

Jenkins

(CI Server after Hudson, CruiseControl, Team City and Home Built)

Presented by: Purushottam Kumar
Engineering Manager, BFS



IGATE

Speed. Agility. Imagination

IGATE Sensitive

0

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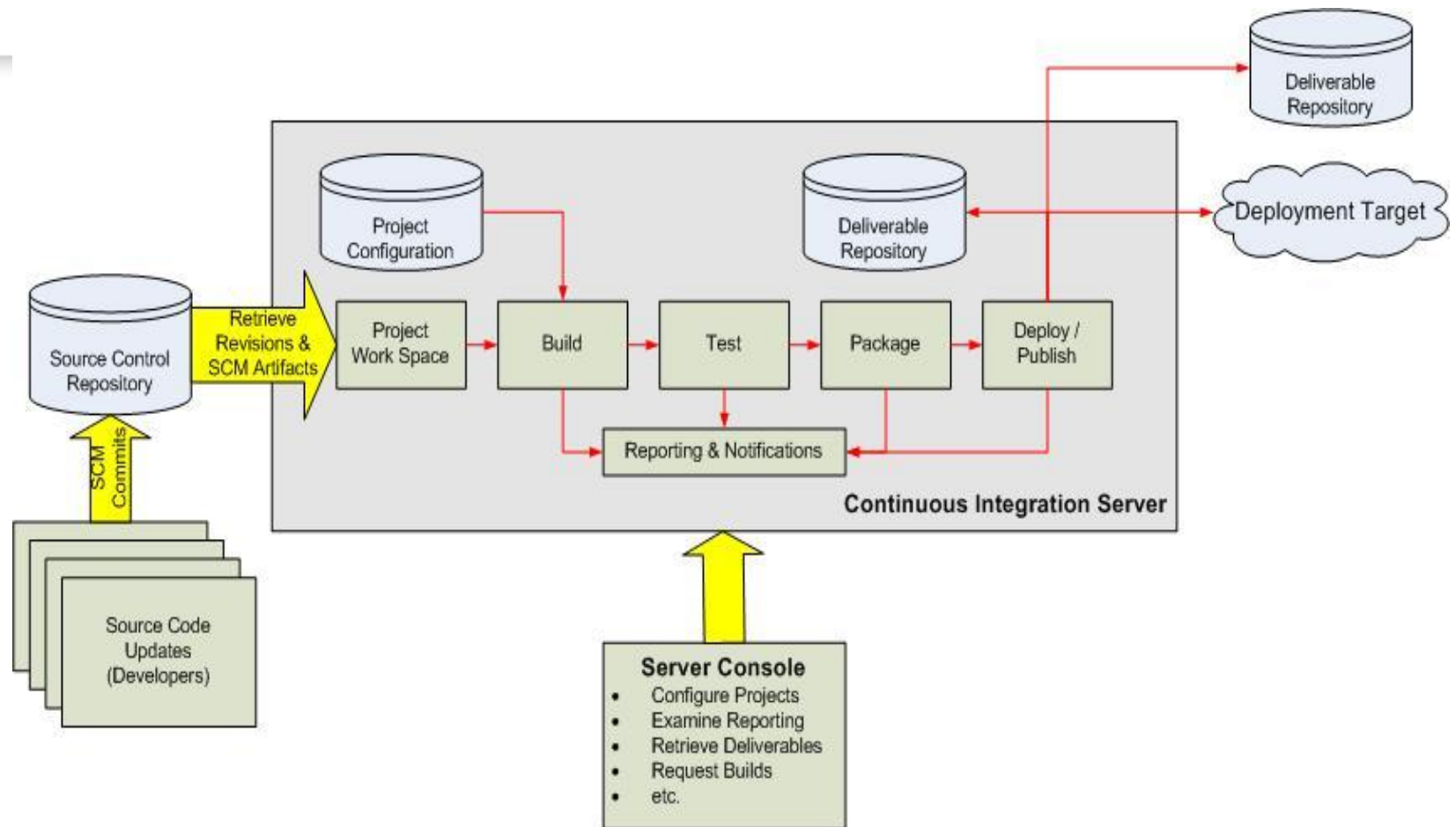
What's Continuous Integration?

