Internet all the things!
curl everywhere

Daniel Stenberg, February 1st 2015

Agenda

How we got here

Using libcurl

Future

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Please ask!

Feel free to interrupt and ask at any time!

First there was nothing

One day in 1996

... became curl 1998

HTTP, Gopher, FTP

... fast-forward to 2015

curl is a command line tool for transferring data with URL syntax, supporting **DICT, FILE, FTP, FTPS, Gopher, HTTP, HTTPS, IMAP, IMAPS, LDAP, LDAPS, POP3, POP3S, RTMP, RTSP, SCP, SFTP, SMTP, SMTPS, Telnet and TFTP**. curl supports SSL certificates, HTTP POST, HTTP PUT, FTP uploading, HTTP form based upload, proxies, cookies, user+password authentication (Basic, Digest, NTLM, Negotiate, Kerberos..), HTTP/2, happy eyeballs, file transfer resume, proxy tunneling and a busload of other useful tricks.

1000 million users

16 Software, Access, Actuate, Adara Networks, **Adobe**, Aditiva, Adknowledge, alaTEST, Altera, **AOL**, **Apple**, Archivas, ATX, Autodesk, **BBC**, Bietfuchs, Bitcartel, Blackberry, Blizzard, Bloglines.com, Blue Digits, Blue Security, **BMW**, **Bosch**, Bwin, Candela Technologies, Canonical, Carestream Health, Cascade Data Systems, CatchFIRE Systems, CERN, CheckPoint, **Chevrolet**, Chronos, **Cisco**, CLAAS Tractor SAS, Comcast, Contactor Data, Cybernetica AS, Datasphere S.A., Datordax, Denon, DesignQuotes, Digium, EdelWeb, EFS Technology, Eiffel Software, **Electronic Arts**, Emsoft, Euroling, Ergon Informatik AG, ESRI, expandtalk.se, Eye-Fi, E2E Technologies Ltd, F-Secure, **Facebook**, FalconView, Feitian Technologies, FriendFeed, FMWebschool, GRIN, Groopex, Grooveshark, Focuseek, Games Workshop, Garmin, GipsyMedia Ltd, **Google**, Haxx, HPC, Heynow Software, **Hitachi**, **HP**, **Huawei**, HTC, inSORS, **IBM**, ideelabor.ee, Idruna Software Inc, Id Software, Infomedia Business Systems Division, Informatica PowerCenter, Information Handling Services, Insignia, **Intel**, Internet Security Systems, Intra2net AG, Jajja Communications, JET, JLynx Software, Kajala Group Ltd., Kaleidescape, Karelia, Kaseya, Kencast inc., Kerio Technologies, Kongsberg Spacetec, LassoSoft, Lastpass, LG, Linden Lab, Machina Networks, Macromates, Macromedia, Magic TV, Mandiant Memoryze, MandrakeSoft, Marantz, **Mazda**, McAfee/Network Associates Inc, MediaAnalys, Mellanox Switch Management System, **Mercedes-Benz**, Metaio, Micromuse Inc., MokaFive, Inc, Momento, Moodstocks, **Motorola**, Nagarsoft, Neptune Labs, Nest, Netflix, Netiq, Network Mail, Neuros Technology, **Nintendo**, NoDesign's DIA Parrot, Nortel, Office2office Plc, OKTET Labs Ltd, One Laptop Per Child, Onkyo, On Technology, OpenLogic, Optimsys, **Oracle**, Outrider, Palm, **Panasonic**, Pandigital, Passiv Systems, Pelco, **Philips**, **Pioneer**, Polaroid Corporation, Polycom, Pure Storage, Quest, QNX, **RBS**, Research in Motion, Retarus Network Services GmbH, Riverbed, Rolltech, Inc, RSA Security Inc, RSSS, **Samsung**, SanDisk, **SAS Institute**, **SEB**, **Sharp**, **Siemens**, Silicon Landmark, Slingbox, SmithMicro, Sony, Source Remoting, Spotify, Steambird, **Sun**, **Swisscom**, Symantec, System Garden, Tasvideos, Tellabs, Telstra, Telvue, Thumbtack, Tilgin, **Tomtom**, ToolAware, **Toshiba Corporation**, Trend Micro, Tribalmedia, Tiempo de Espera, Unity3d, Vivisimo, Vmware, Voddler, Volition Inc, Vuo, Wump Research & Company, **Xilinx**, XonaSoftware, **Yahoo**, Yamaha, Zimbra, Zixcorp, Zonar Systems LLC, Zyxel … and more

All the things!

