

# Cryptojacking

or, *"How to Go to Prison with JavaScript"*

What is  
Cryptojacking?

Cryptojacking is the unauthorized use of another person's processor to mine cryptocurrency.

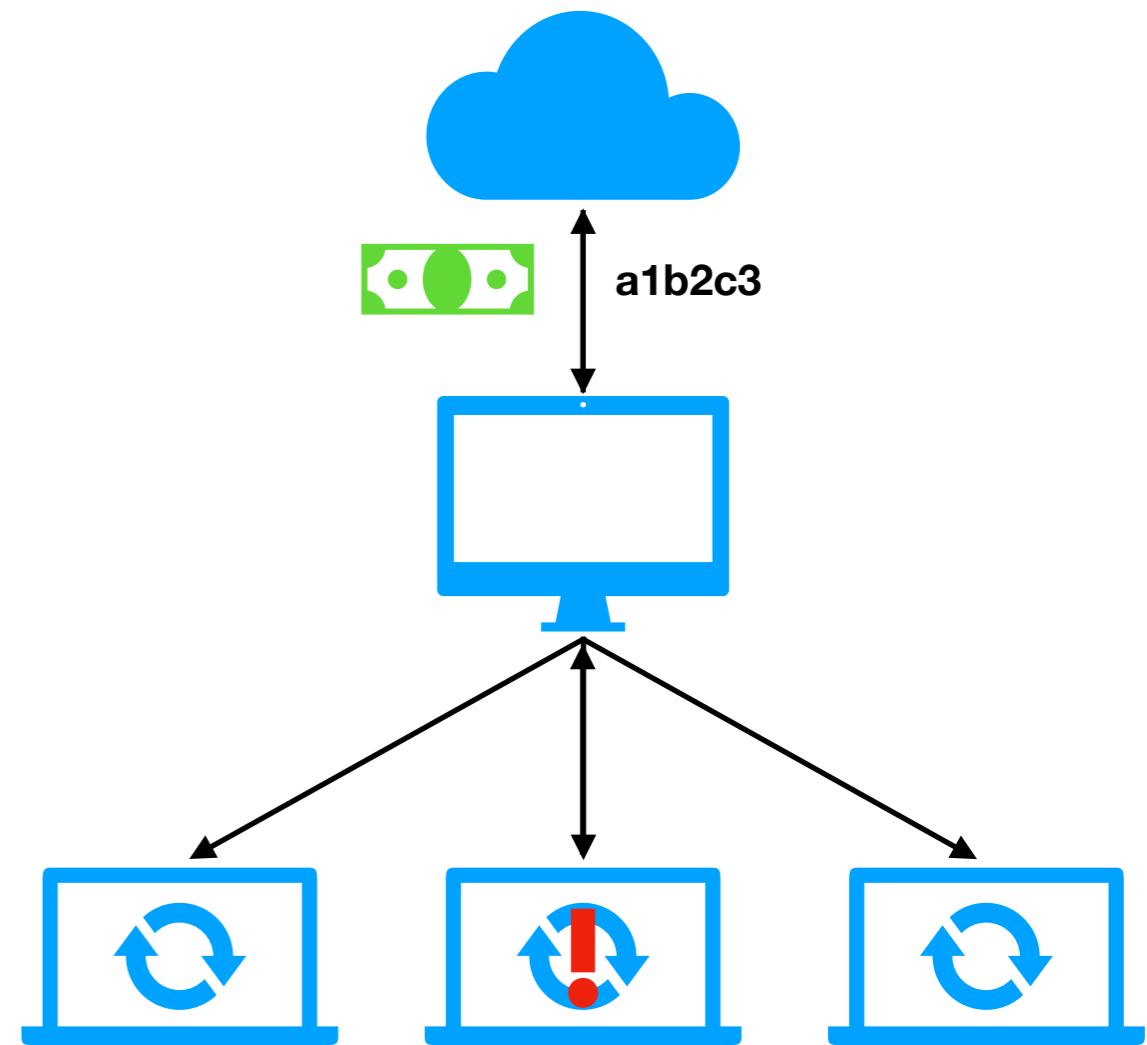
Cryptojacking is highly  
unethical and **illegal** in many  
parts of the world.

Cryptojacking can be done  
on servers, desktops and  
**even mobile devices.**

Typically, cryptojacking is performed **in-browser** with no need to install malicious code on a victim's device.

# How does cryptojacking work?

1. A user loads a mining script from the attacker's server via an either malicious or compromised website.
2. The script begins working until it finds successful hashes.
3. When a hash is found, the client sends it back to the attacker's server.
4. The attacker then uses the block to claim a cryptocurrency reward on the blockchain.
5. Repeat.



Cryptojacking has become a serious issue on the web and the subject of analysis by software security firms around the world.

