

CI From the trenches

Julian Simpson, www.build-doctor.com



Who am I?



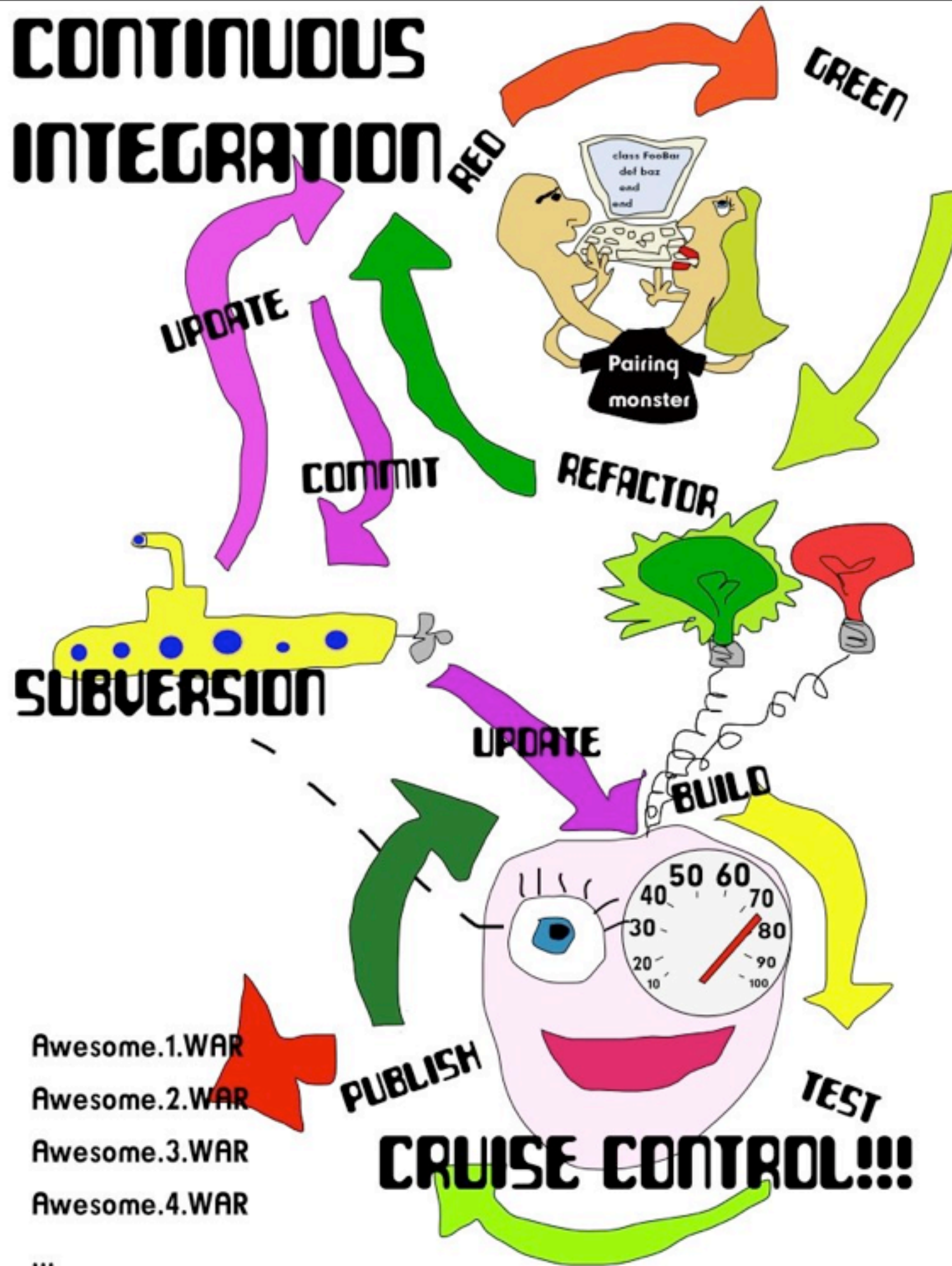
What is CI?



<http://flickr.com/photos/oberazzi/318947873>

... members of a team integrate their work frequently ...

Each integration is verified by an automated build
(including test)



Dashboard Server : muscat.juliansimpson.org



Dashboard

Builds

Administration



Summary

5 project build(s)



2 project build(s) failed

3 project build(s)
succeeded

0 project(s) building



2 project(s) discontinued



0 project(s) inactive

60% of projects passing

Tools

[RSS Feed](#)[for CCTray](#)[for CC-Config](#)

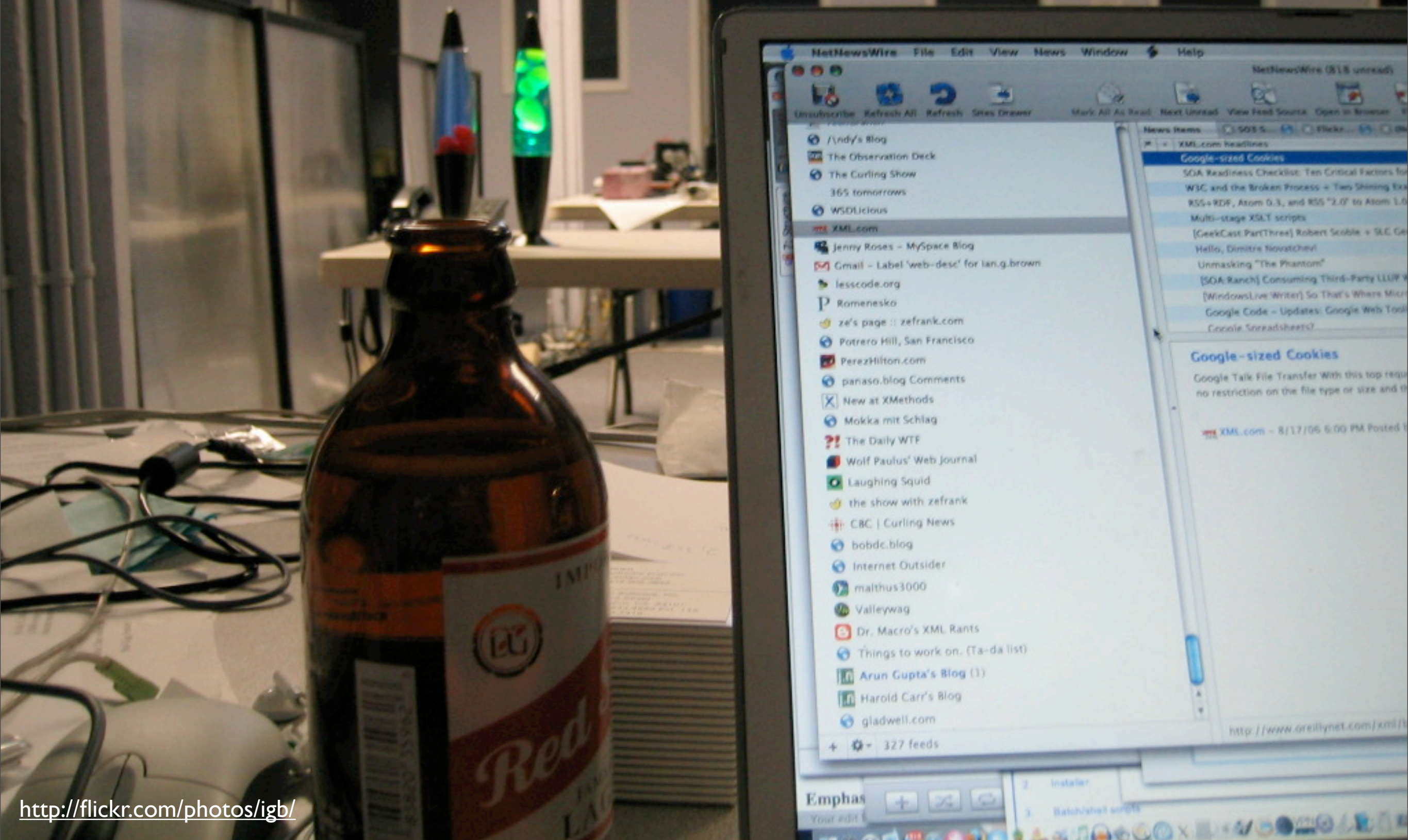
What's this talk about?

