

Xdebug

Forum PHP - Paris, France - Nov 10, 2010

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Derick Rethans



- Dutchman living in London
- PHP development
- Author of the `mcrypt`, `input_filter`, `dbus`, `translit` and `date/time` extensions
- Author of `Xdebug`
- Contributor to the Apache Zeta Components Incubator project (formerly eZ Components)
- Freelancer doing PHP (internals) development



- Xdebug: An Open Source debugging tool
- About 8 years old
- Works on "every" operating system
- Version 2.1 released earlier this year
- PHP 5.1, 5.2, 5.3 and trunk

Tailored installation instructions:

Help By Error Messages

```
Warning: DOMDocument::load() [domdocument.load]: Document is empty in
/home/httpd/presentations,
line: 1 in /home/httpd/pres2/show2.php on line 165
```

```
( ! ) Warning: DOMDocument::load() [domdocument.load]: Document is empty in /home/httpd/
|presentations,_line:_1_in_/home/httpd/pres2/show2.php_on_line_165_____
|Call_Stack_____
|#|Time__|Memory_|Function_____|Location_____
|1|0.0022|_786328|{main}(_)_____|../show2.php:0_____
|2|0.0180|1397248|Presentation->display(_) |../show2.php:114_____
|3|0.0183|1399032|DOMDocument->load(_)_____|../show2.php:165_____
```

```
xdebug.default_enable=1
html_errors=1
```

```
( ! ) Warning: DOMDocument::load() [domdocument.load]: Document is empty in /home/httpd/
|presentations,_line:_1_in_/home/httpd/pres2/show2.php_on_line_165_____
|Call_Stack_____
|#|Time__|Memory_|Function_____|Location_____
|1|0.0024|_786328|{main}(_)_____|../show2.php:0_____
|2|0.0183|1397248|Presentation->display(_null_)__|../show2.php:114_____
|3|0.0185|1399032|DOMDocument->load(_string(32)_)|../show2.php:165_____
```

