# Trust Issues

## trouble in package paradise

@nietaki

## whoami

Jacek Królikowski

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elixir forum

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## Disclaimers

## Prototyping

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!= production

## "Reasonable Security"

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## Why **not** to look into the libraries

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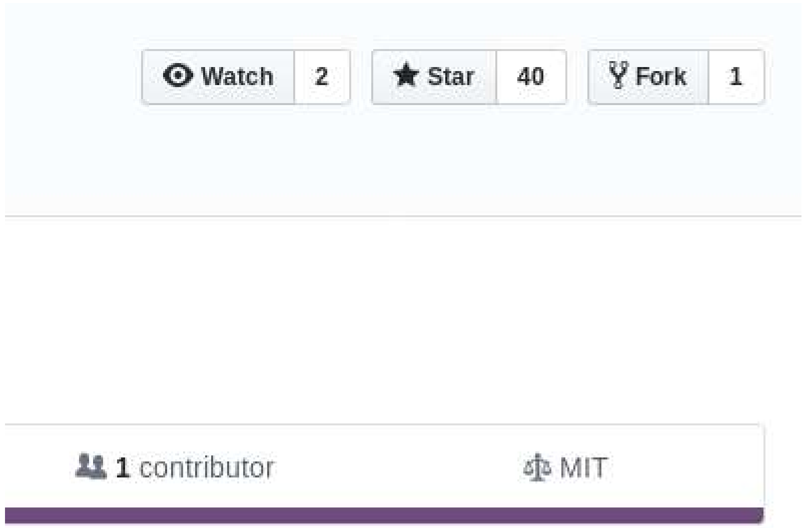

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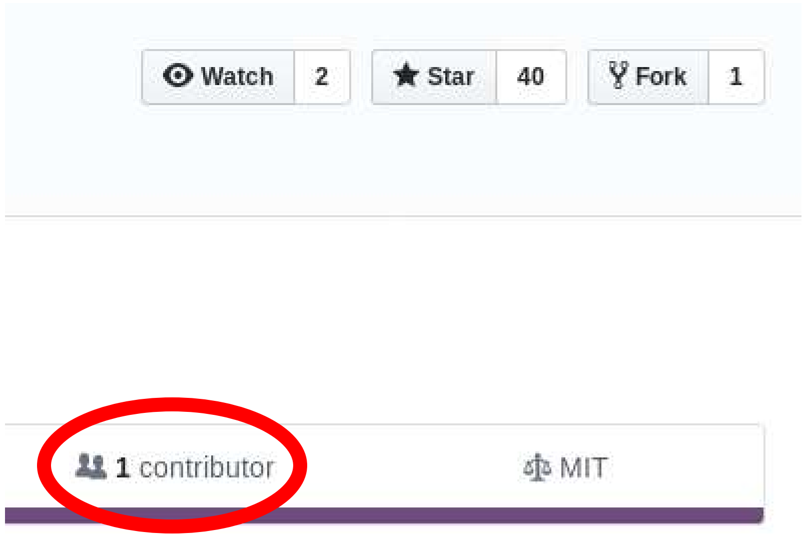

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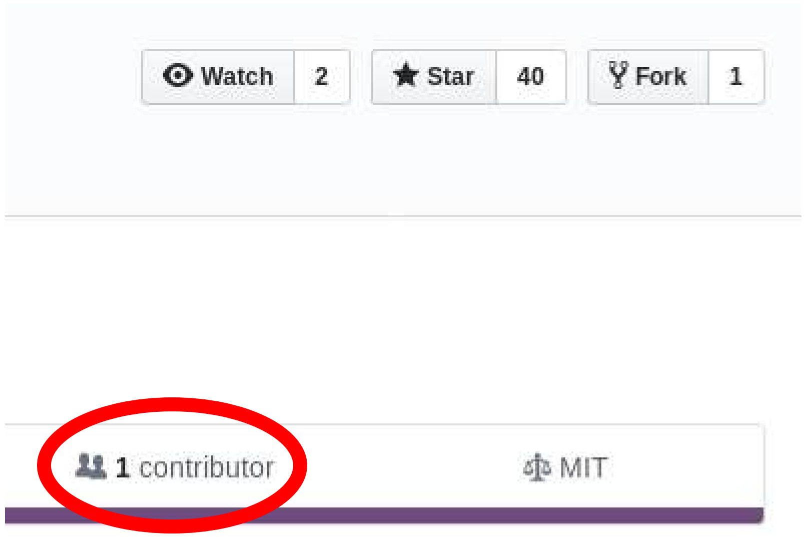

$\overset{?}{=}$

hex.pm/packages/evil_left_pad

## I only use popular packages!

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```
$ wc -l mix.lock
106 mix.lock
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  "unicode_util_compat": {:hex, :unicode_util_compat, "0.3.1",
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[:rebar3], [], "hexpm"},
  "unsafe": {:hex, :unsafe, "1.0.0",
"7c21742cd05380c7875546b023481d3a26f52df8e5dfedcb9f958f322baae305",
[:mix], [], "hexpm"},
  "uuid": {:hex, :uuid, "1.1.8",
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## I'm too small to be a target!

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```
iex(1)> :code.all_loaded() |>
...(1)> Enum.map(fn {module, _path} -> module end) |>
...(1)> Enum.filter(fn module ->
...(1)>   behaviours = Keyword.get(module.module_info[:attributes], :behaviour, [])
...(1)>   Ecto.Repo in behaviours
...(1)> end)

