

Hudson CI

haocheng

本著作係依據創用 CC Attribution-ShareAlike 3.0 Unported 授權條款進行授權。如欲瀏覽本授權條款之副本，請造訪 <http://creativecommons.org/licenses/by-sa/3.0/>，或寄信至 Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA。

Continuous Integration is a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily – leading to multiple integrations per day.

-- Martin Fowler

Why CI?

- Rapid Feedback
- Reduced Risk
- Collective Ownership
- Continuous Deployment
- Offload from people

Best Practices of CI

- Single Source Repository
- Commit often
- Make Your Build Self-Testing
- Automate the Build
- Build fast

Hudson

Extensible continuous integration
server



What is Hudson?

- Open-source CI server
- Easy to install and use
- Extensibility
 - Over 330+ plugins (230+ last year)
 - More than 20,000 installations

Why Hudson?

- GUI to manage
- Strong community and eco-system
- Distributed builds
- Open Source and Free!

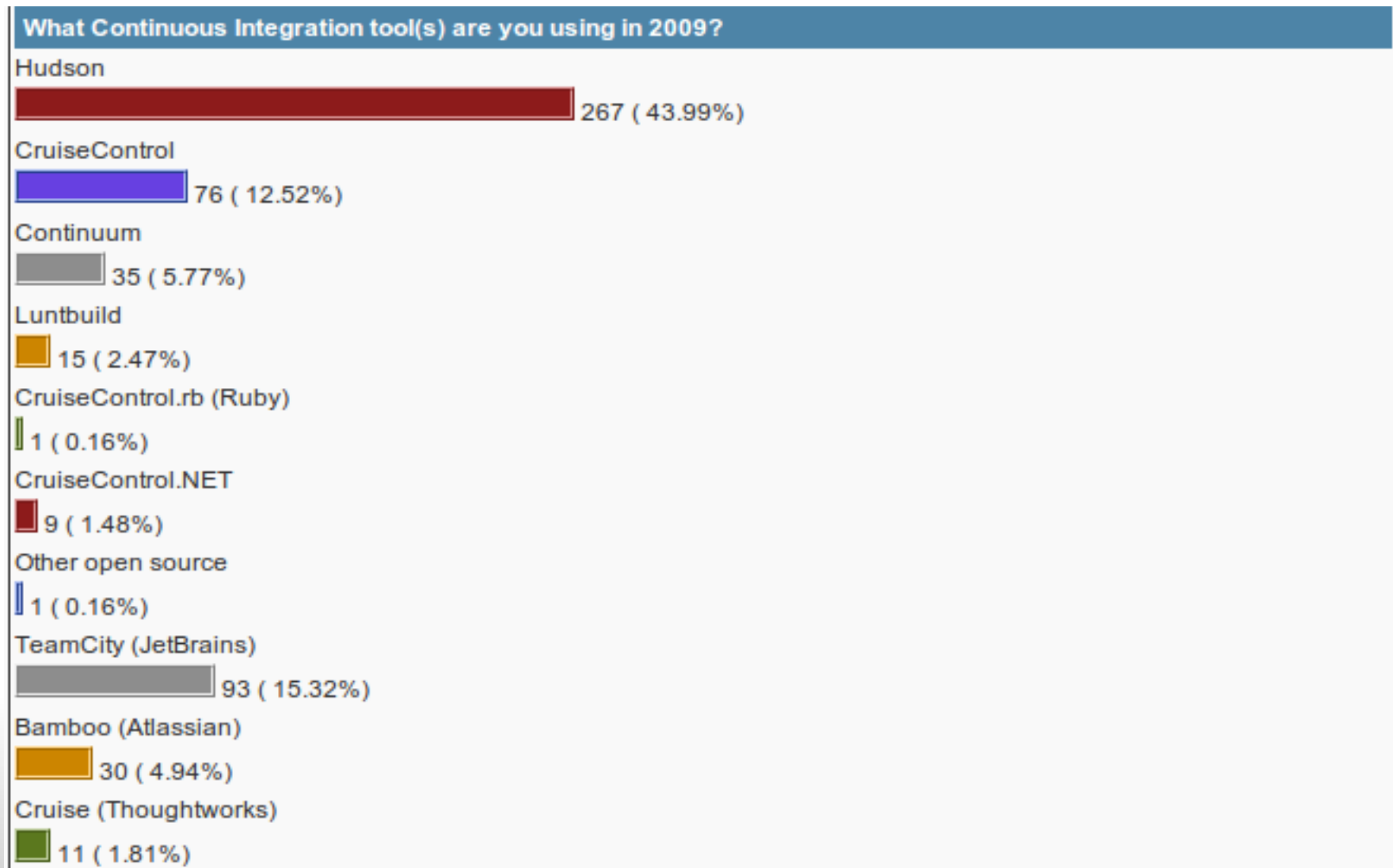
Lots of people are using Hudson...



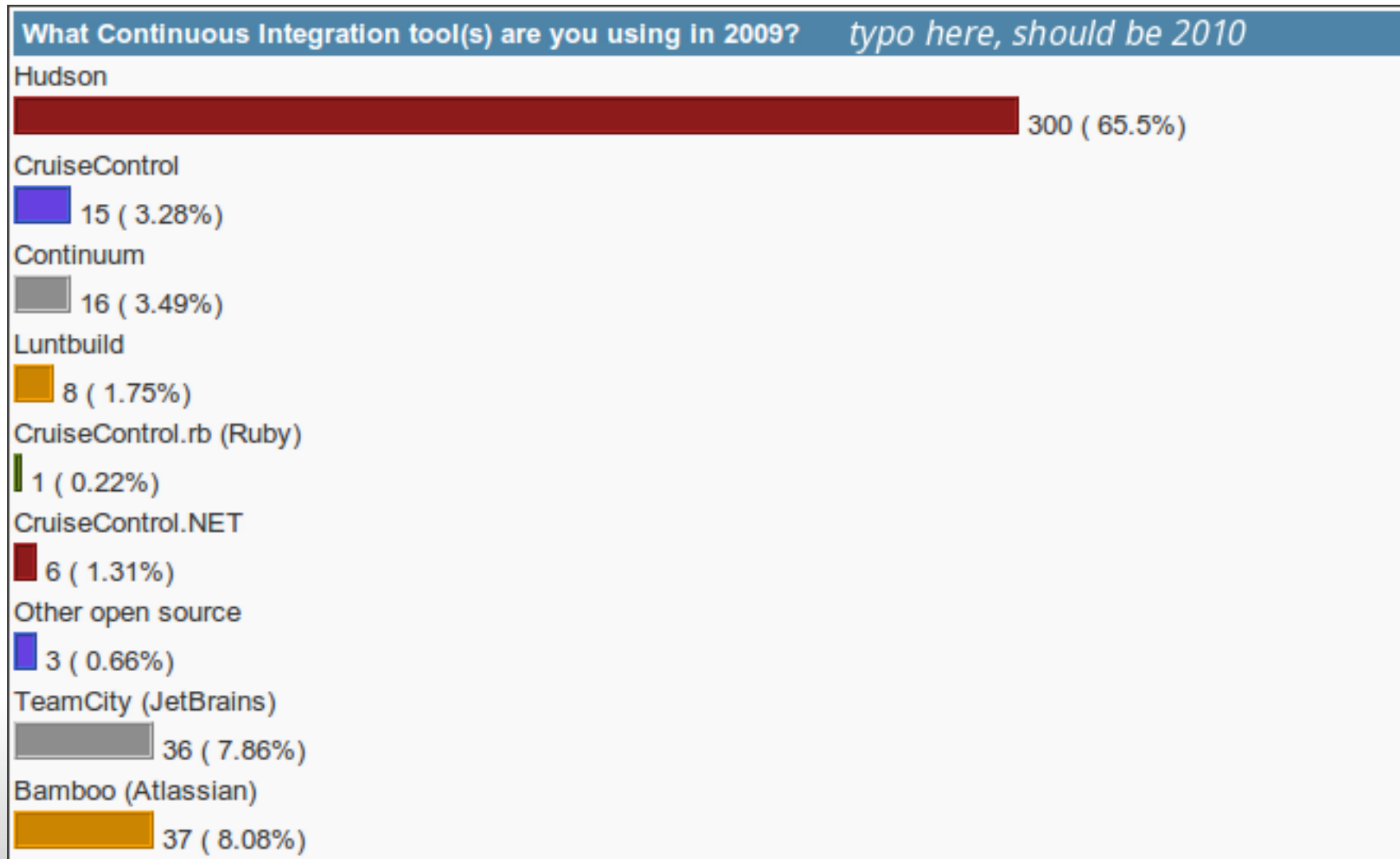
Including Yahoo ;-)



