enable low latency and energy efficient communications over heterogeneous IoT networks. In addition, specific functionalities such as mobility or multihoming should be considered, by design, in the definition of the protocol suite. The results of this work will be evaluated through controlled (using FIT IoT Lab) and real-field experimental validations.

Job details

Position type: PhD Student (36 months)
Gross salary: around 2900 euros per month
Position open date: January 2018 (approximately)
Location: ICube Lab, Network Research Group, University of Strasbourg, Strasbourg, France

Applicants must hold a Master degree (or equivalent) in computer engineering or computer science before they can take on the position. A strong background in Computer Networks, Mathematics, Signal Processing, Communication theory/systems and programming is a plus. Proficiency in the English language (spoken and written) is required. Applicants should be highly motivated, have initiative and responsibility, be able to work independently, have interest in scientific research, have commitment to publish research results in top tier conferences/journals and to obtain a doctoral degree. Applications must include the following items:

- detailed CV
- soft copy of your publications if any (e.g., master's thesis, conference/journal papers)
- your transcripts of undergraduate and honors/master degrees
- two recommendation letters

Please send your application before the 28th of October 2017 to:

- Pr. Thomas Noël (noel@unistra.fr)
- Dr. Julien Montavont (montavont@unistra.fr)