

Dear Daniel,
I had emailed you a couple months ago

**curl**

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Since you weren't aware that your name was attached to Instagram related hacking code, I thought you might want to know, in case you weren't already aware, that your name is also included in Spotify terms and conditions.

Cancel

LICENSES

libcurl

<http://curl.haxx.se/>

The libcurl distribution is Copyright (c) 1996 - 2015, Daniel Stenberg, daniel@haxx.se.

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these are big companies that you likely don't
want to have a trail of evidence that you are
a part of

an Instagram and Spotify hacking ring

Daniel Stenberg

@bagder



Daniel Stenberg

@bagder



wolfSSL



An *open source project* that makes a *command line tool* and a *library* for transferring data using Internet protocols

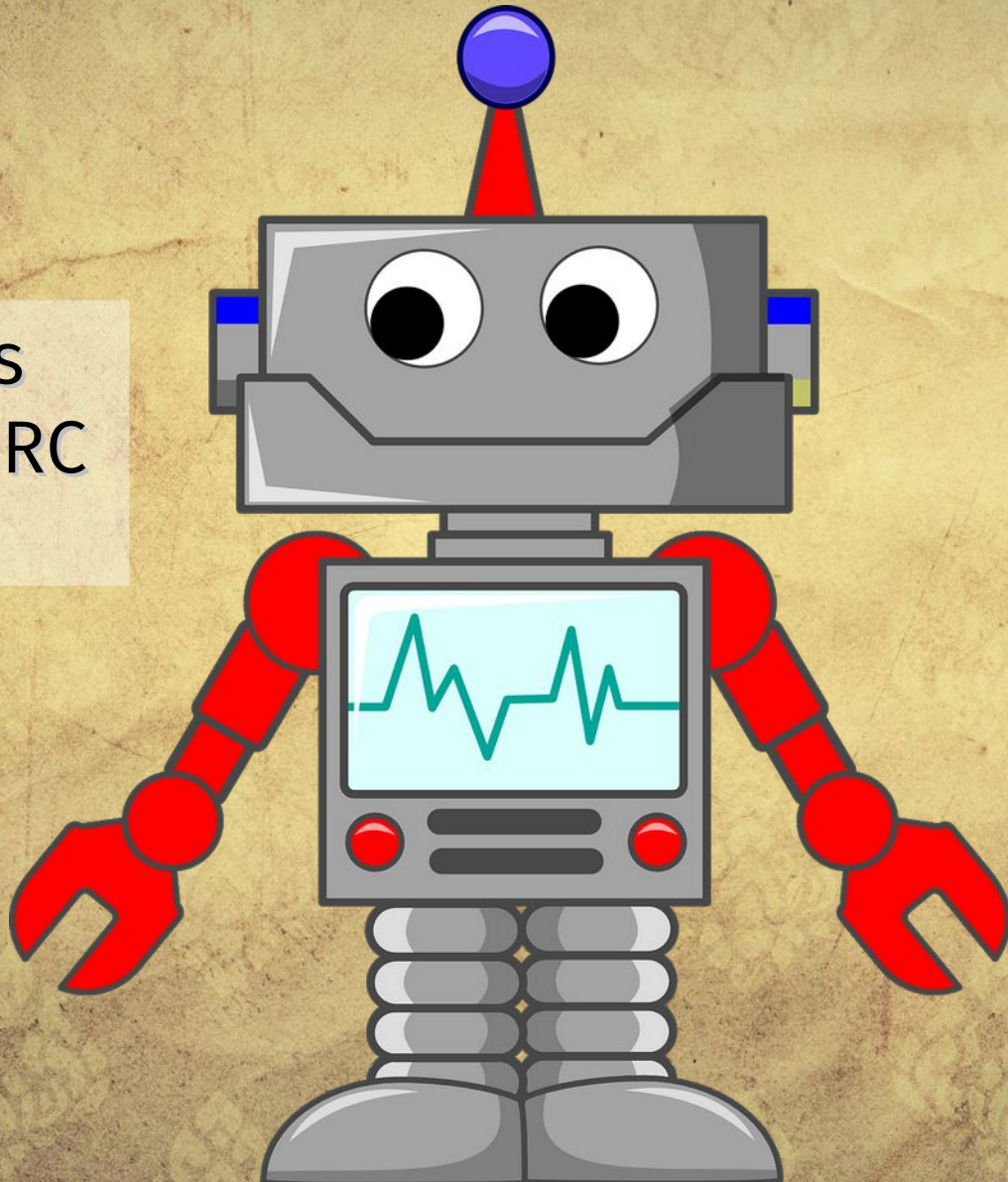
Once upon the time...

nothing



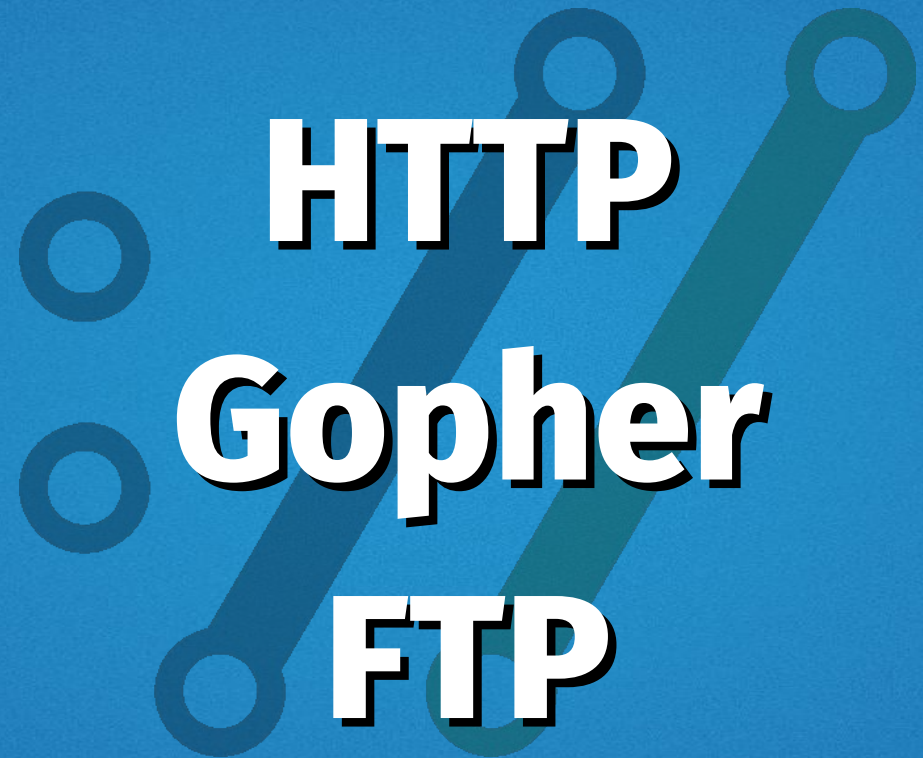


... while I was
writing this IRC
bot...