CI Tools survey in 2009



CI Tools survey in 2010



<http://www.wakaleo.com/resources/polls>

Another CI Tools Survey in 2010

Hudson



Continuum



Anthill



Bamboo



Cruise Control



Other (leave comment)

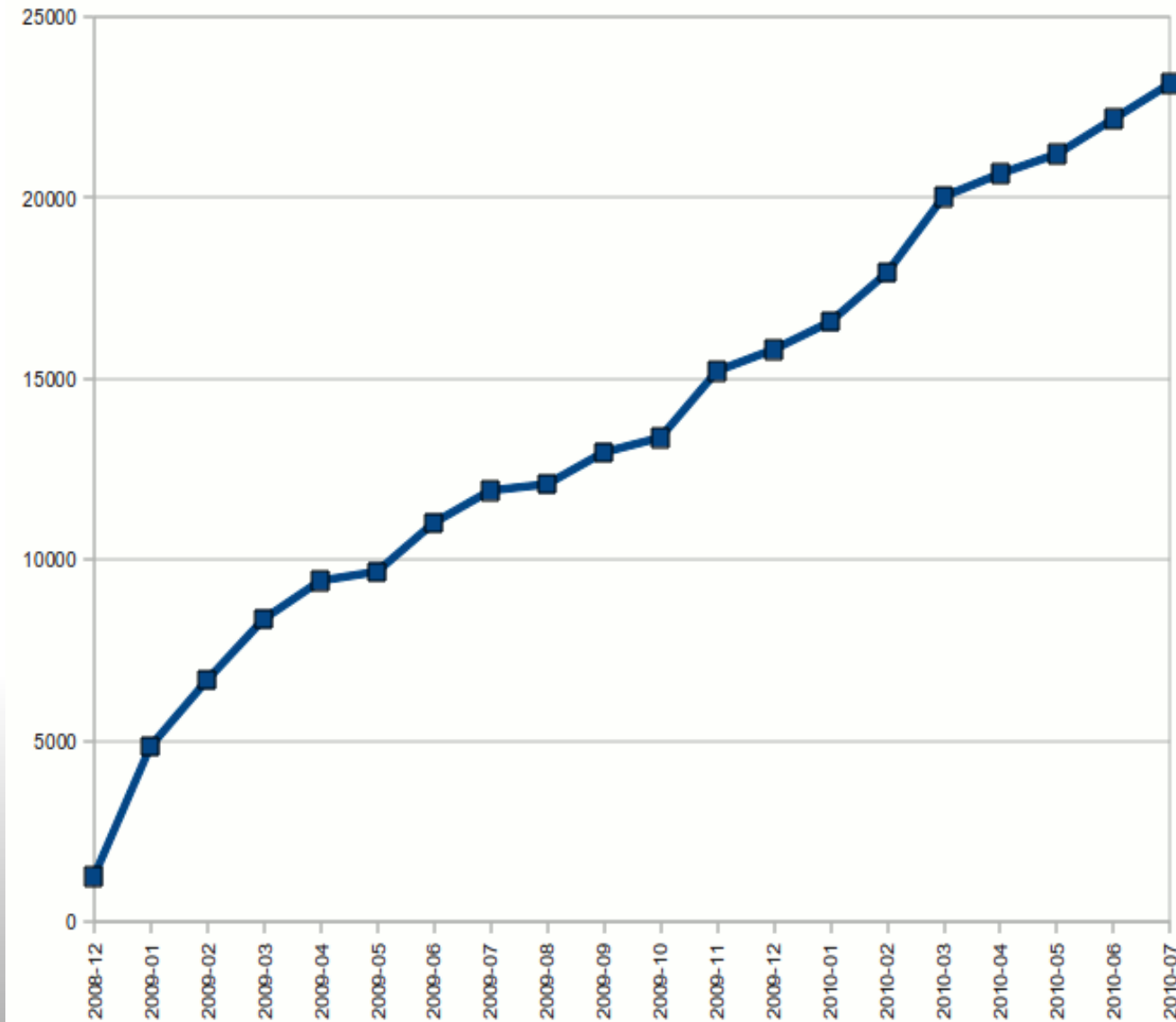


TeamCity

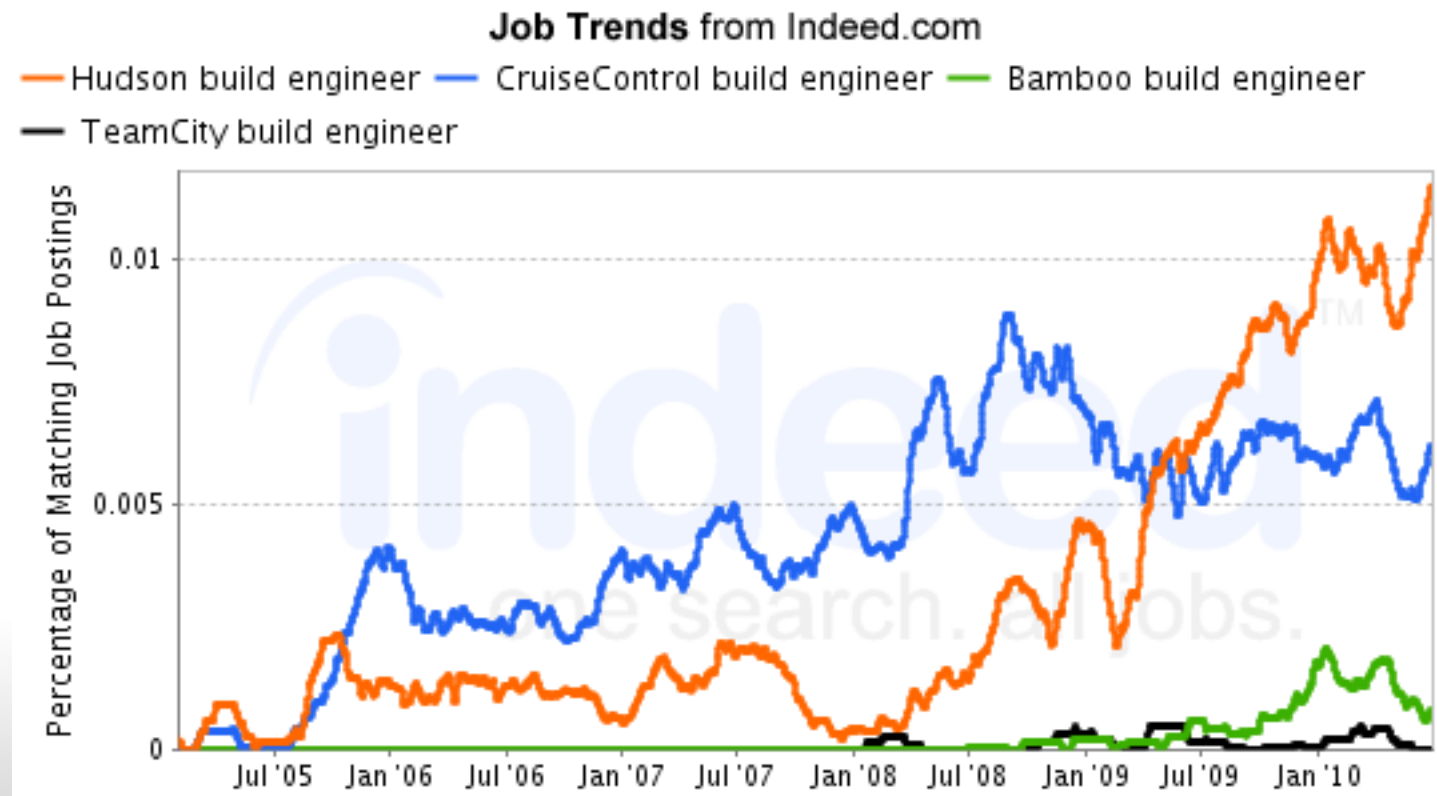


Total votes: 432

Hudson is still growing...



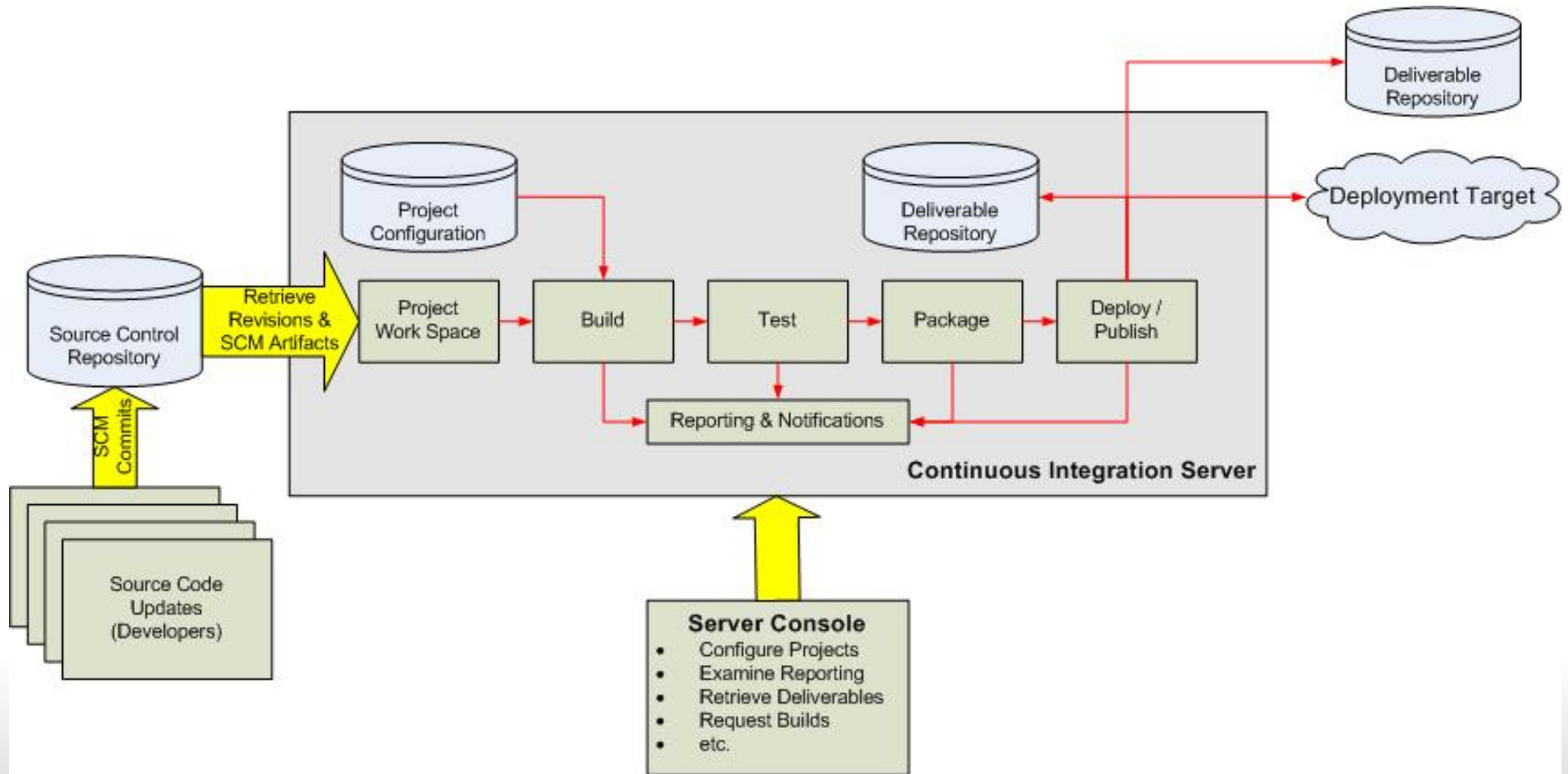
And the Job Trend is increasing



Basic Features

- Notice a change
- Check out source code
- Execute builds/tests
- Record and publish results
- Notify developers

CI Overview



from Continuous integration with Hudson

Notice a change

- Build Periodically
- Depend on other projects
- Poll SCM
 - Subversion Push vs. Pull

Check out source code

- Subversion
- CVS
- Git
- Mercurial
- Perforce

Execute builds/tests

- Java

- Ant, Maven, Gradle

- .Net

- MSBuild, PowerShell

- Shell Script

- Python, Ruby, Groovy

Record and publish results






- JUnit
- TestNG
- Findbugs
- Cobertura
- Checkstyle
- PMD

Job Status

Job State:

Successful	Unstable	Broken	Disabled
			

Job Stability:

80+	60-79	40-59	20-39	0-19
				

Findbugs Integration



?