Sharing



<http://flickr.com/photos/imagesbyk2/27263706/>

Sharing with a lamp



<http://flickr.com/photos/igb/>

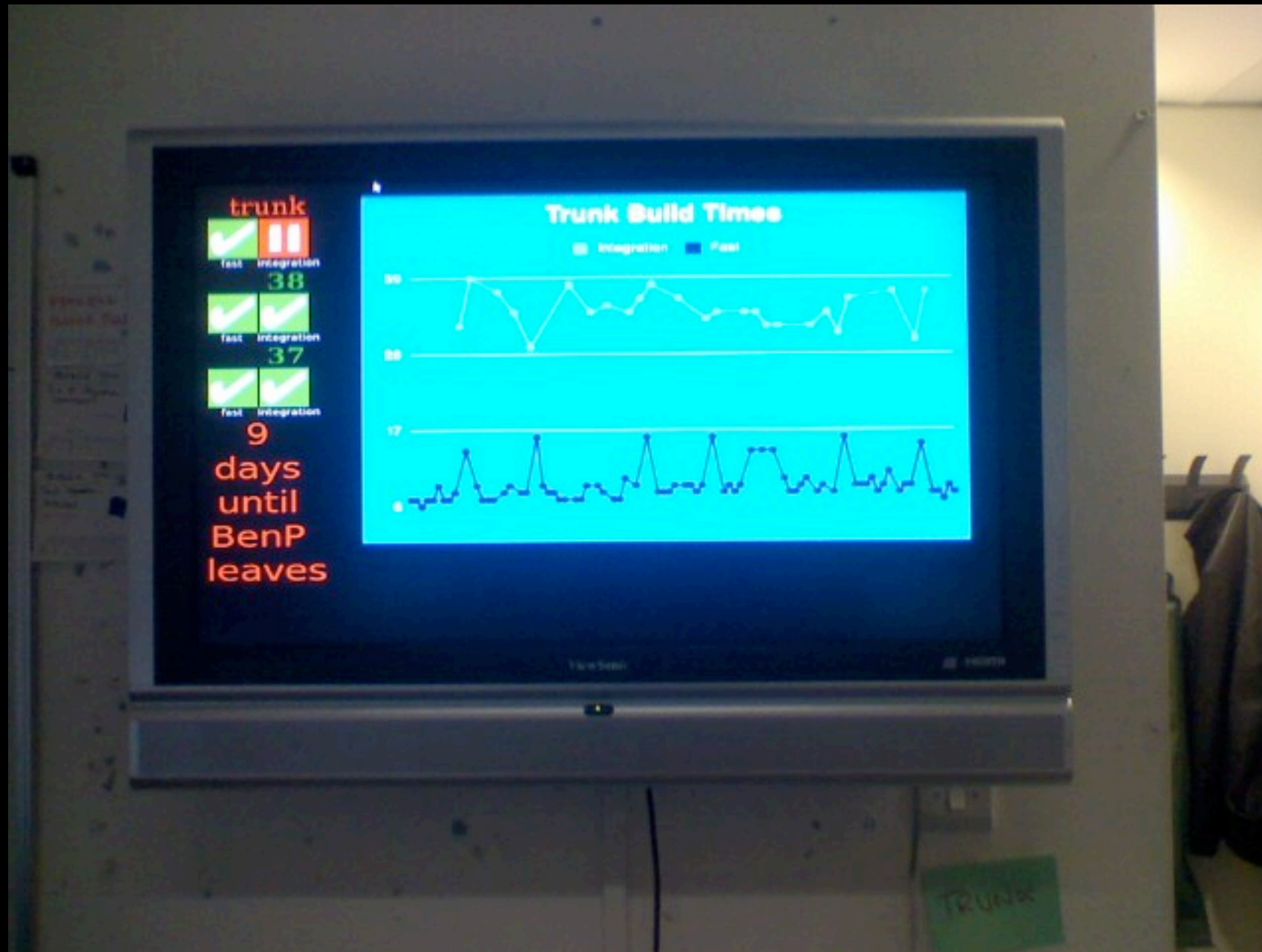
Wednesday, 4 March 2009

Sharing with a rabbit



<http://flickr.com/photos/enfad/>

Sharing with a radiator



<http://www.flickr.com/photos/mibgames>

Think like a sysadmin



<http://flickr.com/photos/leftcase/>

Think like a sysadmin: I/O



<http://flickr.com/photos/paszczak000/>

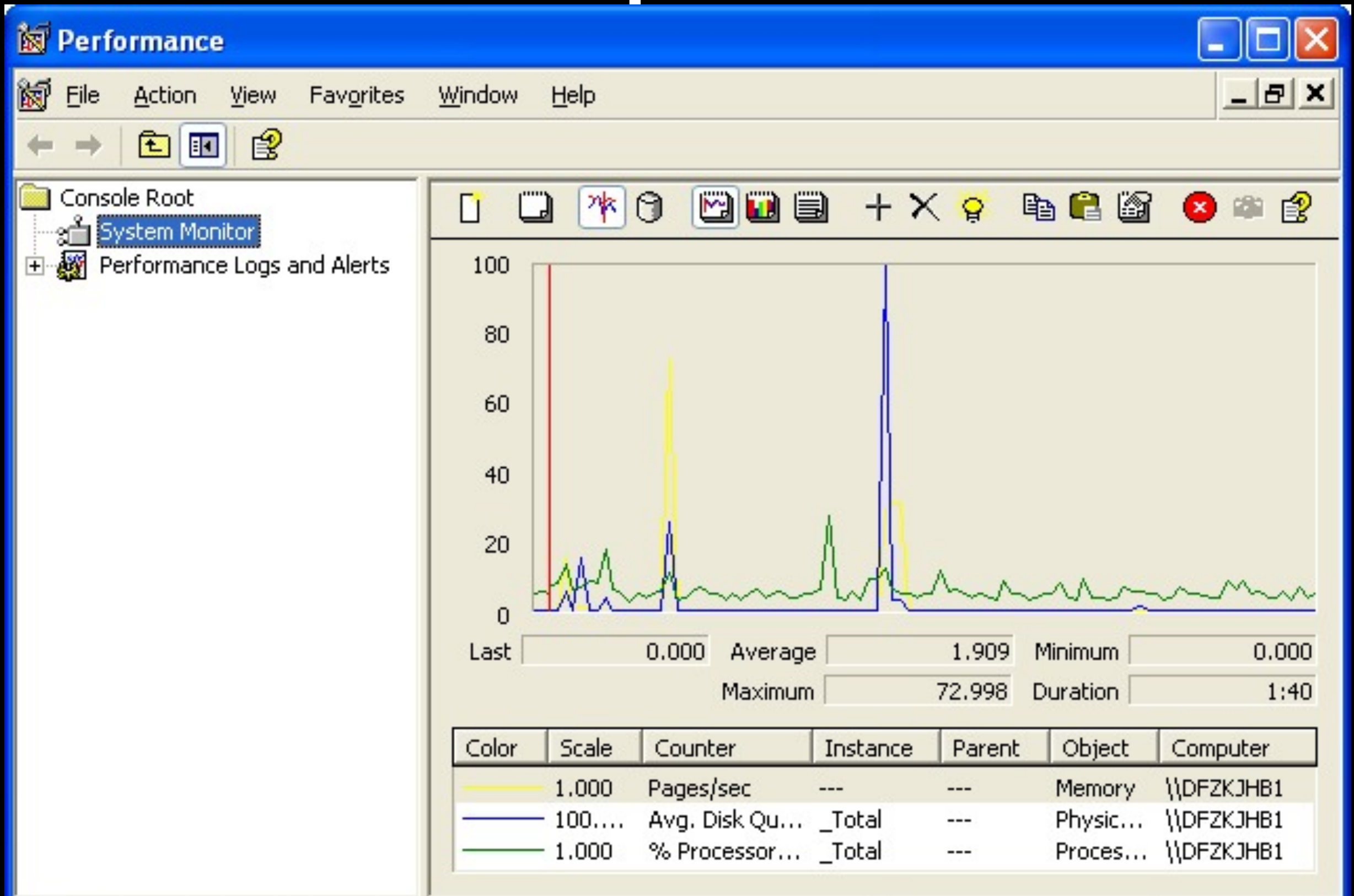
iostat -d 5 10

```
julian-simpsons-macbook:~ jsimpson$  
julian-simpsons-macbook:~ jsimpson$  
julian-simpsons-macbook:~ jsimpson$ iostat -d 5 5
```

