NPM Security

Security & Stability risks when working with node package manager(s).

Why tho?

- prevent build and production failures
- prevent system compromisation
- prevent leaking of secret information

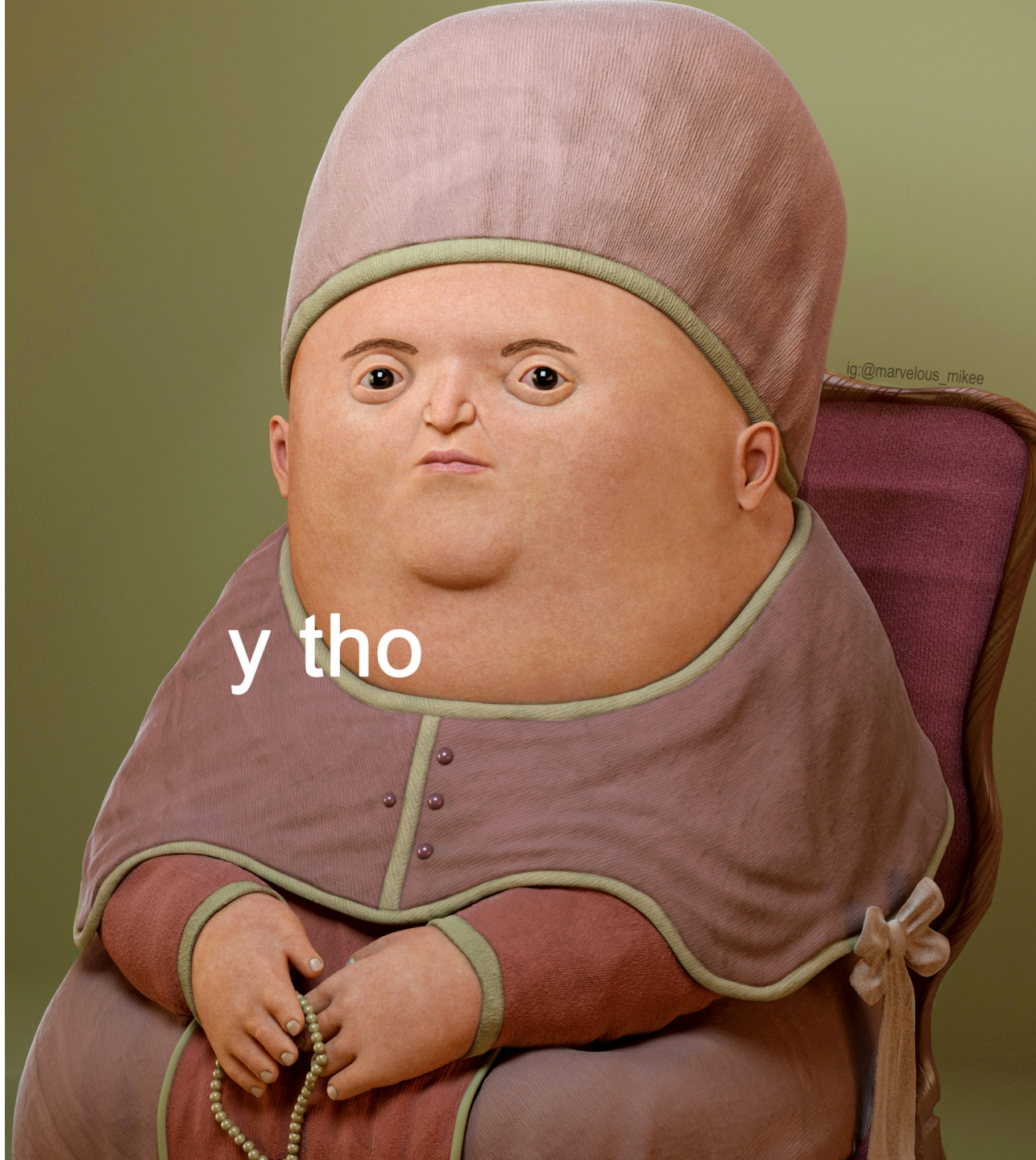


Image courtesy of Miguel Vasquez

Attack Vectors

Most common attack vectors you'll encounter are …

- Typosquatting
- Malicious Contributors
- Malicious Packages

Typosquatting 🅰️

Typosquatting takes advantage of a developer unwillingly installing a package with a slightly different, mispelled name.

