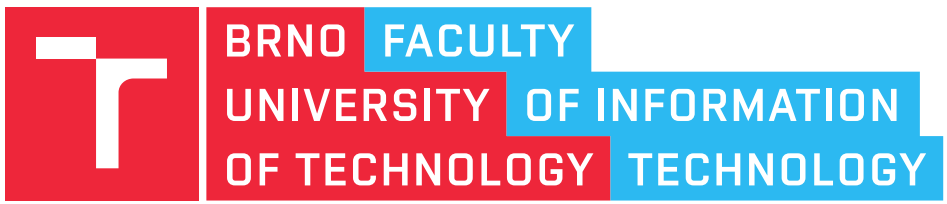
Comparison of Privacy Preserving Tools in Web Browsers and Extensions

Bc. Vojtěch Fiala

Supervisor: Ing. Libor Polčák, Ph.D.



January 20, 2025

Motivation

- Over 90 % (2) of all websites track their visitors.
- Users are often tracked for targeted advertising (1).
- Multiple anti-tracking methods and tools exist.
- How do they compare?
- Which one to choose?

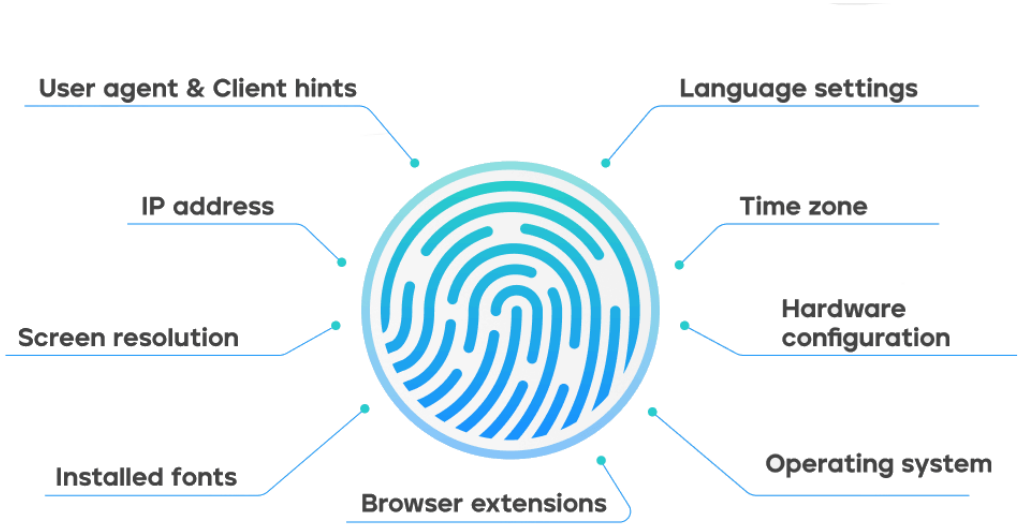


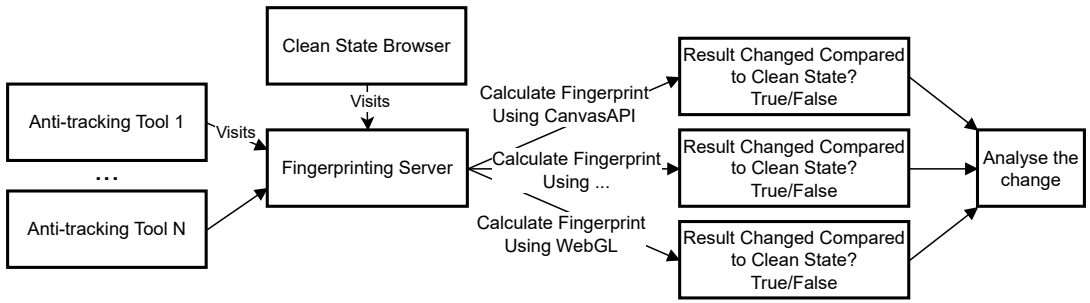
Image taken from (4)