disk0			disk2			disk3			disk4		
KB/t	tps	MB/s	KB/t	tps	MB/s	KB/t	tps	MB/s	KB/t	tps	MB/s
29.20	3	0.09	60.40	0	0.00	33.17	0	0.00	62.98	0	0.00
992.97	7	6.40	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00
571.82	25	13.73	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00
0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00
0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00

```
julian-simpsons-macbook:~ jsimpson$  
julian-simpsons-macbook:~ jsimpson$  
julian-simpsons-macbook:~ jsimpson$  
julian-simpsons-macbook:~ jsimpson$
```


Windows perfmon.exe



Think like a sysadmin: Startup

```
Terminal - shirish@Mugglewille-desktop: ~
Edit View Terminal Go Help
Terminal - shirish@Mugglewille... X Terminal - shirish@Mugglewille... X Terminal - shirish@Mugglewille... X Terminal - shirish@Mugglewille... X Terminal - shirish@Mugglewille... X

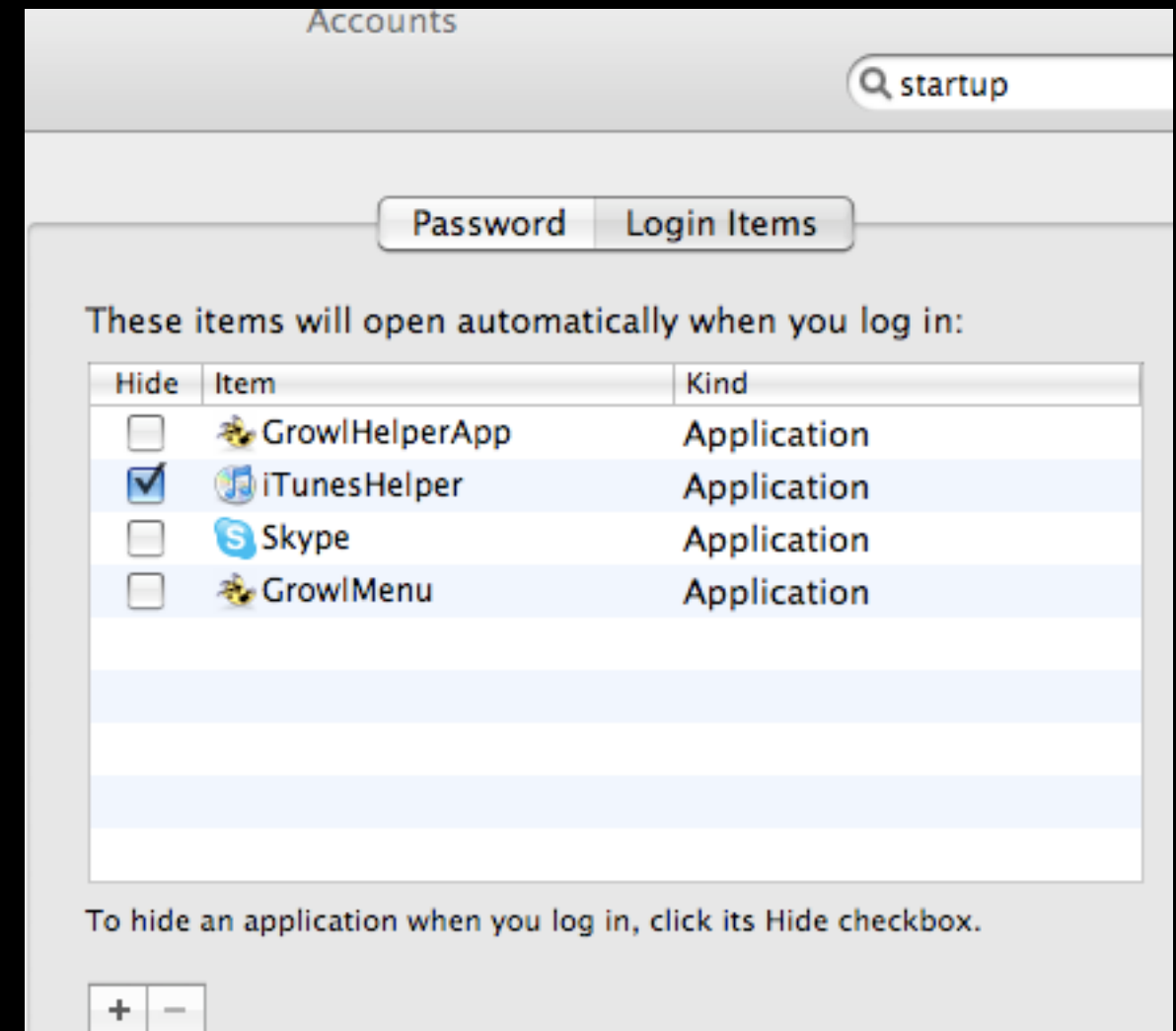
sv Runlevel Config -: stop service =/+ : start service h: help q: quit

service 1 2 3 4 5 0 6 S
-----
networkd [X] [X] [X] [X] [X] [ ] [ ] [ ]
api-supply [ ] [X] [X] [X] [X] [ ] [ ] [ ]
cpid [ ] [X] [X] [X] [X] [ ] [ ] [ ]
alsa-utils [ ] [X] [ ] [ ] [ ] [ ] [ ] [ ]
macron [ ] [X] [X] [X] [X] [ ] [ ] [ ]
ocupsd [X] [X] [X] [X] [X] [ ] [ ] [ ]
omd [ ] [X] [X] [X] [X] [ ] [ ] [ ]
oparmor [ ] [ ] [ ] [ ] [ ] [ ] [ ] [X]
oport [ ] [X] [X] [X] [X] [ ] [ ] [ ]
td [ ] [X] [X] [X] [X] [ ] [ ] [ ]
vahi-dae$ [ ] [X] [X] [X] [X] [ ] [ ] [ ]
luetooth [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
oinc-cli$ [ ] [X] [X] [X] [X] [ ] [ ] [ ]
ootlogd [ ] [X] [X] [X] [X] [ ] [ ] [ ]
litty [ ] [ ] [ ] [ ] [ ] [ ] [ ] [X]
onsole-s$ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [X]
ron [ ] [X] [X] [X] [X] [ ] [ ] [ ]
ups [ ] [X] [X] [X] [X] [ ] [ ] [ ]
ous [ ] [X] [X] [X] [X] [ ] [ ] [ ]
```

