$ whoami

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Agenda

1. The Before Times
2. Log4Shell
3. SBOMs
4. XZ Utils
5. Supply Chain Attacks
    a. The Types
    b. The Tactics
    c. The Targets
    d. The Tools
6. Takeaways

My Biases

- This talk is mainly about application security
  - (as opposed to regulatory compliance, OS hardening, etc)
- My background is more Ops than Dev
- I empathize more with blue teams
- I mostly see through an ASPM lens (particularly SCA)
- My day job is soaked in cloud native woo woo
- I have spent most of my career working in open source
  - So the supply chain we're talking about is OSS

An Idea

Before we get started

Paul Novarese · You

Software Supply Chain Security/InfoSec/OPSEC

3mo ·

I'm going to start actually collecting data but it feels like most enterprise software development projects have way more risk from deliberate malware software supply chain attacks than from "traditional" vulnerabilities. Even if this isn't currently the case, it will be very soon since the velocities aren't even in the same neighborhood.

10

8 comments · 1 repost

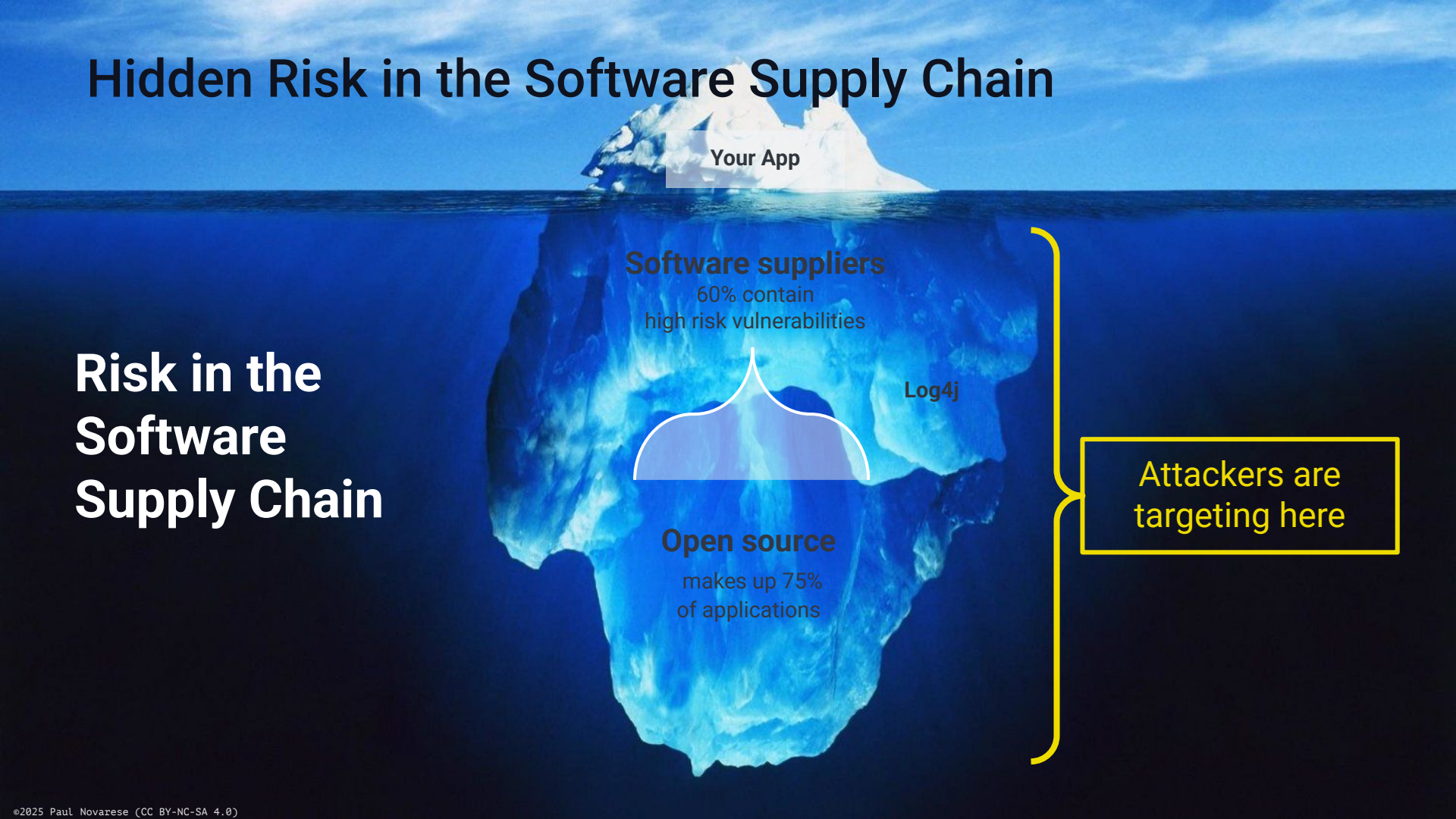
Risk Theory

- Yes, CVEs are increasing
- But, malware supply chain attacks are increasing faster
- CVEs are becoming more noisy, less actionable
- Most of the scores are bogus
- KEV is the only thing that really matters

