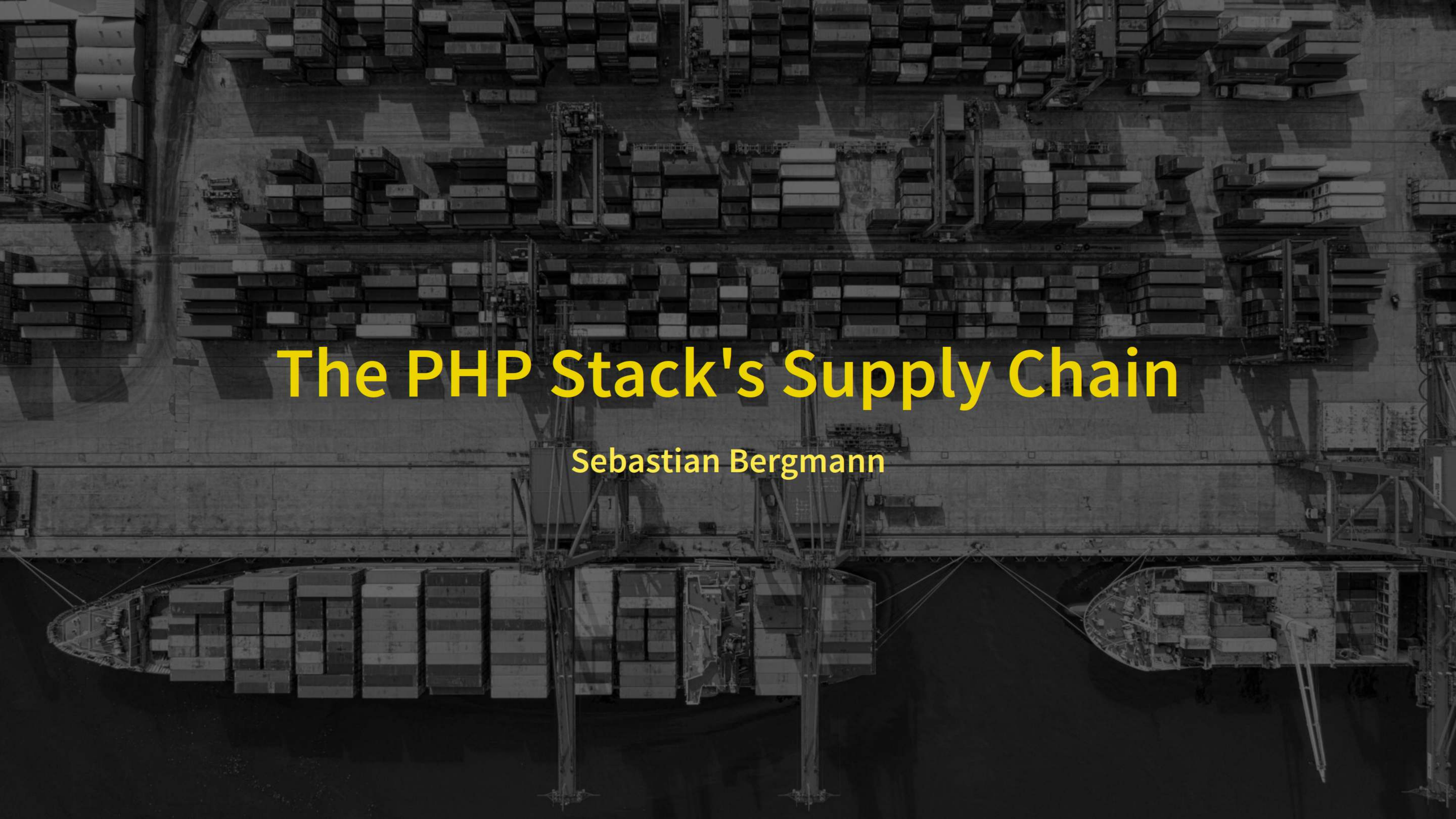

The PHP Stack's Supply Chain

Sebastian Bergmann

- **Sebastian** since 1978
- **Computers** since 1990
- **PHP** since 1998
- **Open Source** since 1998
- **PHPUnit** since 2000
- **thePHP.cc** since 2009

https://en.wikipedia.org/wiki/The_Settlers_(1993_video_game)

"The Settlers" (1993)

- 1 developer (Volker Wertich)
- ~ 70 KLOC (M68K Assembly)
- 0 external dependencies (educated guess)

Web Application (2023)

- Full Stack!
- But what is the full stack?