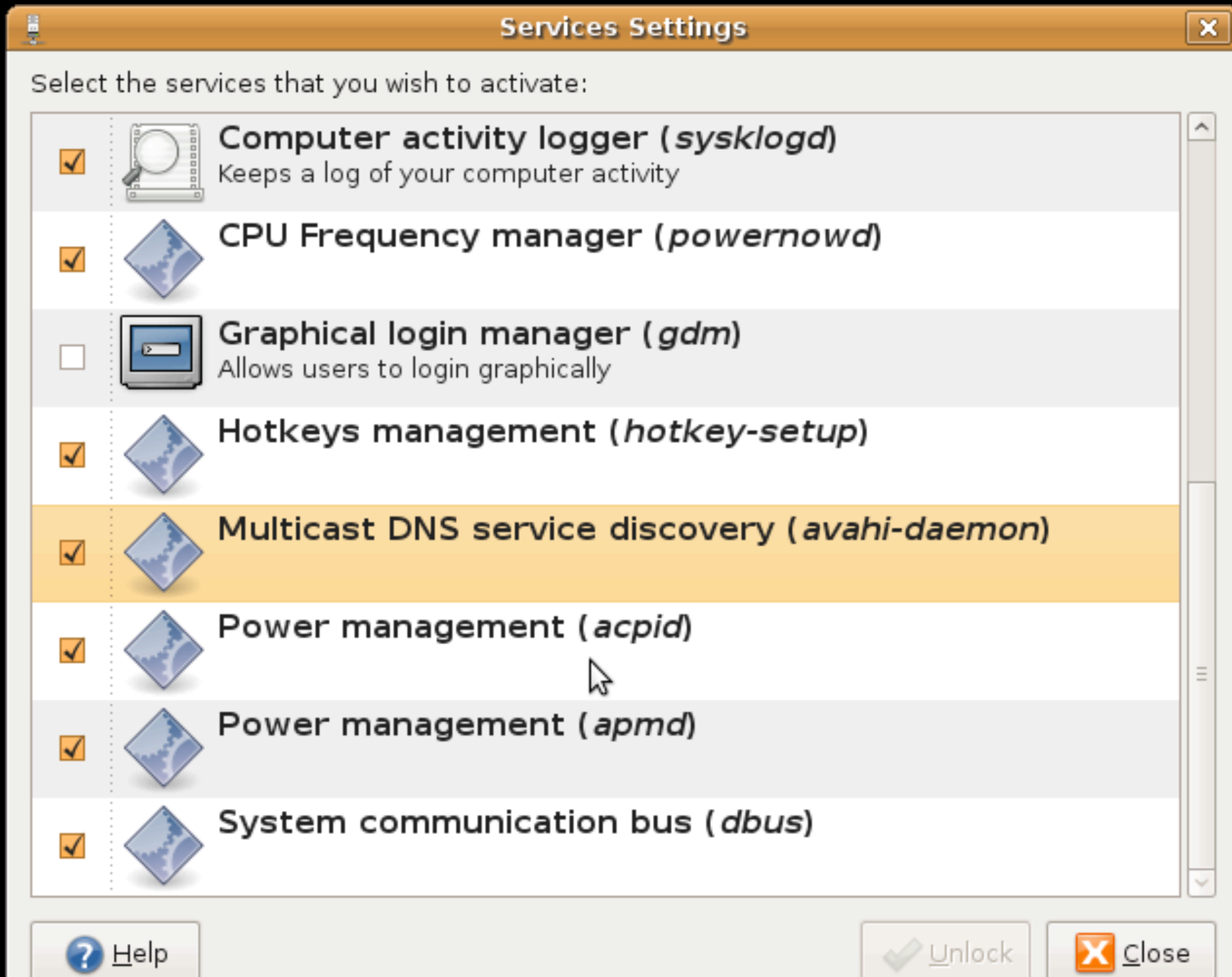
<http://flickr.com/photos/69859207@N00/>