FindBugs Warnings

FindBugs Result

Warnings Trend

All Warnings	New Warnings	Fixed Warnings
32	1	13

Summary

Total	High Priority	Normal Priority	Low Priority
32	0	32	0

Details

Packages	Files	Types	Warnings	Details	New	Fixed
----------	-------	-------	----------	---------	-----	-------

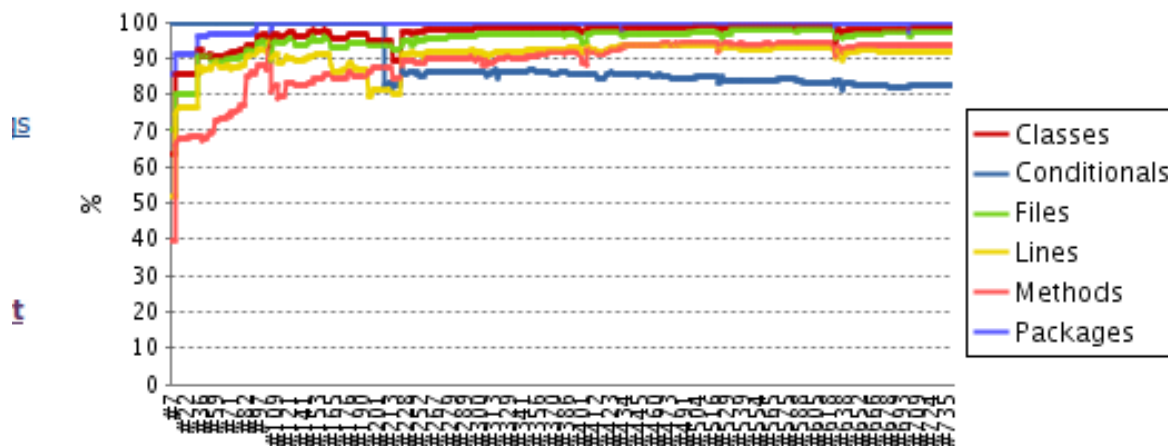
Package	Total	Distribution
ngc.answer	3	<div></div>
nac.answer.discrepancy	4	<div></div>

Cobertura Integration

Code Coverage

Cobertura Coverage Report

Trend



Project Coverage Summary

Name	Packages	Files	Classes	Methods	Lines
Cobertura Coverage Report	100% <div>72/72</div>	97% <div>197/203</div>	98% <div>488/497</div>	94% <div>1650/1763</div>	92% <div></div>

Coverage Breakdown by Package

Name	Files	Classes	Methods	Lines
salvia.pathology.dao	100% <div>1/1</div>	100% <div>1/1</div>	100% <div>1/1</div>	100% <div></div>
salvia.pathology.histology	88% <div>7/8</div>	92% <div>11/12</div>	90% <div>84/93</div>	88% <div>3</div>

Project Relationship



Project Relationship

upstream project:



downstream project:

● #105	● #215-● #220
● #104	● #214
● #103	● #213
● #102	● #206-● #212
● #101	● #198-● #205
● #100	● #193-● #197
● #92	● #192
● #91	● #190 ● #191
● #90	● #189
● #89	● #187 ● #188
● #88	● #181-● #186
● #86	● #170-● #180

Notify developers

- Twitter
- email
- RSS
- IM
- IDE
- Android/iPhone
- Firefox

YOU BROKE THE BUILD!

This is Agnes and she's none too pleased with you, Bub. You broke the build. You should have known that you were making breaking changes, but you checked them in anyway.



If you start using continuous integration, Agnes won't have to come back.