Mac OS X

TVs

Iphones and Ipads

Other phones

Linux

Games

Version control systems

Cars

PHP sites

Set-top boxes

Audio equipment

Bluray players

Printers

Firefox crash reporter

Sites: Facebook, Yahoo, ...

Your next device

Everyone in this room most likely has a device using libcurl. Probably even more than one!

mozilla

why they use curl?

Because Internet doesn't follow specs

Open source

MIT licensed

Simple and stable API

Yet powerful API

HTTP library when libwww was the only choice

C library is still most portable

Bindings for every language

Decent documentation

Decent stability

Supports all the protocols

Fast

Allows disabling parts for footprint shaving

Many TLS backends

Small devices still like C

`http://curl.haxx.se/libcurl/theysay.html`

the project

curl and libcurl

Transfer data using internet application protocols

Stable products

Stable API

Maximum portability

MIT

Contributors over time

1200+ in total

30-40 contributors per release

Increasing linearly

Core team < 10 people

Volunteers!

bindings

Ada95, Basic, C++, Ch, Cocoa, D, Dylan, Eiffel, Euphoria, Falcon, Ferite, Gambas, glib/GTK+, Guile, Haskell, ILE/RPG, Java, Lisp, Lua, Mono, .NET, Object-Pascal, Ocaml, Pascal, Perl, PHP, Postgres, Python, R, Rexx, Ruby, Scheme, S-Lang, Smalltalk, SP-Forth, SPL, Tcl, Visual Basic, Visual FoxPro, Q, wxWidgets, XBLite

So what do I do?

When I want to use it.

Build it

Because on most embedded devices you will

Tailor your own build

Yocto / OpenEmbedded, BuildRoot etc provide recipes

All Linux distros have binary packages

Transfer oriented

A transfer: data going in either or both directions to or from a given URL

Create an "easy handle" with curl_easy_setopt()

Create one handle for each transfer or re-use it serially

Set your transfer options and preferences

Like URL

Write callback

Authentication

Or another one of the 200+ options

Synch or asynch

The easy interface is single-transfer and blocking

The multi interface is many-transfers and non-blocking

hello world - blocking

```c
CURL *h = curl_easy_init();

curl_easy_setopt(h, CURLOPT_URL, "http://example.com");

curl_easy_setopt(h, CURLOPT_FOLLOWLOCATION, 1L);

CURLcode res = curl_easy_perform(h);

if (res)
  fprintf(stderr, "curl_easy_perform() failed: %s\n",
          curl_easy_strerror(res));

curl_easy_cleanup(h);
```

hello world – non-blocking

```
CURL *h = curl_easy_init();

curl_easy_setopt(h, CURLOPT_URL, "http://example.com");

CURLM *m = curl_multi_init();

curl_multi_add_handle(m, h);

int running;
do {
  res = curl_multi_fdset(h, ...);
  select();
  curl_multi_perform(m, &running);

} while(running);

curl_multi_remove_handle(m, h);
curl_easy_cleanup(h);
curl_multi_cleanup(m);
```

event-based

avoids select() and poll()

event-library agnostic

scales better when beyond hundreds of parallel transfers

curl_multi_socket_action()

Event-based logic is usually trickier to write, read and debug

Documented

As man pages, as web pages on the site and even PDF documents in the release archives.

