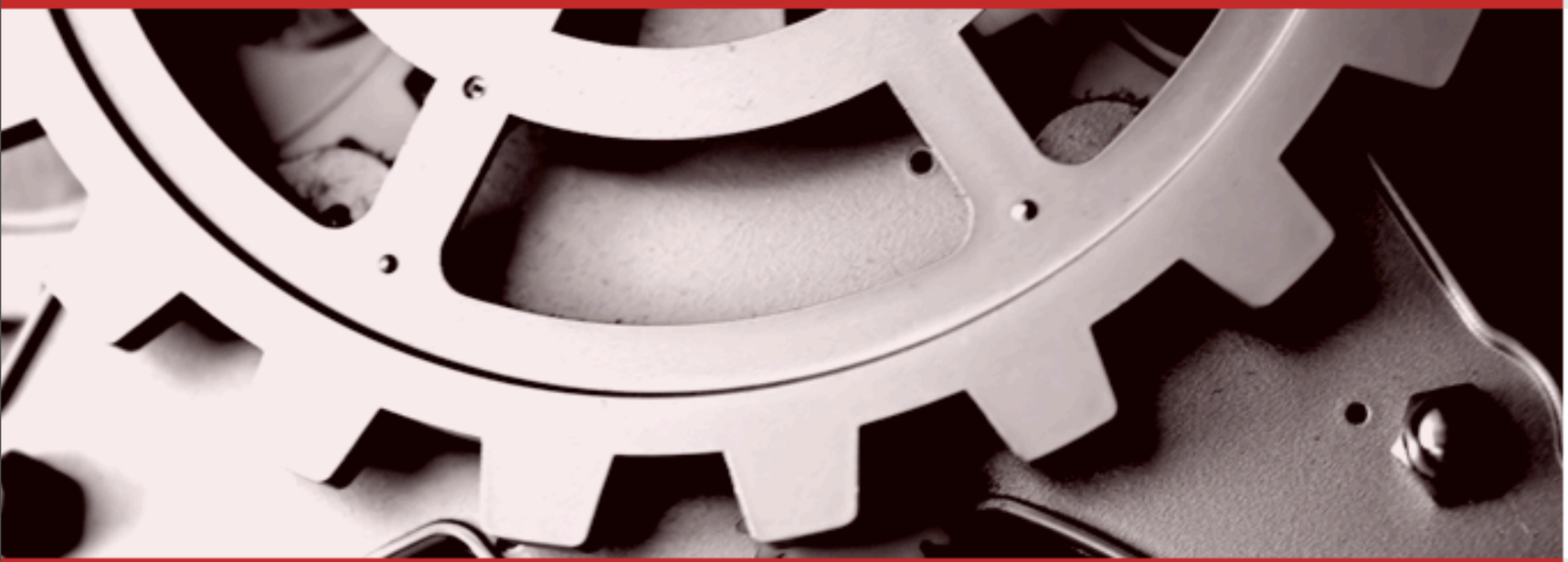

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The Power of Refactoring

Stefan Koopmanschap

4developers, Krakow, March 7 2009

What will we do?

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- What is refactoring?
- Why refactoring?
- Requirements
- HOWTO

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Stefan Koopmanschap

Who is he?

About me

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- Professional Services Consultant at Ibuildings
- 10 years of PHP experience
- auto didact
- married, 2 kids, 6 cats, a bunch of fish
- Apple lover
- music addict
- symfony advocate

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Refactoring

What is it?

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Refactoring is a disciplined technique for restructuring an existing body of code, altering its internal structure without changing its external behavior. Its heart is a series of small behavior preserving transformations. Each transformation (called a 'refactoring') does little, but a sequence of transformations can produce a significant restructuring. Since each refactoring is small, it's less likely to go wrong. The system is also kept fully working after each small refactoring, reducing the chances that a system can get seriously broken during the restructuring.

(Martin Fowler - Refactoring.com)

Code refactoring is the process of changing a computer program's code to make it amenable to change, improve its readability, or simplify its structure, while preserving its existing functionality.

(Wikipedia)

What

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Code refactoring is the process of changing a computer program's internal structure without modifying its external behavior or existing functionality.

Why

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This is usually done to improve code readability, simplify code structure, change code to adhere to a given programming paradigm, improve maintainability, or improve extensibility.

