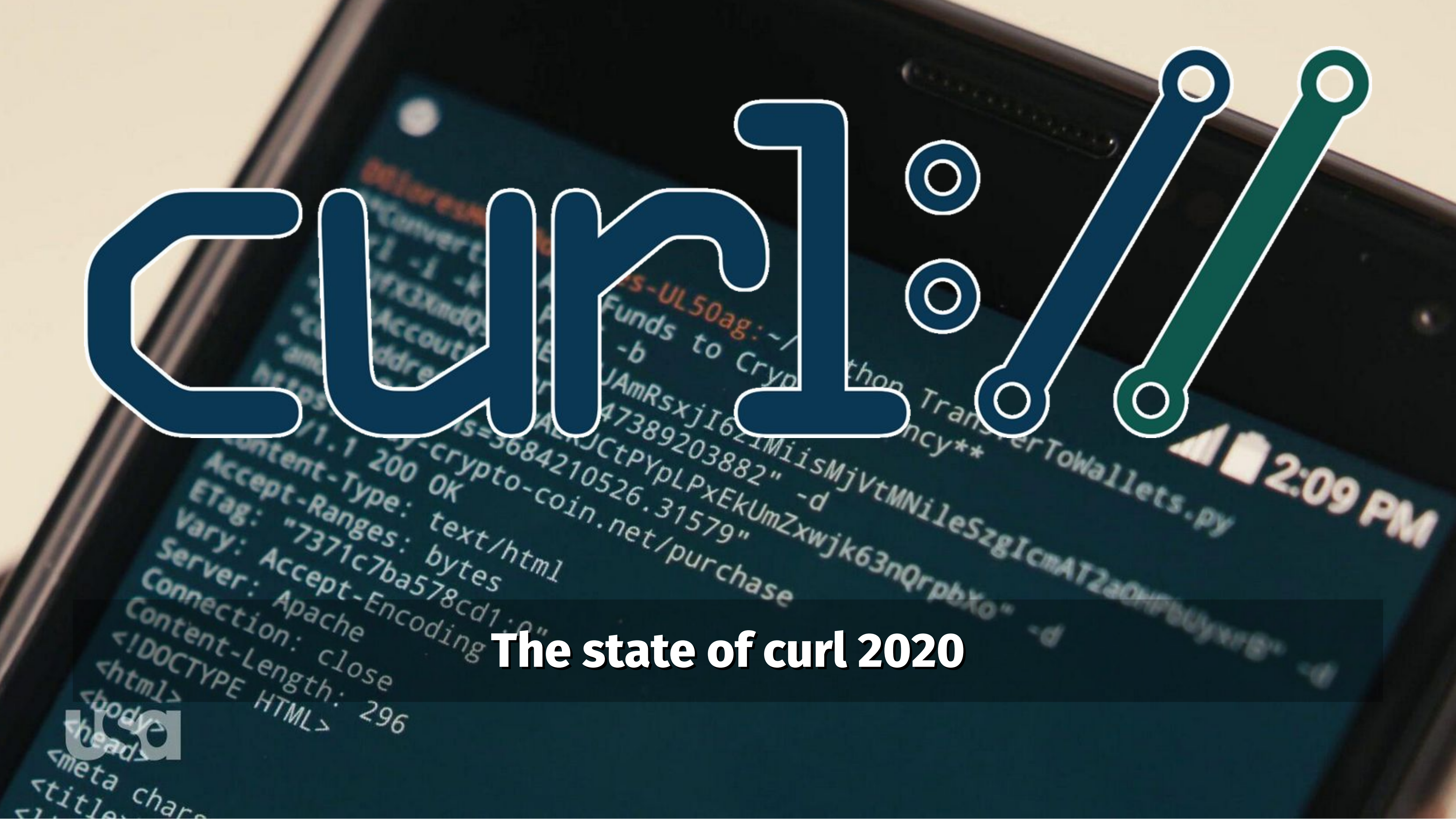


```
HTTP/1.1 200 OK
Content-Type: text/html
Accept-Ranges: bytes
ETag: "7371c7ba578cd1:0"
Vary: Accept-Encoding
Server: Apache
Connection: close
Content-Length: 296
<!DOCTYPE HTML>
<html>
<body>
<head>
```

The state of curl 2020

Growth and size

Quality and testing

Commits

Newcomers and oldies

Releases

Activity

Vulnerabilities

Users' view

Money

The last 12 months

Less Good

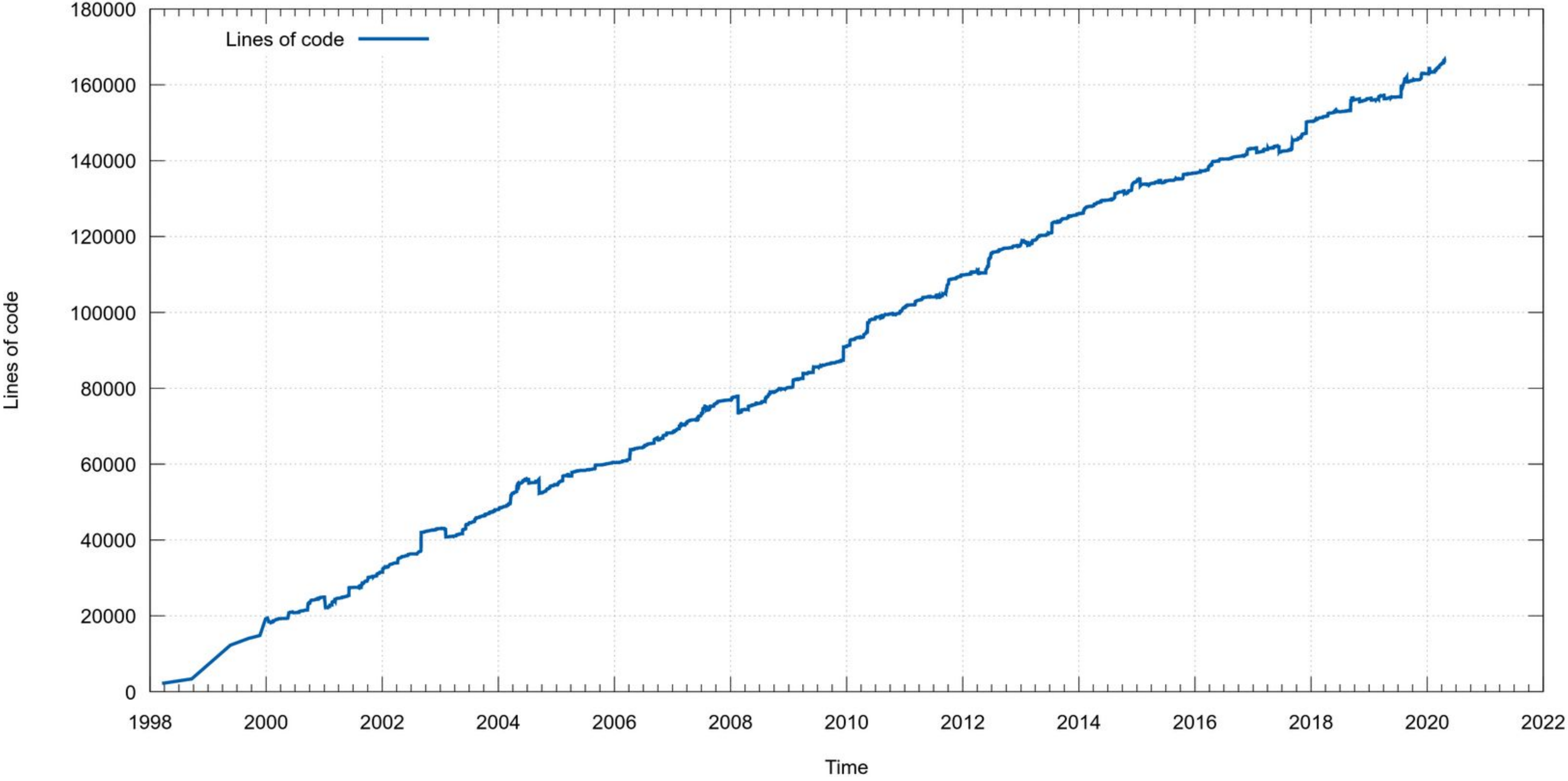
My role

Future

Growth and size

Lines of code

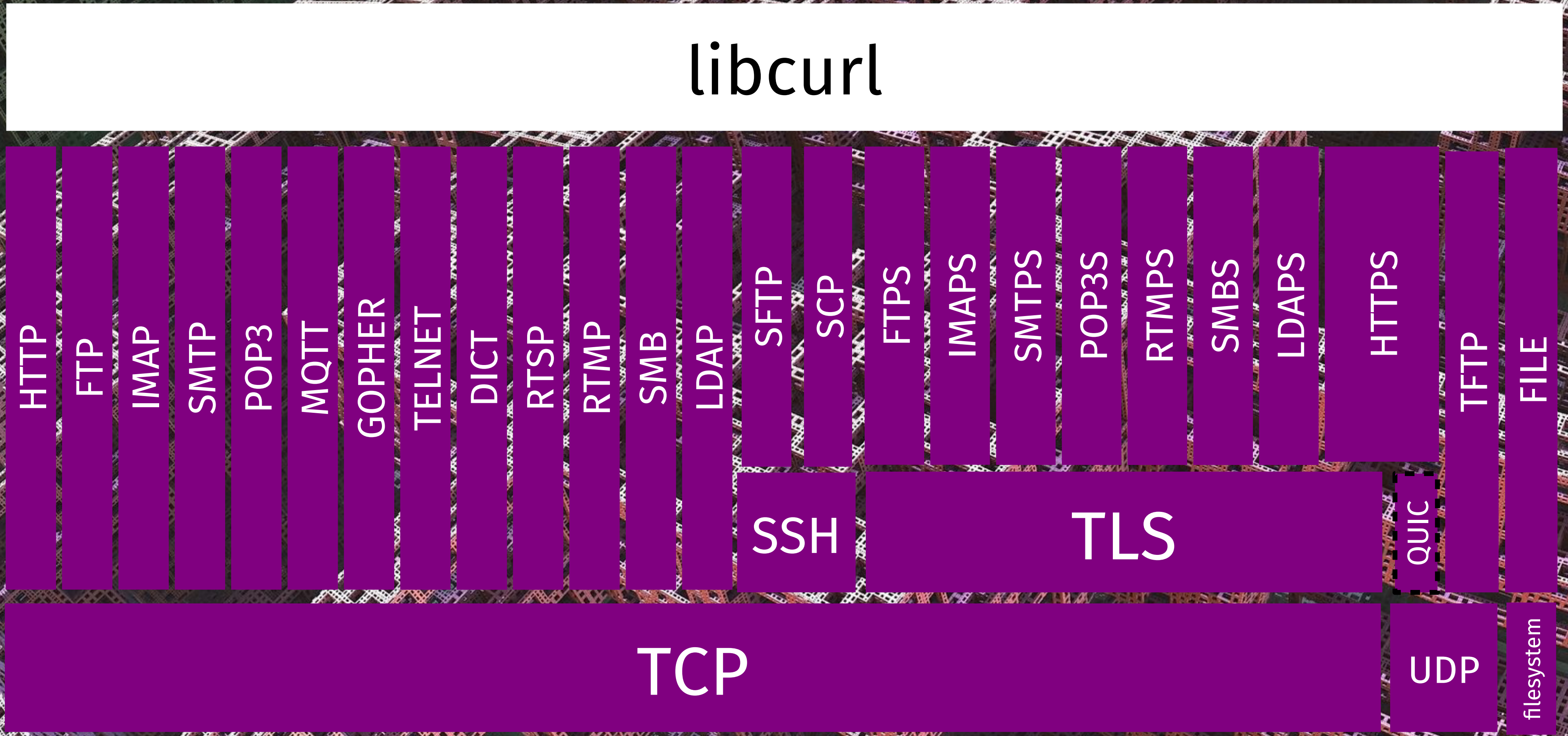
@bagder



Is 165K LOC a lot?

@bagder

25 transfer protocols



libcurl

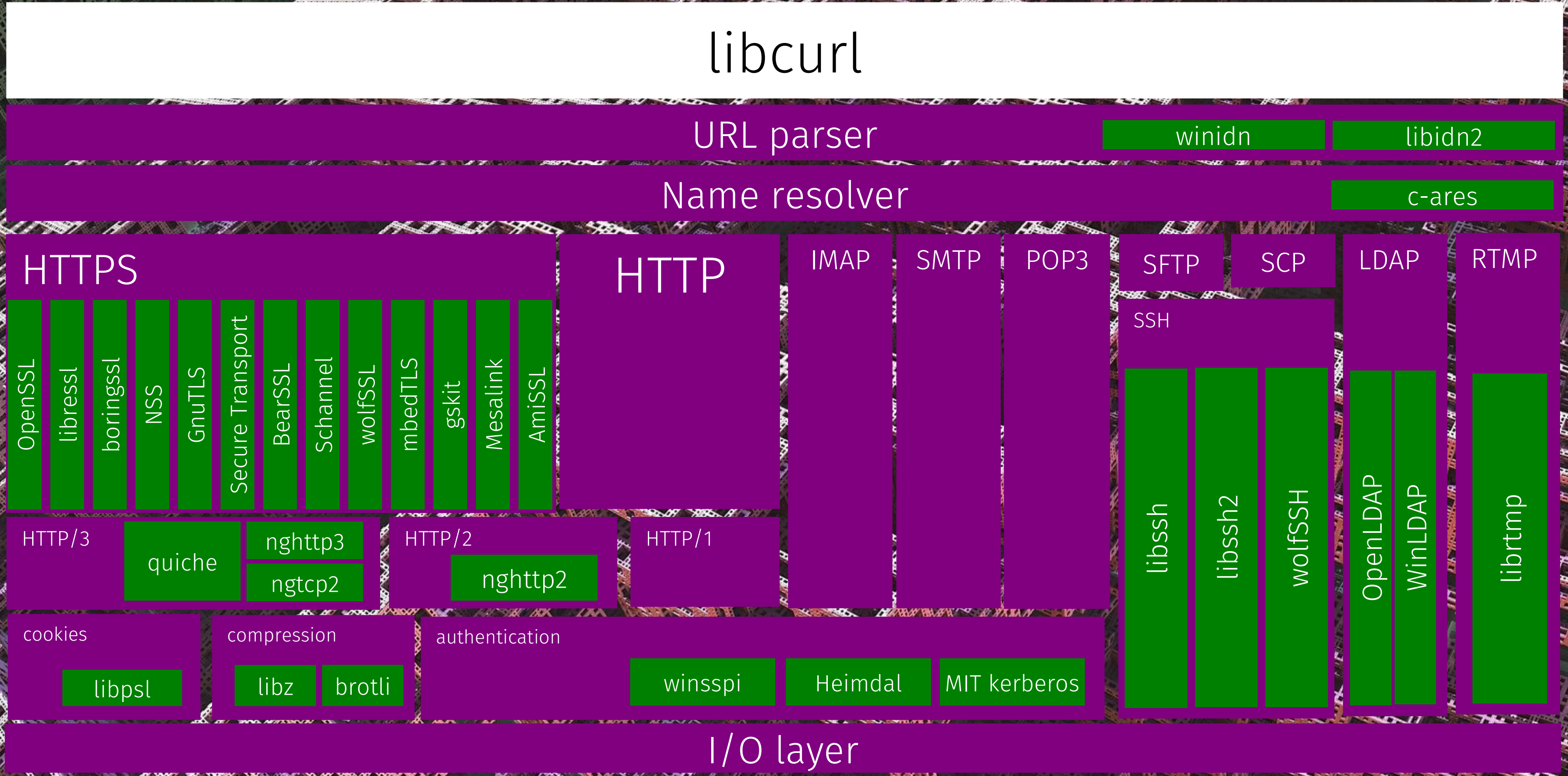
HTTP FTP IMAP SMTP POP3 MQTT GOPHER TELNET DICT RTSP RTMP SMB LDAP SFTP SCP FTPS IMAPS SMTPS POP3S RTMPS SMBS LDAPS HTTPS TFTP FILE

SSH TLS QUIC

TCP UDP filesystem

@bagder

32 third party dependencies



libcurl

URL parser: winidn, libidn2

Name resolver: c-ares

HTTPS: OpenSSL, libressl, boringssl, NSS, GnuTLS, Secure Transport, BearSSL, Schannel, wolfSSL, mbedTLS, gskit, Mesalink, AmiSSL

HTTP

HTTP/3: quiche, nghttp3, ngtcp2

HTTP/2: nghttp2

HTTP/1

IMAP

SMTP

POP3

SFTP

SCP

SSH: libssh, libssh2, wolfSSH

LDAP: OpenLDAP, WinLDAP

RTMP: librtmp

cookies: libpsl

compression: libz, brotli

authentication: winsspi, Heimdal, MIT kerberos

I/O layer

72 operating systems

libcurl

Blackberry Tablet OS	Sailfish OS	UnixWare	Illumos	AIX	Mac OS 9	Windows CE	vxWorks	NuttX
ipadOS	SCO Unix	Linux	Windows	macOS	FreeBSD	MS DOS	z/OS	WebOS
PlayStation Portable	RISC OS	NetBSD	OpenBSD	VMS	Tru64	Haiku	UNICOS	Tizen
Mbed	FreeRTOS	Android	iOS	Blackberry 10	Integrity	MINIX	OS21	Cygwin
ReactOS	ChromeOS	Cell OS	HP-UX	ucLinux	IRIX	OS/2	MPE/iX	NCR MP-RAS
SunOS	Hurd	OS/400	Solaris	Symbian	AmigaOS	Netware	SINIX-Z	Syllable OS
Lineage OS	Plan 9	Ultrix	TPF	BeOS	eCOS	QNX	NonStop OS	tvOS
Garmin OS	Genode	DragonFly BSD	Nintendo Switch	Fuchsia	Serenity	Redox	Hardened BSD	FreeDOS

