

Continuous Integration Practice

Automated build pipelines with Hudson and Sonar

And Other Cool Hudson Tips !

Forest Xie

Nexus International Team

Dec 2011



Agenda



CI Basic



Hudson



Deploy
Pipeline



Quality
metrics



sonar

Automated
Code Quality

CI Fundamentals

Martin Fowler sez:

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.



**Faster
Feedback**



**Better
Visibility**



**Automated
Delivery**

In software engineering, continuous integration (CI) implements continuous processes of applying quality control — small pieces of effort, applied frequently. Continuous integration aims to improve the quality of software, and to reduce the time taken to deliver it, by replacing the traditional practice of applying quality control after completing all development.

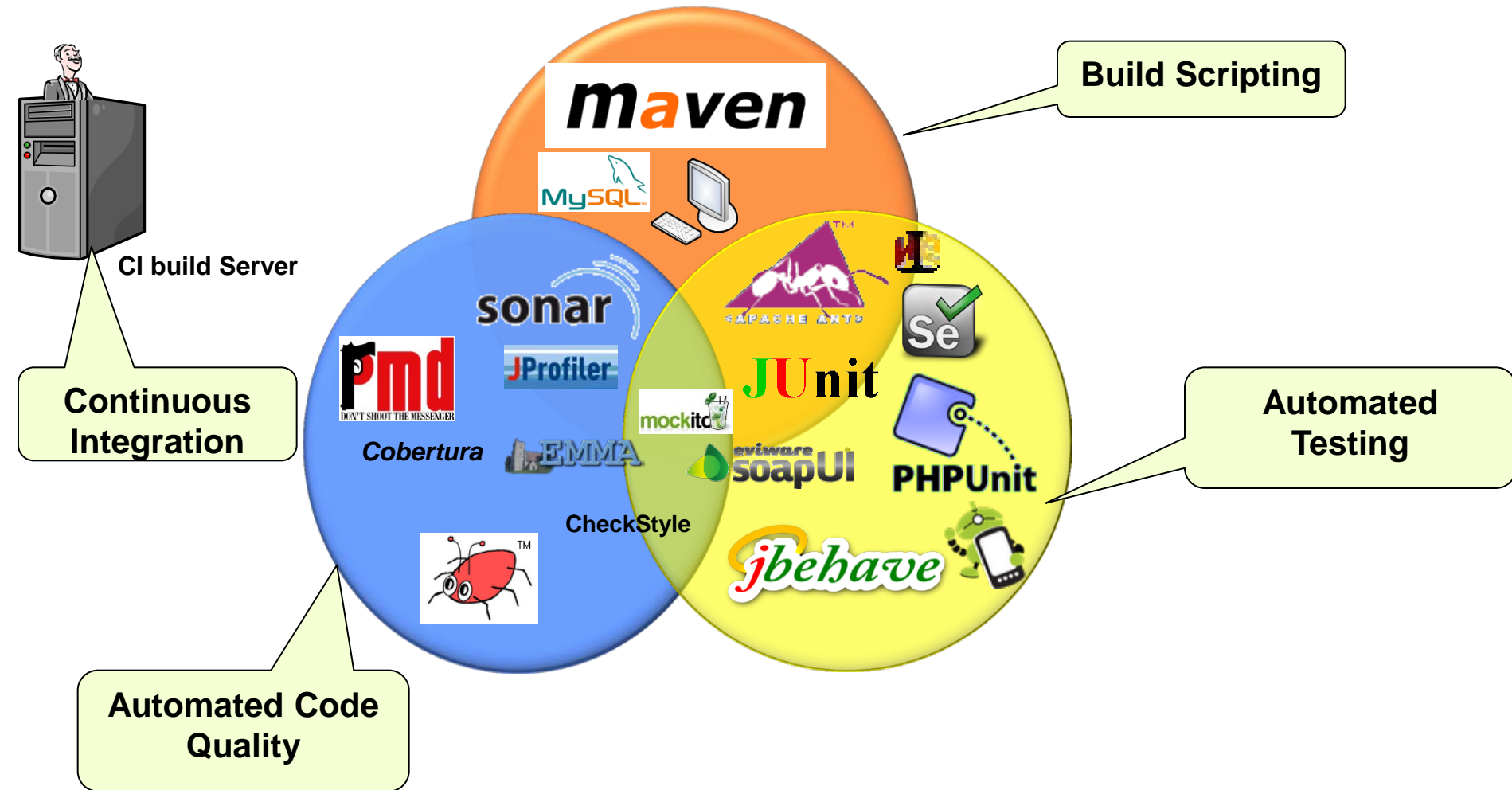
Meet Mr. Hudson!

- Open-source CI server at java.net
- Emphasis on ease of installation and use
 - “java -jar hudson.war” execution
 - Configure everything from browsers
- Extensibility
 - 140+ community-developed public plugins
 - By 150+ contributors