OS X Startups

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple Computer//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>Label</key>
  <string>com.apple.autofs</string>
  <key>KeepAlive</key>
  <true/>
  <key>Program</key>
  <string>/usr/libexec/autofs</string>
  <key>ProgramArguments</key>
  <array>
    <string>autofs</string>
  </array>
</dict>
</plist>
```



Ubuntu services

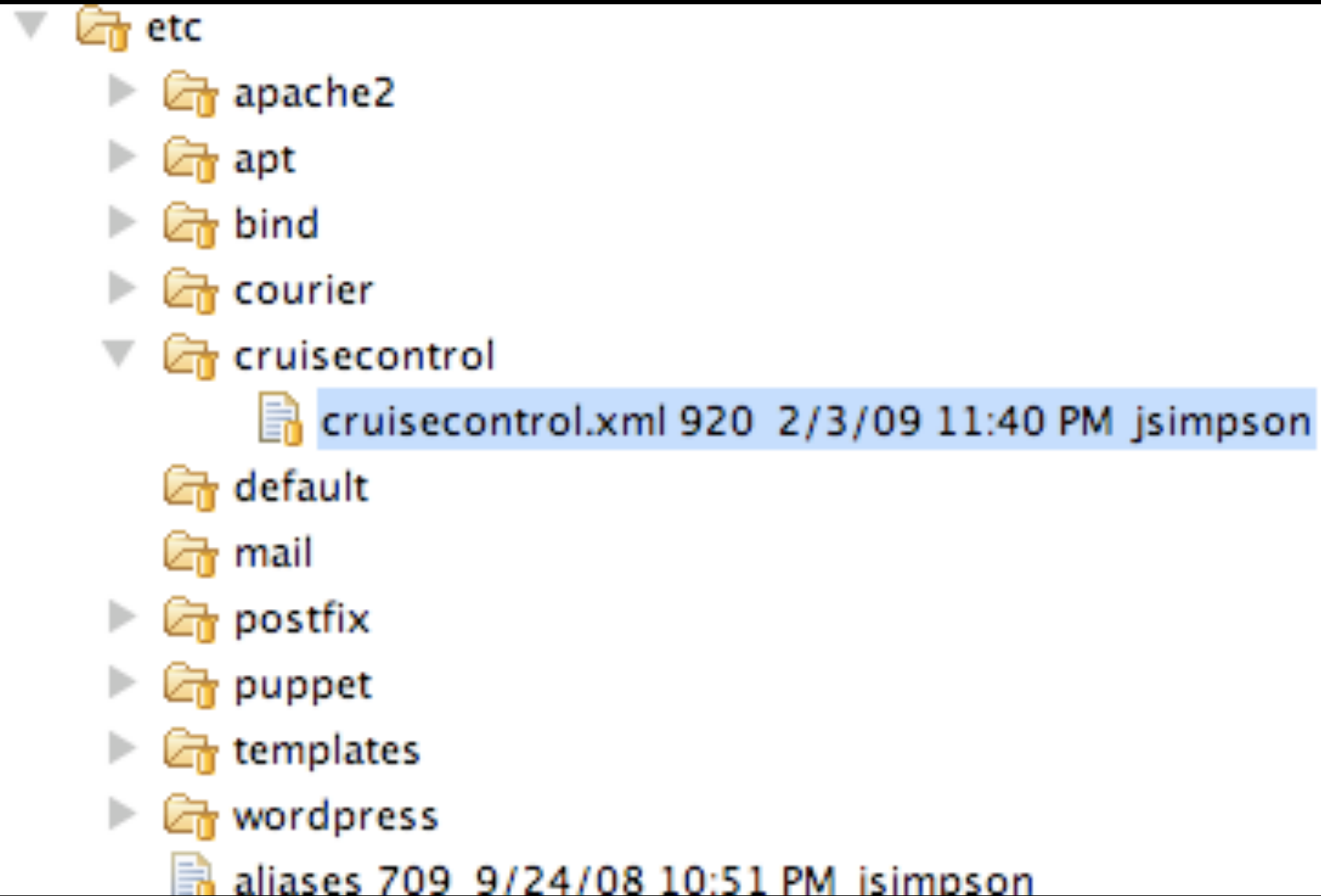


Think like a sysadmin: Security



<http://flickr.com/photos/untitled13/>

Version control



Team City Security



Log in to TeamCity

Version 4.0.2 (build 8222)

Username:

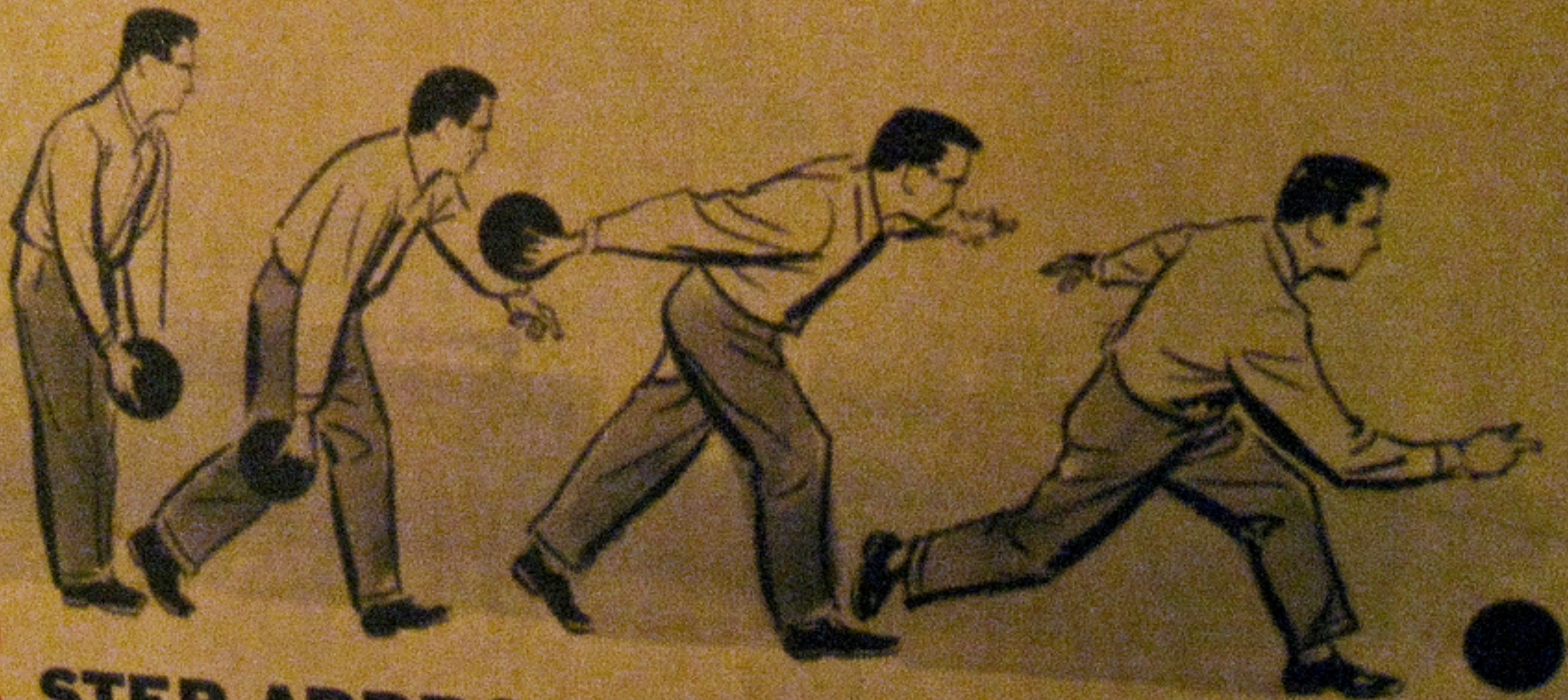
Password:

☒ Remember me

[Register a New User Account](#) or [Login as a Guest](#) [?](#)

Release Management

The second range finder from the right. If you find the straight ball, then line up the range finder you find that this places you just about at the suggested position (see illustration on deliveries).



THE **3** STEP APPROACH

<http://flickr.com/photos/adrianclarkmbbs/>

Release Management: Build label

Server : ccweb01.thoughtworks.com

Dashboard

Builds



cce-release-jdk1.6 Passed

Build Time: 12 Aug 2008 08:20 GMT -05:00

Dur

Build: build.72

Artifacts

Modifications

Build Log

Tests

Errors and Warnings

Artifacts

No artifacts found

Release Management: VCS label

WOLTER
TAG
SUCKS

<http://flickr.com/photos/rbrwr/>

- ▶ build
- ▼ core
 - ▶ branches
 - ▼ tags
 - ▶ ANT_11
 - ▶ ANT_12
 - ▶ ANT_13
 - ▶ ANT_13_B1
 - ▶ ANT_13_B2
 - ▶ ANT_13_B3
 - ▶ ANT_13_MAIN_MERGE4
 - ▶ ANT_14
 - ▶ ANT_14_B1
 - ▶ ANT_14_B2
 - ▶ ANT_141
 - ▶ ANT_141_B1
 - ▶ ANT_15_B1
 - ▶ ANT_15_B2
 - ▶ ANT_15_B3

Release Management: labelled deployable



<http://en.wikipedia.org/wiki/>

Index of /maven2/ant/ant/

[../](#)

[1.4.1/](#)

[1.5/](#)

[1.5.1/](#)

[1.5.2/](#)

[1.5.3-1/](#)

[1.5.4/](#)

[1.6/](#)

[1.6.1/](#)

[1.6.2/](#)

[1.6.3/](#)

[1.6.4/](#)

[1.6.5/](#)

[1.7.0/](#)

[maven-metadata.xml](#)

[maven-metadata.xml.md5](#)

[maven-metadata.xml.sha1](#)

04

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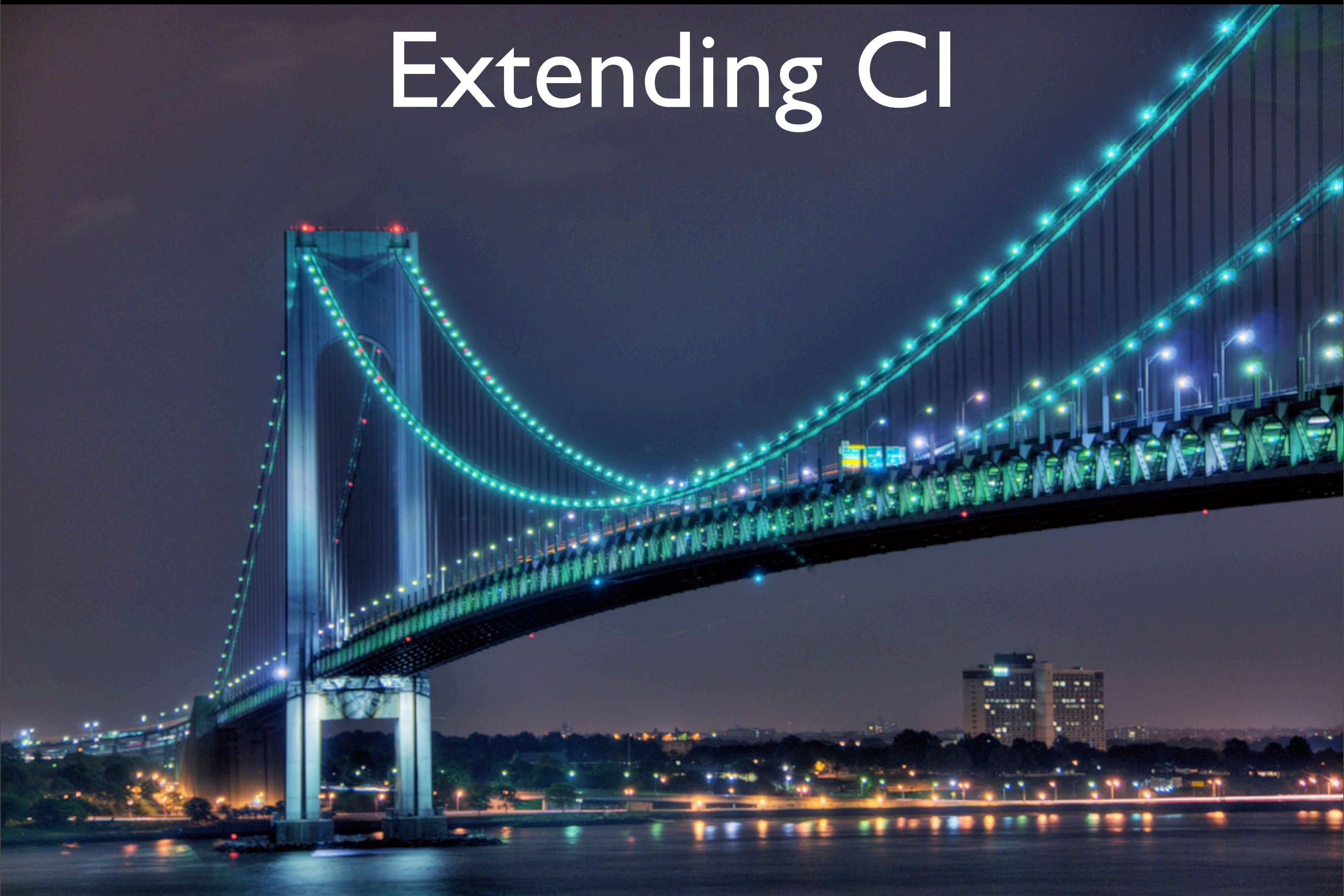
21

20

04

09

Extending Cl



<http://flickr.com/photos/yukonblizzard/>

Extending CI: System Deployment

<http://flickr.com/photos/dharrels/>

Conway's law in action

