

The ZABBIX logo consists of the word "ZABBIX" in a bold, white, sans-serif font, centered within a solid red rectangular background. The background of the entire slide is a dark blue gradient with a faint, glowing network of white lines and dots, overlaid on a subtle world map.

**ZABBIX**

# Using curl Library in Zabbix

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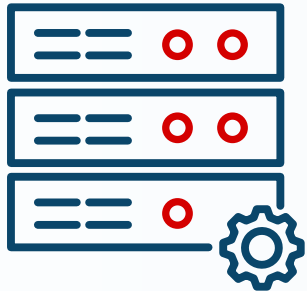
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Senior C Developer, Zabbix

# Collaboration

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ZABBIX



curl://



# Agenda

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- About curl
- Why curl
- First appearance
- Change in 7.0
- Useful information



# About curl



# httpget

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- November 1996: httpget
- Daniel Stenberg took over
- August 1997: urlget (FTP support)
- March 1998: curl (upload support)
- August 2000: libcurl

# Name

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- client for URLs
- “See URL”
- curl URL Request Library
- Capable Ubiquitous Reliable Libre

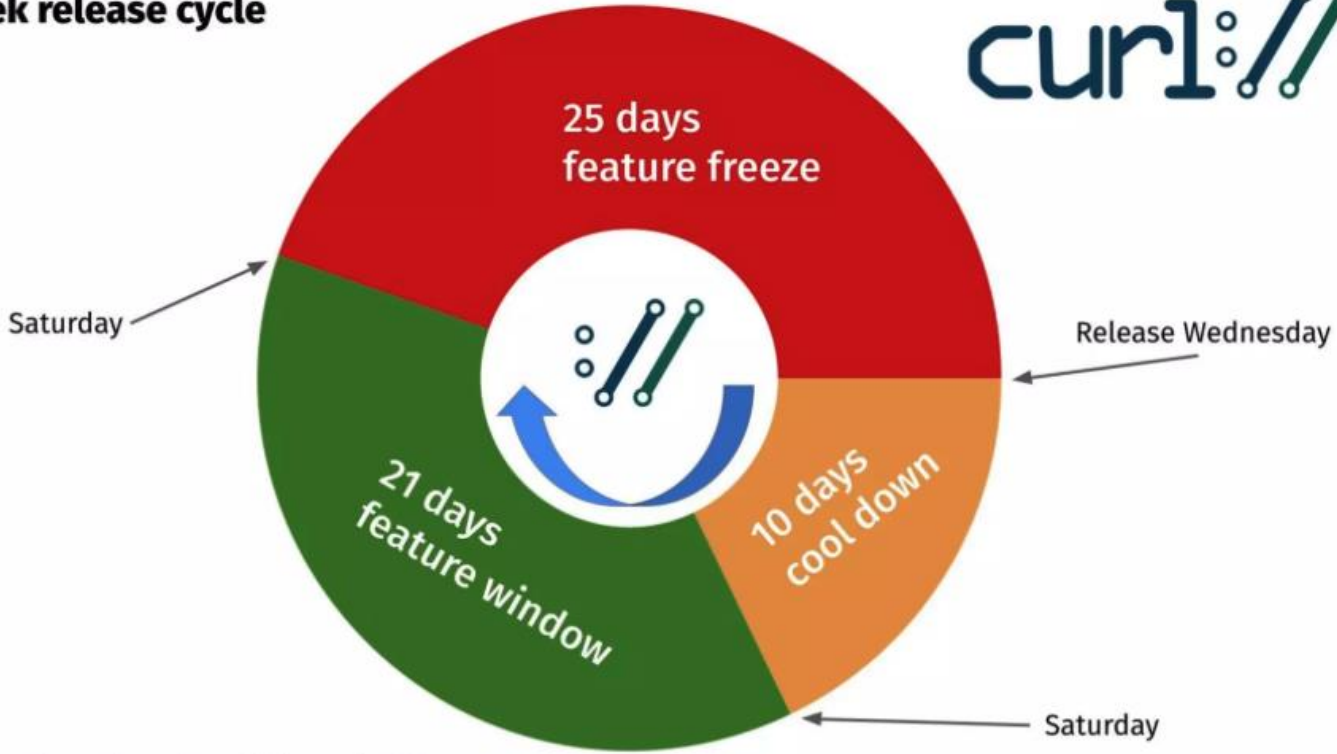
# Other facts

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- A library for transferring data using Internet protocols
- Open Source
- Developed by “everyone” (1200/3000)
- MIT license (slightly edited)
- No paperwork
- Release on Wednesday every 8 weeks

# Release cycle

## 8 week release cycle



Round and round again until the end of time...