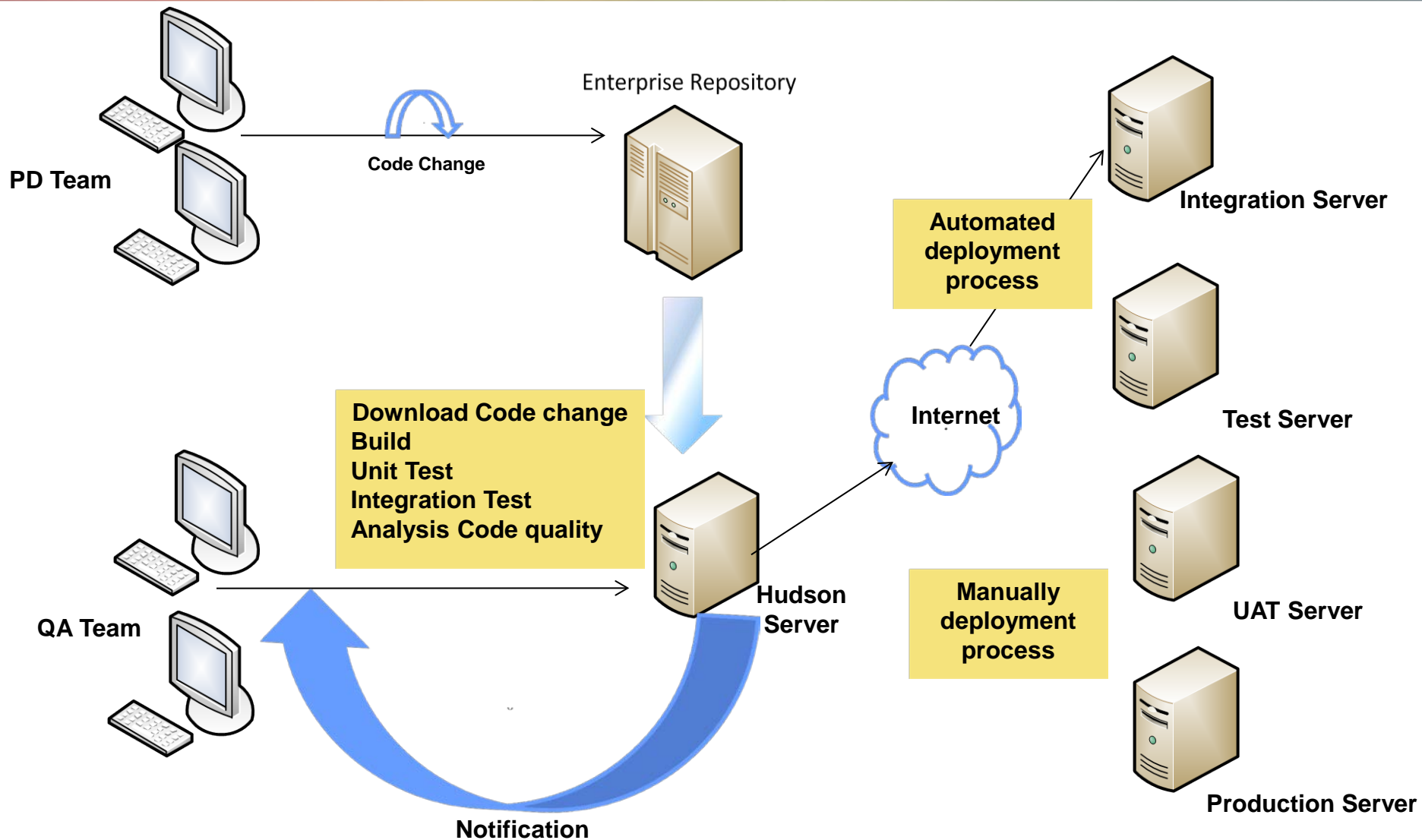


*Easy to set up and configure
Good build and code quality metrics
Lots of plug-in*

CI Big Picture In Nexus International Team



CI Structure In Nexus International Team



Demonstration environment

Hudson

search

Hudson

新建任务

系统管理

用户

构建历史

Project Relationship

Check File Fingerprint

New View

Launch Tray App

Status Monitor

Welcome to Kijiji QA Global CI Server

Build Status

All	CA-QA-Deploy-Pipeline	+					
S	W	任务 ↓	上次成功	上次失败	上次持续时间	Console	
		QA-daily-trigger	2 小时 23 分 (#22)	N/A	94 毫秒		
		QA e747 Analysis	14 days (#5)	14 days (#4)	1 小时 2 分		
		QA e747 commit	2 小时 23 分 (#43)	9 小时 3 分 (#41)	21 分		
		QA e747 deploy	1 小时 16 分 (#30)	13 days (#9)	9 分 11 秒		
		QA e747 Integration test	1 小时 37 分 (#25)	N/A	20 分		
		QA e747 unit testing	2 小时 1 分 (#52)	13 days (#36)	24 分		
		QA e748 commit	N/A	N/A	N/A	N/A	

图标: [S](#) [M](#) [L](#)

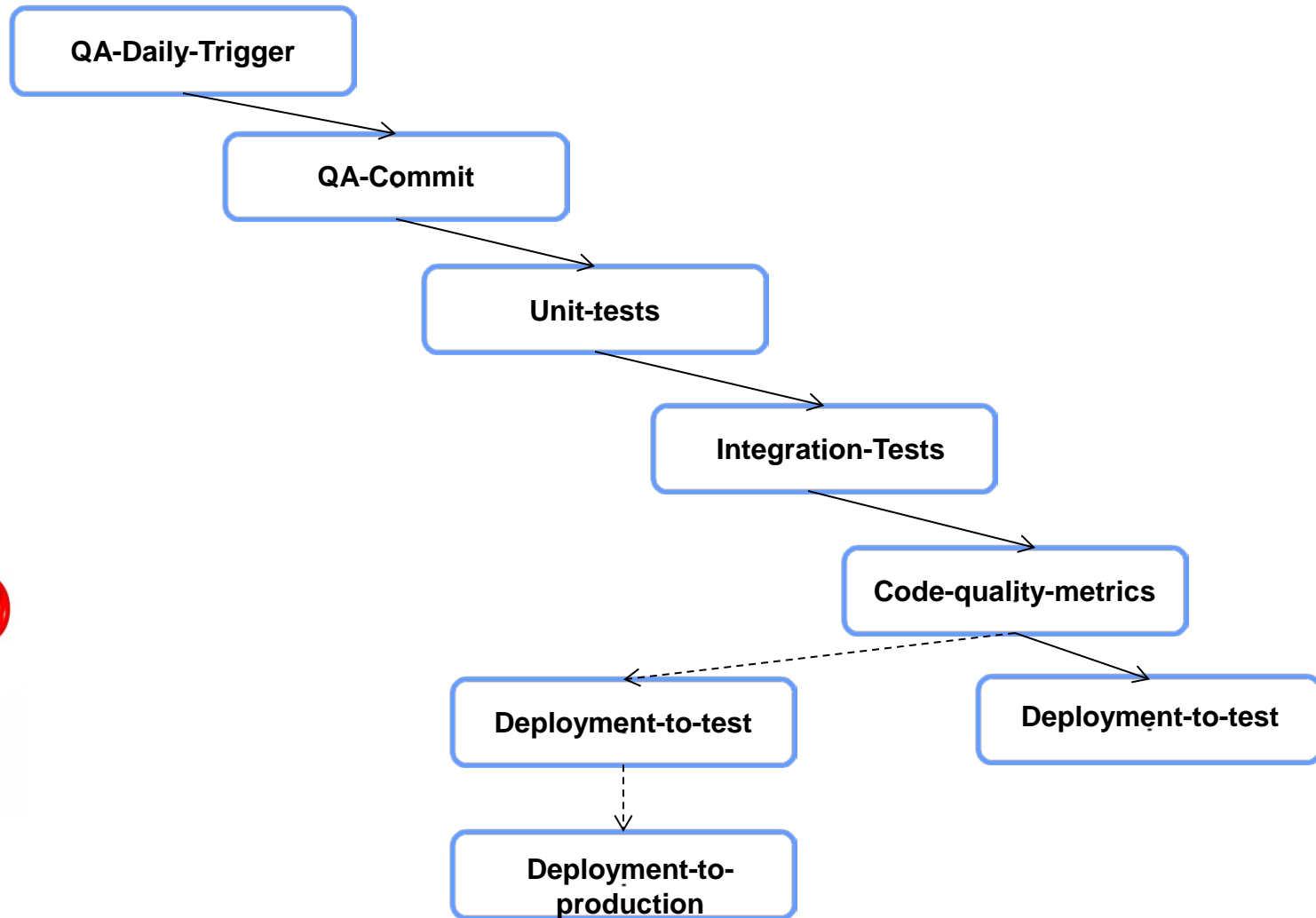
图例 [全部](#) [失败](#) [最后一次](#)

