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
- Ouput 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 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 update

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

XHProf: Hierarchical Profiler Report

http://localhost/xhp/xhprof_html/index.php?run=4d5a1c53bf66d&source=myapp

Google

Run Report

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

Tip

Click a function name below to drill down.

View Top Level Run Report

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

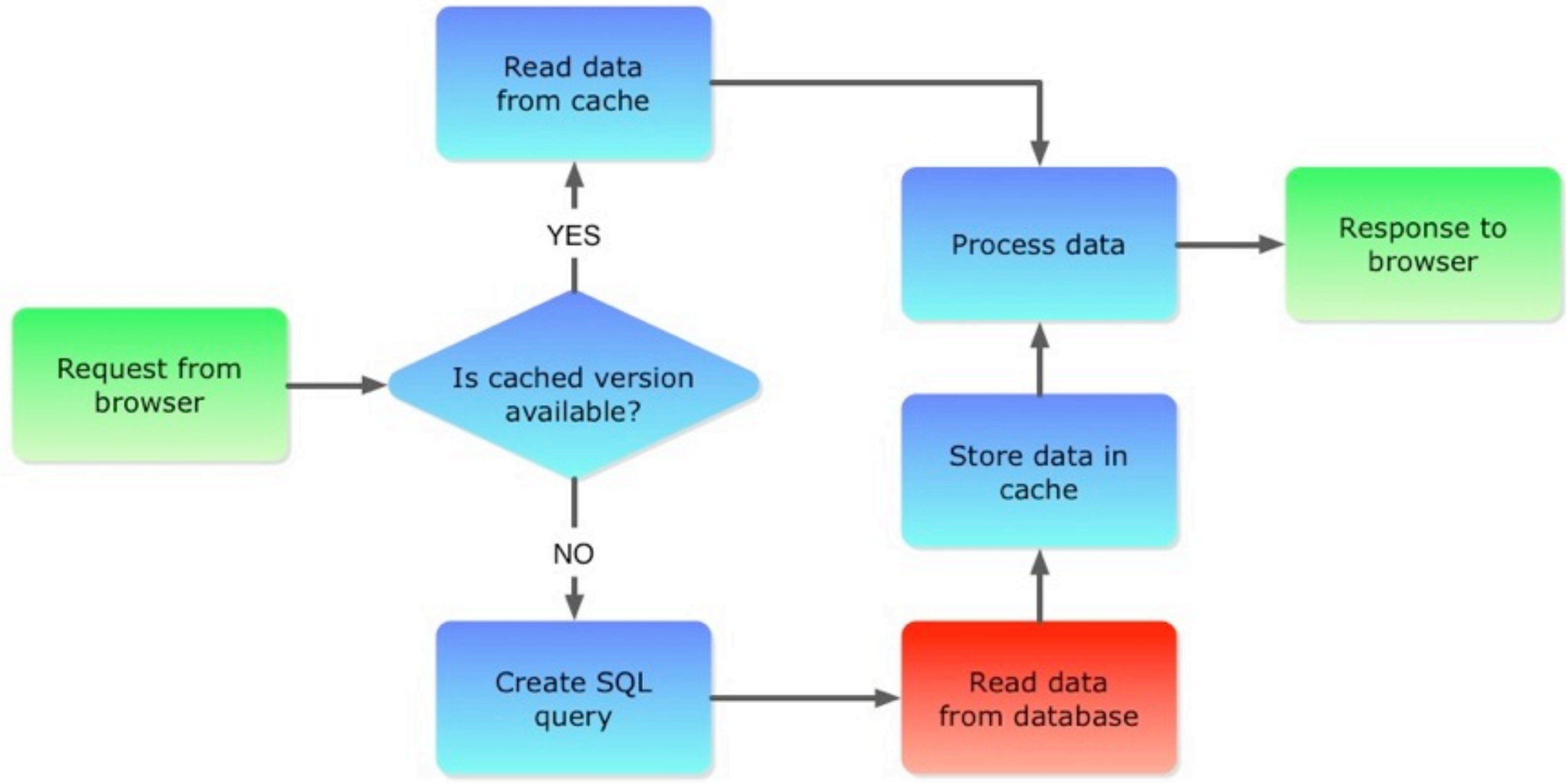
Obvious stuff

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!