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.

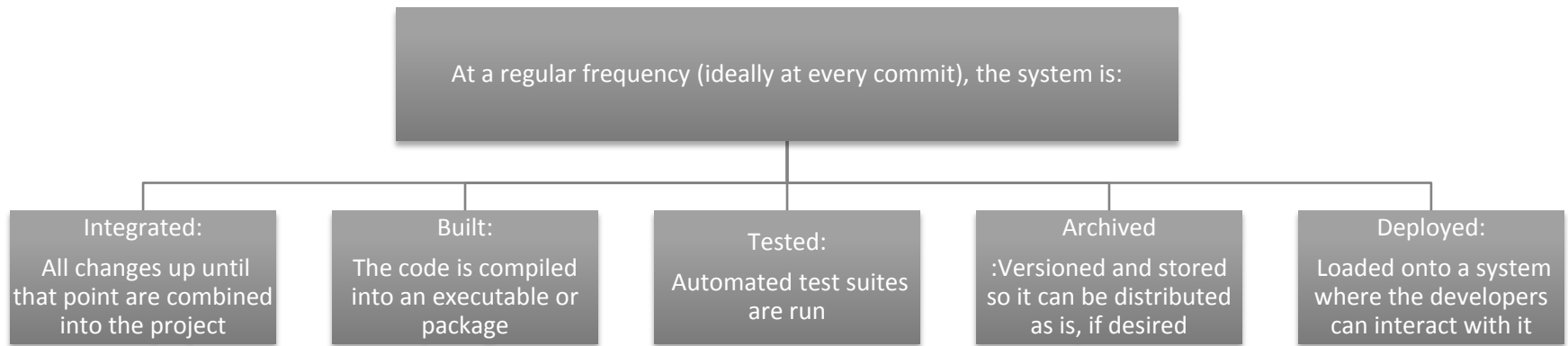
Ref: http://en.wikipedia.org/wiki/Continuous_integration

