

## Internship project

# FL-Minifer

## A Tool To Minify and Unify AdBlocker's Filter Lists

### Supervisors

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### Research team

The student will join the Spirals project-team led by Lionel Seinturier (Professor, Spirals) <[lionel.seinturier@univ-lille.fr](mailto:lionel.seinturier@univ-lille.fr)>. Spirals is a joint project-team between Inria and the University of Lille, within UMR CRISTAL.

**Spirals project-team**  
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### Scientific Context

Tracking on the web has been a growing issue for the recent years. With the advent of newer, more complicated web technologies, companies find themselves with various tools that can be used to track the users with the aim to distribute more targeted and precise advertisements, which inevitably generates more clicks.

The advertisement industry has often relied on traditional tools, such as cookies, with the first cases of tracking being documented in the New York Times as early as 2001. Since then, tracking techniques have evolved tremendously and simple cookie tracking has transformed to include vast and complex pipelines that exploit cookies.

However, as the users are starting to wake up to these tracking issues, browsers have been working toward more private and discreet ways of browsing the web, such as with the inclusion of the Incognito Mode, which flushes cookies after a browsing session.

Such tools have forced advertisers to rely on more silent and more precise techniques, leading to the rise of a new stateless technique that makes use of existings tools and APIs in the browser to build an unique ID by exploiting the diversity of the users' software and hardware configuration. This technique is called *browser fingerprinting* [Eckersley10, Laperdrix16].

In order to limit the tracking and its disturbances, ad blockers' usage has been growing in recent years: it was found that at least 42.7% of internet users use ad blocking tools, with the most popular being Adblock.

Ad blockers rely on filter lists, which are a collection of blocking rules, to block tracking domains and hide advertisements on pages. However, since they rely on statically typed rules, advertisers

are able to quickly adapt by changing their domains, or updating their advertisement position in the page.

Users are trusting ad blockers to protect them from trackers: nevertheless, the diversity of filter lists can lead to cases where the very tool made to protect the users can be used to track them.

## Internship Project

This project will focus on enhancing users' understanding about browser fingerprinting and ad-blockers by complementing an existing tracking tool that exploits the diversity of filter-lists to build a profile of the user. This will be done through the improvement of existing algorithms and parser and through the adaptation of the current algorithm in the *AmlUnique* browser extension. The current test page can be accessed on: <https://test.amiunique.org>.

**The objective of this internship project is to define and implement a browser extension for Chrome designed to enrich the end-user's understanding of browser fingerprinting and tracking services by providing visual feedback (e.g., graphs, charts, statistics, notifications, alerts) regarding fingerprinting and tracking activities.**

Some requirements of the internship are:

1. Provide an initial state-of-the-art analysis of ad-blockers (e.g., AdBlock,  $\mu$ Block, Ghostery, Privacy Badger, Disconnect).
2. Understand the data pipeline and the current algorithm used in the test page.
3. Build an improved version of the rule's parser that includes cosmetic rules.
4. Develop a filter-list minifier that will be used to speed up the current algorithm.
5. Documentation on browser's extensions inner working.
6. Based on the previous documentation and the established constraints, define a method to include the current filter-list tracking algorithm in the *AmlUnique* extension.

This project will benefit from our experience in the domain of browser fingerprinting, as well as through the datasets collected by the [AmlUnique.org](https://amiunique.org)<sup>1</sup> website and our existing browser extensions.<sup>2,3</sup>

## Skills Summary

The student will develop her/his skills in Javascript, web privacy, browser extension, as well as statistical data analysis and machine learning.

As is a common practice in the Spirals research team, all source code is expected to be open sourced, and the student is encouraged to participate in open source and online communities.

## References

- [Acar13] G. Acar, M. Juarez, N. Nikiforakis, C. Diaz, S. Gurses, F. Piessens, and B. Preneel, **"FPDetective: Dusting the web for fingerprinters"**. *ACM SIGSAC Conf. on Computer and Communications Security* (CCS'13).
- [Bursztein16] E. Bursztein, A. Malyshev, T. Pietraszek and K. Thomas, **"Picasso: Lightweight Device Class Fingerprinting for Web Clients"**. *Workshop on Security and Privacy in Smartphones and Mobile Devices* (SPSM'16).
- [Eckersley10] P. Eckersley. **"How unique is your web browser?"**. *Int. Conf. on Privacy Enhancing Technologies* (PETS'10).
- [Englehardt16] S. Englehardt and A. Narayanan, **"Online tracking: A 1-million-site measurement and analysis"**. *ACM SIGSAC Conf. on Computer and Communications Security* (CCS'16).

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<sup>1</sup> <https://amiunique.org>

<sup>2</sup> <https://addons.mozilla.org/en-US/firefox/addon/amiunique>

<sup>3</sup> <https://chrome.google.com/webstore/detail/amiunique/pigjfdpomldldkmoaiigpbncemhjeca>

[Laperdrix16] P. Laperdrix, W. Rudametkin, B. Baudry. “**Beauty and the Beast: Diverting modern web browsers to build unique browser fingerprints**”. *IEEE Symp. on Security and Privacy* (S&P’16).