Let's put it online!

... became curl 1998

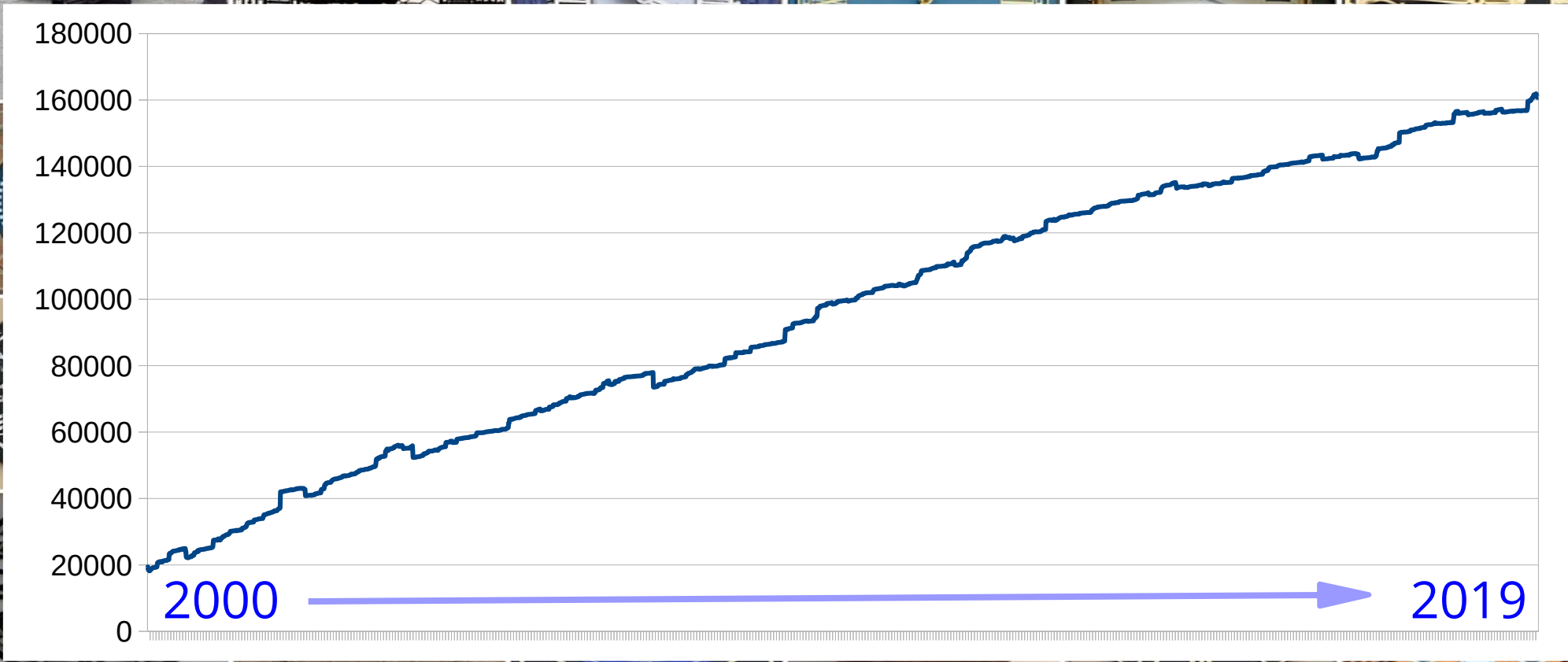


December 1998

Mailing List

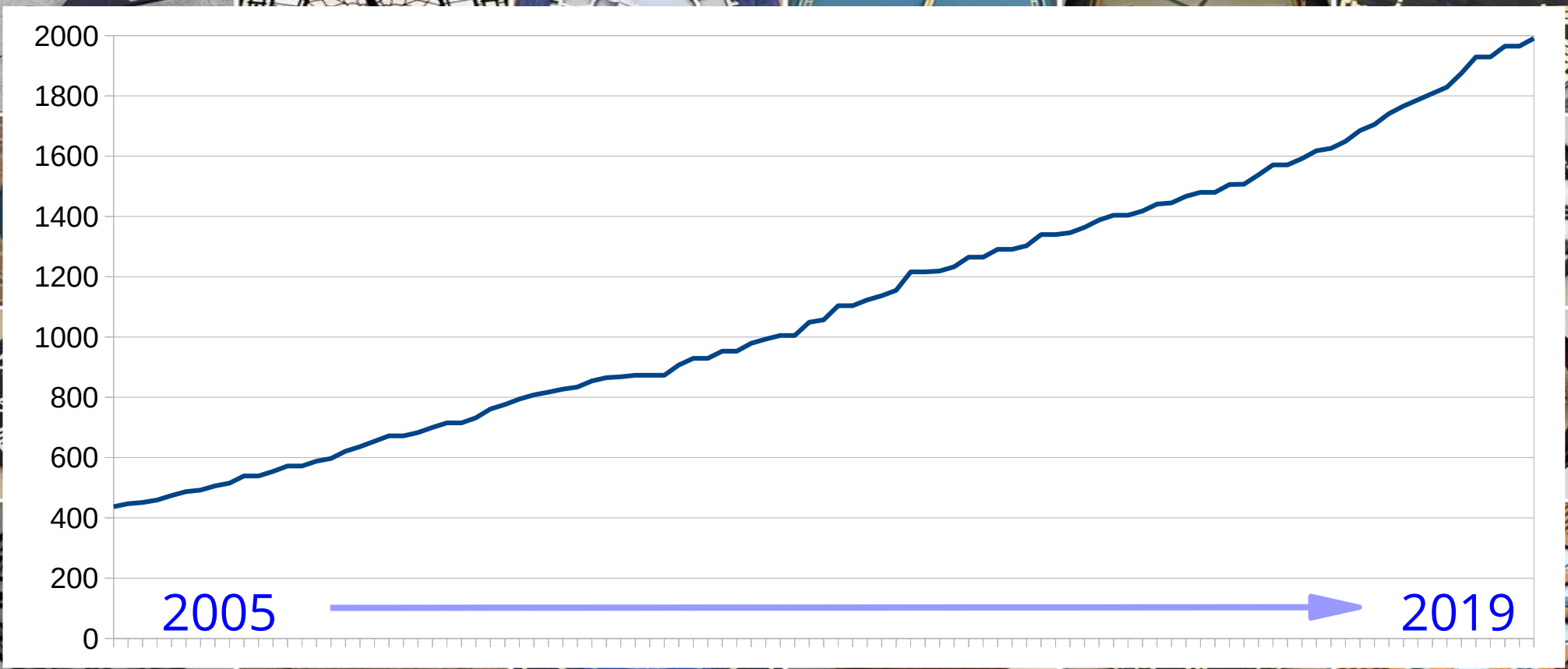
Due to the massive popularity, We have started a mailing list about this tool.
(Version 4.8.4 alone got downloaded more than 300 times from this site.)