Hudson Instance for CA

Build pipelines



Deploy Pipeline in Nexus International Team

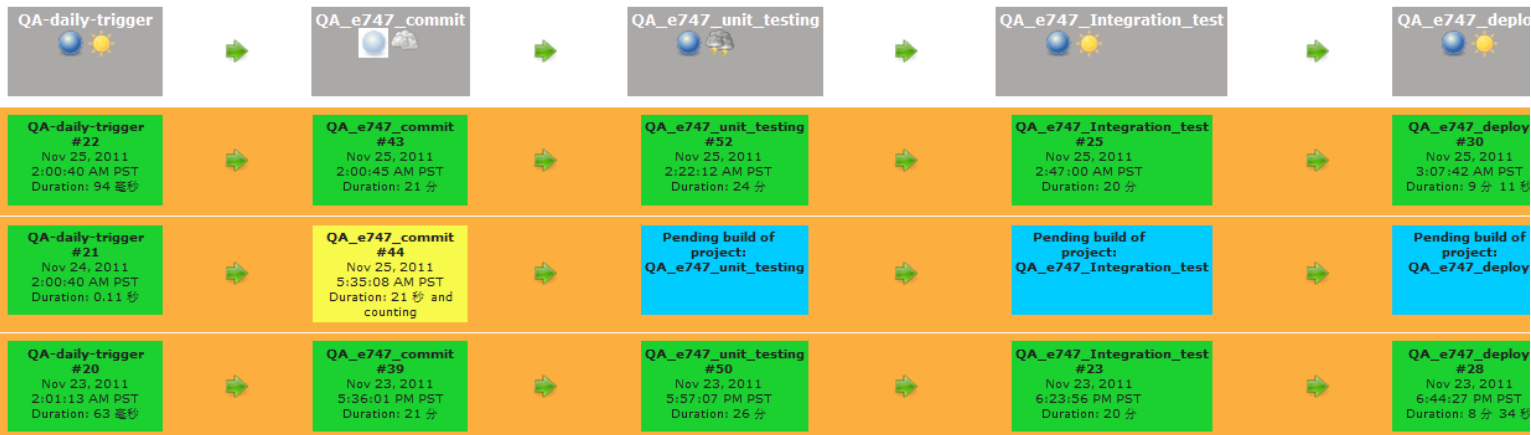


CA Project Release Pipeline

Hudson » CA-QA-Deploy-Pipeline

Build Pipeline View: CA-QA-Deploy-Pipeline

- Configure View
- Start Build of Pipeline for QA-daily-trigger
- View/Hide Build Pipeline Icon Legend



Create Hudson Jobs/Pipeline by Script

-
- Demo



Never send a human to do a machine's job.

Code Quality Metrics



Why use code quality metrics

- ✓ **Better quality code**
- ✓ **Global picture of code quality**
- ✓ **Statistical code quality trends**
- ✓ **Detect potential bugs**
- ✓ **More value-added manual reviews**



Types of code quality metrics we are using

- Coding Standards
 - Naming conventions, Javadoc comments, layout...
 - Tool: **CheckStyle**
- Best Practices
 - Good programming habits, potential bugs,...
 - Tools: **Checkstyle, PMD, Findbugs, Crap4j**
- Bug Detection
 - Broken code, dangerous code, bugs,...
 - Tool: **FindBugs**
- Code Coverage
 - How much code is executed by your tests
 - Tool: **Cobertura, Emma, Cloveer, Crap4j**

Automating code quality metrics with Hudson

- Configuring the plugin

Define thresholds appropriate for your project

☒ Publish FindBugs analysis results

Use rank as priority ☐

Run always ☒

Health thresholds
 100% 100 0% 200

Health priorities
☐ Only priority high ☐ Priorities high and normal ☒ All priorities

Status thresholds

	All priorities	Priority high	Priority normal	Priority low
Total	500	200		
New	200	100		
Total	500	200		
New	200	100		

Use delta for new warnings ☐

Trend graph [You can define the default values for the trend graph in a separate view.](#)

