



SSD Side Channel from JavaScript

Advisor: **Jonas Juffinger**

Motivation





Leaking the websites visited by a person can significantly inflict harm on their privacy. From more specific tracking to show very targeted ads to extortion campaigns that threaten to leak websites visited in private to co-workers or family members, the effects on the attacked person can be numerous.

When loading a website, browsers access the disk to either store or read cached files of the specific website. We recently showed that these accesses to an SSD cause timing differences for other accesses that can be measured by an attacker [1]. Using a neural network, we were able to correctly identify a visited website out of 100 websites with a high accuracy of up to 97 %. However, we ran the attack with local code execution which greatly reduces the attack opportunities.

In your thesis you try to build a website fingerprinting attack using the SSD side channel in JavaScript. With this attack working in JavaScript a website could spy on which websites a user opens in the browser. JavaScript can write and read from the disk using the file system API [2], fulfilling, in theory, all requirements for the side-channel attack.

Your tasks are to first get familiar with the topic. Then the first step is to access the disk from JavaScript and measure access times. Next you try to see any effect of heavy disk usage, e.g., through a disk benchmark, on the access times. If low small enough accesses are detectable, you record traces of the web browser opening websites and try to classify them using a neural network.

Goals and Tasks

-  Get familiar with the topic [1 Week]
-  Write Test Environment [2 Month]
-  Perform measurements [2 Month]
-  Analyze the results of the measurements [1 Month]

Literature

- > [J. Juffinger et al.](#)
Secret Spilling Drive: Leaking User Behavior through SSD Contention
[Network and Distributed System Security Symposium 2024](#)
- > [Mozilla](#)
JavaScript File System API
https://developer.mozilla.org/en-US/docs/Web/API/File_System_API

Courses & Deliverables

- Introduction to Scientific Working**
Short report on background
Short presentation
- Bachelor Project**
Project code and documentation
- Bachelor's Thesis**
Project code
Thesis
Final presentation

Recommended if you're studying

- CS
- ICE
- SEM

Prerequisites

- > Interest in the topic area
- > Programming (JavaScript / Python)
- > Google Chrome, Firefox or Safari Browser

Advisor Contact

jonas.juffinger@tugraz.at