# Cryptojackers are hacking websites to mine cryptocurrencies

by Selena Larson [@selenalarson](#)

🕒 February 22, 2018: 11:17 AM ET

 Recommend 1



LILY HAY NEWMAN SECURITY 12.29.17 07:00 AM

# CRYPTOJACKING HAS GOTTEN OUT OF CONTROL

W I R E D

# Cryptojacking Displaces Ransomware As Most Popular Cyberthreat



**Jason Bloomberg** Contributor i

[Enterprise & Cloud](#)

*I write and consult on digital transformation in the enterprise.*

# Forbes

How did we get here?

# BitcoinPlus

[Generate Bitcoin](#)[How Bitcoin Works](#)[Bitcoin For Websites](#)[Contact Us](#)

## Bitcoin Generation

New: you can [generate bitcoin for a friend](#).

<a href="#">Start Generating</a>	
Status	Loading
Payout amount	0.00002685 BTC
Payouts this session	0
<a href="#">View total payouts</a>	
Current speed ?	0
Average speed ?	0
Estimated time per payout	0.00 hours
<a href="#">Stop generating</a>	

You must have Java installed to use the bitcoin generator.

If your browser asks you to run the applet, or to install Java, say yes.

Waiting for Java applet to load...

**Step 1:** Click "Start Generating"

**Step 2:** Wait while your computer works ([leave this page open](#))

**Step 3:** Earn bitcoin

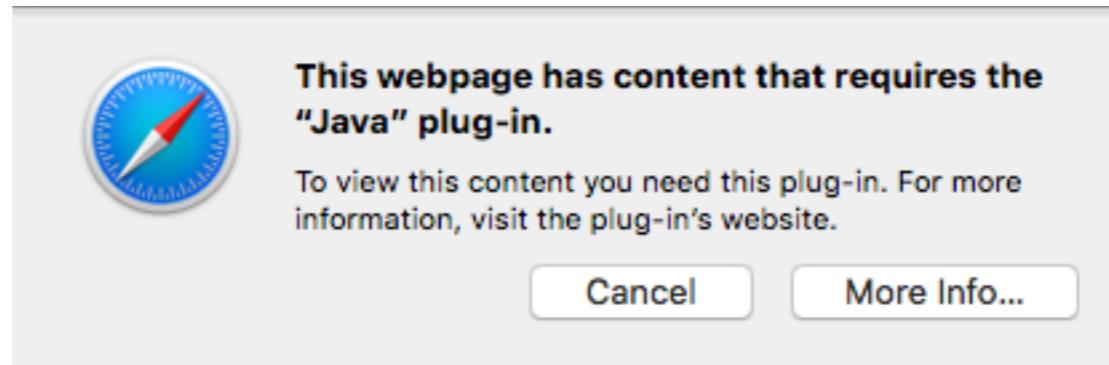
It's that easy. Want the explanation? Read [how bitcoin works](#), but click "Start Generating" first so you'll earn bitcoin while you read.

New: The [bitcoin miner for websites](#) is available.

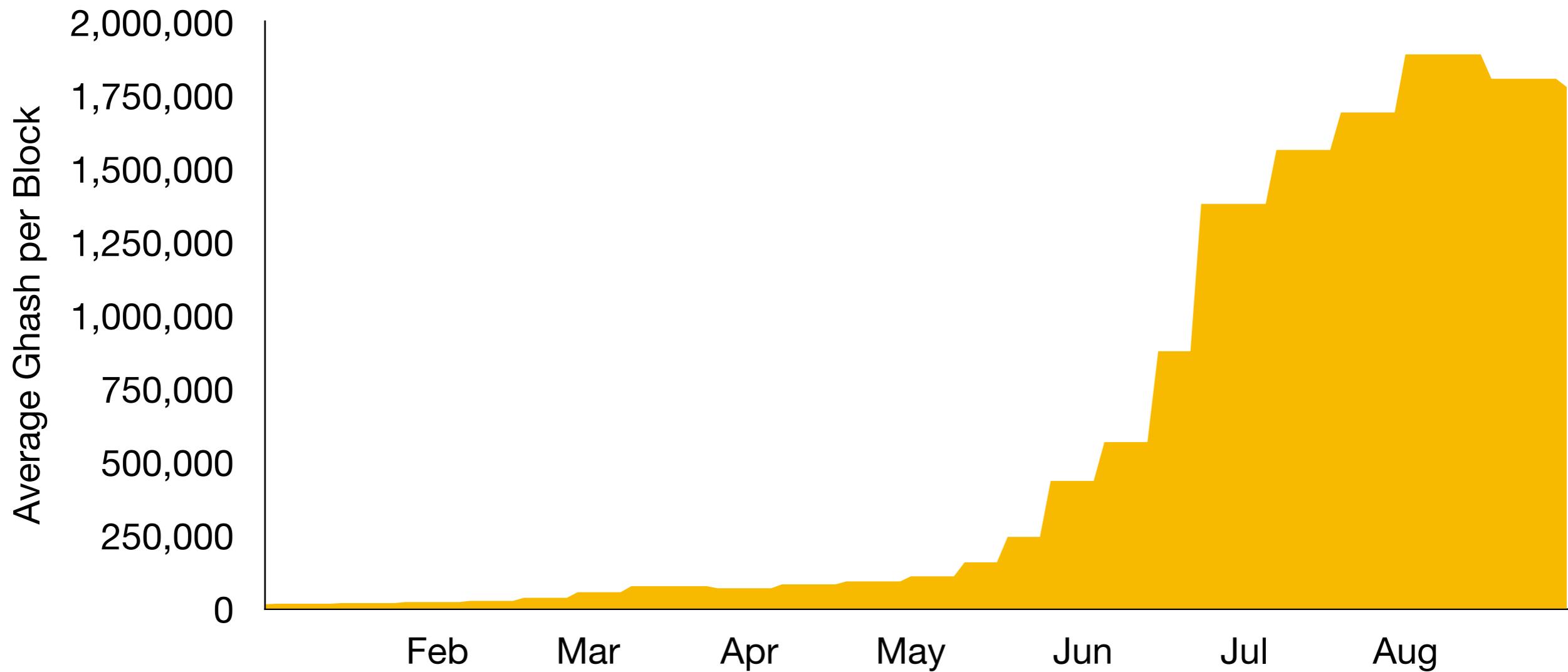
You are not logged in. You can **start generating now** and **your coins will be transferred to your account** when you [sign up](#). If you close your browser your coins may be lost.