Objectives

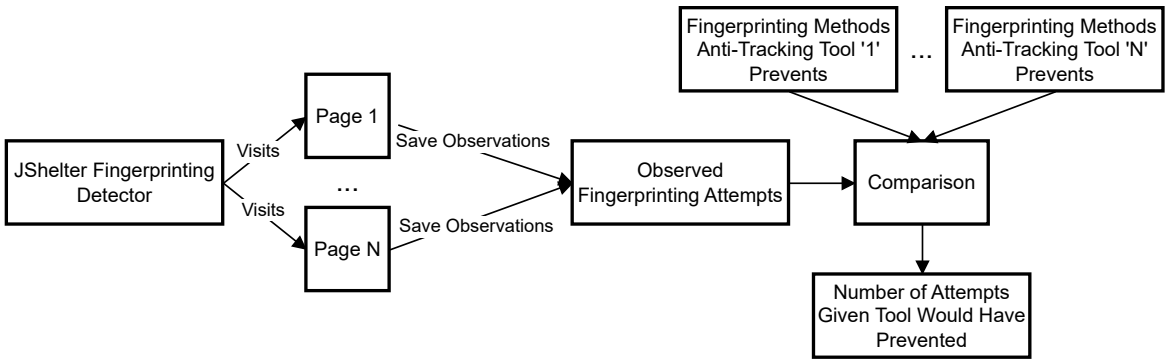
- Design of repeatable and deterministic comparisons.
- Evaluation of API-based anti-tracking tools.
- Evaluation of content-blocking tools.
- Evaluation of a tool's impact on real sites.

Evaluation of API-based Anti-tracking Tools

- Based on Master's Thesis by Jana Petráňová (3).
- Fingerprinting server to observe anti-tracking capabilities.
- Analysis of the results.

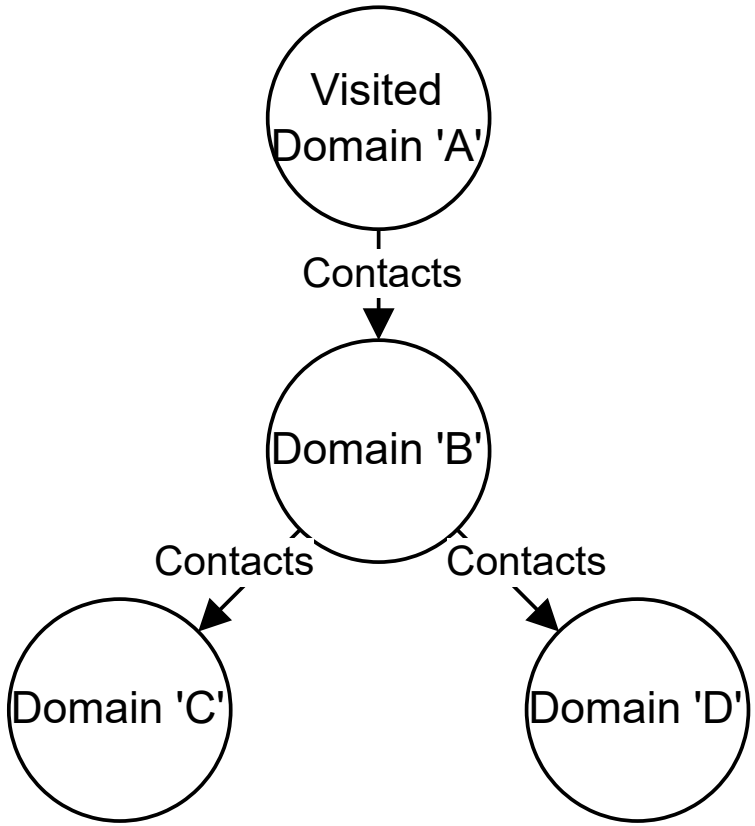


- Use JShelter Fingerprinting Detector to observe fingerprinting attempts.
- Log the attempts to ensure repeatability and determinism.
- Compare the results with observed capabilities of each tool.