www.YouBrokeTheBuild.com

Twitter

Timeline

Favorites

Following

Followers

Lists ▾



bioit_build

bioit build

SUCCESS:Esperanto \$702 - <http://tinyurl.com/24f5y4n>

31 Aug



bioit_build

bioit build

FAILURE:Esperanto \$701 - <http://tinyurl.com/2wupc89>

31 Aug



bioit_build

bioit build

FAILURE:Esperanto \$700 - <http://tinyurl.com/2aozg6a>

31 Aug



bioit_build

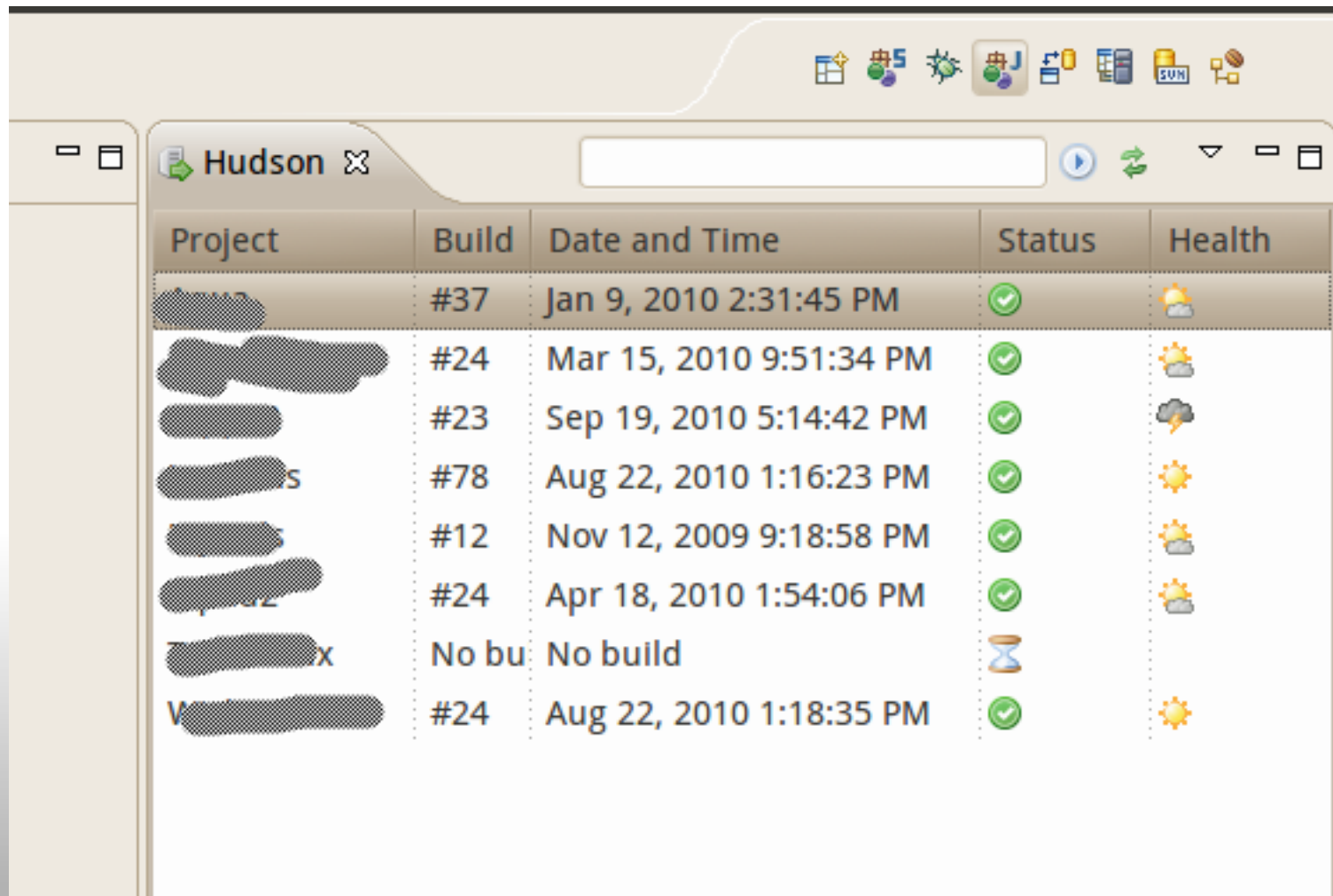
bioit build

SUCCESS:Esperanto \$698 - <http://tinyurl.com/2uswyl4>

30 Aug

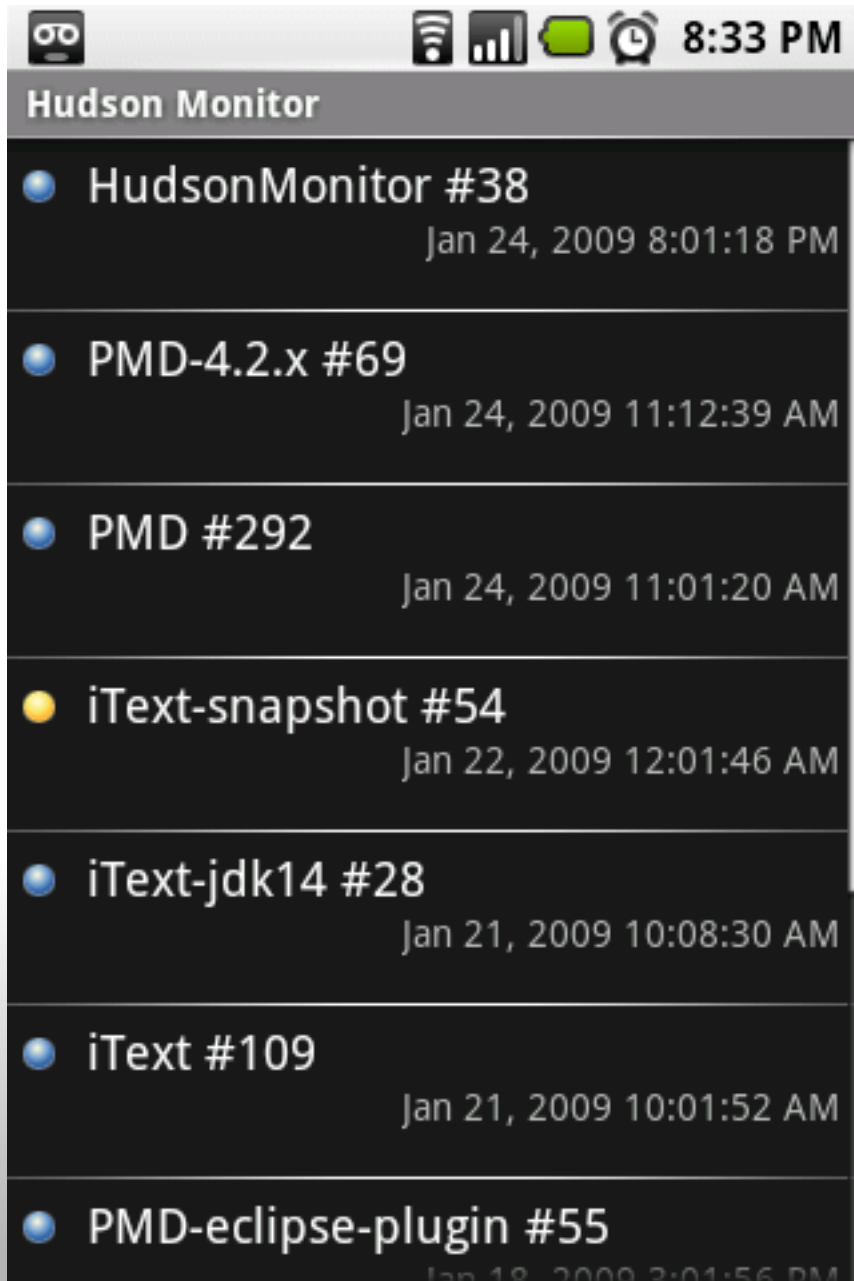
Hudson on Eclipse

Update Site: <http://code.google.com/p/hudson-eclipse/>



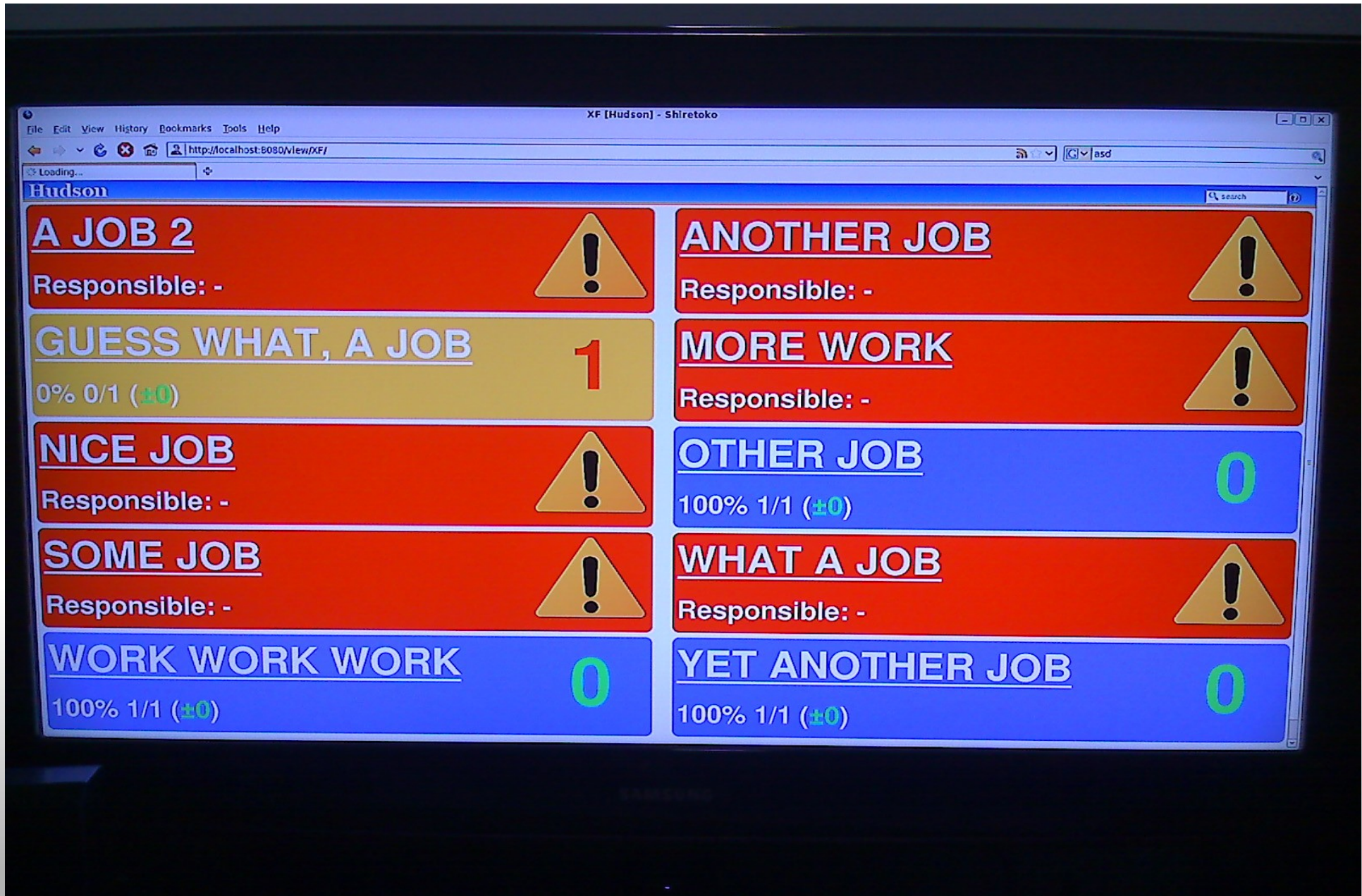
Project	Build	Date and Time	Status	Health
[REDACTED]	#37	Jan 9, 2010 2:31:45 PM	Success	Good
[REDACTED]	#24	Mar 15, 2010 9:51:34 PM	Success	Good
[REDACTED]	#23	Sep 19, 2010 5:14:42 PM	Success	Good
[REDACTED]s	#78	Aug 22, 2010 1:16:23 PM	Success	Good
[REDACTED]s	#12	Nov 12, 2009 9:18:58 PM	Success	Good
[REDACTED]	#24	Apr 18, 2010 1:54:06 PM	Success	Good
[REDACTED]x	No bu	No build	Failure	Bad
[REDACTED]	#24	Aug 22, 2010 1:18:35 PM	Success	Good

Hudson on Android



- Android Market
- [Hudson Wiki](#)

eXtreme Feedback Panel plugin



Hudson Sound plugin

<http://wiki.hudson-ci.org/display/HUDSON/Hudson+Sounds+plugin>



DEMO

Installation&Upgrade

- Download Tomcat 6
- Download hudson.war
- Put hudson.war under webapps
- Start Tomcat

Create a Job

工作名稱

☐ **Build a free-style software project**

This is the central feature of Hudson. Hudson will build your project, combining any SCM with any build system, and then build.

☐ **Build a maven2 project**

Build a maven2 project. Hudson takes advantage of your POM files and drastically reduces the configuration.

☐ **Build an Ivy project**

Build an Ivy project. Hudson takes advantage of your Ivy module descriptor files to provide additional functionality.

☐ **Monitor an external job**

This type of job allows you to record the execution of a process run outside Hudson, even on a remote machine. This is useful for monitoring your existing automation system. See [the documentation for more details](#).

☐ **Build multi-configuration project**

Suitable for projects that need a large number of different configurations, such as testing on multiple environments, per configuration.

☐ **Copy existing job**

Copy from

OK

Configure a Job

Project name

Salvia

Description

- ☐ Discard Old Builds
- ☐ This build is parameterized
- ☐ Disable Build (No new builds will be executed until the project is re-enabled.)
- ☐ Execute concurrent builds if necessary (beta)