Hardware
Webbrowser
Framework
Libraries
...
PHP Application
Framework
Libraries
...
Composer
Phive
PHPUnit
Psalm
...
PHP
Webserver
Database
libc
libxml2
OpenSSL
PCRE
...
C/C++ Compiler
Kernel
Hardware

Hardware
Webbrowser
Framework
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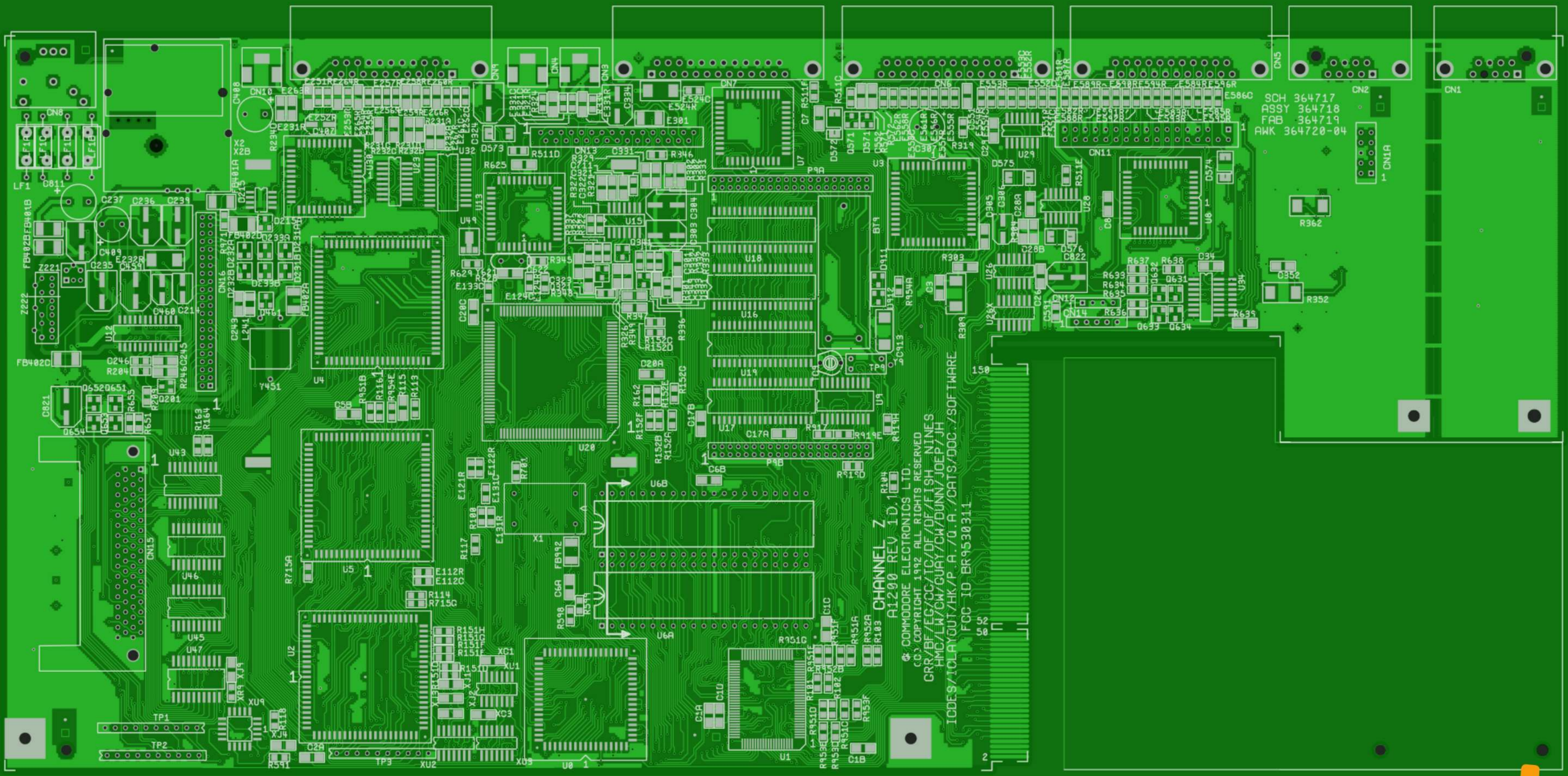
SCH 364717
ASSY 364718
FAB 364719
AWK 364720-04
CHANNEL Z
A1200 REV 1D.1
© COMMODORE ELECTRONICS LTD.
(C) COPYRIGHT 1992 ALL RIGHTS RESERVED
CRR/BF/EG/CC/TC/DF/DF/FISH_NINES
HMC/LW/CW/GUAY/CW/DUNN/JOEP/JH
ICDES/ICLAYOUT/HK/P.A./0.A./CATS/DOC./SOFTWARE
FCC ID BR9530311