Read data from cache
YES
Process data
Response to browser
Request from browser
Is cached version available?
Store data in cache
NO
Create SQL query
Read data from database

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

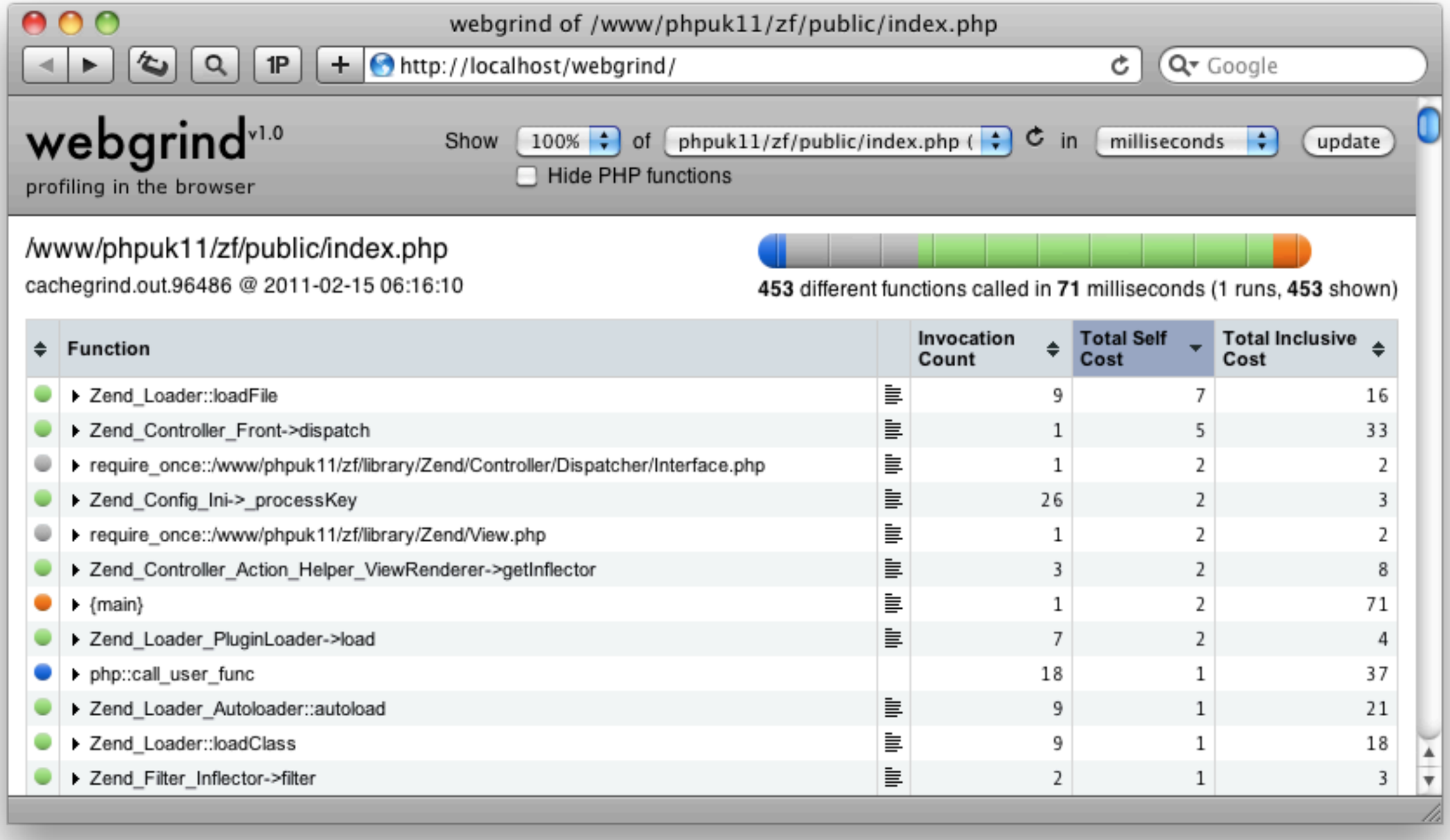
- strip all require_once calls from the Zend Framework code

```
$ 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



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