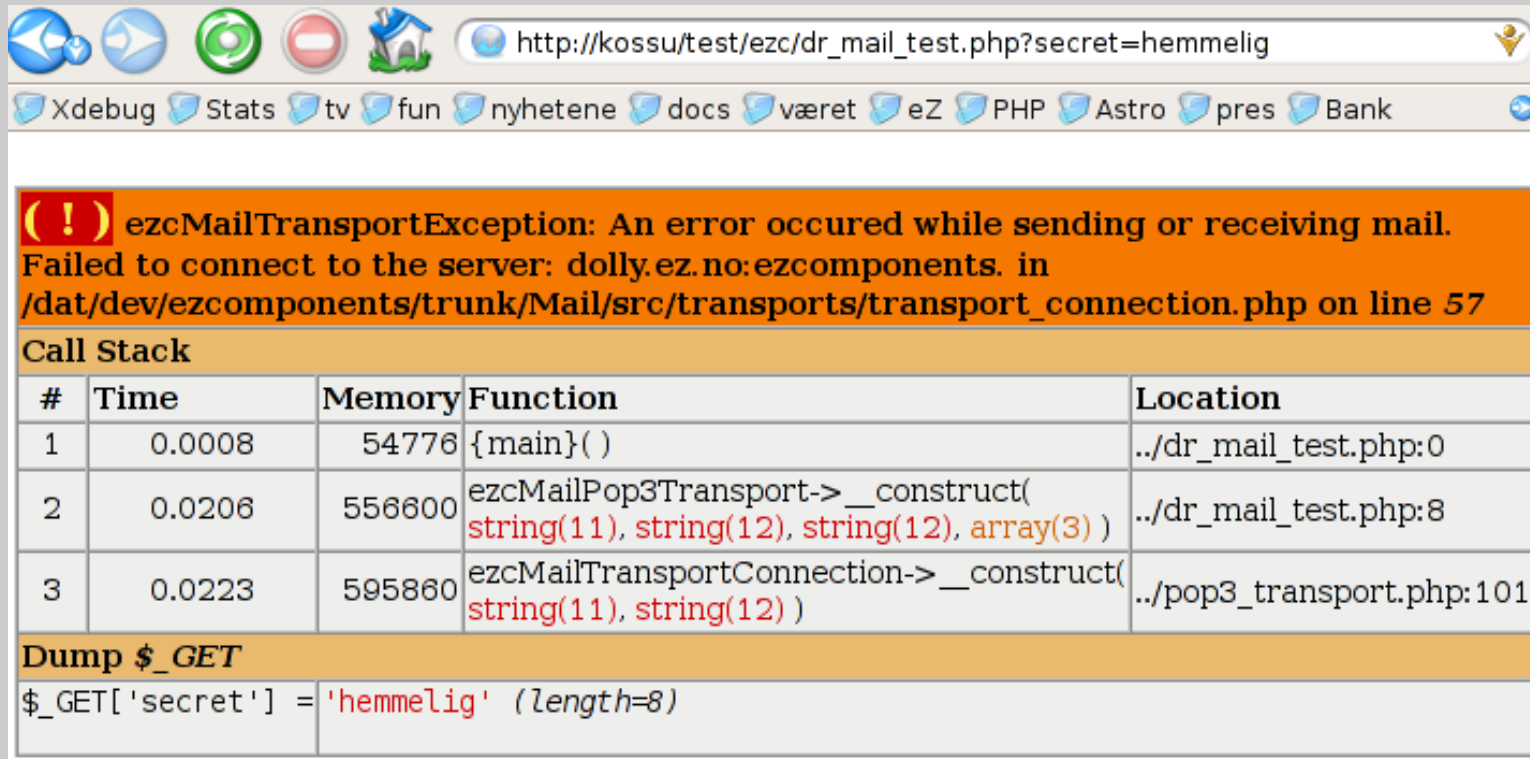
```
xdebug.collect_params=1
```

```
( ! ) Warning: DOMDocument::load() [domdocument.load]: Document is empty in /home/httpd/
|presentations,_line:_1_in_/home/httpd/pres2/show2.php_on_line_165_____
|Call_Stack_____
|#|Time__|Memory_|Function_____|Location_____
|1|0.0022|_787720|{main}(_)_____|../show2.php:0_____
|2|0.0183|1398552|Presentation->display(_null_)__|../show2.php:114_____
|3|0.0186|1400336|DOMDocument->load(_string(32)_)|../show2.php:165_____
```

```
xdebug.collect_params=2
```

```
( ! ) Warning: DOMDocument::load() [domdocument.load]: Document is empty in /home/httpd/
|presentations,_line:_1_in_/home/httpd/pres2/show2.php_on_line_165_____
```

Debugging With Request Variables



The screenshot shows a web browser window with the address bar containing `http://kossu/test/ezc/dr_mail_test.php?secret=hemmelig`. Below the address bar is a navigation bar with icons for Xdebug, Stats, tv, fun, nyhetene, docs, været, eZ, PHP, Astro, pres, and Bank. The main content area displays an error message in a red box: **(!) ezcMailTransportException: An error occurred while sending or receiving mail. Failed to connect to the server: dolly.ez.no:ezcomponents. in /dat/dev/ezcomponents/trunk/Mail/src/transports/transport_connection.php on line 57**. Below the error message is a section titled **Call Stack** with a table showing the following data:

#	Time	Memory	Function	Location
1	0.0008	54776	{main}()	../dr_mail_test.php:0
2	0.0206	556600	ezcMailPop3Transport->__construct(string(11), string(12), string(12), array(3))	../dr_mail_test.php:8
3	0.0223	595860	ezcMailTransportConnection->__construct(string(11), string(12))	../pop3_transport.php:101

Below the call stack is a section titled **Dump \$_GET** with the following output:

```
$_GET['secret'] = 'hemmelig' (length=8)
```

`xdebug.dump.GET=*`

`xdebug.dump.POST=username,password`

Also for: COOKIE, ENV, FILES, REQUEST, SERVER
and SESSION

Scream

- PHP's @ operator hides warnings and errors
- `xdebug.scream=1` makes PHP ignore @



