

Optimising a Zend Framework application

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“Optimisation is a game of eliminating measurable inefficiencies.

If you can't reliably measure or predict the impact of an optimisation, then how do you know it's a worthwhile optimisation?”

Pádraic Brady

So what makes an
application slow?

What's slow?

- Complicated database calls
- Inefficient coding
- PHP!
- Using a framework!

Measuring performance

Siege

<http://www.joedog.org/index/siege-home>

```
edit ~/.siegerc  
  verbose = false  
  concurrent = 10  
  benchmark = true
```

Running:

```
$siege -t 30s http://localhost/info.php
```

Siege output

```
$ siege -t 30s http://localhost/info.php
** SIEGE 2.70
** Preparing 10 concurrent users for battle.
The server is now under siege...
Lifting the server siege...      done.
Transactions:          25054 hits
Availability:          100.00 %
Elapsed time:          31.98 secs
Data transferred:     1362.59 MB
Response time:         0.01 secs
Transaction rate:    783.43 trans/sec
Throughput:           42.61 MB/sec
Concurrency:           9.97
Successful transactions: 25054
Failed transactions:   0
Longest transaction:   7.68
Shortest transaction:  0.00
```

Test a basic app

- zf create project
- zf enable layout
- Run siege

Transaction rate: 79.38 trans/sec

Profile with xdebug

<http://www.xdebug.org>

- Install: `pecl install xdebug`
- Output file compatible with:
 - KCachegrind (Linux)
 - WinCacheGrind (Windows)
 - MacCallGrind (OS X)
 - WebGrind (PHP)

Profile with xdebug

php.ini

```
xdebug.profiler_enable = 0  
xdebug.profiler_enable_trigger = 1  
xdebug.profiler_output_dir = "/Users/rob/xdebug"
```

Enable per request:

http://localhost/places/public/?XDEBUG_PROFILE=1

(or use the Firefox extension)

webgrind^{v1.0}

profiling in the browser

Show of
 in

 Hide PHP functions

/www/phpuk11/zf/public/index.php

cachegrind.out.96486 @ 2011-02-15 06:16:10



453 different functions called in 71 milliseconds (1 runs, 373 shown)

Function	Invocation Count	Total Self Cost	Total Inclusive Cost
▶ {main}	1	2	71
▶ Zend_Application->run	1	0	34
▶ Zend_Application_Bootstrap_Bootstrap->run	1	0	34
▶ Zend_Controller_Front->dispatch	1	5	33
▶ Zend_Application->__construct	1	1	23
▶ Zend_Loader_Autoloader::autoload	9	1	21
▶ Zend_Loader::loadClass	9	1	18
▶ Zend_Controller_Dispatcher_Standard->dispatch	1	0	18
▶ Zend_Loader_Autoloader->_autoload	9	0	18
▶ Zend_Loader::loadFile	9	7	16
▶ Zend_Application->setOptions	1	0	15
▶ Zend_Application->setBootstrap	1	0	14

Profile with xhprof

- <http://techportal.ibuildings.com/?p=1527>
- <http://phpadvent.org/2010/profiling-with-xhgui-by-paul-reinheimer>
- Install xhprof
- Set up `append.php` & `prepend.php`
- Profile!
- Sort results by Excl. CPU usage

Run Report

Run #4d5a1c53bf66d: XHPProf Run (Namespace=myapp)

[View Top Level Run Report](#)

Tip

Click a function name below to drill down.

Overall Summary

Total Incl. Wall Time (microsec): 90,439 microsecs
Total Incl. CPU (microsecs): 44,069 microsecs
Total Incl. MemUse (bytes): 4,386,856 bytes
Total Incl. PeakMemUse (bytes): 4,426,632 bytes
Number of Function Calls: 1,829

[\[View Full Callgraph\]](#)

 Displaying top 100 functions: Sorted by Incl. Wall Time (microsec) [\[display all\]](#)