Advanced Project Options

Advanced...

Source Code Management

- ☐ None
- ☒ Subversion

Modules

Repository URL

http://svn.bioinfo/svn/trunk/Salvia

Local module directory (optional)

Salvia

Add more locations...

Configure Hudson

Home directory	<input type="text" value="/home/server/hudson_home"/>	?
System Message	<div><div></div></div>	?
# of executors	<input type="text" value="2"/>	?
Quiet period	<input type="text" value="15"/>	?
SCM checkout retry count	<input type="text" value="0"/>	?
Default view	<div>Projects</div>	?
<input type="checkbox"/> Enable security		?
<input type="checkbox"/> Prevent Cross Site Request Forgery exploits		?
<input type="checkbox"/> Help make Hudson better by sending anonymous usage statistics and crash reports to the Hudson project.		?
Global properties		
<input type="checkbox"/> Environment variables		

Manage Plugins

更新	Available	已安裝	進階
Enabled		名稱 ↓	版本
<input checked="" type="checkbox"/>	Hudson Speaks! Plugin	This plugin gives Hudson a voice using FreeTTS .	0.1.1
<input checked="" type="checkbox"/>	FindBugs Plug-in	This plug-in collects the FindBugs analysis results of the project modules and visualizes the found warnings.	4.3
<input type="checkbox"/>	Hudson CVS Plug-in		1.0
<input checked="" type="checkbox"/>	Hudson Locks and Latches plugin	This plugin adds locking and latch functionality to Hudson.	0.5
<input checked="" type="checkbox"/>	Hudson JIRA plugin	This plugin integrates Hudson to Atlassian JIRA .	1.20
<input type="checkbox"/>	Hudson Ivy plugin	This plugin allows Hudson to configure project dependencies using the Ivy dependency management system.	1.1
<input checked="" type="checkbox"/>	eXtreme Feedback Panel	Adds an eXtreme Feedback View intended to be used on large panels to monitor the status of the selected jobs.	1.0.7
<input checked="" type="checkbox"/>	Hudson Sonar Plugin	Quickly benefit from Sonar , an open-source dashboard based on many analysis tools like Checkstyle, PMD and Cobertura.	1.3.1

Going Distributed

- Need Isolation
- Need Different environments
- One Computer is not enough


Add Slave using JNLP

- Java Web Start on slave initiates the session
 - Hudson sends JNLP file and jar files
 - A separate socket connection is made
-



Slave windows

Connect slave to Hudson one of these ways:

-  Launch Launch agent from browser on slave

- Run from slave command line:

```
javaws http://localhost:8080/hudson/computer/windows/slave-agent.jnlp
```

- Or if the slave is headless:

```
java -jar slave.jar -jnlpUrl http://localhost:8080/hudson/computer/windows/slave-agent.jnlp
```

