

# Unit Testing with FlexUnit

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# So why Test?

- A bad release of code or software will stick in people's minds.
- Debugging code is twice as hard as writing the code in the first place.
- It's your job!

# Where did TDD come from?

## Extreme Programming

- Software Engineering Methodology

- First proposed by Kent Beck in March 1996 from the Chrysler Comprehensive Compensation System (C3)

- Wrote *Extreme Programming Explained* in Oct 1999

# From Existing Practices

-NASA, "test first" practices

-Leo Brodie *Thinking Forth* published in 1984, advocating a bottom up and incremental design pattern

# Some items that XP advocated..

- UML designs
- Source control
- Pair Programming
- Test driven development with Unit Testing
- just to name a few, IXP has currently 23 practices listed..

# Several layers to Software Testing

## Application layer

### -Acceptance Testing

- testing a completed product before transfer of ownership

If by the customer..

- Beta Testing

- User Acceptance testing (w

If by the vendor..

- Release Acceptance

- QA Testing

# Several layers to Software Testing

## Application Layer

### -Usability Testing

- Selenium, <http://wiki.openqa.org>

- AutoTestFlash,

<http://osflash.org/autotestflash>

## System Layer

### -Load Testing

- Grinder, <http://grinder.sourceforge.net/>

# Several layers to Software Testing

## Code Layer

- Unit Testing

- test the core logic of the software coding



# Unit Testing

- Unit Testing
  - test functionality of a single class or unit
- Test Driven development (TDD)
  - write the tests first then write the code
- Continuous Testing
  - runs all the unit tests during a build or SVN update
  - let's the automated tools to the heavy lifting
- Continuous Integration (CI)
  - Continuous Testing among a team
  - Cruise Control - <http://cruisecontrol.sourceforge.net>

# Unit Testing Frameworks

-JUnit

-SQLUnit

-tSQLUnit

-CFUnit

-CFCUnit

-ASUnit

-FlexUnit

-Just about every language as a UT framework

# FlexUnit

- It's actually a bad name for it.
- Tests any AS3 class used in either Flash, Flex or AIR
- the front end GUI display is written in Flex
- can be run via Flex Builder/browser, Command-Line and ANT

# Common Elements of any UT

- assertions, the list of expected results
  - assertEquals()
  - assertFalse()
  - assertNotNull()
  - assertNotNull()
  - assertNull()
  - assertEquals()
  - assertEquals()
  - assertTrue()
  - assertTrue()

# Common Elements of any UT

## Test Fixture

-any properties or objects that need to be initialized to run the test

-Two common methods

- setUp()

- tearDown()

# Common Elements of any UT

## Test Case

- the smallest unit
- tests for a particular response

# Common Elements of any UT

## Test Suite

- A collection of Test Cases

# Common Elements of any UT

## Test Runner

- calls the tests and displays the results
- `startTest()`



# Common Elements of any UT

## Test Harness

- automated scripting to run the tests

# Difference with FlexUnit from CFUnit

- ActionScript has an Asynchronous behavior
- Unless you tell FlexUnit that you are expecting an asynchronous event, your test may yield a false positive.
  - FlexUnit has a `addAsync()` function to handle this
  - Daniel Rinehart has a blog post on this..
  - [http://life.neophi.com/danielr/2007/03/asynchronous\\_testing\\_with\\_flex.html](http://life.neophi.com/danielr/2007/03/asynchronous_testing_with_flex.html)

# Another important note..

One test case is never enough..

You need to test for..