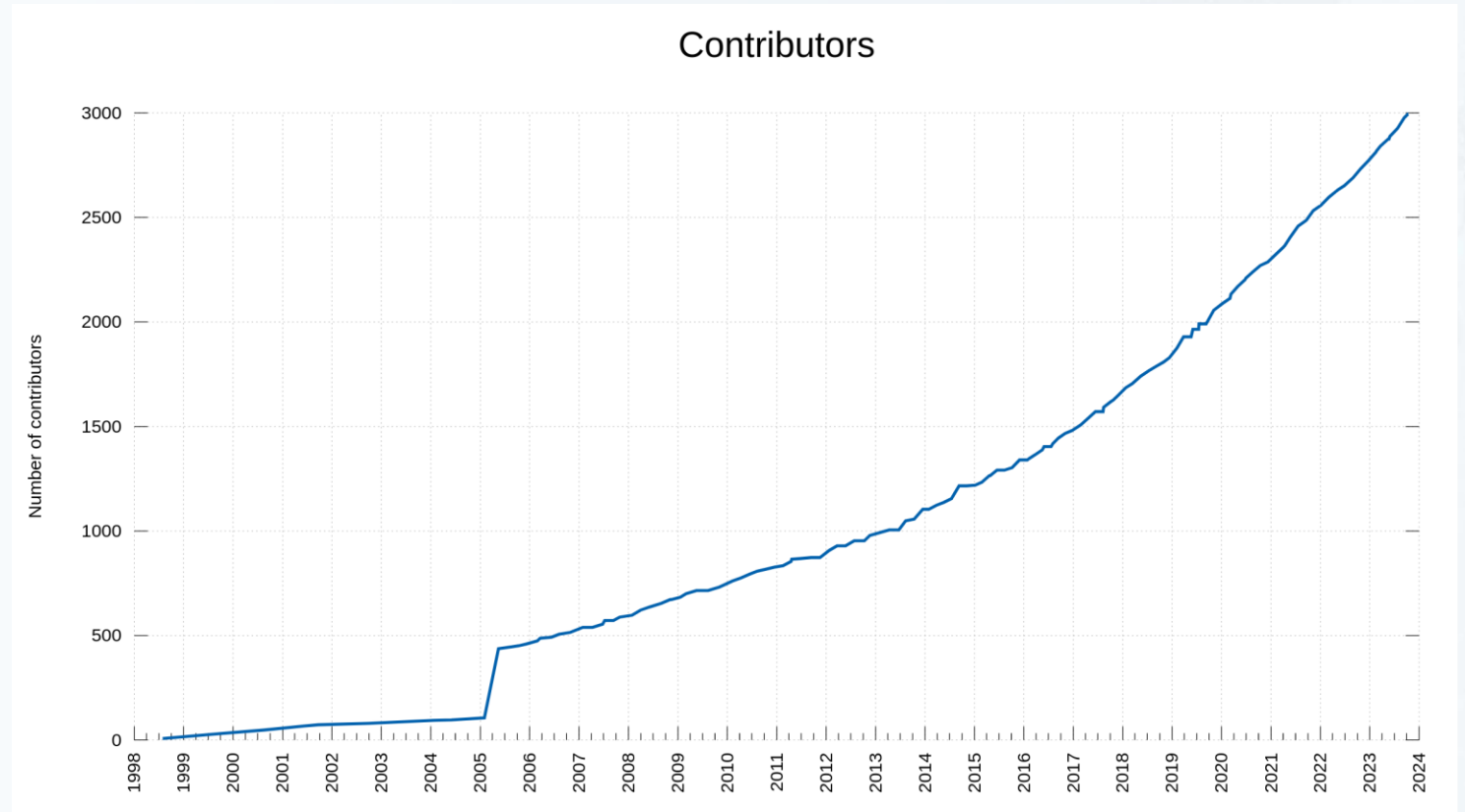
Why curl



# Still there

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- 26 years
- Still actively developed
- Around 3000 contributors
- Conferences and meetings