Projects tied to windows

None

Add Slave using sshd

- Master talks to sshd on a slave
- Send slave.jar and “java -jar slave.jar”
- SSH session becomes bi-di byte stream

```
Creating jdk1.6.0_16/jre/lib/rt.jar
Creating jdk1.6.0_16/jre/lib/jsse.jar
Creating jdk1.6.0_16/jre/lib/charsets.jar
Creating jdk1.6.0_16/lib/tools.jar
Creating jdk1.6.0_16/jre/lib/ext/localedata.jar
Creating jdk1.6.0_16/jre/lib/plugin.jar
Creating jdk1.6.0_16/jre/lib/javaws.jar
Creating jdk1.6.0_16/jre/lib/deploy.jar
```

```
Done.
[09/27/10 23:21:20] [SSH] Starting sftp client.
[09/27/10 23:21:20] [SSH] Copying latest slave.jar...
[09/27/10 23:21:21] [SSH] Copied 229,544 bytes.
[09/27/10 23:21:21] [SSH] Starting slave process: cd '/home/haocheng/hudson' && /home/haocheng/hudson/jdk/bin/java -jar slave.jar
<===[HUDSON REMOTING CAPACITY]===>***channel started
Slave.jar version: 1.378
This is a Unix slave
Copied maven-agent.jar
Copied maven-interceptor.jar
Copied maven2.1-interceptor.jar
Slave successfully connected and online
```









Some Distributed Issues

- Different OS/Environment
- Install required tools
- System administration
- Need to install slave manually
- Tied Jobs to Slaves

Monitor Slaves

- Monitor key metrics
 - Low disk space and swap
 - Clock out of sync
- Put offline automatically

S	名稱 ↓	Response Time	Free Swap Space	Free Disk Space	Free Temp Space	Architecture	Clock Difference	
	master	1ms	882MB	4GB	4GB	Linux (i386)	In sync	
	Ubuntu	40ms	480MB	5GB	5GB	Linux (i386)	In sync	
	WinXP	53ms	956MB	11GB	11GB	Windows XP (x86)	In sync	

Refresh status

Automated System Installations



- > Hudson + pxe-install plugin
 - BOOTP proxy
 - TFTP
 - pxelinux



Your corporate IT guy
& his DHCP server

- > Slaves
 - Power on, hit F12
 - PC boots from network (PXE)
 - Choose OS from menu
 - Chain boot into OS
 - Installs non-interactively



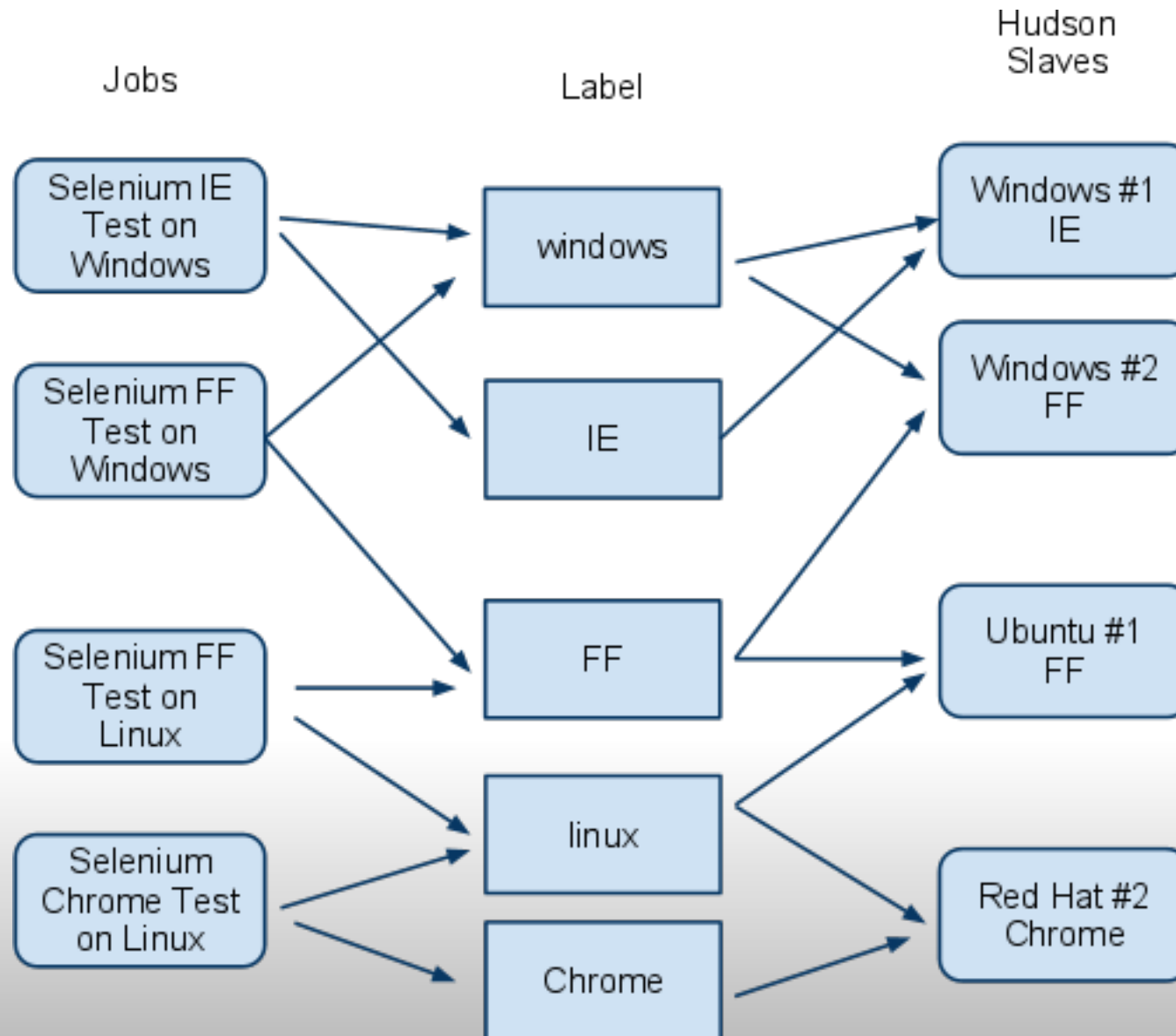
from Koshuke's slide: [Continuous Integration in the Cloud with Hudson, JavaOne 2009](#)

Automated System Installations

- > Trivial with most Linux and Solaris
- > Works with Windows, too
 - Called “Windows Deployment Service”
 - Needs a Windows 2003 server
 - Vista (easy) or XP (hard) deployment
- > Turns out quite useful outside Hudson, too
 - No more broken CD drives
 - No more CD-Rs

from Koshuke's slide: [Continuous Integration in the Cloud with Hudson, JavaOne 2009](#)

Labels to Rescue



More on Label

- Don't tied job to Slave, tied to Label
- Label is a group of slaves
- Support boolean expressions since 1.372
 - windows&&IE
 - FF||Chrome
 - !windows
- Can be used with Matrix Project

Matrix project

- Need to run in multiple environments
 - Different JDK
 - Different OS
 - Different Browser
- Axis could be:
 - Slave
 - User defined
- Combination Filter
 - `!(OS=="linux" && browser=="IE")`
- Touchstone builds
 - Sanity check

Create Matrix Project

工作名稱

☐ **Build a free-style software project**

This is the central feature of Hudson. Hudson will build your project, combining any SCM with something other than software build.