Run static analysis tool

Build

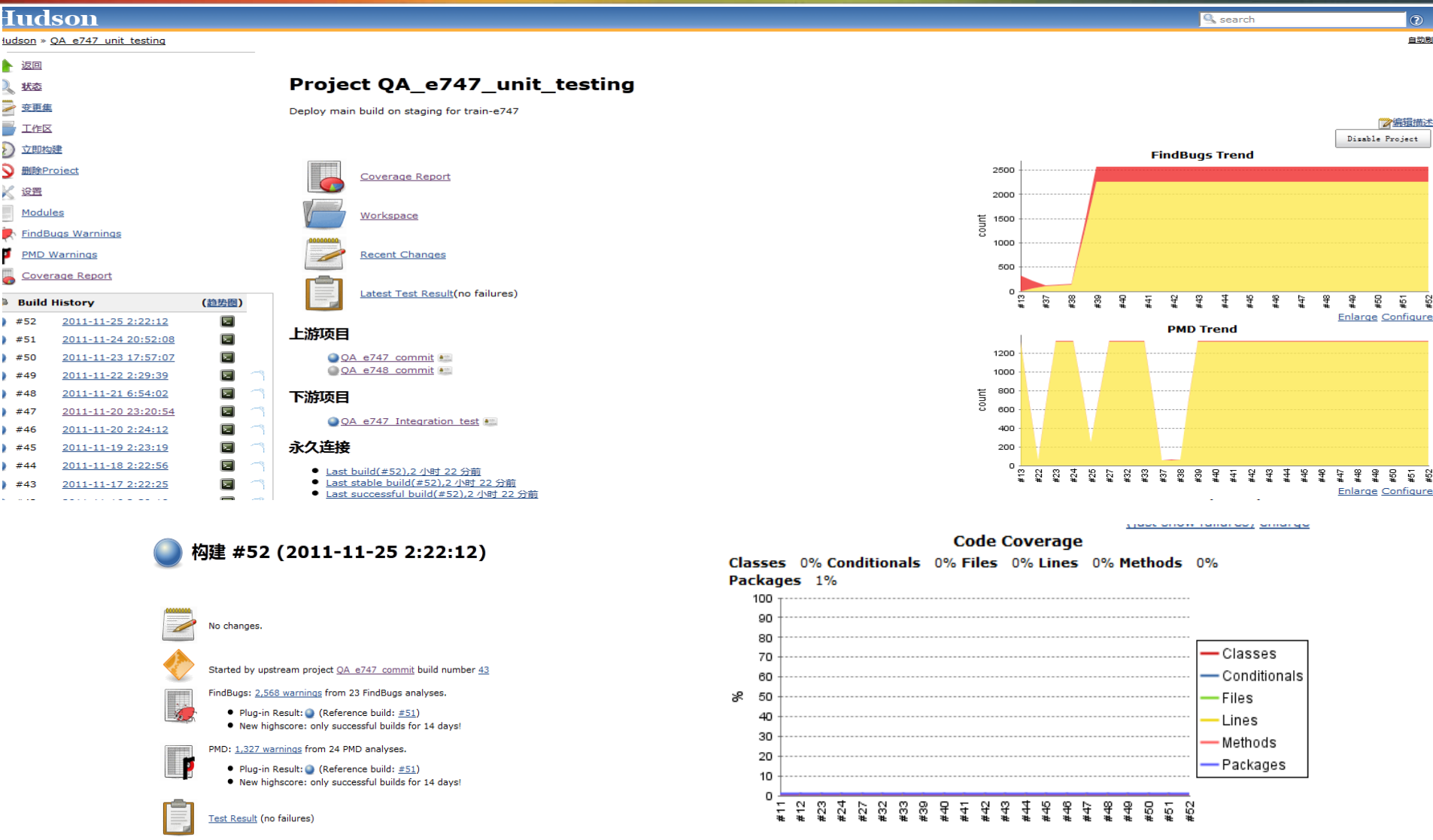
Root POM

view/v3classifieds/c4/pom.xml

Goals and options

clean test findbugs:findbugs pmd:pmd cobertura:cobertura -e

Automating code quality metrics with Hudson



“I Find Your Lack of Tests Disturbing”

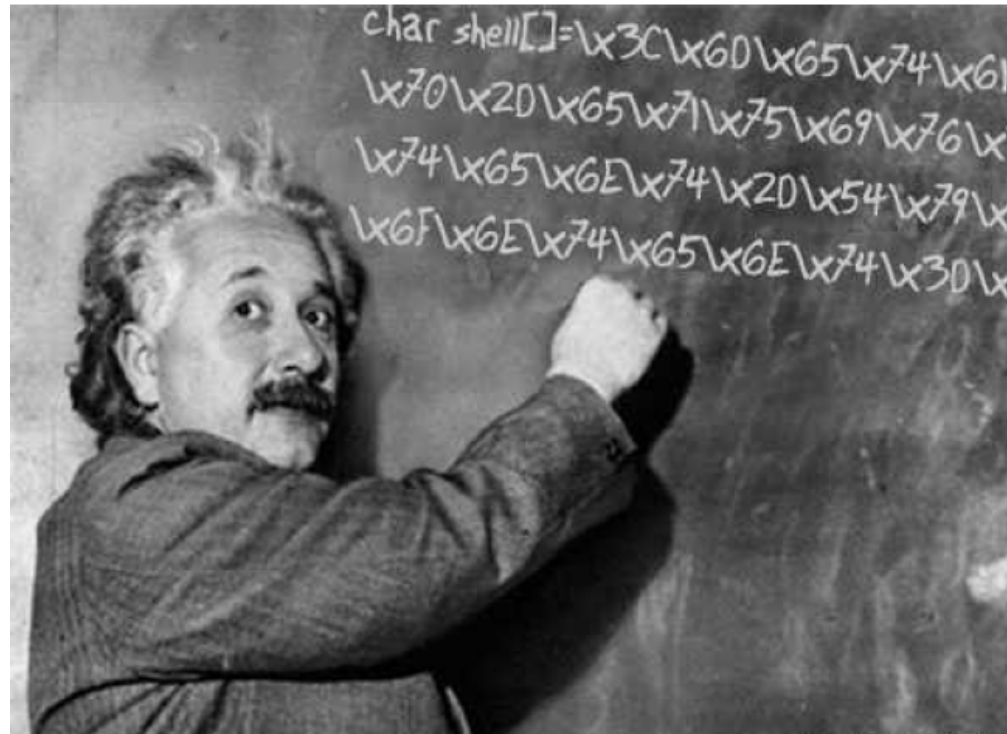


TESTING

I FIND YOUR LACK OF TESTS DISTURBING.

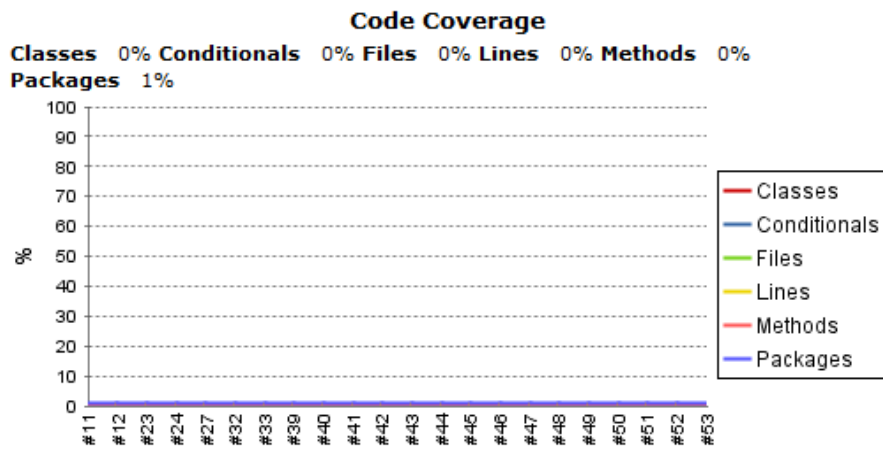
Code Coverage

- What can code coverage metrics tell you:
 - Indicates what code is being executed by your unit tests
 - Can help isolate untested code
 - Does not guarantee that the tests that are run of high quality
 - Can be an indicator of whether tests are being written at all



Get code coverage report in Hudson

- Using the hudson code coverage plugins
 - Generate data using Ant or Maven
 - Report coverage metrics in Hudson



Project Coverage summary

Name	Classes	Conditionals	Files	Lines	Methods	Packages
Cobertura Coverage Report	0% 10/5497	0% 155/98378	0% 10/4268	0% 242/216673	0% 39/45289	1% 6/546