Function trace

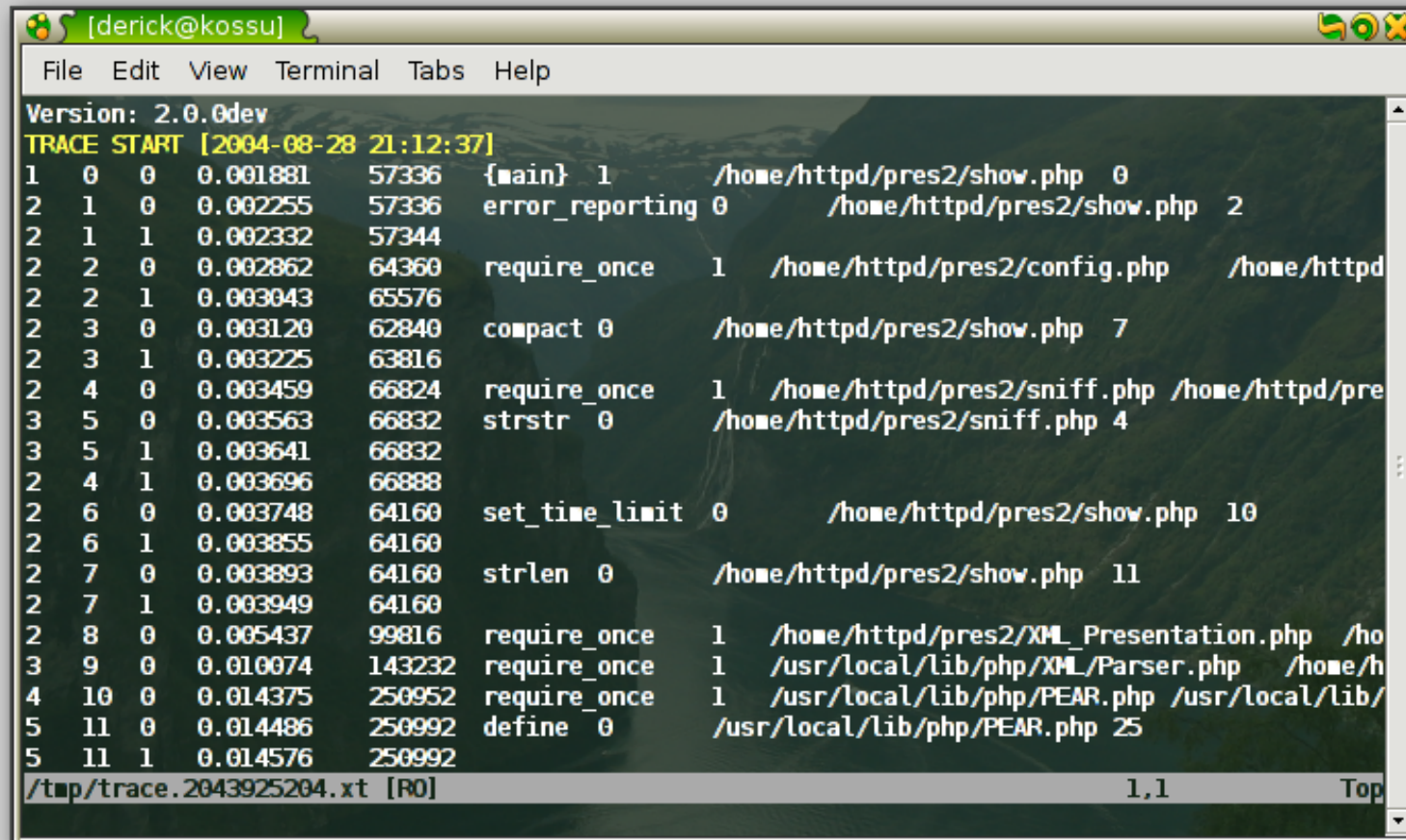
```
TRACE START [2010-03-24 11:03:12]
0.0022 787776 -> {main}() /home/httpd/pres2/show2.php:0
0.0028 803160 -> require(/home/derick/dev/ezcomponents/trunk/Base/src/
ezc_bootstrap.php)/home/httpd/pres2/show2.php:2
0.0029 803552 -> dirname('/home/derick/dev/ezcomponents/trunk/Base/src/
ezc_bootstrap.php')/home/derick/dev/ezcomponents/trunk/Base/src/ezc_bootstrap.php:12
0.0030 803968 -> explode('/', '/home/derick/dev/ezcomponents/trunk/Base/src')/home/
derick/dev/ezcomponents/trunk/Base/src/ezc_bootstrap.php:13
0.0031 807352 -> count(array (0 => '', 1 => 'home', 2 => 'derick', 3 => 'dev', 4 =>
'ezcomponents', 5 => 'trunk', 6 => 'Base', 7 => 'src'))/home/derick/dev/ezcomponents/trunk/Base/src/
ezc_bootstrap.php:15
0.0032 807800 -> array_slice(array (0 => '', 1 => 'home', 2 => 'derick', 3 => 'dev', 4
=> 'ezcomponents', 5 => 'trunk', 6 => 'Base', 7 => 'src'), 0, -2)/home/derick/dev/ezcomponents/
trunk/Base/src/ezc_bootstrap.php:17
0.0033 808952 -> join('/', array (0 => '', 1 => 'home', 2 => 'derick', 3 => 'dev', 4
=> 'ezcomponents', 5 => 'trunk'))/home/derick/dev/ezcomponents/trunk/Base/src/ezc_bootstrap.php:17
0.0065 1002544 -> require(/home/derick/dev/ezcomponents/trunk/Base/src/base.php)/home/
derick/dev/ezcomponents/trunk/Base/src/ezc_bootstrap.php:18
0.0066 990560 -> __autoload('ezcTemplateCustomFunction')/home/derick/dev/ezcomponents/
trunk/Base/src/ezc_bootstrap.php:0
0.0066 990560 -> ezcBase::autoload('ezcTemplateCustomFunction')/home/derick/dev/
ezcomponents/trunk/Base/src/ezc_bootstrap.php:38
0.0067 990560 -> ezcBase::setPackageDir()/home/derick/dev/ezcomponents/trunk/Base/
src/base.php:125
0.0068 990832 -> dirname('/home/derick/dev/ezcomponents/trunk/Base/src/base.php')/