☐ **Build a maven2 project**

Build a maven2 project. Hudson takes advantage of your POM files and drastically reduces

☐ **Monitor an external job**

This type of job allows you to record the execution of a process run outside Hudson, even connect Hudson as a dashboard of your existing automation system. See [the documentation for more](#)

☒ **Build multi-configuration project**

Suitable for projects that need a large number of different configurations, such as testing o

☐ **Copy existing job**

Copy from

OK

Configuration

Configuration Matrix

Slaves

Name

Node/Label

- ☐ FF (Ubuntu 10.10)
- ☐ IE ()
- ☒ linux (Ubuntu 10.10)
- ☒ windows ()

Slaves

Name

Node/Label

- ☒ FF (Ubuntu 10.10)
- ☒ IE ()
- ☐ linux (Ubuntu 10.10)
- ☐ windows ()

Add axis ▼

☐ Run each configuration sequentially

☒ Combination Filter

Filter

☒ Execute touchstone builds first

Filter



Required result

Execute the rest of the combinations only if the touchstone builds has (at least) the selected result.

Results

Project Demo-Matrix

Configuration Matrix

	linux	windows
FF		
IE		

Configuration linux,FF



[工作區](#)



[最近的變更](#)

永久連結

- [Last build \(#1\), 20 min ago](#)
- [Last stable build \(#1\), 20 min ago](#)
- [Last successful build \(#1\), 20 min ago](#)

DEMO

Hudson on Cloud

- Hudson EC2 plugin
- CloudBees
- 8.5 cents/hour of EC2 vs 1 cent/minute of CB

Hudson EC2 plugin


AWS Account Information

Cloud


Amazon EC2

Region ?


Access Key ID ?

 **Invalid AWS access key ID**

Secret Access Key

 **Invalid AWS secret access key**

EC2 RSA Private Key ?


 **This doesn't look like a private key at all**

Hudson EC2 plugin

And which AMI you want to start

AMIs

AMI ID

 Endpoint URL is not a valid URL

Instance Type

Choose the instance type you'd want to launch.

Description

Remote FS root


Remote user

Labels

Init Script

This shell script gets executed right after Hudson connects to a new EC2 instance. This is a good place to execute a system set up, such as installing some packages.

CloudBees' Hudson as a Service



The screenshot displays the CloudBees Hudson web interface. The top navigation bar includes links for Home, DEV@cloud, RUN@cloud, Support, and Account. The left sidebar contains various navigation options such as New Job, Manage Nodes, Build Queue, and Build History. The main content area shows a table of jobs with columns for Job Name, Last Success, Last Failure, and Last Duration. A blue callout box with an arrow points to the 'Build Queue' section, stating: 'But with CloudBees Host, slaves are dynamically added!'.

Job Name	Last Success	Last Failure	Last Duration
BuildQueue	N/A	7 hr 4 min (S)	22 sec
Build	1 day 12 hr (S)	N/A	2 hr 12 min
Build	2 days 4 hr (S)	N/A	25 min
Build	14 hr (S)	N/A	8 min 47 sec
Build	N/A	1 day 18 hr (S)	18 min
Build	N/A	1 day 12 hr (S)	40 sec
Build	14 hr (S)	N/A	2 min 28 sec
Build	14 hr (S)	N/A	1 min 50 sec
Build	14 hr (S)	N/A	16 sec
Build	14 hr (S)	1 day 13 hr (S)	8 min 54 sec
Build	14 hr (S)	2 days 3 hr (S)	21 min
Build	1 day 15 hr (S)	1 day 18 hr (S)	1 min 38 sec

Miscellaneous

- Integrate with Repository Browser
- Monitor an external job
- Hudson for non-Java Projects

Tracking Changes



Changes

[#740 \(2010/3/9 上午 11:56:35\)](#)

37940. Apply Exp時的注意事項提醒功能 — [vita](#) / [Sventon 2.x](#)

[#737 \(2010/3/8 下午 04:25:23\)](#)

37868. — [vita](#) / [Sventon 2.x](#)

[#736 \(2010/3/8 下午 04:21:22\)](#)

37867. — [vita](#) / [Sventon 2.x](#)

37866. — [vita](#) / [Sventon 2.x](#)

[#733 \(2010/3/8 上午 11:18:38\)](#)

37785. add Google-Collections jar — [haocheng](#) / [Sventon 2.x](#)

37784. organize imports — [haocheng](#) / [Sventon 2.x](#)

[#727 \(2010/3/3 下午 04:22:16\)](#)

37651. extract comparator into separate class to implement Serializable — [haocheng](#) / [Sventon 2.x](#)

[#726 \(2010/3/3 下午 04:15:16\)](#)

37647. organize imports — [haocheng](#) / [Sventon 2.x](#)

[#724 \(2010/3/2 下午 05:16:01\)](#)

Integration with Sventon

[\[show recent changes\]](#)

HEAD 379

Rev: **37940** - <http://svn.bioinfo/svn/>

Revision Information - 37940

Show directory



Revision: 37940

Date: 2010/3/9 上午 11:51

Author: vita

Message: Apply Exp時的注意事項提醒功能

Action Path

Modified [/trunk/Salvia/src/salvia/pathology/bloodchem/web/BeginApplyBloodChemistryExpCasePage.html](#)

Modified [/trunk/Salvia/src/salvia/pathology/histology/web/BeginApplyHistologyExpCasePage.html](#)

Modified [/trunk/Salvia/src/salvia/pathology/urine/web/BeginApplyUrineExpCasePage.html](#)

Modified [/trunk/Salvia/src/salvia/web/base/BaseWebPage.html](#)

Added [/trunk/Salvia/web/js/globalFunctions.js](#)

Monitor an External Job

Hudson Wiki - Monitor an External Job

Hudson

[Hudson](#) » [Backup Mercurial](#) » [#15](#)



[Back to Job](#)



[Console Output](#)



[Previous Run](#)



畫面輸出

Started

```
tar: 從成員名稱中移除前端的「/」  
/home/haocheng/dbdump/  
/home/haocheng/dbdump/aqua.tar  
Finished: SUCCESS
```

Hudson for non-Java Projects

- Python
- PHP
- Ruby
- .Net



- Hudson: <http://hudson-ci.org/>
- Mailing List: <http://wiki.hudson-ci.org/display/HUDSON/Mailing+List>
- Wiki: <http://wiki.hudson-ci.org/display/HUDSON/Home>
- Follow @hudsonci on Twitter
- "TS-5301 Continuous Integration in the Cloud with Hudson" by Koshuke
- Hudson Wiki - Distributed builds
- Label and Matrix Project Enhancements
- Continuous Integration by Martin Fowler
- Continuous Integration with Hudson - the book
- Continuous Integration with Hudson on JavaWorld



- haocheng.lee@gmail.com
- follow [@haocheng](https://twitter.com/haocheng) on Twitter