# Protocols and features

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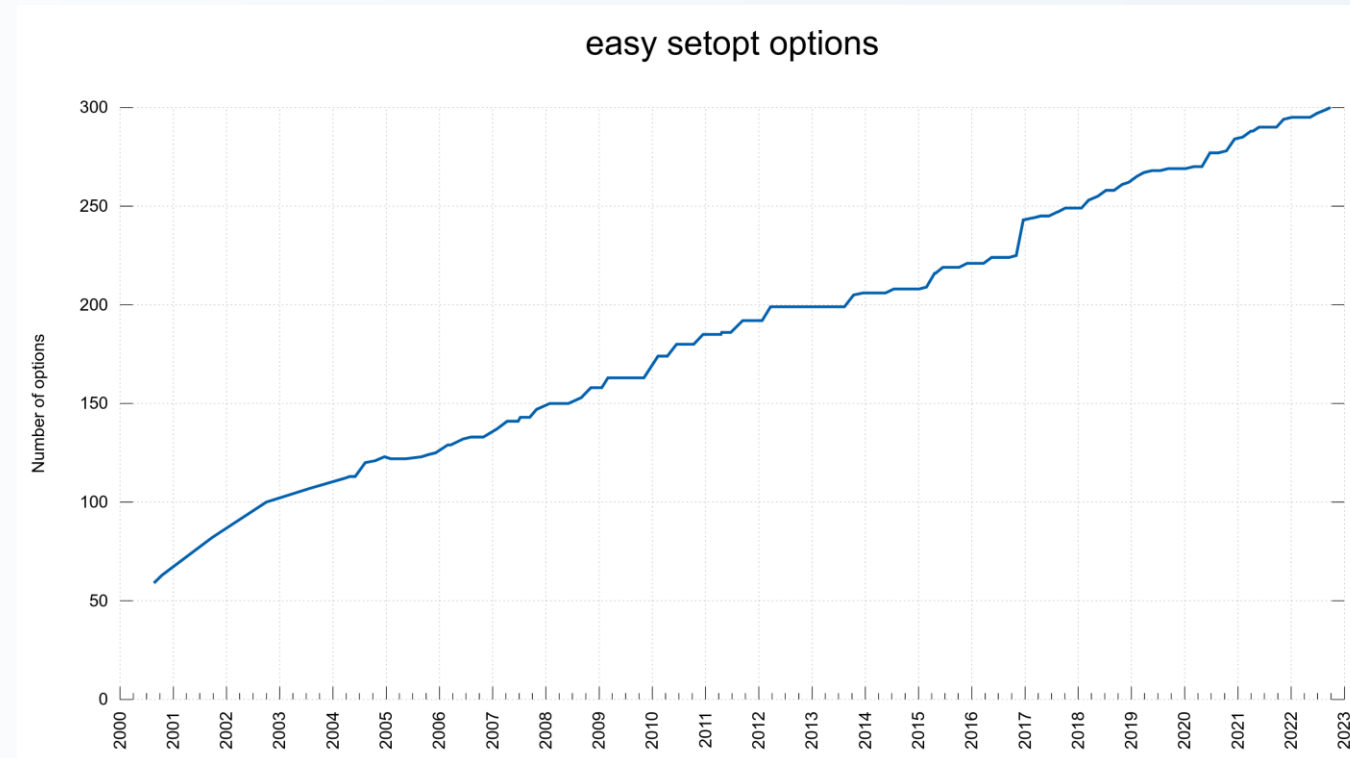
- curl supports 28 protocols: *DICT, FILE, FTP, FTPS, GOPHER, GOPHERS, HTTP, HTTPS, IMAP, IMAPS, LDAP, LDAPS, MQTT, POP3, POP3S, RTMP, RTMPS, RTSP, SCP, SFTP, SMB, SMBS, SMTP, SMTPS, TELNET, TFTP, WS* and *WSS*.
- curl supports TLS certificates, HTTP POST, HTTP PUT, FTP uploading, HTTP form based upload, proxies (SOCKS4, SOCKS5, HTTP and HTTPS), HTTP/2, HTTP/3, cookies, user+password authentication (Basic, Plain, Digest, CRAM-MD5, SCRAM-SHA, NTLM, Negotiate, Kerberos, Bearer tokens and AWS Sigv4), file transfer resume, proxy tunneling, HSTS, Alt-Svc, unix domain sockets, HTTP compression (gzip, brotli and zstd), etags, parallel transfers, DNS-over-HTTPS and more.