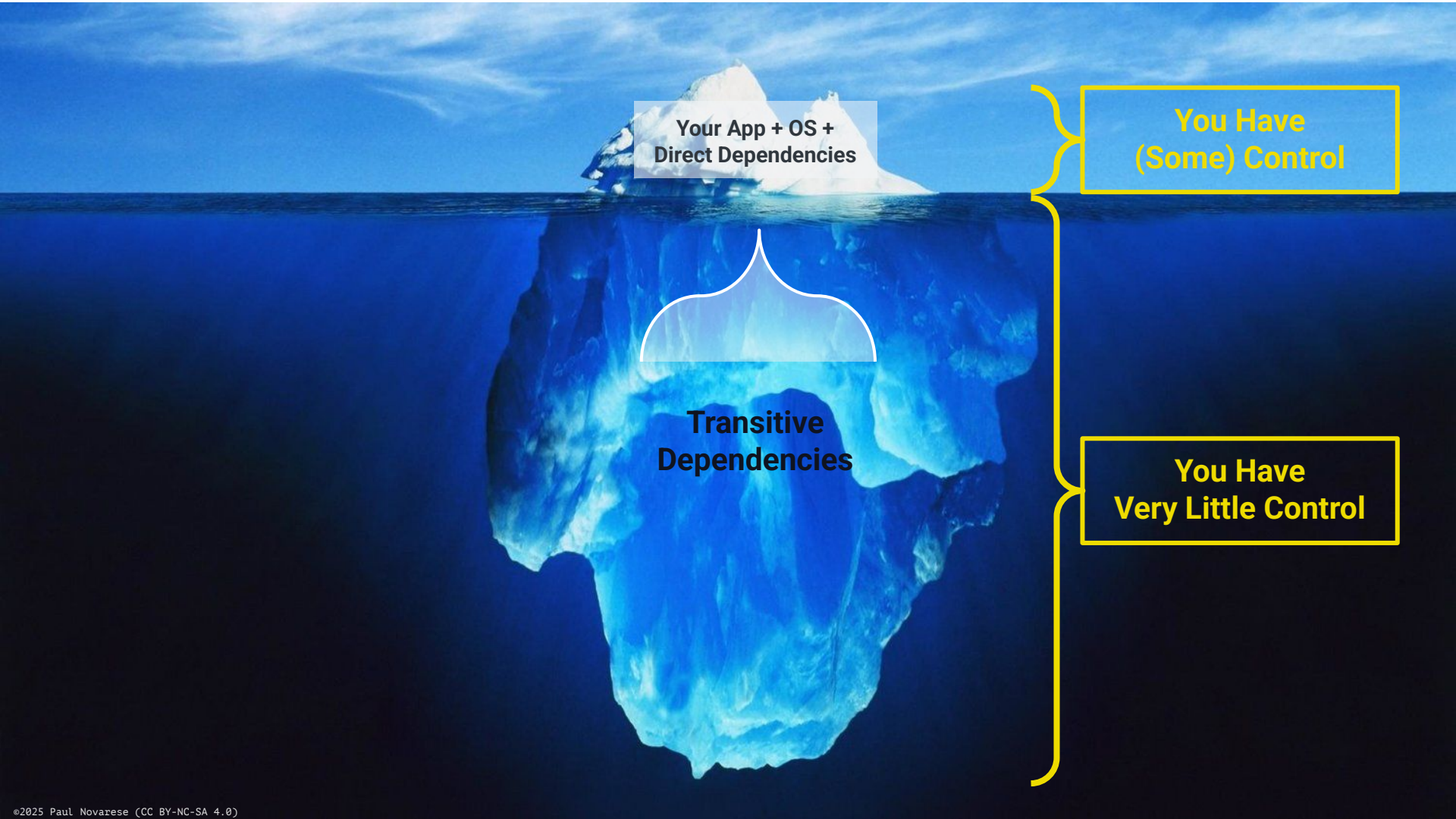
The Before Times

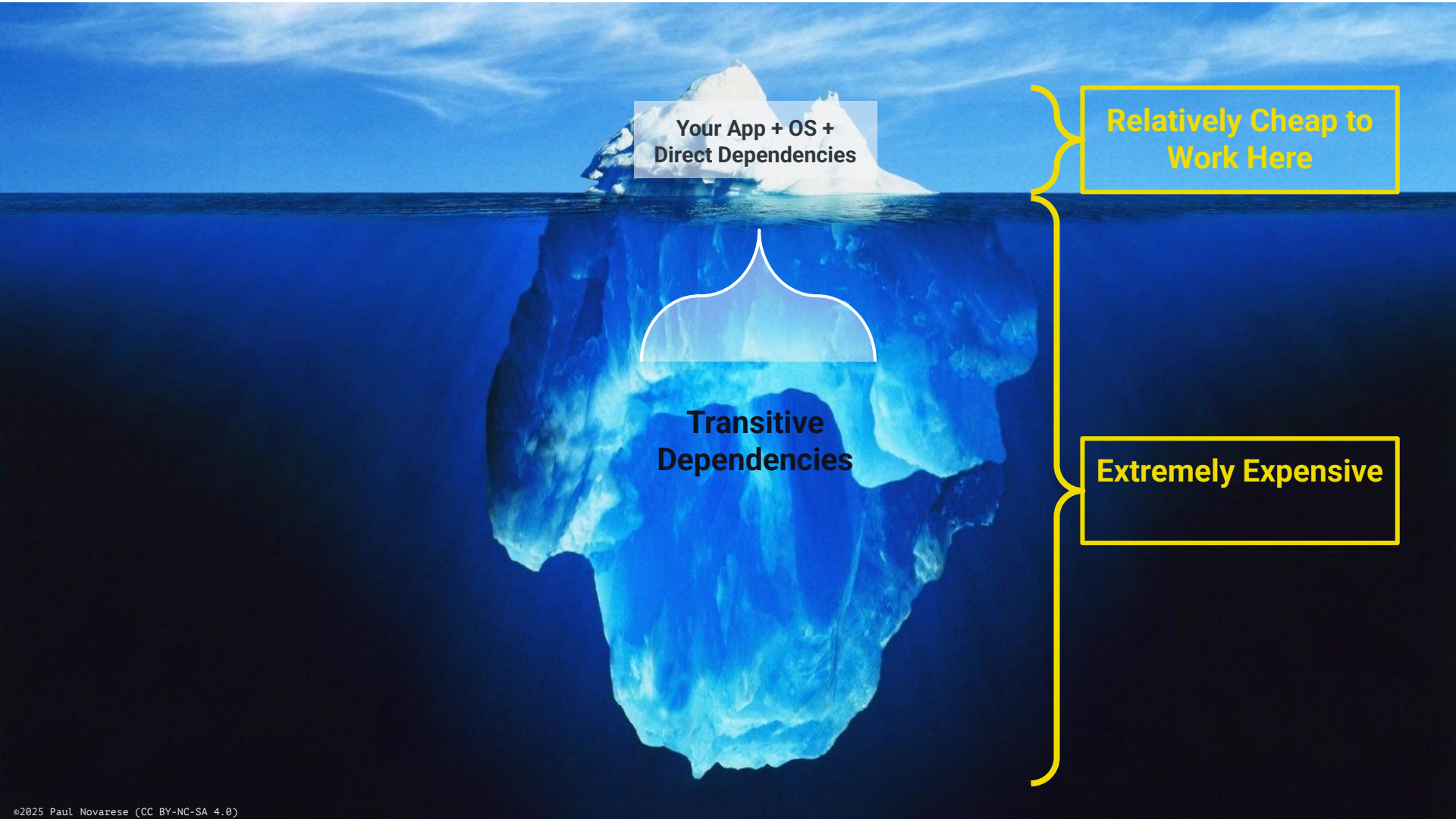
Everything before Log4Shell

Hidden Risk in the Software Supply Chain



Risk in the Software Supply Chain





What is a transitive dependency?

```
[root@47b22c89d160 /]# pip show boto3
Name: boto3
Version: 1.37.31
Summary: The AWS SDK for Python
Home-page: https://github.com/boto/boto3
Author: Amazon Web Services
Author-email:
License: Apache License 2.0
Location: /usr/local/lib/python3.9/site-packages
Requires: botocore, jmespath, s3transfer
Required-by:
```

```
160 /]# pip show six
Version: 1.15.0
Summary: Python 2 and 3 compatibility utilities
Home-page: https://github.com/benjaminp/six
Author: Benjamin Peterson
Author-email: benjamin@python.org
License: MIT
Location: /usr/lib/python3.9/site-packages
Requires:
Required-by: python-dateutil
```

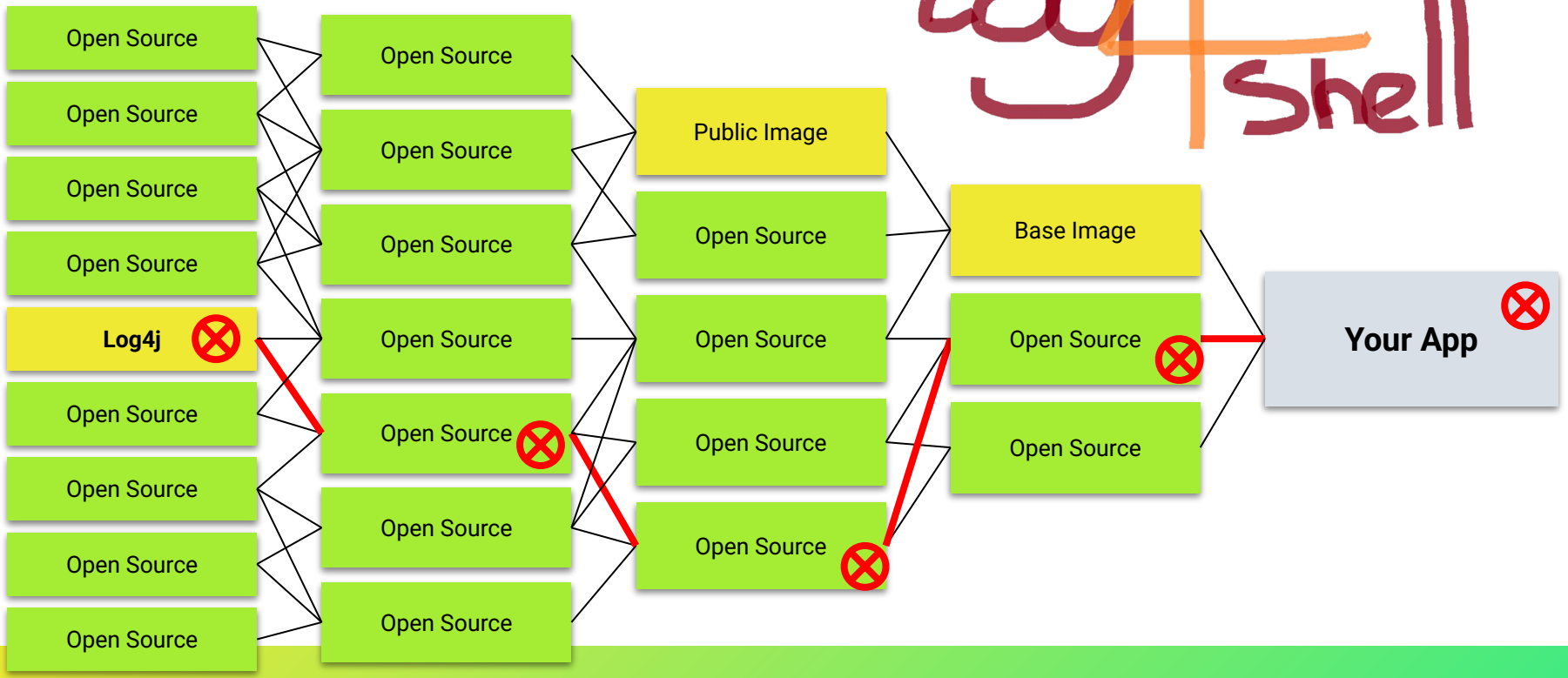
Notes on this Metaphor

- Things have changed a lot but we're still thinking about old systems
- They're attacking the bottom now - that's a supply chain attack
- But really, the top isn't "your code" - the top is your direct dependencies, bottom is transitive
- You can only directly control what's at the top
- Lack of control means "patch faster" won't work and "zero CVE" is not achievable
- They're attacking the whole iceberg, but you probably only know about the stuff at the top
- The CVE system predates this change and hasn't really evolved
- The bottom of the iceberg is growing faster than the top
- You can't just "patch faster" - it's unsustainable
- The change is largely due to the massive rise in software package managers
- If the code is in your direct dependency vs. your transitive deps the vulnerability is still the same isn't necessarily less likely to be vulnerable depending on where it lives
- But having distributed system of dependencies makes it more likely that one link gets compromised
- you would probably have MORE vulnerabilities if you wrote all the code in-house, the more distributed it is the better the bug hunting becomes. But your chances of getting compromised go up.