20 CPU architectures

libcurl

x86	PowerPC	ARM	MIPS	RISC-V
SPARC	m68k	POWER	OpenRISC	Cell
s390	Nios	SH4	HP-PA	ARC
Itanium	Alpha	MicroBlaze	VAX	Xtensa

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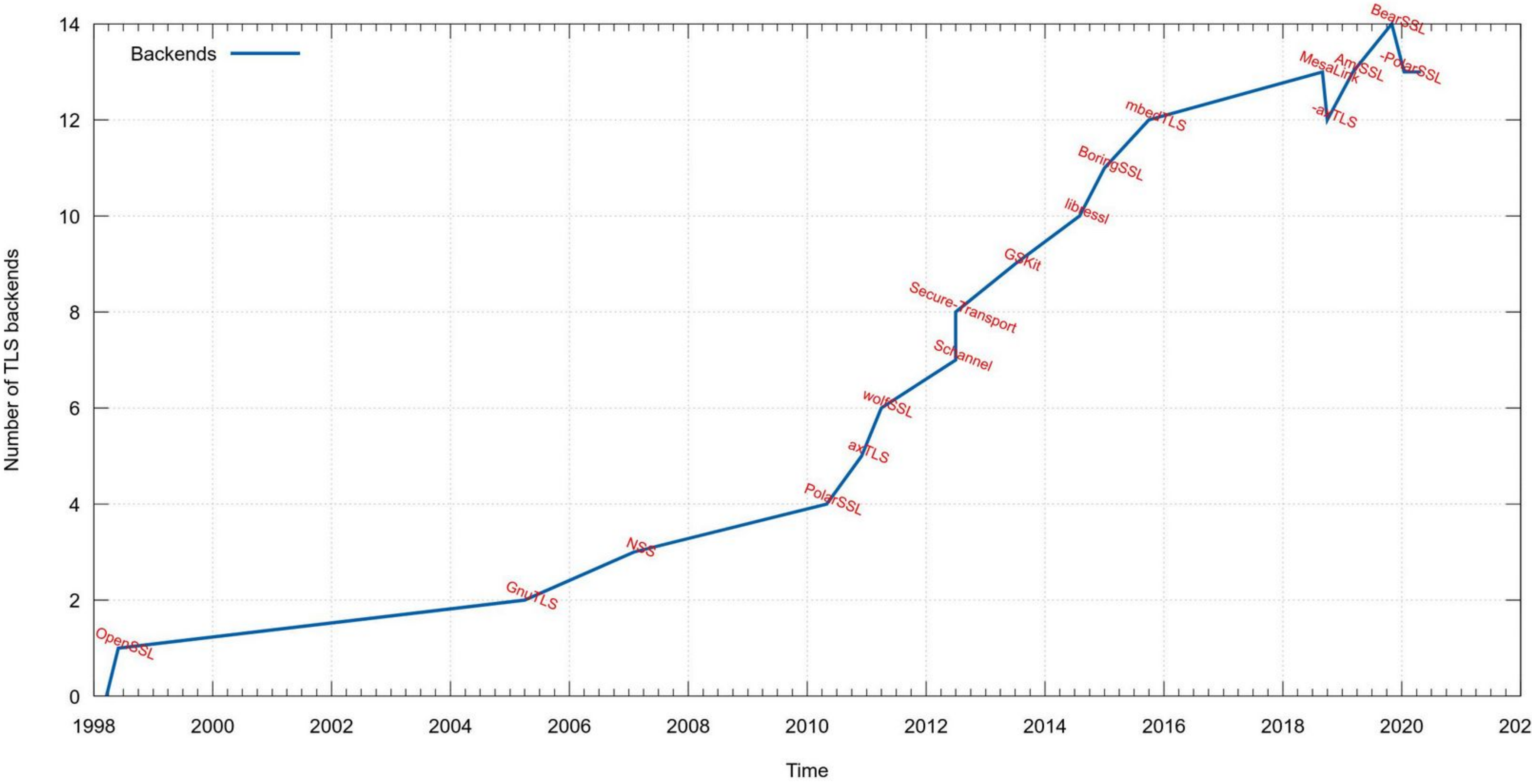
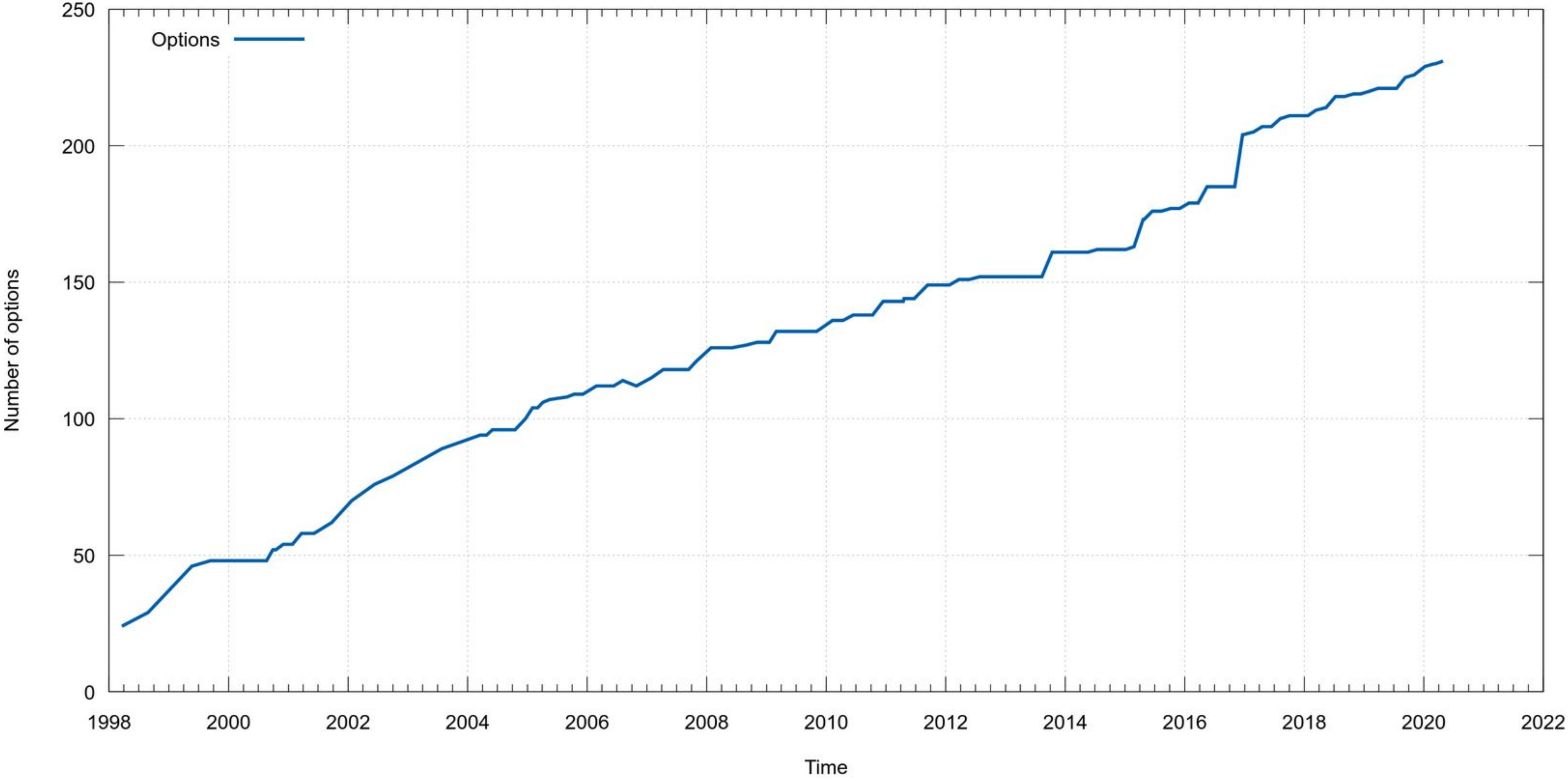
Supported TLS backends

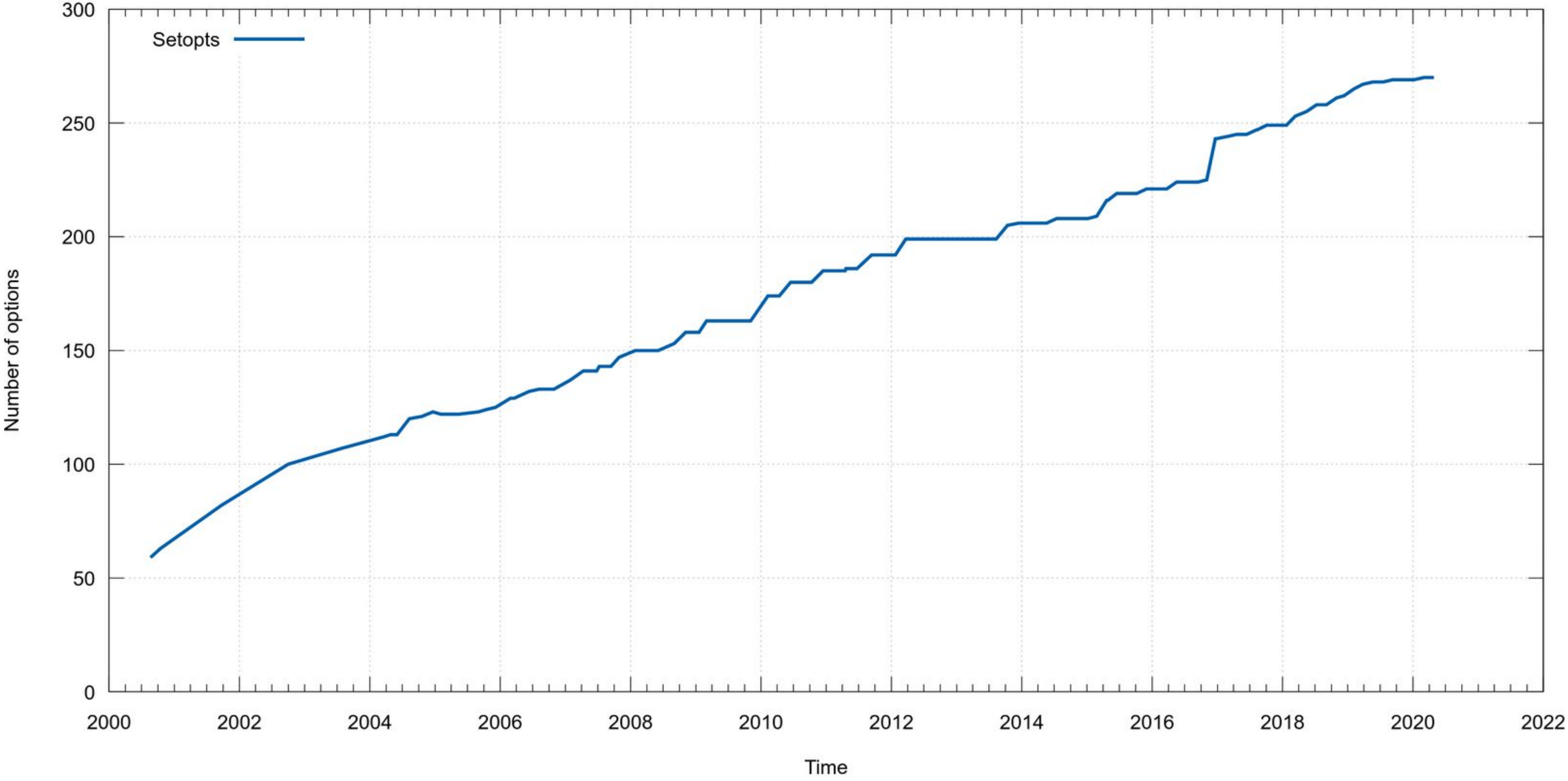


@bagder

Command line options



easy setopt options



Quality and testing

C!

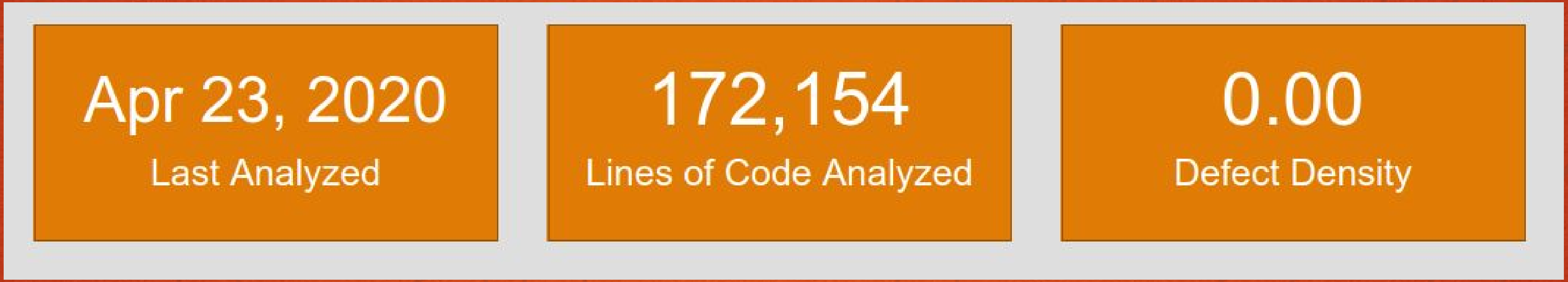
Efficient and *portable*!

Some security problems could be avoided using something else

Lots of “reach” would then also be avoided

Mitigations: readable code, reviews, tests, fuzzing, static code analyzing

Coverity on curl – fixed defects



Apr 23, 2020
Last Analyzed

172,154
Lines of Code Analyzed

0.00
Defect Density

OSS-Fuzz

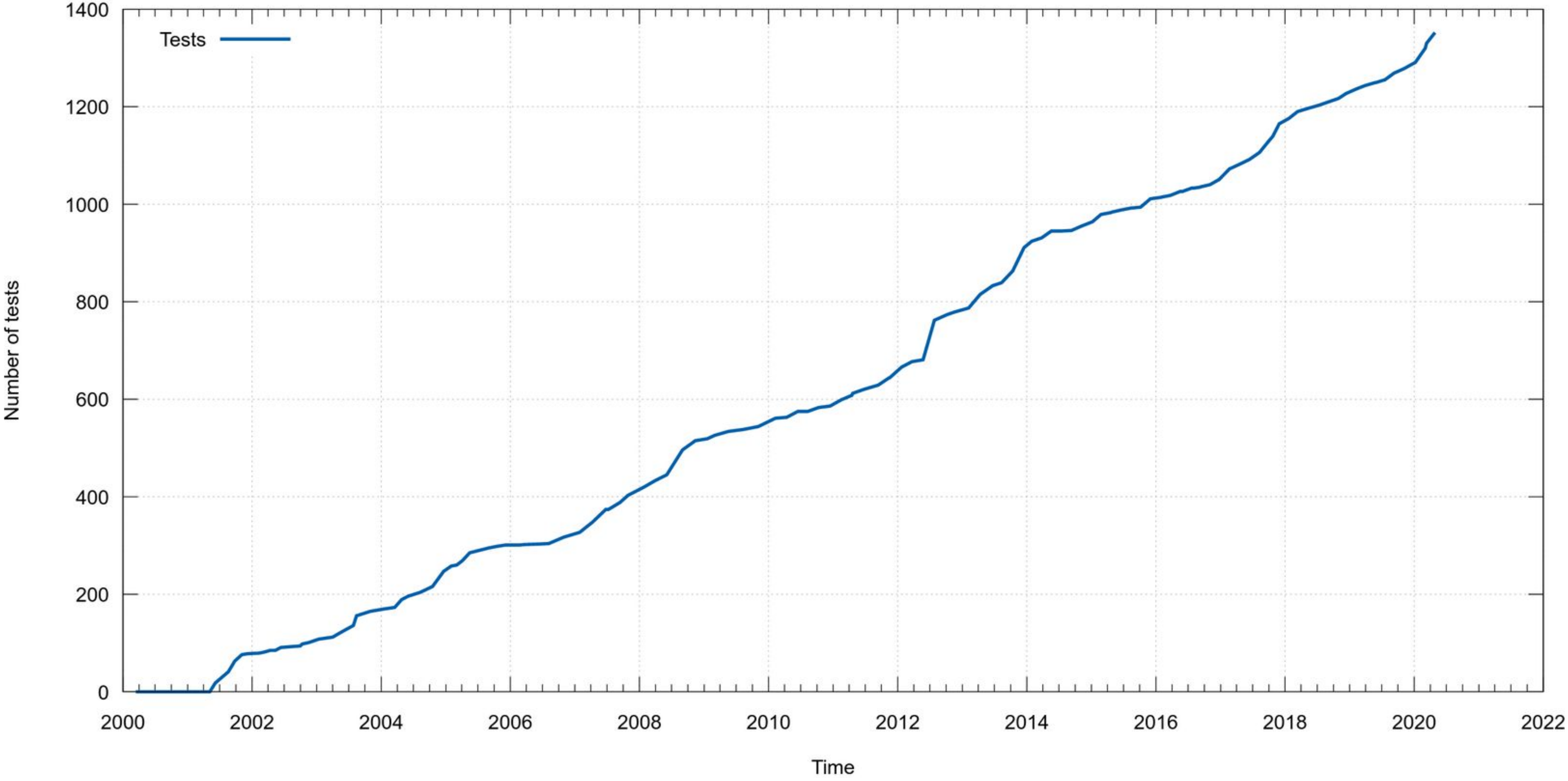
Basically flatlined the last year – nothing new is reported.