# Protocols and features

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```
$ curl --help all | grep -c -- --  
250
```





# Runs on

## 92 operating systems

AIX	AmigaOS	Android	Aros	Atari FreeMiNT	BeOS	Blackberry 10	Blackberry Tablet OS	Cell OS
Chrome OS	Cisco IOS	Cygwin	DG/UX	DragonFly BSD	DR DOS	eCOS	FreeDOS	FreeBSD
FreeRTOS	Fuchsia	Garmin OS	Genode	Haiku	HardenedBSD	HP-UX	Hurd	Illumos
Integrity	iOS	ipadOS	IRIX	Linux	Lua RTOS	Mac OS 9	macOS	Mbed
Micrium	MINIX	MorphOS	MPE/iX	MS-DOS	NCR MP-RAS	NetBSD	NetWare	Nintendo Switch
NonStop OS	NuttX	OmniOS	OpenBSD	OpenStep	Orbis OS	OS/2	OS/400	OS21
Plan 9	PlayStation Portable	QNX	Qubes OS	ReactOS	Redox	RISC OS	RTEMS	Sailfish OS
SCO Unix	Serenity	SINIX-Z	Solaris	SunOS	Syllable OS	Symbian	Tizen	TPF
Tru64	tvOS	ucLinux	Ultrix	UNICOS	UnixWare	VMS		