... and time passed...



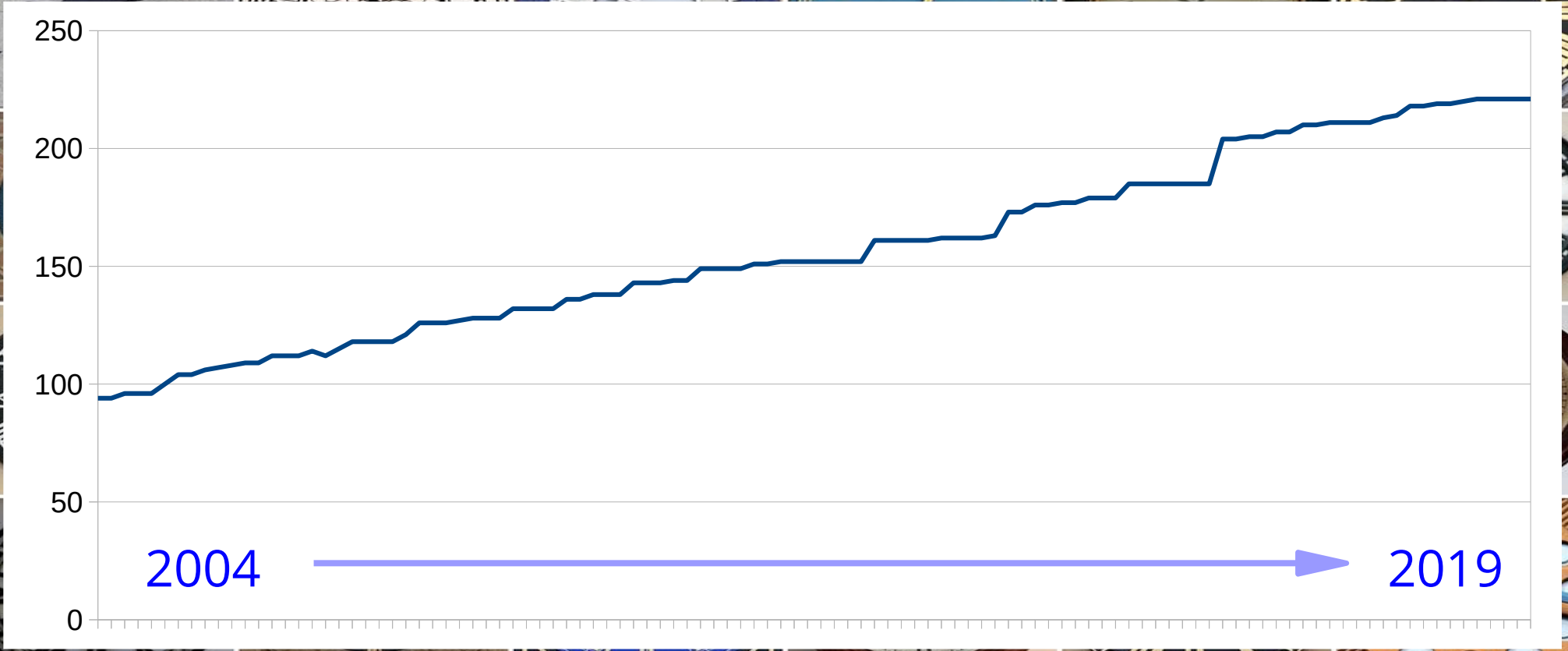
Number of lines of code

... and time passed...



Number of contributors

... and time passed...



Number of command line options

2019

DICT, FILE, FTP, FTPS, Gopher, HTTP, HTTPS, IMAP, IMAPS, LDAP, LDAPS, POP3, POP3S, RTMP, RTMPS, RTSP, SCP, SFTP, SMB, SMBS, SMTP, SMTPS, Telnet and TFTP

TLS certificates, HTTP POST, HTTP PUT, FTP uploading, HTTP form based upload, HTTP/HTTPS/SOCKS proxy, cookies, authentication (Basic, Digest, NTLM, Negotiate, Kerberos), HTTP/2, HTTP/3, alt-svc:, happy eyeballs, file transfer resume, proxy tunneling, DNS-over-HTTPS, HTTP compression and much more