CI-Fuzz runs a little fuzzing on every commit / PR

We need more entry points to get more out of fuzzers

@bagder

Test cases



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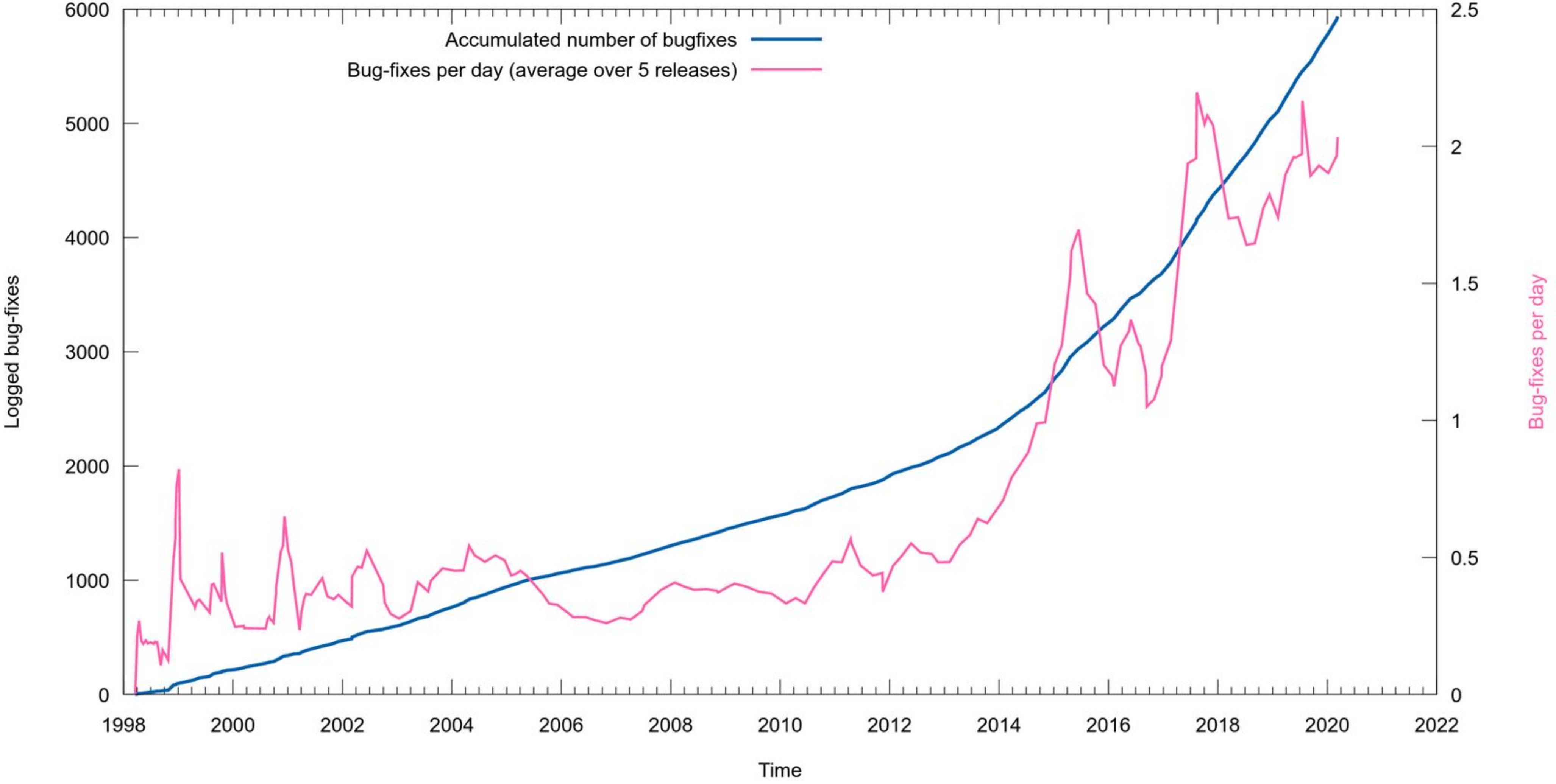
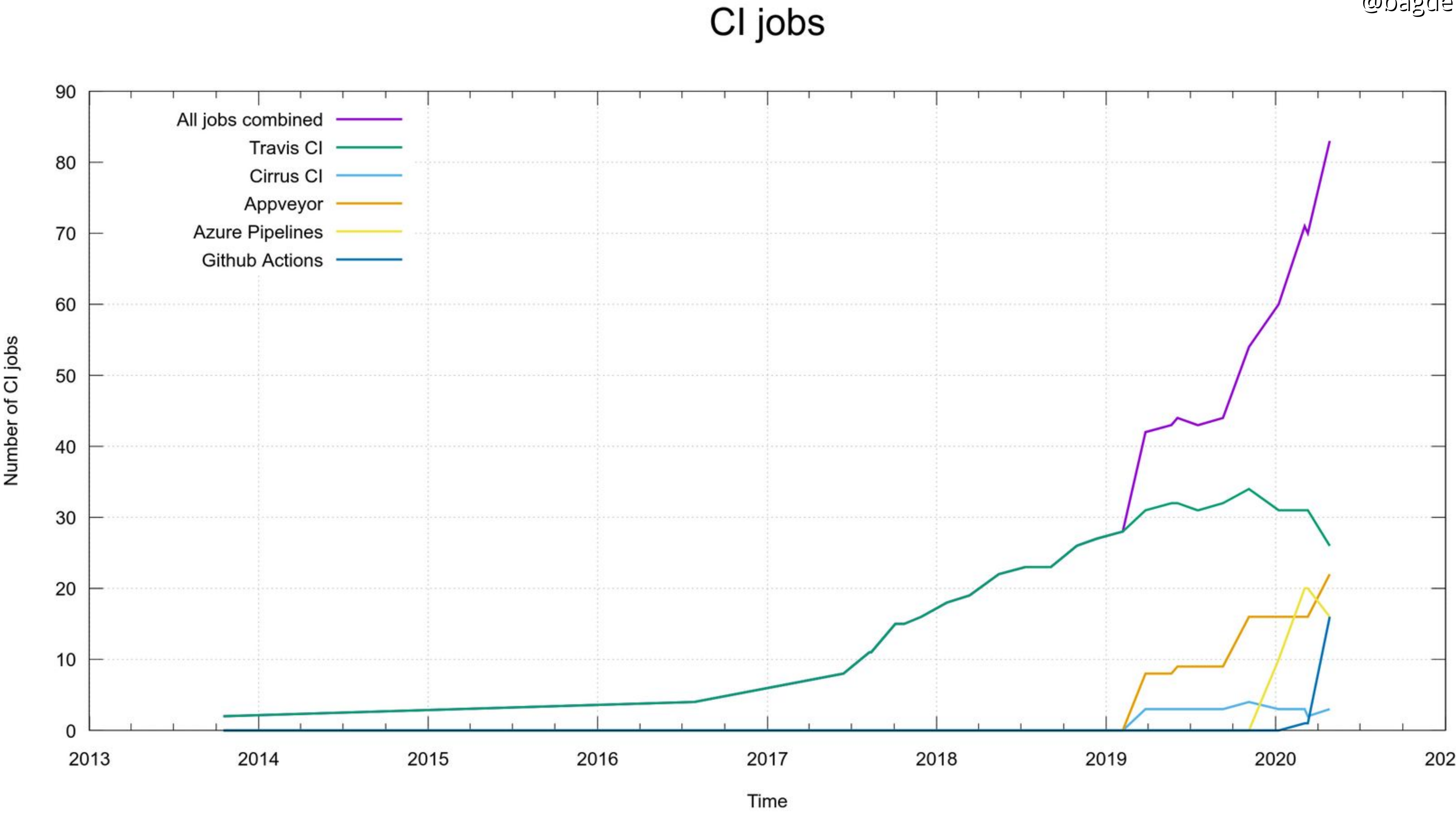
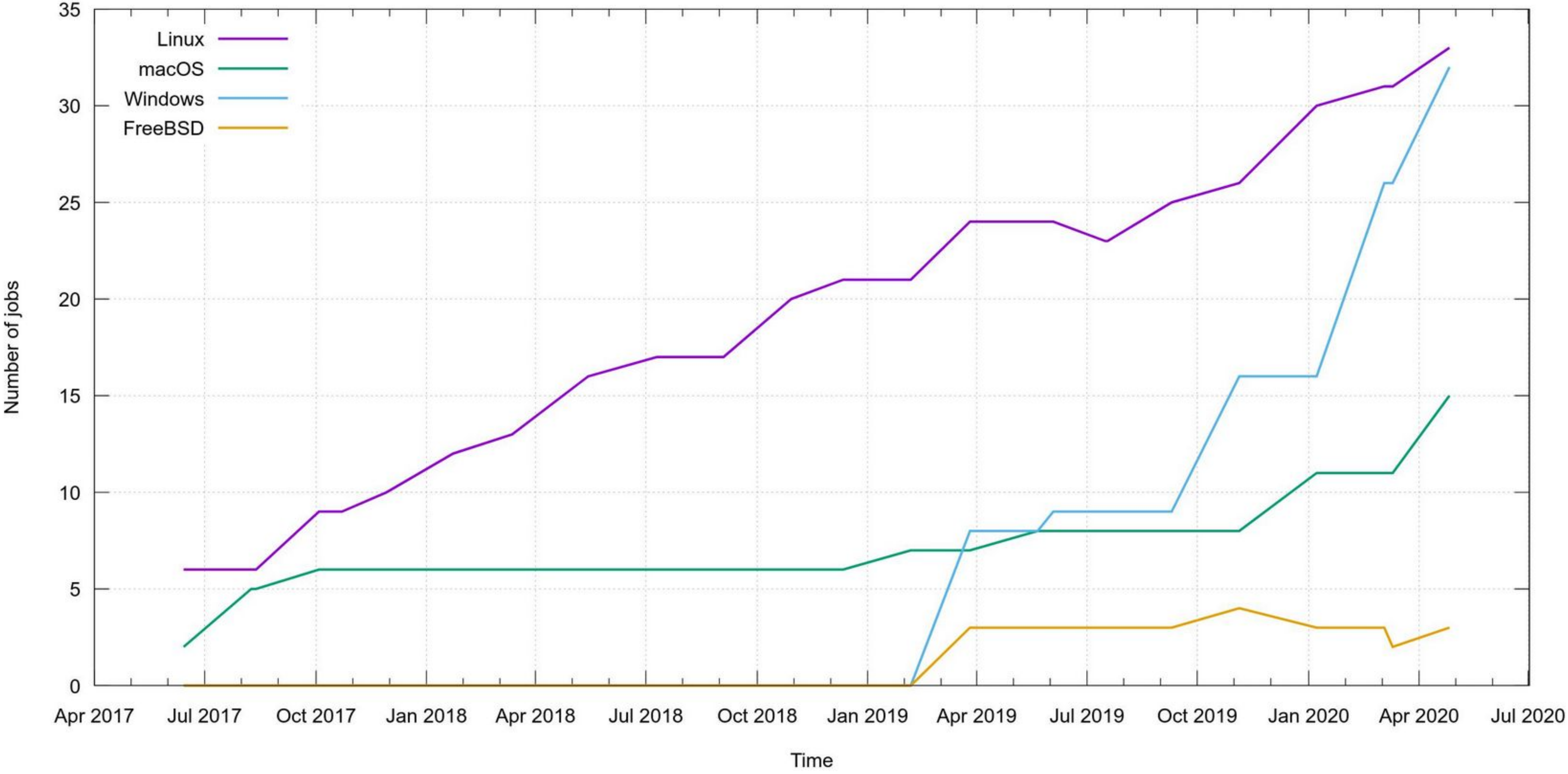
Bug-fixes




CI jobs
All jobs combined
Travis CI
Cirrus CI
Appveyor
Azure Pipelines
Github Actions
Number of CI jobs
0
10
20
30
40
50
60
70
80
90
2013
2014
2015
2016
2017
2018
2019
2020
2021
Time

@bagder

CI jobs per platform



Test coverage

Good to know, hard to measure. We’ve given up for now

Was 72 - 78% on flaky coveralls.io

For a single TLS – SSH – resolver – config setup!

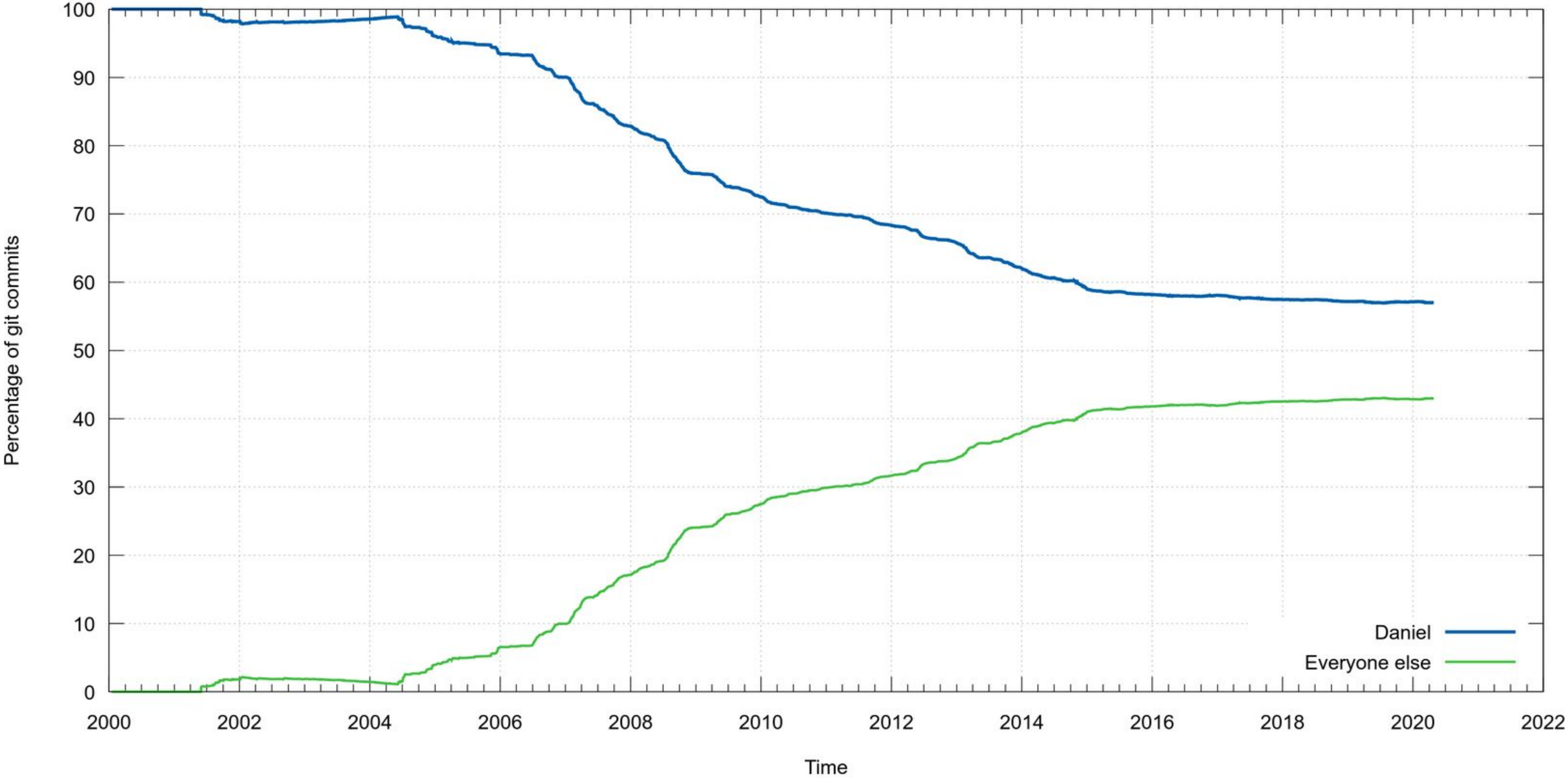
Some tests too slow for coverage runs in the cloud (torture)