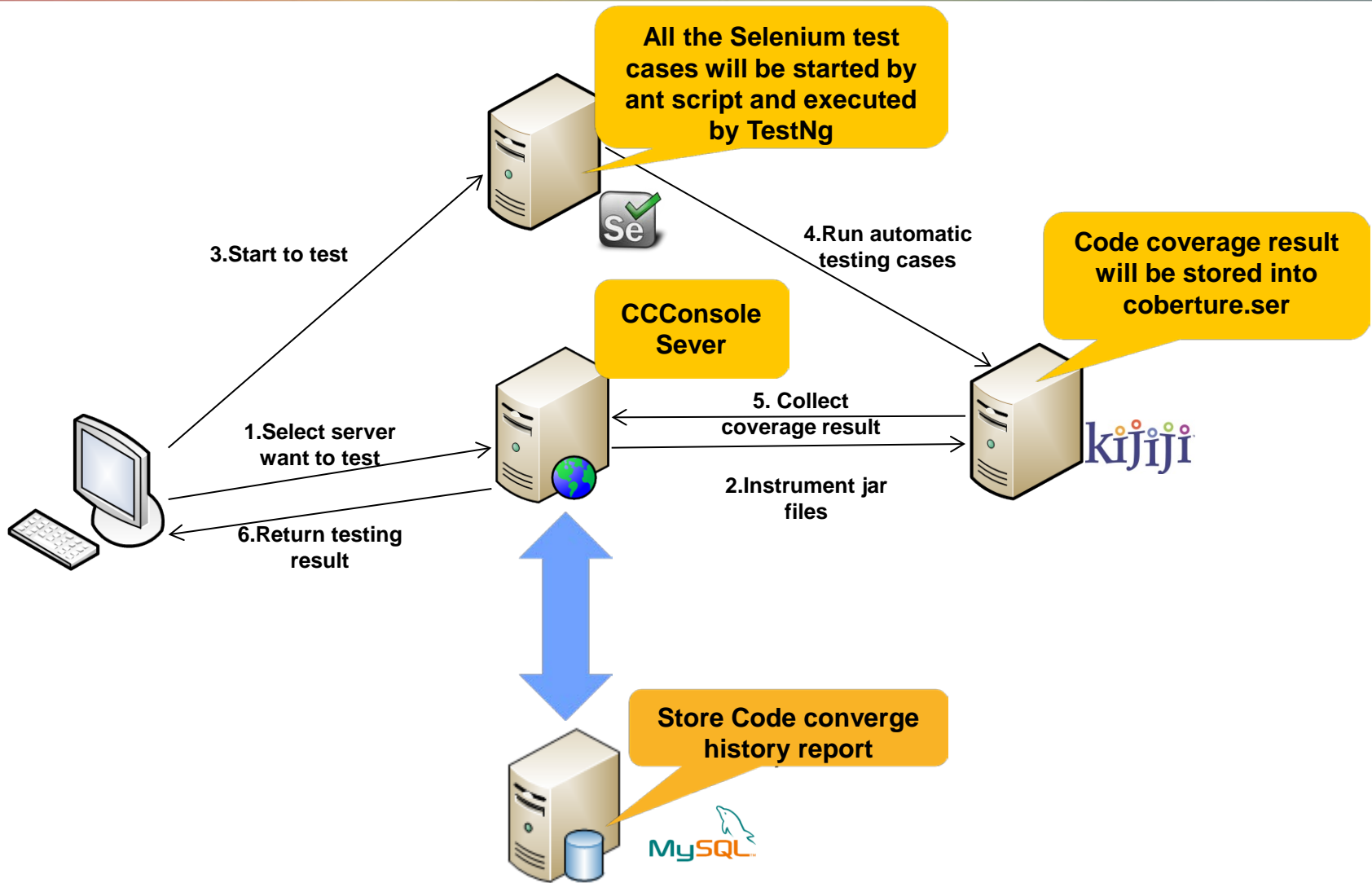
Coverage Breakdown by Package

Name	Classes	Conditionals	Files	Lines	Methods
com.ebay.domain.classifieds.biz.facebook.userdetails	0% 0/2	0% 0/4	0% 0/2	0% 0/65	0% 0/25
com.ebay.eco.api.web.server.biz	0% 0/5	0% 0/30	0% 0/6	0% 0/141	0% 0/46
com.kopin.bns.bannedwords	0% 0/4	0% 0/14	0% 0/3	0% 0/73	0% 0/22
com.ebay.classifieds.admin.confotool.core.controllers	0% 0/38	0% 0/121	0% 0/22	0% 0/666	0% 0/110
com.ebay.kerrel.classifieds.ascountv.jsp	0% 0/9	0% 0/44	0% 0/7	0% 0/281	0% 0/40
com.ebay.intec.classifiedsbdioq	0% 0/6	0% 0/120	0% 0/6	0% 0/324	0% 0/71
com.ebay.eco.api.server.controller.v1	0% 0/2	N/A	0% 0/2	0% 0/36	0% 0/14
com.ebay.domain.classifieds.pres.taglib.adultroof	0% 0/1	0% 0/2	0% 0/1	0% 0/10	0% 0/2
ContactOverrides	0% 0/1	N/A	0% 0/1	0% 0/1	0% 0/1
com.ebay.domain.classifieds.biz.address	0% 0/4	0% 0/8	0% 0/4	0% 0/63	0% 0/21
com.ebay.domain.classifieds.pres.taglib.areahome	0% 0/24	N/A	0% 0/24	0% 0/134	0% 0/48
com.ebay.domain.classifieds.biz.usell	0% 0/9	0% 0/282	0% 0/4	0% 0/282	0% 0/39
com.ebay.classifieds.core.tvote	0% 0/41	0% 0/106	0% 0/23	0% 0/690	0% 0/168
com.ebay.app.classifieds.biz.migration.aymtree.js	0% 0/17	0% 0/392	0% 0/13	0% 0/3426	0% 0/139
com.ebay.intec.classifiedsadmnote	0% 0/5	0% 0/108	0% 0/5	0% 0/309	0% 0/67

But it's still not enough for us...

- ✓ We want to manage all the code coverage history report
- ✓ We want to get to Code Coverage report for any kinds of testing
- ✓ We want to test any kinds for modules I want
- ✓ We want to get code coverage for my own feature pool
- ✓ ...

How CCConsole Works



Code Coverage Console

Code Coverage Console

Sunday, November 2

Submit New Test

My Opened Test

All Test Status

Select Server(s):

☐ f023.intern.qa-kijiji.com (in use by doxie)

Please enter app server name: (Ex: f001)

.intern.qa-
kijiji.com

Add

Add the server you want to test or select the server already added

Select Project Group (test target):

--none--

☐ use feature branch

Create / Edit

Select your test plan, it will decide which jar's code coverage report you want to get

Test Name:

Submit Test

Named your test and submit your test to CCConsole Server

Create new test plan

Create/Edit Project Group

All Jar list:

ClassifiedsApplication-4.0.e749-e749v1_f
ClassifiedsApplication.jar
ClassifiedsAutocomplete-4.0.e749-e749v1_
ClassifiedsAutocomplete.jar
ClassifiedsBotBlocker-4.0.e749-e749v1_f0
ClassifiedsBotBlocker.jar
ClassifiedsCore-4.0.e749-e749v1_f023.jar
ClassifiedsCore.jar
ClassifiedsDAL-4.0.e749-e749v1_f023.jar
ClassifiedsDAL.jar
ClassifiedsDomain-4.0.e749-e749v1_f023.
ClassifiedsDomain.jar
ClassifiedsKernel-4.0.e749-e749v1_f023.
ClassifiedsKernel.jar

>>>

<<<

Selected Jar list:

ClassifiedsApplication.jar
ClassifiedsCore.jar

New Jar:

testDemo.jar

Add

Project Group Name: (suggestion: name as trainid_featureid_ownerid)

ClassifiedsTest

Description: (optional)

ClassifiedsTest Test Demo

Filter: (optional) [Usage](#)