home/derick/dev/ezcomponents/trunk/Base/src/base.php:244
0.0069 990728 -> array_key_exists('ezcTemplateCustomFunction', array ())/home/
derick/dev/ezcomponents/trunk/Base/src/base.php:128
0.0069 990728 -> array_key_exists('ezcTemplateCustomFunction', array ())/home/
derick/dev/ezcomponents/trunk/Base/src/base.php:142
0.0070 991536 -> preg_match('/^[a-z0-9]*([A-Z][a-z0-9]*)?([A-Z][a-z0-9]*)?/',
'ezcTemplateCustomFunction', NULL)/home/derick/dev/ezcomponents/trunk/Base/src/base.php:157
0.0072 993304 -> sizeof(array (0 => 'ezcTemplateCustom', 1 => 'ezc', 2 =>
'Template', 3 => 'Custom'))/home/derick/dev/ezcomponents/trunk/Base/src/base.php:161
0.0073 993664 -> strtolower('Template_Custom_autoload.php')/home/derick/dev/
ezcomponents/trunk/Base/src/base.php:165
0.0073 993496 -> ezcBase::requireFile('template_custom_autoload.php',
'ezcTemplateCustomFunction', 'ezc')/home/derick/dev/ezcomponents/trunk/Base/src/base.php:167
0.0074 994184 -> file_exists('/home/derick/dev/ezcomponents/trunk/Base/src/../../
autoload/template_custom_autoload.php')/home/derick/dev/ezcomponents/trunk/Base/src/base.php:278
0.0075 993848 -> strtolower('Template_autoload.php')/home/derick/dev/ezcomponents/
trunk/Base/src/base.php:175
0.0076 993888 -> ezcBase::requireFile('template_autoload.php',
'ezcTemplateCustomFunction', 'ezc')/home/derick/dev/ezcomponents/trunk/Base/src/base.php:177
0.0077 994568 -> file_exists('/home/derick/dev/ezcomponents/trunk/Base/src/../../
autoload/template_autoload.php')/home/derick/dev/ezcomponents/trunk/Base/src/base.php:278
0.0100 1105728 -> require(/home/derick/dev/ezcomponents/trunk/autoload/
template_autoload.php)/home/derick/dev/ezcomponents/trunk/Base/src/base.php:280
```