What Log4Shell Showed Us

The Awakening

The Software Supply Chain



Open Source is Bigger Than You Can Imagine

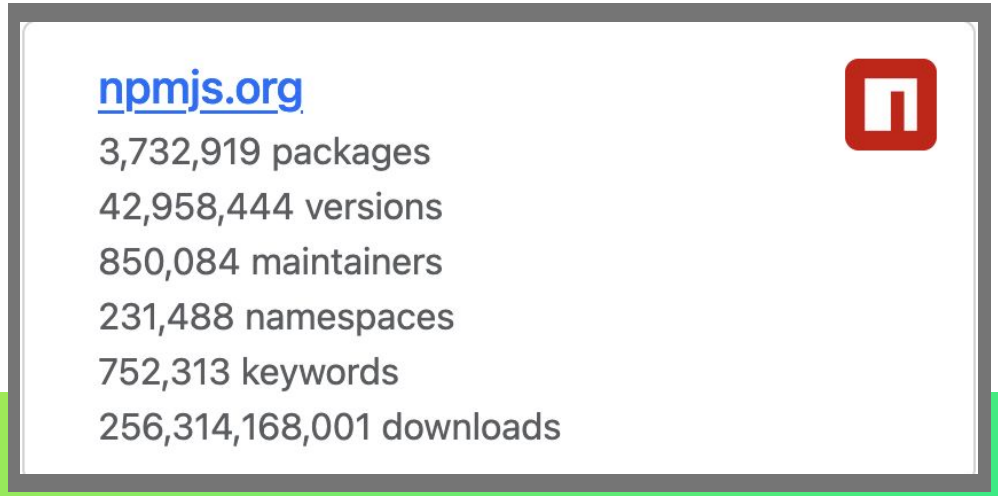
Josh Bressers https://www.youtube.com/watch?v=SEnB9Riiazs

And CVE Growth

Josh Bressers https://www.youtube.com/watch?v=SEnB9Riiazs

Open Source is Huge

- NPM introduced 2010
- 43 million packages (as of April)
- Approx 1,000,000 new packages **per month**
- That’s just NPM!



Log4Shell Recap

- Growth of dependencies is now obvious
- The term “software supply chain” starts to show up
- Many people hear about SBOMs for the first time

- **Bonus**: log4shell is STILL to this day on CISA’s Top 15 Frequently Exploited List
  - (Also the only open source component on that list)
  - **We’ll be dealing with this for DECADES**
  - https://www.cisa.gov/sites/default/files/2024-11/aa24-317a-2023-top-routinely-exploited-vulnerabilities.pdf

SBOMs

A brief note

What is an SBOM?

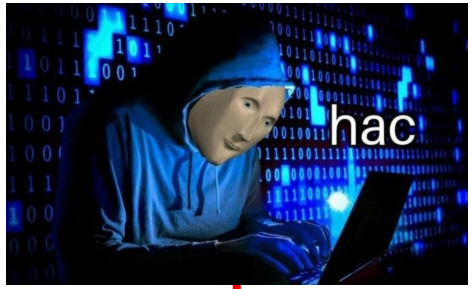
If We Knew What We are Consuming

- People spent insane amounts of time just finding log4j, because nobody knew where (or even if) it was hiding
- Knowing = Faster Remediation
- SBOMs help, a LOT, but… “a phone book is not illuminating”
  - They aren’t a silver bullet
  - Scanners aren’t perfect (e.g. can’t penetrate binary blobs, cf. OpenSSL3.)
  - Not all SBOMs are equal
  - SBOMs aren’t ubiquitous (yet) (producers aren’t reliably supplying them)
  - SBOMs are more accurate and useful when producers/maintainers generate them BUT something is better than nothing
  - SBOM management is hard
  - Any SBOM generated before an actual build is suspect (transitive deps)
  - SBOM Everywhere: https://github.com/ossf/sbom-everywhere

XZ and Beyond

An Amazing Thing Happened at a Unique Moment in Time

The Jia Tan Reverse Funnel Plan



XZ

Fedora

Suse

Debian

Docker Images

RHEL

SLES

Ubuntu

etc

Base Image

Open Source

Open Source

Open Source

Open Source

Open Source

Open Source

Your Organization

Enterprise

Government Agency

Nonprofit

Enterprise

Enterprise

NGO

Government Agency

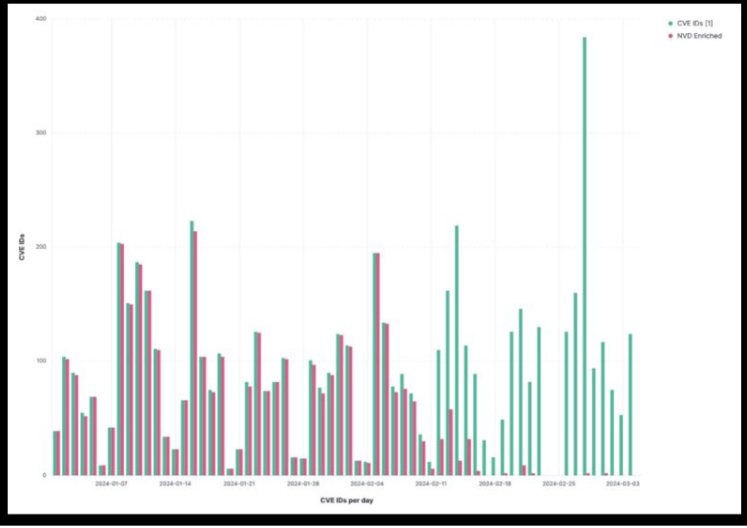
Enterprise

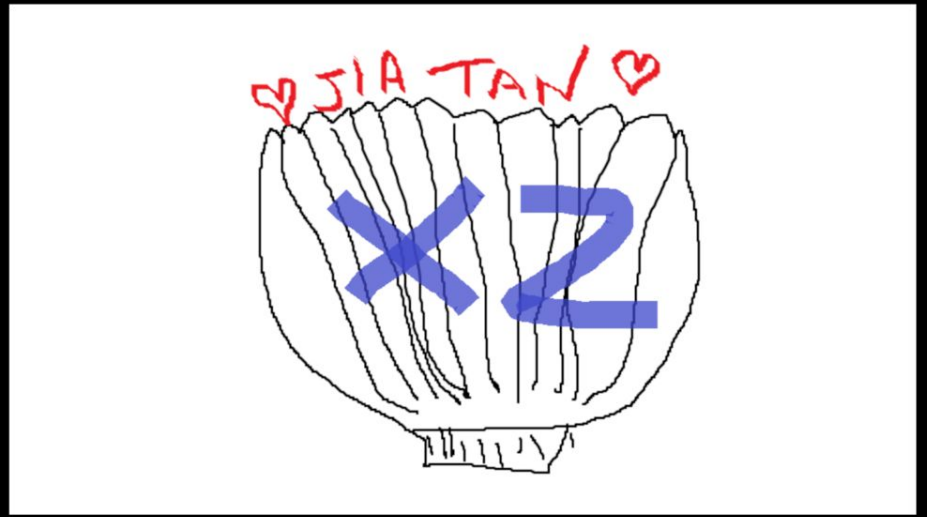
NATIONAL VULNERABILITY DATABASE

NATIONAL VULNERABILITY DATABASE
NVD

NOTICE

NIST is currently working to establish a consortium to address challenges in the NVD program and develop improved tools and methods. You will temporarily see delays in analysis efforts during this transition. We apologize for the inconvenience and ask for your patience as we work to improve the NVD program.





Stop Thinking About Open Source like a Vendor

This

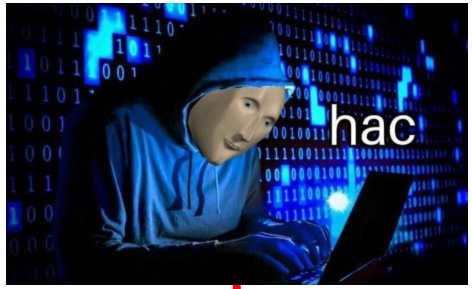
Not this

Open Source Software Supply Chains

- XZ was an actual attack, almost certainly a state actor
  - First time we've seen the long-con for real
- Red Hat **IS** a supplier (if you are paying them)
  - they assume responsibility in exchange for money
- npm is **NOT** a supplier
- A lot of critical plumbing is maintained by unpaid guys who have day jobs, take vacations, etc.

Supply Chain Attacks

The Jia Tan Reverse Funnel Plan



XZ

Fedora

Suse

Debian

Docker Images

RHEL

SLES

Ubuntu

etc

Base Image

Open Source

Open Source

Open Source

Open Source

Open Source

Open Source

Your Organization

Enterprise

Government Agency

Nonprofit

Enterprise

Enterprise

NGO

Government Agency

Enterprise

typical bitcoin enjoyer

AVERAGE

stuxnet enthusiast

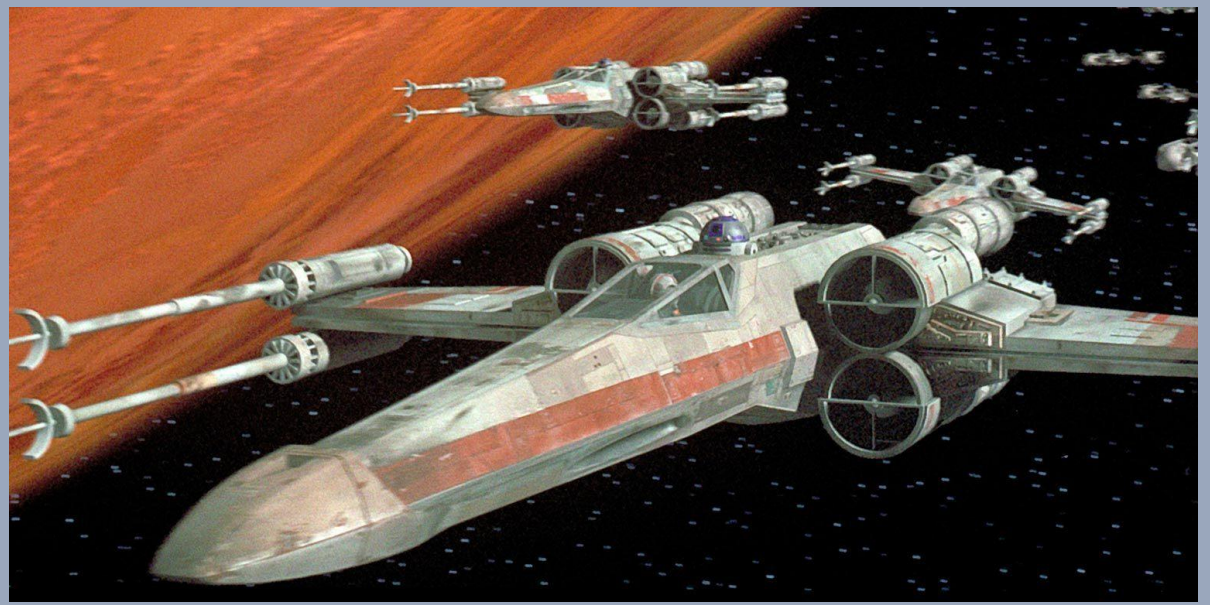
Supply Chain Attack Types

- Typical bitcoin enjoyer (criminals)
  - These are often ransomware attacks with fewer steps
  - Just steal the wallet/keys whatever
  - Targets are projects with minimal security and overworked/absent maintianers
- Average (state-sponsored) stuxnet enthusiast
  - Willing to put in the effort for the long con (Jia Tan)

What defenders are prepared for

vs.

