

OpenWeb Vancouver - Vancouver, Canada

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<http://derickrethans.nl/talks.php>

- Dutchman living in Norway
- eZ Systems A.S.
- eZ Components project lead
- PHP development
- mcrypt, input_filter, date/time support, unicode
- QA

It's OK to write code that does not work



About Testing

Front-end

- Acceptance Tests and System Tests that run in the browser
- Testing of Web Services with Unit Tests
- Compatibility Testing for Browser/OS/etc. combinations
- Performance Testing
- Security Testing

Back-end

- Functional Testing of business logic with Unit Tests
- Reusable Components, but they often come with their own tests

Unit Testing

Tests small parts of an application or library (units) for correctly working code. Tools: PHPUnit, SimpleTest

System Testing

The testing of a whole integrated system against the specified requirements. Tools: Selenium

Non-functional Testing

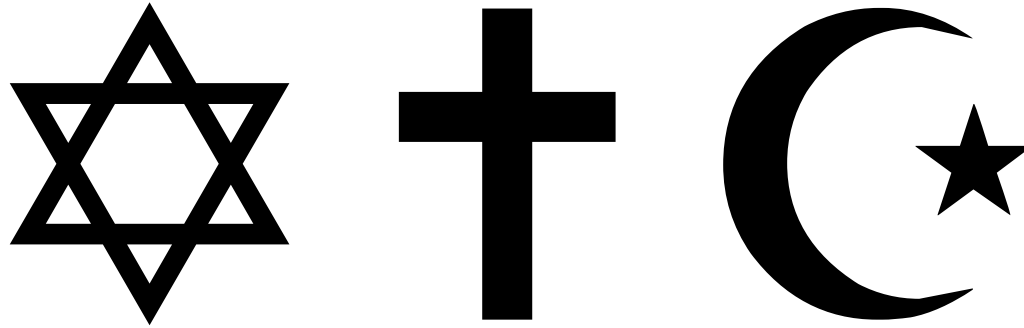
Testing for performance, load, stress, reliability, availability, security. Tools: ab, siege, httpperf, chorizo

Test-Driven Development

a feature without a test is not a feature

**It is not just a method of testing
software.**

It is a religion.



Requirements Specification

Define what the software is supposed to do.

Design

Define how the software is supposed to be implemented.

Implementation

The implementation of the software itself.

Testing

The implemented software is tested.

Sometimes.

Tests drive the development

- Tests are written before the code
- There is no code without tests

Test Suites

- Contain tests that check whether the code does what it is supposed to do
- Also cover things that should fail

Requirements Specification

Define what the software is supposed to do.

Design

Define how the software is supposed to be implemented.

Implementation \equiv Testing

The implemented software is tested.

The implementation of the software itself.

Present the Idea

Write the Requirements Document

Design the Component

Implementation

- Write API stubs with parameter documentation and descriptions
- Write test cases
- Initial implementation
- Initial implementation review
- Updating implementation according to review
- Implementation review

Pre-release Testing

Write Test Case

Write a test case to test the correct behavior of the method, and verify that the test case fails

Fix the Issue

Fix the implementation

Verify Fix with Test Case

Make sure that the test cases pass with the new implementation

Check Other Test Cases

Verify that the fix for this defect did not break any other test case

PHP Unit

PHPUnit

Unit Testing Framework for PHP

```
derick@kossu: ~/dev/ezcomponents/trunk
derick@kossu:~/dev/ezcomponents/trunk$ php UnitTest/src/runtests.php Workflow
ezcUnitTest uses the PHPUnit 3.0.6 framework from Sebastian Bergmann.

[Preparing tests]:
eZ components:
  Workflow:
    ezcWorkflowDefinitionStorageXmlTest: .....
    ezcWorkflowExecutionTest: .....
    ezcWorkflowTest: .....
    ezcWorkflowNodeTest: .....
    ezcWorkflowConditionTest: .....
    ezcWorkflowVisitorVisualizationTest: .....

Time: 00:00

OK (132 tests)
derick@kossu:~/dev/ezcomponents/trunk$
```