vxWorks	watchOS	WebOS	Wii System Software	Windows	Windows CE	Xbox System		
Xenix	Zephyr	z/OS	z/TPF	z/VM	z/VSE			

Operating systems known to have run curl

# Backwards compatibility

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We **never** break existing functionality

# Backwards compatibility

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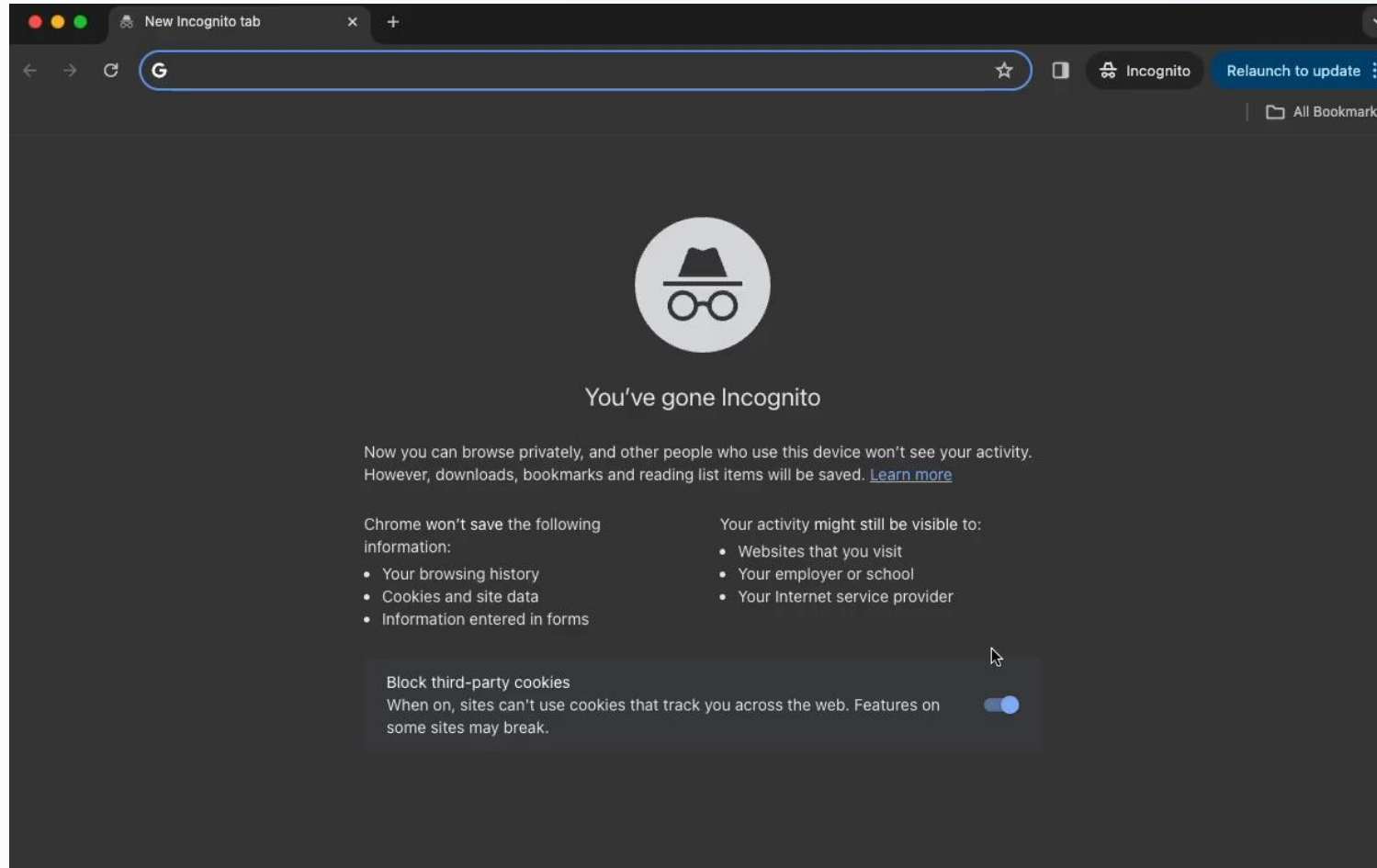
Previous **SONAME** number bumps (breaking backwards compatibility):

1. libcurl 7.1, August 2000
2. libcurl 7.5 December 2000
3. libcurl 7.7 March 2001
4. libcurl 7.12.0 June 2004
5. libcurl 7.16.0 October 2006

We are determined to bump the SONAME as rarely as possible. Ideally, we **never** do it again.

# Copy as curl

---

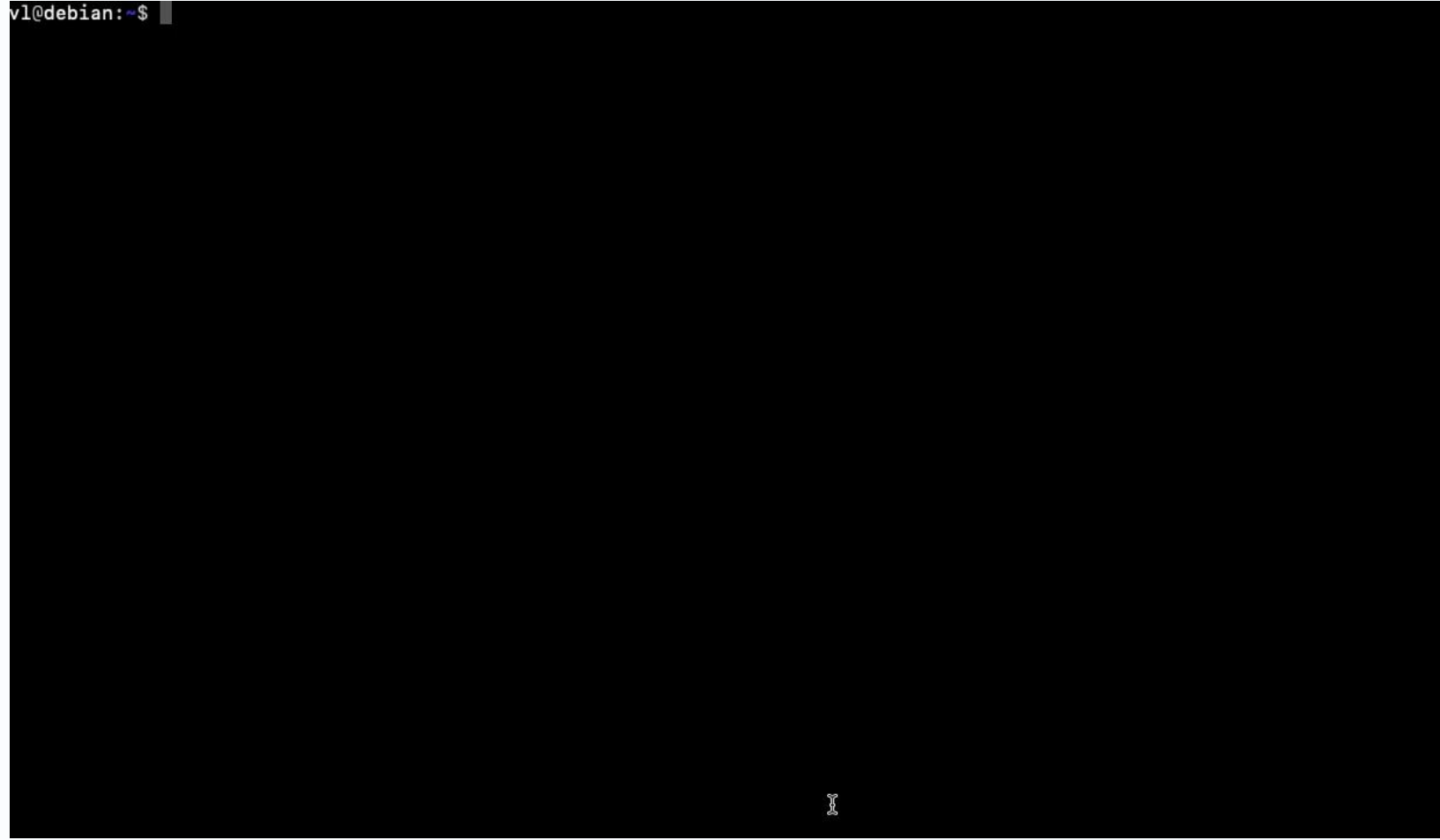




# Generate code from command-line

---