Already have an account? [Log in](#).

In May 2011, Canadian developer Donny Nadolny releases BitcoinPlus.com, a Java based Bitcoin miner for use in the browser. His website includes instructions on how to add the miner on your own site and even a handy Wordpress plugin for easier embedding.

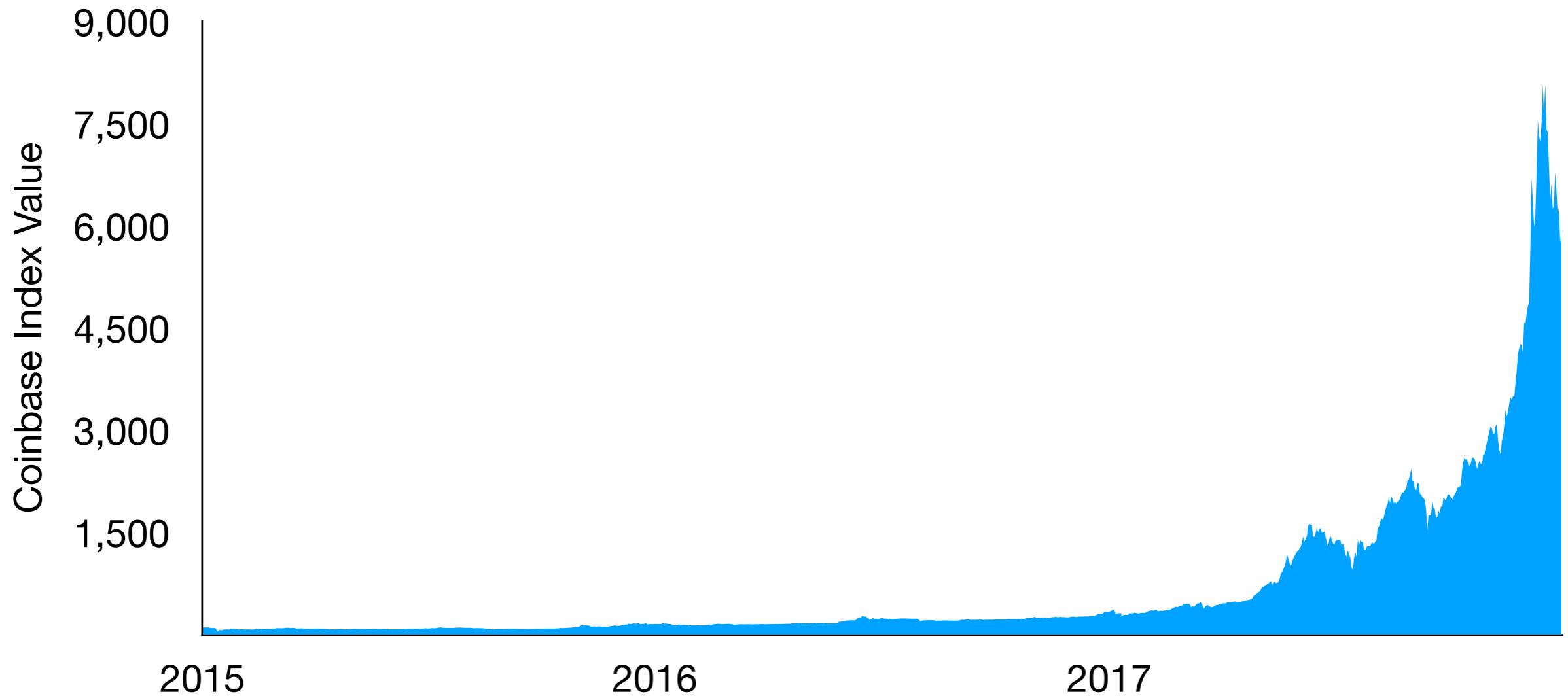


However, since BitcoinPlus.com requires the Java plugin to be installed and enabled to run, it's not viable for cryptojacking without some level of social engineering to trick users into enabling it. Some forum discussions mention embedding it on sites already using Java applets as a cover, but there's no clear evidence that anyone actually did this.