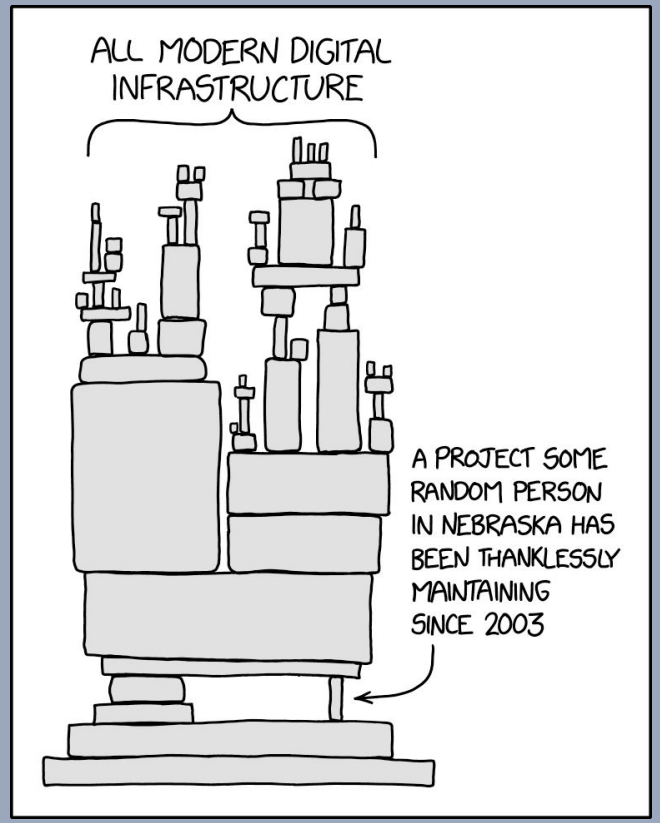
What they’re actually up against



Supply Chain Attack Tactics

- Backdoors are a thing, but they’re not like this anymore
- Wargames has baked expectations into people’s brains
  - They’re (mostly) wrong
- It’s mostly about speed
- The scenario of planting backdoors, then waiting is wrong
- Solana attack a couple of months ago was over in ~2 hours
- XZ involved a strong push to speed up acceptance testing
- Again, CVE/NVD was designed in the 1900s
- Most malware doesn’t meet the criteria for CVEs

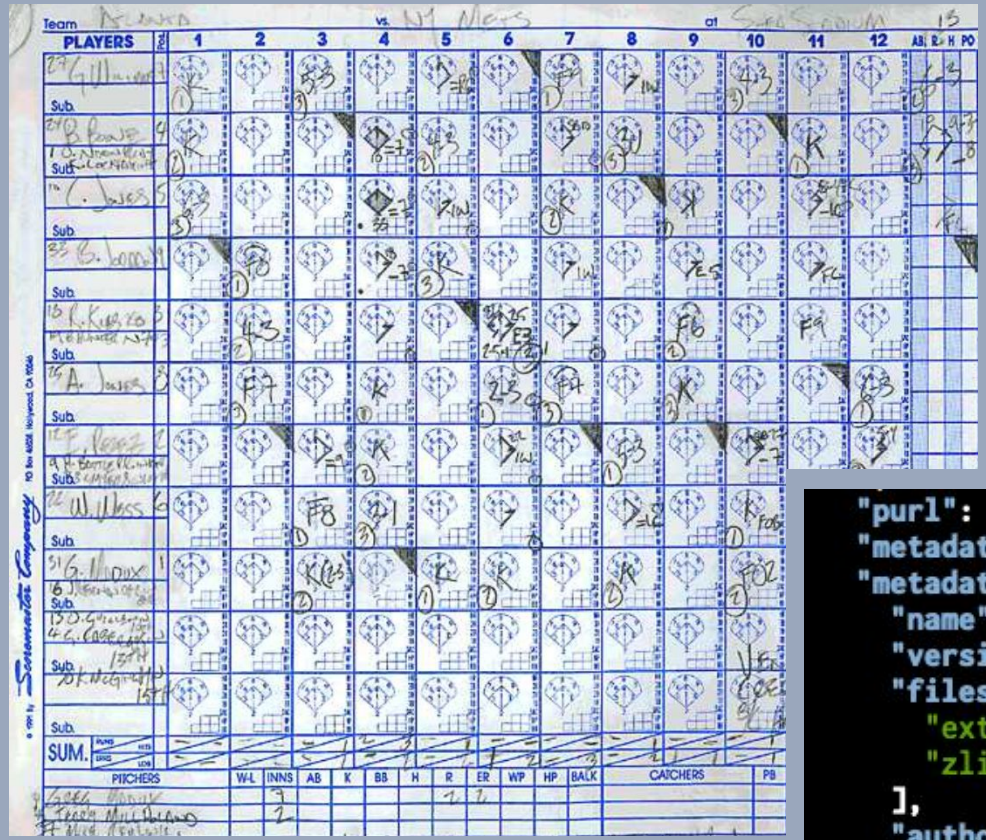
Targets



Supply Chain Attack Targets

- For criminals they’re looking for projects with poor hygiene, standard stuff, solo absent maintainers, bad openssf scorecards
- The long-con state actors are looking for critical projects with overworked maintainers
- There are a LOT of projects in both buckets
- And again, some overlap here
- These are generalities and not hard-and-fast rules

Tools



Nutrition Facts

Serving Size 6 rolls (85g)
Servings Per Container 2.5

Amount Per Serving	
Calories 210	Calories from Fat 80
	% Daily Value*
Total Fat 9g	**14%**
Saturated Fat 2g	**11%**
Trans Fat 1.5g	
Cholesterol 10mg	**3%**
Sodium 390mg	**16%**
Total Carbohydrate 25g	**8%**

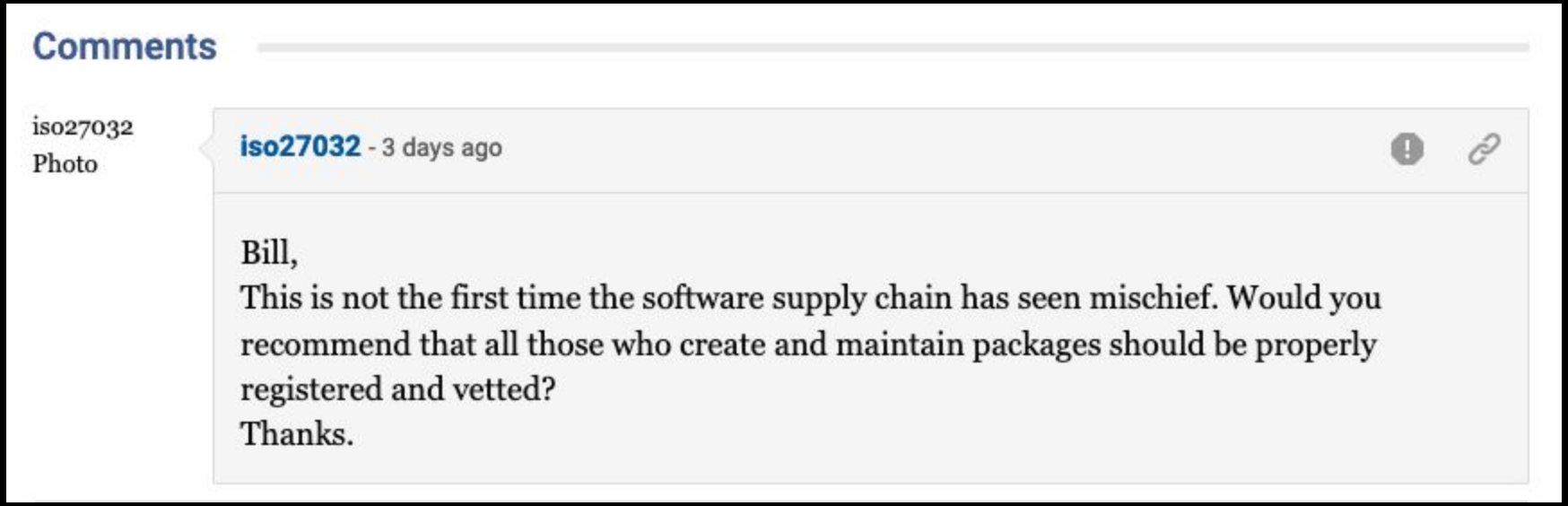
```
"purl": "pkg:gem/zlib@2.0.0",
"metadataType": "GemMetadata",
"metadata": {
  "name": "zlib",
  "version": "2.0.0",
  "files": [
    "ext/zlib/extconf.rb",
    "zlib.so"
  ],
  "authors": [
    "Yukihiro Matsumoto",
    "UENO Katsuhiro"
  ],
  "homepage": "https://github.com/ruby/zlib"
```