```
vl@debian:~$
```



```
I
```



First appearance

# First appearance

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- Zabbix 1.3.3 (Web monitoring) in 2007
  - *Configuration* → *Web*
  - *Monitoring* → *Web*
- curl 7.15
- Apache 1.3.34
- PHP 5.2
- MySQL 5.0.32
- Debian “etch” 4 / Fedora “Moonshine” 7

# Web monitoring in 1.3.3

The screenshot displays the Zabbix web interface. At the top left is the ZABBIX logo. The top right corner contains links for 'Help' and 'Profile'. Below the logo is a navigation menu with tabs for 'Monitoring', 'Inventory', 'Reports', 'Configuration', 'Administration', and 'Login'. Underneath this is a secondary menu with links for 'General', 'Web', 'Hosts', 'Items', 'Triggers', 'Actions', 'Maps', 'Graphs', 'Screens', 'IT services', and 'Export/Import'. The main content area is titled 'CONFIGURATION OF ZABBIX' and features a dropdown menu currently set to 'Housekeeper'. A modal window titled 'Housekeeper' is open, containing two input fields: 'Do not keep actions older than (In days)' with a value of 365, and 'Do not keep events older than (In days)' also with a value of 365. A 'Save' button is located at the bottom right of this modal. The footer of the page includes the text 'ZABBIX 1.3.3 Copyright 2001-2007 by SIA Zabbix' and 'Connected as 'Admin''.



# Web monitoring in 1.3.3

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The screenshot displays the Zabbix web interface for monitoring web services. The top navigation bar includes 'Monitoring', 'Inventory', 'Reports', 'Configuration', 'Administration', and 'Login'. Below this, a secondary menu shows 'Overview', 'Web', 'Latest data', 'Triggers', 'Queue', 'Events', 'Actions', 'Maps', 'Graphs', 'Screens', and 'IT services'. The main content area is titled 'STATUS OF WEB MONITORING' and features a table with the following data:

Host	Name	Number of steps	State	Last check	Status
dimir	web (1 Scenarios)				
	scenario1	1	Idle till 16 May 18:39:29	16 May 18:39:09	OK

At the bottom of the interface, it shows 'ZABBIX 1.3.3 Copyright 2001-2007 by SIA Zabbix' and 'Connected as Admin'.

# Until 7.0

---

`./configure --with-libcurl`

- SSL/TLS
- SMTP authentication
- Elasticsearch
- OAuth 2.0 Bearer Access Token

# #define

---

