State actors, sleeper agents and plain bugs

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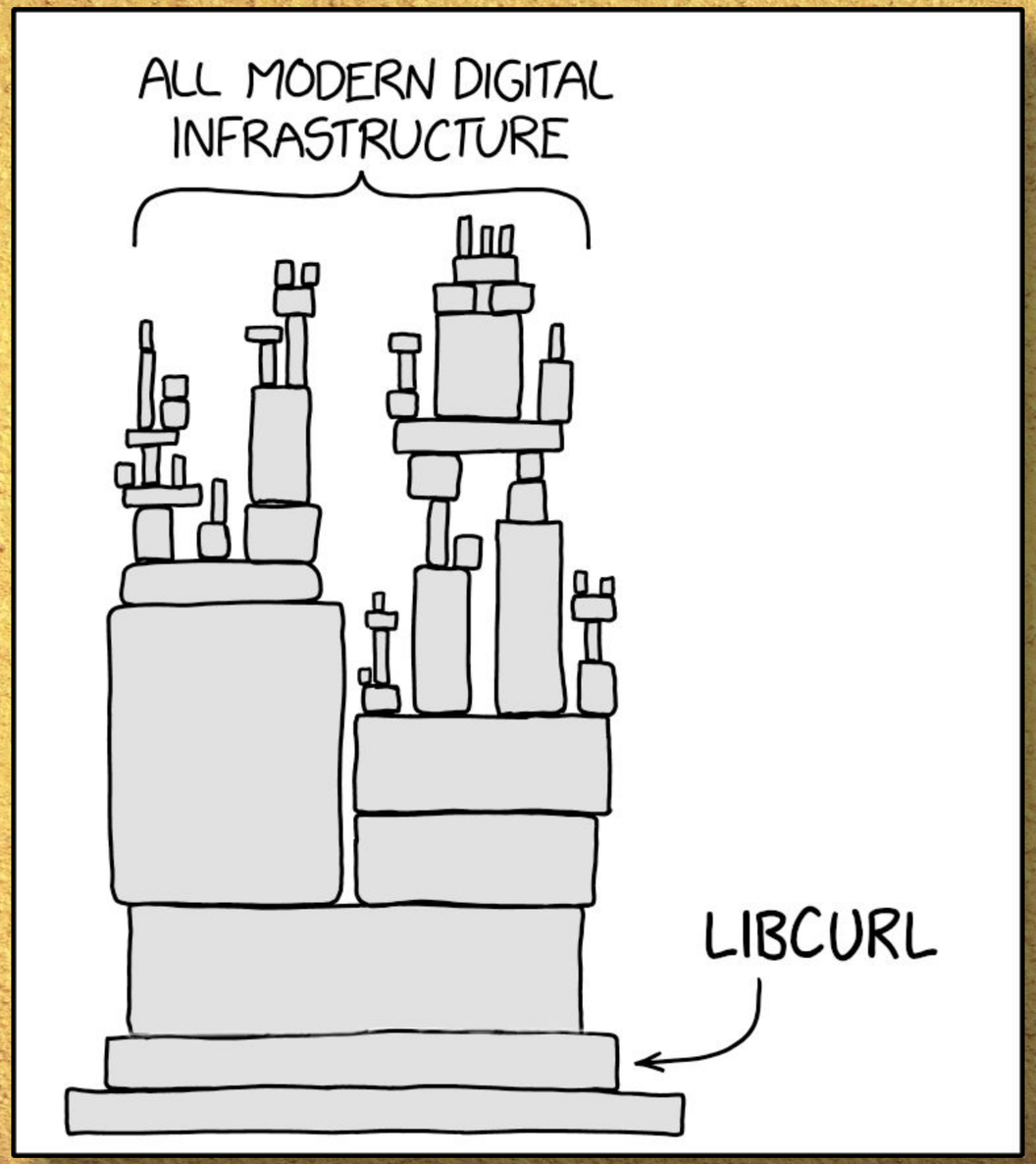
Just ask!


curl://
://
An open source project that makes a command line tool and a library for transferring data using Internet protocols
curl.se

We strive to perform best-in-class in every aspect regarding security and Open Source


ALL MODERN DIGITAL INFRASTRUCTURE
LIBCURL


curl runs in some devices
Windows 10
iOS
FORTNITE
RŌBLOX
chromeOS
NETFLIX
PLAYERUNKNOWN'S
SPIDER-MAN
Roku
Roku Ultra