Supply Chain Attack Tools

- OpenSSF Scorecard
- Github “insights” - project health
  - Learn about contributors/maintainers
  - are they even real people?
- SBOMs
  - more than just CPEs/vuln matching
  - the map to open source insights

A Note on State Actors

THE PROBLEM



https://www.bleepingcomputer.com/news/security/malicious-pypi-package-with-37-000-downloads-steals-aws-keys/

HUNTED LABS

THE “SOLUTION”

https://www.youtube.com/watch?v=TQeP6GWU0e4

HUNTED LABS

HUNTED LABS

A couple of notes on state actors (redacted)

- FSB, CCP/PLA, DPRK, Iran all have different methods
- A lot of these guys are out in the open
- What should we be looking for? Contributors? Maintainers?
- Solo maintainers, poor OpenSSF scorecard/hygine
- Contributors aren’t a problem generally
- Don’t hold your breath for a top-down solution

Yes, the planet got destroyed by malware. But for a beautiful moment in time we created a magical developer experience.

What can we do about it?

- Pin dependencies whenever possible
- Pinning isn't always pinning! (e.g. github tags are NOT immutable)
- I used to think pinning was really bad, but it's basically imperative now
- Github makes things worse because they want things to be extremely frictionless for devs
- Friction is a big deal BUT there has to be SOME weight on security
- You're much more susceptible here if you're a devops practitioner or cloud native or whatever you want to call it
- pypi has started developing a package quarantine
- Go has a lot of features that make these attacks difficult
- Curated repositories are harder to attack but not impossible

The Takeaways

Takeaways

- Fixing transitive dependencies is essentially impossible
- CVE and NVD are broken
  - They weren’t designed for open source
  - You can’t patch faster, you can’t keep up, nobody can
- Malware is increasing faster than vulnerabilities
- Scan your builds and produce SBOMs
  - Don’t eat out of dumpsters
  - Take advantage of open source insights (expert mode)
- It’s very difficult to stop long-con state actors
- Pin your dependencies
- Use the language and package manager security features

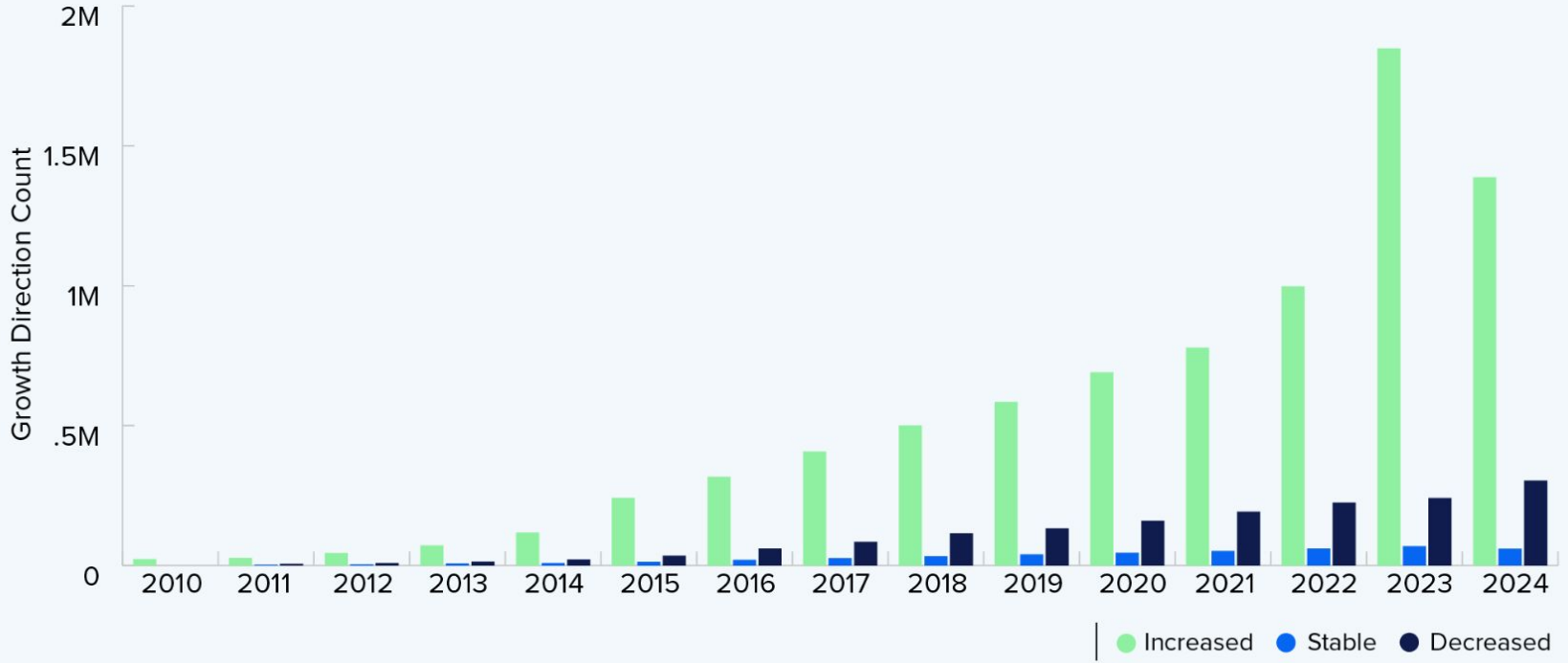
Open source is different

There’s nothing wrong with open source, this is how it works

There’s something wrong with what we expect from open source

FIGURE 1.2

Release Frequency of Open Source Projects

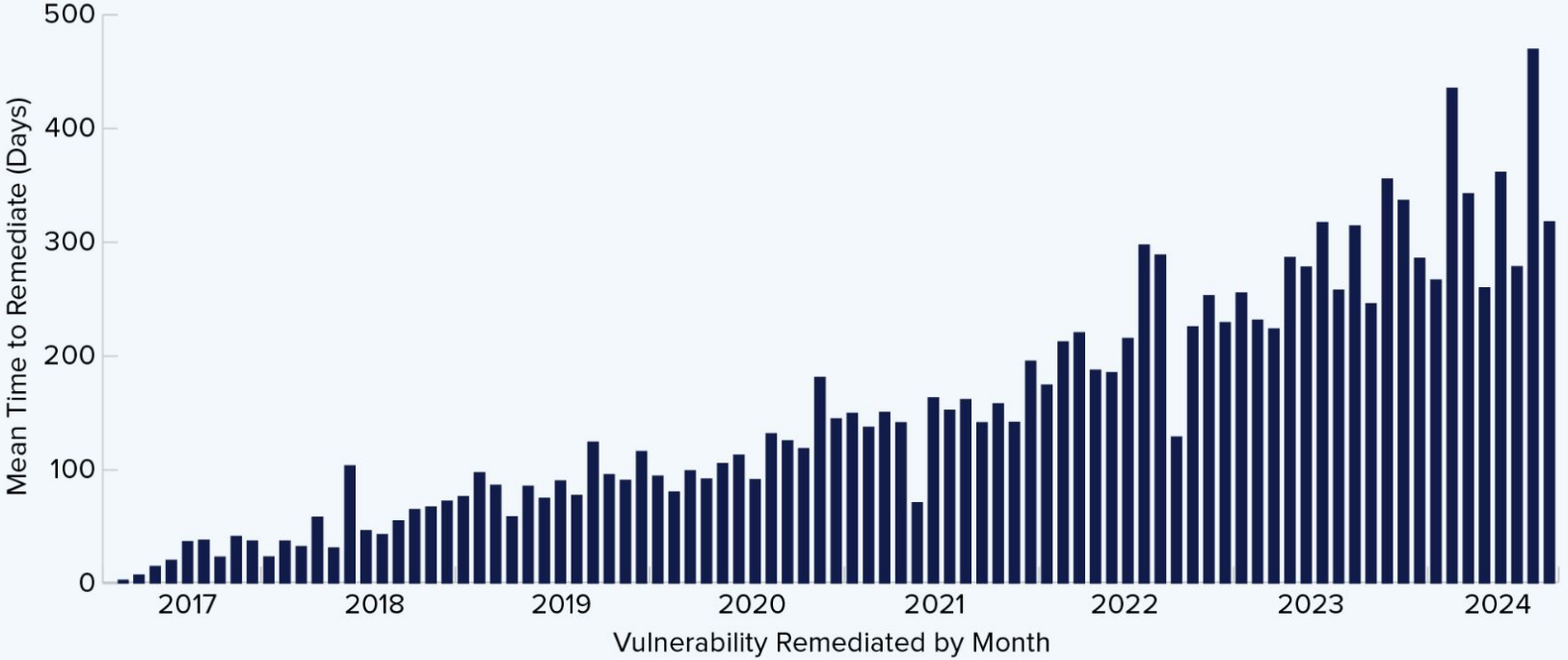


Projects that released faster, slower or the same as the prior year.