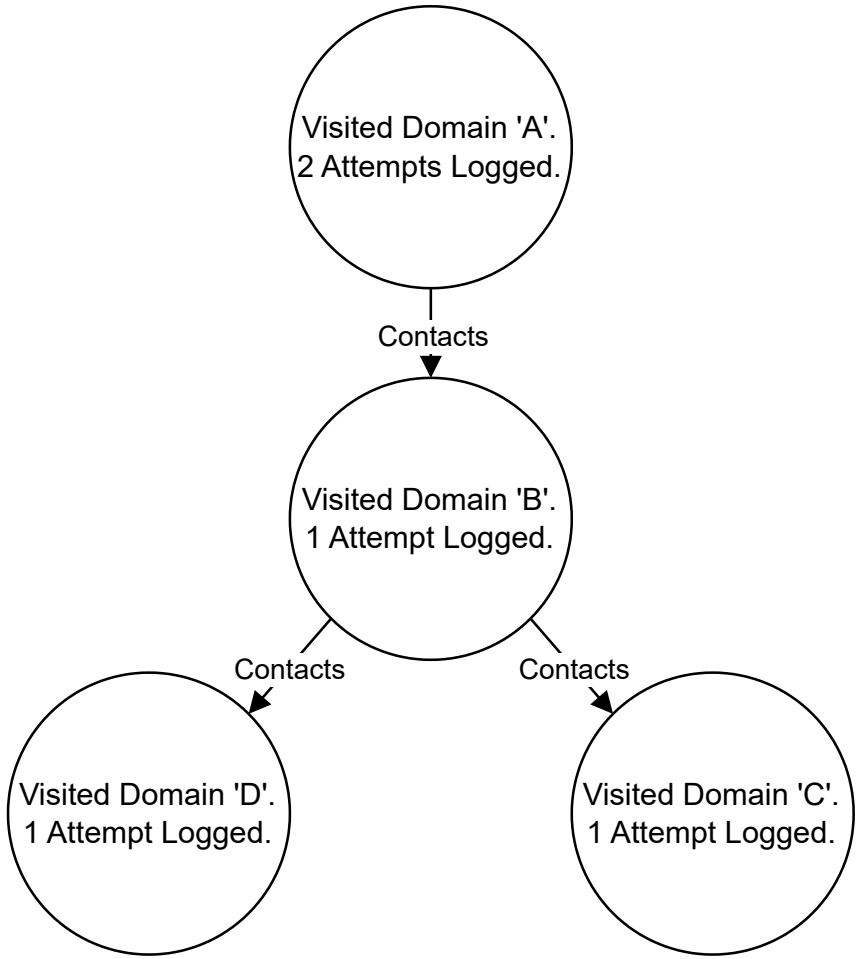
Evaluation of Content-blocking Tools

- Observe the traffic associated with several websites.
- Log the traffic and maintain the request structure.
- Simulate the traffic with content-blocking tool present.
- Observe the results.



Evaluation of Content-blocking Tools

- Observe fingerprinting attempts associated with several websites.
- Log the traffic and maintain the request structure.
- Simulate the traffic with content-blocking tool present.
- Obtain the number of tracking attempts prevented.



Impact on Real Sites

- Based on Master's Thesis by Jana Petráňová.
- Visit a website several times with no anti-tracking tools present.
- Log the outputs and detect the content.
- Visit the website again with anti-tracking tool present.
- Log the output and compare them.

Plans

- Implement the evaluators.
- Use the evaluations to compare selected anti-tracking tools.
- Draw conclusions based on the results.

References I

(1) CYPHERS, B. and GEBHART, G. *Behind the One-Way Mirror: A Deep Dive Into the Technology of Corporate Surveillance* online. Electronic Frontier Foundation, 2019. Available at: https://www.eff.org/wp/behind-the-one-way-mirror. (cit. 2025-01-13).

(2) DAMBRA, S.; SANCHEZ ROLA, I.; BILGE, L. and BALZAROTTI, D. *When Sally Met Trackers: Web Tracking From the Users' Perspective*. In: *31st USENIX Security Symposium (USENIX Security 22)*. Boston, MA: USENIX Association, August 2022, p. 2189–2206. ISBN 978-1-939133-31-1.

(3) PETRÁŇOVÁ, J. *Běhová prostředí pro testování činnosti rozšíření pro webový prohlížeč*. 2024. Master's thesis. Brno University of Technology, Faculty of Information Technology.

(4) VORSTER, A. *What is a Digital Fingerprinting and How Does It Work?* online. 2022. Available at: https://blog.octobrowser.net/your-digital-fingerprint-what-it-is-and-how-it-is-used-to-deanonymize-you. (cit. 2025-01-14).

Thank You for Your Attention!

Discussion