```
#if 0x071400 <= LIBCURL_VERSION_NUM /* cURL <= 7.20.0 */  
    #define HAVE_SMTP_AUTHENTICATION 1  
#endif
```

# Cons

---

1. Zabbix **doesn't care** what protocols/features are available in the curl library it uses
2. Run time curl library changes are **not visible** to Zabbix until it's recompiled
3. If you compile zabbix with "rich" curl library and then run it with "thin" one the error message about missing functionality will **not be clear**




# Runtime errors



# Runtime errors

Test media type "Office365" ✕

 **Details ▲** Media type test failed. ✕

An unknown option was passed in to libcurl

\* Send to

Subject

\* Message



Change in 7.0



# Use curl API

---

- Before:

```
#if 0x071400 <= LIBCURL_VERSION_NUM /* version 7.20.0 */
    #define HAVE_SMTP_AUTHENTICATION 1
#endif
```

- `$ grep LIBCURL_VERSION_NUM /usr/include/x86_64-linux-gnu/curl/curlver.h`  
`#define LIBCURL_VERSION_NUM 0x075801`

- After:

```
if (curl_version_info(CURLVERSION_NOW)->version_num) < 0x071400)
{
    /* error handling */
    return FAIL;
}
```



# Compile once

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- Compile Zabbix **once** with any libcurl
- Upgrade libcurl to enable missing protocols/features
- **No need** to recompile Zabbix when libcurl is changed

# Compiling

---

```
./configure --with-libcurl
```

- only checks if curl library is available

# What has changed

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- Required build-time libcurl version:
  - Before: 7.13.1
  - After: **7.19.1**
- If feature is available we use it
- A clearer error message, mentioning also the curl library version being used
- The *SMTP authentication (yes/no)* in zabbix server log file during start-up will reflect the **real situation**

```
1941420:20240517:165329.769 ***** Enabled features *****  
1941420:20240517:165329.769 SMTP authentication: YES
```

- All curl version checks moved to runtime

# What has changed

Test media type "Gmail" ✕

**!** Details ▲ Media type test failed. ✕

cURL library does not support SSL/TLS (using version 7.88.1)

\* Send to

Subject

\* Message



# Affected

---

- Zabbix server
  - Elasticsearch, Web monitoring, HTTP agent, SMTP auth
- Zabbix proxy
  - Elasticsearch, Web monitoring, HTTP agent
- Zabbix agent
  - `web.page.get[]`
- **Not** affected: Zabbix agent2, Windows agent



Useful information

# What does your libcurl support

---

```
$ curl-config --protocols
```

*HTTP*

*HTTPS*

*IMAP*

*IMAPS*

```
$ curl-config --features
```

*IPv6*

*SSL*

# RedHat based

---

```
$ dnf search libcurl
```

```
libcurl          : A library for getting files from web servers
```

```
libcurl-minimal : Conservatively configured build of libcurl for minimal installations
```

**libcurl-minimal** and **curl-minimal** will be installed by default instead of **libcurl** and **curl**. The "minimal" variants provide only a subset of protocols (HTTP, HTTPS, FTP). The full versions can be explicitly requested as **libcurl-full** and **curl-full**.