Some code paths still hard to test with existing test suite

Commits, frequency and whom

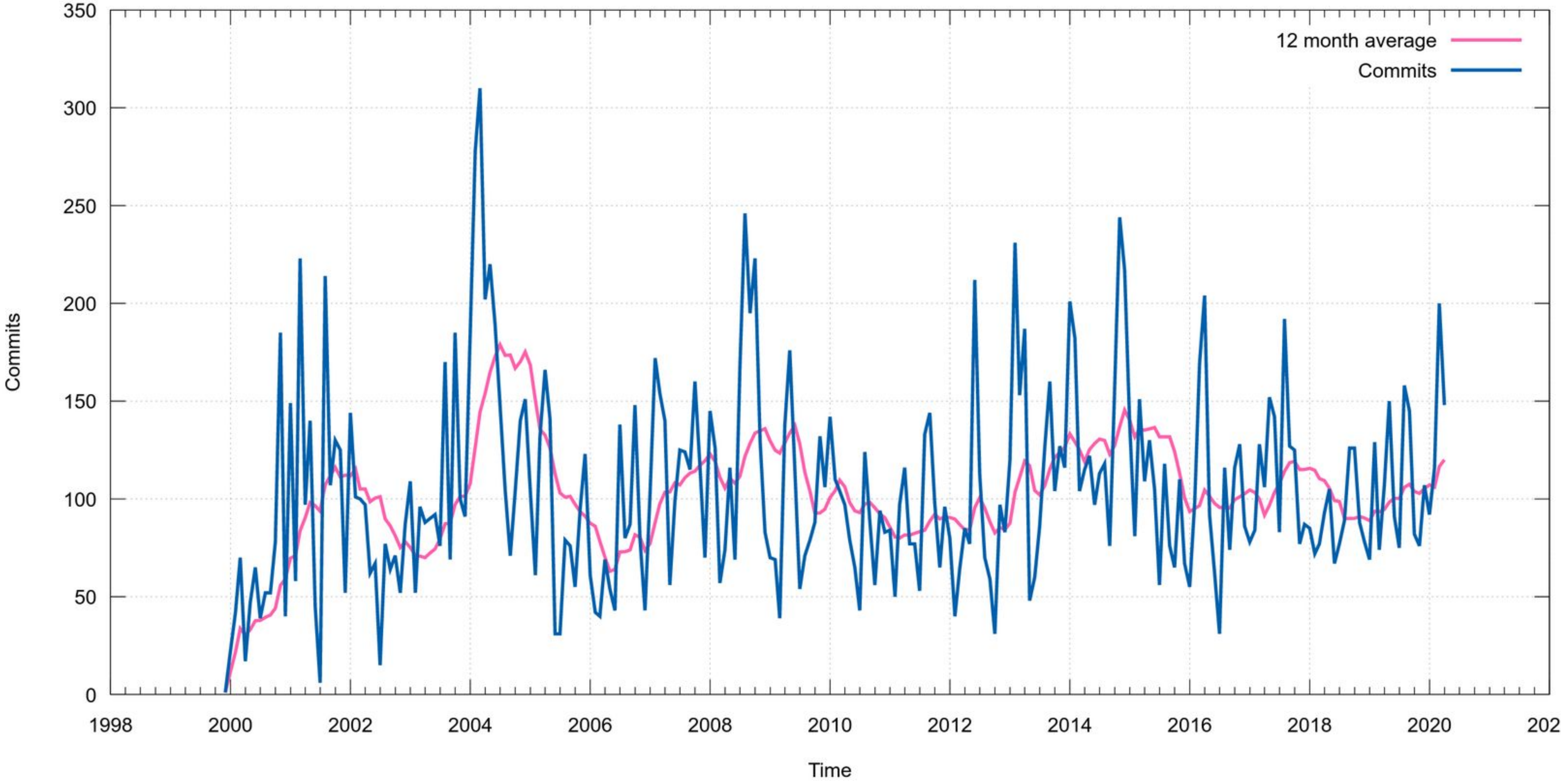
@bagder

Daniel's share of the total commits



@bagder

Commits per month



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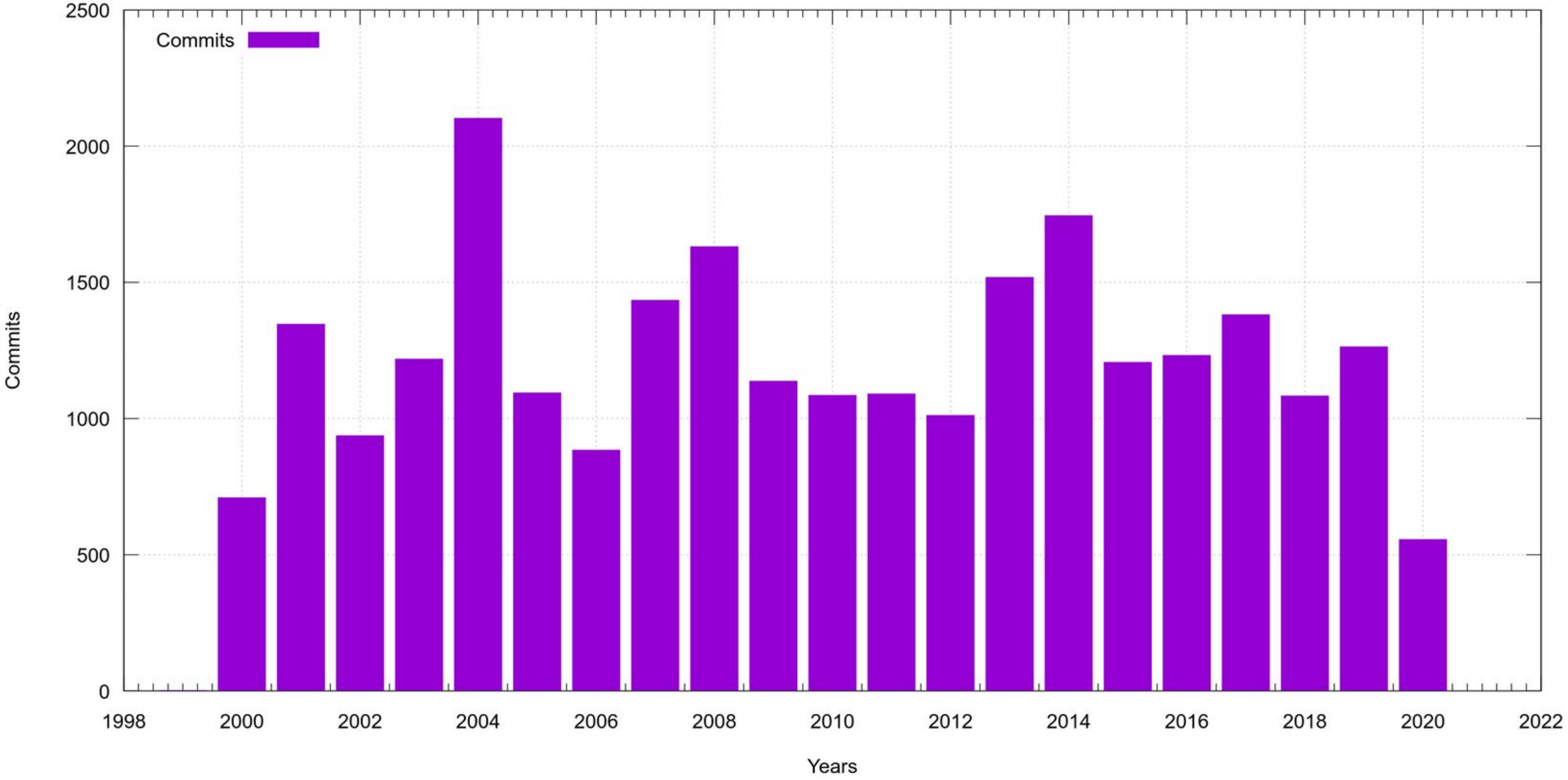
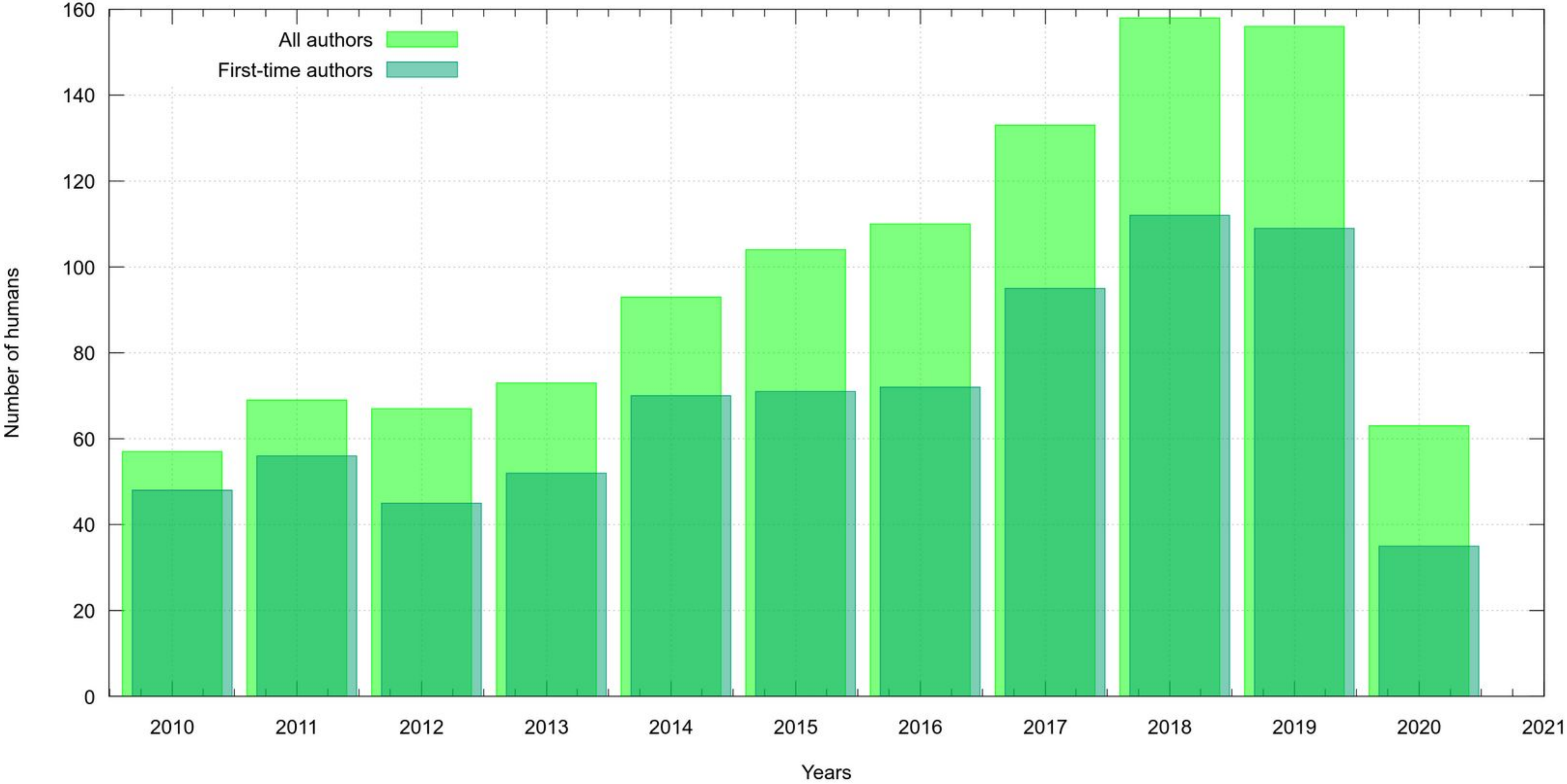
Commits per year



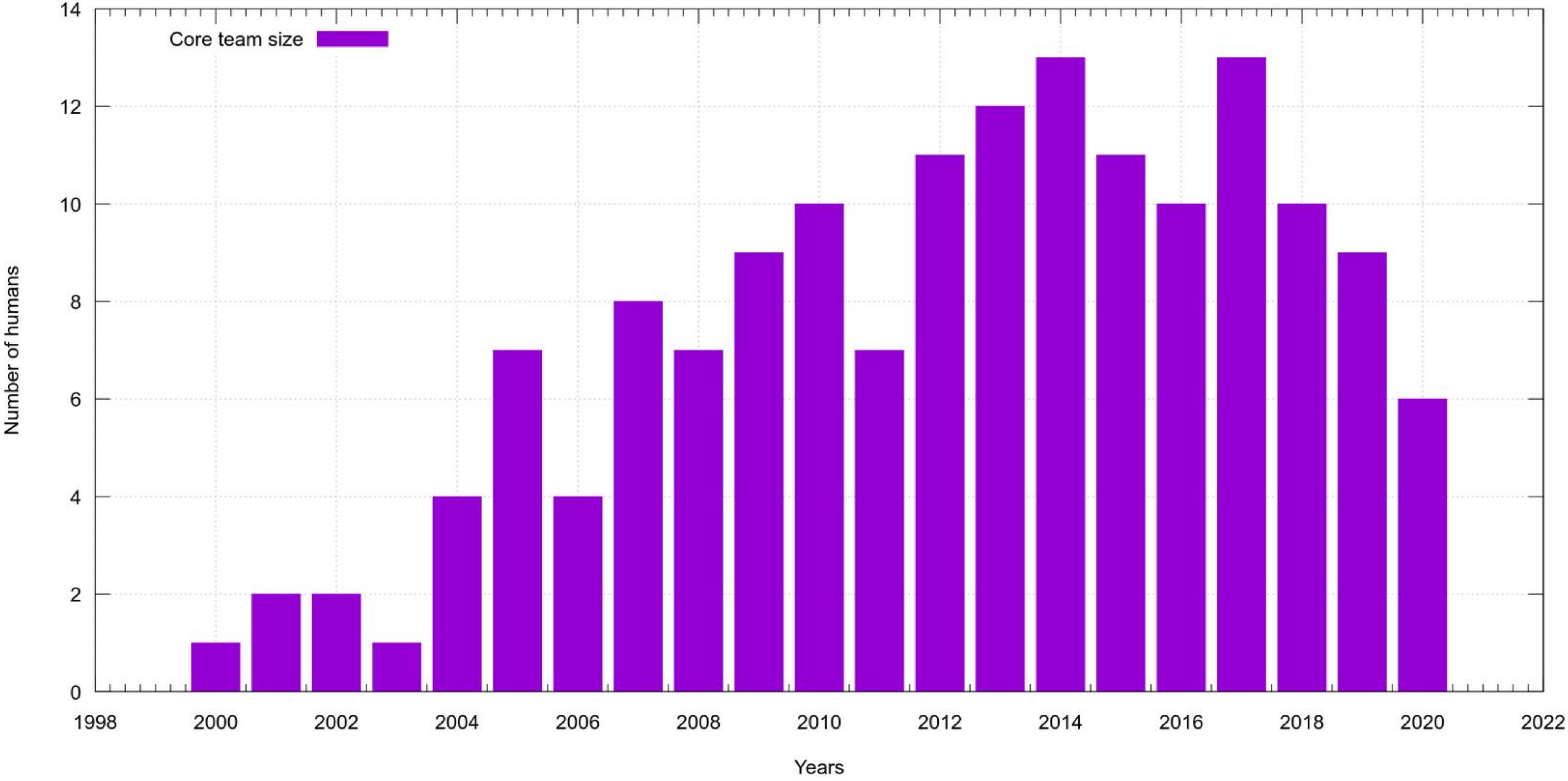
@bagder

Commit authors per year



@bagder

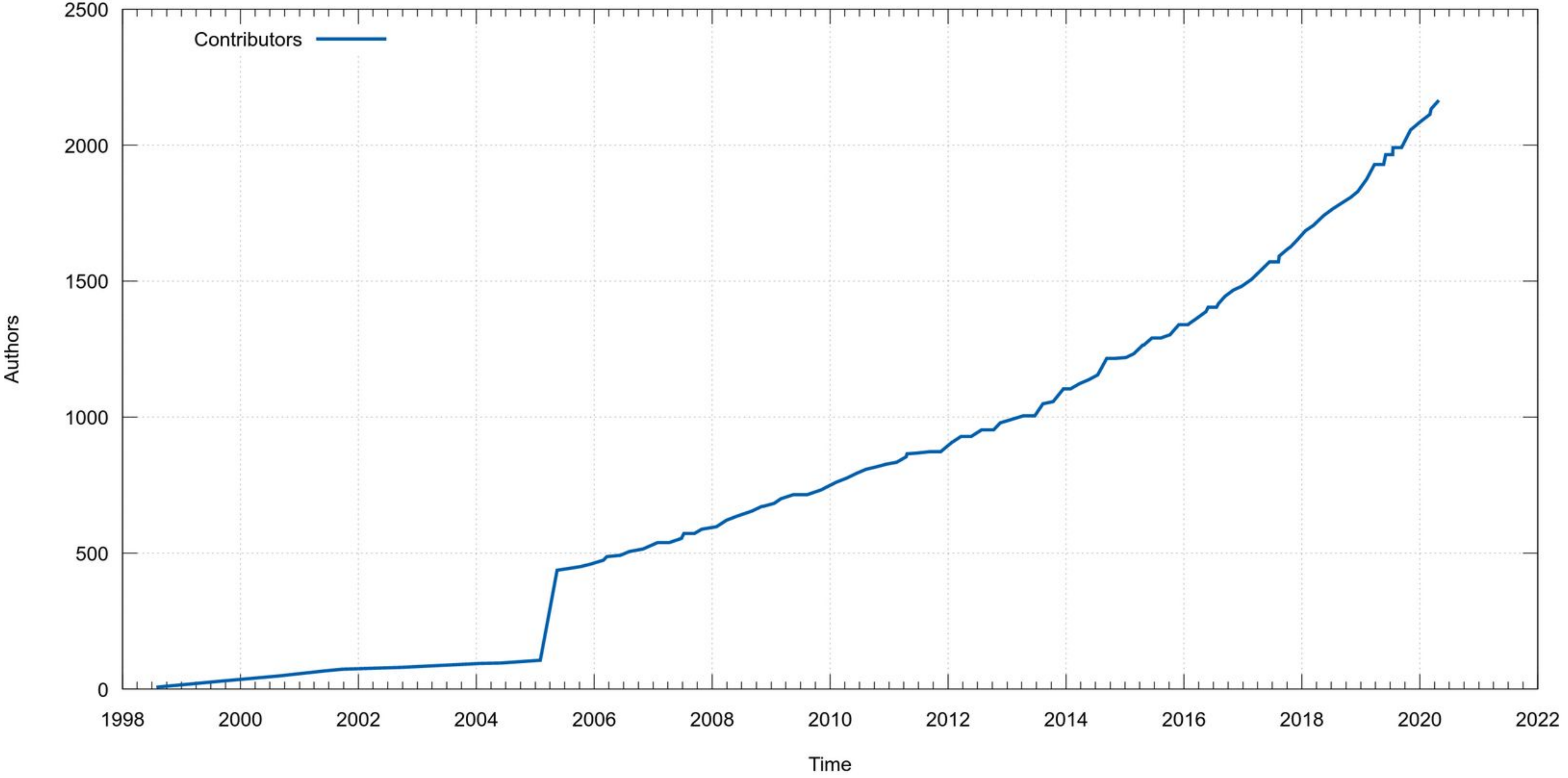
Size of the core team per year, number of persons with 10 commits or more