Number of available web sites

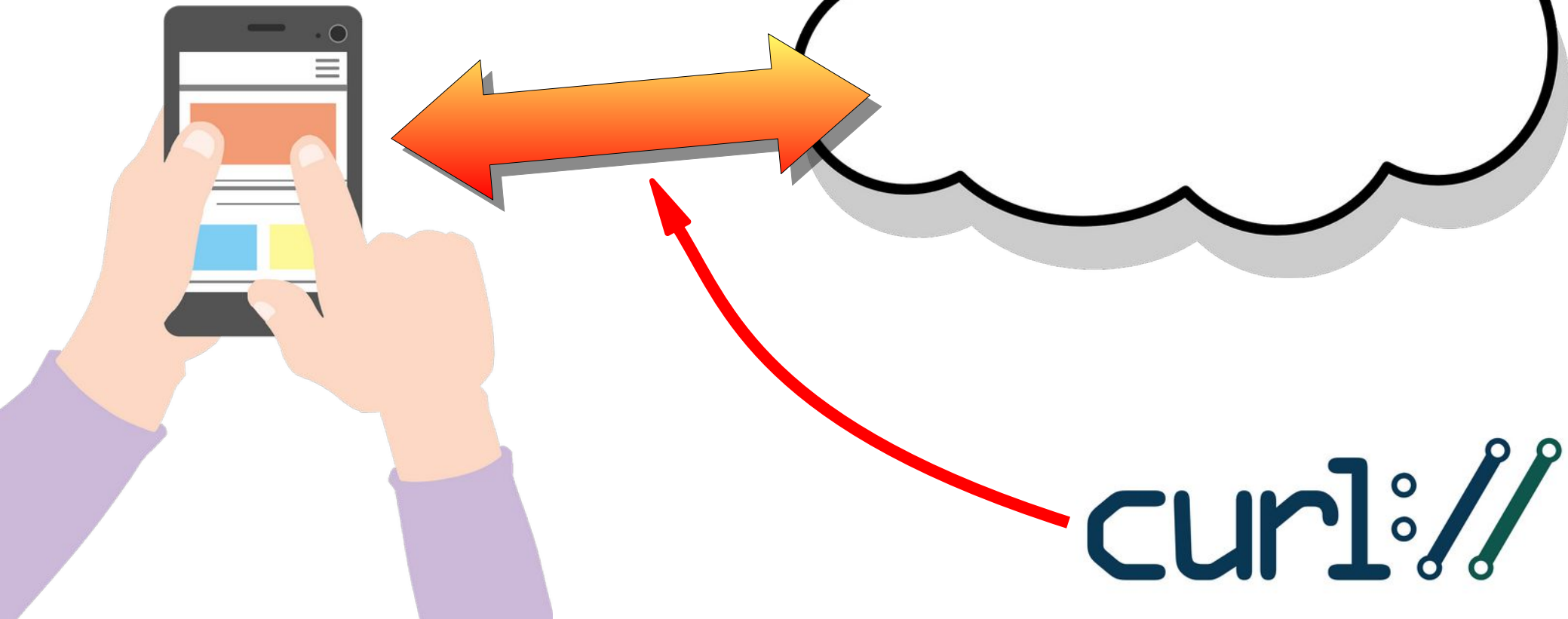
1996: 257,000

2019: 1,940,000,000

(multiplied 7,500 times)

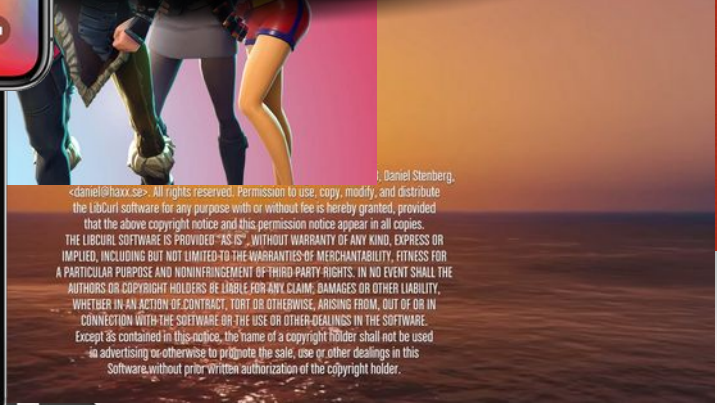
Just curl it!

curl is a bridge



Widely used

@bagder



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NETFLIX

PlayStation



16 Software, 1C Company, ACCESS, Actuate, Adara Networks, AddLive, Adobe, Aditiva, Adknowledge, alaTEST, Altera, Alcatel, Amazon, Ananse Productions, AOL, Apple, Archivas, ATX, AT&T, Autodesk, Avaya, BBC, Bietfuchs, Biicode, Bitcartel, Blackberry, Blizzard, Bloglines.com, Blue Digits, Blue Security, BMW, Booking.com, Bosch, Baojun, Broadcom, bwin, Cadillac, Candela Technologies, Canonical, Carestream Health, Cascade Data Systems, CatchFIRE Systems, CERN, CheckPoint, Chevrolet, Chronos, Cisco, Citrix, CLAAS Tractor SAS, Comcast, Contactor, CounterPath, Cybernetica, Datasphere, Datordax, Denon, DesignQuotes, Device Scape, Digium, EdelWeb, EFS Technology, Eiffel Software, Electronic Arts, Emsoft, Enigma Software, Euroling, Ergon Informatik, ESRI, etikett.de, www.expandtalk.se, Eye-Fi, E2E Technologies Ltd, F-Secure, Facebook, FalconView, Feitian Technologies, Ford, FriendFeed, FMWebschool, Garmin, GeekDrop, GRIN, Groopex, Grooveshark, focuseek, Games Workshop, Garmin, GipsyMedia, GMC, Google, Haxx, HPC, Heynow Software, Hitachi, Holden, Honeywell, HP, Huawei, HTC, inSORS, IBM, ideelabor.ee, Idruna Software Inc, Id Software, Infomedia Business Systems Division, Informatica, Information Handling Services, Insignia, Instagram, Intel, Internet Security Systems, Intra2net AG, isee systems, Jajja Communications, Jawbone, JET, JLynx Software, Kajala Group Ltd., Kaleidescape, Karelia, Kaseya, kencast inc, Kerio Technologies, Kongsberg Spacetec, LassoSoft, lastpass, LG, LifeSize Software, Linden Lab, Machina Networks, Macromates, Macromedia, Magic TV, Matrix Science, Mandiant, MandrakeSoft, Marantz, Mazda, McAfee, MediaAnalys, Mellanox, Mercedes-Benz, Metaio, Micromuse Inc., Miniclip, Modio, MokaFive, Inc, Momento, Moodstocks, Motorola, Mozilla, Music FX Live, Nagarsoft, Neptune Labs, Nest, Netflix, Netgear, Netiq, Network Mail, Neuros, Nintendo, Nissan, NoDesign, Nortel, Office2office Plc, OKTET Labs Ltd, One Laptop Per Child, Onkyo, On Technology, Opel, OpenLogic, opsmate, Optimsys, Oppo, Oracle, Outrider, Palm, Panasonic, Pandigital, Parrot, Passiv Systems, Pelco, Philips, Pioneer, Plogue, Pocket Gems, Polaroid Corporation, Polycom, Pure Storage, Quest, QVD, QNX, RBS, Renault, Research in Motion, Retarus Network Services GmbH, Riverbed, ROBLOX, Rockstar Games, Rolltech Inc, RSA Security Inc, RSSS, Samsung, SanDisk, SAP, SAS Institute, Seat, SEB, Sharp, Siemens, Silicon Landmark, Sjphone, Skoda, Slingbox, SmithMicro, Sony, Sophos, Source Remoting, Splunk, Spotify, Steambird, Subaru, Suzuki, Sun, SurfEasy Inc, Swisscom, Symantec, System Garden, Tango, tasvideos, TeamViewer, Tellabs, Telstra, Telvue, Tesla, Thermomix, Thumbtack, Tilgin, Tomtom, ToolAware, Toshiba, Toyota, Trend Micro, Tribalmedia, Trion Worlds, Tiempo de Espera, Unisys, UniPlot, Unity3d, ustream, Valve, Vauxhall, Verisure, VETport, Vivisimo, Vmware, Vodder, Volition Inc, Vuo, VW, Wump Research, Xiaomi, Xilinx, XonaSoftware, Yahoo, Yamaha, Yubico, Zimbra, Zixcorp, Zonar Systems, Zyxel, Z2,