Current view: [/home/derick/dev/ezcomponents/trunk/Graph/src](#)

Date: Thu Jun 14 11:04:17
CEST 2007

Executable lines: 8756

Code covered: 96.04%

Executed lines: 8409

Legend: Low: 0% to 35% Medium: 35% to 70% High: 70% to 100%

	Coverage (show details)		
axis	<div style="width: 90.67%; background-color: green; border: 1px solid black;"></div>	90.67%	612 / 675 lines
charts	<div style="width: 99.42%; background-color: green; border: 1px solid black;"></div>	99.42%	518 / 521 lines
colors	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	222 / 222 lines
data_container	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	41 / 41 lines
datasets	<div style="width: 93.88%; background-color: green; border: 1px solid black;"></div>	93.88%	230 / 245 lines
driver	<div style="width: 96.51%; background-color: green; border: 1px solid black;"></div>	96.51%	1217 / 1261 lines
element	<div style="width: 98.26%; background-color: green; border: 1px solid black;"></div>	98.26%	451 / 459 lines
exceptions	<div style="width: 98.89%; background-color: green; border: 1px solid black;"></div>	98.89%	89 / 90 lines
interfaces	<div style="width: 91.58%; background-color: green; border: 1px solid black;"></div>	91.58%	859 / 938 lines
math	<div style="width: 99.72%; background-color: green; border: 1px solid black;"></div>	99.72%	359 / 360 lines
options	<div style="width: 99.09%; background-color: green; border: 1px solid black;"></div>	99.09%	762 / 769 lines
palette	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	8 / 8 lines
renderer	<div style="width: 95.71%; background-color: green; border: 1px solid black;"></div>	95.71%	2811 / 2937 lines
structs	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	39 / 39 lines
graph.php	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	2 / 2 lines
graph_autoload.php	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	103 / 103 lines
tools.php	<div style="width: 100.00%; background-color: green; border: 1px solid black;"></div>	100.00%	86 / 86 lines