Newcomers and oldies

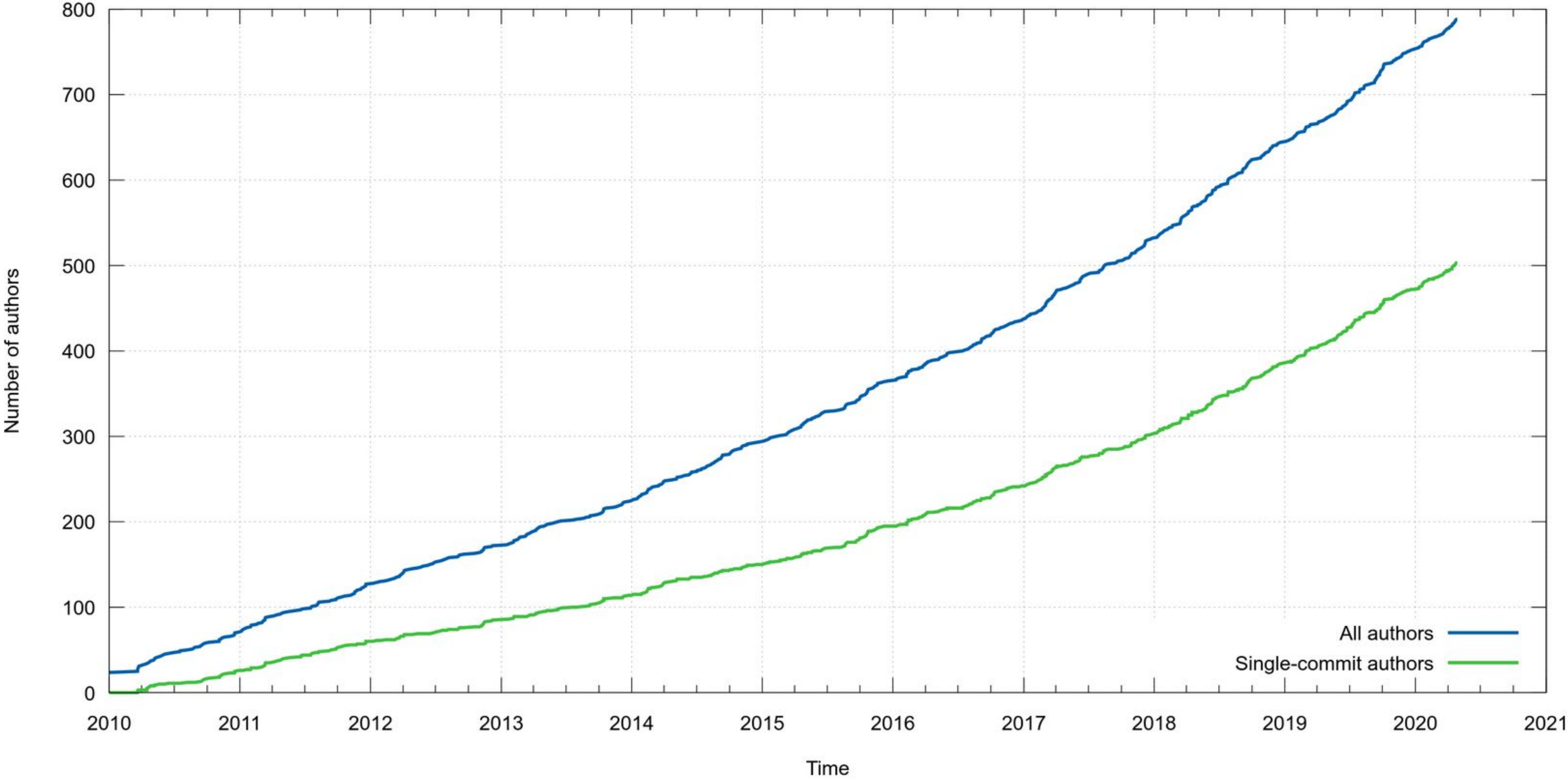
@bagder

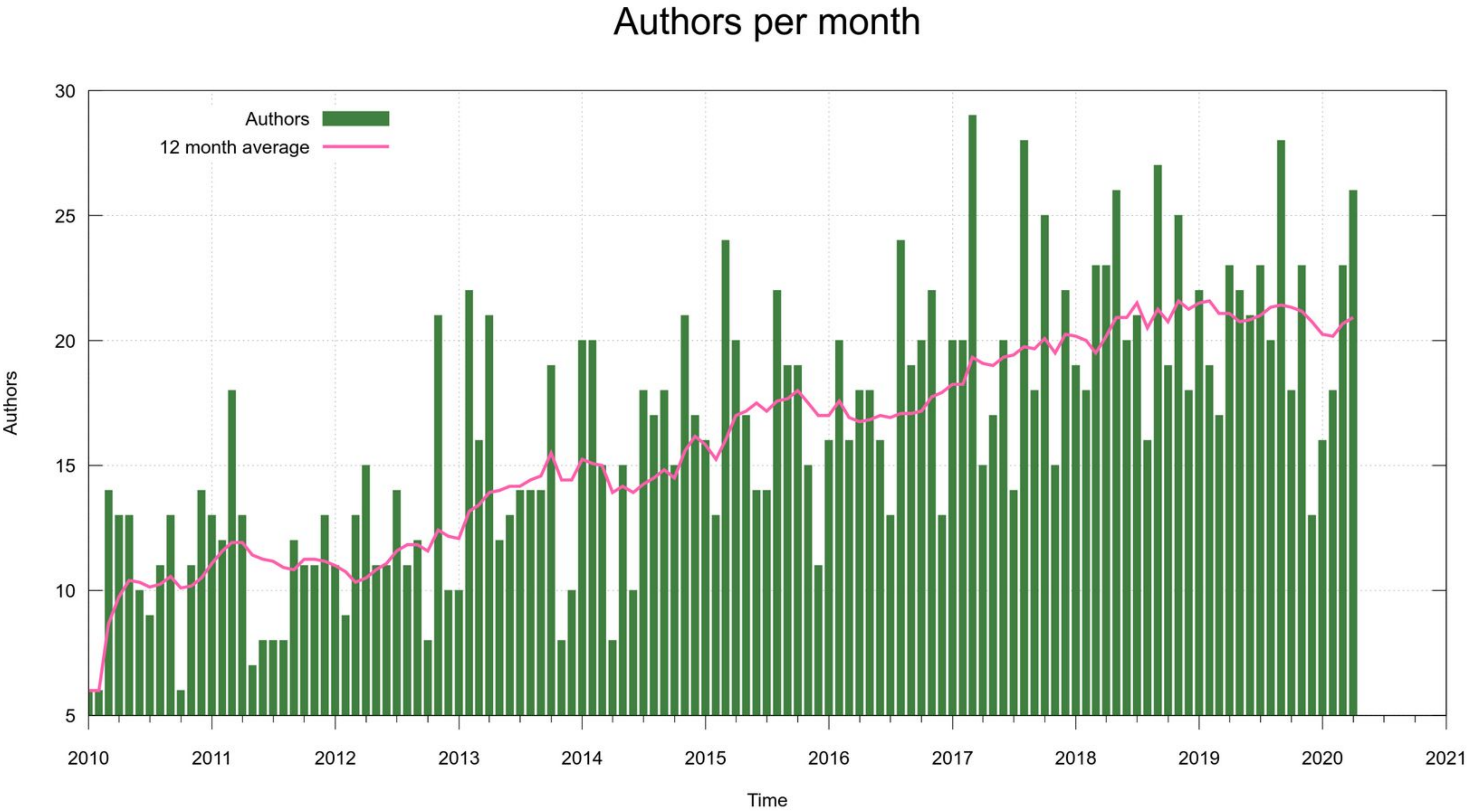
Contributors



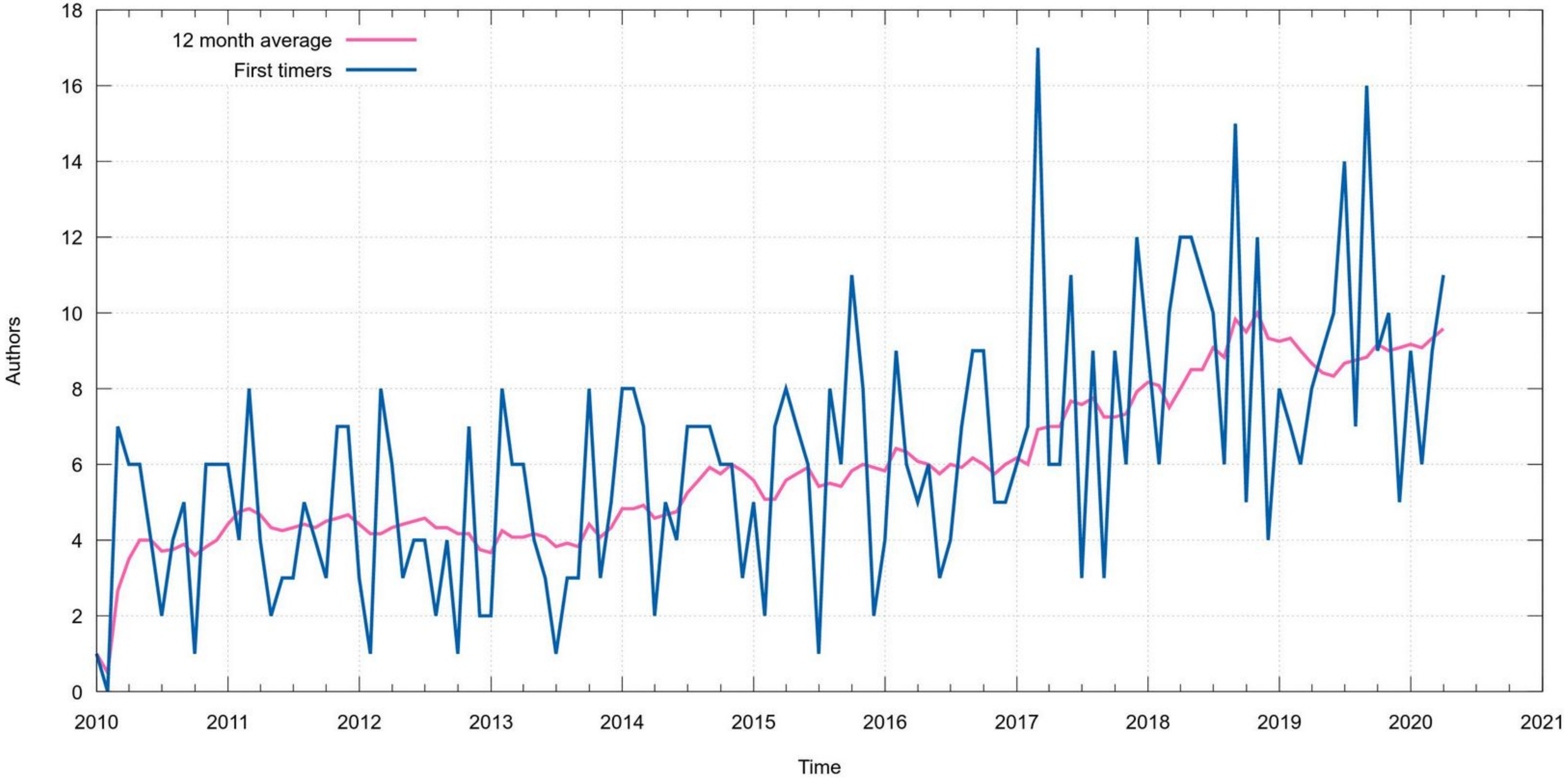
@bagder

Commit authors



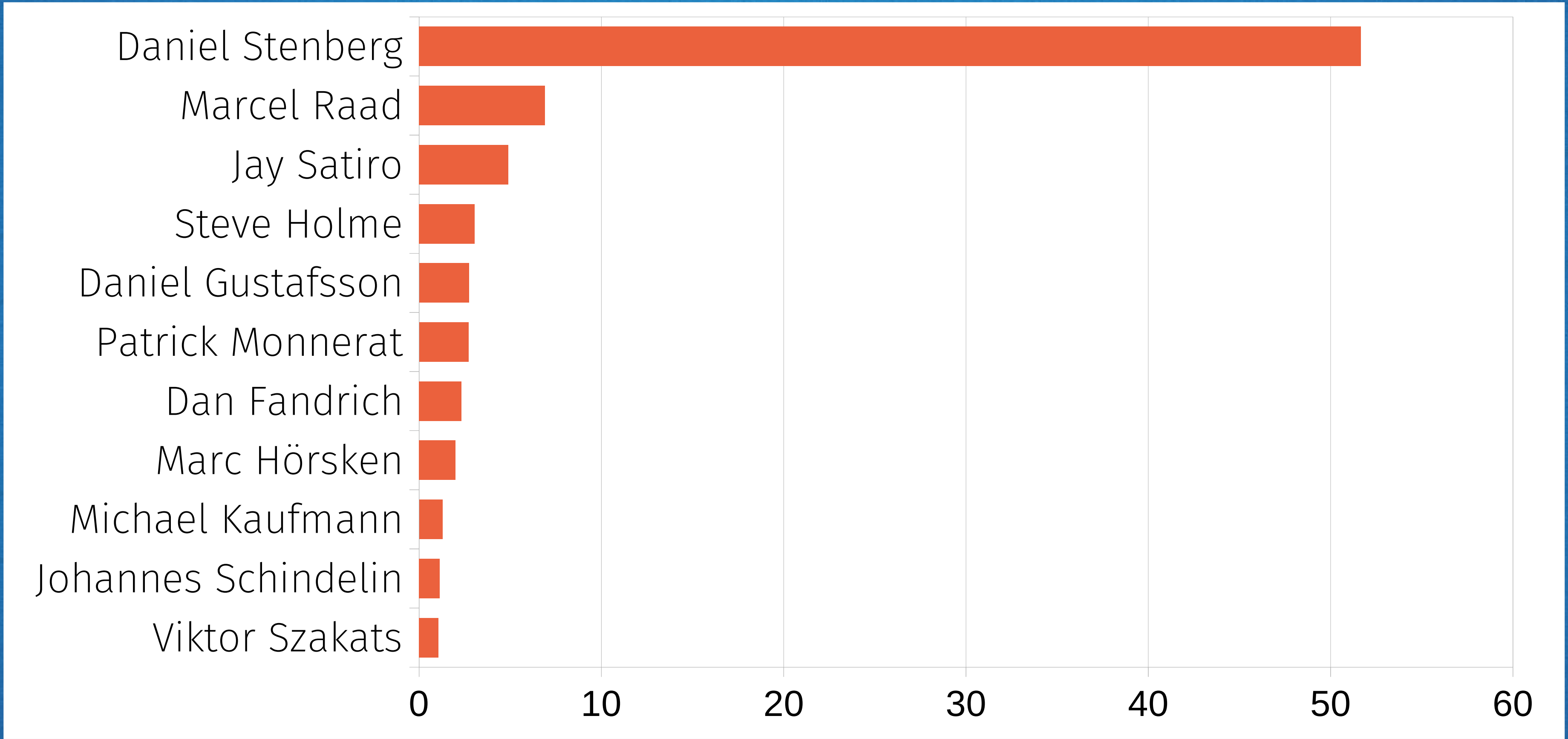

Authors per month
Authors
12 month average
30
25
20
15
10
5
Authors
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Time

