Laboratoire de l'Informatique du Parallélisme
Unité mixte CNRS - ENS Lyon - Inria - UCB Lyon n°5668

Title: Multiband and energy-saving mechanisms in WLANs.

Duration: 5 to 6 months

Description
Although rarely implemented in wireless cards, multiple energy-saving mechanisms for Wi-Fi have been proposed by IEEE [1] (e.g., TIM, prompt, TWT). In our previous work [2], we showed that, if correctly parameterized, these energy-saving mechanisms can save up to 80% of energy without noticeably impacting the end-devices throughput.

In this internship, the first objective is to evaluate the opportunity for a WLAN to apply on one of its two or three channel bands (namely, 2.4, 5, and 6 GHz) an energy-saving mechanism while letting the default behavior for the other band(s). This study requires a fine performance analysis of realistic scenarios using both theoretical models and discrete-event simulations. The second objective of this internship is to design an algorithm to automatically decide, in the joint interest of performance and energy saving, which frequency to turn on, which energy-saving to apply, and on which bands to assign traffic flows. The outcome of this internship could lead to a solid proof of concept for energy-saving mechanisms and push manufacturers to implement them and network administrators to apply them.

[1] Guérin, E., Begin, T., & Guérin Lassous, I. (2023). An overview of MAC energy-saving mechanisms in Wi-Fi. *Computer Communications*.
[2] Guérin, E., Begin, T., & Guérin Lassous, I. (2023). Performance Analysis of MAC Energy-saving Strategies for WLANs. In *Proceedings of the 26th ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems*.

Skills to be developped:

- Modeling and performance evaluation
- WLAN and Wi-Fi

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