Some settings:

```
xdebug.auto_trace=1
xdebug.trace_output_dir=/tmp
xdebug.collect_params=1
xdebug.collect_return=1
xdebug.collect_includes=1
xdebug.collect_assignments=1
```

Function trace to file

Automatic readable format



```
[derick@kossu]
File Edit View Terminal Tabs Help
Version: 2.0.0dev
TRACE START [2004-08-28 21:12:37]
1 0 0 0.001881 57336 {main} 1 /home/httpd/pres2/show.php 0
2 1 0 0.002255 57336 error_reporting 0 /home/httpd/pres2/show.php 2
2 1 1 0.002332 57344
2 2 0 0.002862 64360 require_once 1 /home/httpd/pres2/config.php /home/httpd
2 2 1 0.003043 65576
2 3 0 0.003120 62840 compact 0 /home/httpd/pres2/show.php 7
2 3 1 0.003225 63816
2 4 0 0.003459 66824 require_once 1 /home/httpd/pres2/sniff.php /home/httpd/pre
3 5 0 0.003563 66832 strstr 0 /home/httpd/pres2/sniff.php 4
3 5 1 0.003641 66832
2 4 1 0.003696 66888
2 6 0 0.003748 64160 set_time_limit 0 /home/httpd/pres2/show.php 10
2 6 1 0.003855 64160
2 7 0 0.003893 64160 strlen 0 /home/httpd/pres2/show.php 11
2 7 1 0.003949 64160
2 8 0 0.005437 99816 require_once 1 /home/httpd/pres2/XML_Presentation.php /ho
3 9 0 0.010074 143232 require_once 1 /usr/local/lib/php/XML/Parser.php /home/h
4 10 0 0.014375 250952 require_once 1 /usr/local/lib/php/PEAR.php /usr/local/lib/
5 11 0 0.014486 250992 define 0 /usr/local/lib/php/PEAR.php 25
5 11 1 0.014576 250992
/tmp/trace.2043925204.xt [R0] 1,1 Top
```

```
xdebug.auto_trace=1 ; enable tracing
xdebug.trace_format=1 ; selects computerized format
xdebug.trace_options=0 ; sets extra option (1 = append)
```

- HTML traces
- Tracing only parts of an application with `xdebug_start_trace()` and `xdebug_stop_trace()`.
- Fetching the trace file name that is being used with `xdebug_get_tracefile_name()`.
- Changing how much data is shown with `xdebug.var_display_max_children`, `xdebug.var_display_max_data` and `xdebug.var_display_max_depth`.

demo

Simple profiling

- Uses the "computerized" trace files
- A script is provided in the Xdebug source dir: contrib/tracefile-analyser.php:

```
php tracefile-analyser.php /tmp/trace.124683842.xt [sortkey] [element count]
```