-com.ebay.belen.germany.webapp.common.util.UrlSigner
-com.ebay.belen.germany.webapp.common.util.ViewNameDefinition

Add the module which want to get their report

You can add new jar if the jar list doesn't include the jar

Set the test plan name

Add the class you don't care about

Use Filter for test plan

Filter Usage Page

Here're some examples for filter

1. Will exclude these classes from the report if you add following rules to the filter (one rule per line).

```
-com.ebay.*.*Module*
-com.ebay.*.*Module
-com.ebay.*.*vo.*
-com.ebay.*.*Vo.*
-com.ebay.*.*data.*
```

2. Will **only include these classes in the report if you add following rules to the filter (one rule per line).**

```
+com.ebay.*.*Module*
+com.ebay.*.*Module
+com.ebay.*.*vo.*
+com.ebay.*.*Vo.*
+com.ebay.*.*data.*
```

3. If you edit filter like this, it will first only include the classes following "+" and then exclude all classes following "-" from first step.

```
+com.ebay.*.*Module*
+com.ebay.*.*Module
-com.ebay.*.*vo.*
-com.ebay.*.*Vo.*
-com.ebay.*.*data.*
```


How to get your code coverage report

Code Coverage Console

Sunday, November 27

Submit New Test		My Opening Test		All Test Status			
Test Name: all-modules-test							
Pool Name	Instrument Build	Instrument Status		Current Build	Redo Instruemnt	Roll Back Instruemnt	Lastest Result
f023.intern.qa-kijiji.com	e743_caboose_v01	Preparation finished. Completed successfully!		e743_caboose_v01	Kick Off	Kick Off	24十一月 04:58:21

Result Collection

Select if merge result this time with last time:

☒ merge

Collect Result

After the testing finished, Collect the result for code coverage

Current Auto Options Status:

☐ auto result collection ☐ auto result generation

Report Generation

Select cer for report generation:

all_module_test

Generate Report

Download Ser File

Report created successfully. -- 24 +

If you want to roll back

Generate the report

Close Test

Check the newest report



Code Coverage Console

Sunday, November 27

Submit New Test		My Opening Test		All Test Status		
Test Name: all-modules-test ▾						
Pool Name	Instrument Build	Instrument Status		Current Build	Redo Instruemnt	Roll Back Instruemnt
f023.intern.qa-kijiji.com	N/A	Roll back to original jars finished. Completed successfully!		e743_caboose_v01	<button>Kick Off</button>	<button>Kick Off</button>
						24十一月 04:58:21

Result Collection

Select if merge result this time with last time:

☒ merge

[Collect Result](#)

Report Generation

Select cer for report generation:

all_module_test

[Generate Report](#)

[Download Ser File](#)

Latest Re 25十一月 10:31:30

Report created successfully. -- 24十一月 18:31:31

Current Auto Options Status:

☐ auto result collection ☐ auto instrument for new build ☐ auto report generataion

[Close Test](#)

After Generate the report, you can see the latest report

Code coverage report

Coverage Report - All Packages

Package	# Classes	Line Coverage		Branch Coverage		Complexity
All Packages	6719	25%	63215/248625	14%	15960/108900	2.189
FTL	1	0%	0/1	N/A	N/A	0
com.ebay.af.common.context	1	0%	0/71	0%	0/20	1.647
com.ebay.af.common.model	45	9%	278/2847	3%	64/1882	5.119
com.ebay.af.common.util.xml	24	0%	0/530	0%	0/208	2.653
com.ebay.af.common.xml	8	29%	133/452	20%	44/212	2.924
com.ebay.af.common.xml.translator	4	0%	0/30	0%	0/10	1.467

Line Code coverage

Branch Code coverage

<

Code Complexity

Code coverage for each class

Code coverage history

Query the history testing by user and server name

Code Coverage Console

Sunday, November 27

Check the history code coverage report

Showing Test Results

Mr. Cheemba Test

All Test Status

coverage report

owner:

doxie

Show Opening Test Only

Pool Name Filter:

Submit

Test ID	Test Name	Server Name	User ID	Update Date	Project Name	Test Status	Report Link
4196	all-modules-test	f023	doxie@ebay.com	2011-11-24 02:04:42	all_module_test	opening	Report
4195	all_modules_test	f023	doxie@ebay.com	2011-11-24 01:35:57	all_module_test	finished	--
4194	all_modules_test	f023	doxie@ebay.com	2011-11-24 00:48:37	all_module_test	finished	Report
4193	doxie_Test	f023	doxie@ebay.com	2011-11-23 01:18:32	doxie_Test	finished	Report
4192	usetracycases	f023	doxie@ebay.com	2011-11-22 23:28:44	tracy test	finished	Report
4190	kijijitest123	f023	doxie@ebay.com	2011-11-22 03:55:19	kijiji-common-api-jar	finished	Report
4189	doxieneutestforcommon	f023	doxie@ebay.com	2011-11-21 22:46:44	kijiji-common-api-jar	finished	Report
4188	doxie12345	f023	doxie@ebay.com	2011-11-21 22:35:37	kijiji-common-api-jar	finished	--
4187	doxie-test1	f023	doxie@ebay.com	2011-11-21 06:30:12	kijiji-common-api-jar	finished	Report
4186	classified-libs-test1	f023	doxie@ebay.com	2011-11-21 06:12:09	tracy test	finished	--
4185	common-api-test	f023	doxie@ebay.com	2011-11-20 20:59:44	kijiji-common-api-jar	finished	Report
4184	kijiji-common-api-mytest	f023	doxie@ebay.com	2011-11-20 19:34:11	kijiji-common-api-jar	finished	--
4183	kijiji-common-api-newtest	f023	doxie@ebay.com	2011-11-20 19:18:45	kijiji-common-api-jar	finished	Report
4182	kijiji-commom-test2	f023	doxie@ebay.com	2011-11-19 05:05:18	kijiji-common-api-jar	finished	Report
4181	kijiji-common-api-test	f023	doxie@ebay.com	2011-11-18 02:10:57	kijiji-common-api-jar	finished	--
4180	classified-libs-test	f023	doxie@ebay.com	2011-11-18 01:58:11	tracy test	finished	--
4179	classifieds-libs-test	f023	doxie@ebay.com	2011-11-18 00:48:35	tracy test	finished	--
4178	classified-libs-test	f023	doxie@ebay.com	2011-11-18 00:35:39	tracy test	finished	--
4177	kijiji-common-api-test	f023	doxie@ebay.com	2011-11-18 00:22:59	kijiji-common-api-jar	finished	--

Page: 1 / Total: 1

Close test & Redo



Code Coverage Console

If you want to start a new test for your test plan

Monday, November 27

My Opening Test						
Test Name: all-modules-test						
Pool Name	Instrument Build	Instrument Status		Current Build	Roll Back Instrument	Lastest Result
f023.intern.qa-kijiji.com	N/A	Roll back to original jars finished. Completed successfully!		e743_caboose_v01	Kick Off	24 十一月 04:58:21

Result Collection

Select if merge result this time with last time:

☒ merge

Collect Result

Report Generation

Select cer for report generation:

all_module_test

Generate Report

Download Ser File

Latest Report: 25 十一月 10:31:30

Report created successfully. -- 24 十一月 18:31:31

Current Auto Options Status:

☐ auto result collection
 ☐ auto instrument for new build
 ☐ auto report generation

Close Test

If you want to redo the new testing for your plan, close the test

- Demo



Throughout human history, we have been dependent on machines to survive.