Continuous Integration Overview

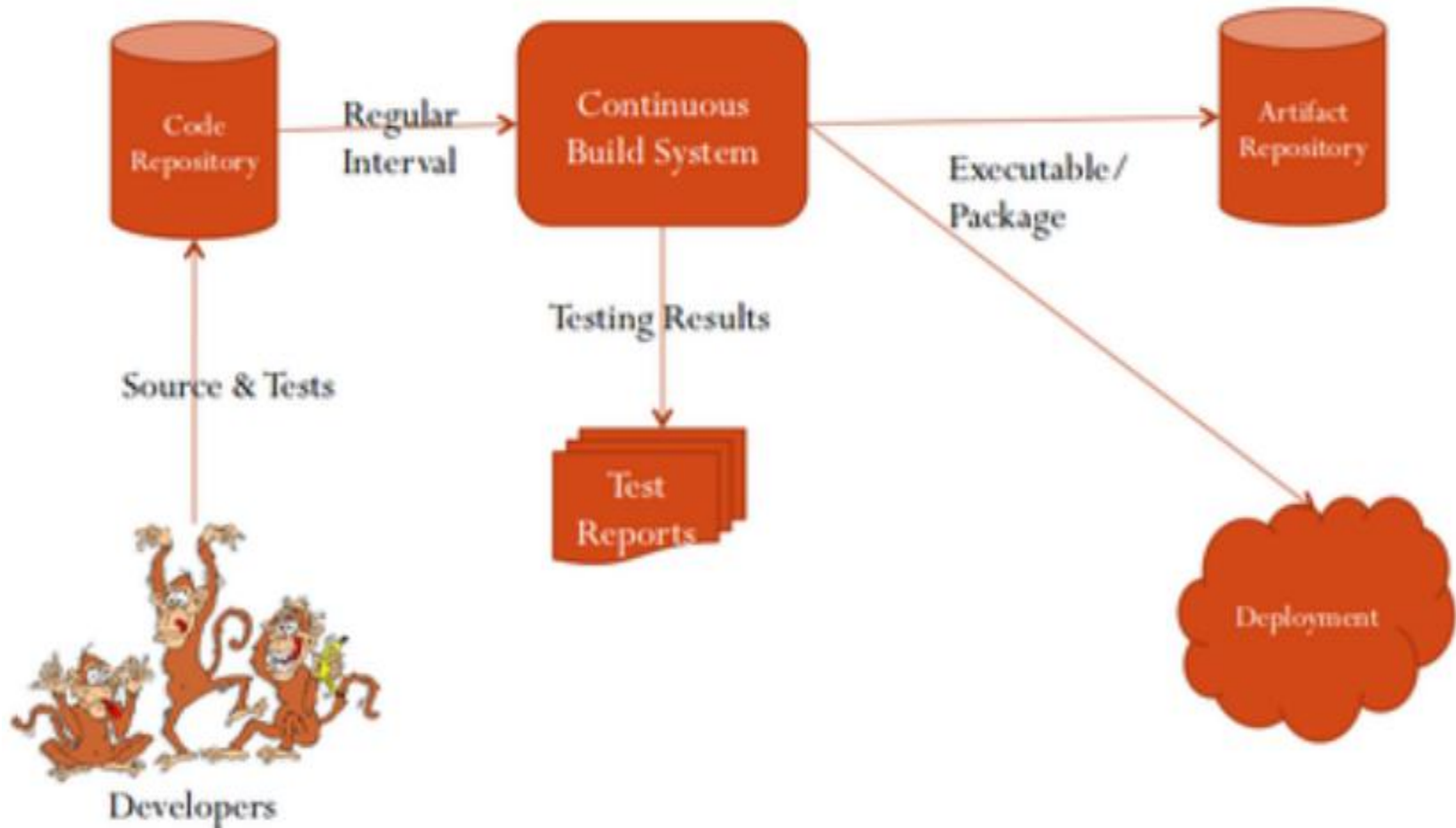


Ref: <http://www.javaworld.com/javaworld/jw-12-2008/images/CIOverview.jpg>

CI – What does it really mean?



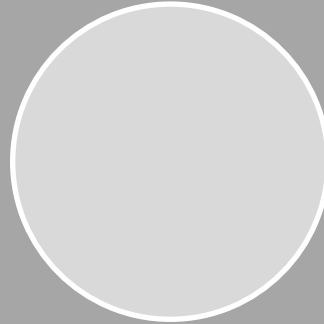
CI -Workflow



History

Continuous Integration emerged in the Extreme Programming (XP) community, and XP advocates Martin Fowler and Kent Beck first wrote about continuous integration circa 1999.

Continuous Integration



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.

- Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible.
 - -- Martin Fowler
- Ref: <http://martinfowler.com/articles/continuousIntegration.html>



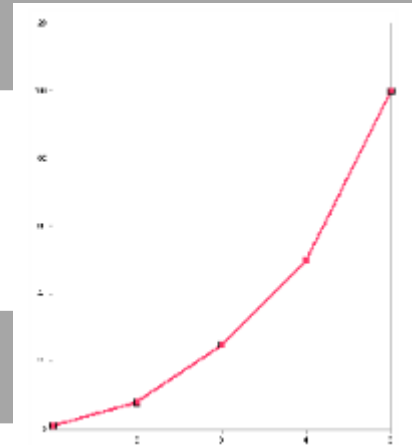
Why Continuous Integration?