Improve readability

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Improve maintainability

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Extend/change/implement

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Is it the holy grail?

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Rewrite

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A rewrite in computer programming is the act or result of re-implementing a large portion of existing functionality without re-use of its source code. When the rewrite is not using existing code at all, it is common to speak of a rewrite from scratch. When instead only parts are re-engineered, which have otherwise become complicated to handle or extend, then it is more precise to speak of code refactoring.

(Wikipedia)

Refactor vs Rewrite

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Refactor vs Rewrite

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- Refactor whenever it is possible

Refactor vs Rewrite

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- Refactor whenever it is possible
- Big change? Try to cut it into smaller units

Refactor vs Rewrite

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- Refactor whenever it is possible
- Big change? Try to cut it into smaller units
- Still have to break the API? Go ahead, and rewrite!

Refactor vs Rewrite

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- Refactor whenever it is possible
- Big change? Try to cut it into smaller units
- Still have to break the API? Go ahead, and rewrite!
- Don’t take the decision in 5 minutes

Refactor vs Rewrite

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Refactoring takes less effort

- Nice for you
- Better for the quality of your work

Breaking the API is more work

- Ensure all calling code is altered as well
- Update your unit tests
- Update your documentation

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Requirements

for successful refactoring

Requirements

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- Codebase knowledge
- Structured API
- Unit testing

Codebase knowledge

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- Know what to change quickly
- Be aware of your changes
- Be aware of impact of your changes on other components

Structured API

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- Refactoring DOES NOT REPLACE design!
- You need a good API that allows internal changes
- Additions to existing API's should not change existing API
- Keep small "units"

Unit testing

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```
require File.dirname(__FILE__) + "/../../lib/internationaliser"

class StringInternationalisationTest < Test::Unit::TestCase
  def test_can_translate_sausage_to_german
    INTERNATIONAL['sausage'] = 'würst'
    assert_equal('würst', _('sausage'))
  end
end
```

Unit testing

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- Unit testing is your first point of QA
- They safeguard you from unexpected side effects
- Test - Change - Test

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An example

user authentication

A test-driven approach

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UserTest.php

```php
class UserTest extends PHPUnit_Framework_TestCase
{
    public function testCorrectUserCredentials()
    {
      $this->assertTrue(User::authenticate('test', 'test'));
    }

    public function testIncorrectUsername()
    {
      $this->assertFalse(User::authenticate('wrong', 'test'));
    }

    public function testIncorrectPassword()
    {
      $this->assertFalse(User::authenticate('test', 'wrong'));
    }
}
```

Line: 1 Column: 1 PHP Tab Size: 2 —

My first implementation

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user.class.php

```php
class User {

  /**
   * authenticate a user
   *
   * @param string $username
   * @param string $password
   * @return boolean
   * @todo actually implement this
   */
  public static function authenticate($username, $password)
  {
    if ('test' == $username && 'test' == $password)
    {
      return true;
    }
    else
    {
      return false;
    }
  }
}
```

Line: 21 Column: 20 PHP Tab Size: 2 authenticate

My first implementation

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user.class.php

```
class User {

  /**
   * authenticate a user
   *
   *
   *
   *
   *
   *
  pu
  {
    return false;
  }
 }
}
```

Session

```
stefan-koopmanschaps-imac:code stefan$ phpunit UserTest.php
PHPUnit 3.3.4 by Sebastian Bergmann.

...

Time: 0 seconds

OK (3 tests, 3 assertions)
stefan-koopmanschaps-imac:code stefan$
```

Line: 21 Column: 20 PHP Tab Size: 2 authenticate

A more dynamic version

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user2.class.php

```php
class User {

  /**
   * authenticate a user
   *
   * @param string $username
   * @param string $password
   * @return boolean
   * @todo actually implement this
   */
  public static function authenticate($username, $password)
  {
    $sql = "SELECT `id` FROM `user`
            WHERE `username`='" . mysql_real_escape_string($username) . "'
            AND `password`='" . md5($password) . "'";
    $res = mysql_query($sql);
    if (mysql_num_rows($res) == 1)
    {
      return true;
    }
    else
    {
      return false;
    }
  }
}
```

Line: 28 Column: 2 PHP Tab Size: 2 authenticate

A more dynamic version

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user2.class.php

```php
class User {

  /**
   * authenticate a user
   *
   * @param string $username
   * @p
   * @r
   * @t
   */
  publi
  {
    $sq

    $re
    if
    {
      r
    }
    else
    {
      return false;
    }
  }
}
```

Session

```
stefan-koopmanschaps-imac:code stefan$ phpunit UserTest.php
PHPUnit 3.3.4 by Sebastian Bergmann.