```
#!/bin/bash
cd /path/to/your/project && \
jvc clean && \
jvc prod war test.war && \
scp ~/projects/test.war root@remoteserver:/root/uploads \
ssh root@remoteserver "/etc/init.d/tomcat stop" && \
ssh root@remoteserver "rm -rf /usr/local/tomcat/webapps/" \
ssh root@remoteserver "cd /usr/local/tomcat/webapps/ROOT" \
ssh root@remoteserver "/etc/init.d/tomcat start" && \
echo "all done"
```


Java - Bash/src/BashTest.java - Eclipse SDK - /Users/jsimpson/Documents/workspace

Hierar JUnit after 1.029 seconds

1/1 Errors: 0 Failures: 0

BashTest [Runner:JUnit 3] (1.014 s)

Outline

- import declaration
- BashTest
 - testBashIsValid

```
import java.io.IOException;

public class BashTest extends TestCase {

    public void testBashIsValid() throws Exception {
        Process child = null;

        String command = "/bin/bash -nx src/deploy.sh";
        try {
            child = Runtime.getRuntime().exec(command);
            Thread.sleep(1000);
        } catch (IOException e) {
            fail("invalid bash file");
        } finally {

            assertEquals(0, child.exitValue());

        }

    }

}
```

Problems Javadoc Declaration Console

<terminated> BashTest [JUnit] /System/Library/Frameworks/JavaVM.framework/Versions/1.5.0/Home/bin/java (Ma

Writable Smart Insert 9 : 1

```
ssh root@remoteserver "/etc/init.d/tomcat stop" && \
```

' # <=== NASTY UNMATCHED QUOTE

```
ssh root@remoteserver "rm -rf /usr/local/tomcat/webapps/
```

```
ssh root@remoteserver "cd /usr/local/tomcat/webapps/  
ROOT; jar -xvf /root/uploads/test.war" && \
```


java -bashTest.java -classpath ... /Users/jsimpson/Documents/Workspace

Hierar JUnit 1.091 seconds

Errors: 0 Failures: 1

test [Runner: JUnit 3] (1.076 s)
testBashIsValid (1.076 s)

ace

network.AssertionFailedError: e
test.testBashIsValid(BashTest.j

QuantrixTest.java build.xml BashTest.java 5

```
import java.io.IOException;

public class BashTest extends TestCase {

    public void testBashIsValid() throws Exception {
        Process child = null;

        String command = "/bin/bash -nx src/deploy.sh";
        try {
            child = Runtime.getRuntime().exec(command);
            Thread.sleep(1000);
        } catch (IOException e) {
            fail("invalid bash file");
        } finally {

            assertEquals(0, child.exitValue());