In monst cases those packages are similar to the original packages but include one or another malware or malicious code.

Typosquatting Examples

```
npm install -
```

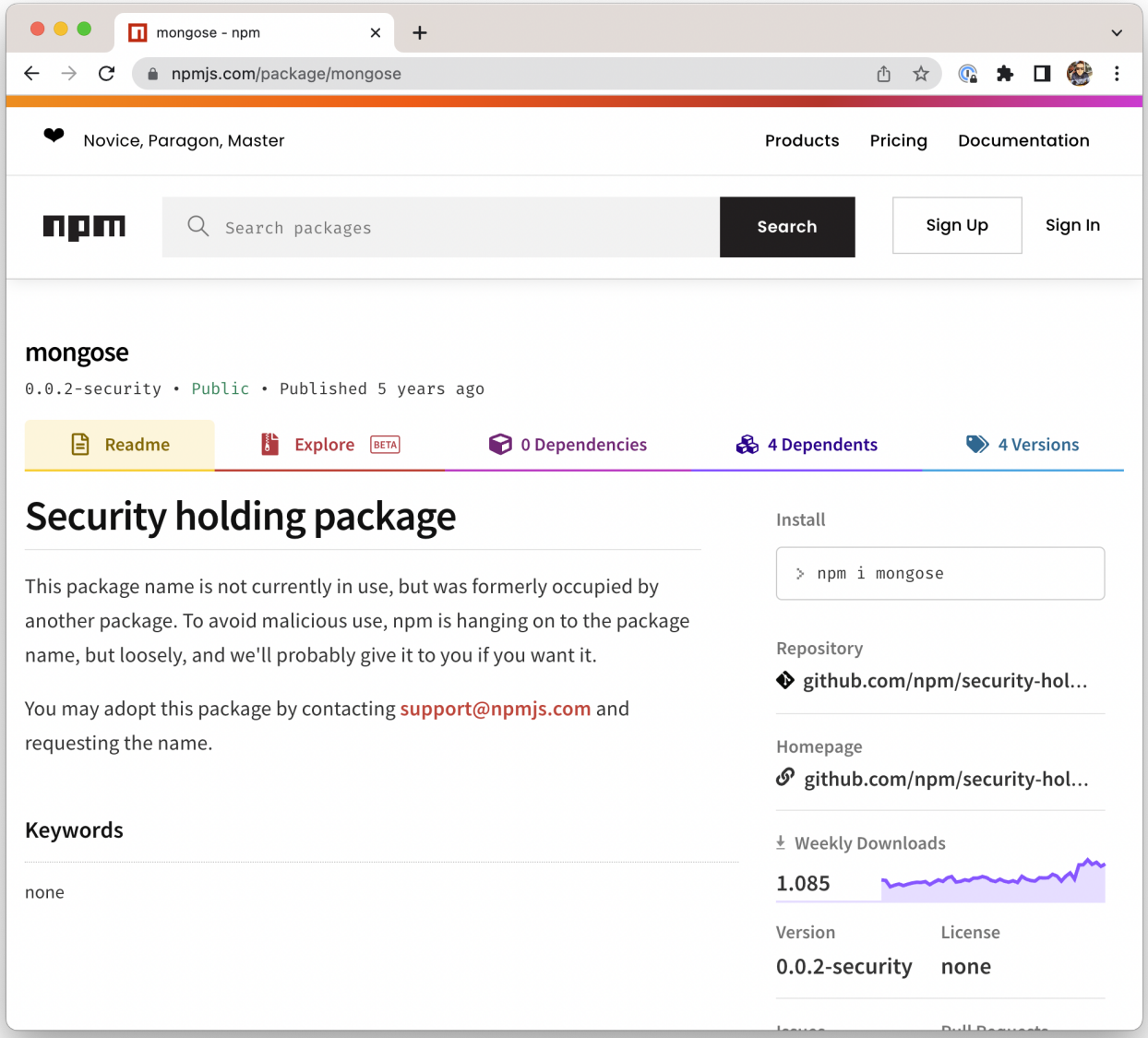
Would install the empty package `-` which still has **26.000 Downloads** a week!

image showing security placeholder on previously malicious packages

In most cases not harmfull as many packages have been disarmed by npm in the past. Some examples:

mongoose - mongose
cross-env - crossenv or crossenv.js
lodash - lodashs
babel-cli - babelcli

… some still have more than 1k downloads a week! (*Though they are empty!*)



Compromised Contributors 👤

Some open source packages have many contributors that have access to publish npm packages. Some of these processes are automated using NPM tokens.