Function Name	Calls	Calls%	Incl. Wall Time (microsec)	IWAll%	Excl. Wall Time (microsec)	EWAll%	Incl. CPU (microsecs)	ICpu%	Excl. CPU (microsec)	ECPU
main()	1	0.1%	90,439	100.0%	1,296	1.4%	44,069	100.0%	477	1.1
Zend_Application::run	1	0.1%	44,383	49.1%	21	0.0%	21,446	48.7%	9	0.0
Zend_Application_Bootstrap_Bootstrap::run	1	0.1%	44,356	49.0%	84	0.1%	21,433	48.6%	29	0.1
Zend_Controller_Front::dispatch	1	0.1%	44,063	48.7%	1,104	1.2%	21,287	48.3%	485	1.1
Zend_Application::_construct	1	0.1%	26,694	29.5%	239	0.3%	13,005	29.5%	111	0.3
Zend_Loader_Autoloader::autoload	6	0.3%	21,942	24.3%	246	0.3%	10,639	24.1%	114	0.3

For more information:

Profiling PHP Applications

Derick Rethans : Rosemont : 13:00 TODAY

Obvious stuff

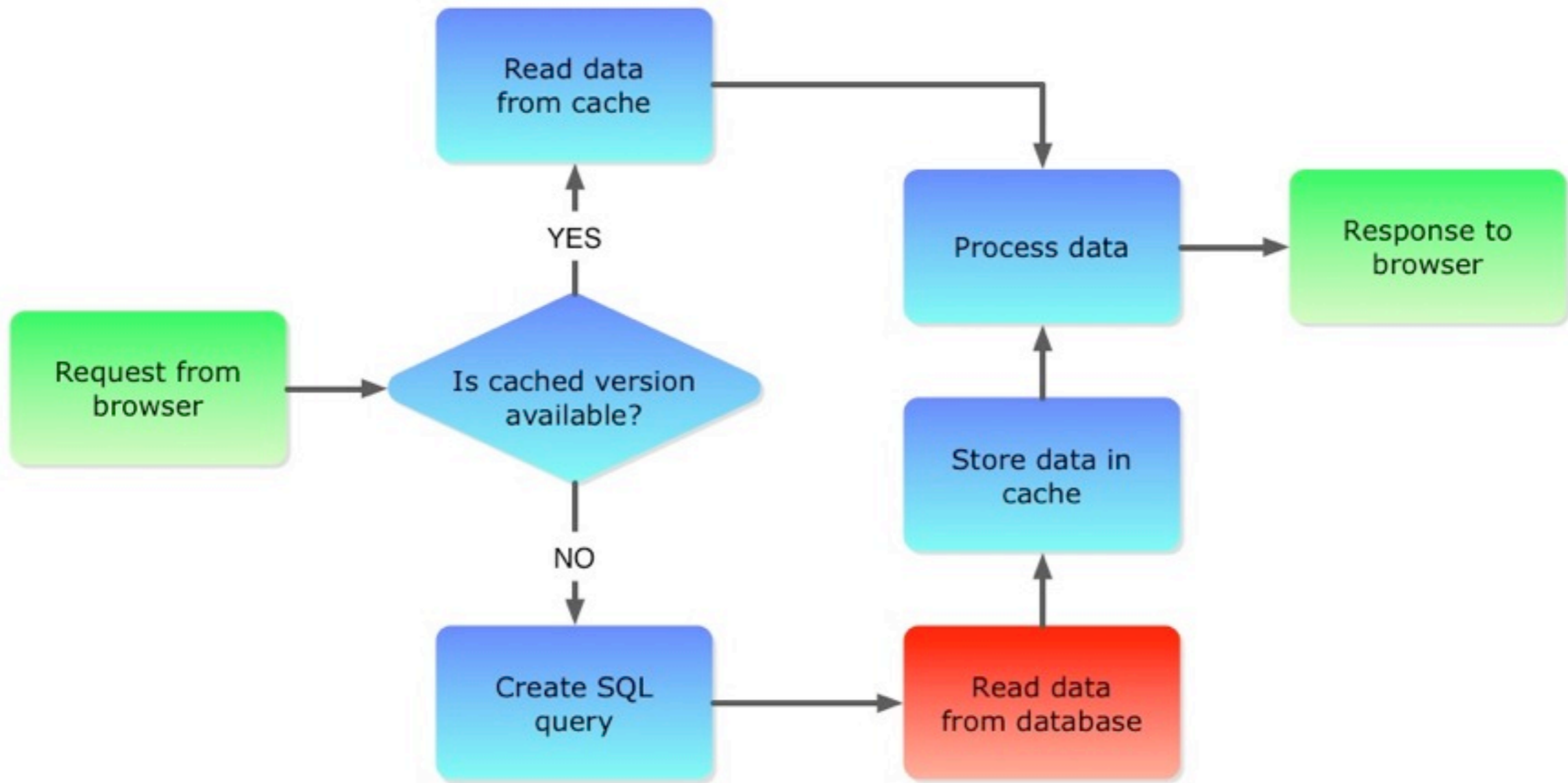
APC

If you don't have a byte code cache installed, you don't care about performance

Before: 79.38 trans/sec

After: 311.17 trans/sec

Cache!



Caching strategies

- Cache long running operations
- Cache the entire page

ZF specific

Loading files

Include path

- Use absolute paths to include files
- Place ZF **first** on include_path

```
defined( 'APPLICATION_PATH' )  
    || define( 'APPLICATION_PATH',  
              realpath(dirname(__FILE__) . '/../application' ) );  
  
set_include_path(implode(PATH_SEPARATOR, array(  
    realpath(APPLICATION_PATH . '/../library'),  
    get_include_path(),  
)));
```

Wrong!

```
defined( 'APPLICATION_PATH' )  
    || define( 'APPLICATION_PATH',  
              dirname(__FILE__) . '/../application' );  
  
set_include_path(implode(PATH_SEPARATOR, array(  
    get_include_path(),  
    APPLICATION_PATH . '/../library',  
)));
```

Transaction rate: 267.79 trans/sec

Autoload only

- strip all `require_once` calls from the Zend Framework code

```
$ cd library/Zend
$ find . -name '*.php' -not -wholename \
  '*/Loader/Autoloader.php' \
  -not -wholename '*/Application.php' -print0 | \
  xargs -0 sed --regexp-extended --in-place \
  's/(require_once)/\/// \1/g'
```

or for Mac:

```