„I have ranted about the absurdity of the term "full stack engineer" (I mean, show me the web dev who also writes their own device drivers 😕) but I'd like to recant.

Annoying it may be, but it's the term we've got to describe the most significant shift in eng roles since devops.”

https://nitter.net/mipsytipsy/status/1659607267598307328

„What I want to see from people: Sure, I mainly do PHP, but if the house is on fire, I'll go fix it.

It doesn't matter if it's a kernel setting, an error in JavaScript, or if I have to call a service provider because their server is down.

I run off and learn what I need to solve the problem (or find help) along the way.”

Volker Dusch

Sorry for getting sidetracked ...

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C/C++ Compiler
Kernel
Hardware

What could possibly go wrong?

- Hardware Bug with Security Implications
- Software Bug with Security Implications
- Software Feature with Security Implications
- Supply Chain Attack

April 2014

Heartbleed

https://heartbleed.com

March 2016

NPM package left-pad depublished

https://nitter.net/seldo/status/712414400808755200

October 2018

Malware in Python package colo(u)rama

https://bertusk.medium.com/b66b8a534a8

January 2018

Meltdown and Spectre

https://meltdownattack.com

January 2019

Remote Code Execution in apt

https://justi.cz/security/2019/01/22/apt-rce.html

January 2019

pear.php.net compromised

https://thephp.cc/articles/blast-from-the-past

June 2020

Signature Verification Bypass in fwupd

https://access.redhat.com/security/cve/cve-2020-10759

August 2020

Commits from umn.edu in Linux kernel repository

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

March 2021

Malicious commits in PHP Git repository

https://news-web.php.net/php.internals/113838

April 2021

Supply Chain Attack on Composer

https://blog.sonarsource.com/php-supply-chain-attack-on-composer

December 2021

log4shell

https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2021-44228

December 2021

"American Megatrands" sticker

https://www.servethehome.com/dude-dell-hpe-ami-american-megatrands

February 2022

Attack on KA-SAT modems

https://www.reuters.com/world/europe/russia-behind-cyberattack-against-satellite-internet-modems-ukraine-eu-2022-05-10

March 2022

Embedded Malicious Code in node-ipc

https://github.com/advisories/GHSA-97m3-w2cp-4xx6

March 2022

Supply Chain Attack on PEAR

https://blog.sonarsource.com/php-supply-chain-attack-on-pear

April 2022

Composer Command Injection Vulnerability

https://blog.packagist.com/cve-2022-24828-composer-command-injection-vulnerability

April 2022

Attack(s) using stolen GitHub OAuth tokens

https://github.blog/2022-04-15-security-alert-stolen-oauth-user-tokens

May 2022

DDoS Attack on phar.phpunit.de

https://thephp.cc/presentations/ddos-attacks-on-open-source-infrastructure

May 2022

Fork of hautelook/phpass compromised

https://www.bleepingcomputer.com/news/security/popular-python-and-php-libraries-hijacked-to-steal-aws-keys