In case those accounts are hacked or tokens are leaked this opens up the possibility to manipulate the packages.

- **Protect your NPM Account with 2FA**
- **Protect your NPM Token in CI secrets**

Malicious Contributors 😈

A package contributor decides willingly to break a package or inject malicious code.

Example: marak colors and faker package 2022 (full story: 1, 2)

unicode madness / endless loop from malicious colors package

Malicious Package? 🤔

A Malicous package can use at least two attack vectors injecting and executing code on behalf of the user or system.

Abused Lifecycle Hooks ♻️

npm lifecycle hooks (preinstall, postinstall) containing shell scripts or any kind of executable code.

- run in background (use: `--foreground-scripts`)
- executed with the permission of the user that ran `npm`

Everything is possible: Leak environment variables, configuration files, install malware, trojans, manipulate & delete files.

Malicious Source File(s) 😡

Every file that is included in a project can contain malicious parts!

Those parts are not easy to get as the code is in most cases obfuscation, encoded and mangled.

Again – this opens abilities to leak environment variables, configuration files, install malware, trojans, manipulate & delete files.

Demo: Malicious Package ⌨️

Install a package containing a `preinstall` shell script to show the current username in a OSX notification.

see examples/node-package-security-risks directory

Countermeasures 

We can do something! 💪

- use `npm ci` (even on dev machines!)
- do not install packages for everything
- use packages with a certain age
- never edit `package.json` versions by hand

📌 pin versions

Use exact version (no semver-ranges) to make sure no undesired updated version is installed.

```
npm install --save-exact <package-name>
```

or make it the default behavior

```
npm config set save-exact true
```

not recommended for library type of modules cause of package dublication

ignore scripts 🙈

```
npm ci --ignore-scripts
npm link --ignore-scripts <path>
npm install --ignore-scripts <package>
npm update --ignore-scripts <package>
```

or disabling scripts once and for all:

```
npm config set ignore-scripts true
```