http://curl.haxx.se/libcurl/

--libcurl

```
$ curl http://example.com/ -d "moo" -k -u my:secret

$ curl http://example.com/ -d "moo" -k -u my:secret --libcurl code.c

$ cat code.c
```
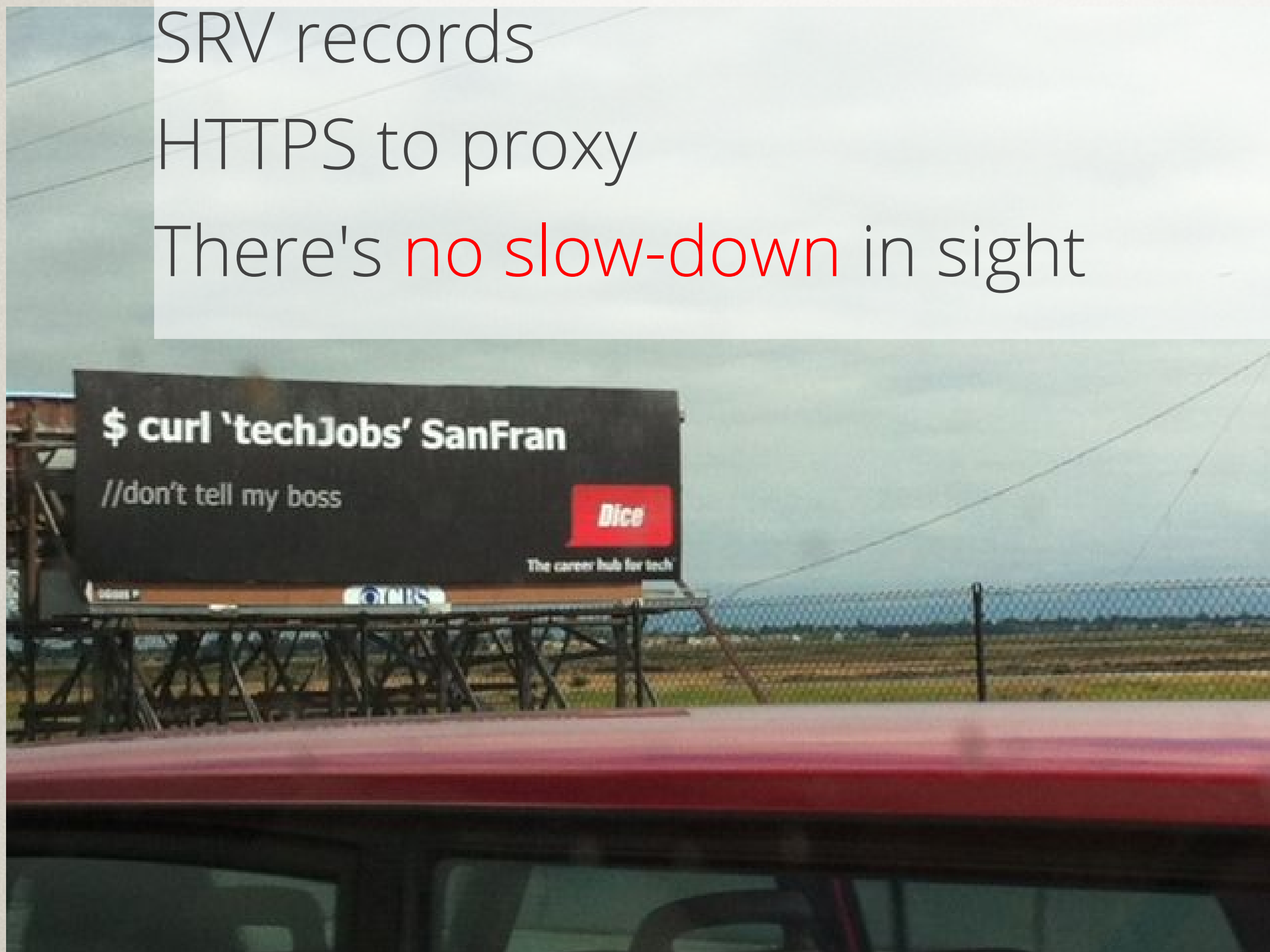
Future?

HTTP/2 multiplexing

Better parallel DNS lookups

SRV records

HTTPS to proxy

There's no slow-down in sight

$ curl `techJobs' SanFran

//don't tell my boss

Dice

The career hub for tech

Thank you!

Learn more!

- curl and libcurl: http://curl.haxx.se/

- curl vs wget:
  http://daniel.haxx.se/docs/curl-vs-wget.html

- curl vs other tools:
  http://curl.haxx.se/docs/comparison-table.html

- curl's TLS backends compared:
  http://curl.haxx.se/docs/ssl-compared.html

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