To Auth or Not To Auth? A Comparative Analysis of the Pre- and Post-Login Security Landscape

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Web Security Research Crawls Top-Sites

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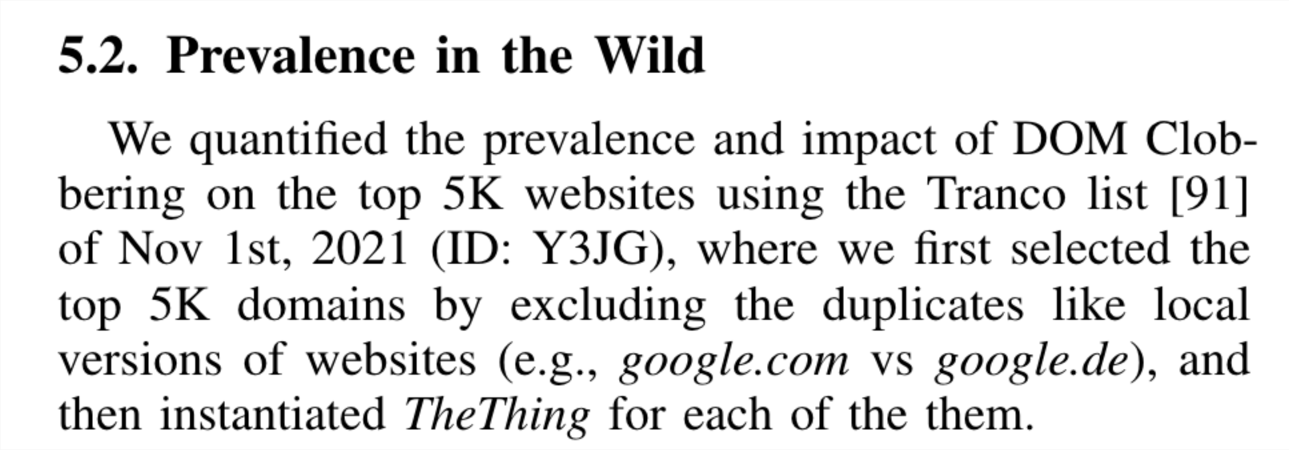

5.2. Prevalence in the Wild

We quantified the prevalence and impact of DOM Clobbering on the top 5K websites using the Tranco list [91] of Nov 1st, 2021 (ID: Y3JG), where we first selected the top 5K domains by excluding the duplicates like local versions of websites (e.g., *google.com* vs *google.de*), and then instantiated *TheThing* for each of the them.

Khodayari, Soheil, and Giancarlo Pellegrino. "It's (DOM) Clobbering Time: Attack Techniques, Prevalence, and Defenses." IEEE S&P 2023

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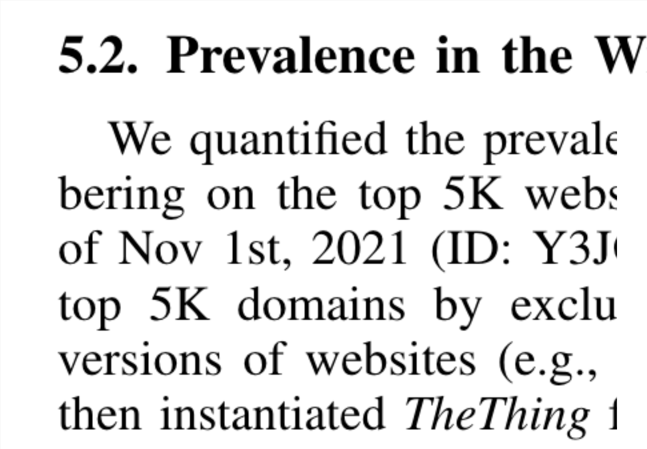