Sonatype State of the Software Supply Chain: https://www.sonatype.com/state-of-the-software-supply-chain/introduction

FIGURE 1.3

Rate of Vulnerability Remediation Over Time



How long a project took to remediate known vulnerabilities in their dependencies.

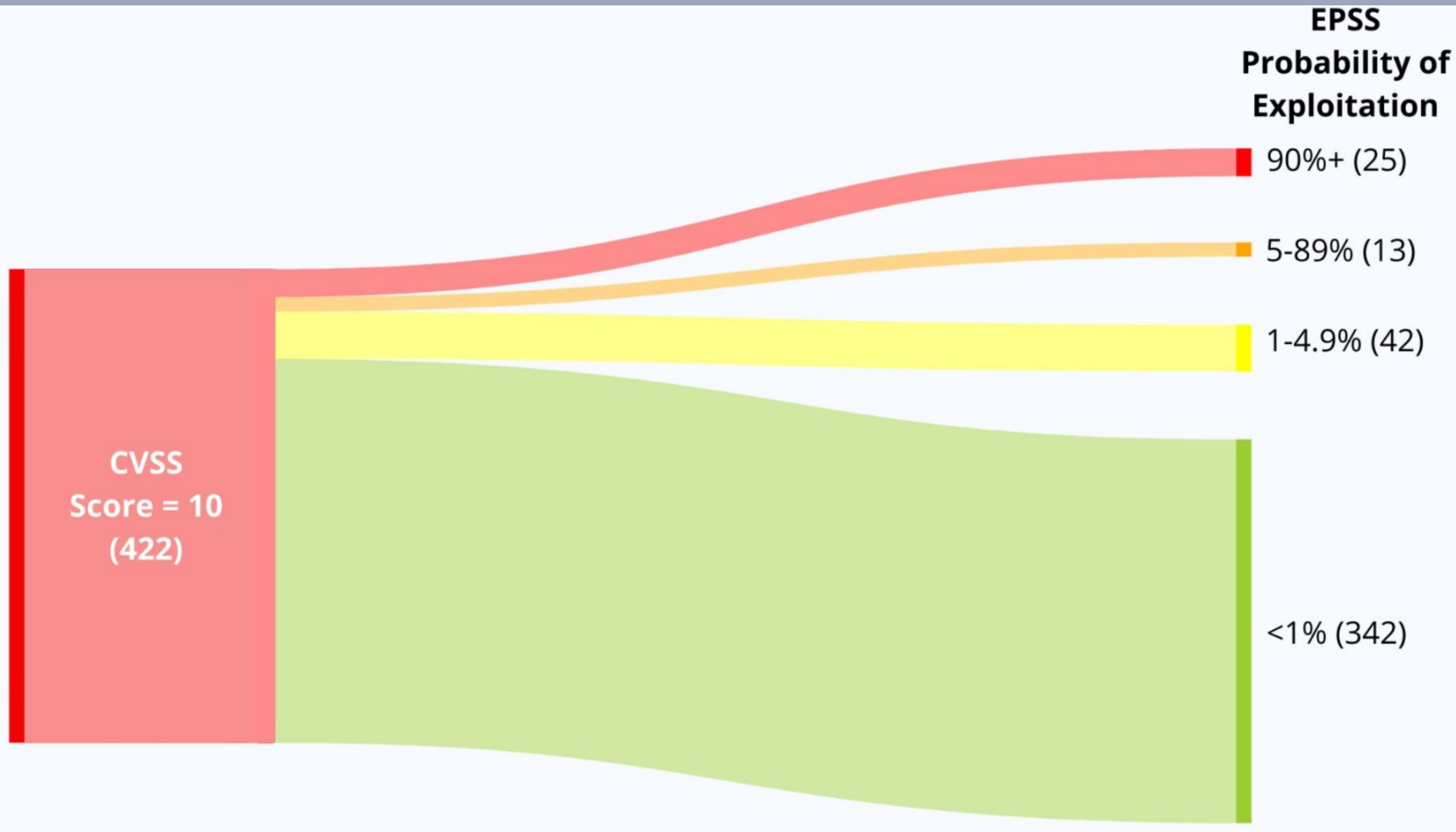
Sonatype State of the Software Supply Chain: https://www.sonatype.com/state-of-the-software-supply-chain/introduction


YOUR
SCORE
HIGH
SCORE


WHAC
-A-
MOLE
WHAC
-A-
MOLE
WHAC
-A-
MOLE
WHAC
-A-
MOLE
WHAC
-A-
MOLE
FREE
PLAY

Takeaway: Patch Faster is Broken and Chasing CVE 0 is a Losing Battle

- CVEs increasing faster than they can be fixed
- Most of these are not important anyway
- But they all have CVSS scores > 9.8 so you can't tell which ones ARE important
- GHSAs (more transparent than CVEs)
- **CISA KEV + EPSS**
- VEX, CSAF, OpenSSF Malicious Packages Repository are helpful
- GitHub Insights and other project health metrics
  - This is (currently) a very manual process
  - But it's getting a lot easier



Nucleus

Patrick Garrity https://www.linkedin.com/posts/patrickmgarrity_the-evolution-of-patricks-sankey-matics-activity-7118334146728357888-zxxn/

Takeaway: Open Source Project Health/Insights

- This is PROACTIVE (the better advisory data, scoring etc is about reactive improvements)
- This is (currently) largely a manual process (but it's getting a lot easier)
- This path provides info on contributors/maintainers
  - (cf. Linux kernel removing Russian nationals from their maintainer team)
- I see a lot of people asking for more data like this but they want stuff like positive IDs on contributors
  - They think they can find boogeymen putting traps into open source
- But Evaluating project health isn't directly about safety
  - it's about tracking all of those deps in the iceberg
  - What happens when it hits the fan?
  - **Are the projects you're depending on healthy, will you be able to work with them?**
- Keep in mind: google, your bank, etc are all sucking up tons of data on YOU, why shouldn't we be trying to do this ourselves?
  - The only question is whether this should be centralized for scale
- This can protect you from dependency confusion (highly underrated vector)
- Ransomware attacks and the software supply chain as a vector are peanut butter and chocolate
  - Note that crypto wallet/key exfiltration is just a special case of ransomware with fewer steps
- **Are you eating cake or are you eating toilet paper?**

anchore / syft

Type / to search

Code | Issues 372 | Pull requests 43 | Actions | Projects | Wiki | Security 1 | Insights

- Pulse
- Contributors
- Community Standards
- Commits
- Code frequency
- Dependency graph
- Network
- Forks
- Actions Usage Metrics
- Actions Performance Metrics

November 4, 2024 – November 11, 2024

Period: 1 week

Overview

13 Active pull requests

6 Active issues

4	9	1	5
Merged pull requests	Open pull requests	Closed issue	New issues

Excluding merges, **5 authors** have pushed **4 commits** to main and **12 commits** to all branches. On main, **3 files** have changed and there have been **13 additions** and **1 deletions**.

4 Pull requests merged by **4** people

- **Restore log on UI teardown**
  #3427 merged 3 days ago
- **doc: Add official Syft logo license information**
  #3421 merged 4 days ago
- **chore(deps): bump anchore/sbom-action from 0.17.6 to 0.17.7**
  #3418 merged 5 days ago
- **chore: build release sbom from go.mod**
  #3417 merged last week

9 Pull requests opened by **4** people

- **update node classifier to support 6.x**
  #3419 opened 5 days ago
- **Support scanning files in mount namespaces**
  #3423 opened 4 days ago
- **chore(deps): update stereoscope to 120d9ea511e2f7a9887b443c52e66cd19bb80b43**
  #3424 opened 4 days ago

```
"purl": "pkg:gem/zlib@2.0.0",
"metadataType": "GemMetadata",
"metadata": {
  "name": "zlib",
  "version": "2.0.0",
  "files": [
    "ext/zlib/extconf.rb",
    "zlib.so"
  ],
  "authors": [
    "Yukihiro Matsumoto",
    "UENO Katsuhiro"
  ],
  "homepage": "https://github.com/ruby/zlib"
```

Takeaway: We Can Investigate the Open Source we Consume

- Are the projects healthy
  - Can we work with them when the chips are down?
- Are contributors known actors?
  - Are they visible outside of whatever repo

Takeaway: Open Source Will Not Work in the Authoritarian Dystopia

- Registration/Authentication/Verification will backfire
- Many projects will move to weird places
- A lot of people will just stop contributing

Footnotes

- Sonatype: State of the Software Supply Chain
  https://www.sonatype.com/state-of-the-software-supply-chain/introduction
- Tidelift: State of the Open Source Maintainer
  https://explore.tidelift.com/2024-survey/2024-tidelift-state-of-the-open-source-maintainer-report
- Anchore: Software Supply Chain Security Report
  https://get.anchore.com/2024-software-supply-chain-security-report/
- Thomas Depierre: I am not a Supplier
  https://www.softwaremaxims.com/blog/not-a-supplier
- The Double-Edged Sword of Increased Vulnerability Data
  https://github.blog/security/supply-chain-security/securing-the-open-source-supply-chain-the-essential-role-of-cves/
- Open Source is Bigger Than You Can Imagine
  https://anchore.com/blog/open-source-is-bigger-than-you-imagine/
- 2023 Top Routinely Exploited Vulnerabilities
  https://www.cisa.gov/news-events/cybersecurity-advisories/aa24-317a
- Patrick's CVE Diagrams
  https://www.linkedin.com/posts/patrickmgarrity_the-evolution-of-patricks-sankey-matics-activity-7118334146728357888-zxxn/
- possible origin of the iceberg
  https://www.slideshare.net/loriayre/open-source-library-system-software-free-is-just-the-tip-of-the-iceberg
- Log4Shell logo: https://en.wikipedia.org/wiki/File:Log4Shell_logo.png
- xz logo: https://infosec.exchange/@jerry/112186387514069376