June 2022

Hertzbleed

https://www.hertzbleed.com

June 2022

Public Travis CI Logs (Still) Expose Users to Cyber Attacks

https://blog.aquasec.com/travis-ci-security

June 2022

OpenSSL Remote Memory Corruption

https://guidovranken.com/2022/06/27/notes-on-openssl-remote-memory-corruption/

July 2022

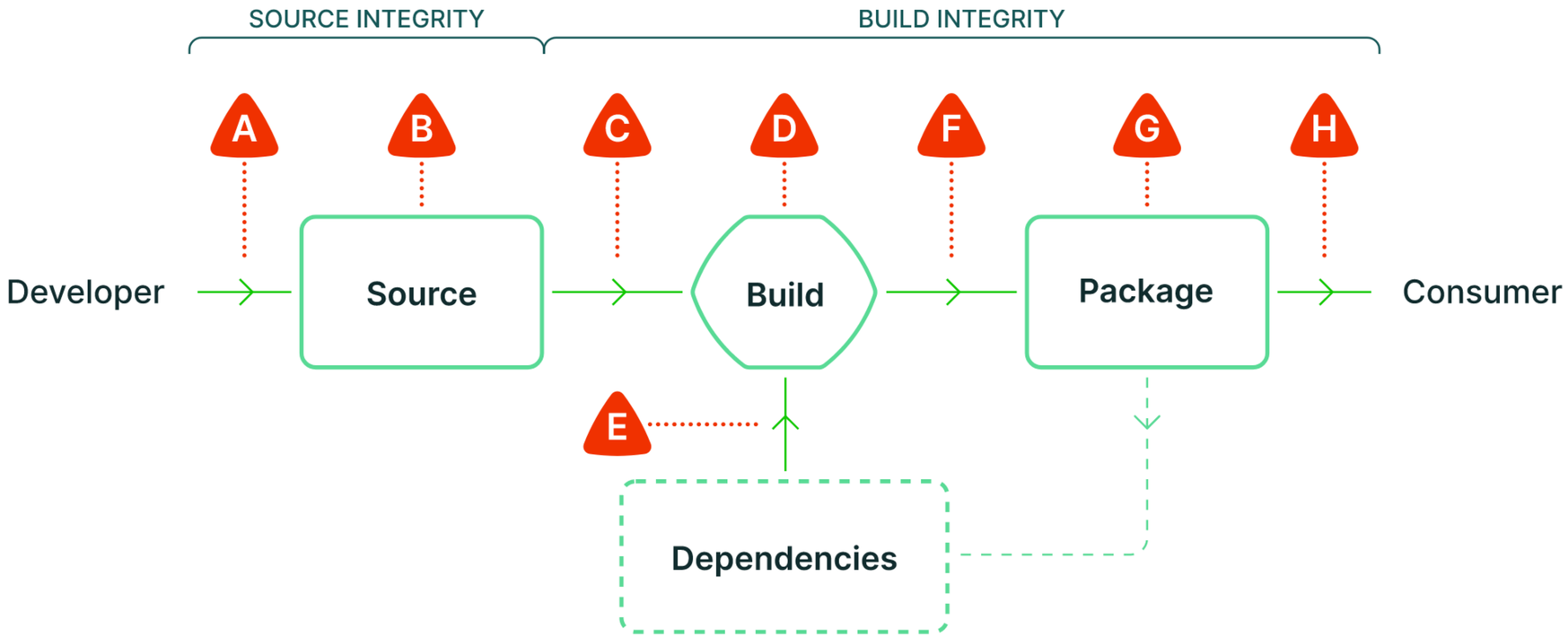
CuteBoi

https://cuteboi.info

July 2022

python-atomicwrites deleted and recreated

https://nitter.net/balloob/status/1545509863651811333



A Submit unauthorized change

B Compromise source repo

C Build from modified source

D Compromise build process

E Use compromised dependency

F Upload modified package

G Compromise package repo

H Use compromised package

https://slsa.dev/spec/v0.1/#supply-chain-threats

„**TL;DR:** Combining pull_request_target workflow trigger with an explicit checkout of an untrusted PR is a dangerous practice that may lead to repository compromise.”

https://securitylab.github.com/research/github-actions-preventing-pwn-requests

„I really need to pin github action versions.

A base dependency upgrade (ubuntu 20.04 security issue fix) caused a mess all across my CI supply chain today -.-”

https://nitter.net/Ocramius/status/1536625991098978304

Dear Provider,

[redacted] is reaching out to you as a provider of the Slic3r software utilized by [redacted] for running its business.