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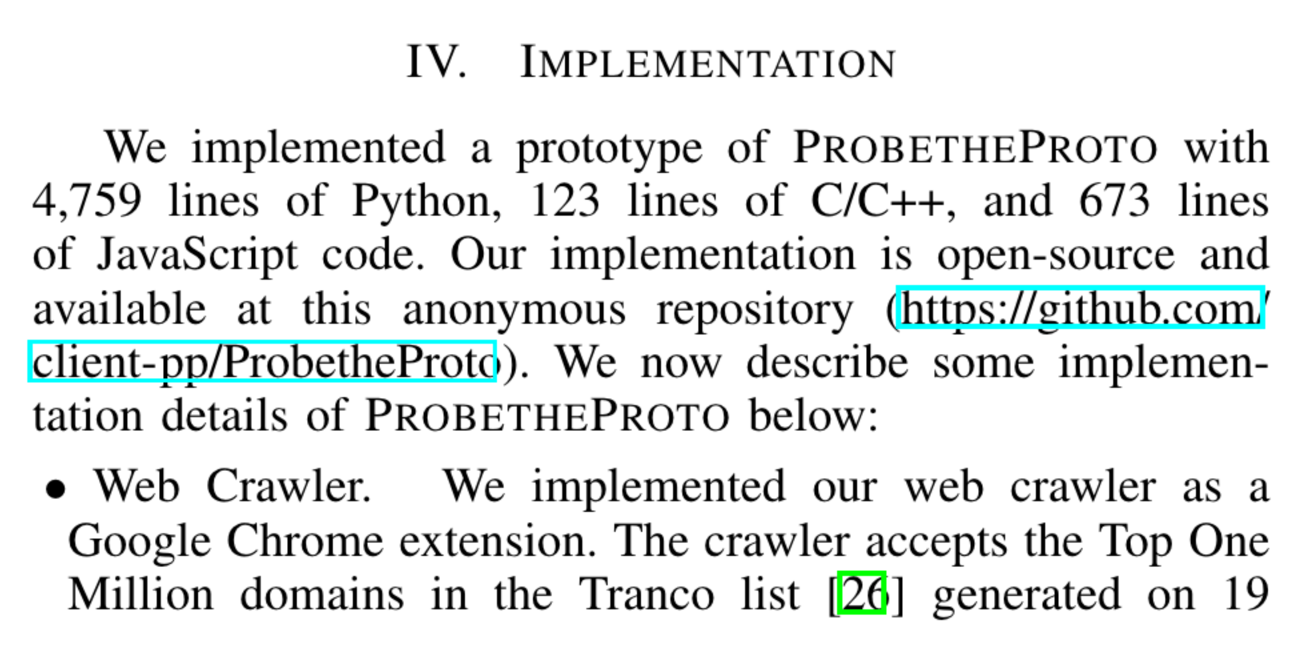

IV. Implementation

We implemented a prototype of ProbeTheProto with 4,759 lines of Python, 123 lines of C/C++, and 673 lines of JavaScript code. Our implementation is open-source and available at this anonymous repository (https://github.com/client-pp/ProbetheProto). We now describe some implementation details of ProbeTheProto below:

- Web Crawler. We implemented our web crawler as a Google Chrome extension. The crawler accepts the Top One Million domains in the Tranco list [26] generated on 19

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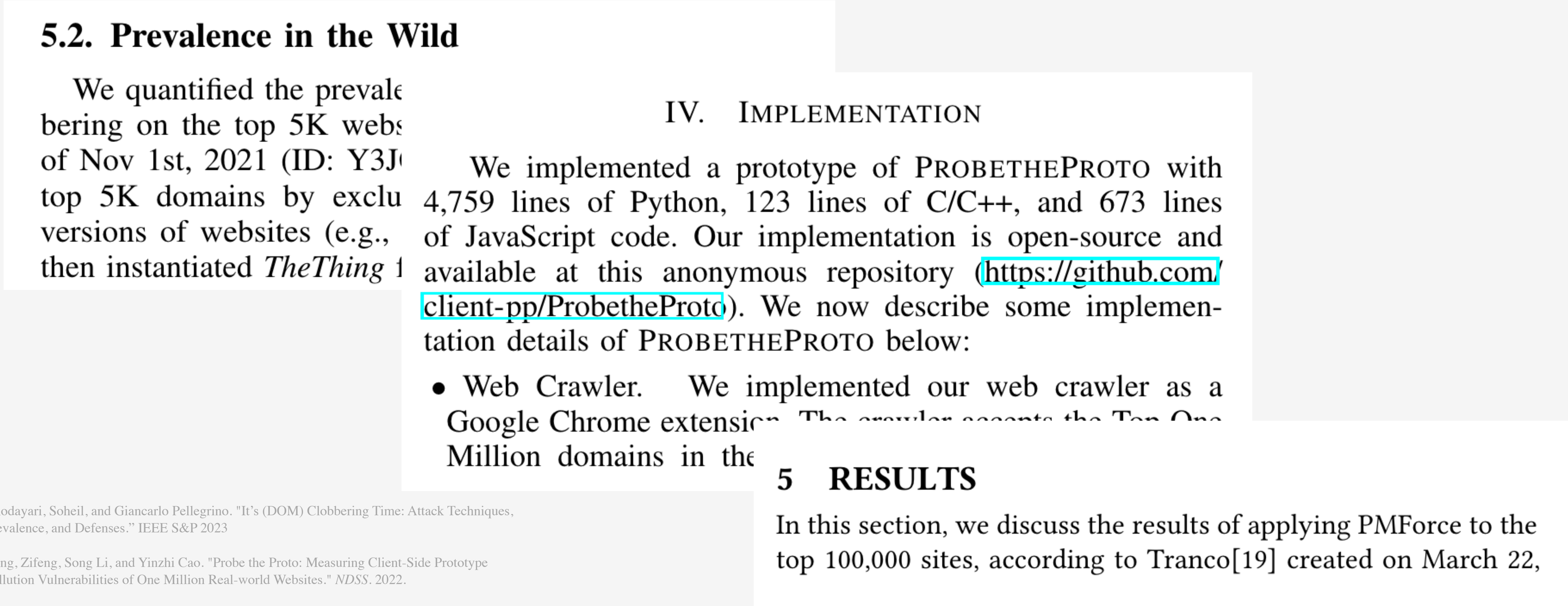

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5 RESULTS

In this section, we discuss the results of applying PMForce to the top 100,000 sites, according to Tranco[19] created on March 22,

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Steffens, Marius, and Ben Stock. "PMForce: Systematically Analyzing postMessage Handlers at Scale." *CCS* 2020.