$ find . -name '*.php' -not -wholename \
  '*/Loader/Autoloader.php' -not -wholename \
  '*/Application.php' -print0 | \
  xargs -0 sed -E -i '.bak' 's/(require_once)/\/// \1/g'
```

Baseline ZF app

webgrind of /www/phpuk11/zf/public/index.php

http://localhost/webgrind/ Google

webgrind^{v1.0}
profiling in the browser

Show 100% of phpuk11/zf/public/index.php in milliseconds
 Hide PHP functions

/www/phpuk11/zf/public/index.php
cachegrind.out.96486 @ 2011-02-15 06:16:10

453 different functions called in 71 milliseconds (1 runs, 453 shown)

Function	Invocation Count	Total Self Cost	Total Inclusive Cost
▶ Zend_Loader::loadFile	9	7	16
▶ Zend_Controller_Front->dispatch	1	5	33
▶ require_once::/www/phpuk11/zf/library/Zend/Controller/Dispatcher/Interface.php	1	2	2
▶ Zend_Config_Ini->_processKey	26	2	3
▶ require_once::/www/phpuk11/zf/library/Zend/View.php	1	2	2
▶ Zend_Controller_Action_Helper_ViewRenderer->getInflector	3	2	8
▶ {main}	1	2	71
▶ Zend_Loader_PluginLoader->load	7	2	4
▶ php::call_user_func	18	1	37
▶ Zend_Loader_Autoloader::autoload	9	1	21
▶ Zend_Loader::loadClass	9	1	18
▶ Zend_Filter_Inflector->filter	2	1	3

Zend_Loader::loadFile

```
public static function loadFile($filename,
    $dirs = null, $once = false)
{
    self::_securityCheck($filename);
    $incPath = false;
    if (!empty($dirs)&&(is_array($dirs) || is_string($dirs))) {
        if (is_array($dirs)) {
            $dirs = implode(PATH_SEPARATOR, $dirs);
        }
        $incPath = get_include_path();
        set_include_path($dirs . PATH_SEPARATOR . $incPath);
    }
    if ($once) {
        include_once $filename;
    } else {
        include $filename;
    }
    if ($incPath) { set_include_path($incPath); }
    return true;
}
```

Zend_Loader::loadFile

Change loadFile() to:

```
public static function loadFile($filename,  
    $dirs = null, $once = false)  
{  
    if (APPLICATION_ENV == 'live') {  
        include $filename;  
        return true;  
    }  
    // continue...
```

(Or use ZF2's autoloader...)