Over the summer of 2011, the difficulty of Bitcoin mining skyrockets to nearly 2 million Gigahashes per block on average making in-browser Bitcoin mining infeasible. BitcoinPlus.com goes offline, and cryptojacking is effectively dead in the water.

But this is not the end...



About 6 years later, “crypto fever” sweeps the market.

Developers create hundreds of new, easier to mine cryptocurrencies and prices of existing currencies surge. Rapidly, the rewards of in-browser mining rise and begin to outweigh the cost of hashing algorithms.



In September 2017, Coinhive.com launches, offering a service that uses a Monero crypto miner written in C, compiled into WebAssembly and embedded in the browser as an alternative to advertisements.

# It's this easy to use...

```
<script src="https://coinhive.com/lib/coinhive.min.js"></script>
<script>
    var miner = new CoinHive.Anonymous('YOUR_SITE_KEY');
</script>
```

Unfortunately, Coinhive's service only encourages customers to ask for users' permission before mining on their devices. **It does not require it.**

Shortly after, malware programmers flock to Coinhive's service and malicious mining scripts begin showing up across the web.

News & Analysis

# Why Hackers Love Cryptocurrency Miner Coinhive

*Cryptocurrency miner Coinhive is becoming a hacking tool for cybercriminals, according to security researchers.*



By Michael Kan November 29, 2017 6:43PM EST





By Helen Partz

MAY 08, 2018

# Coinhive Code Found On 300+ Websites Worldwide In Recent Cryptojacking Campaign



MINING

## COINHIVE IN-BROWSER SOFTWARE IS ‘MINING’ \$250K PER MONTH, RESEARCH FINDS



IAN TOZER | AUG 16, 2018 | 04:00



Ad blocking and anti-virus services respond by blocking Coinhive's domain and, in some cases, all forms of browser based crypto mining, both legal and illegal.

SNEAKY SNEAKY | By Jordan Pearson | Sep 19 2017, 11:52am

# Someone Made an Ad Blocker But for Cryptocurrency Mining

Is this necessary, now?

**MOTHERBOARD**

# Adblock Plus and (a little) more

## Kicking out Cryptojack

· 2017-09-21 19:05 by Ben Williams



SECURITY WORLD | TECHNOLOGY

# Why is Malwarebytes blocking Coinhive?

Posted: October 18, 2017 by [Adam Kujawa](#)

Last updated: July 19, 2018



Coinhive responds by releasing a new version of their tool called “AuthedMine” which requires that all customers display an opt in message before mining in hopes that ad blockers will make exceptions for this version of their tool.

# From AuthedMine.com...

## A Note to Adblock and Antivirus Vendors

**There is no need to block AuthedMine.com or any scripts hosted on this domain.**

AuthedMine.com offers a Monero miner that can be embeded into other Websites. This miner will only ever run after an **explicit opt-in from the user. The miner never starts without this opt-in.**

We implemented a secure token to enforce this opt-in on our servers. It is not circumventable by any means and we pledge that it will stay this way. The opt-in token is only valid for the current browser session (at max 24 hours) and the current domain. The user will need to opt-in again in the next session or on a different domain.

The opt-in notice is hosted on our servers and **can not be changed** by website owners. There's no way a website owner can start mining without the user knowing.

Click here to see how the Opt-In looks like: [\[start mining\]](#).

A detailed and technical explanation of the Opt-In can be found in our [documentation](#).

We believe that browser based mining can be a viable alternative for intrusive and annoying ads if used honestly and with consent by the user. We kindly ask Adblock and Antivirus Vendors to support us.

Please help us build a better web.

Cheers,  
[Coinhive](#)

But it's too little too late. Most ad blockers refuse to whitelist Coinhive due to their less than reputable past, and dozens of clones of their tool are already widely available online.

Additionally, many new cryptojacking tools crop up using entirely different languages, frameworks and cryptocurrencies.