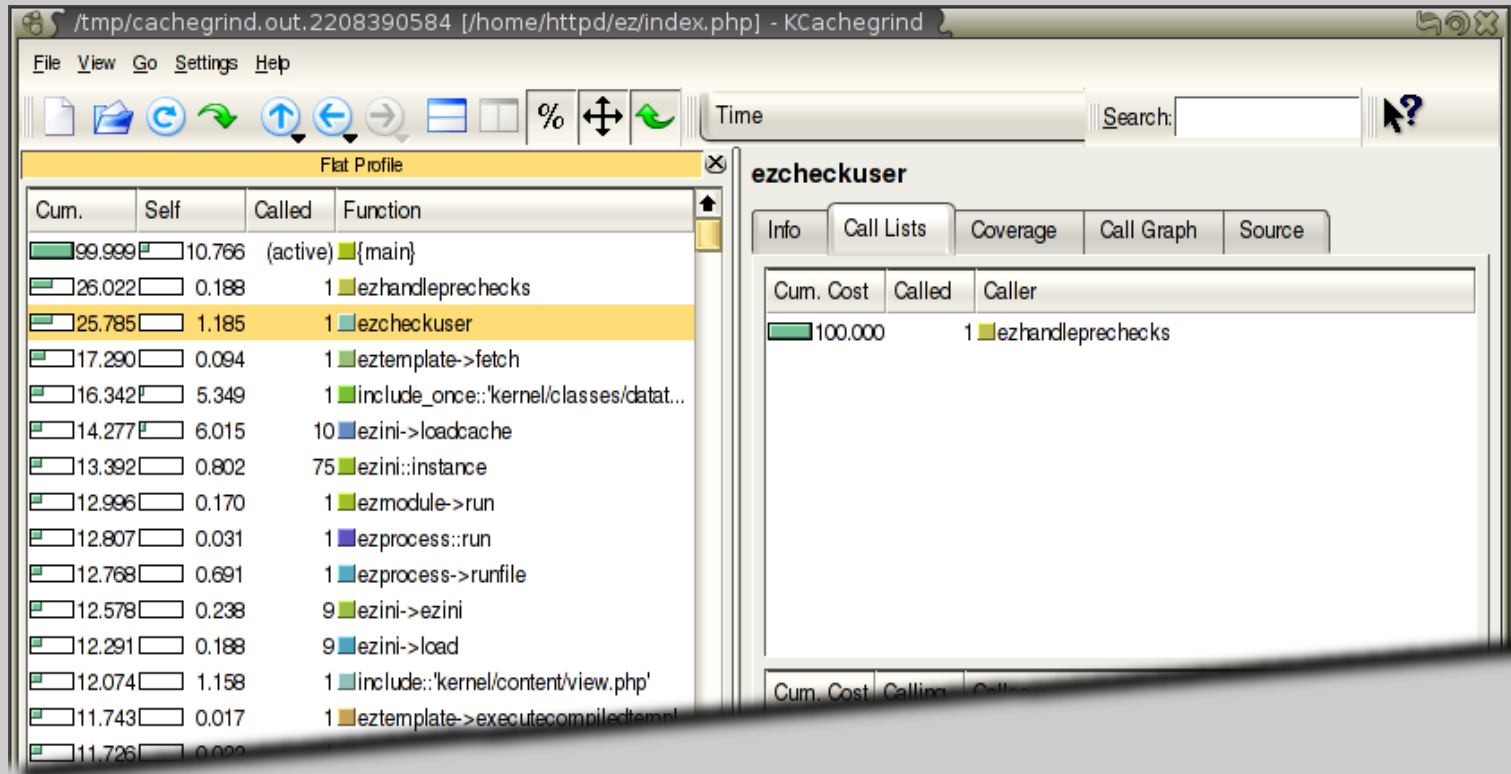
- sort keys: calls, time-inclusive, memory-inclusive, time-own, memory-own

Showing the 10 most costly calls sorted by 'time-inclusive'.

function	#calls	Inclusive time	memory	Own time	memory
{main}	1	0.0894	1025656	0.0006	5672
Presentation->display	1	0.0723	408848	0.0004	-11528
ezcTemplate->process	10	0.0685	243320	0.0005	-2976
ezcTemplateCompiledCode->execute	10	0.0627	14144	0.0009	1672
include	10	0.0612	12352	0.0009	-4392
__autoload	10	0.0176	781904	0.0006	1080
ezcBase::autoload	10	0.0170	780824	0.0017	-80728
ezcTemplateCompiledCode::findCompiled	10	0.0094	38776	0.0024	12888
ezcTemplateCompiledCode->checkRequirements	10	0.0094	2968	0.0029	2968
ezcBase::loadFile	10	0.0093	642320	0.0070	625520