Zend_Application

Config

```
// Create application, bootstrap, and run
$application = new Zend_Application(
    APPLICATION_ENV,
    APPLICATION_PATH . '/configs/application.ini'
);
```

Cache with APC

```
$config = apc_fetch('my_config');
if (!(is_array($config)) {
    require_once 'Zend/Config/Ini.php';
    $section = APPLICATION_ENV;
    $filename = APPLICATION_PATH . '/configs/application.ini';
    $config = new Zend_Config_Ini($filename, $section);
    $config = $config->toArray();
    apc_store('my_config', $config, 600);
}

// Create application, bootstrap, and run
$application = new Zend_Application(
    APPLICATION_ENV,
    $config
);
```

Zend_Db_Table

Metadata

```
abstract class Zend_Db_Table_Abstract {
    protected function _setupMetadata()
    {
//...
        // Fetch metadata from the adapter's describeTable()
        // method
        $metadata = $this->_db->describeTable($this->_name,
            $this->_schema);
//...
    }
}
```

Cache the Metadata

application.ini:

```
; set up the cache
resources.cachemanager.db.frontend.name = Core
resources.cachemanager.db.frontend
    .options.lifetime = 7200
resources.cachemanager.db.frontend
    .options.automatic_serialization = true
resources.cachemanager.db.backend.name = File
resources.cachemanager.db.backend
    .options.cache_dir = APPLICATION_PATH "../cache/db"

; set up database resource
resources.db.defaultMetadataCache = "db"
```

Zend_View

View helpers

```
// View script  
<?php echo $this->myhelper($variable); ?>
```

Zend_View implementation:

```
public function __call($name, $args)  
{  
    // is the helper already loaded?  
    $helper = $this->getHelper($name);  
  
    // call the helper method  
    return call_user_func_array(  
        array($helper, $name),  
        $args  
    );  
}
```

View helpers

Move common view helpers to your own extension of `Zend_View`

```
// library/App/View.php
class App_View extends Zend_View
{
}
```

```
// configs/application.ini
autoloadernamespaces[] = "App_"
```

```
// application/Bootstrap.php
class Bootstrap extends Zend_Application_Bootstrap_Bootstrap
{
    protected function _initView()
    {
        $resources = $this->getOption('resources');
        $options = array();
        if (isset($resources['view'])) { $options = $resources['view']; }
        $view = new App_View($options);
        if (isset($options['doctype'])) {
            $view->doctype()->setDoctype(strtoupper($options['doctype']));
            if (isset($options['charset']) && $view->doctype()->isHtml5()) {
                $view->headMeta()->setCharset($options['charset']);
            }
        }
        if (isset($options['contentType'])) {
            $view->headMeta()->appendHttpEquiv('Content-Type',
                $options['contentType']);
        }

        $viewRenderer = new Zend_Controller_Action_Helper_ViewRenderer();
        $viewRenderer->setView($view);
        Zend_Controller_Action_HelperBroker::addHelper($viewRenderer);
        return $view;
    }
}
```

Let's look at two commonly
used view helpers

url() view helper

```
class App_View extends Zend_View
{

    public function url($urlOptions = array(),
        $name = null, $reset = false, $encode = true)
    {
        $fc = Zend_Controller_Front::getInstance()
        $router = $fc->getRouter();

        return $router->assemble($urlOptions, $name, $reset,
            $encode);
    }
}
```

escape()

```
abstract class Zend_View_Abstract
    implements Zend_View_Interface
{

    public function escape($var)
    {
        if (in_array($this->_escape,
            array('htmlspecialchars', 'htmlentities'))) {
            return call_user_func($this->_escape, $var,
                ENT_COMPAT, $this->_encoding);
        }

        if (1 == func_num_args()) {
            return call_user_func($this->_escape, $var);
        }
        $args = func_get_args();
        return call_user_func_array($this->_escape, $args);
    }
}
```