10,000,000,000
installations

curl uses libcurl



libcurl

TCP

UDP

file-
system

IP

24 supported protocols

libcurl



60 libcurl bindings

application

PureBasic	C++ Requests	D	Falcon	go-curl	Java	Lua-cURL	Object-Pascal	perl6-net-curl	Nim
ScriptBasic	Chcurl	Delphi	Ferite	Guile	Julia	Mono	O'CamL	PHP/CURL	Rexx
curlpp	BBHTTP (Cocoa)	Eiffel	Gambas	Harbour	Common Lisp	.NET	Pascal	PostgreSQL	Ring
curlcpp	Curlhandle (Cocoa)	Euphoria	glib/GTK+	Haskell	luacurl	node.js	WWW::Curl (perl)	pyCURL	RPG
Tclcurl	Visual Basic	Visual Foxpro	Q	vXWidgets	XBLite	Xojo	S-Lang	Smalltalk	SP-Forth
Net::Curl (perl)	curl-rust	Scheme	Scilab	SPL	Clojure	Curb (Ruby)	Ada95	R	Kapito (Erlang)

libcurl

30 third party dependencies

libcurl

URL parser

winidn

libidn2

Name resolver

c-ares

HTTPS

- OpenSSL
- libressl
- boringsssl
- NSS
- GnuTLS
- Secure Transport
- Schannel
- wolfSSL
- mbedtls
- gskit
- Mesalink
- AmiSSL

HTTP

IMAP

SMTP

POP3

SFTP

SCP

LDAP

RTMP

SSH

libssh

libssh2

wolfSSH

OpenLDAP

WinLDAP

librtmp

HTTP/3

quiche

ngtcp2 family

HTTP/2

nghttp2

HTTP/1

cookies

libpsl

compression

libz

brotli

authentication

winspi

Heimdal

MIT-kerberos

I/O layer

Features can be disabled at build-time

libcurl

pthread

verbose output

sspi

crypto auth

ntlm-wb

TLS SRP

unix-sockets

cookies

HTTP auth

DNS-over-HTTPS

MIME

date parser

netrc

progress meter

DNS shuffle

alt-svc

71 operating systems

libcurl

Blackberry Tablet OS	Sailfish OS	UnixWare	Illumos	AIX	Mac OS 9	Windows CE	vxWorks	
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


```
> curl -X POST http://api.allthethings.com  
-d {email:freetshirt@apigee.com}  
{  
> link:api.allthethings.com/v2/com?
```



\$ curl 'techJobs' SanFran

//don't tell my boss



The career hub for tech

Hi Daniel,

I'm the marketing director for Dice.com and I wanted to reach out to you to thank you for spotting our billboard error on the 101. **We are deeply embarrassed by this mistake** to say the least. In a classic coding scenario, our QA failed us. Unfortunately for us, we bought this spot long-term and we are trying to figure out how quickly we can replace the content.

Master of many things

Subject: Multimedya isc-v:85

I have toyota corola with multimedya system that you have its copyright.

I need a advice to know how to use the gps.

Cisco Small Business Routers, March 2019

```
location / {  
    root    html;  
    index  index.html index.htm;  
  
    if ($http_user_agent ~* "curl") {  
        return 403;  
    }  
  
    proxy_set_header X-Real-IP $remote_addr;  
    proxy_set_header Host $http_host;  
    proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;  
  
    rewrite ^/(.*) https://$host/$1 permanent;  
  
    proxy_pass 'http://$server_addr:8000';  
}
```

Malwares use it too (1/2)

October 2015: a single curl package was downloaded more than 300,000 times from the web site, accounting for over 70% of the used bandwidth.



Afterwards, it checks the presence of CURL³ libraries within the system directory. Those libraries are actually necessary for running applications `CURL.exe` and `Converter.exe`. In case of their absence, LiteC **downloads these libraries from the official web⁴** via the `Urlmon` function `URLDownloadToFileW()`. After the download, the zip archive is extracted into the system directory, e.g. "`{Windows}\system32`".

UPDATE: CURL libraries are now directly included into the initial installer `WeatherAppSetup.exe`.

Malwares use it too (2/2)



Chinese APT10 Hacking Group
Delivers UPPERCUT Backdoor Via
Malicious Word Documents

LOOKBACK —

New advanced malware, possibly nation sponsored, is targeting US utilities

Dear Engineer. You failed your licensing exam. Open this document to learn more.

DAN GOODIN - 8/2/2019, 12:00 PM



UFONet - Denial of Service Toolkit

"oderint dum metuant"



About Us Alerts and Tips Resources Industrial Control Systems

National Cyber Awareness System > Analysis Reports > MAR-10201537 - HIDDEN COBRA FASTCash-Related Malware

Malware Analysis Report (AR18-275A)

MAR-10201537 - HIDDEN COBRA FASTCash-Related Malware

Original release date: October 02, 2018 | Last revised: December 21, 2018

Why?

Why use curl?

Internet doesn't follow specs

Open source; MIT licensed

Simple, stable, powerful API

Multi-platform

Documentation

Stable

All the protocols

Fast

Footprint shaving

Many TLS backends

<https://curl.haxx.se/libcurl/theysay.html>

Why Open Source?

There was never any alternative to me

Wanted to contribute back

Would never even come close unless

No, I would not be rich otherwise

```
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* This software is licensed as described in the file COPYING, which  
* you should have received as part of this distribution. The terms  
* are also available at http://curl.haxx.se/docs/copyright.html.  
* You may opt to use, copy, modify, merge, publish, distribute and/or sell  
* copies of the Software, and permit persons to whom the Software is  
* furnished to do so, under the terms of the COPYING file.  
* This software is distributed on an "AS IS" basis, WITHOUT WARRANTY OF ANY  
* KIND, either express or implied.  
*  
*****/  
  
#include "curl_setup.h"
```

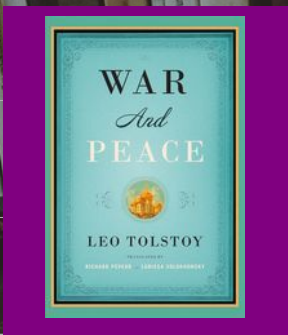

How?