30,000,000,000
installations

We want to keep it secure

Code style

Easy to read

Easy to understand

Easy to debug

Consistent

Avoid raw memory management

Written for humans

Banned functions

easy-to-get-wrong functions
not tread-safe functions
not portable-enough functions
functions we have our own implementations of
(strcat, gets, sscanf, strtol, atoi, sprintf, snprintf, strtok, and several more)

Complexity checks

Capped maximum complexity

Capped maximum function length

Human review

Every pull-request is reviewed by a human

Review bots

Several review bots help us catch omissions: GitHub Copilot, Augment review, Aisle Analyzer

No binary blobs

No binary files in git

Avoid base64-encoded chunks too

REUSE compliant

Every file has a copyright statement
Every file has license specifier

No git force push

History cannot be rewritten

No confusable unicode

Only a subset of Unicode is allowed - in some places

Document everything

Internal APIs
Concepts
Architecture
External APIs
Everything

Many tests

Thousands of tests

Catch regressions

Verify functionality

Add tests for all new functionality

Ideally add tests for bugfixes too

Always add more tests

Torture tests

- Build with a debug option
- Use wrapper functions for fallible functions
- Wrappers can optionally return error

- Test case is first run once
- Count fallible function invokes = N
- Rerun the test case N times
- For each iteration, make next function fail
- Verify no crash and no memory leak
- Repeat for all tests

CI like crazy

220+ jobs per commit and push

they usually complete within 10 minutes

15 CPU days/day

Compiler options

All picky compiler options

-Werror

Always fix every problem

Run-time checkers in CI

Valgrind

memory, address, undefined sanitizers

Code analyzers

Multiple traditional static code analyzers: clang-tidy, CodeSonar, Coverity

Multiple AI-powered analyzers: ZeroPath, Codex Security

Fuzzing

CI

OSS-Fuzz

Read-only CI jobs

A breached cloud service should not taint us

Check the CI jobs

Zizmor helps keep them decent

Reproducible releases

Anyone can make an exact binary duplicate

Digitally signed

Releases
Commits
Tags

git backup

codeberg

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fixed vulnerabilities

always fixed in the next release

document vulnerabilities

thoroughly

external audits

three, so far

2016: Cure 53 ⇒ 7 CVEs

2022: Trail of Bits ⇒ 2 CVEs

2024: Trail of Bits ⇒ 0 CVEs

2fa

strong 2fa required of all committers

API and ABI stability

always users to always upgrade

private security reporting

suspected vulnerabilities are handled with care

Open Source

Everything done in the open - accessible and transparently

Securing curl

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Code style	Banned functions	Complexity checks	Human reviews	Review bots	No binary blobs	REUSE compliant
No git force push	No confusable Unicode	Document everything	Many tests	*torture tests*	CI like crazy	All picky compiler options and -Werror
Valgrind and sanitizers	AI + static code analyzers	Fuzzing, in CI and non-stop	read-only CI jobs	zizmor the CI jobs	Reproducible releases	Signed releases, commits, tags
git backup on codeberg	Vulnerabilities fixed in next release	Document vulnerabilities thoroughly	Code audits	(strong) 2fa for all committers	API and ABI stability allows *always-update*	private security reporting

Everything done in the open - accessible and transparently

Hosting

★curl.se

★private origin

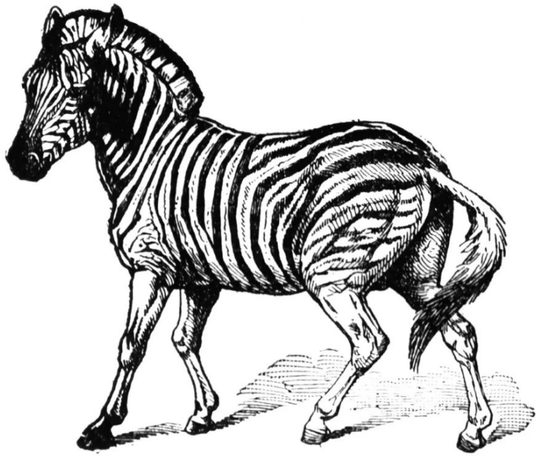
★CDN by Fastly

★anycast DNS

★static HTML

★99.95% “origin offload”

Telling others instead of doing it yourself



Rewriting curl in rust

A weekend project

O RLY?

Dr Baksit Drivehr


QUESTIONS?

License