Monthly first time authors



@bagder

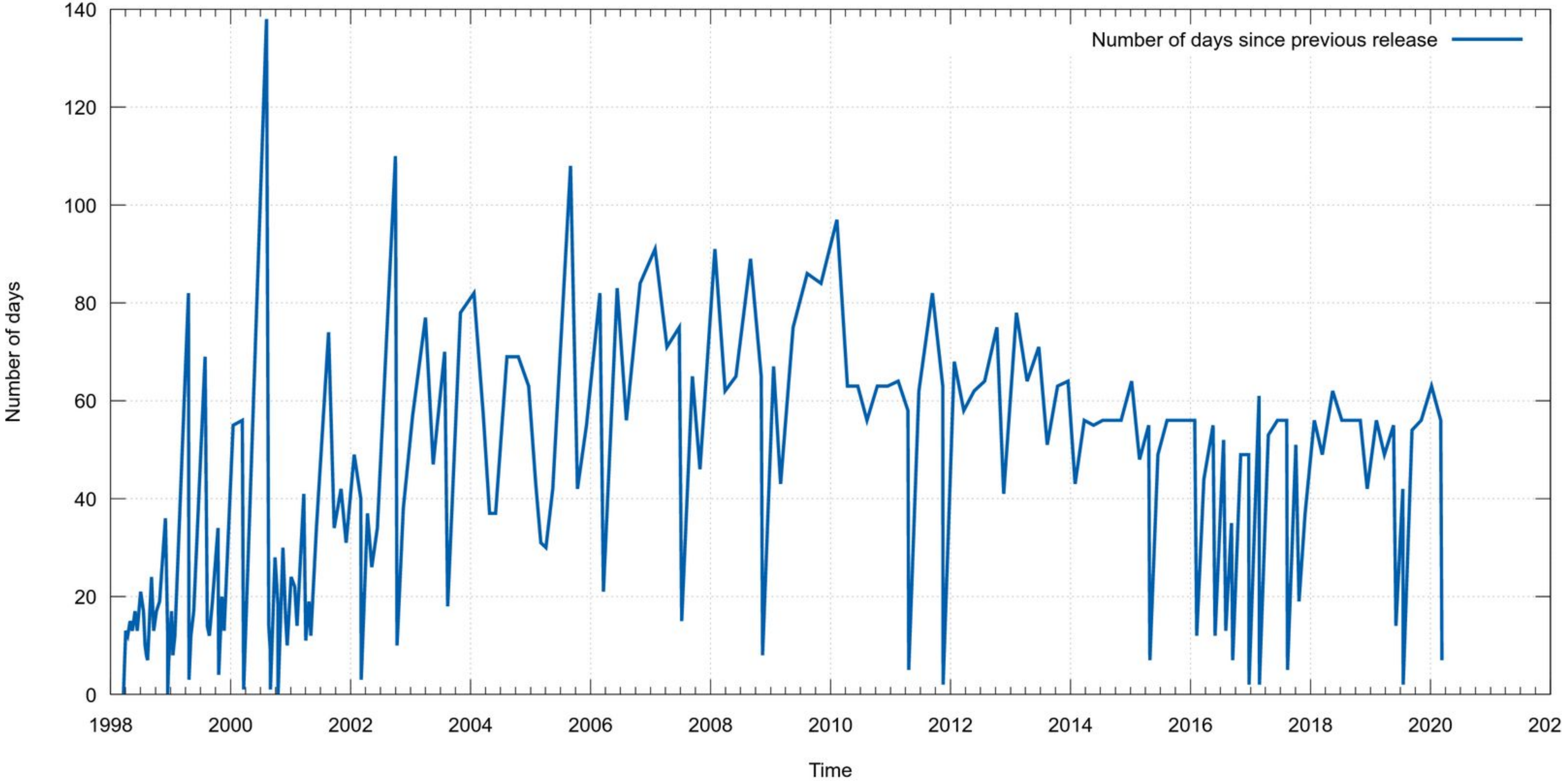
Top-11 commit authors since 1 Jan 2017



Releases

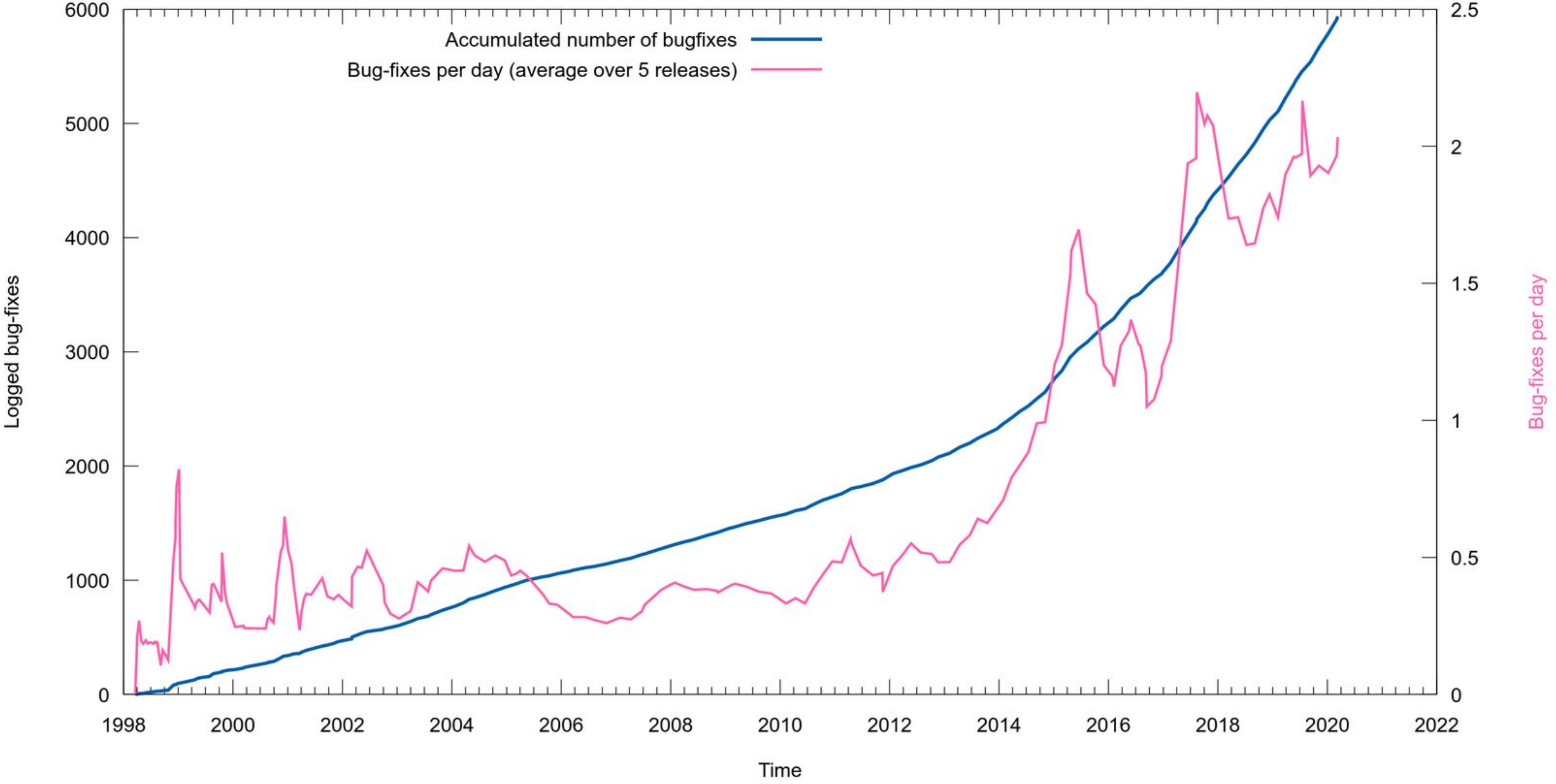
@bagder

Days between releases



@bagder

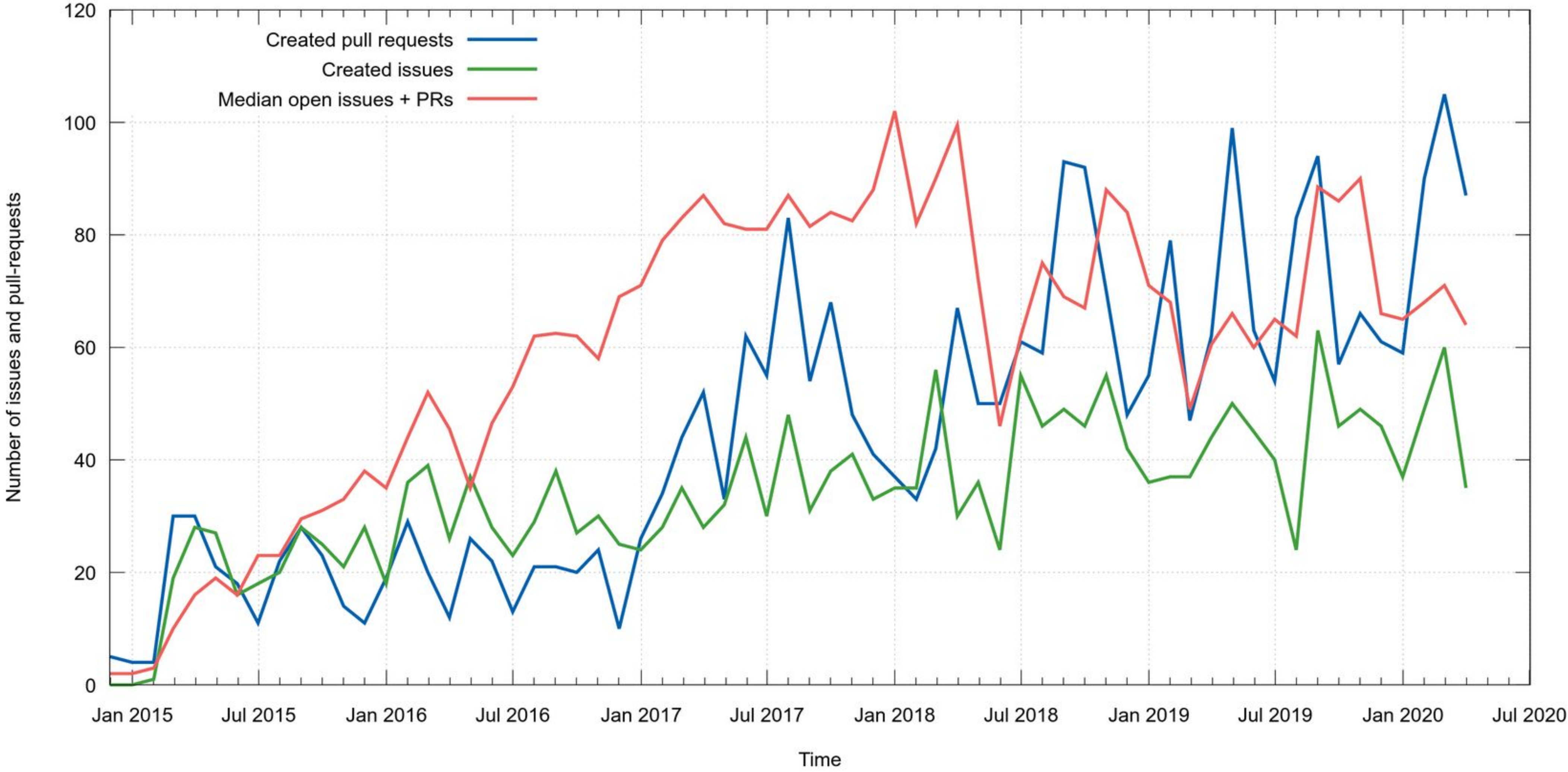
Bug-fixes



Activity

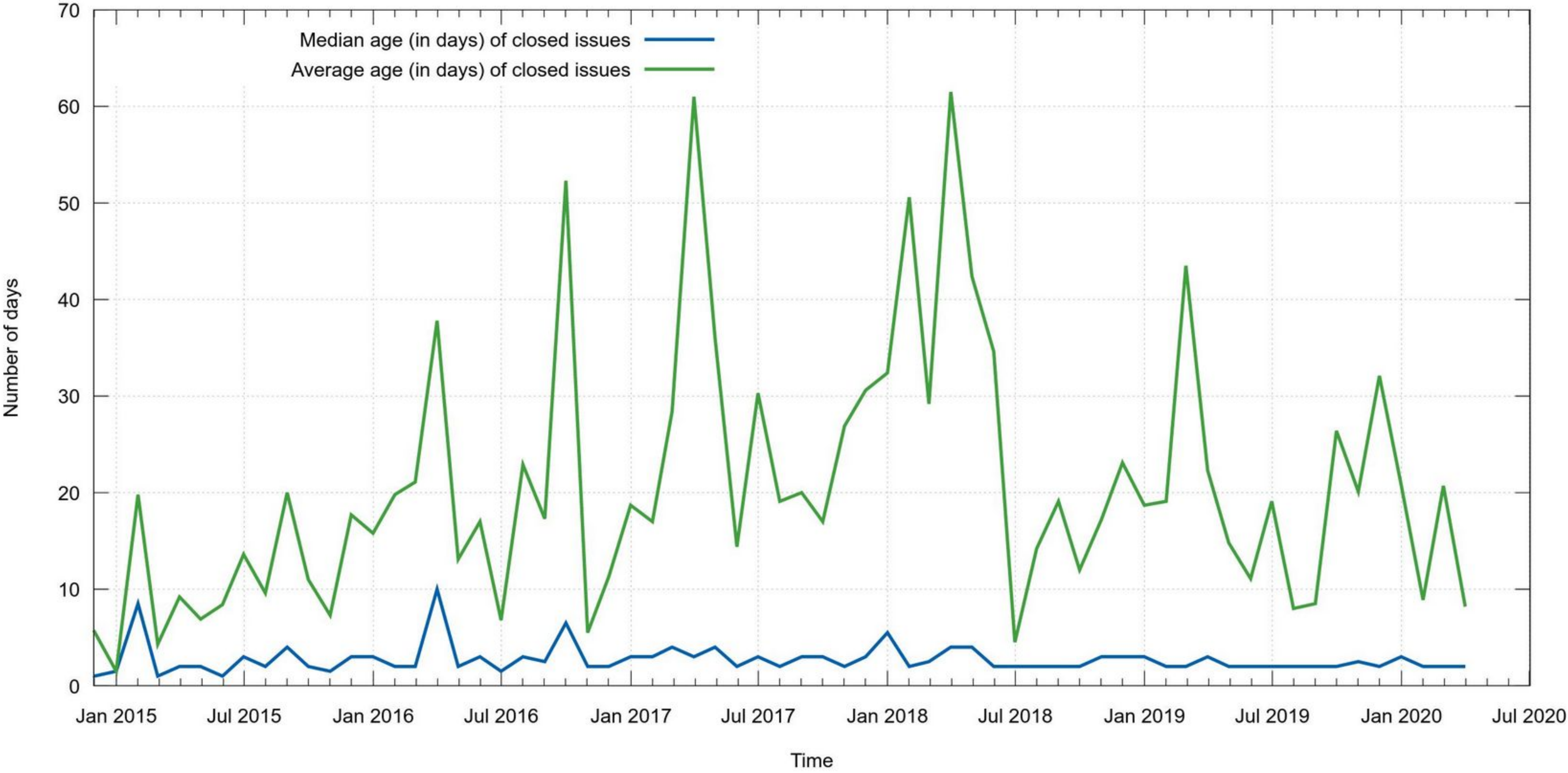
@bagder

Monthly issue activity in github/curl/curl



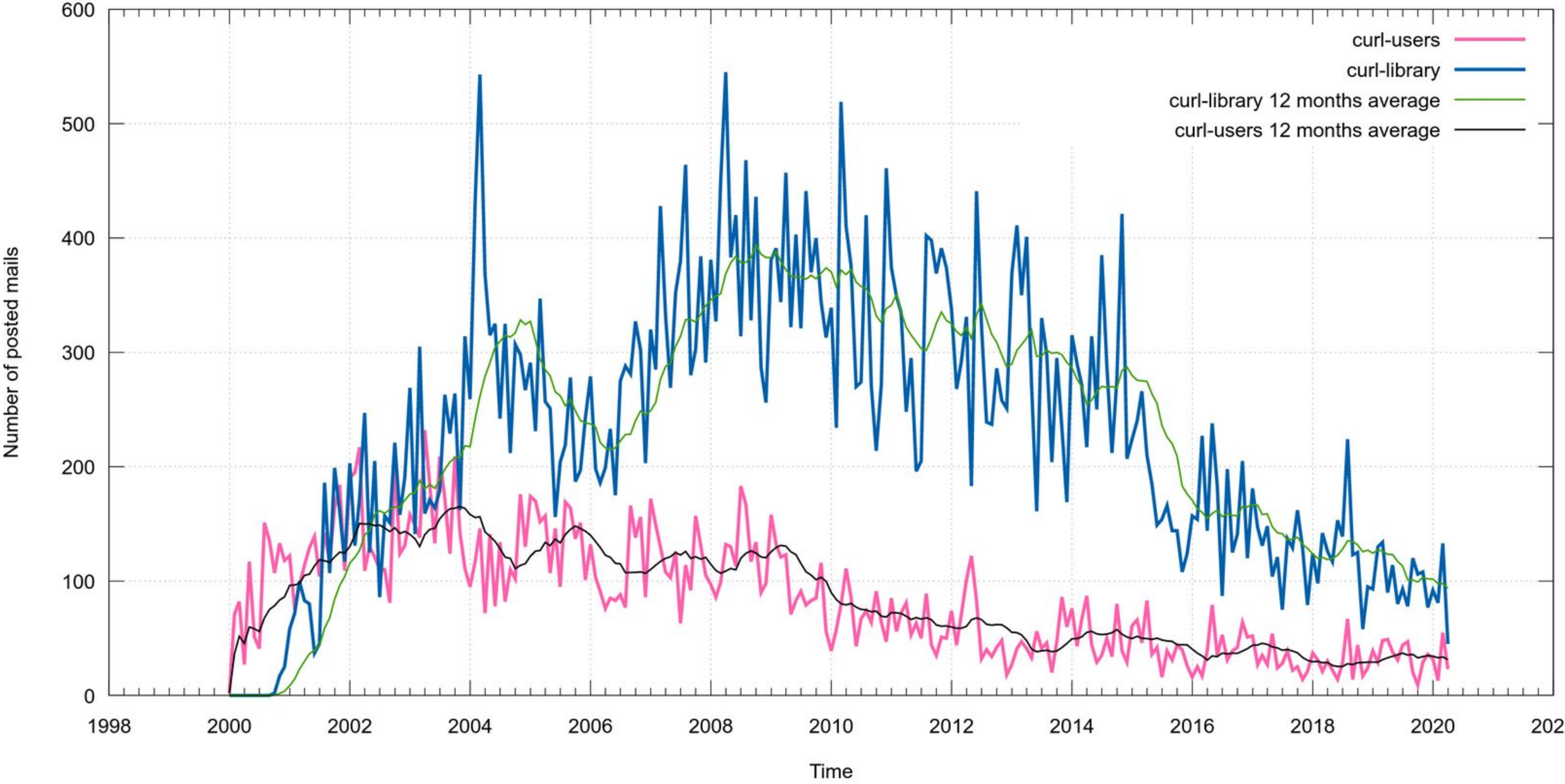
@bagder

Github issue ages per month in github/curl/curl



@bagder

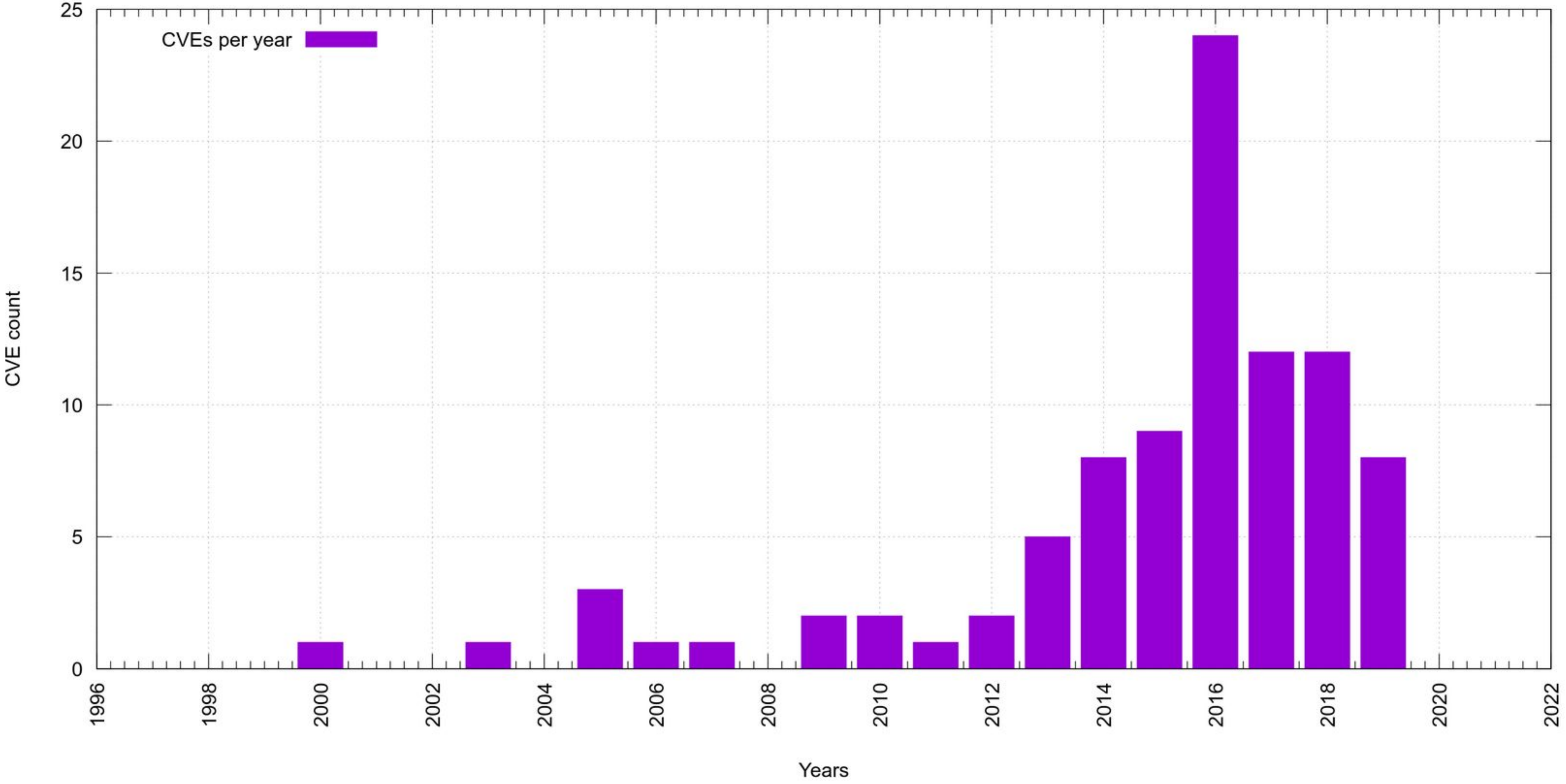
Mailing list posts per month



Vulnerabilities

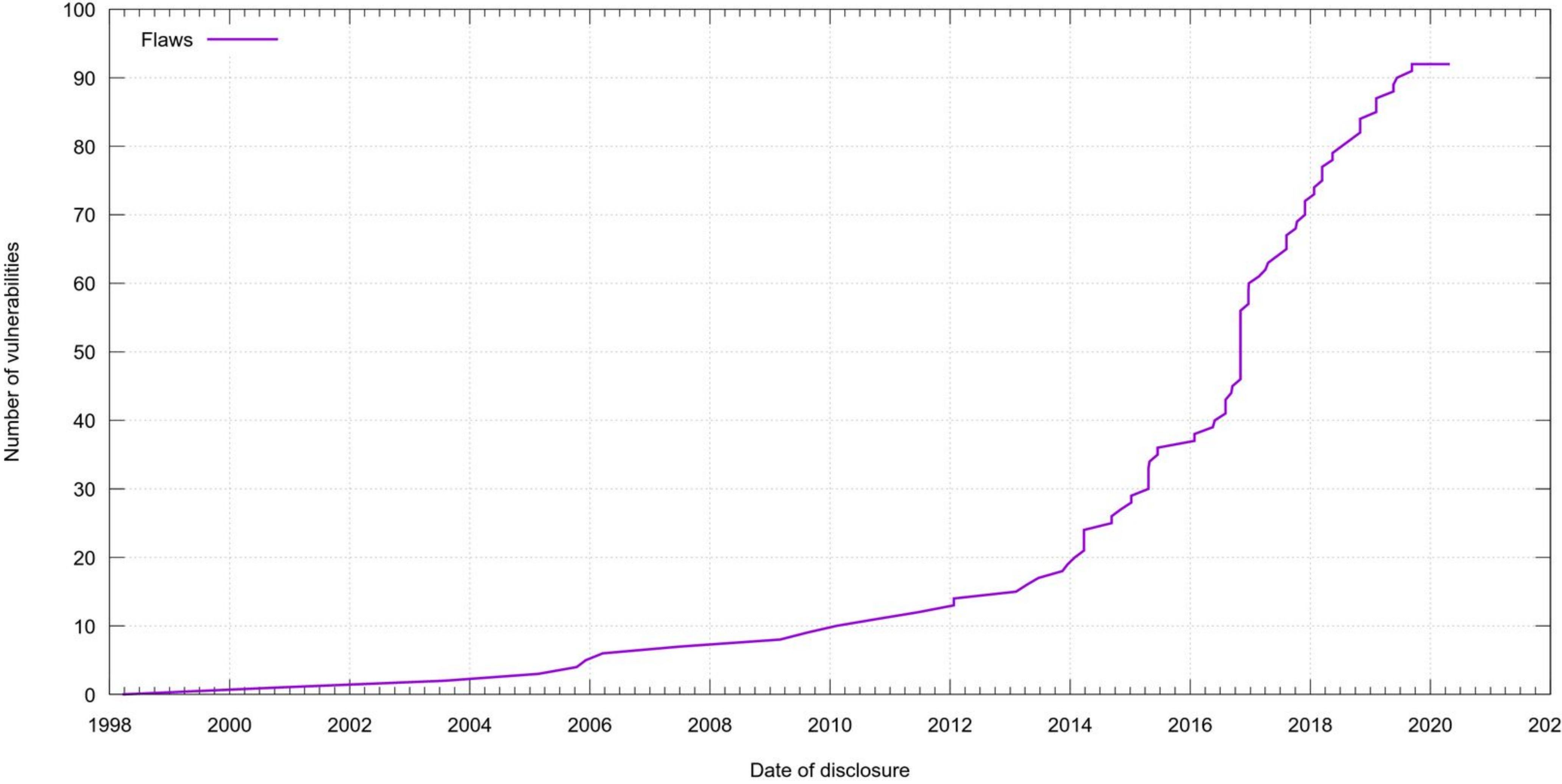
@bagder

CVEs per year



@bagder