Log4Shell Reading List

Dealing with log4shell (detection, mitigation, workarounds)
https://cloudsecurityalliance.org/blog/2021/12/14/dealing-with-log4shell-aka-cve-2021-44228-aka-the-log4j-version-2/

Keeping up with log4shell (post mortem)
https://cloudsecurityalliance.org/blog/2021/12/16/keeping-up-with-log4shell-aka-cve-2021-44228-aka-the-log4j-version-2/

Mysterious tweet hinting at the exploit
https://twitter.com/sirifu4k1/status/1468951859381485573

Another mysterious tweet:
https://twitter.com/CattusGlavo/status/1469010118163374089

“THE” pull request:
https://github.com/apache/logging-log4j2/pull/608

Cloudflare digs for evidence of pre-disclosure exploits in the wild:
https://twitter.com/eastdakota/status/1469800951351427073

XZ Reading List

Technologist vs spy: the XZ backdoor debate
https://lcamtuf.substack.com/p/technologist-vs-spy-the-xz-backdoor

General XZ roundups
https://boehs.org/node/everything-i-know-about-the-xz-backdoor
https://arstechnica.com/security/2024/04/what-we-know-about-the-xz-utils-backdoor-that-almost-infected-the-world/

FAQ on the XZ compromise/backdoor CVE-2024-3094
https://gist.github.com/thesamesam/223949d5a074ebc3dce9ee78baad9e27

examination of claims of technical solutions to XZ and why they're wrong
https://federated.saagarjha.com/notice/AgPahhBPr9xHXMAPWi

OSS backdoors: the folly of the easy fix
https://lcamtuf.substack.com/p/oss-backdoors-the-allure-of-the-easy

deep inspection of the backdoor injection
https://research.swtch.com/xz-script
https://gynvael.coldwind.pl/?lang=en&id=782

interactions in open source projects (examination of XZ infiltration)
https://robmensching.com/blog/posts/2024/03/30/a-microcosm-of-the-interactions-in-open-source-projects/

thread from november 2023 theorizing about a long con threat actor assuming control of a major project
https://infosec.exchange/@mariuxdeangelo/111348817163534252

thread exploring pressure on XZ maintainer to hand off control of the project
https://twitter.com/robmen/status/1774067844785086775

bullying as a vulnerability in open source
https://www.404media.co/xz-backdoor-bullying-in-open-source-software-is-a-massive-security-vulnerability

tracking Jia Tan's commit timestamps
https://twitter.com/birchb0y/status/1773871381890924872

examining Jia Tan's complete github commit history
https://huntedlabs.com/where-the-wild-things-are-a-complete-analysis-of-jiat95-github-history

looking into the "Jia Tan" persona
https://www.wired.com/story/jia-tan-xz-backdoor/

Sloppy OpenSSF statement (later redacted) implying Scorecard indicated XZ issues
https://web.archive.org/web/20240331024907/https://openssf.org/blog/2024/03/30/xz-backdoor-cve-2024-3094/

Lessons from XZ Utils: Achieving a More Sustainable Open Source Ecosystem
https://www.cisa.gov/news-events/news/lessons-xz-utils-achieving-more-sustainable-open-source-ecosystem

solana-web3.js Reading List

Paul McCarty breaks the news
https://www.linkedin.com/feed/update/urn:li:activity:7269857421739593728/

Post-hack release notes
https://github.com/solana-labs/solana-web3.js/releases/tag/v1.95.8

GitHub Advisory
https://github.com/advisories/GHSA-2mhj-xmf4-pr8m

Tweet from project sponsor
https://x.com/anza_xyz/status/1864085236432134264

Post mortem
https://nftandgamefi.com/2024/12/04/solanas-supply-chain-attack-how-160k-vanished-in-hours/

NPM values zero friction over even minimal security
https://www.youtube.com/live/aEWYOiVZP90

Malicious NPM Packages Exfiltrate Hundreds of Developer SSH Keys via GitHub
https://thehackernews.com/2024/01/malicious-npm-packages-exfiltrate-1600.html

placeholder

Open Source Insights Reading List

NPM Provenance: The Missing Security Layer in Popular JavaScript Libraries
https://medium.com/exaforce/npm-provenance-the-missing-security-layer-in-popular-javascript-libraries-b50107927008

Your dependencies have dependencies: new features to assess risk
https://dev.to/stacklok/your-dependencies-have-dependencies-new-features-to-assess-risk-3f1b

Repo Swatting
https://www.bsidesmelbourne.com/2024-repo.html
https://github.com/6mile/repo-swatting (hopefully slides will be posted soon)

Securing open source software: Whose job is it, anyway?
https://www.theregister.com/2024/03/08/securing_opensource_software_whose_job/

Maltego Cyber Investigation Platform &c
https://www.maltego.com/

The US Federal Government Understands that open source is not a supplier
https://www.linkedin.com/feed/update/urn:li:activity:7073021512030511104/

identifying vulnerabilities in open source codebases at scale
https://github.com/chebuya/SASTsweep

Open Source Project Security Baseline
https://baseline.openssf.org/versions/2025-02-25

Project Health is the Third Pillar of Open Source Strategy
https://bitergia.com/project-health-is-the-third-pillar-of-open-source-strategy/

Bad Ideas Around Enforced Contributor Identity and Authentication:

Malicious PyPI package with 37,000 downloads steals AWS keys
https://www.bleepingcomputer.com/news/security/malicious-pypi-package-with-37-000-downloads-steals-aws-keys/

LLM Code Authorship Detection (this is a bad idea and will probably make things worse)
https://apiiro.com/blog/llm-code-author-detection-unmasking-malicious-package-contributions/

Digital Identity Attestation Roundup
https://openssf.org/blog/2021/01/27/digital-identity-attestation-roundup/

Building Trust Within Open Source Software
https://www.identity.com/building-trust-within-open-source-software/

This isn't a problem specific to Open Source:

North Korean hacker got hired by US security vendor, immediately loaded malware
https://arstechnica.com/tech-policy/2024/07/us-security-firm-unwittingly-hired-apparent-nation-state-hacker-from-north-korea/

Twitter employee is convicted in Saudi spy case
https://www.cnn.com/2022/08/09/tech/former-twitter-employee-conviction/index.html

Projects and Data Sources

NPM Provenance: The Missing Security Layer in Popular JavaScript Libraries
https://medium.com/exaforce/npm-provenance-the-missing-security-layer-in-popular-javascript-libraries-b50107927008

Your dependencies have dependencies: new features to assess risk
https://dev.to/stacklok/your-dependencies-have-dependencies-new-features-to-assess-risk-3f1b

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identifying vulnerabilities in open source codebases at scale
https://github.com/chebuya/SASTsweep

OpenSSF Malicious Packages Repository:
https://openssf.org/blog/2023/10/12/introducing-openssfs-malicious-packages-repository/

Common Security Advisory Framework
https://oasis-open.github.io/csaf-documentation/

Exploit Prediction Scoring System
https://www.first.org/epss/

CISA Known Exploited Vulnerability Catalog
https://www.cisa.gov/known-exploited-vulnerabilities-catalog

Vulnerability Exploitability Exchange
https://cyclonedx.org/capabilities/vex/

GitHub Advisory Database
https://github.com/advisories

GitHub Insights
https://docs.github.com/en/issues/planning-and-tracking-with-projects/viewing-insights-from-your-project/about-insights-for-projects

Open Source Insights
https://deps.dev/

State Actors (CCP/PLA/FSB/DPRK/&c)

Is America Ready for a Full-Blown Cyberwar?
https://podcasts.apple.com/us/podcast/is-america-ready-for-a-full-blown-cyberwar-with/id1643307527?i=1000700124540

How North Korea is Exploiting GitHub to Infiltrate Software Supply Chains
https://huntedlabs.com/how-north-korea-is-exploiting-github-to-infiltrate-software-supply-chains/

DPRK NPM activity
https://stacklok.com/blog/dependency-hijacking-dissecting-north-koreas-new-wave-of-defi-themed-open-source-attacks-targeting-developers
https://stacklok.com/blog/destroyloneliness-npm-starjacking-attack-on-roblox-nodejs-library-delivers-quasarrat
https://stacklok.com/authors/poppaea-mcdermott

Opentofu removing Russians
https://www.linkedin.com/posts/danlorenc_revert-commit-that-removed-russian-providers-activity-7279107641925107712-xYF2/

North Korea targets crypto developers via NPM supply chain attack
https://www.theregister.com/2025/02/13/north_korea_npm_crypto/

Why remove Russian maintainers of Linux kernel? Here's what Torvalds says
https://www.zdnet.com/article/why-remove-russian-maintainers-of-linux-kernel-heres-what-torvalds-says/

Linus Torvalds kicked the Russians out of Linux, now they're creating a sovereign Linux community in Russia — Ministry of Digital Development steps in
https://www.tomshardware.com/software/linux/linus-torvalds-kicked-the-russians-out-of-linux-now-theyre-creating-a-sovereign-linux-community-in-russia-ministry-of-digital-development-steps-in