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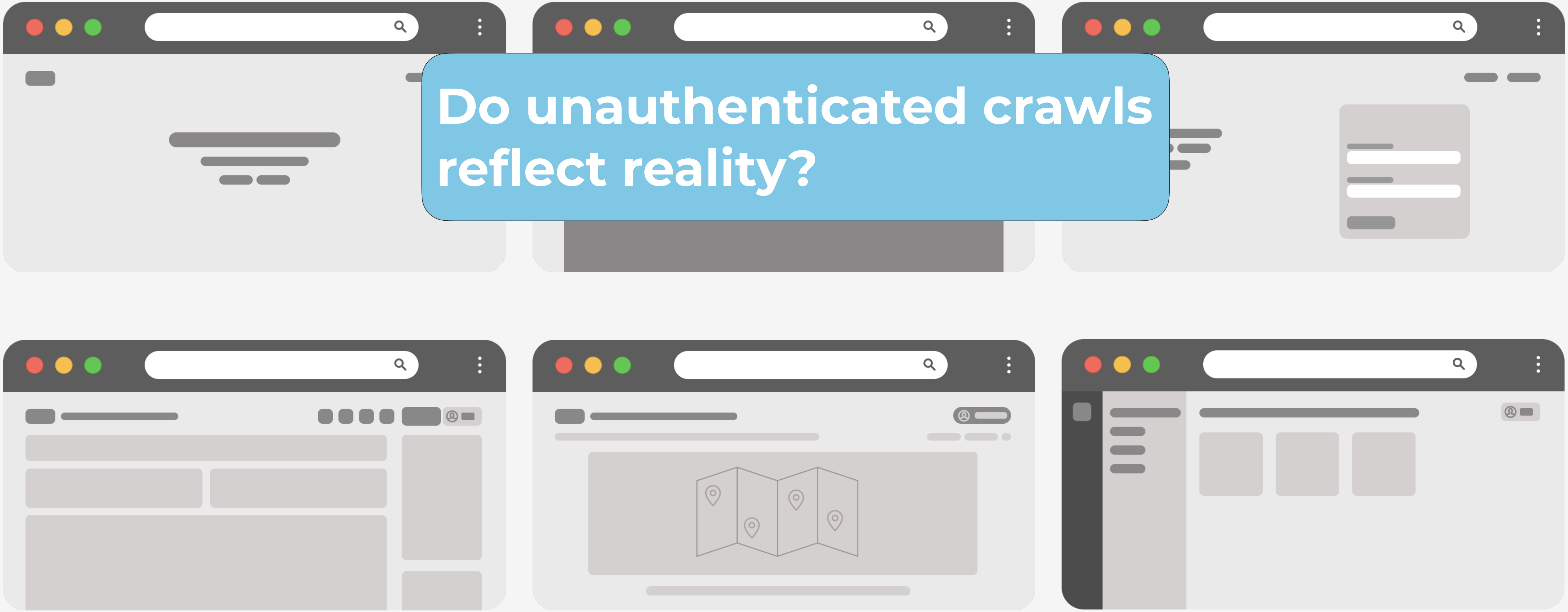

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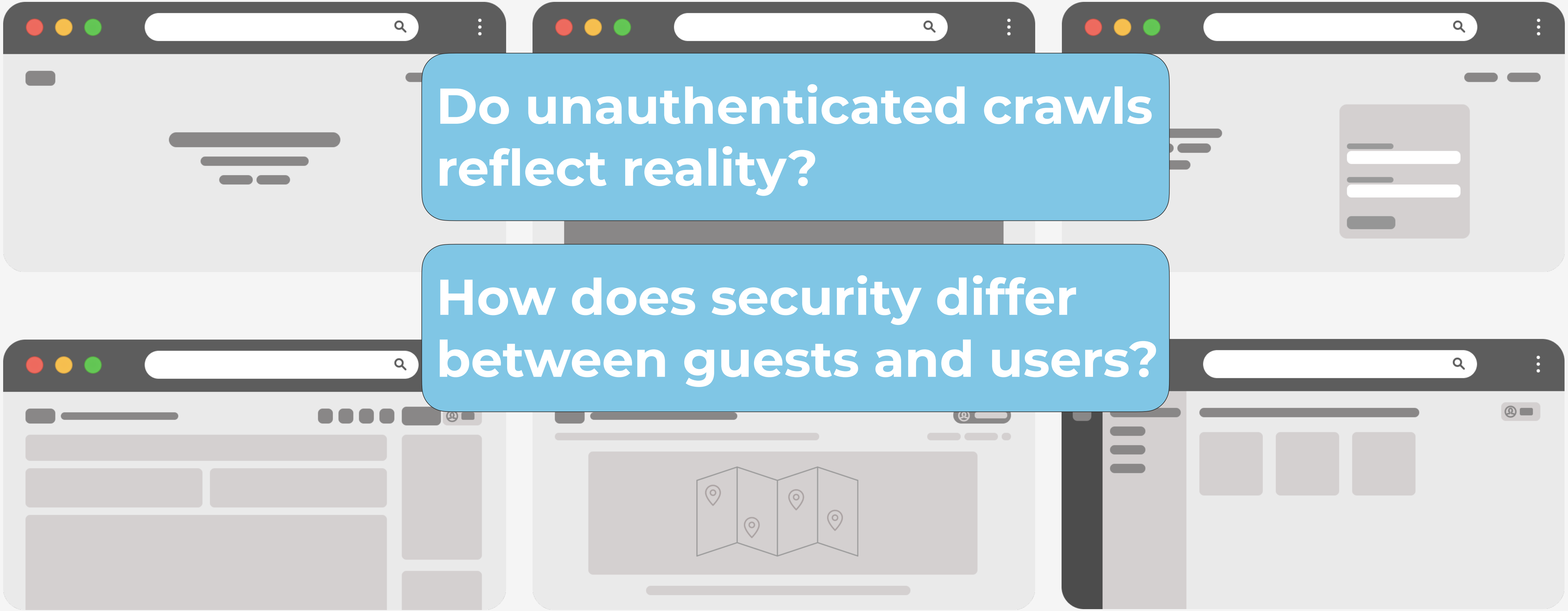