[MyApp.Repo]
```

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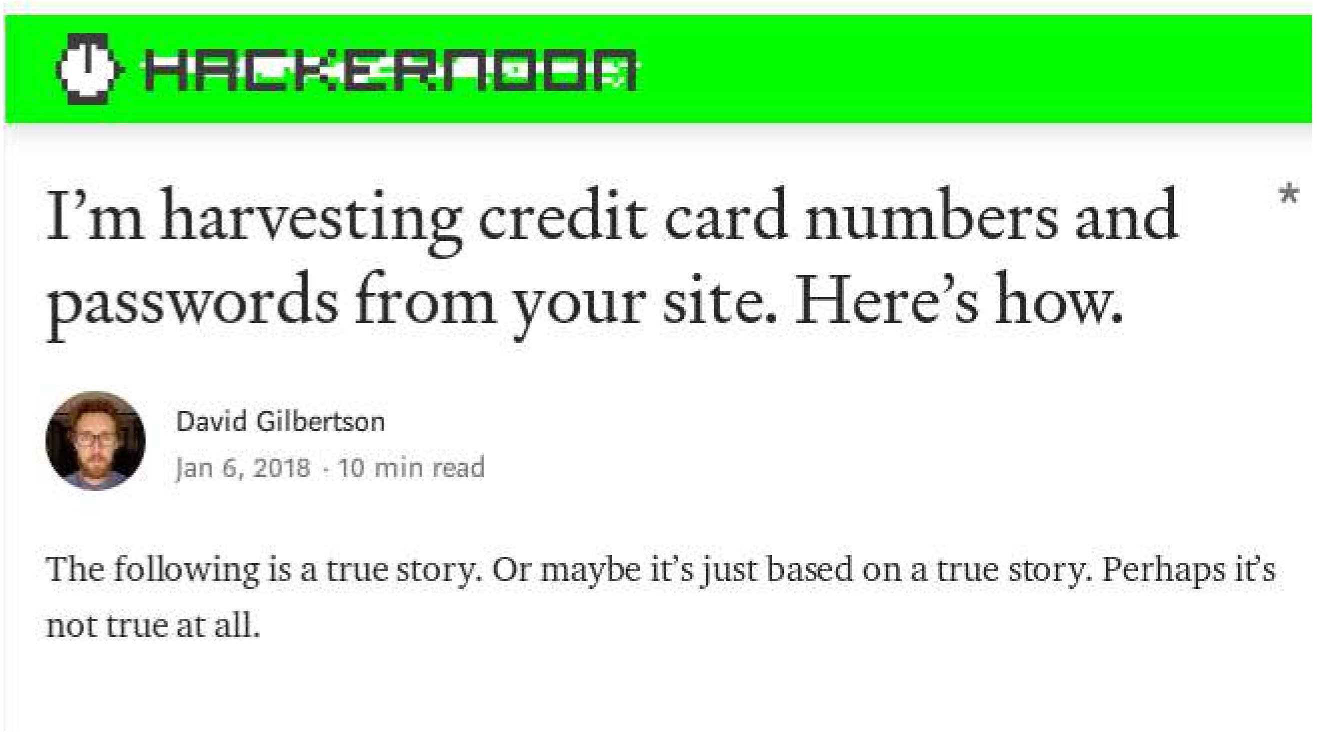
HACKERNOON

I'm harvesting credit card numbers and passwords from your site. Here's how.

David Gilbertson

Jan 6, 2018 · 10 min read

The following is a true story. Or maybe it's just based on a true story. Perhaps it's not true at all.

https://hackernoon.com/im-harvesting-credit-card-numbers-and-passwords-from-your-site-here-s-how-9a8cb347c5b5

## Attacks don't happen in practice!

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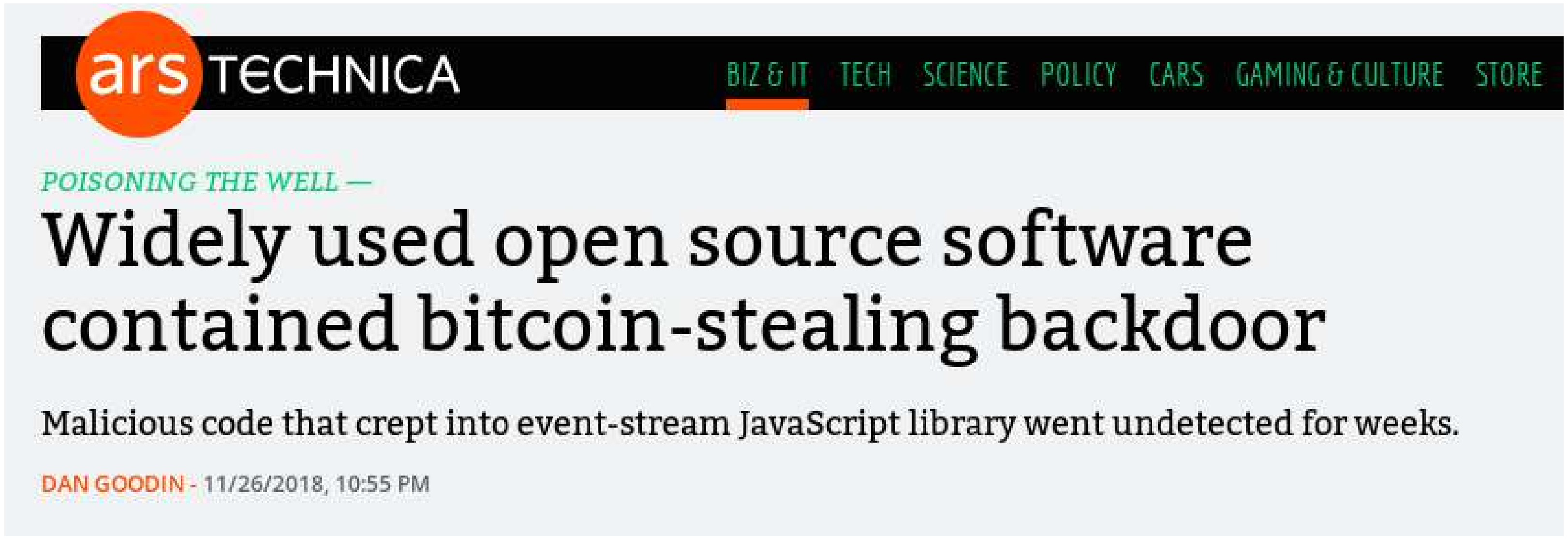


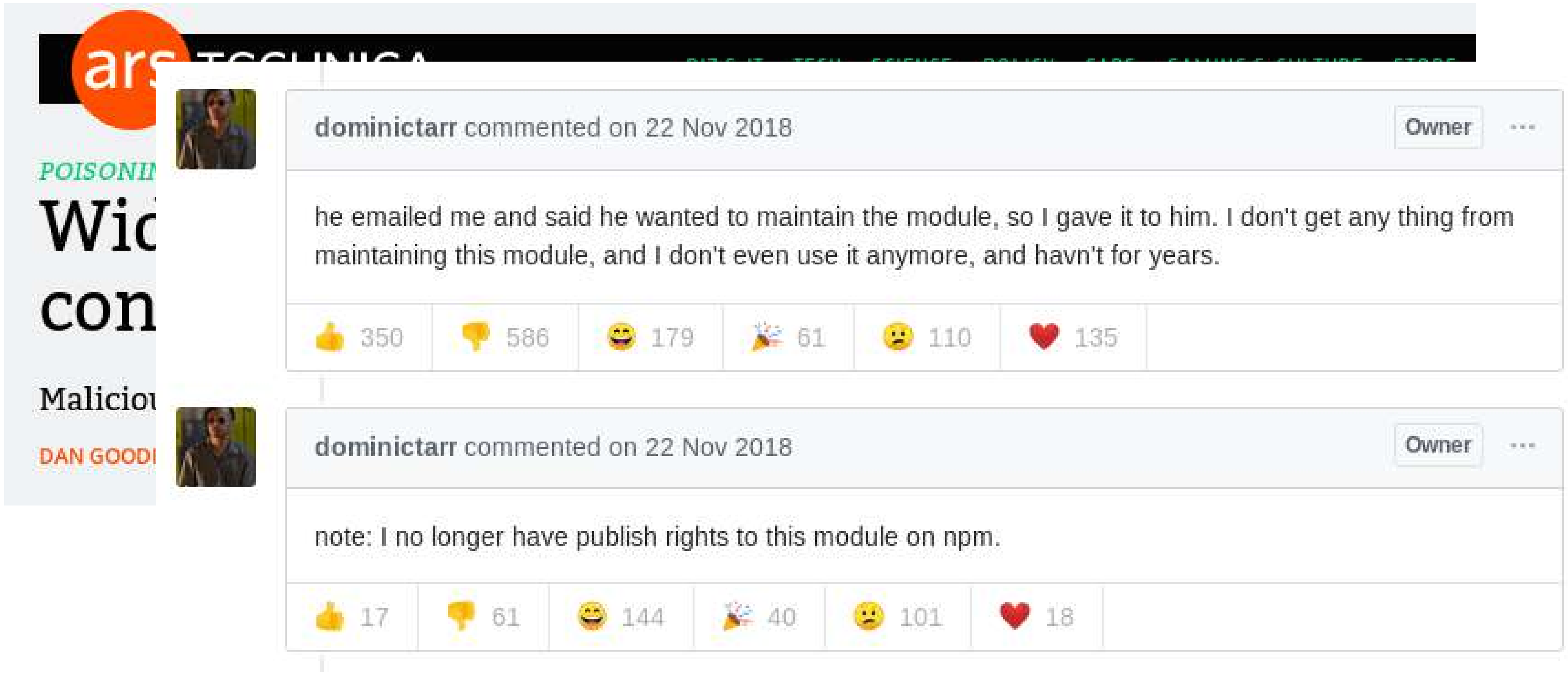
POISONING THE WELL —

Widely used open source software contained bitcoin-stealing backdoor