        }

    }

}
```

Outline

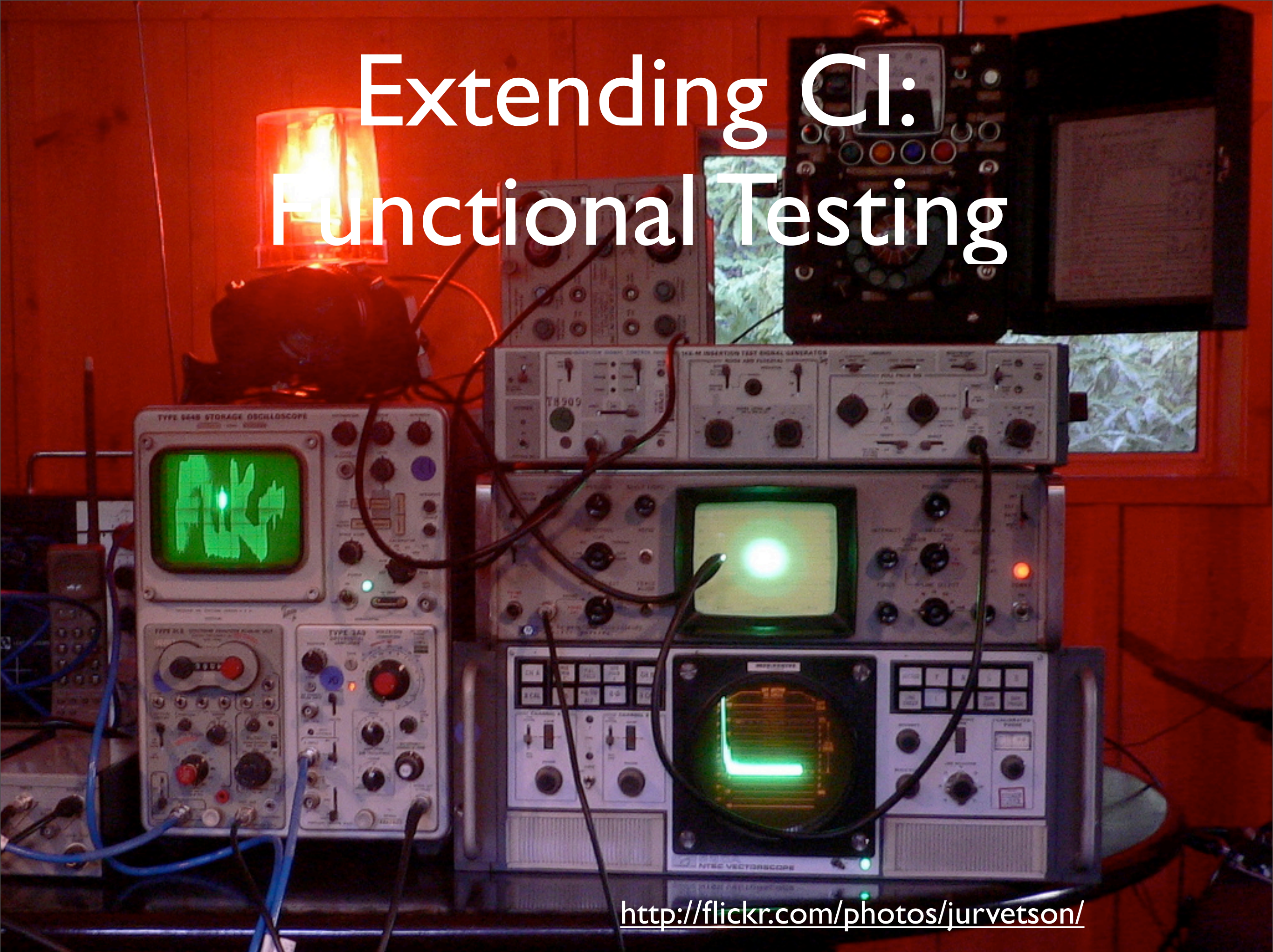
- import decla
- BashTest
 - testBash

Problems Javadoc Declaration Console

<terminated> BashTest [JUnit] /System/Library/Frameworks/JavaVM.framework/Versions/1.5.0/Home/bin/java

Writable Smart Insert 9 · 1

Extending CI: Functional Testing



<http://flickr.com/photos/jurvetson/>

Selenium Remote Control v1.0-beta-1 [2201], with Core v1.0-beta-1 [1994] - Mozilla Firefox

File Edit View History Bookmarks Tools Help

← → ↺ × 🏠

http://localhost:4001/selenium-server/core/RemoteRun

Google

Getting Started Latest BBC Headlines

Se selenium 34 78.96

Selenium Functional Testing for Web Apps

Open Source From [ThoughtWorks, Inc](#) and Friends

Slow Mode:☐

Tools

View DOM Show Log

8118d58385354abca9e77f6b35c0c770

Last Four Test Commands:

type(css=#meve-basic-info-tab)
click(css=#saLoad(20000)
getText(member[nickname][error])
getText(member[surname][error])

1CLICK2FAME.com

We are in Auditions
19 Days left

Next stage
Finals Heats

Last stage
The Finals

Upload a Video | Hello Go Jerry | Ed

BEST VIDEOS

Search

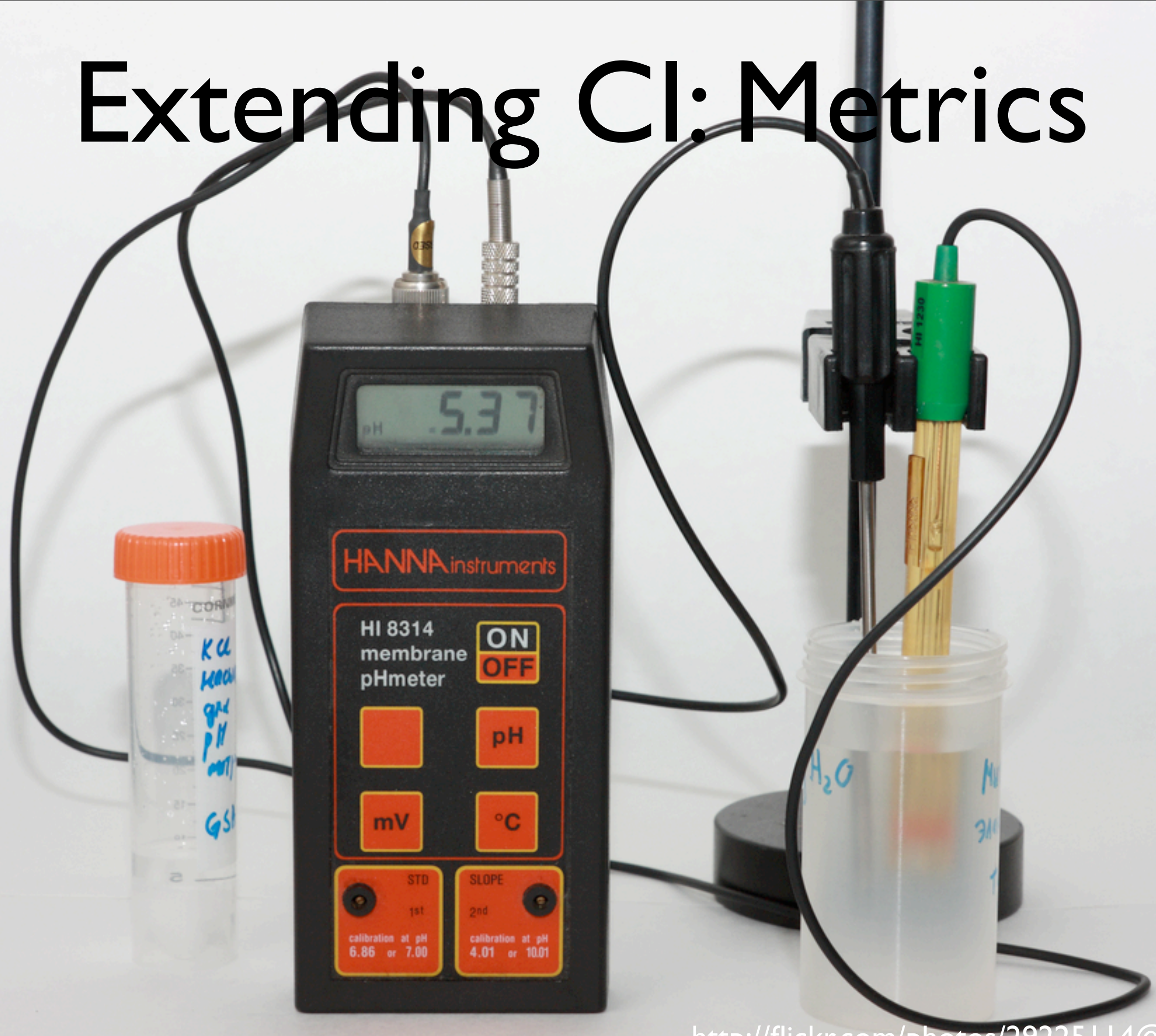
Basic Info Password About Me Q&As My Networks My Performances (0) Upload Video

Basic Information

Email jerry@competitor.com

Wednesday, 4 March 2009

Extending CI: Metrics



<http://flickr.com/photos/29225114@N08//>

Sonar

Dashboard

Measures drilldown
Violations drilldown
Time machine
Coverage clouds
Administration



Version 2.1-SNAPSHOT on Feb. 22, 2009 03:12, using profile Nemo rules.

Lines of code

3'352

6 packages
70 classes
552 methods
0.6% duplicated lines

Comments

69.5%

7'643 comment lines

Code coverage

71.1%

205 tests
3.2 sec ▲

Test success

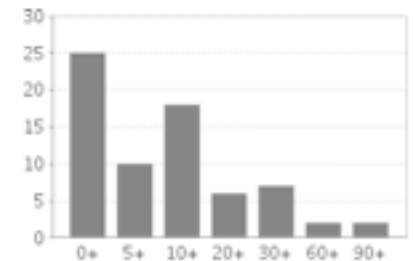
100.0%

0 failures
0 errors

Complexity

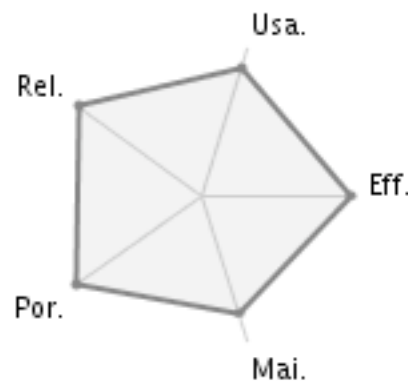
2.4 /method

19.2 /class
1'346 decision points



Rules compliance

67.4% ▼



Violations

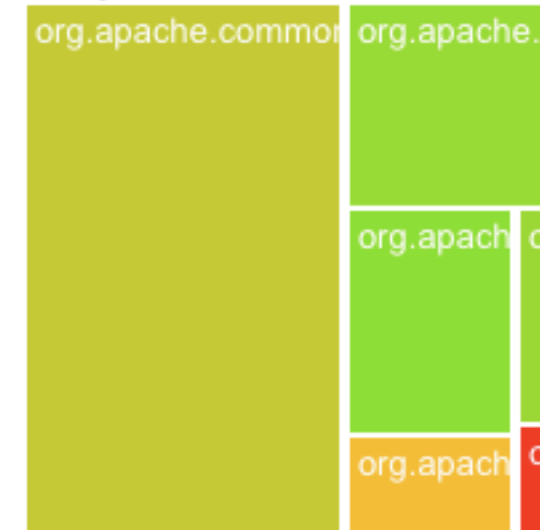
364 ▲

Efficiency
Maintainability
Portability
Reliability
Usability



☐ include opt. rules

Components



Size

Lines of code

Color 0% 100%

Rules compliance

Alert



Events

All

Feb. 22, 2009 Version 2.1-SNAPSHOT

Dec. 28, 2008 Version 2.0-SNAPSHOT

Dec. 21, 2008 Version 1.8.1-SNAPSHOT

FindBugs

Bad practice Warnings

Code Warning