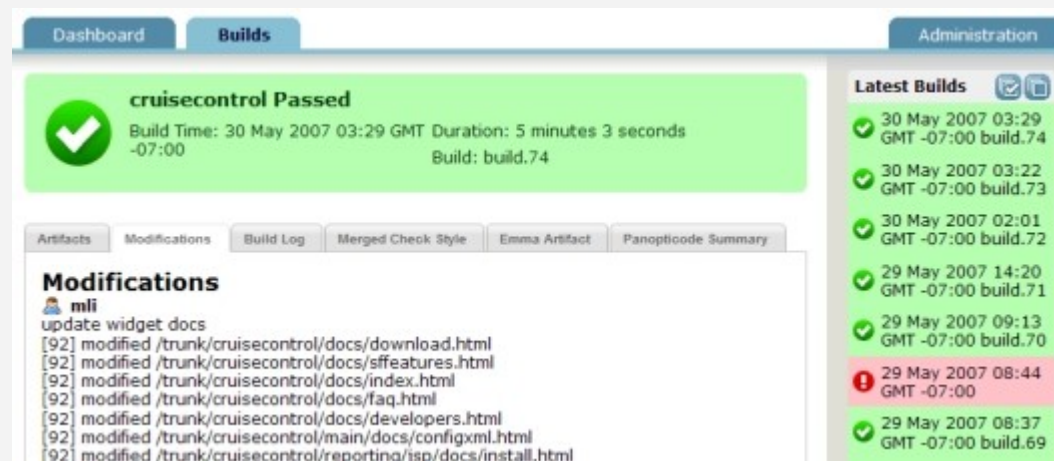
- Good data
- Bad data
- Edge cases

**Let's look at some code!**

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# Continuous Integration (CI)

- Uses the JUnit report
- Throws it to CruiseControl
  - <http://cruisecontrol.sourceforge.net>



The screenshot displays the CruiseControl web interface. At the top, there are tabs for 'Dashboard', 'Builds', and 'Administration'. The 'Builds' tab is active, showing a green banner with a checkmark icon and the text 'cruisecontrol Passed'. Below this, it states 'Build Time: 30 May 2007 03:29 GMT Duration: 5 minutes 3 seconds -07:00' and 'Build: build.74'. Underneath, there are tabs for 'Artifacts', 'Modifications', 'Build Log', 'Merged Check Style', 'Emma Artifact', and 'Panopticode Summary'. The 'Modifications' tab is selected, showing a list of files modified by user 'mli', including 'download.html', 'sffeatures.html', 'index.html', 'faq.html', 'developers.html', 'configxml.html', and 'install.html'. On the right side, there is a 'Latest Builds' section with a list of recent builds, each with a green checkmark icon, except for one with a red exclamation mark icon. The builds are listed with their dates, times, and build numbers.

Build Time	Status	Build Number
30 May 2007 03:29 GMT -07:00	Success	build.74
30 May 2007 03:22 GMT -07:00	Success	build.73
30 May 2007 02:01 GMT -07:00	Success	build.72
29 May 2007 14:20 GMT -07:00	Success	build.71
29 May 2007 09:13 GMT -07:00	Success	build.70
29 May 2007 08:44 GMT -07:00	Failure	build.69
29 May 2007 08:37 GMT -07:00	Success	build.69

# Conclusion

- Some Unit Testing is better than none
- Unit Testing is only as good as you make it
- It needs to be integrated into your development process
- A good idea to include the Unit Testing classes in your SVN repository
- Your computer can automate a lot of the heavy lifting
- You actually do have time to do testing!

# Recommended Reading

Pragmatic Programmers Series

<http://www.pragmaticprogrammer.com>

Code Complete, Steve McConnell

Writing Effective Test Cases, Alistair Cockburn

<http://www.extremeprogramming.org>

<http://www.martinfowler.com/>

# Recommended Reading

Unit Testing Frameworks

<http://cfunit.sourceforge.net/>

<http://www.cfcunit.org/cfcunit/>

<http://www.asunit.com/>

<http://code.google.com/p/as3flexunitlib/>



# Recommended Reading

Flex and Ant

[http://weblogs.macromedia.com/pmartin/archives/2006/06/flexunit\\_ant.cfm](http://weblogs.macromedia.com/pmartin/archives/2006/06/flexunit_ant.cfm)

- Peter Martin

Continuous Integration

Cruise Control - <http://cruisecontrol.sourceforge.net/index.html>

# Thanks for coming!

For any additional questions or comments..

- Email: [mason@fusionlink.com](mailto:mason@fusionlink.com)
- Source code and examples on [labs.fusionlink.com](http://labs.fusionlink.com)

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