 **deepwn / deepMiner** Watch 57 Star 409 Fork 184

[Code](#) [Issues 3](#) [Pull requests 0](#) [Projects 1](#) [Wiki](#) [Insights](#)

deepMiner webminer proxy (update for monero7) <https://deepool.net/miner.html>

miner javascript coinhive pool-proxy cryptonight bypass-av xmr monero7 webminer emscripten wasm

133 commits 1 branch 0 releases 3 contributors View license

Branch: master New pull request Create new file Upload files Find file Clone or download

Latest commit 1eb978e 10 days ago
evil7 update btc donte
.github Update issue templates 3 months ago
cryptonight-wasm up 10 days ago
web up 10 days ago
.gitattributes Initial commit a year ago
.gitignore update wasm and source for v7. don't use it in bad way pls 11 days ago
CryptoNight.txt Rename CryptoNote.txt to CryptoNight.txt a year ago
CryptoNight_CN.md Create CryptoNight_CN.md a year ago
LICENSE Create LICENSE 11 months ago
README.md update btc donte 10 days ago
Zero-to-Monero-1-0-0.pdf Add files via upload 2 months ago
banner update a year ago
cluster.js up 10 months ago
config.json up 10 days ago
install.sh Update install.sh 10 days ago
package-lock.json update wasm and source for v7. don't use it in bad way pls 11 days ago
package.json new package.json 10 days ago
server.js up 10 days ago

 [cryptonoter](#) / [webminerpool](#)  
forked from [notgiven688/webminerpool](#)

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Complete sources for a monero (aeon) webminer.

 133 commits  4 branches  0 releases  1 contributor

Branch: [master](#) [New pull request](#) [Create new file](#) [Upload files](#) [Find file](#) [Clone or download](#)

This branch is 37 commits behind [notgiven688:master](#). [Pull request](#) [Compare](#)

Author	Commit Message	Date
 notgiven688	changed readme	Latest commit a676b48 on May 7
 SDK	removed webminerpool.com references	5 months ago
 hash_cn	getting ready for merge	6 months ago
 server	changed readme	5 months ago
 README.md	changed readme	5 months ago

 **Crypto-Loot / cryptoloot**

Code Issues 1 Pull requests 0 Projects 0 Wiki Insights

Watch 5 Star 12 Fork 3

Self Hosted Library for CryptoLoot <https://crypto-loot.com>

monero monero-mining monetization webmasters web-mining mining bitcoin

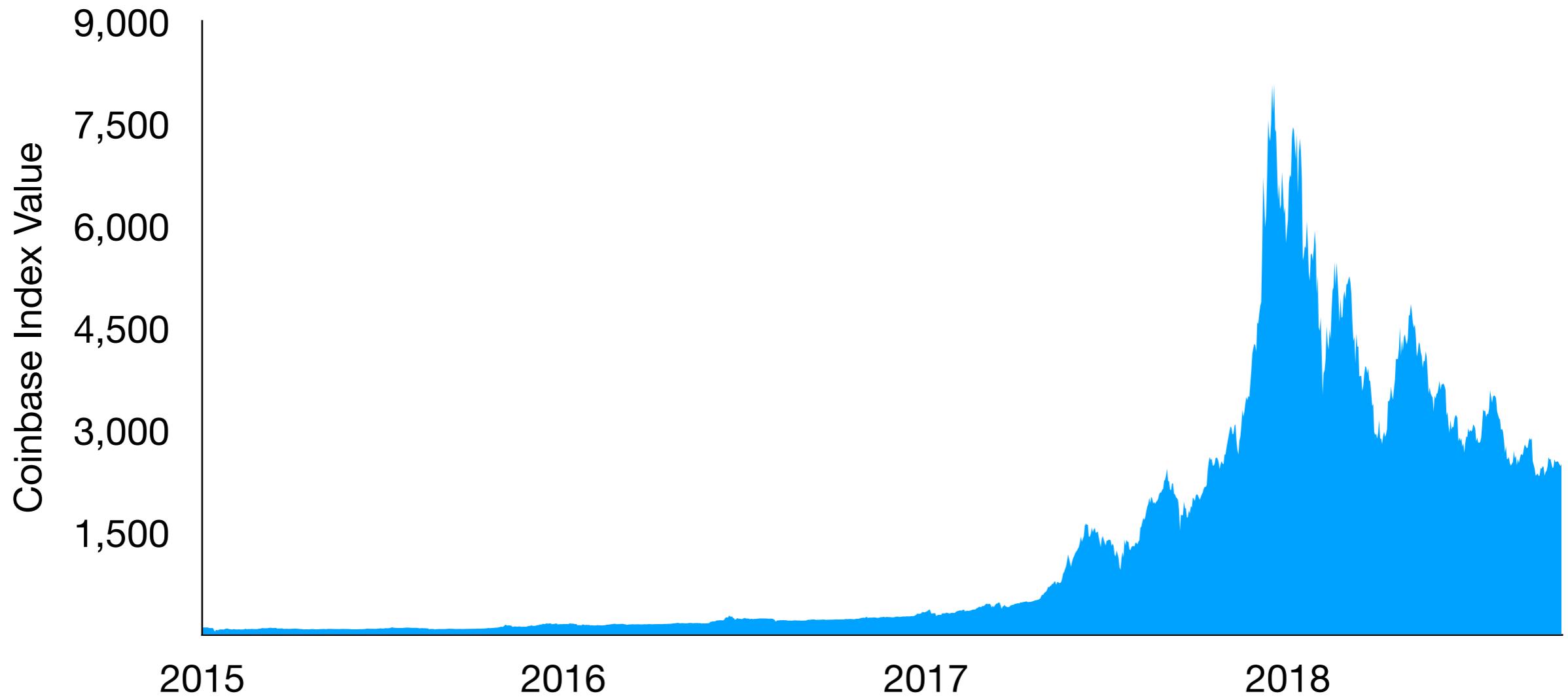
18 commits 1 branch 3 releases 1 contributor