```php
$config = apc_fetch('my_config');
if (!(is_array($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

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

Zend_View implementation:

```php
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_"
```

```php
// 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()

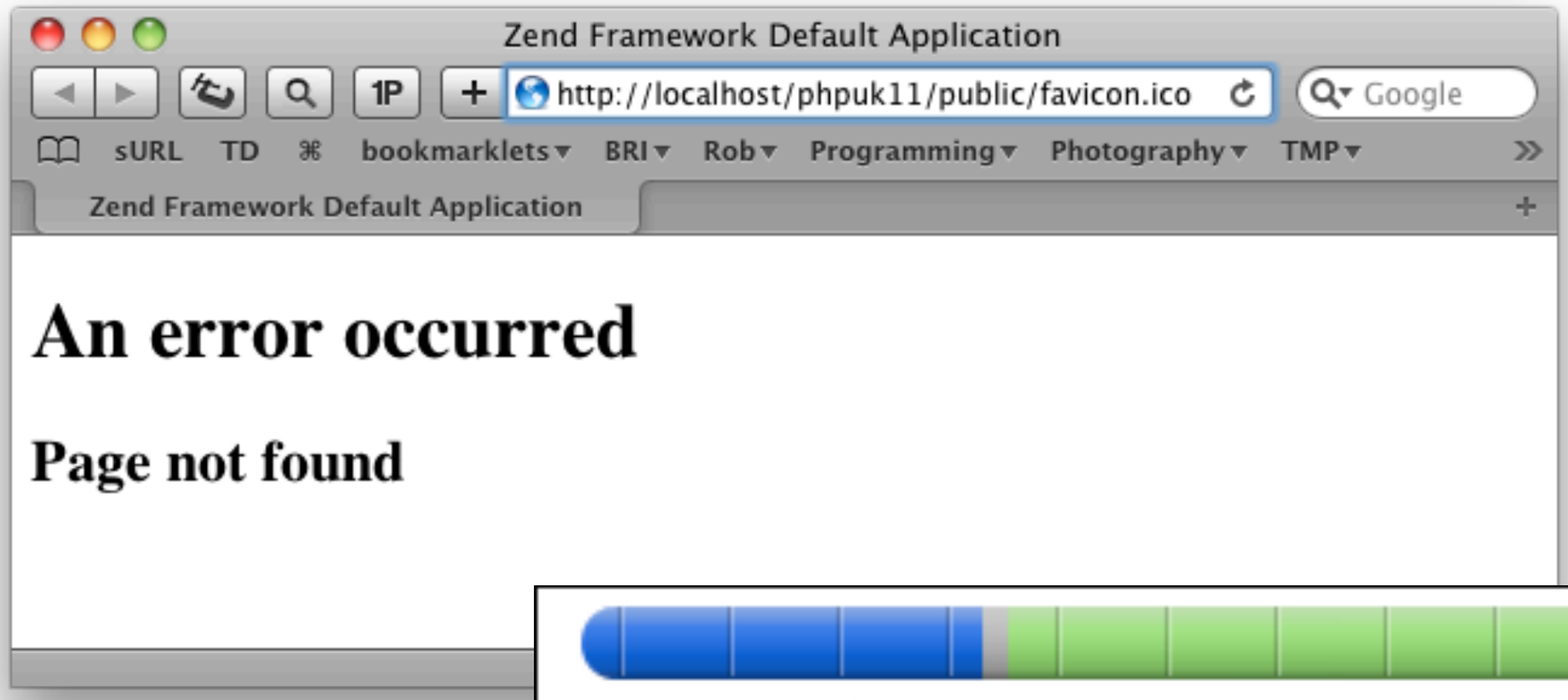
```
class App_View extends Zend_View
{

  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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twitter: @akrabat

Thank you

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