Malicious code that crept into event-stream JavaScript library went undetected for weeks.

DAN GOODIN - 11/26/2018, 10:55 PM

# Attacks don't happen in practice!



**dominictarr** commented on 22 Nov 2018

he emailed me and said he wanted to maintain the module, so I gave it to him. I don't get any thing from maintaining this module, and I don't even use it anymore, and havn't for years.

👍 350 👎 586 😄 179 🎉 61 😕 110 ❤️ 135

**dominictarr** commented on 22 Nov 2018

note: I no longer have publish rights to this module on npm.

👍 17 👎 61 😄 144 🎉 40 😕 101 ❤️ 18

https://github.com/dominictarr/event-stream/issues/116
https://arstechnica.com/information-technology/2018/11/hacker-backdoors-widely-used-open-source-software-to-steal-bitcoin/

## MIT License (excerpt)

> *“ THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, (...) INCLUDING BUT NOT LIMITED TO (...) FITNESS FOR A PARTICULAR PURPOSE (...).*
>
> *IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY (...) ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE (...).*

https://opensource.org/licenses/MIT
https://gist.github.com/dominictarr/9fd9c1024c94592bc7268d36b8d83b3a

## So what can we do?

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> *“ Rule 6: Be proactively paranoid - paranoia does not work retroactively*

https://www.youtube.com/watch?v=S8GPTvq1m-w
(nsfw language)

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- Static analysis of dependencies 😶