[redacted] are reaching out to you in response to the zero day log4j vulnerability the details are published by Apache: https://logging.apache.org/log4j/2.x/security.html

Please confirm whether the system provided by you to [redacted] is susceptible to the log4j vulnerability.

Please confirm which steps [redacted] is to take in order to protect its assets from possible attacks related to the software vulnerability.

Best regards / Cordialement.

https://nitter.net/alranel/status/1478383193787187201

„I have to tip my hat to $bigcorp whose software supply chain inventory is comprehensive enough to contact individual open source maintainers.”

https://nitter.net/dnlongen/status/1478737214179844100

software

supply chain inventory

https://nitter.net/dnlongen/status/1478737214179844100

U.S. Executive Order 14028

https://www.federalregister.gov/executive-order/14028

```
$ wget https://phar.phpunit.de/phpunit-10.3.0.phar

$ php phpunit-10.3.0.phar --sbom
<?xml version="1.0"?>
<bom xmlns="https://cyclonedx.org/schema/bom/1.4">
 <components>
  <component type="library">
   <group>phpunit</group>
   <name>phpunit</name>
   <version>10.3.0</version>
   <purl>pkg:composer/phpunit/phpunit@10.3.0</purl>
   <description>The PHP Unit Testing framework.</description>
   <licenses>
    <license>
     <id>BSD-3-Clause</id>
    </license>
   </licenses>
  </component>
  <component type="library">
   <group>myclabs</group>
   <name>deep-copy</name>
   <version>1.11.1</version>
   <purl>pkg:composer/myclabs/deep-copy@1.11.1</purl>
   .
   .
   .
```

```
<purl>pkg:composer/phpunit/phpunit@10.3.0</purl>
```

```
<purl>pkg:composer/myclabs/deep-copy@1.11.1</purl>
```

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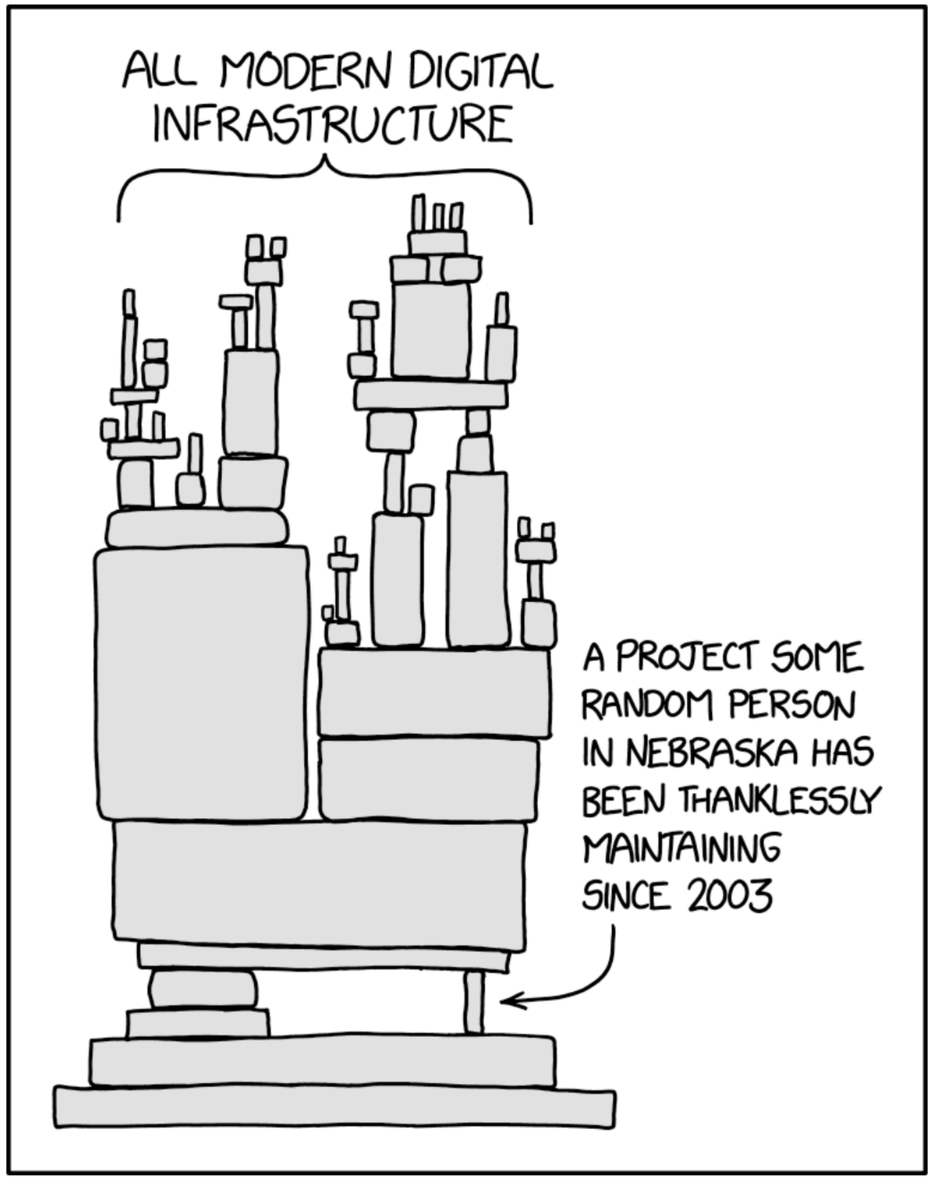

