

Package mis-management

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Disclaimer

- This talk was prepared very spontaneously.
- We don't claim to have all the solutions, but we want to point out problems we see.
- We don't want to blame the people running package managers. They're often volunteers with little support from the industry that uses their work.

Outline

- Incidents
- Theoretical attacks
- Future

PyPi

149,452 pkgs (August 19)

*) <http://www.modulecounts.com/>

Typosquatting in Programming Language Package Managers

Master Thesis by Nikolai Tschacher in March 2016

<http://incolumitas.com/2016/06/08/typosquatting-package-managers/>

Attack 1: standard library names

Register python standard library names, hope someone will install them.

3929 installations of urllib2 in two weeks.

Attack 2: Typosquatting

Register slight variations and common typos of popular packages names (setuptols instead of setuptools).

After they finished that research they deleted all the packages they had registered.

So we could register them and count how many of them were installed.

<https://pytosquatting.overtag.dk/>

September 2017:

Slovakian CERT discovers packages with obfuscated setup code doing callbacks to a chinese IP.

<http://www.nbu.gov.sk/skcsirt-sa-20170909-pypi/>

PyPI now blocks all standard library names.

(Tested w/ Python 3.7)

PyPI did not block all the previously abused typo names.

We were able to re-register some of them yesterday

npm

680,893 pkgs (August 19)

Malicious packages in npm

Typo-packages send environment variables to attacker's server.

<https://iamakulov.com/notes/npm-malicious-packages/>

Backdoor in npm package getcookie

Deprecated package "mailparser" added pointless dependency to getcookie.

<https://www.infoq.com/news/2018/05/npm-getcookies-backdoor>

eslint incident

Packages "eslint-scope" and "eslint-config-eslint" sent npm configuration file .npmrc to attacker's server.

Likely compromised developer account due to password reuse.

<https://eslint.org/blog/2018/07/postmortem-for-malicious-package-publishes>

Snap malware 1/3

Cryptocurrency miner disguised as the “systemd” daemon.

At least two of the snap packages, 2048buntu and Hextris, uploaded to the Ubuntu Snaps Store by user Nicolas Tomb, contained malware.

Snap malware 2/3

Uploaded as proprietary software. No sources.

Currently, it is impossible to establish the number of affected users because the Ubuntu Snap Store does not provide an install count.

Snap malware 3/3

Malware author's statement/trolling:

In reference with my applications in the snappy store, I wanted to explain that it was my way of monetizing the software. (It was not prohibited in the store regulations)

...

By the way, it should be noted that such situations may happen more often (not from my side). Maybe I could help in securing this.

It's not Canonical's fault or snappy packages (in flatpak it is possible). Closed software will always do something that you can not influence.

Snap malware 4/3

...and then Snap maintainers edited the package and removed the Malware and published a new version!



Honorable mentions

- npm 5.7.0 which broke irreversibly broken production servers
<https://github.com/npm/npm/issues/19883>
- Yarn doesn't have a security model?
<https://github.com/yarnpkg/yarn/issues/1169>
- Browser extensions (next slide)

Browser extensions

>20 Million Users Installed Malicious Ad Blockers From Chrome Store

(April 2018)

<https://adguard.com/en/blog/over-20-000-000-of-chrome-users-are-victims-of-fake-ad-blockers/>

Big Star Labs

Browser extensions + mobile apps invisibly collecting users' browsing history

- Block Site. Privacy policy.
Android app with 100,000+ installs.
Chrome extension with 1,440,000+ users.
Firefox extension with 119,000+ users.
- Poper Blocker. Privacy policy.
Chrome extension with 2,280,000+ users.
Firefox extension with 50,000+ users.
- CrxMouse. Privacy policy.
Chrome extension with 410,000+ users.

<https://adguard.com/en/blog/big-star-labs-spyware/>

Buying Chrome extension

The developer of a popular Chrome extension ("Add to Feedly") sold his extension after he got a lucrative offer.

The new version of the extension started injecting Ads into web pages.

Hypothetical attacks

Buying packages?

We haven't seen something alike for package managers, but it's a plausible threat scenario.

The popular dependency


The David Gilbertson scenario:

Package maintainers are insensitive to new dependencies

=> Easy to spread on "dependency hell" platforms (NPM, PyPi, Ruby Gems etc)

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

StackOverflow support

 StackExchange

Search on Ask Ubuntu...

[Home](#)
[Questions](#)
[Tags](#)
[Users](#)
[Unanswered](#)

▼ create a script to replay recording (cf. `$HOME/.record.again`)


Install

I also created an installation script

```
curl --location https://git.io/record-gif.sh | bash -
```

[share](#) [edit](#) [flag](#)

edited Apr 13 '17 at 12:23

 Community ♦
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A variety of problems

- Usually no moderation, everyone can add packages.
- Developers may practice bad security and get compromised.
- Developers may turn bad / collaborate with bad actors.
- Insufficient post-incident handling by package managers.

Many of these are hard problems and there are not always obvious solutions.

Moderated or not?

The "Debian" model: Only a closed group of developers can upload packages, becoming a developer is a manual process.

The PyPi/NPM/... model: Just sign up on a web page, everyone can upload packages with no vetting.

Open and risky

The open model has obvious risks, but it also brings a lot of agility to the development process.

It's unlikely that a project like PyPi will switch to a moderated model.

Partial work-arounds

Exists: Reactionary / hindsight

Possible future: Opt-in security hardening?

(Like Yarn for NPM)

Is the distribution model eroding?

It looks like we're observing an erosion of the most secure model.

Snap/Flatpak make Linux distributions move away from a moderated model.

PPAs and other unofficial sources are popular.

curl <https://install.fancy.io> | sudo bash

Is software distribution becoming less secure?

Direction of Snap

Good question... some issues:

- Hard to find sources (impossible for proprietary pkgs)
- Build reproduction!? (run in CI)
- Hard to assert the publisher (currently no certified publishers)
- Anyone can add a package
- Maybe good: CI is run by Canonical, no alternatives

Canonical pushing snap:

- Default Snap + daemon since 16.04
- 18.04 has gnome-calculator as a snap
- Official Ubuntu Twitter account.

Search: `snap from:ubuntu` - 11 updates this August, almost daily now!

- (example next slide)



Ubuntu 
@ubuntu

Following



You know what #ubuntu really needs? More ponies! Install ponysay from the snap store, and you can help fix this important problem!



snap install ponysay

bit.ly/2MBkZqa



Is the Debian model even good enough?

The "Debian model" assumes developers are honest, their machines not compromised and that the infrastructure is trustworthy.

Reproducible builds

Debian is working on it, but "reproducible by default" is still years away.

Binary Transparency

Idea: Storing package data in an auditable, append-only structure.

Goal: You can't un-release packages without leaving a trail.

Good things to do

- Block previously abused namespaces.
- Use HTTPS, particularly for all downloads outside a verified distribution system.
- Don't delete / unpublish old versions with security problems (no matter if binary or source).
- Store release hashes in an auditable append-only structure. (You likely already have one: Your Git repo.)

Call for the community

- More understanding of platforms like Snap, Flatpak etc. needed?
- Pen testing!
- Friendly typo/namesquatting?
- Call out bad practices
- Help good package managers distribute faster (become a maintainer?)