Announced and fixed CVEs



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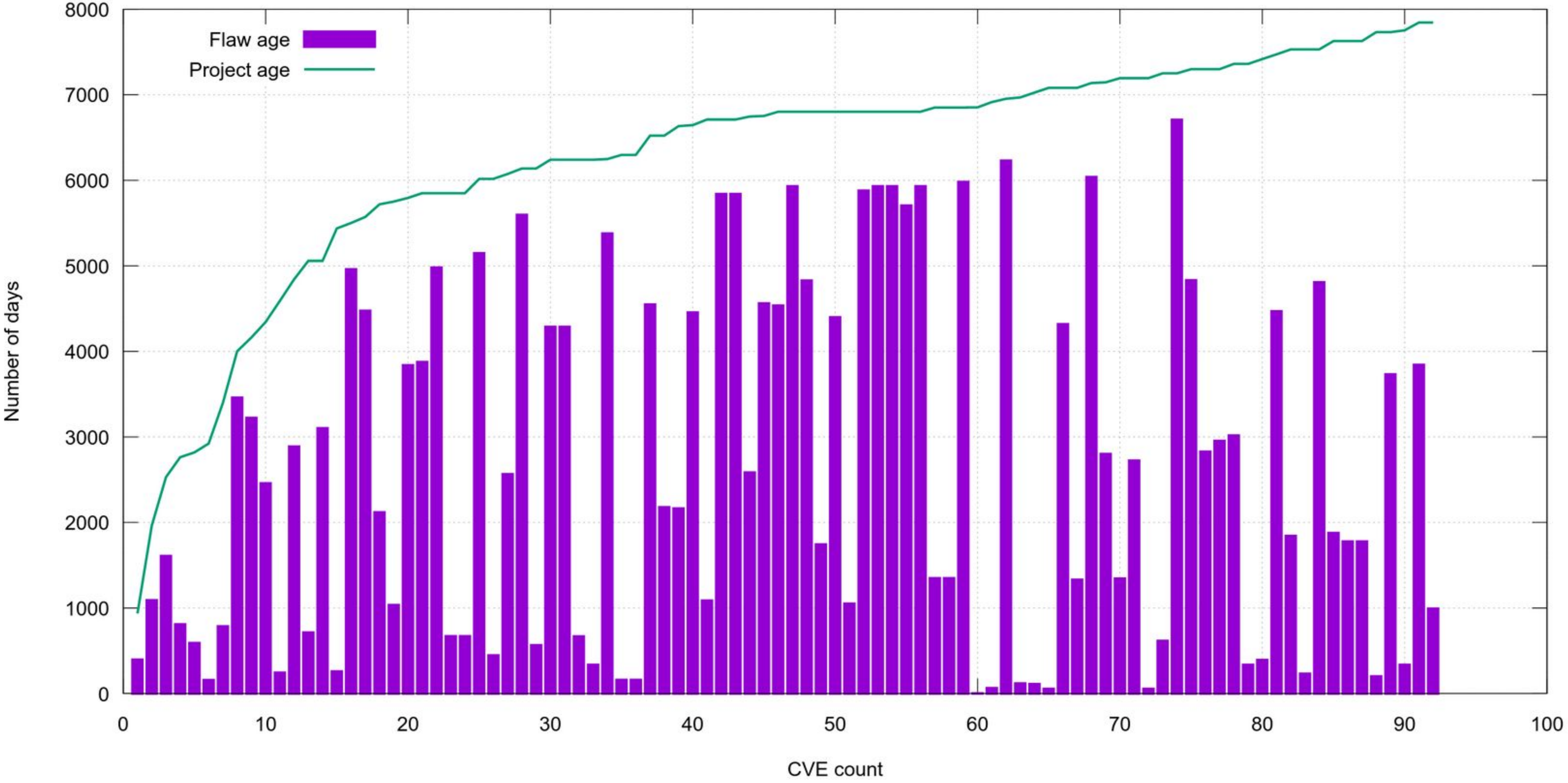
Time each CVE existed



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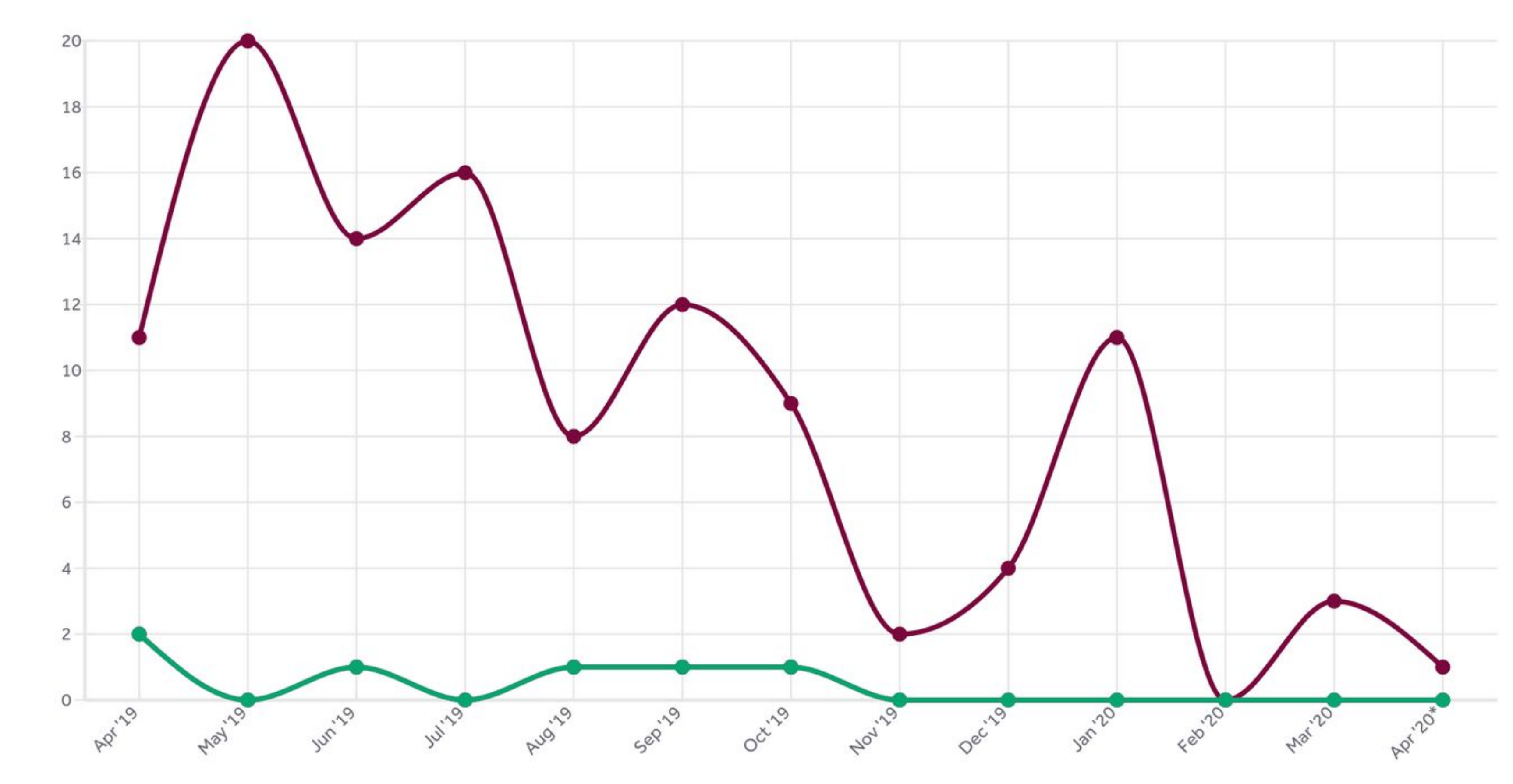
Bug bounty submissions



Bug bounty stats

Total Submissions: **112**

Reports Rewarded: **6**

Total Bounties: **$1,400**

Average Bounty: **$233**

Average Response Time: **an hour**

Average Triage Time: **a day**

Average Bounty Time: **10 days**

Average Resolution Time: **19 days**

Lessons from past vulnerabilities

Integer overflows are tricky things. Mitigations: saferealloc, limited string lengths. More: dynbuf (PR #5300)