CVE/NVD Brokenness Reading List

Filling the NVD data gap
https://github.com/anchore/nvd-data-overrides

NVD Chaos Podcast
https://resilientcyber.substack.com/p/s6e11-josh-bressers-and-dan-lorenc

Identifying Software
https://guix.gnu.org/en/blog/2024/identifying-software/

CVEs CWEs CVSS and It's Discontents
https://www.linkedin.com/pulse/cves-cwes-cvss-its-discontents-sherif-mansour

Open Source Security Podcast Episode 392 – Curl and the calamity of CVE
https://opensourcesecurity.io/2023/09/10/episode-392-curl-and-the-calamity-of-cve/

Shedding Light on CVSS Scoring Inconsistencies
https://arxiv.org/abs/2308.15259

My previous DevOpsDays 2022 talk (Learn From Log4Shell):
https://www.youtube.com/watch?v=PINtIL_oN0k
https://github.com/pvnovarese/2022-devopsdays

Probably Don't Rely on EPSS Yet:
https://insights.sei.cmu.edu/blog/probably-dont-rely-on-epss-yet/

CVE-2020-19909 is everything that is wrong with CVEs:
https://daniel.haxx.se/blog/2023/08/26/cve-2020-19909-is-everything-that-is-wrong-with-cves/

AI Slop vuln/bug reports
https://github.com/curl/curl/issues/16267

Curl abandons CVSS
https://daniel.haxx.se/blog/2025/01/23/cvss-is-dead-to-us/

Go security team has similar issues with CVSS
https://bsky.app/profile/filippo.abyssdomain.expert/post/3lgftm56t522f

Software Supply Chains Reading List

Hackers poison source code from largest Discord bot platform
https://www.bleepingcomputer.com/news/security/hackers-poison-source-code-from-largest-discord-bot-platform/

Overcoming Software Supply Chain Attacks
https://blog.karambit.ai/overcoming-software-supply-chain-attacks-c8746a0236ab

iconburst NPM supply chain attack
https://www.scmagazine.com/news/iconburst-supply-chain-attack-uses-typo-squatting-to-spread-malicious-javascript-packages-via-npm

Deceptive Deprecation: The Truth About npm Deprecated Packages
https://blog.aquasec.com/deceptive-deprecation-the-truth-about-npm-deprecated-packages

aquasec/CIS supply chain security guide
https://www.aquasec.com/news/software-supply-chain-security-guide-cis-aqua-security/

OWASP kube top ten risks #2: supply chain vulnerabilities
https://github.com/OWASP/www-project-kubernetes-top-ten/blob/main/2022/en/src/K02-supply-chain-vulnerabilities.md

CNCF Catalog of Supply Chain Compromises
https://github.com/cncf/tag-security/tree/main/community/catalog/compromises

PyPI Project Quarantine
https://blog.pypi.org/posts/2024-12-30-quarantine/

How Go mitigates supply chain attacks
https://go.dev/blog/supply-chain

How Threat Actors Are Weaponizing Your Favorite Open-Source Package Registry
https://fosdem.org/2025/schedule/event/fosdem-2025-5662-how-threat-actors-are-weaponizing-your-favorite-open-source-package-registry/

The most notable supply chain hacks of 2024
https://www.kaspersky.com/blog/supply-chain-attacks-in-2024/52965/

Git Checkout Authentication to the Rescue of Supply Chain Security
https://archive.fosdem.org/2023/schedule/event/security_where_does_that_code_come_from/

Software supply chain security practices are maturing — but it's a work in progress
https://www.reversinglabs.com/blog/openssf-survey-supply-chain-security-practices

Open Source Supply Chain Security at Google
https://research.swtch.com/acmscored

CVE Half-Day Watcher
https://github.com/Aqua-Nautilus/CVE-Half-Day-Watcher

Few Open Source Projects are Actively Maintained
https://www.infoworld.com/article/3708630/report-finds-few-open-source-projects-actively-maintained.html

The Massive Bug at the Heart of NPM
https://blog.vlt.sh/blog/the-massive-hole-in-the-npm-ecosystem

A Study on Navigating Open-Source Dependency Abandonment:
https://courtney-e-miller.github.io/static/media/WeFeelLikeWereWingingIt.dc3c76d3b3c2d12f4fee.pdf

Research directions in software composition
https://dl.acm.org/doi/10.1145/210376.210389

SBOM Reading List

Making Better SBOMs
https://kccncna2022.sched.com/event/182GT/
https://www.youtube.com/watch?v=earq775L4fc

Reflections on Trusting Trust
https://www.cs.cmu.edu/~rdriley/487/papers/Thompson_1984_ReflectionsonTrustingTrust.pdf
https://web.mit.edu/6.033/2002/wwwdocs/handouts/h25-review2slides2.pdf

Introduction to SBOMs - What is it and do I need one?
https://www.youtube.com/watch?v=jVl6K5h6PzY

Generate sboms with syft and jenkins
https://www.youtube.com/watch?v=nMLveJ_TxAs

Profound Podcast - Episode 10 (John Willis and Josh Corman)
https://www.buzzsprout.com/1758599/8761108-profound-dr-deming-episode-10-josh-corman-captain-america

GitHub Self-Service SBOMs
https://github.blog/2023-03-28-introducing-self-service-sboms/

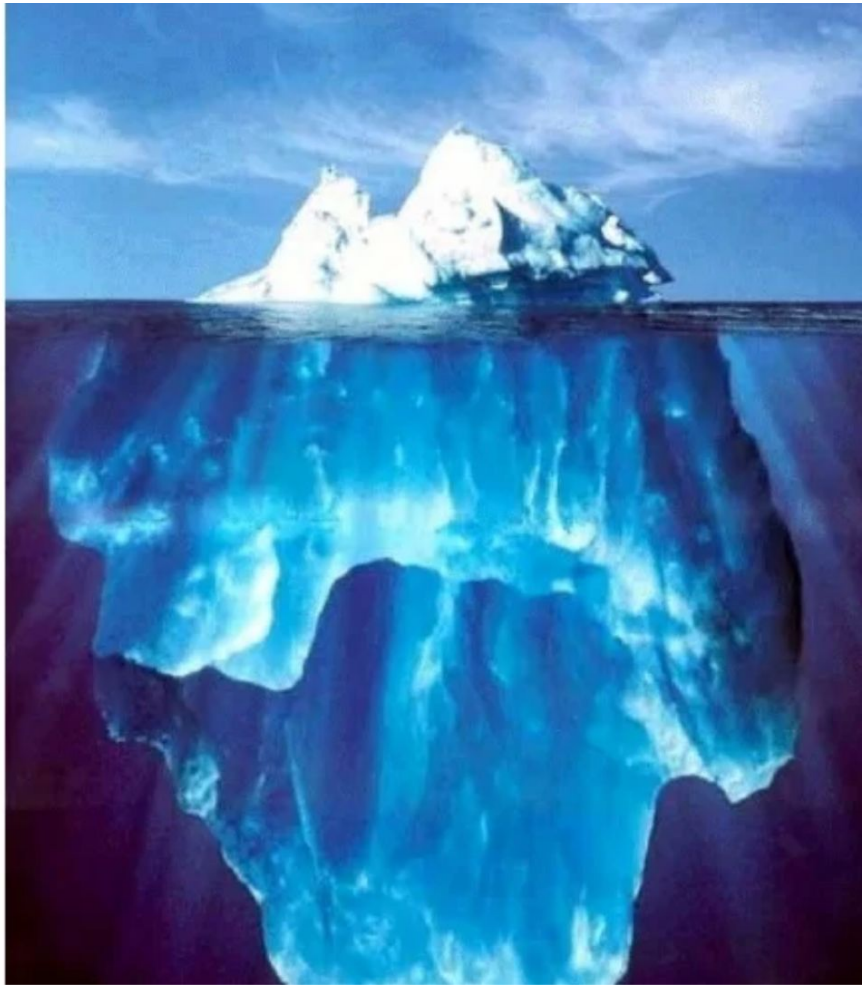
Do SBOMS Need VEX?:
https://www.linkedin.com/posts/aph10_sbom-softwaresupplychainsecurity-vex-activity-7108017924384137216-VARV/

Glossary

- CVE - Common Vulnerabilities and Exposures - https://cve.mitre.org/
- CVSS - Common Vulnerability Scoring System - https://nvd.nist.gov/vuln-metrics/cvss
- CISA - cybersecurity and infrastructure security agency - https://cisa.gov
- KEV - Known Exploited Vulnerabilities https://www.cisa.gov/known-exploited-vulnerabilities-catalog
- EPSS - Exploit Prediction Scoring System - https://www.first.org/epss/
- SBOM - Software Bill of Materials - https://www.cisa.gov/sbom
- VEX - Vulnerability Exploitability eXchange - https://github.com/openvex/spec
- CSAF - Common Security Advisory Framework - https://oasis-open.github.io/csaf-documentation/
- GHSA - GitHub Security Advisory - https://github.com/advisories
- OpenSSF - Open Source Security Foundation - https://openssf.org/

Free is Just the Tip of the Iceberg: Open Source Library System Software

Lori Bowen Ayre
lori.ayre@galecia.com
METRO Webinar
October 6, 2009



HUNTED LABS

Hunted Labs

A New XZ Every Day

The Nightmare Future of Open Source Supply Chains is Already Here

BSides SLC
2025-04-11
Paul Novarese <pvn@huntedlabs.io>

Hunted Labs