CCConsole in the next

- Support all kinds for projects (Currently it is available for global version).
- Support get the code coverage by code change.
- Support PHP and JavaScript.

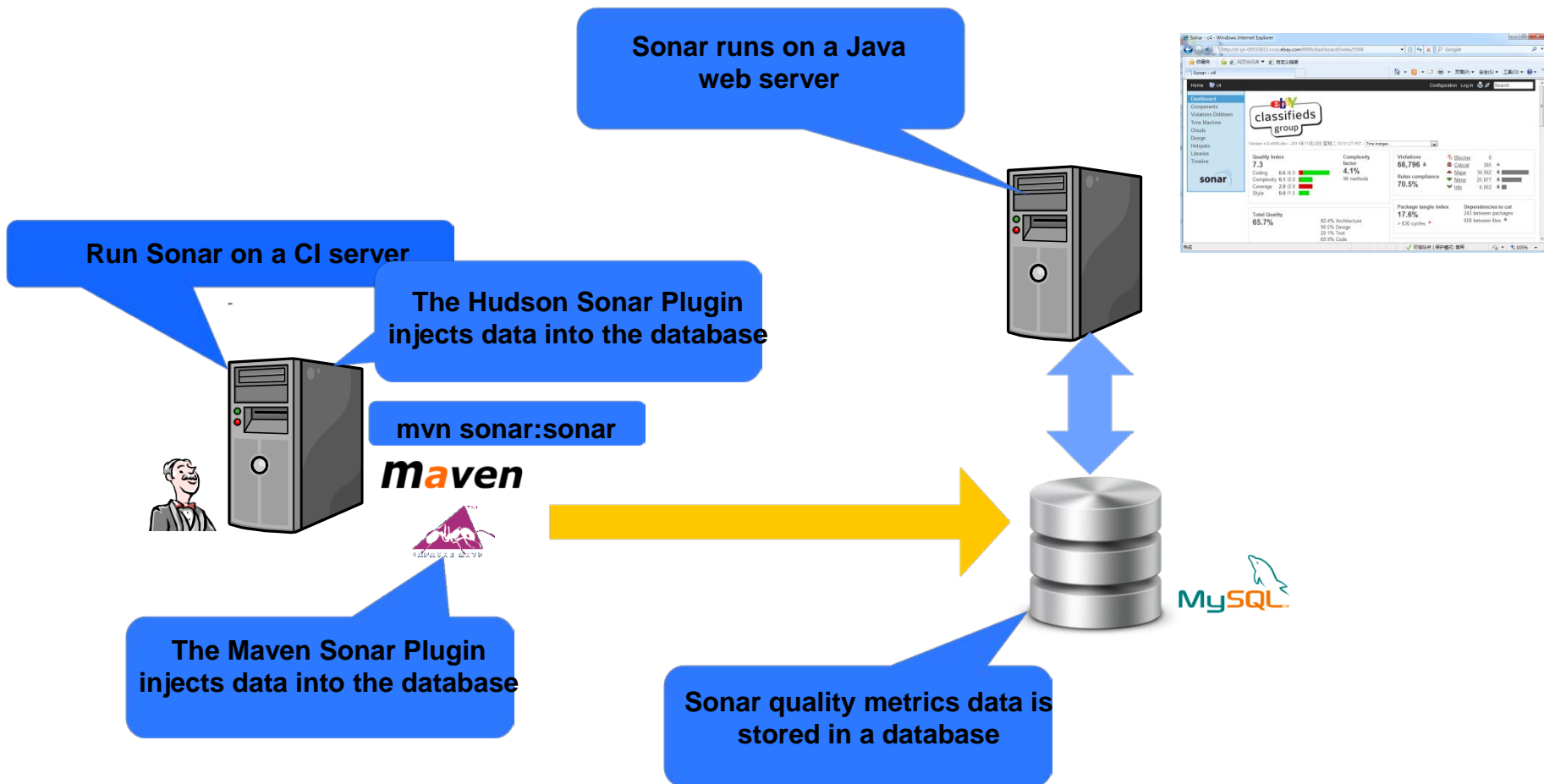


Code Quality Management

- Check out Sonar!
 - ✓ Centralized code quality management
 - ✓ Generate code quality metrics in an automated build using Maven or Ant
 - ✓ Store code quality metrics in a database
 - ✓ Code quality metrics can be consulted on a web site



Sonar Architecture in Nexus International Team



Manage all the projects in the same page

Collect all the projects result

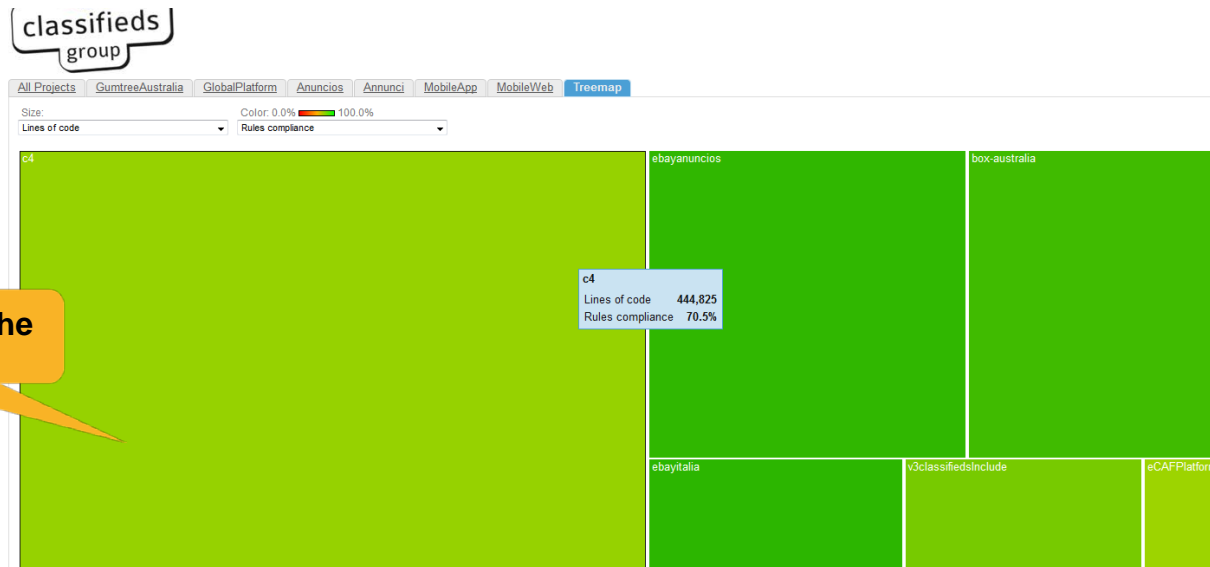
All Projects | GmtreeAustralia | GlobalPlatform | Anuncios | Annunci | MobileApp | MobileWeb | Treemap