Do unauthenticated crawls reflect reality?

How does security differ between guests and users?

Comparative Security Measurement

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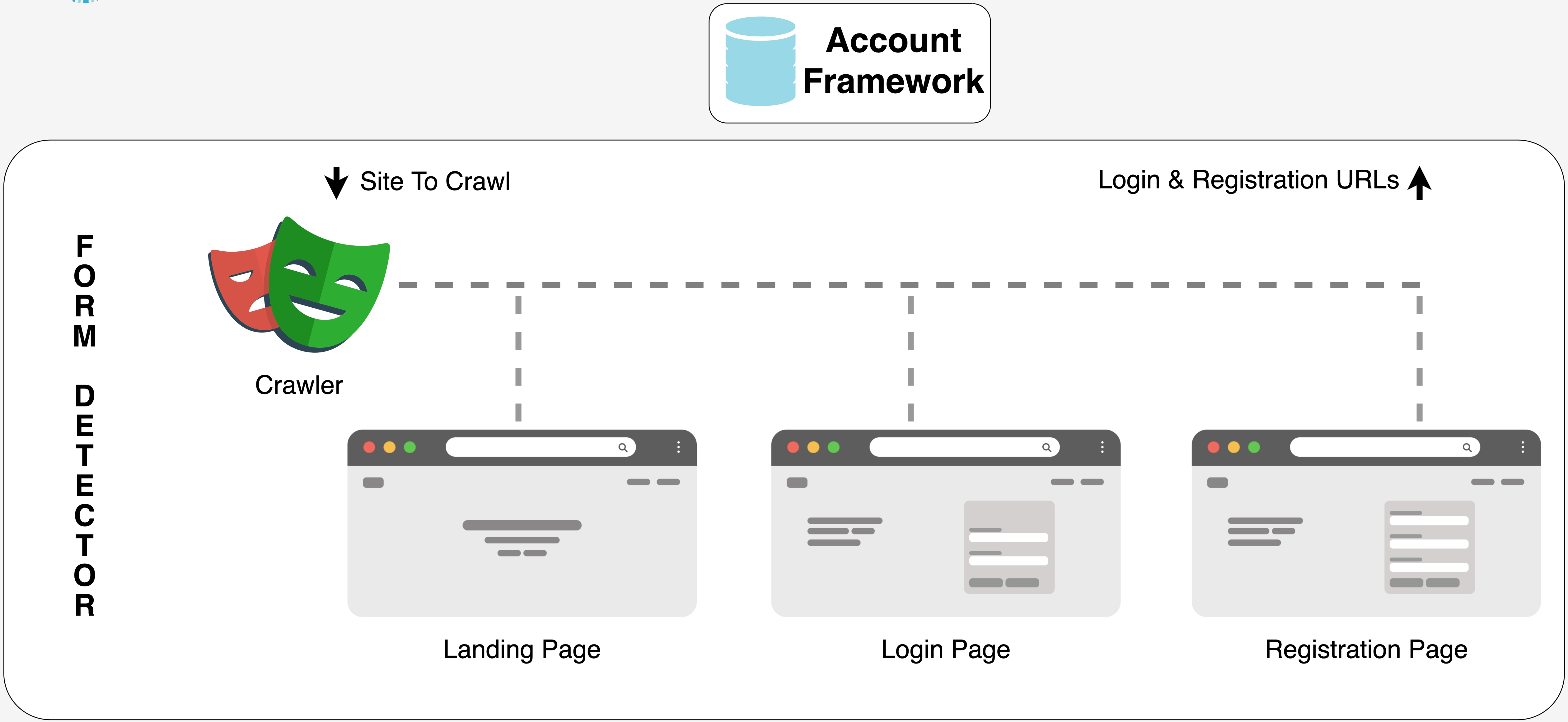
5. **PostMessages:**
   - Uses PMForce [Steffens and Stock CCS 2020]
   - How many (vulnerable) handlers exist?