133 Relevant RFCs (260,000 lines)

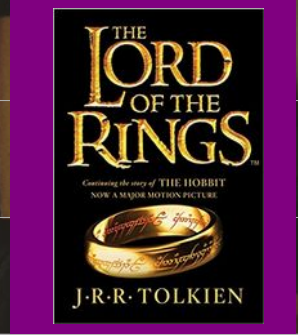
libcurl

821 822 850 854 959 974 1035 1081 1123 1225 1350 1425 1427 1436 1460 1510
1635 1639 1651 1653 1725 1730 1734 1738 1777 1808 1867 1869 1870 1884 1928
1939 1945 1950 1951 1952 1959 1964 2045 2046 2047 2048 2049 2060 2061
2068 2095 2104 2109 2133 2145 2183 2184 2192 2195 2222 2228 2229 2231
2246 2255 2326 2373 2384 2388 2389 2396 2428 2449 2459 2478 2487 2518
2553 2554 2577 2595 2616 2617 2640 2718 2732 2817 2818 2821 2831 2854
2936 2964 2965 3207 3280 3493 3501 3513 3617 3659 3961 3986 4120 4121
4178 4217 4248 4346 4366 4422 4511 4516 4559 4616 4954 4959 5034 5092
5321 5322 5849 6749 7230 7231 7232 7233 7234 7235 7238 7540 7541 7628
7838 8314 8446 8484

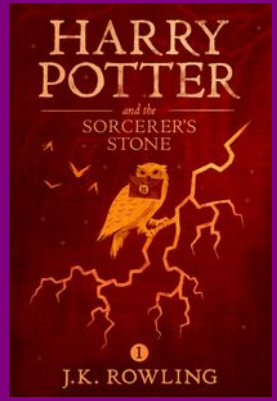
1,327,449 words



War and peace



Lord of the rings



Harry Potter



curl RFCs

Who makes curl

curl

2,000 contributors

740 authors

150 authors per year

12 regulars

Daniel

(The boxes are not drawn to scale)

Contributors

2,000 in total
40-50 per release
Increasing
Small core team
Volunteers



**Everything is
public**





mailing lists

on github

**a few have push
rights**



Who pays



Spare time hackers

Company paid contributors

Company paid feature development

The mighty sponsors of curl

WUJI JOL Haxx

fastly®



TeamViewer



ICONS8



Themeisle



clay



Technical SEO specialist
Webperf Amsterdam WebDev Techno



rabattkalas.se



Secure enough for the billions?

Static code analyzers

CI like crazy

Code audit

Many tests

Docs

Fuzzing

Valgrind and sanitizers

Reviews

Code style

(at 90+ CVEs and counting)



THIS CERTIFICATE THAT THERE HAVE BEEN DEPOSITED IN THE TREASURY OF

10,000

THE UNITED STATES OF AMERICA

10,000

A

SERIES OF 1928

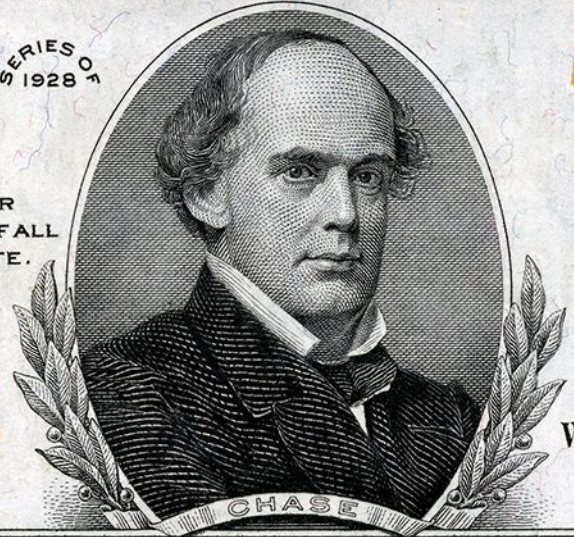
A00000001A

THIS CERTIFICATE IS A LEGAL TENDER IN THE AMOUNT THEREOF IN PAYMENT OF ALL DEBTS AND DUES PUBLIC AND PRIVATE.

CERTIFICATE

A00000001A

N.O. Woods
Treasurer of the United States.



WASHINGTON, D.C.

SERIES OF 1928

A.W. Mellon
Secretary of the Treasury.

A₁

10,000

TEN THOUSAND DOLLARS
IN GOLD COIN PAYABLE TO THE BEARER ON DEMAND

10,000

curl bug bounty

Let's make it personal

**This is the lead developer
of this project**



I'm just an average developer person

I made this for myself

I just never stopped working on it

I made it possible for others to help out

I didn't stop working on it

I took it in directions I thought was right

I kept on working

Over twenty years add up

4,000 commit-days

15,000 spare time hours

16,000 commits

25,000 emails sent

What's maintaining?

Security issues

Release management

Web site admin

Mailing list admin

Patch reviewing

User support

Blogging about it

Debugging

Patch merging

Feature development

Write documentation

Event planning

Getting stickers

Doing talks



Why I do it?

I enjoy creating something that is appreciated by others. Many others.

I want to make curl as good as possible

Everyone needs a hobby

“The created economic value
cannot be overstated.”



Not everyone loves me

ESTA application



Official Website of the Department of Homeland Security

U.S. Customs and Border Protection

ESTA - Electronic System for Travel Authorization | U.S. Department of Homeland Security

Download | Print | CLOSE

TRAVEL NOT AUTHORIZED

You are not authorized to travel to the United States under the Visa Waiver Program. You may be able to obtain a visa from the Department of State for your travel. Please visit the United States Department of State website at <http://www.travel.state.gov/> for additional information about applying for a visa.

PAYMENT RECEIPT

You have successfully submitted payment for the application listed below. A request by the cardholder to the bank or PayPal for a refund of fees will result in an automatic denial of the application. Please print this page for your personal records.