Branch: master ▾ New pull request Create new file Upload files Find file Clone or download ▾

 **Crypto-Loot Fixed MinerUI Bug** Latest commit a0de3b1 on Aug 30

File	Message	Time
css	v1.0.0	11 months ago
lib	Fixed MinerUI Bug	a month ago
README.md	Script update. No need for Polymath.js	4 months ago
cl_log.txt	CryptoLoot SelfHosted v2.0 Release	4 months ago
example.html	CryptoLoot SelfHosted v2.0 Release	4 months ago
updater.php	Script update. No need for Polymath.js	4 months ago

Where are we now?



After a year of booming crypto markets, the cryptocurrency world is entering a “crypto winter.” Currency prices are dropping, interest in new currencies is waning, and the rewards of cryptojacking are quickly drying up.

**BITCOIN CRIME** JULY 19, 2018 08:34

# Cryptojacking Falls in Second Quarter, Coinciding with Crypto Bear Market: Research



# Cryptojacking: Has cryptocurrency-mining malware already reached its peak?

Newly released figures suggest coinmining attacks have started to decline, as some hackers grow impatient with low returns on their investment, which could lead to a rise in more dangerous attacks.



By [Danny Palmer](#) | July 17, 2018 -- 12:00 GMT (05:00 PDT) | Topic: [Security](#)



**BITCOIN CRIME** AUGUST 31, 2018 22:01

# Not a Ticket to Riches: Average Cryptojacking Website Makes Only \$5.80 per Day



Governments are also starting to crack down more intensely on cryptojackers, increasing the risk associated with it.

**Blockchain**

# 16 Arrested in Japan Over Monero Cryptojacking Case

By [Alex Rathod](#)  4 months ago  Leave a comment

TOSHI TIMES



By Marie Huillet

JUL 09, 2018

# **China: 20 Arrested in Cryptojacking Case Allegedly Affecting Over 1 Million Computers**



# Japan issues first-ever prison sentence in cryptojacking case

The 24-year-old has been sentenced despite making only \$45 from his antics.



By [Charlie Osborne](#) for [Zero Day](#) | July 5, 2018 -- 12:04 GMT (05:04 PDT) | Topic: [Security](#)



Hackers are responding by abandoning the browser and turning to more powerful, more damaging attack vectors.

LILY HAY NEWMAN SECURITY 02.12.18 12:09 PM

# NOW CRYPTOJACKING THREATENS CRITICAL INFRASTRUCTURE, TOO

W I R E D

SECURITY



## Cryptojacking apps invade Google Play store, with one even hitting more than 100K downloads

Software that secretly mines cryptocurrency on infected devices is gaining popularity with cybercriminals, who have even managed to sneak malicious apps into the Google Play Store.

By Brandon Vigliarolo | April 5, 2018, 8:48 AM PST



# Hackers are increasingly exploiting cryptojacking malware without needing active browsers

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WRITTEN BY

Nicholas Fearn

*Crypto malware is quickly extending to non-browser applications, says Checkpoint*



Meanwhile, legal browser based crypto mining is slowly regaining interest as an alternative to advertisements on high traffic websites.