Profiling

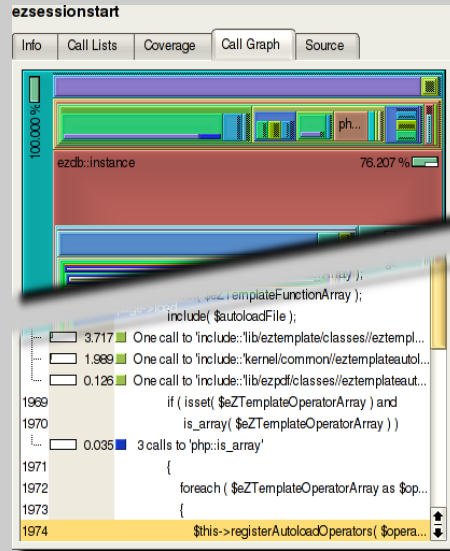
KCacheGrind's Flat Profile and Call List



```
xdebug.profiler_enable=1           ; enable profiler  
xdebug.profiler_output_dir=/tmp     ; output directory  
xdebug.profiler_output_name=cachegrind.out.%p
```

Profiling

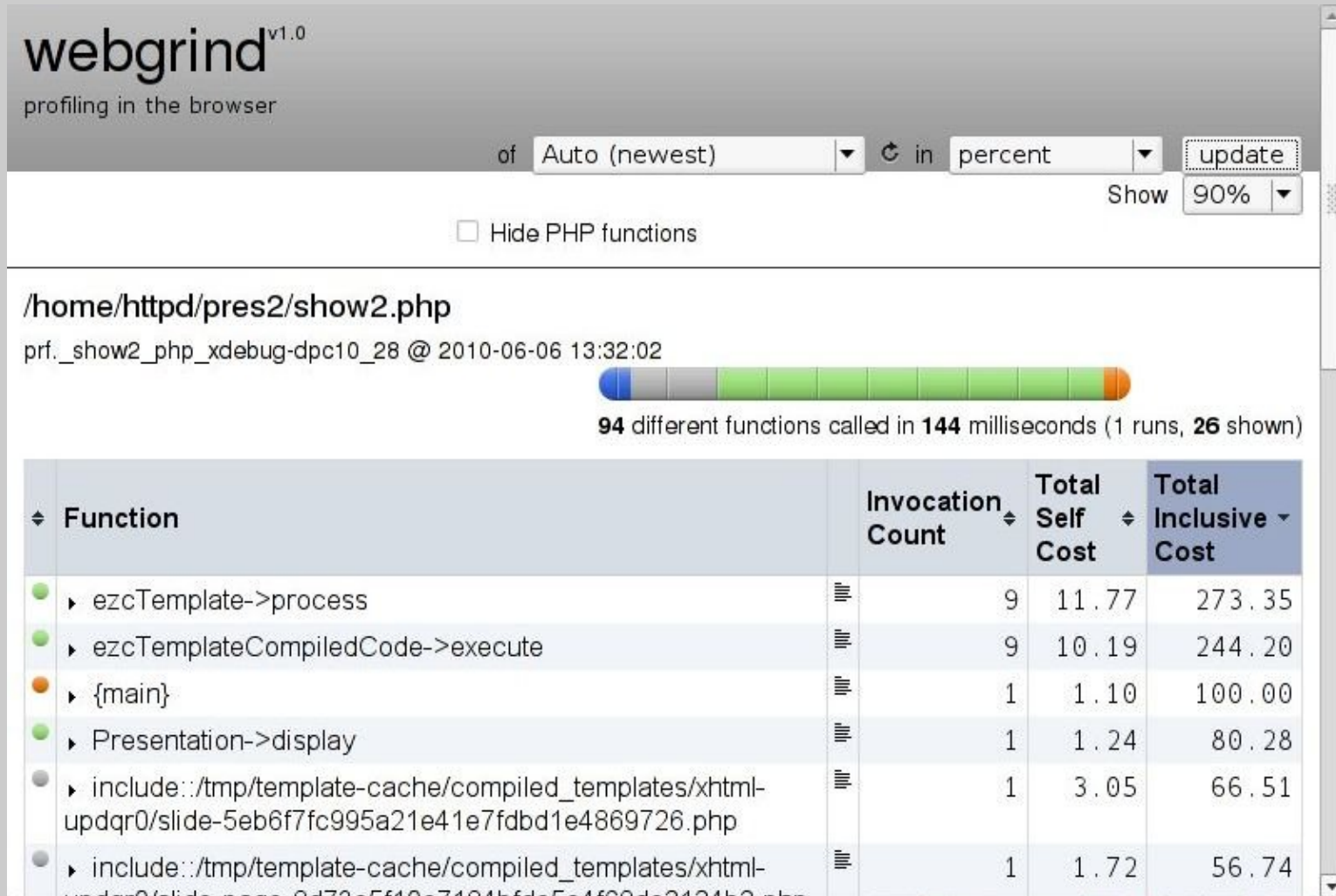
KCacheGrind's Call Graph and Source Annotations