Crawling Pipeline



Account Framework

Site To Crawl

Login & Registration URLs

FORM DETECTOR

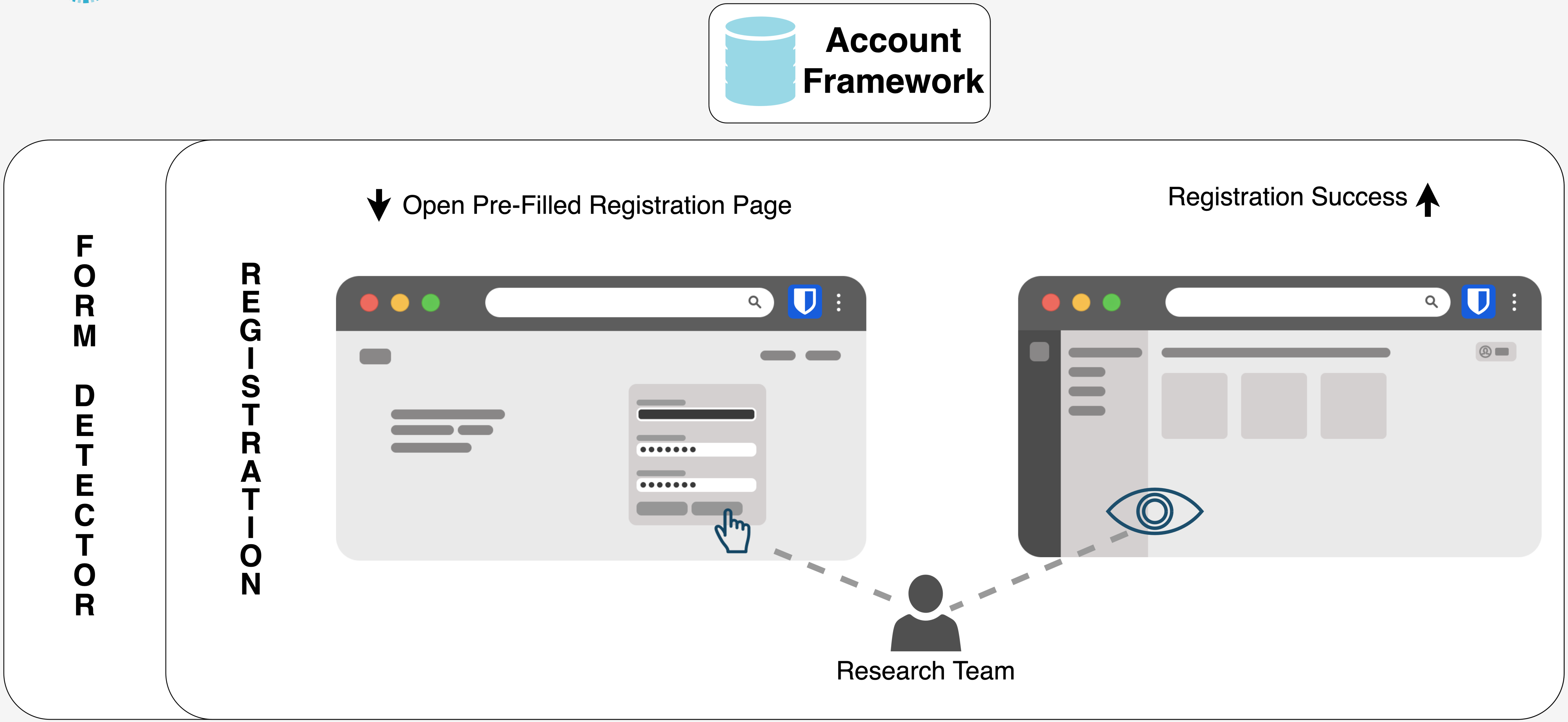
Crawler

Landing Page

Login Page

Registration Page

Crawling Pipeline



Account Framework

FORM DETECTOR