Rewrite escape()

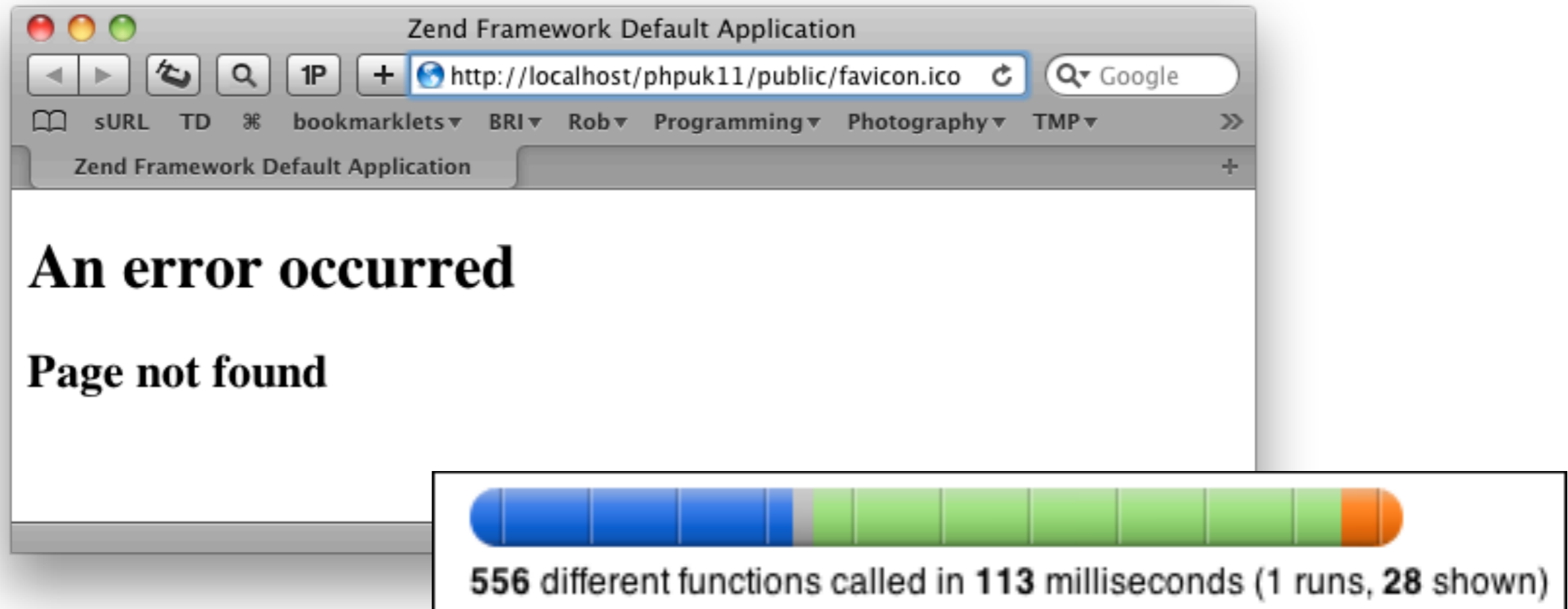
```
class App_View extends Zend_View
{

    public function escape($var)
    {
        return htmlspecialchars($var, ENT_COMPAT,
            $this->_encoding);
    }
}
```

Other things to
consider

Add a favicon.ico

Avoid ZF 404 handling!



The manual

Read the
Zend Framework Performance Guide

<http://framework.zend.com/manual/en/performance.html>

Summary

- Use APC (or another byte-code cache)
- Use Zend_Db_Table's metacache
- Cache the slow stuff!
- Move key view helpers to App_View
- Simplify Zend_Loader in production

Questions?

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Thank you

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