```
$ sudo dnf install curl-full libcurl-full --alloweraseing
```



# Library in a non-standard location

---

```
$ ./configure [...] --with-libcurl=/usr/local/bin/curl-config
```

```
ld: ../../src/libs/zbxhttp/libzbxhttp.a(http.o): in function  
`zbx_http_convert_to_utf8': /tmp/zabbix-master/src/libs/zbxhttp/http.c:957:  
undefined reference to `curl_easy_header'
```

```
/usr/lib/x86_64-linux-gnu/libcurl.so
```

```
/usr/local/lib/libcurl.so
```

```
$ LDFLAGS="-Wl,--no-as-needed /usr/local/lib/libcurl.so" ./configure [...]  
--with-libcurl=/usr/local/bin/curl-config
```

Documentation -> Installation -> Known issues -> Compilation issues



# Some Q/A about curl

# What about CURL from curl.com?

---

During the summer of 2001, curl.com was busy advertising their client-side programming language for the web, named CURL.

**We are in no way associated with curl.com or their CURL programming language.**

Our project name curl has been in effective use since 1998. We were not the first computer related project to use the name "curl" and do not claim any rights to the name.

*We recognize that we will be living in parallel with curl.com and wish them every success.*

# Commercial support for curl?

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curl is fully open source. It means you can hire any skilled engineer to fix your curl-related problems.

We list available alternatives on the curl website: <https://curl.se/support.html>



# How many are using curl?

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It is impossible to tell.

We do not know how many users that knowingly have installed and use curl.

We do not know how many users that use curl without knowing that they are in fact using it.

We do not know how many users that downloaded or installed curl and then never use it.

In 2020, we estimate that curl runs in roughly **ten billion** installations world wide.



# How to resume a transfer?

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curl supports resumed transfers both ways on both FTP and HTTP. Try the **-C** option.

# Does curl support JavaScript?

---

No.

# Question

---

`http://http://http://@http://http://?http://#http://`

Is this legitimate URL?

# Yes!

---

`http://http://http://@http://http://?http://#http://`

`http` – the scheme of the URL. This speaks HTTP. The “://” separates the scheme from the following authority part (that’s basically everything up to the path).

`http` – the user name up to the first colon

`//http://` – the password up to the at-sign (@)

`http:` – the host name, with a trailing colon. The colon is a port number separator, but a missing number will be treated by curl as the default number. Browsers also treat missing port numbers like this. The default port number for the http scheme is 80.

`//http://` – the path. Multiple leading slashes are fine, and so is using a colon in the path. It ends at the question mark separator (?).

`http://` – the query part. To the right of the question mark, but before the hash (#).

`http://` – the fragment, also known as “anchor”. Everything to the right of the hash sign (#).

# Try it

---

```
$ curl "http://http://http://@http://http://?http://#http://"  
--resolve http:80:127.0.0.1  
<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN">  
<html><head>  
<title>404 Not Found</title>  
</head><body>  
<h1>Not Found</h1>  
<p>The requested URL was not found on this server.</p>  
<hr>  
<address>Apache/2.4.57 (Debian) Server at http Port 80</address>  
</body></html>
```



# trurl

---

```
$ trurl --url https://curl.se --set host=example.com --set  
scheme=ftp
```

```
ftp://example.com/
```

```
$ trurl --url https://curl.se/hello?search=foo --append path=you
```

```
https://curl.se/hello/you?search=foo
```

```
$ trurl --url https://curl.se/we/are.html --get '{path}'  
/we/are.html
```

```
$ trurl --url https://curl.se/we/are.html --get '{port}'
```

```
443
```

```
$ trurl "https://example.com?a=home&here=now&thisthen" -g  
'{query:a}'
```

```
home
```

```
https://github.com/curl/trurl
```

The ZABBIX logo consists of the word "ZABBIX" in white, uppercase, sans-serif font, centered within a solid red rectangular box. The background of the slide is a dark blue gradient with a faint, glowing network of white lines and nodes, and a semi-transparent world map in the center-right.

**ZABBIX**

Questions?

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**Thank you for listening!**