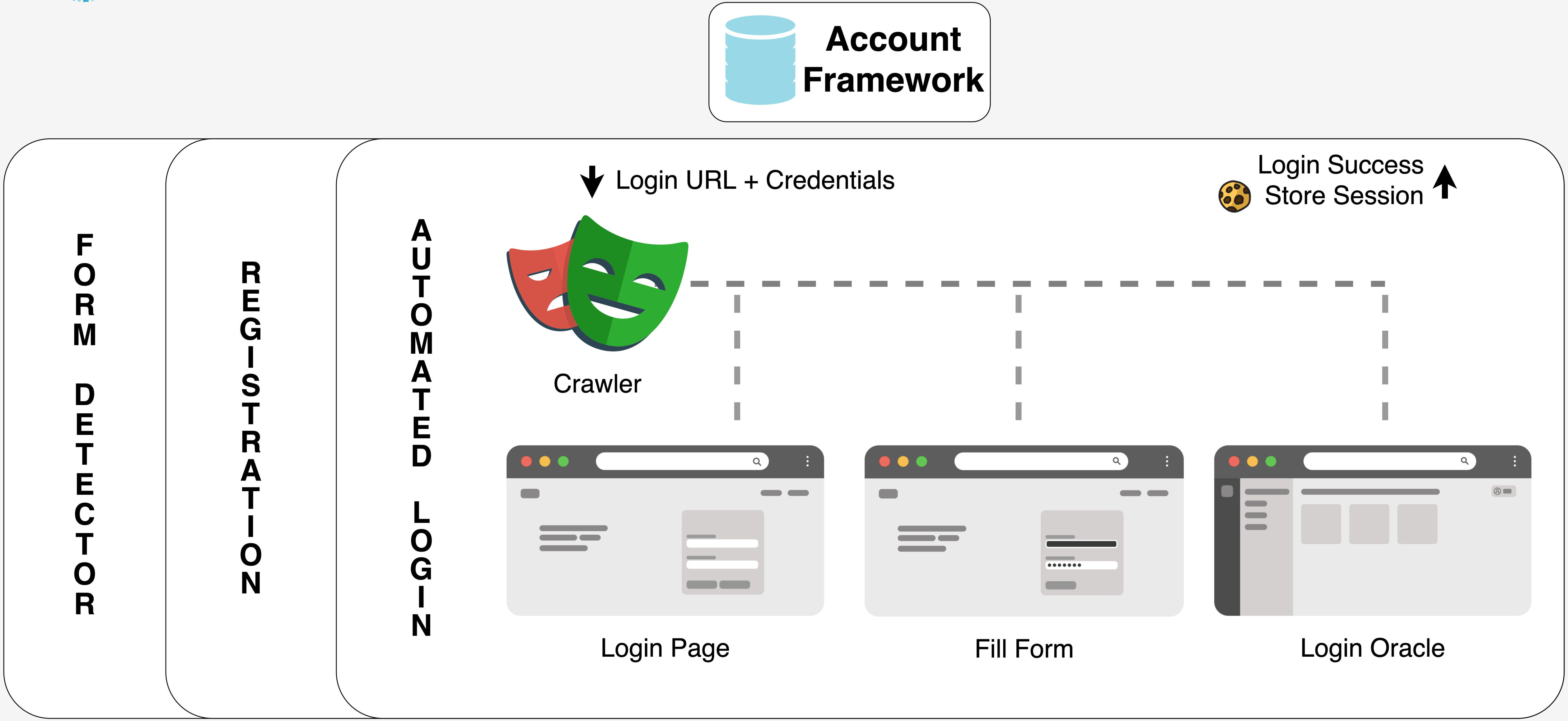
REGISTRATION

Open Pre-Filled Registration Page

Registration Success

Research Team

Crawling Pipeline



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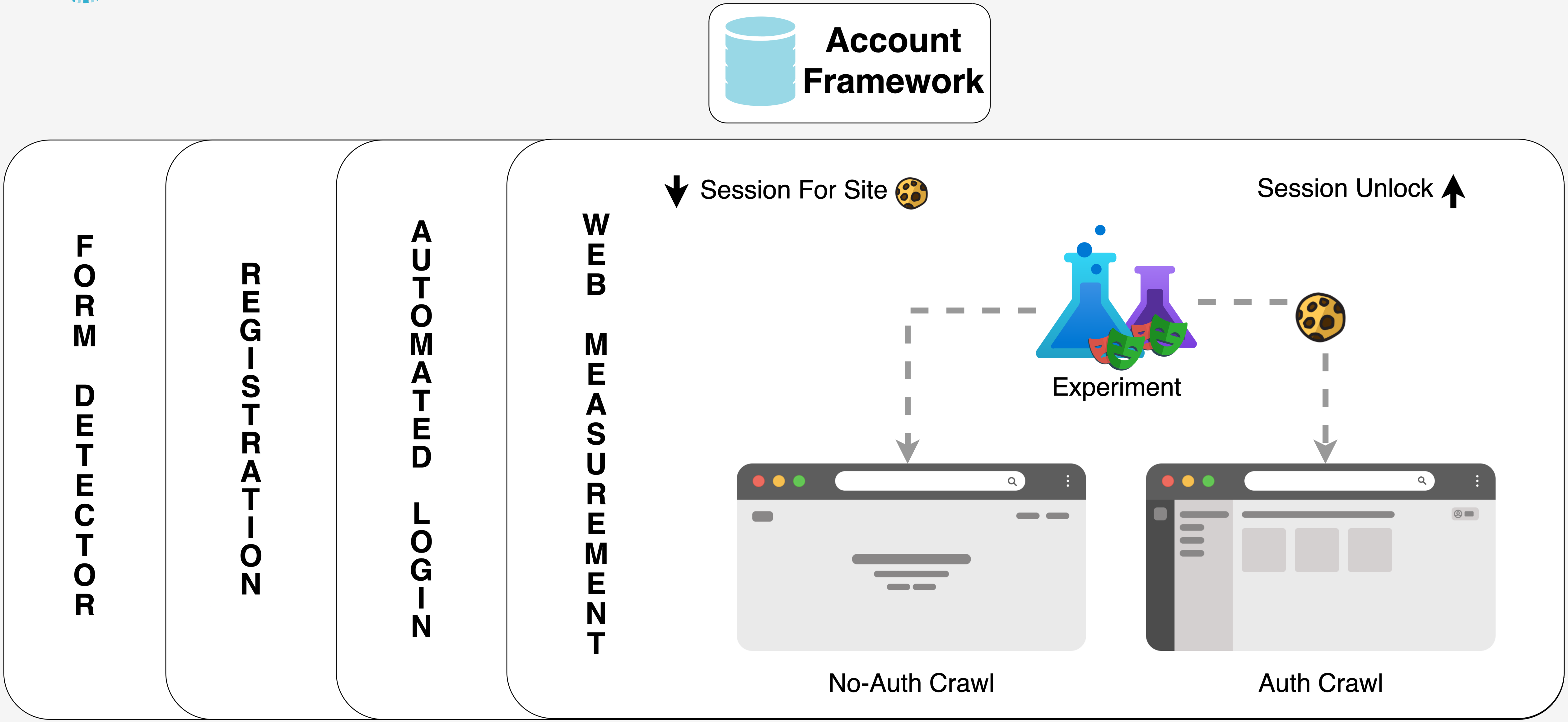