BLOG

# Could cryptojacking go legit and disrupt digital advertising?

By [Patricio Robles](#) | October 24th 2017

●Econsultancy

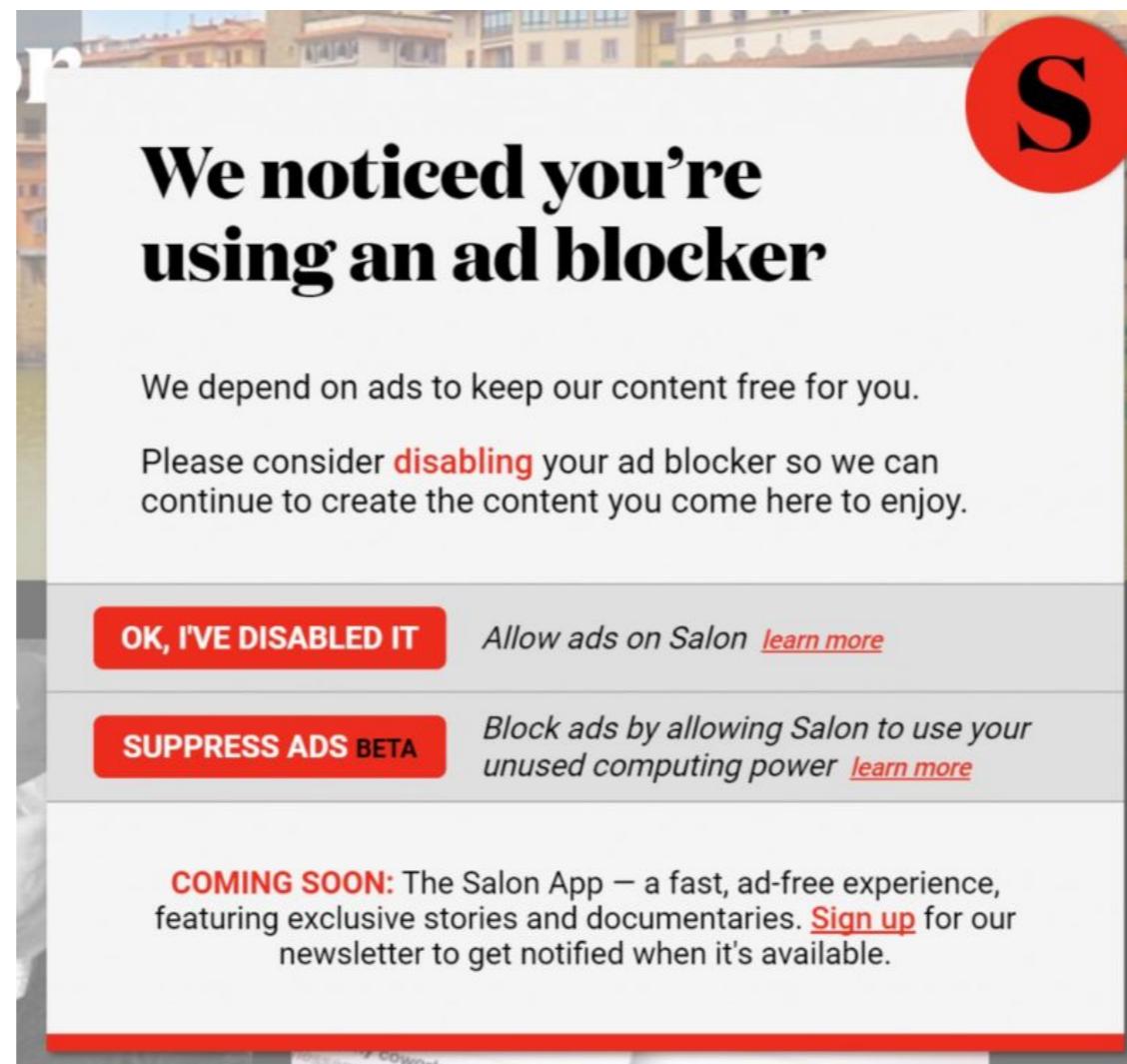
# The Pirate Bay turns transparent: Can cryptocurrency mining really replace ads?

Opinion: There is a fine line between mining for profit through visitors and cryptojacking, and we are yet to see whether or not the trend will be viable for businesses.



By [Charlie Osborne](#) for [Between the Lines](#) | July 10, 2018 -- 12:25 GMT (05:25 PDT) | Topic: [Blockchain](#)





Legal browser based crypto  
mining is also gaining popularity  
as a means of supporting charities.

INSIGHTS

# Mining cryptocurrency has become fashionable for charities – but does it work?

Monero is particularly popular



# Donate Your Tab To

Stop Gun Violence



 \$59.16 raised for: [Everytown](#)

**DonateYourTab.to**

# Give hope, just by being here

This website uses some of your computer's processing power to automatically generate funds for [UNICEF Australia](#).

UNICEF works in some of the world's toughest places to save children, protect their rights, and help them fulfil their potential.

[START DONATING](#)



What can we expect  
in the future?

Over time, cryptocurrencies will either grow more difficult to mine or devalue themselves through inflation. As the work-reward ratios of mining changes, cryptojacking will likely constantly move to newer, easier to mine currencies.

This will benefit those currencies and their associated tools by providing readily available mining pools. Cryptojacking may effectively incentivize software that is easier to use for malicious purposes.

We may have already seen  
the beginnings of this effect  
in the mining of Monero.