Flaws linger in the code a long time until detected

Fuzzing is king

Fixing the flaws is usually straight-forward

Raising the bounties

The users’ view

Annual user survey

What is used, what is ignored

What is good, what is bad

What should be added, what should be removed

How are we doing

User survey 2020

Mid May time frame

Very much interested in feedback on where to take it and what to ask for

Received 732 responses 2019 (up 9%)

`https://daniel.haxx.se/media/curl-user-poll-2019-analysis.pdf`

Web site traffic 2020 (April 19 to April 20)

Fastly makes our lives easier

2.1 million requests/day (up from 1.5 million)

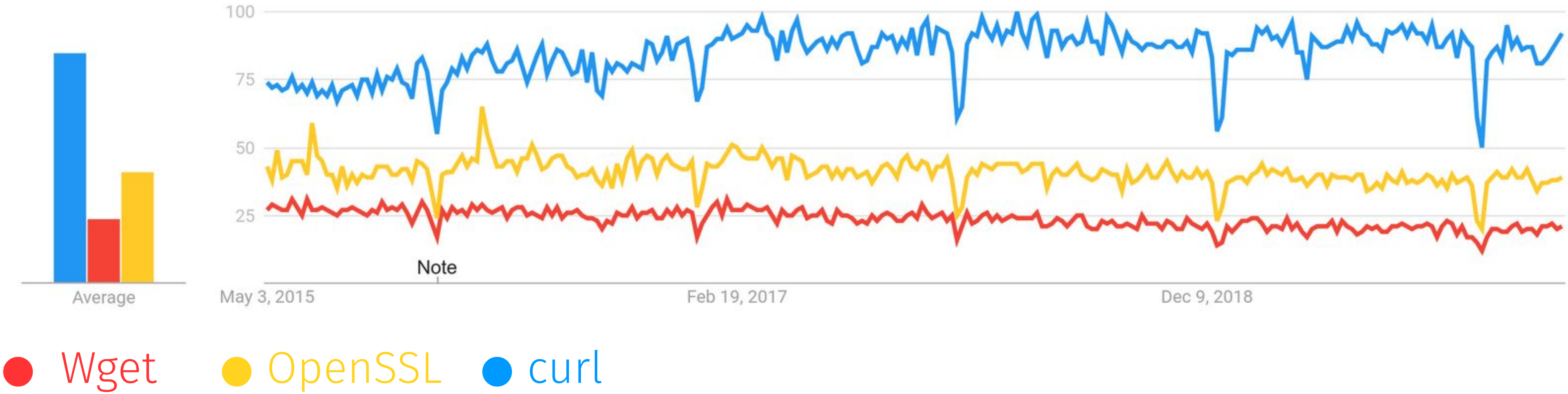
53.1 TB the last 12 months (**up 27%** from 41.6 last period)

Fast web site, close to most users

No logs, no tracking, very little stats

Did I mention Fastly is good?

Google trends 5-year span, worldwide

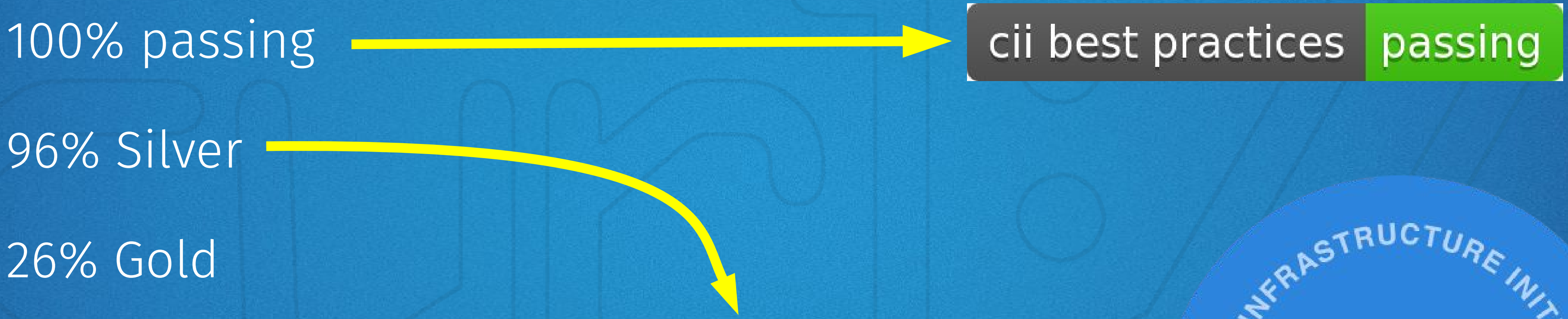


Includes wget and OpenSSL to provide references with similar projects

CII Best Practices

Unchanged status since last year

https://bestpractices.coreinfrastructure.org/en/projects/63



100% passing

cii best practices | passing

96% Silver

26% Gold

“SHOULD have a legal mechanism where all developers of non-trivial amounts of project software assert that they are legally authorized to make these contributions”

Everyone uses curl

Apps: Youtube, Instagram, Skype, Spotify, …

OS: iOS, macOS, Windows, Linux, ChromeOS, AOSP, …

Cars: 22 top brands. Mercedes, BMW, Toyota, Nissan, Volkswagen, …

Game consoles: PS4, Nintendo Switch, …

Games: Fortnite, Red Dead Redemption 2, Spider Man, …

Estimate: 10 billion installations

Money

Finances and sponsors

curl is not a legal entity

Open Collective holds our funds

Daniel is employed by wolfSSL

wolfSSL offers commericial curl services

Expense sponsors

Server hosting: Haxx

Server bandwidth: Fastly

CI services: Teamviewer, Travis, Azure Pipelines

Haxx

fastly®

Azure Pipelines

Travis CI

TeamViewer

Gold sponsor

Silver sponsors

SANTA BARBARA CHOCOLATE ®

CoolTechZone
Privacy Research

_x Unscramblex

Maid 2 Clean

ICONS8

MiniTool
Partition Wizard

MoneyArcher

Mini Tool

BEST VPN RATING

Crosswordsolver.com

premium
minds

clay

Major single-shot donors 2019-2020

Uffizzicloud: **1,300 USD**

Comcast: **5,000 USD**

Indeed: **10,000 USD**

Backblaze: **15,600 USD**

Many smaller donors

189 individuals and 85 organizations have contributed

(April 28, 2020)

Balance

Balance as of April 28, 2020:

$54,147.07 USD

@bagder

Expenses without direct sponsors

Bug bounty – started carefully, will increase

curl up – wanted to sponsor travel/lodging this year

Stickers – getting and shipping merchandise

More?

Done the last 12 months

850 bug-fixes

25 changes

three CVEs

~~Deprecated~~ Removed

CURLOPT_DNS_USE_GLOBAL_CACHE

HTTP Pipelining

PolarSSL

libcurl options

CURLOPT_MAXAGE_CONN

CURLINFO_RETRY_AFTER

CURLOPT_SASL_AUTHZID

CURLMOPT_MAX_CONCURRENT_STREAMS

CURLOPT_MAIL_RCPT_ALLLOWFAILS

CURLSSLOPT_NO_PARTIALCHAIN

News in libcurl

HTTP3 support with two backends

curl_multi_poll: waits more

curl_multi_wakeup(): wake up libcurl

BearSSL: new TLS backend

wolfSSH: new SSH backend

tiny-curl

MQTT

Improved in libcurl

CURLU_NO_AUTHORITY allows empty authority/host part

XFERINFOFUNCTION: supports CURL_PROGRESSFUNC_CONTINUE

non-blocking SOCKS connects

Command line tool

parallel transfers with -Z

--parallel-max and --parallel-immediate

--no-progress-meter

--etag-compare and --etag-save

--mail-rcpt-allowfails

%{json} in --write-out

Test suite

better Windows support

SOCKS server

dynamic server ports

preprocessed test cases

random skip for torture testing

More and better CI

Other news

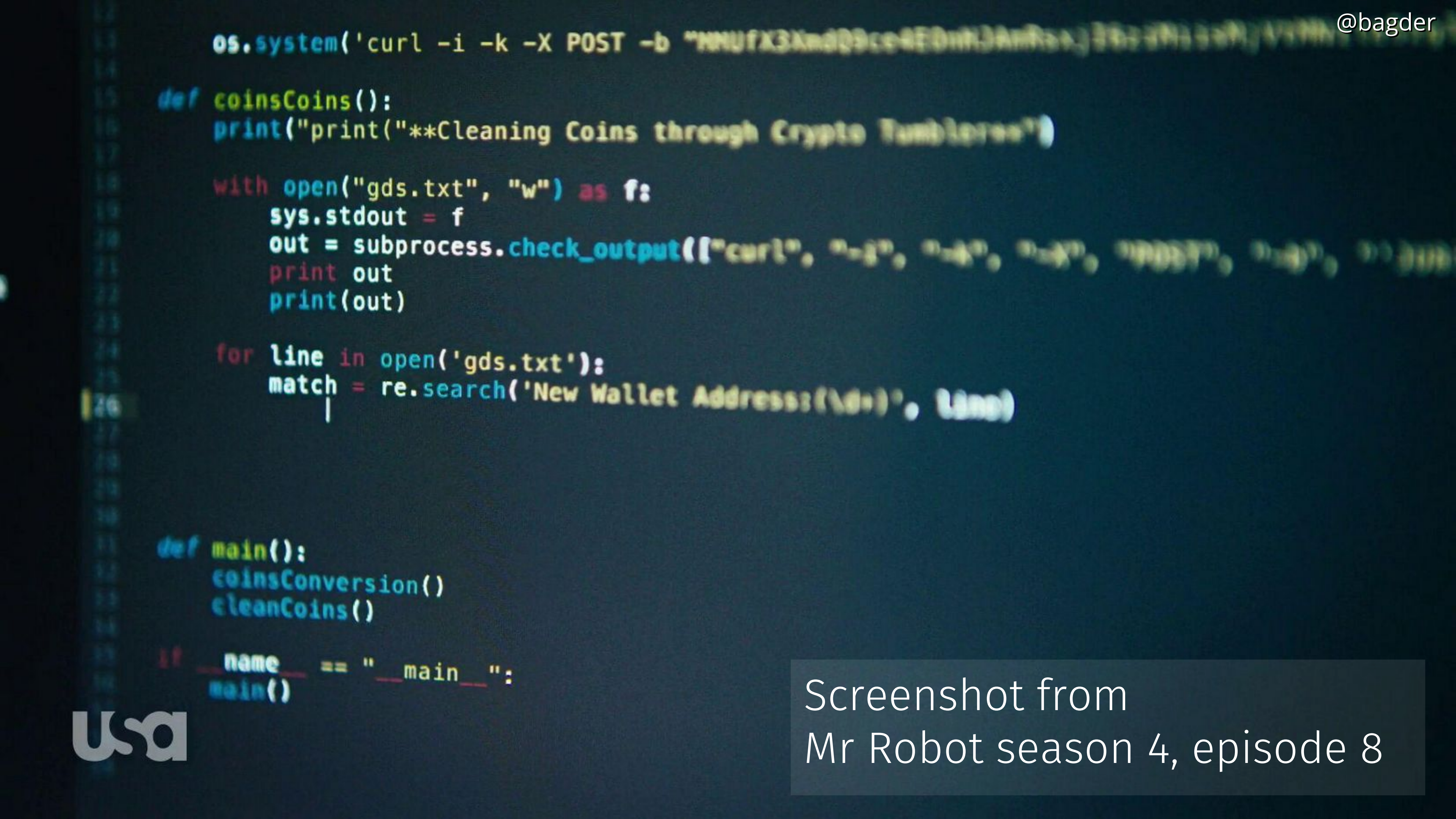
web site: Reporting documentation bugs in curl got easier, dashboard, curl/stats

The hackerone **bug bounty**

“**libcrurl**” - the Google-announced “competitor” in June 2019 (then abandoned again)

Mr Robot curls in Dec 2019

@bagder



```
    os.system('curl -i -k -X POST -b "MNUfX3Xmd@9ce4E0mRJAmRs[illegible]

def coinsCoins():
    print("print("**Cleaning Coins through Crypto Tumblerss")

    with open("gds.txt", "w") as f:
        sys.stdout = f
        out = subprocess.check_output(["curl", "-i", "-k", "-X", "POST", "-b", "[illegible]
        print out
        print(out)

    for line in open('gds.txt'):
        match = re.search('New Wallet Address:(\d+)', line)



def main():
    coinsConversion()
    cleanCoins()

if __name__ == "__main__":
    main()
```

Screenshot from
Mr Robot season 4, episode 8

Less good (compared with 2019)

Flaky tests/CI	still
Slow CI tests	better
Vulnerabilities are still reported	much better
Still regressions, but less frequently?	still
Could use more people who stick around	always

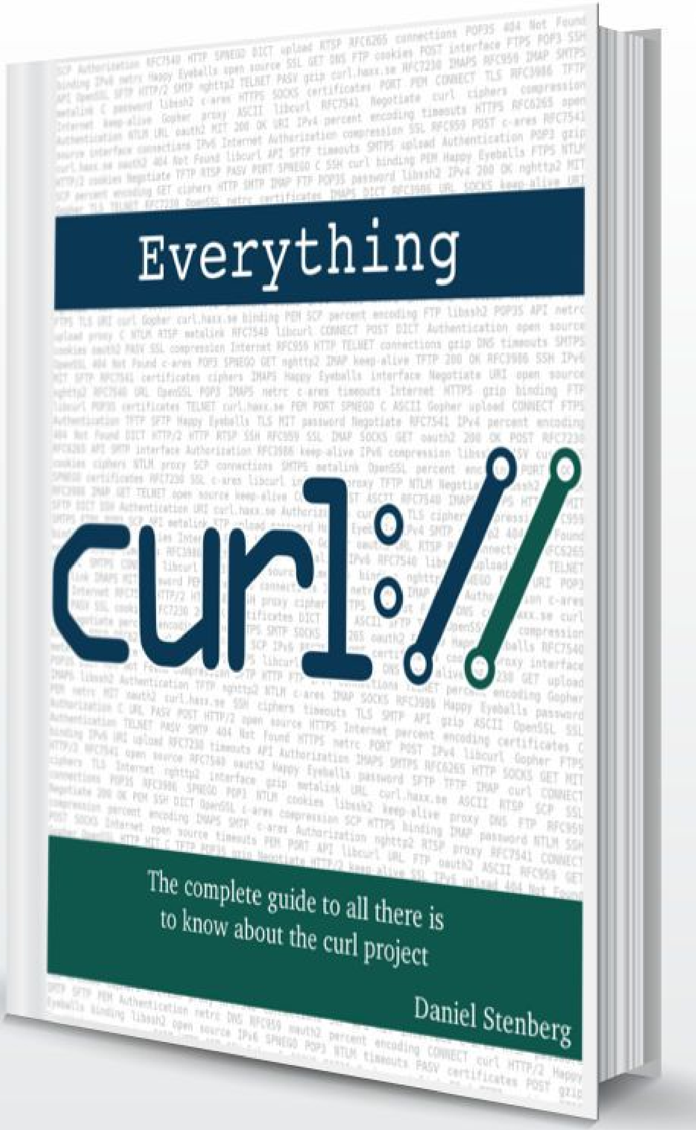
Everything curl

71K words, 10K lines

Only web + PDF now

“95.3% complete”

https://ec.haxx.se/


Everything
curl://
The complete guide to all there is to know about the curl project
Daniel Stenberg

My (Daniel's) role

I’m having fun

I love being able to work full-time with “my baby”

I intend to continue driving and pushing forward. I can’t promise I’ll do this forever, but I can’t see me “stepping down” anytime soon

I aim to keep doing curl full-time; meaning charging companies for support, features, help, anything – for wolfSSL

Me as an individual, the open source project and the company wolfSLL – three separate components with (hopefully) aligned goals.

I trust someone will tell me if I fail to keep things apart appropriately.

@bagder

What I think I do here

I help keeping **the vision** – what curl and libcurl *should* do

I do curl **development** and fix problems – for fun and for customers

I **support users** and developers experiencing problems or bugs.

I **review code** and suggestions

I'm **guiding the architecture** of existing and future features

I **document how things work** and should work internally. If I get run over by a bus tomorrow, everything needed to know about curl should already be put in files.

I try to **inform project members** and "the outside world" about news and things we work on. To drive interest, get feedback and trick more people into helping out

I aim to **master the protocols** curl works with

I **admin and host** the web site, mailing list and random services

I often serve as a "**public face**" for the project. It is sometimes said to be "mine"

I **talk** about and "market" the project in many places and ways

Future

Planning

I can’t tell what “we” will do

I have some ideas about what to do next

Things change all time time

Tell us what *you* want!

Version 8

Release every 56 days

7.71.0 is coming in June 2020

A bump in every release gives us 29 * 56 = 1624 days until version 7.100

I want to avoid reaching 7.100 due to confusions it'll create

1624 days == 4 years and 6 months == December 2024

Evolutionary, not revolutionary?

TODO for libcurl?

I have a **personal list** of things I want to work on

I hope to do more curl **work for hire**

What do *you* **want** to see?

Talk to us!

I’m **@bagder** on Twitter

We’re in **#curl** on Freenode IRC

File **bug reports**:
`https://github.com/curl/curl/issues`

Submit **pull-requests**:
`https://github.com/curl/curl/pulls`

Mailing lists:

curl-users for command line tool questions and support

curl-library for libcurl users, development, debugging, architecture, new stuff.

`https://curl.haxx.se/mail/`

Finally

I hope we’ll have a “real” curl up again in 2021 – somewhere in Europe