Dm net.sourceforge.cruisecontrol.CruiseControlController.halt() invokes System.exit(...), which shuts down the entire vir

DP net.sourceforge.cruisecontrol.launch.Launcher.run(String[]) creates a java.net.URLClassLoader classloader, which sh

Eq net.sourceforge.cruisecontrol.Attribute defines compareTo(Object) and uses Object.equals()

[Bug type EQ_COMPARETO_USE_OBJECT_EQUALS \(click for details\)](#)

In class net.sourceforge.cruisecontrol.Attribute

In method net.sourceforge.cruisecontrol.Attribute.compareTo(Object)

At Attribute.java:[line 63]

Eq net.sourceforge.cruisecontrol.GenericPluginDetail defines compareTo(Object) and uses Object.equals()

Eq net.sourceforge.cruisecontrol.publishers.rss.Item defines compareTo(Item) and uses Object.equals()

[Bug type EQ_COMPARETO_USE_OBJECT_EQUALS \(click for details\)](#)

In class net.sourceforge.cruisecontrol.publishers.rss.Item

In method net.sourceforge.cruisecontrol.publishers.rss.Item.compareTo(Item)

At Item.java:[line 89]

OS net.sourceforge.cruisecontrol.buildloggers.ClearCaseAuditLogger.log(Element) may fail to close stream

[Bug type OS_OPEN_STREAM \(click for details\)](#)

In class net.sourceforge.cruisecontrol.buildloggers.ClearCaseAuditLogger

In method net.sourceforge.cruisecontrol.buildloggers.ClearCaseAuditLogger.log(Element)

Need to close java.io.Reader

Scaling Cl



http://flickr.com/photos/mr_mt_02/

Scaling Cl: The Build Pipeline



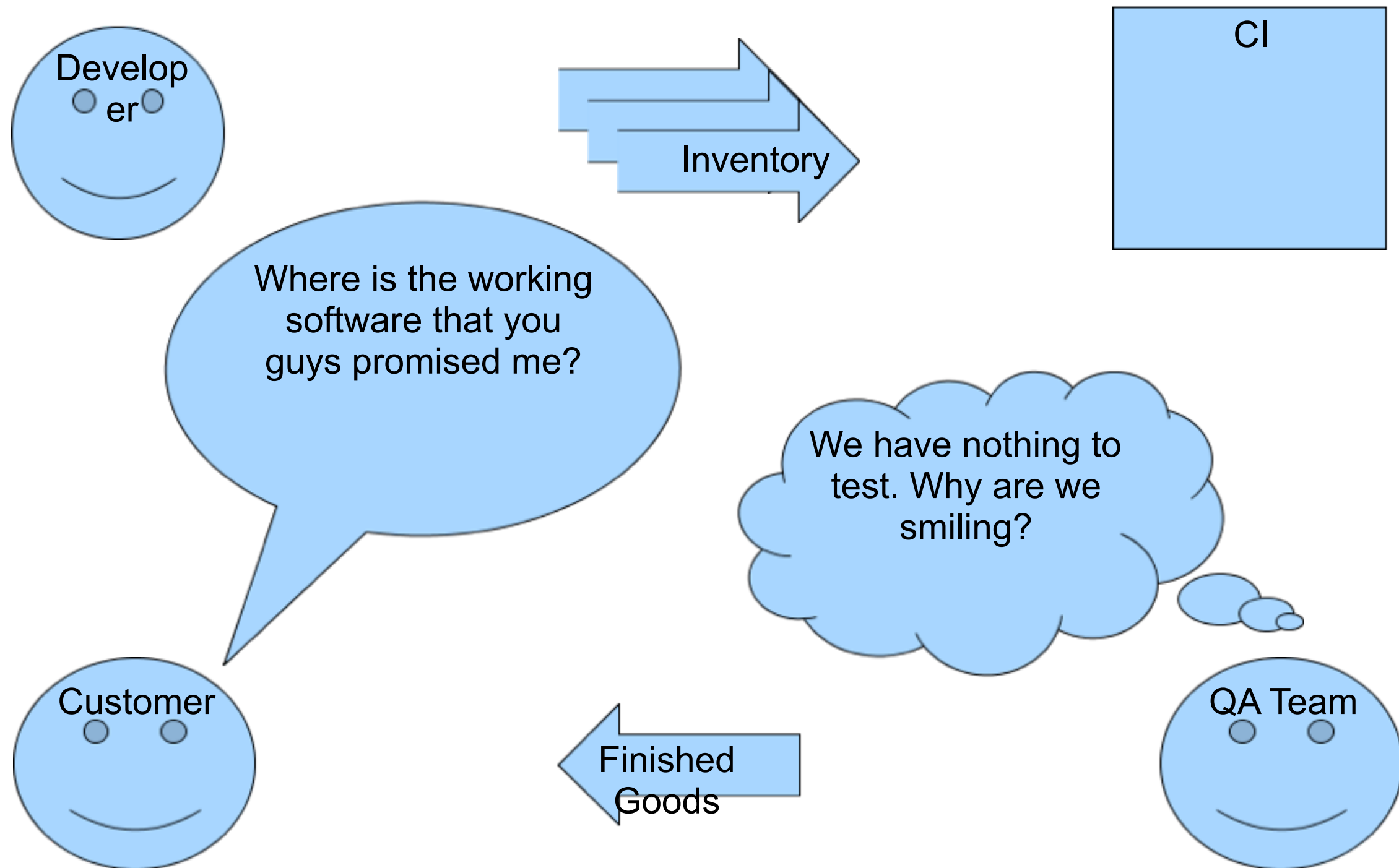
<http://flickr.com/photos/freewine/>

Pipeline Activity in project X

project X 					
	dev		ft		UAT
1.0.5 revision: ddcf951d0d5e... 2 hours ago by ChrisS & ChrisT		auto		manual	
1.0.4 revision: 9b29ca932a59... 6 hours ago by ChrisS & ChrisT		auto		manual	
1.0.3 revision: f91420daffbc... 8 hours ago by Chris Turner		auto		manual	
1.0.2 revision: 8ef33e52e98c... about 1 day ago by CS & ChrisT		auto		auto	
1.0.1 revision: 8ef33e52e98c... about 1 month ago by CS & ChrisT		auto		manual	

Approved by cturner

Bottleneck



Scaling Cl: The Church Organ



<http://flickr.com/photos/tisue/>

Summary

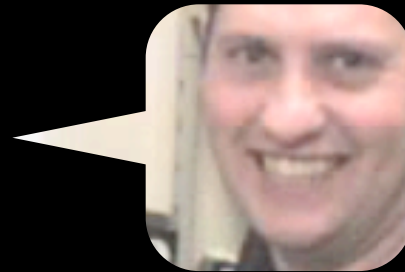
Scaling



Releasing



Admin-ing



Sharing



Extending





Any questions?

<http://flickr.com/photos/chidorian/>

Thanks for listening!

- Other questions?
- <http://www.build-doctor.com>
- medic@build-doctor.com
- <http://twitter.com/simpsonjulian>

