Research internship (Master 2)

# Smartphone-as-a-Service platform for Computer Science Research

Lylian Siffre, Guillaume Rosinosky, Baptiste Jonglez
IMT Atlantique, Inria, France

March - August 2026*

## 1 Introduction

The digital sector's growing energy consumption, particularly from cloud infrastructure and end-user devices, presents a major environmental challenge [1, 2]. Local-first software [3] offers a sustainable [5] alternative by prioritizing data processing on local devices, reducing reliance on energy-intensive data centers. This paradigm aligns user sovereignty with Green IT goals, making it highly relevant for edge computing and national strategic initiatives like France's PEPR Cloud[1].

Our empirical research [4], has begun quantifying the energy profile of local-first applications on mobile platforms. However, a significant barrier remains: the lack of a robust, scalable platform for conducting rigorous, reproducible experiments on diverse real smartphones. This hinders large-scale validation and comparison of results across the research community.

To overcome this, we propose the creation of a public platform for experimentation. This "smartphone-as-a-service" platform would provide researchers with remote, on-demand access to a fleet of instrumented mobile devices for precise energy measurement. This internship will focus on designing and prototyping the core architecture for this platform, using the energy evaluation of local-first software as its primary use-case. The ultimate goal is to establish a foundational resource that accelerates sustainable computing research and provides evidence-based guidance for software development.

## 2 Expected work

**Expected Work.** The internship will focus on the design and implementation of a prototype platform for remote, automated experimentation on a fleet of Android smartphones. The work is structured into core objectives and potential extensions, should time permit.

**Code Development & Integration.** The primary focus will be on establishing a robust provisioning and scheduling system. This involves designing a multi-user framework to allow for the shared, scheduled use of the device fleet. The intern will define and implement the complete lifecycle of a test, encompassing device reservation, application installation, test execution, and pre/post-test reset/wipe procedures. Crucially, this architecture will be designed to integrate with or be inspired by the principles and APIs of existing national testbeds, particularly EnOSlib[2] (used in Grid'5000[3]), to ensure scalability and familiarity for the research community.

**Metrics & Measurement Pipeline.** A critical output of the platform is the collection of reproducible data. The intern will develop a pipeline to periodically sample and retrieve system-level metrics during test execution. This includes detailed energy consumption data from the battery, as

*Possibility to adjust dates, see 4 for more details.

[1] `https://pepr-cloud.fr/en/`

[2] `https://discovery.gitlabpages.inria.fr/enoslib/`

[3] `https://www.grid5000.fr/w/Grid5000:Home`

well as CPU, memory, and network usage statistics. The results must be reliably gathered and stored for analysis at the end of each experiment.

**Validation through Core Scenarios.** The platform's functionality will be validated by implementing three core experimental scenarios of increasing complexity:

1. **Browser-based test:** Reserve a device, execute an automated test scenario that runs on the mobile's browser, and collect all system metrics.
2. **Application test:** Fully wipe a device, install a target application, execute a test, and retrieve the application logs alongside system metrics.
3. **Full device flash:** Extend the provisioning system to dynamically flash a specific OS or custom ROM onto a device as part of the test setup process.

**Stretch Goals.** Potential extensions include implementing network emulation (e.g., controlling bandwidth/latency) to simulate real-world conditions, and developing a feature to record and replay user interaction macros to facilitate test creation.

**Related Work.** Along with the research prototype we developed, some projects are closely related and can serve as a source of inspiration. Appium[4] is an open source project for facilitating UI automation; and STF[5] is a device farm management tool that incorporates many features such as device reservation, remote control, etc.

## 3 Required Skills & Profile

We are looking for a candidate with the following profile:

- A student in the last year of a Master's degree in Computer Science, or in the last year of an engineering school.
- Strong proficiency in Python for automation and backend development.
- Knowledge of or a strong interest in system-level programming and tooling, particularly with the Android Debug Bridge (ADB).
- Knowledge of or a strong interest in learning infrastructure automation tools and concepts inspired by platforms like Kubernetes, EnOSlib, or Grid'5000.
- Familiarity with Linux systems, command-line tools, and basic networking.
- A good level of English to contribute to the writing of documentation and a potential research paper.
- An ability to work autonomously, collaborate effectively, and communicate clearly.
- Curiosity and a strong appetite for tackling complex systems-level challenges.

## 4 Additional information

**Advisors.**


- Lylian Siffre, Kapela, Inria, IMT Atlantique lylian.siffre@inria.fr
- Guillaume Rosinosky, Inria, IMT Atlantique guillaume.rosinosky@inria.fr
- Baptiste Jonglez, Inria, IMT Atlantique baptiste.jonglez@inria.fr


**Duration.** 6 months, from February or March 2026.
**Salary.** Legal minimum of 4,35 € / hour (net of taxes), full time.
**Location.** IMT Atlantique, Inria Stack team, LS2N laboratory in Nantes

[4] `https://appium.io/docs/en/2.0/intro/`
[5] `https://github.com/DeviceFarmer/stf`

## References


[1] Freitag, C., Berners-Lee, M., Widdicks, K., Knowles, B., Blair, G. S., and Friday, A. The real climate and transformative impact of ict: A critique of estimates, trends, and regulations. *Patterns 2*, 9 (2021), 100340.

[2] IEA. Energy and ai, Apr. 2025.

[3] Kleppmann, M., Wiggins, A., van Hardenberg, P., and McGranaghan, M. Local-first software: you own your data, in spite of the cloud. In *Proceedings of the 2019 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software* (Athens Greece, Oct. 2019), ACM, p. 154–178.

[4] Siffre, L., Ledoux, T., Pawlak, R., and Guery, J. Local Computing vs. Cloud Computing: An Empirical Study of Energy Consumption. In *IEEE/ACM 18th International Conference on Utility and Cloud Computing* (Nantes, France, Dec. 2025), ACM, pp. 1–10.

[5] Siffre, L., Ledoux, T., Pawlak, R., and Guery, J. Local-first software for green it. In *2025 11th International Conference on ICT for Sustainability (ICT4S)* (2025), pp. 58–68.