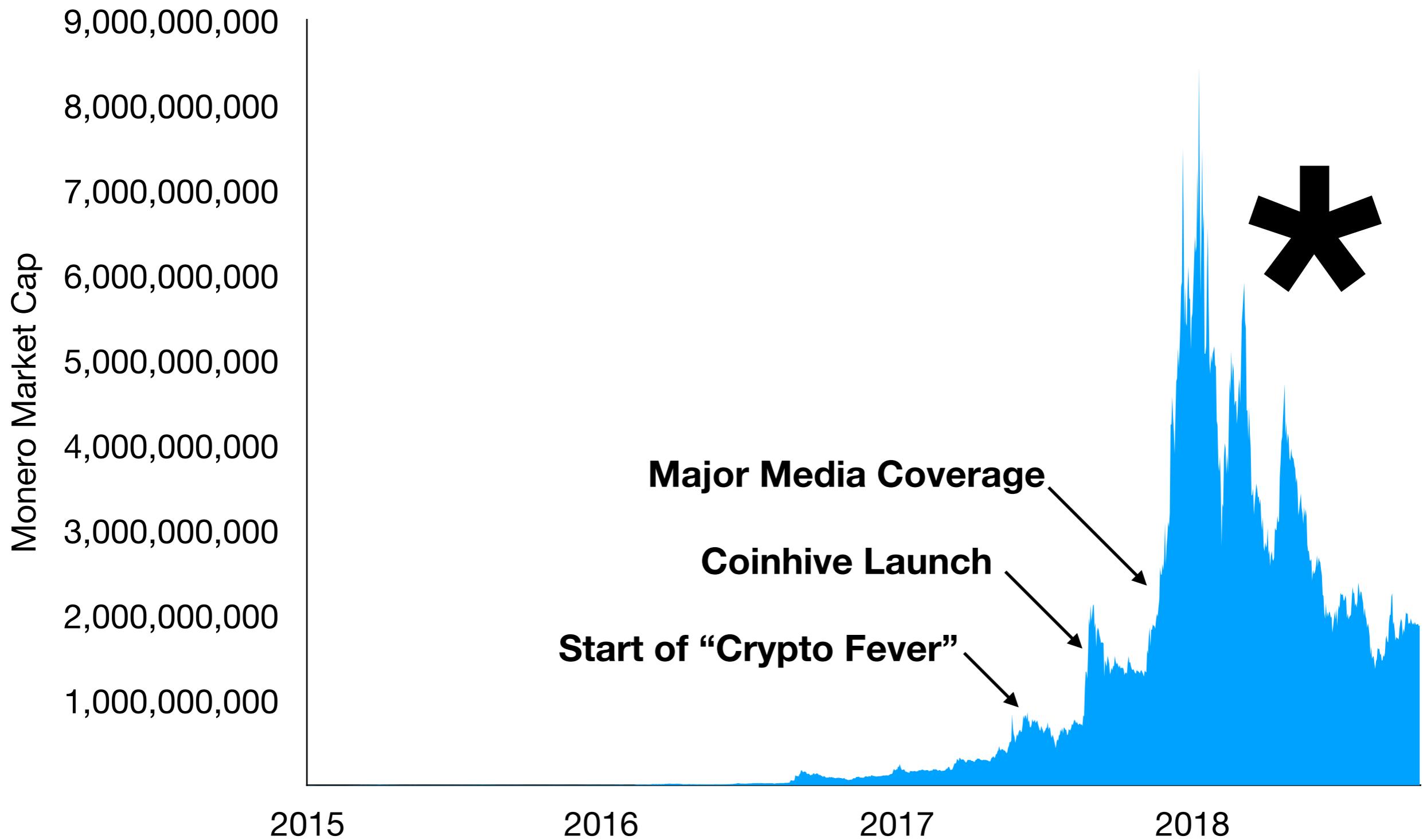


By Molly Jane Zuckerman

JUN 13, 2018

# 5 Percent of Monero in Circulation Was Mined Through Malware, Research Finds





\* This Correlation is  
Highly Speculative

Another problem is that both legal and illegal crypto mining heavily taxes processing power on devices. Older and cheaper devices suffer more from this, and as a result, cryptojacking could make web browsing difficult or even impossible for the poor.

**“We may be in a situation in the future where you’re able to get access more quickly because you’re able to solve these puzzles faster. The faster the CPU you have, the quicker you can progress to the next screen, and everyone could start to be treated differently.”**

*– Dan Cuddeford, Director of Sales for Wandera*

**“It's troubling to consider that in-browser mining could ultimately become its own form of paid prioritization, where the people who can afford more processing power are preferred by services online.”**

*– Lily Hay Newman, WIRED Magazine*

While cryptojacking does pose serious threats now and in the future, legal browser based crypto mining may offer significant benefits by pushing out ad driven web content which already significantly slows down older devices.

What should **we** do  
about cryptojacking?

# As Developers

- Don't cryptojack! Always ask for permission before mining on users' hardware.
- Don't serve advertisements from untrustworthy sources, especially with attached scripts.
- Don't embed iframes from untrustworthy sources.
- Implement a Content Security Policy.
- Use the latest standards for security.

# As Users

- Avoid suspicious websites.
- Use an ad blocker or a browser with cryptojacking blocking features (so far only Firefox, Opera and Brave).
- Don't download programs from untrusted sources.
- Pay attention to your CPU and battery usage.
- Update your software.

# As People

- Get the word out. Inform and educate others about cryptojacking and how to avoid it.
- Help your friends and family protect themselves. Install ad blockers and update software.
- Stay informed on the latest news and advisories in software security.

# Thanks

Rose Karr

RosalineKarr.com  
[github.com/rosalinekarr](https://github.com/rosalinekarr)  
[twitter.com/rosalinekarr](https://twitter.com/rosalinekarr)  
[keybase.io/rosalinekarr](https://keybase.io/rosalinekarr)