Extended Permission Modification for Chrome Extensions

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***Abstract*— This proposal presents a framework for the development of an application to allow users to identify unneeded or unwanted permissions in Chrome extensions and unpack, customize, repackage, then install or re-install chrome extensions. Using Python, we will deploy a GUI application to list current extension permissions and allow the user to grant, deny, and modify permissions.**

I. Introduction

While about 50% of Chrome users use extensions to customize their browsing experience, hackers and proponents of malware increasingly use them as an attack vector on every browser to exploit end-users. Whether coupon clipping when shopping or simple website themes, these extensions pose a potential threat to users' privacy. The best entry point for hackers is to purchase an already existing Chrome extension or hijack an extension owner's Google account to then release a malicious update requesting many unnecessary permissions.

Maintaining control over what an extension has access to is a reasonable way to mitigate the damage a compromised extension can do. There are options to manage permissions via Chrome's extensions page, but only per-site permissions which limits websites an extension has access to. There is no way to remove permissions for clipboard reading, metadata gathering from various hardware, web traffic, storage devices, or browser cookies without manually editing the extension files or removing the extension.

With mitigation comes an important right to privacy. A user should not have to give away their data to use an extension that modifies the look of a web page, for example. Opt-in is rarely used when it comes to data collection: many applications and web pages decide to leave it opt-out, giving the user no way to control initial data collection upon using.

As seen in Fig. 1, Chrome extension uBlock Origin, for example, only lists its permissions as being able to read browsing history and change privacy-related settings. Extension Options, shown in Fig. 2, only allow users to change appearance (dark mode, light mode, etc.), theme, remote fonts, JavaScript, and other similar settings. Settings that could impact the collection, storage, and selling of data are not listed but may be predefined by the developer and not visible to the user.

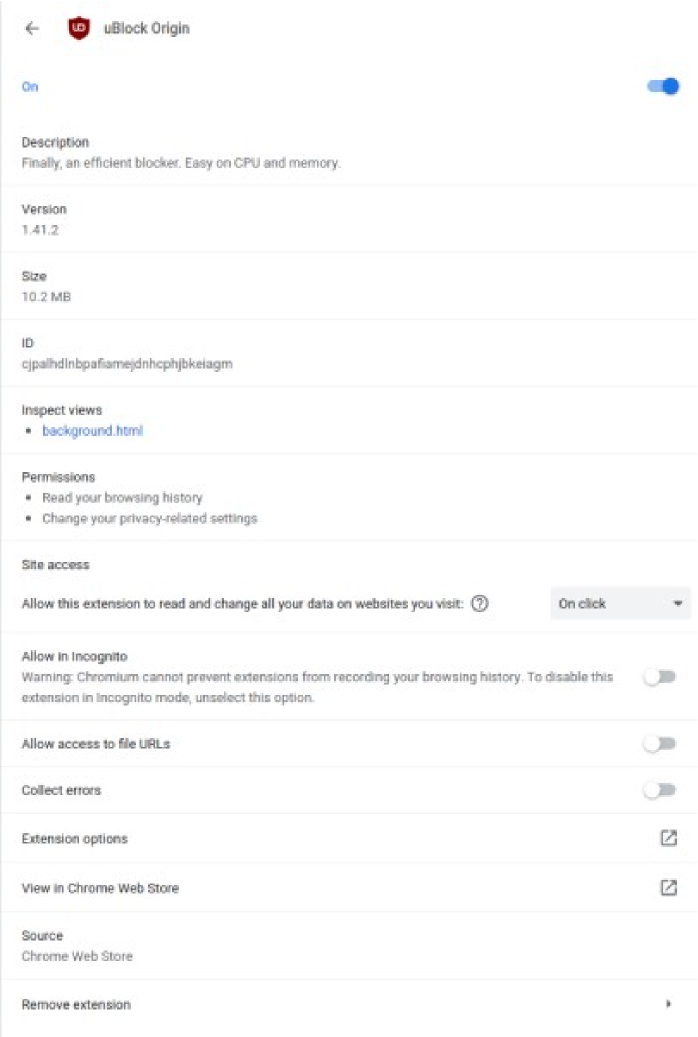
With the application, the user will be able to list all extensions in use and what permissions each extension requires. The user will then be able to set and unset permissions via check boxes provided in the application's interface. The user, if necessary, can use the application to download and install extensions, preventing unwanted permissions from being granted upon installation. This prevents the users from having to install the extension to access the permission system.

To make a better user experience, the application will also give suggested permissions for some popular chrome extensions as well as suggestions for extensions which we believe are used by privacy conscious individuals.

II. Project Description

This project requires the creation of a small-scale application which does the following:

a. List and identify Chrome extensions using an interactive user interface
b. Display a list of permissions the extension automatically grants
c. Place check boxes next to each permission that allow the users to allow or deny permissions
d. For more extensive permissions, allow the user to enter custom data



uBlock Origin

On

Description
Finally, an efficient blocker. Easy on CPU and memory.

Version
1.41.2

Size
10.2 MB

ID
cjpalhdlnbpafiamejdnhcphjbkeiagm

Inspect views
- background.html

Permissions
- Read your browsing history
- Change your privacy-related settings

Site access
Allow this extension to read and change all your data on websites you visit: On click

Allow in Incognito
Warning: Chromium cannot prevent extensions from recording your browsing history. To disable this extension in Incognito mode, unselect this option.

Allow access to file URLs

Collect errors

Extension options

View in Chrome Web Store

Source
Chrome Web Store

Remove extension

Fig. 1 Permissions users can change in uBlock Origin

e. Give permission suggestions to users for some popular chrome extensions

Since the application will be packaged nicely in a GUI, it will be accessible to many users. This is important since some users are uncomfortable with the idea of using command-line interface or CLI. Privacy conscious and/or power users are not necessarily well-versed in CLI applications.

A. Scope

The project will include but is not limited to:

a. Python source code that can identify chrome extensions on a user's system, correctly display permissions it requires, and allow the user to modify or remove said permissions.

b. Ability to download chrome extensions and install them with modified permissions via the application through the Chrome extension store URL or extension ID.

c. A short description of what each permission allows an extension to access, with an optional detailed description.

d. Permission suggestions for popular chrome extensions