https://xkcd.com/2347

„Giving a GitHub project «stars» as a thank you is the «thoughts and prayers» of Open Source. If you really want to support an Open Source developer then give them money [...]. Stars don't put food on the table.”

https://nitter.net/crell/status/964524639857926145

„Sebastian, why do you contribute to Open Source?”

I get that question a lot.

I work on Open Source for over two decades now.

I should have stopped to do so long ago.

Because of parasitic corporations that exploit Open Source without giving back.

„«Open Source» was the attempt to turn the free software movement into unpaid labor for capital.”

https://nitter.net/tante/status/1581903206069587968

„[B]eneficiary of open-source is incredibly keen on open-source continuing to provide them with huge benefits. And will pay for marketing for that, but not so much actually sponsoring developers.”

https://nitter.net/MrDanack/status/1547233934127366144

„Fortune 500 companies would very much like there to be an expectation that open source projects must do extra work of managing a community, so that there are backup maintainers waiting to take over.”

https://nitter.net/MrDanack/status/1547272884246257666

„Being a company and installing dependencies from public, free package indexes is like going to the library every day and checking out 50 books that are necessary to run your business. Getting mad when the library gives you the wrong book is a dick move.”

https://nitter.net/theavalkyrie/status/1567660615103123456

117TH CONGRESS
2D SESSION

S. 4913

To establish the duties of the Director of the Cybersecurity and Infrastructure Security Agency regarding open source software security, and for other purposes.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 21, 2022

Mr. PETERS (for himself and Mr. PORTMAN) introduced the following bill; which was read twice and referred to the Committee on Homeland Security and Governmental Affairs

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A BILL

To establish the duties of the Director of the Cybersecurity and Infrastructure Security Agency regarding open source software security, and for other purposes.

„This is likely going to create a real demand on OSS maintainers to step it up with regards to security. But it doesn't explain how it's going to help with that burden, if at all.”

https://nitter.net/di_codes/status/1574447938054410246

„The nine most terrifying words in the English language are: I'm from the Government, and I'm here to help.”

Ronald Reagan

EU Cyber Resilience Act

https://digital-strategy.ec.europa.eu/en/library/cyber-resilience-act

„If the [Cyber Resilience Act] is, in fact, implemented as written, it will have a chilling effect on open source software development as a global endeavour, with the net effect of undermining the EU's own expressed goals for innovation, digital sovereignty, and future prosperity."