Time changes... ▼

Alert	Name ^	Version	Lines of code	Rules compliance	Build date	Links
	box-australia	TRUNK-SNAPSHOT	113,884 ▲	87.4%	2011-10-10	
	c4	4.0.e000-dev	444,825 ▲	70.5%	2011-11-22	
	eCAFPlatform	0.1-SNAPSHOT	15,427	69.2%	2011-10-09	
	ebayanuncios	1.0	146,425	90.5%	2011-11-07	
	ebayitalia	1.0	63,711	91.3%	2011-11-07	
	v3classifiedsInclude	4.0.e000-dev	50,309	76.7%	2011-11-23	
	v3classifiedsPres	4.0.e000-dev	11,972	0.0%	2011-11-23	

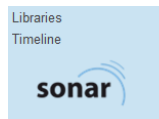
7 results

The treemap of all the projects



Sonar centralizes many code quality metrics

Code quality metrics



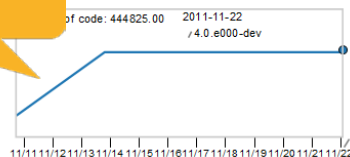
Quality Index
7.3

Coding 0.6 / 4.5
Complexity 0.1 / 2.0
Coverage 2.0 / 2.0
Style 0.0 / 1.5

Complexity factor
4.1%
98 methods

Total Quality
65.7%

82.4% Architecture
90.5% Design
20.1% Test
69.9% Code



Source code metrics

	2011-11-10	2011-11-22
Lines of code	439,557	444,825
Classes	5,616	5,616
Lines of code	621,076 lines	621,076 lines
Classes	572 packages	572 packages

Code rule metrics

Violations
66,796

Rules compliance
70.5%

Violations by severity

Blocker	0
Critical	305
Major	34,562
Minor	25,877
Info	

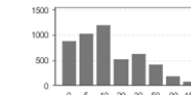
Package tangle index
17.6%
> 630 cycles

Dependencies
243 between packages
658 between files

LCOM4
2.3 /class
33.3% files having LCOM4>1



Response for Class
26 /class



Code complexity metrics

Package structure

Code Coverage metrics in Sonar

Coverage
34.0%



The code coverage
for each package

com.ebay.belen.germany.webapp.search.seo.footer	56.5%	DynamicFooter	50.0%
com.ebay.belen.germany.webapp.common.vmd	56.7%	DynamicFooterModel	51.1%
com.ebay.belen.germany.webapp.advertiser.adsense.util	57.7%	DynamicFooterProviderImpl	57.4%
com.ebay.belen.germany.webapp.versioncontrol.config	62.0%		
com.ebay.belen.germany.webapp.my.manager	65.8%		
com.ebay.belen.germany.webapp.advertiser.adsense.common	66.7%		

com.ebay.belen.germany.webapp.search.seo.footer.DynamicFooter

Coverage	Dependencies	Duplications	LCOM4	Source	Violations
50.0%	Line coverage: 50.0%	Uncovered lines: 8 / 16			
Full source Lines to cover					

Dependencies for class

The details in codes

com.ebay.belen.germany.webapp.advertiser.adsense.common.AdsenseTypeEnum

Coverage	Dependencies	Duplications	LCOM4	Source	Violations
88.9%	Line coverage: 88.9%	Uncovered lines: 1 / 9			
Source Lines to cover					

```

*
* @author acharton
* @since REL-27
*/
public enum AdsenseTypeEnum {

    WIDE("wide"), // wide type is same style as a result list entry
    PIC("pic"), // wide type with a picture, looks like as a result list entry
    ONELINER("1ln"), // a one liner
    SKYSCRAPER("skyscraper"); // a narrow style skyscraper

    private final String type;

    private AdsenseTypeEnum(final String _type) {
        this.type = _type;
    }

    public String getType() {
        return type;
    }

}

```

More advanced code quality metrics



Most violated rules		Any severity ▾	more
▼	Magic Number	15,259	<div></div>
▲	Member name	9,170	<div></div>
▲	If Stmt's Must Use Braces	6,382	<div></div>
▼	Redundant Modifier	5,556	<div></div>
▼	Unused Modifier	5,440	<div></div>

Longest unit tests		more
LanguageHelperTest	609 ms	<div></div>
ChangeLanguageCommandTest	250 ms	<div></div>
FormattingHelperTest	93 ms	<div></div>
PaymentOptionsMethodDisplayOrderComparatorTest	32 ms	<div></div>
TestCaseSetupTest	15 ms	<div></div>

Highest complexity	
regionName	4,412
XmlUtil	1,167
McDaoPelops	624
ClassifiedsPopularSearchCodeGenDolmpl	582
ClassifiedsAdCodeGenDolmpl	553

Most violated							
regionName				0	216	393	
GumtreeECCategoryNicknameMaplnit				0	5	24	
GumtreeEldMaplnit				0	0	2418	
ClassifiedsPopularSearchCodeGenDolmpl				0	0	344	216
ClassifiedsAdCodeGenDolmpl				0	1	315	198

regionName	Count
McDaoPelops	1,518
GumtreeEldMaplnit	1,257
GumtreeECategoryNicknameMaplnit	1,234
ClassifiedsPopularSearchCodeGenDolmnl	1,205

Highest average method complexity	
regionName	4,412.0
XmlUtil	89.8
DoubleMeta	38.3
ManageAdminUsersCommand	30.3
ClassifiedsEntryFixedField	24.3

Which violations occur the most?



The design of the whole project

	Help
	Dependency
	Suspect dependency cycle
	- uses >
	- uses >
	v3classifiedsInclude
	ClassifiedsConfigTool
	c4war
	kijiji-tns-remotes
	com.kijiji.controller.common
	kijiji-common-api
	search-cache-refresher
	clsfds-ecg-api-ext
	ClassifiedsApplication
	kijiji-tns-services
	com.kijiji.service.currency
	ClassifiedsAutocomplete
	ClassifiedsKijijiAPI
	kijiji-remotes
	kijiji-services
	ClassifiedsDomain
	ClassifiedsBotBlocker
	ClassifiedsDAL
	kijiji-remote-apix
	kijiji-mc
	ClassifiedsKernel
	v3classifiedsPres

Keep an eye on your builds



Q & A

Forest Xie

Email: doxie@ebay.com

Skype: [dongsheng.xie](https://www.skype.com/people/dongsheng.xie)