Account Framework

FORM DETECTOR

REGISTRATION

AUTOMATED LOGIN

WEB MEASUREMENT

Session For Site

Session Unlock

Experiment

No-Auth Crawl

Auth Crawl

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- Reasons: Authenticated users redirected to user portals with few links and many buttons

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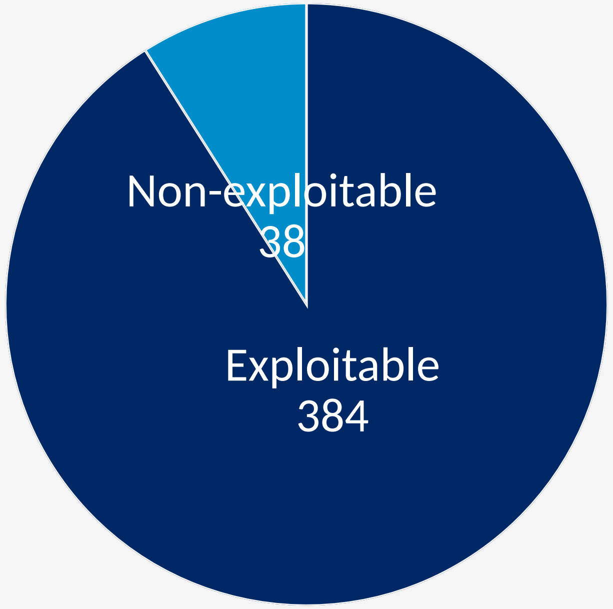

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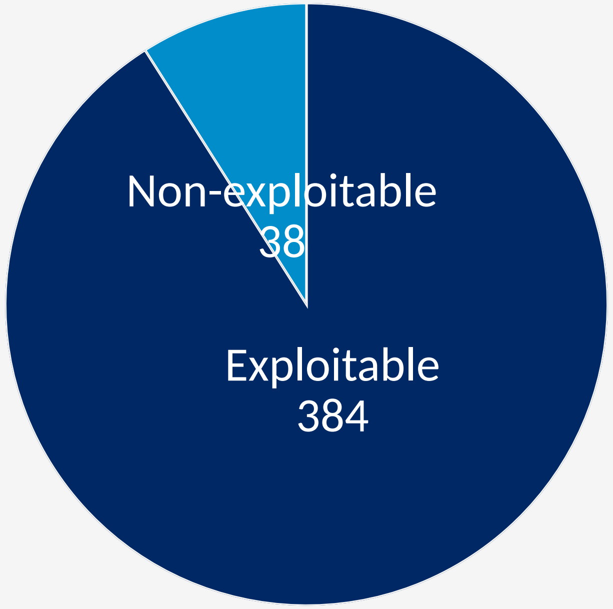

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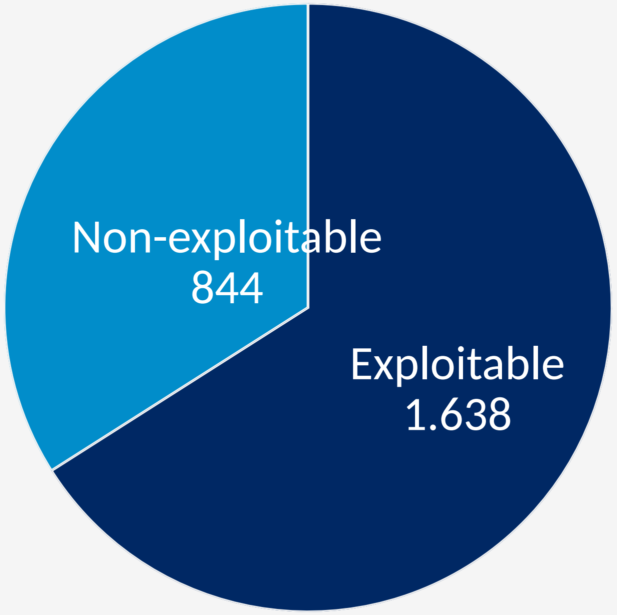