NAME	DATE OF BIRTH	APPLICATION NUMBER	PASSPORT NUMBER	STATUS	EXPIRES
MAGNUS DANIEL STENBERG	Nov 23, 1970	[REDACTED]	[REDACTED]	Travel Not Authorized	N/A

PAYMENT SUMMARY

PAYMENT RECEIVED: US \$4.00
 PAYMENT DATE: April 3, 2018 3:03:31 AM
 PAYMENT TRACKING CODE: [REDACTED]

DHS RECOMMENDS YOU PRINT THIS SCREEN FOR YOUR RECORDS.

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U.S. Department of State NONIMMIGRANT VISA APPLICATION

Administrative Processing

Application ID or Case Number: [REDACTED]
 Case Created: 17-Apr-2018
 Case Last Updated: 17-Apr-2018

Your visa case is currently undergoing necessary administrative processing. This take several weeks. Please follow any instructions provided by the Consular Office for your interview. If further information is needed, you will be contacted. If your visa is approved, it will be processed and mailed/available within two business days. For more information, please visit U.S. Embassy Stockholm.

[Close](#)

Visa application



Now?

On the map right now, maybe

ESNI

DoT

HSTS

MQTT

HTTP/3

tiny-curl

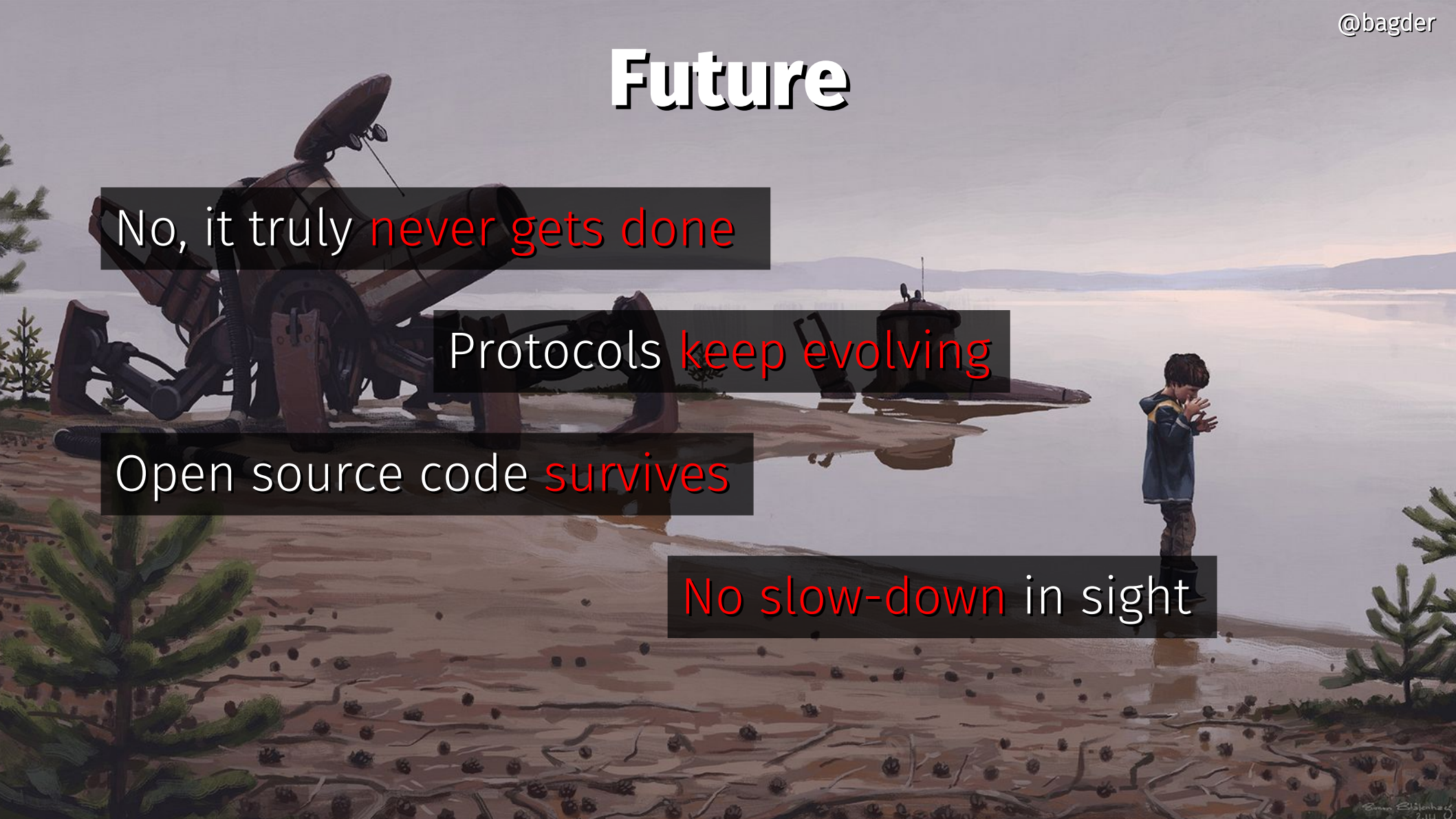
Future

No, it truly **never** gets done

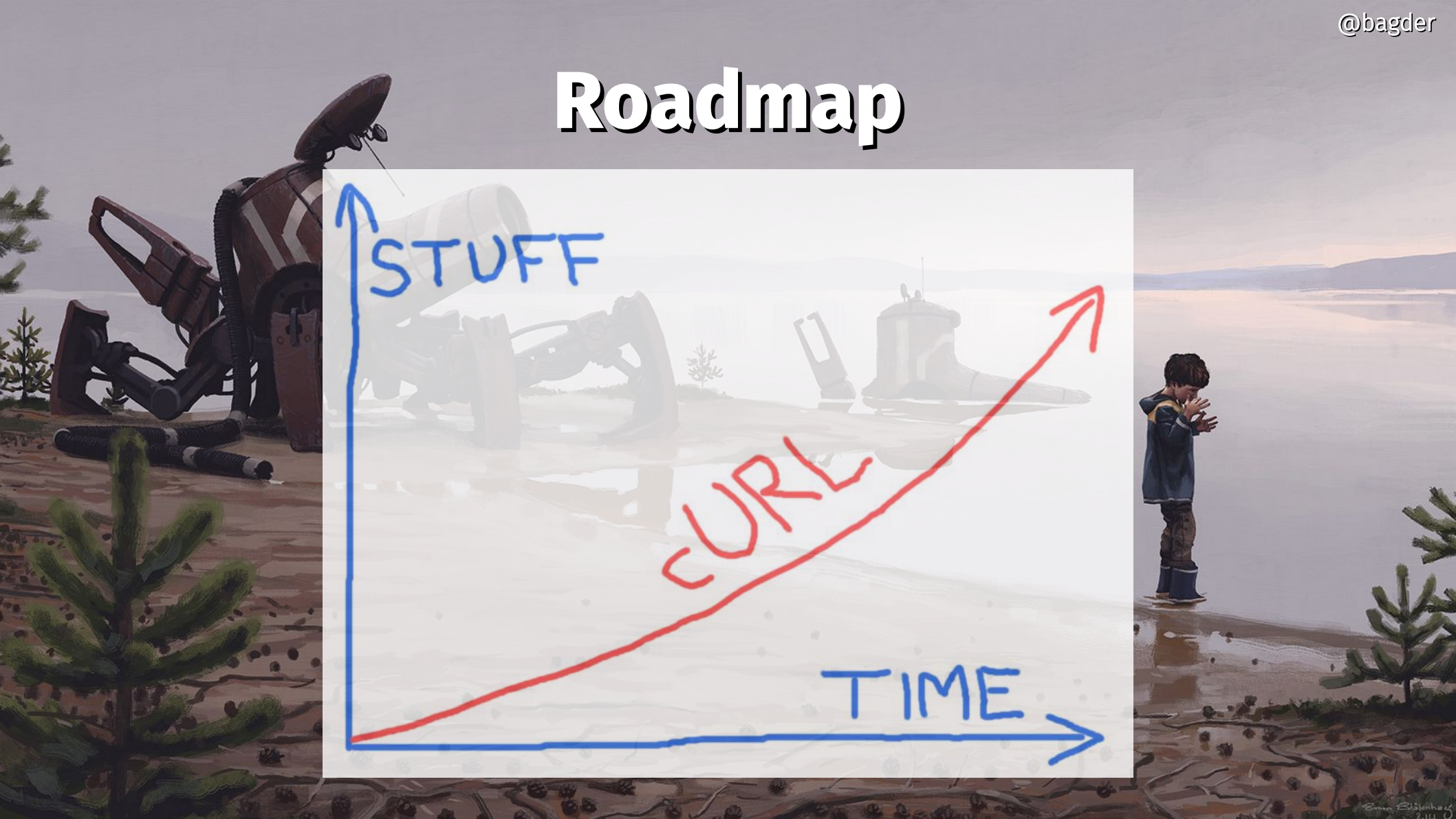
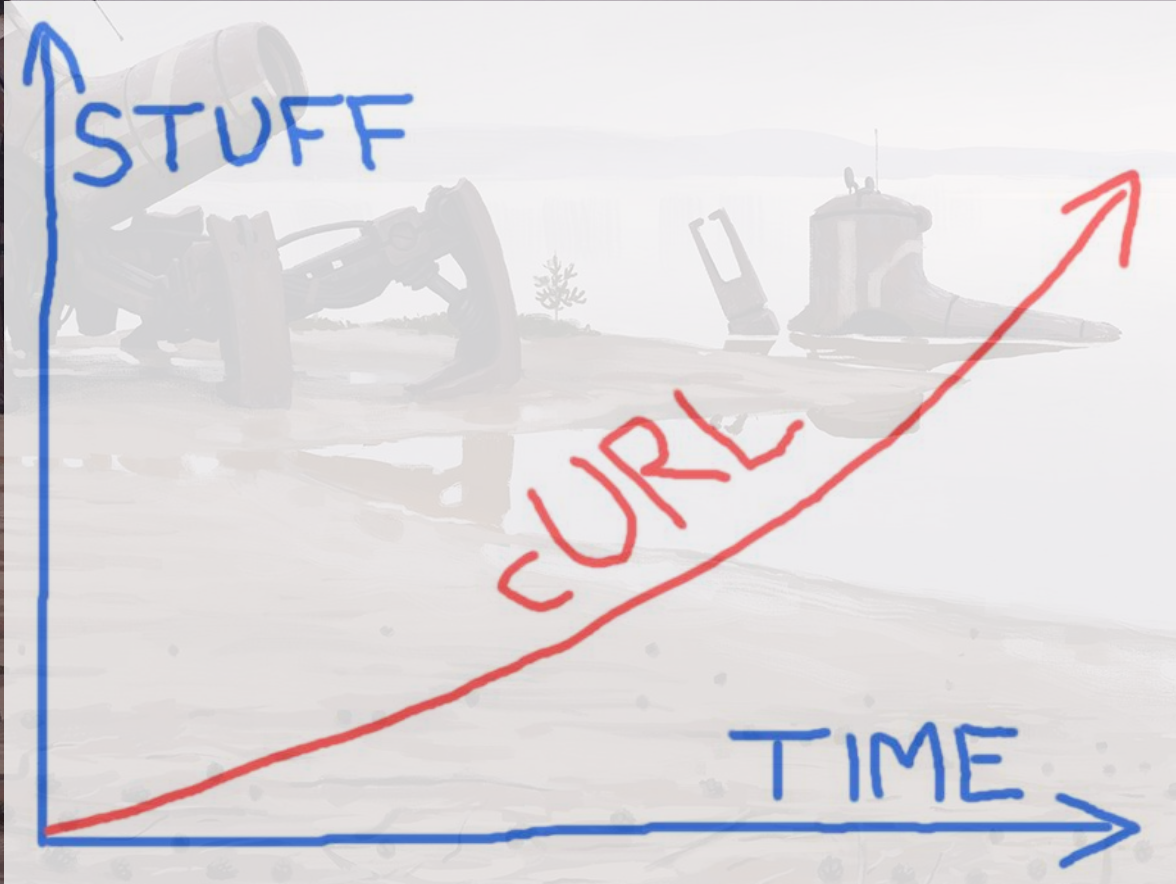
Protocols **keep** evolving

Open source code **survives**

No slow-down in sight



Roadmap



A young child with dark hair is focused on stacking colorful wooden blocks. The child's face is in the background, looking down at the blocks. In the foreground, a stack of blocks is visible, including a red block at the bottom, followed by a green block, a yellow block, and a pink block. A hand is seen at the top left, holding a red block as if about to place it on the stack. The background is softly blurred, showing the child's face and hair.

You can help!

@bagder

Everything

curl:!

<https://curl.haxx.se/book.html>

The complete guide to all there is to know about the curl project

Daniel Stenberg

Thank you!

Questions?

Daniel Stenberg

@bagder

<https://daniel.haxx.se/>



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