- Something else? 🤔

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- OK for individual devs
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- generalizable (!)

## What do we need?

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> *Your own decentralized package security audit network of trust*

## Public key cryptography refresher

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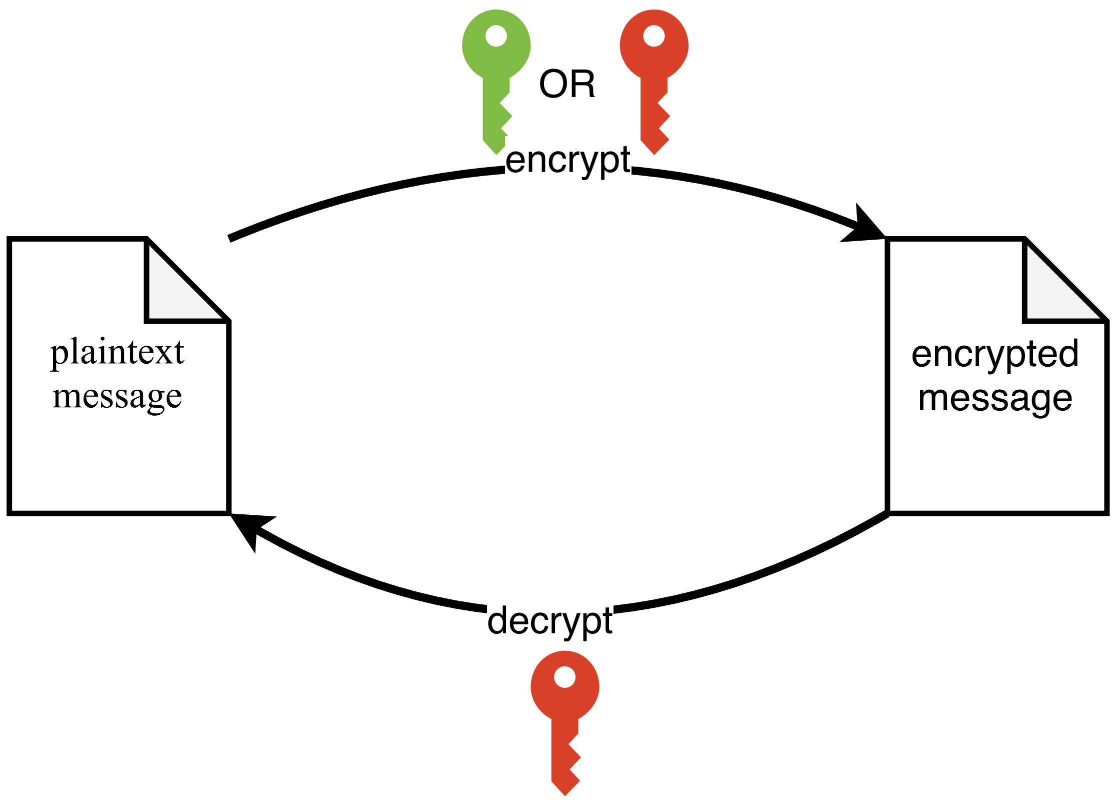

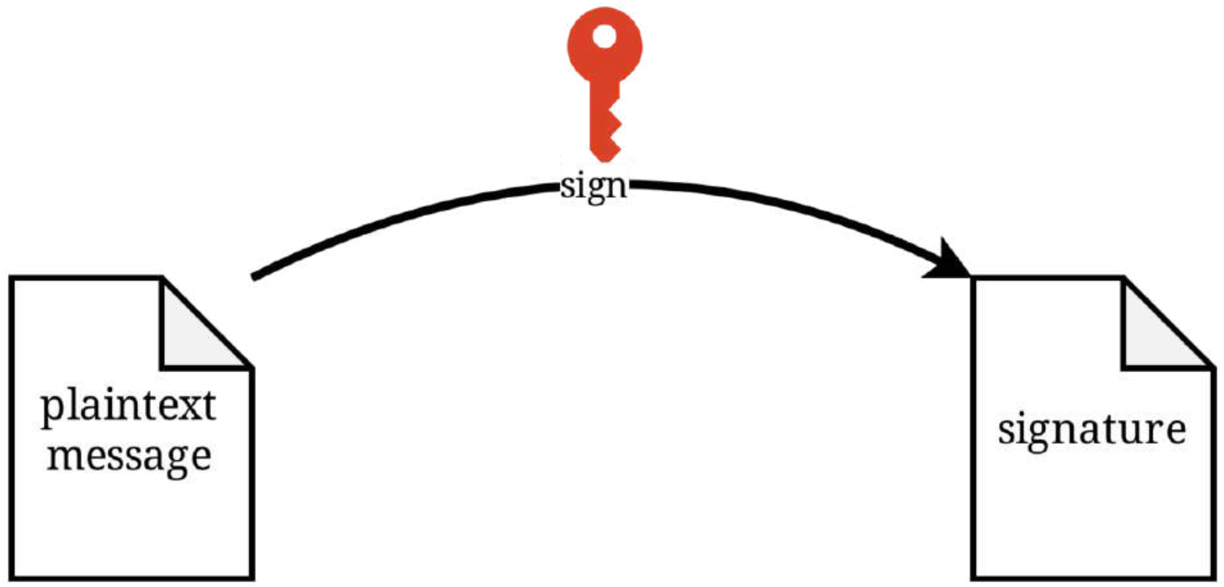
sign
plaintext message
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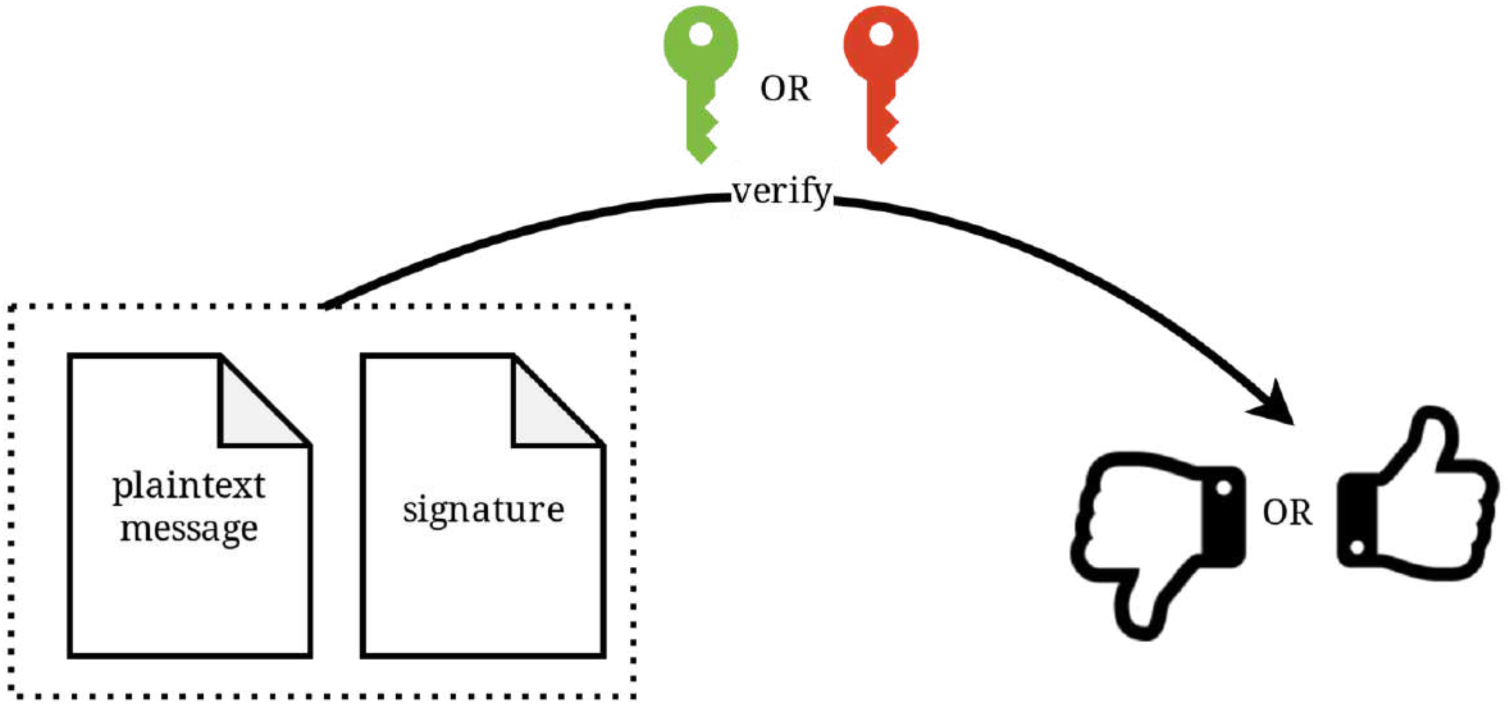
OR
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OR