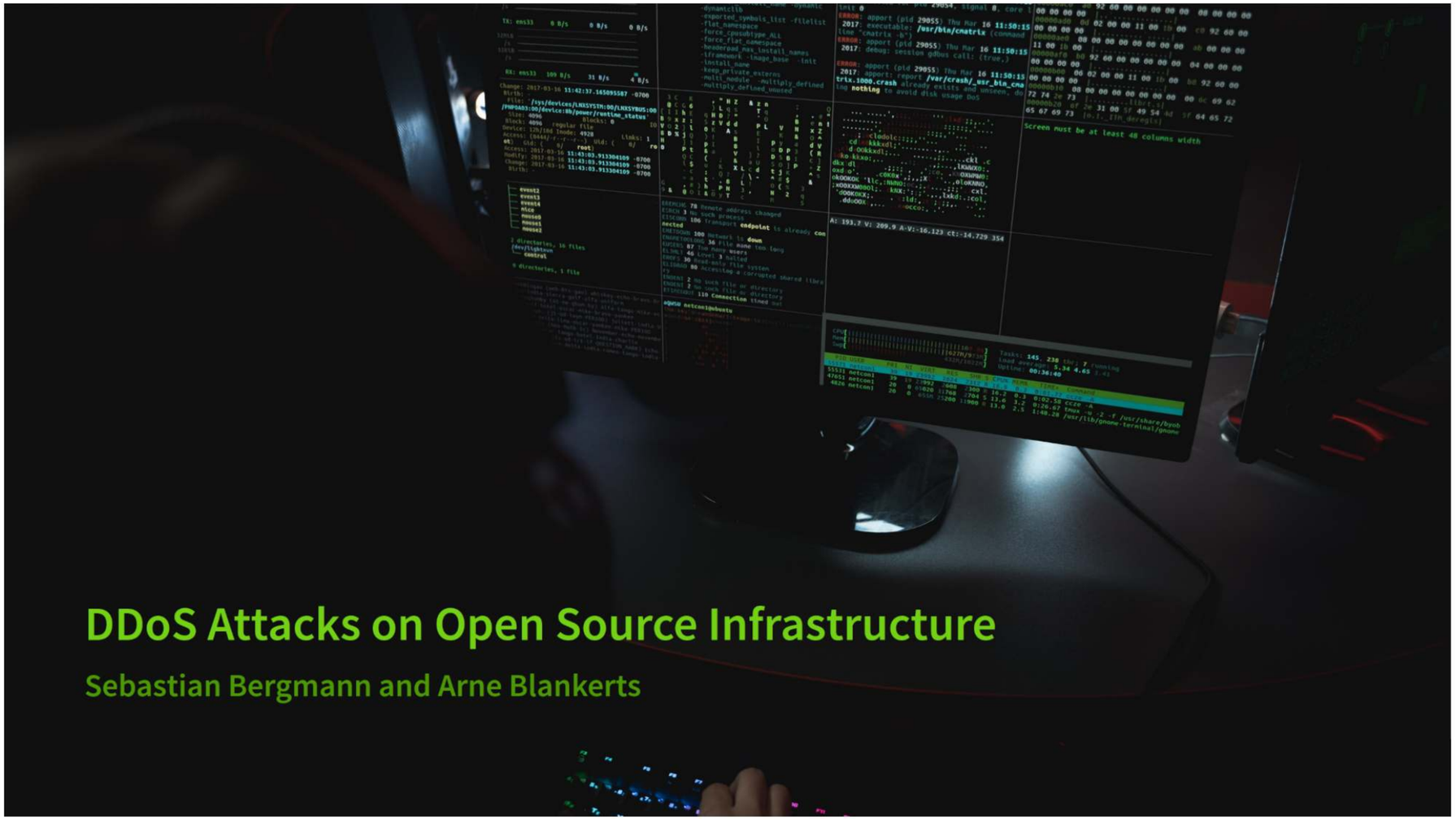
https://newsroom.eclipse.org/news/announcements/open-letter-european-commission-cyber-resilience-act

Because of toxic users that threaten with violence when their change request is not implemented.

„(What feels like) a lifetime of maintaining open source projects has left me with some things to say about the haters. I'm not sure why. Trying to do a light take of it instead of getting mad, here is a post categorizing them.”

https://seld.be/notes/a-nomenclature-of-hate

Because of Distributed Denial of Service attacks on my project's infrastructure.



https://thephp.cc/presentations/ddos-attacks-on-open-source-infrastructure

But I fundamentally believe that infrastructure such as operating systems, programming languages, and development tools must be Open Source.

This is why I continue to work on Open Source.


https://thephp.cc


sebastian@thephp.cc


@sebastian@thephpcc.social
@sebastian@phpc.social

Image Credits

- https://www.pexels.com/photo/birds-eye-view-photo-of-freight-containers-2226458
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