Auth Exploits in No-Auth

No Significant Changes in Security Headers

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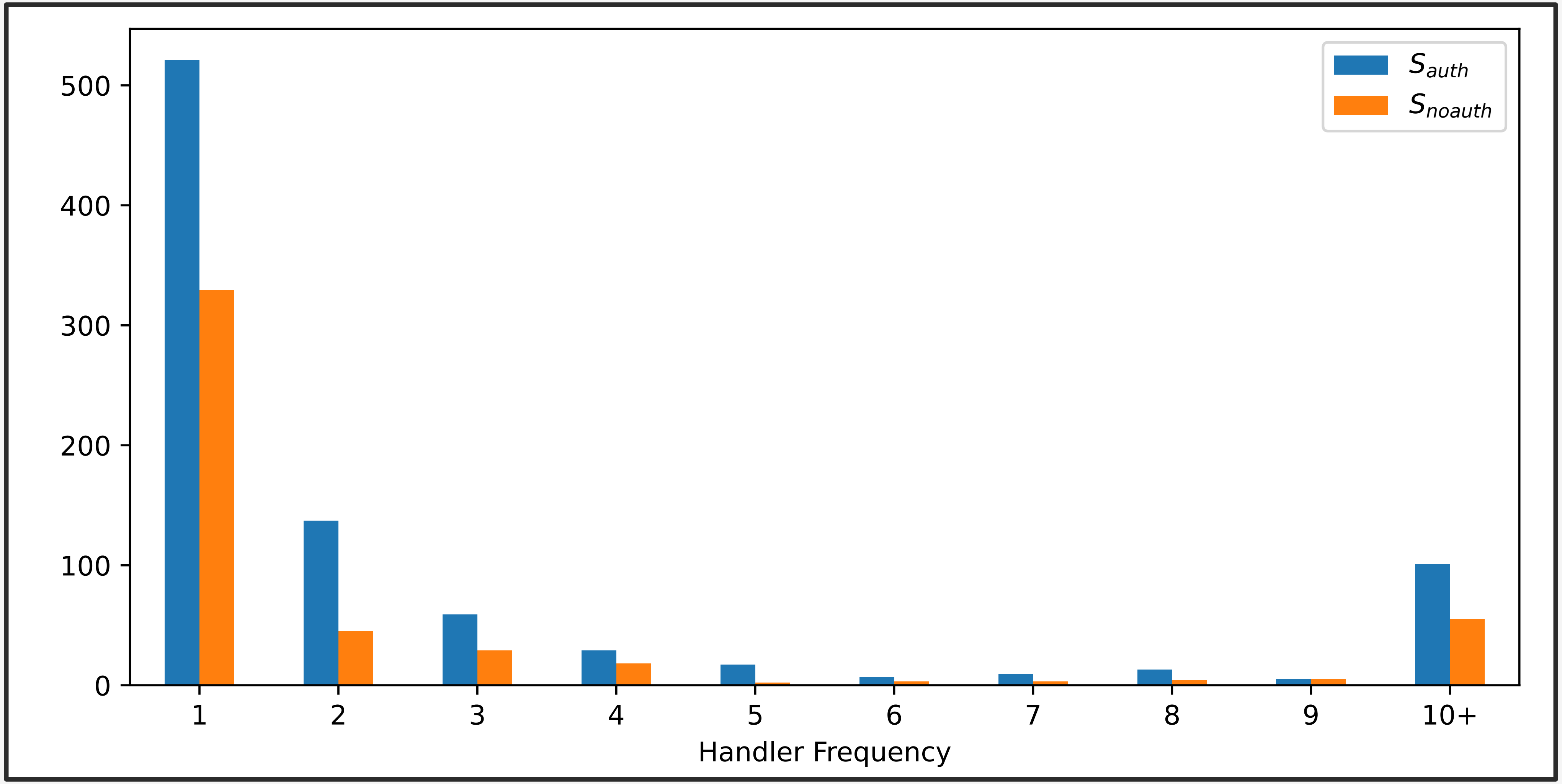
Authenticated Crawlers Detect More Handlers



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  - No substantial differences for security headers
  - Much more Javascript and PostMessages for authenticated state
- Authenticated state is not strictly better or worse
  - Some code only reachable by authenticated or non-authenticated state
  - In general the attack surface is larger for authenticated users

Limitations and Ethics

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- Limitations:
  - Small-scale (only 200 sites)
  - Manual labor involved
  - Many websites could not be tested:
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  - Many websites could not be tested:
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- Ethical consideration:
  - Only test own accounts
  - Only client-side security issues
  - Reasonable load
  - Responsible disclosure

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Thanks for your attention!

https://github.com/cispa/login-security-landscape

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