## How does Hoplon work?

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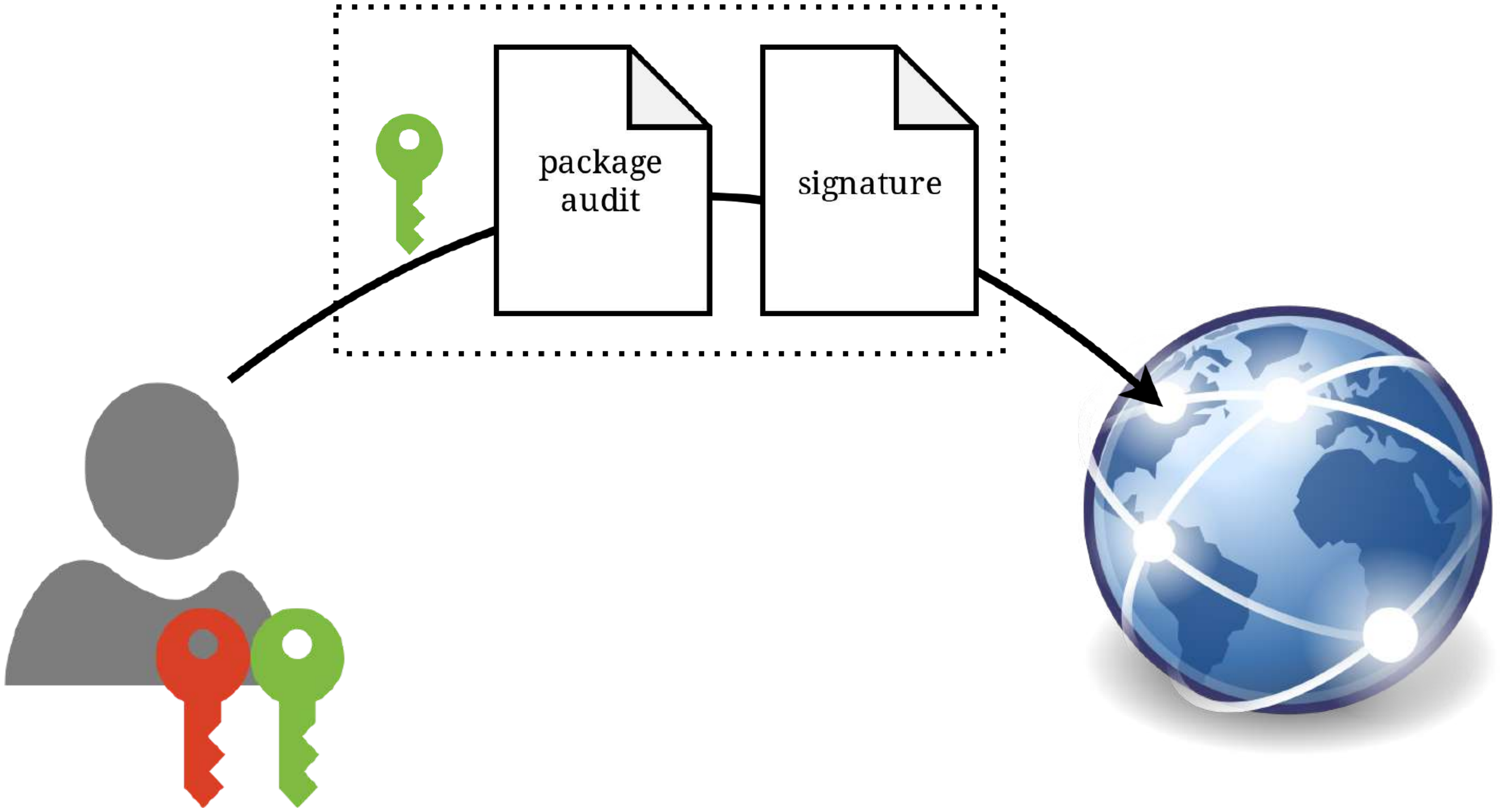

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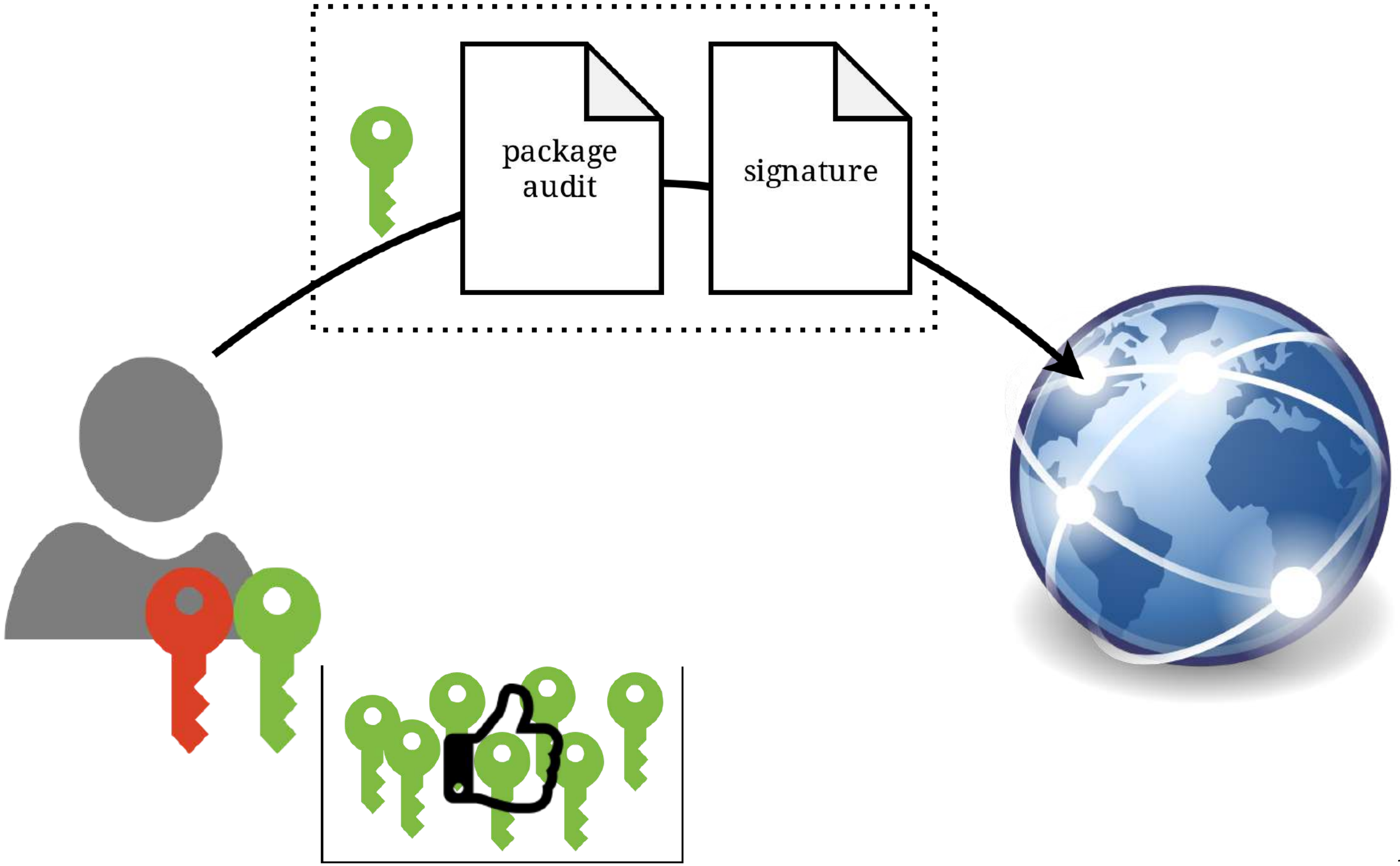
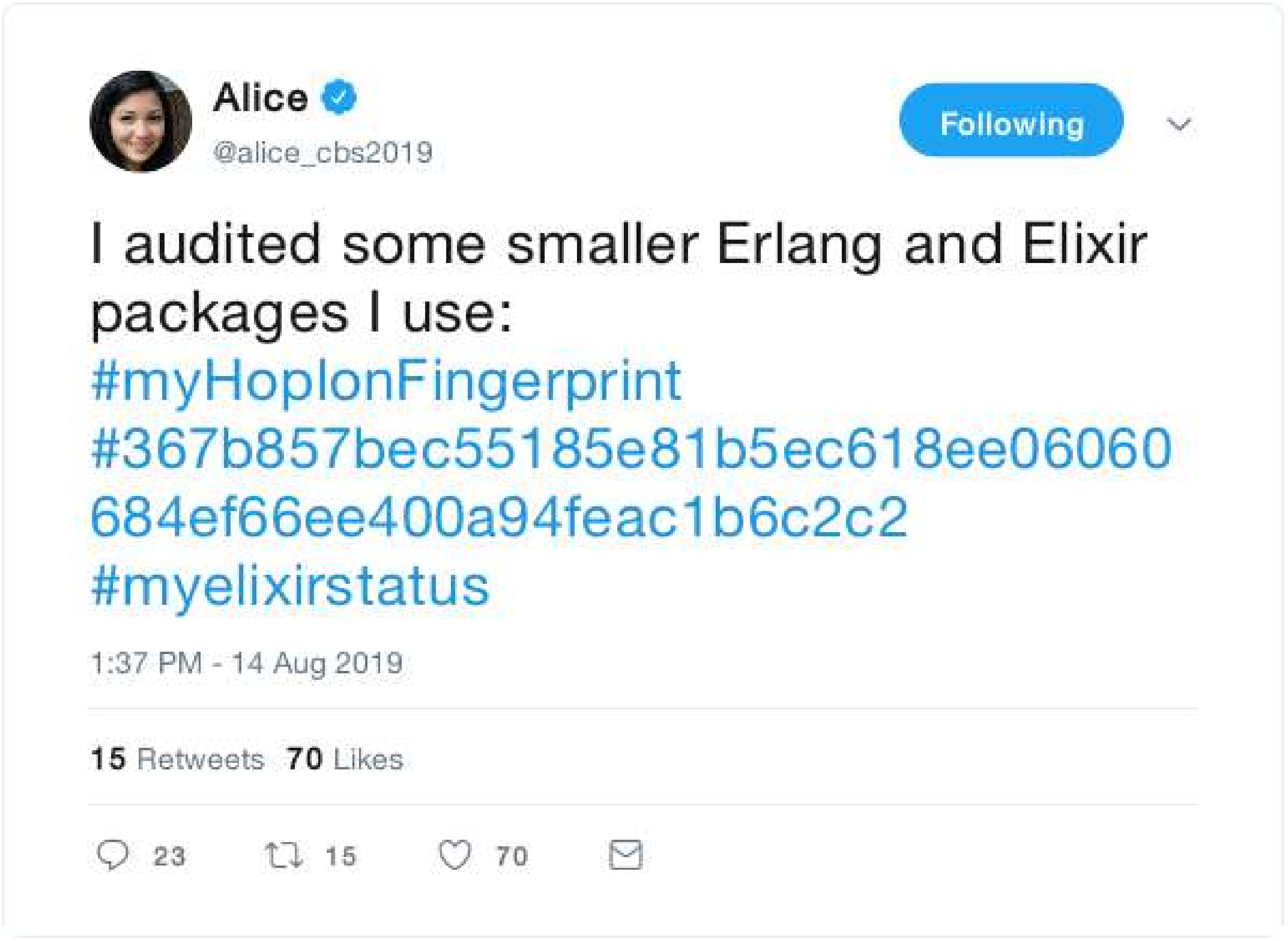


## Demo



Alice
@alice_cbs2019

Following

I audited some smaller Erlang and Elixir packages I use: #myHoplonFingerprint #367b857bec55185e81b5ec618ee06060684ef66ee400a94feac1b6c2c2 #myelixirstatus

1:37 PM - 14 Aug 2019

**15** Retweets **70** Likes

23 15 70

https://thispersondoesnotexist.com/

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  - :public_key, :asn1ct, :httpc

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    - validate the workflow!

I need you!