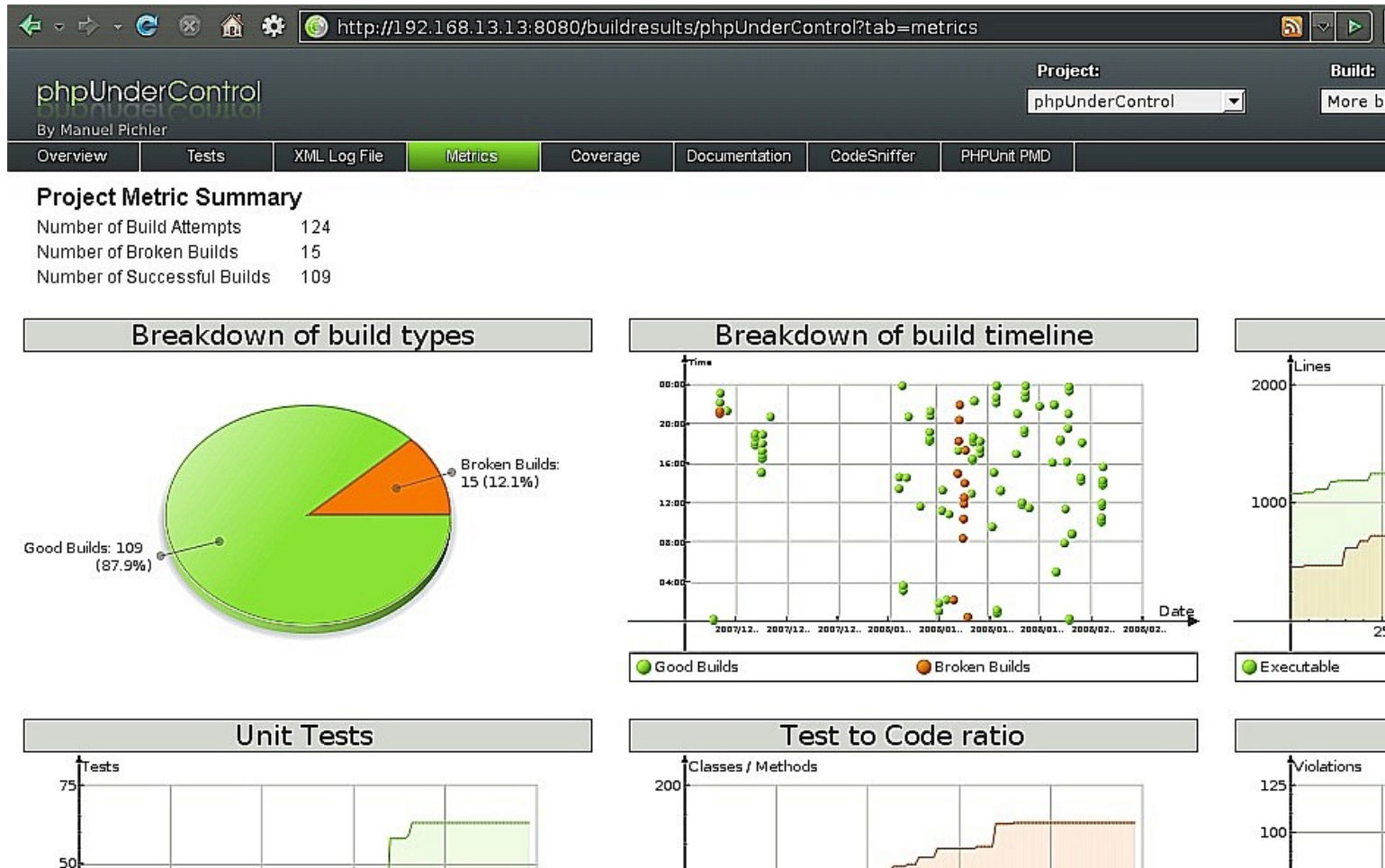
```
151 : /**
152 :  * Ensure proper timestamp
153 :  *
154 :  * Takes a mixed value from datasets, like timestamps, or strings
155 :  * describing some time and converts it to a timestamp.
156 :  *
157 :  * @param mixed $value
158 :  * @return int
159 :  */
160 : protected static function ensureTimestamp( $value )
161 : {
162 :     19 :     if ( is_numeric( $value ) )
163 :     19 :     {
164 :     16 :         $timestamp = (int) $value;
165 :     16 :     }
166 :     3 :     elseif ( ( $timestamp = strtotime( $value ) ) === false )
167 :     :     {
168 :     0 :         throw new ezcGraphErrorParsingDateException( $value );
169 :     :     }
170 :     :
171 :     19 :     return $timestamp;
172 :     : }
```

< 100% Coverage \equiv Not fully tested code

100% Coverage $\not\equiv$ Fully tested code

phpUnderControl

Continuous integration with CruiseControl



- Testing singletons more than one time
- System/Operating System dependent tests
- Private methods
- Code that depends on the state of an external resource
- Things that simply should never happen

Politics

resistance to change

Fear - more work to do

- Introduce TDD concepts gently
- Whenever a problem is found, make and retain a test case for further use
- Start using TDD for new projects

Ignorance - too much time spent on testing

- Out of date with modern processes
- Belief that testing slows the schedule (only if you follow the ship-and-see process)

Case Studies

Microsoft Case Study

- TDD project has twice the code quality
- Writing tests requires 15% more time

IBM Case Study

- 40% fewer defects
- No impact on the team's productivity

John Deere / Ericsson Case Study

- TDD produces higher quality code
- Impact of 16% on the team's productivity

- At first I didn't like that I need to write tests for my code, but now after using it for more than 10 months I can't program without it.
- Helps to come up with better APIs.
- It gives confidence that our software is working well at all times. Even after making major changes and/or changing software we are dependent on.
- Productivity increases - you might lose some when you make the initial tests, but you'll get it back later. The code covered by tests is 'insured' against future changes.
- It works well for libraries, not so well for GUI applications.
- Some things cannot be tested like server errors



PHP Unit: <http://phpunit.de>

phpUnderControl: <http://phpundercontrol.org>

Xdebug: <http://xdebug.org>

These Slides: <http://derickrethans.nl/talks.php>