...

Time: 0 seconds

OK (3 tests, 3 assertions)
stefan-koopmanschaps-imac:code stefan$
```

Line: 28 Column: 2 PHP Tab Size: 2 authenticate

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Tips and tricks

Some tips and tricks

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- Write unit tests before you start refactoring
- Code documentation (phpDoc) is your friend
- Don’t trust your IDE’s refactoring options

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Will you refactor now?

Looking back

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- What is refactoring?
- Why do we want to refactor?
- Is it the holy grail?
- Refactoring vs Rewriting
- Requirements
- How to do it
- Tips and tricks

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Holy Grail:
http://www.flickr.com/photos/joebeone/153921142/ (by/2.0)
Würst test ever:
http://www.flickr.com/photos/pingles/1341229619/ (by-nc-nd/2.0)

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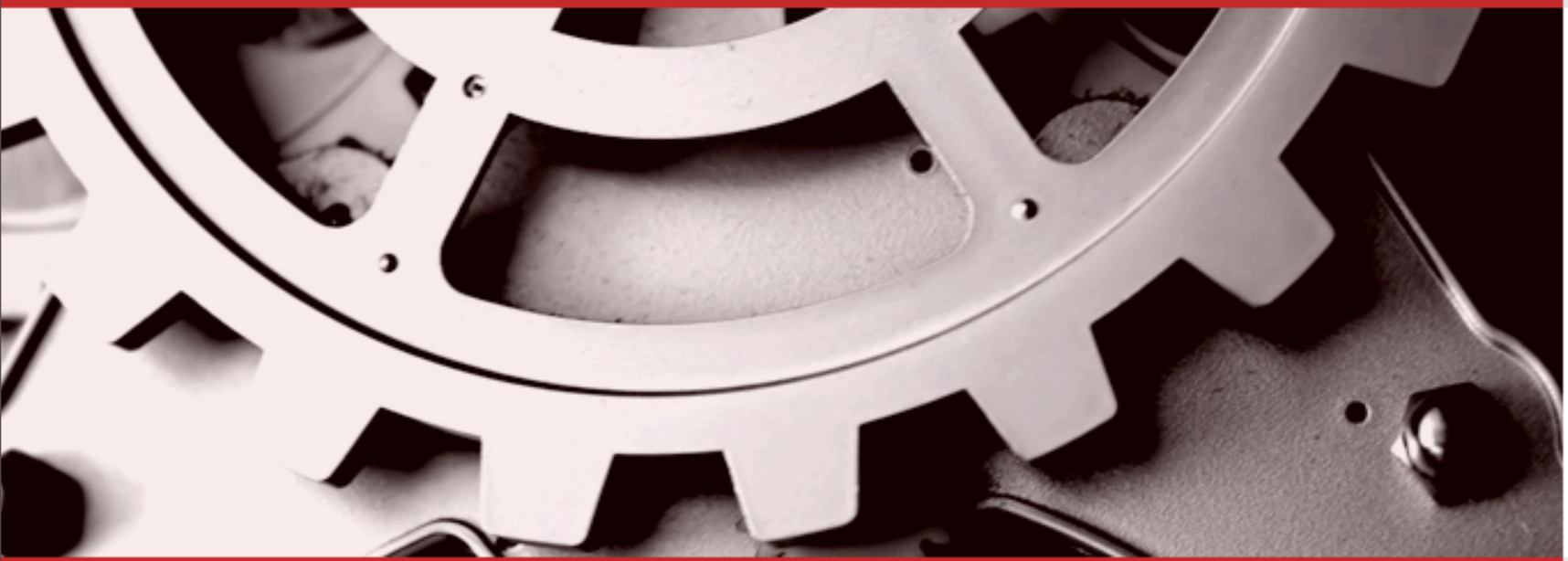
Questions ?



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Thank you!

Contact details:

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