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- key revocation
- features
    - utility APIs?
    - diffs between versions?
    - transitive trust?

# Thank You!

github.com/nietaki/hoplon

slides.com/nietaki/trust-issues

## Bonus slides...

## Learned along the way

- Cryptography
- ASN.1 is cool
- stream_data is cool
    - but I still want to play with PropEr
- Raxx and Raxx.Kit is very productive!
- Testing Mix Tasks (with I/O) can be alright

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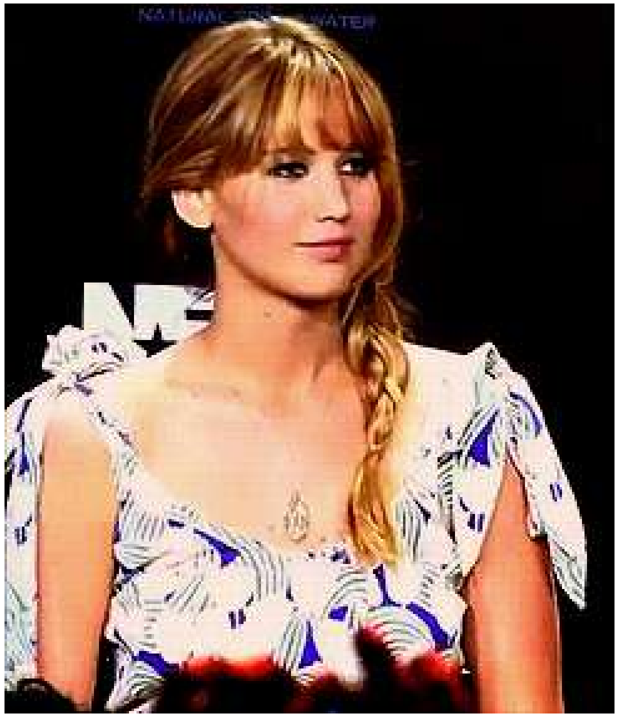

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- https://gist.github.com/nietaki/4a842365e648f5ad73b4784ef05695c9

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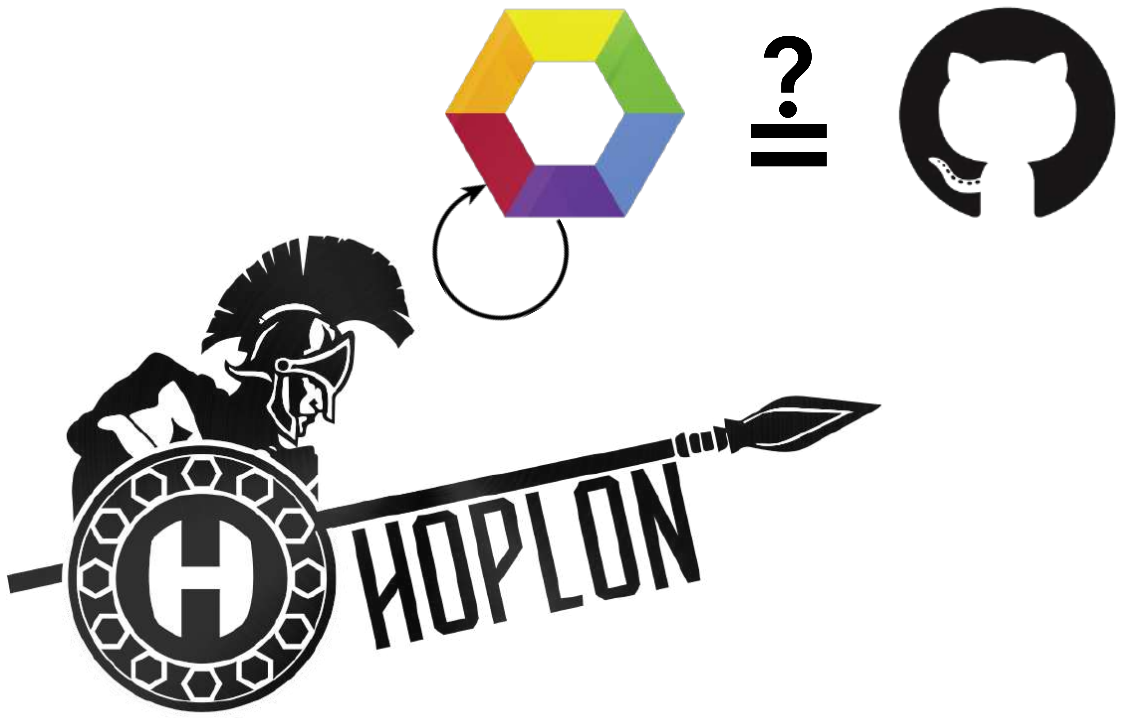