- Call graph
- Area shows time spend
- Stacked to show callees
- Source annotations
- Number of calls
- Total time per function

demo

- Easy to install: extract in a directory in the HTTP root and run



The screenshot displays the Webgrind v1.0 interface. At the top, it shows the script path `/home/httpd/pres2/show2.php` and the profile name `prf._show2_php_xdebug-dpc10_28 @ 2010-06-06 13:32:02`. A progress bar indicates that 94 different functions were called in 144 milliseconds. The main part of the interface is a table with the following columns: Function, Invocation Count, Total Self Cost, and Total Inclusive Cost. The table lists several functions, with `ezcTemplate->process` and `ezcTemplateCompiledCode->execute` being the most expensive.

Function	Invocation Count	Total Self Cost	Total Inclusive Cost
▶ ezcTemplate->process	9	11.77	273.35
▶ ezcTemplateCompiledCode->execute	9	10.19	244.20
▶ {main}	1	1.10	100.00
▶ Presentation->display	1	1.24	80.28
▶ include::/tmp/template-cache/compiled_templates/xhtmll-updqr0/slide-5eb6f7fc995a21e41e7fdbd1e4869726.php	1	3.05	66.51
▶ include::/tmp/template-cache/compiled_templates/xhtmll-updqr0/slide-page-9d72e5f10e7194bfde5e4f69de2124b2.php	1	1.72	56.74

Functions for obtaining coverage information:

```
xdebug_start_code_coverage();  
xdebug_get_code_coverage();  
xdebug_stop_code_coverage();
```

Options to `xdebug_start_code_coverage()`, both only work for files parsed from this moment:

- `XDEBUG_CC_UNUSED`: Enables scanning of code to figure out which line has executable code.
- `XDEBUG_CC_DEAD_CODE`: Enables branch analyzation to figure out whether code can be executed.
- <http://kossu/coverage/index.html>

Analyzing Running Scripts

- DBGp, common Debugging protocol
- Cross-language: PHP, Python, Perl...
- Supported in Xdebug 2

Clients:

- Stand-alone client (Linux (for now)):
- Komodo (Linux, Windows, Mac — commercial)
- Eclipse/PDT (Java based — free)
- Zend Studio for Eclipse (Eclipse-based — commercial)
- Netbeans (Java-based — free)
- PHPStorm (Java-based — commercial)
- MacGDBp (free)
- (and many others:)

Activating the Remote Debugger

php.ini settings:

```
xdebug.remote_enable=1  
xdebug.remote_host=localhost  
xdebug.remote_port=9000
```

On the shell:

```
export XDEBUG_CONFIG="idekey=xdebugrocks"
```

With a browser:

```
http://pres/show.php?
```

```
XDEBUG_SESSION_START=xdebugrocks
```

With browser extensions:

easy Xdebug (FireFox):

Xdebug Helper (Chrome):

Debugging Gotchas

- Xdebug connects to the client
- Remote vs Local debugging
- Debugging proxy: (Komodo-PythonRemoteDebugging)
- `xdebug.remote_connect_back`

demo



- Xdebug site: <http://xdebug.org>
- Xdebug documentation:
<http://xdebug.org/docs.php>
- DBGp specification: <http://xdebug.org/docs-dbgp.php>
- If you like Xdebug: <http://xdebug.org/donate.php>
- These slides: <http://derickrethans.nl/talks.html>