Check if your project uses scripts at all with `can-i-ignore-scripts`

use npq

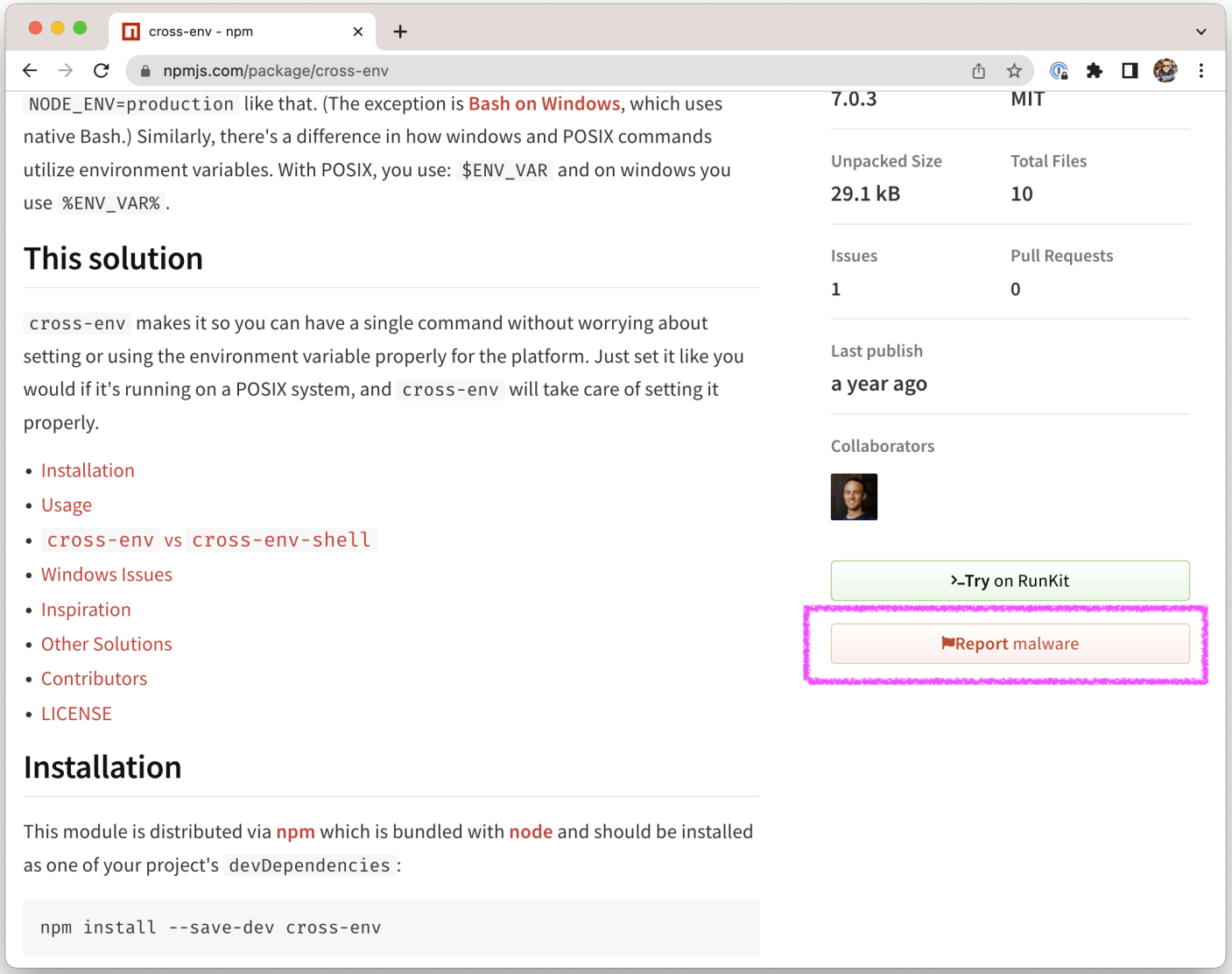
- runs several "marshals" before installing
- but still not 100% secure

Try it:

```
npx npq install cross-env.js
```

report packages

Use the Report Malware Button



Use package rating websites

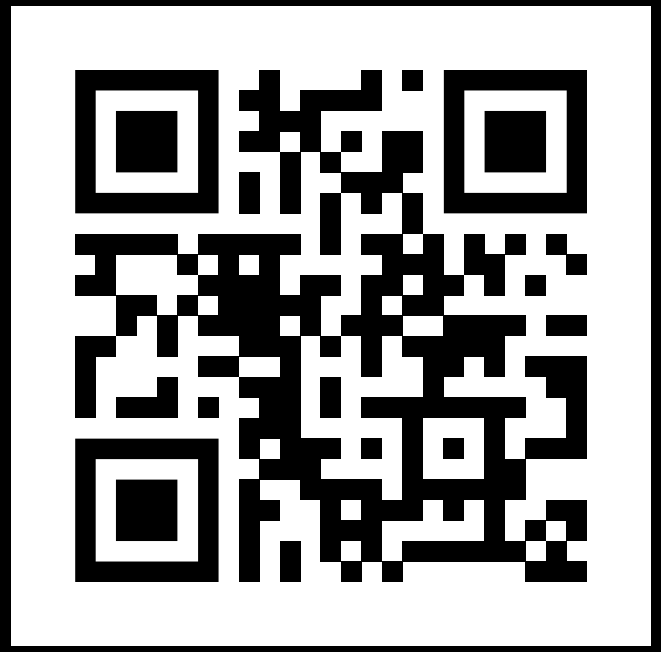
Check packges on websites that collect additional information about packages like popularity, ratings, stars, update-frequency, downloads, number of issues and other kpis and metadata:

- https://snyk.io/advisor/npm-package
- https://openbase.com
- https://www.npmtrends.com

More to Read 

Most important thing is to be aware of security-related topics and not ignoring them.

- General Security
  - What you need to know when installing packages, Account Takeover
- Typosquatting
  - Typosquatting Explained, Attack undetected for 2 weeks
- Malicious Modules
  - 25 compromisde packages, discord packages, crypocurrency miner, Azure Developer Attack (jfrog), Malware Civil War (jfrog)



Thanks for listening! 🐼

Please give feedback & ask questions!