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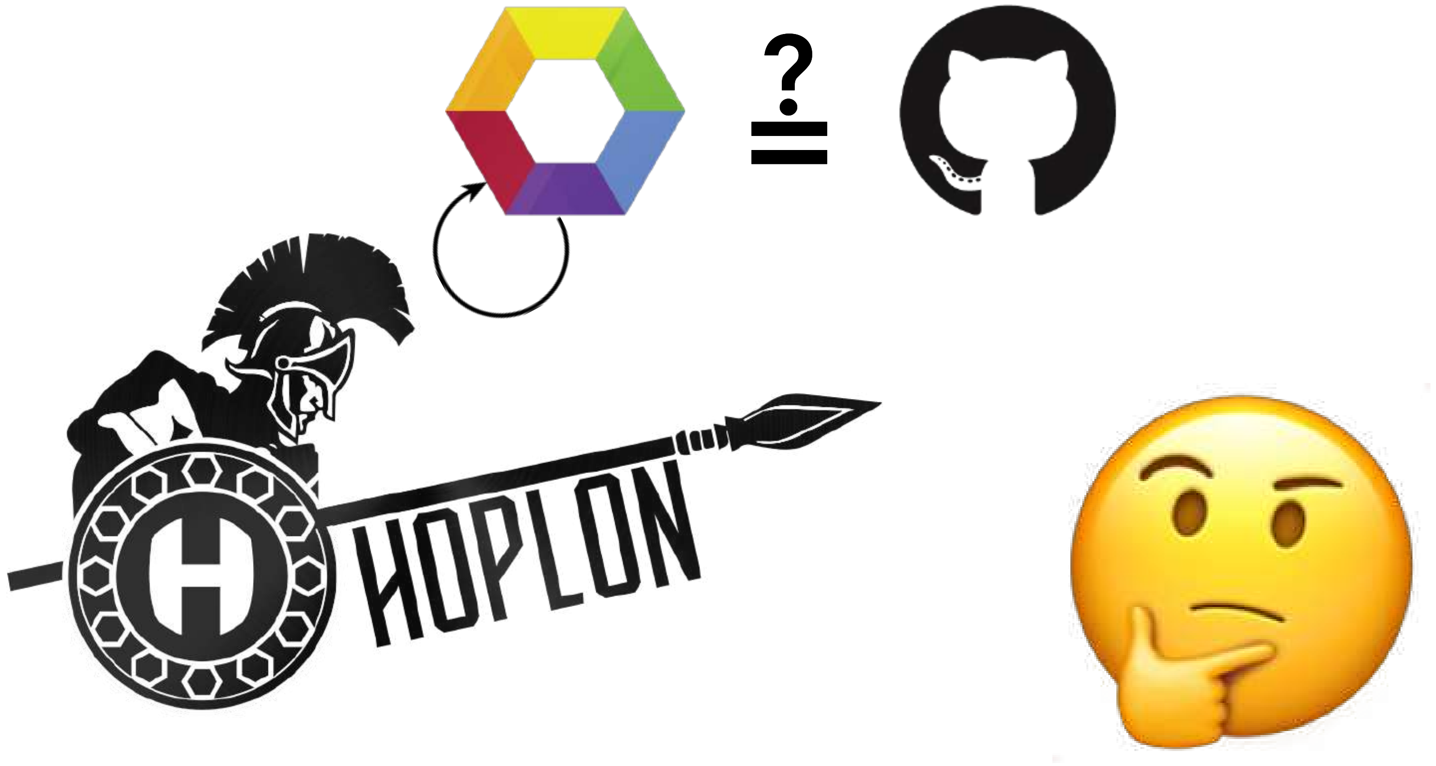

## What's an audit?

https://github.com/nietaki/hoplon/blob/master/lib/HoplonMessages.asn1

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- package definition
  - ecosystem (hex.pm)
  - name
  - hash
  - version (for convenience)

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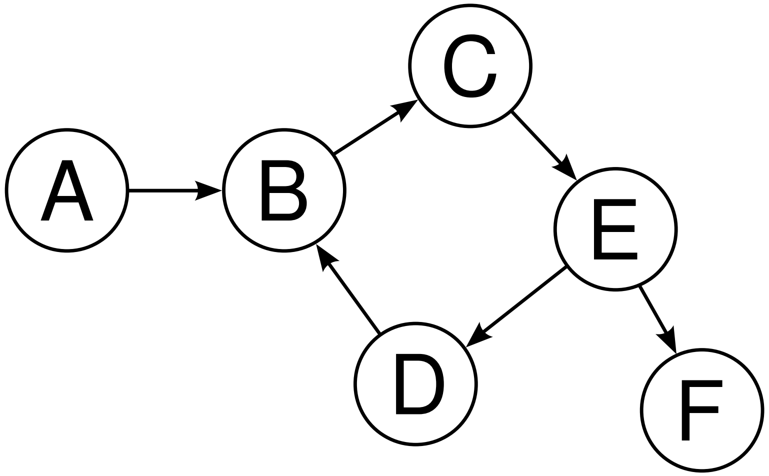

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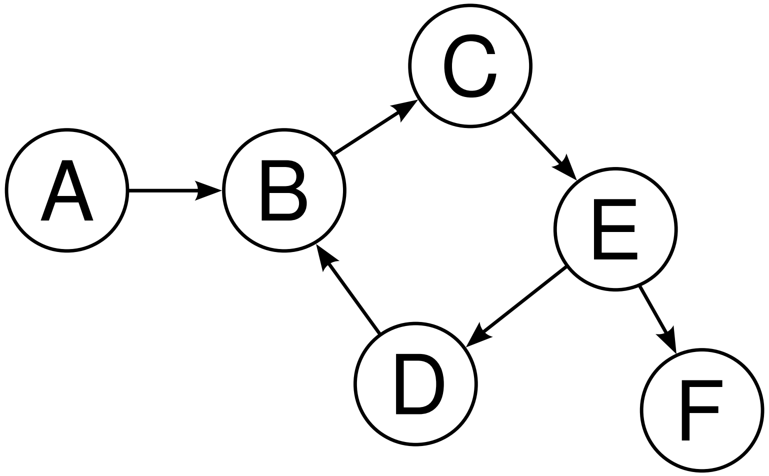
$$\begin{tikzcd}
 & & C \arrow[dr] & \\
A \arrow[r] & B \arrow[ur] & & E \arrow[dl] \arrow[dr] \\
 & & D \arrow[ul] & & F
\end{tikzcd}$$

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