Integration is hard, effort increase exponentially with

- Number of components
- Number of bugs
- Time since last integration

Continuous integration can help you go faster

- Detect build breaks sooner.
- Report failing tests more clearly.
- Make progress more visible.



- Ref: <http://www.slideshare.net/carlo.bonamico/continuous-integration-with-hudson>

Continuous Integration Benefit



Project Management

- Detect system development problems earlier
- Reduce risks of cost, schedule, and budget.



Code Quality

- Measurable and visible code quality
- Continuous automatic regression unit test

Best Practice of CI

Single Source Repository.

Automate the Build and
Test

Everyone Commits Every
Day

Keep the Build Fast

Everyone can see what's
happening

Automate Deployment
(Optional)

Continuous Integration Tools

Name	Platform	License	Windows builders	Java builders	Other builders	SCM system	Notification	IDE Integration	Other Integration
AnthillPro	Cross-platform	Proprietary	MSBuild, NAnt, Visual Studio	Ant, Maven 1 & 2	Shell script	AccuRev, Clearcase, CA Harvest, CVS, Dimensions, Git, Mercurial, Perforce, PVCS, SourceSafe, StarTeam, Subversion, Synergy, TFS, Vault	E-mail, XMPP, RSS, Systray	Eclipse, Visual Studio	(many)
Apache Continuum	JDK, Servlet Container	Apache 2.0	Unknown	Maven 1 & 2	Unknown	Unknown	E-mail	Unknown	Unknown
Apache Gump	Python	Apache 2.0	Unknown	Ant, Maven 1	Unknown	CVS, Subversion	E-mail	Unknown	Unknown
Automated Build Studio	Windows	Proprietary	IncrediBuild, MSBuild, NAnt	Ant	Unknown	CVS, Subversion, StarTeam	E-mail, Windows Messenger, MSN Messenger, Windows Live Messenger, ICQ	Visual Studio	Unknown
Bamboo	Servlet Container	Proprietary	MSBuild, NAnt, Visual Studio	Ant, Maven 1, Maven 2	custom script, command line, Bash	CVS, Subversion, Perforce, ClearCase, Mercurial, Dimension, Git	XMPP, Google Talk, E-mail, RSS, Remote API	IntelliJ IDEA, Eclipse	FishEye, Crowd, JIRA, Clover
Build Forge	Cross-platform	Proprietary	Yes	Yes	Cross-platform command-line	Team Concert, Clear Case, Subversion, Perforce, Mercurial, Git	E-mail	Eclipse	Java API, Perl API, command line, (many)
BuildBot	Python	GPL	Yes (command line)	Yes (command line)	Yes (command line)	CVS, Arch, Bazaar, Darcs, Subversion, Perforce, Mercurial, Git	E-mail, Web page, GUI, IRC	Unknown	Unknown
CABIE	LAMP	GPL2	Unknown	Unknown	Unknown	CVS, Subversion, Perforce	Web	Unknown	Unknown
Cascade	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Cruise	Cross-platform	Proprietary	Yes	Yes	Cross-platform command-line	Subversion, Perforce, Mercurial, Git	E-mail, CCTray	None	RESTful API
CruiseControl	Cross-platform	BSD-style	NAnt, Rake, and Xcode	Phing, Ant, Maven	catch-all 'exec'	clearcase cvs darcs Git mercurial MKS Source team Foundation SCM subversion Team Foundation Server Visual SourceSafe	E-mail, CCTray	Eclipse,	Unknown
CruiseControl.NET	Cross-platform	BSD-style	MSBuild, NAnt, Visual Studio	Unknown	command line	Unknown	E-mail, CCTray, RSS	Unknown	Unknown
Drops.NET	Windows	BSD-style	NAnt, Visual Studio	Unknown	Unknown	CVS, Visual SourceSafe, PVCS,	E-mail	Unknown	Unknown

Ref: http://en.wikipedia.org/wiki/Comparison_of_Continuous_Integration_Software

Jenkins for Continuous Integration



Jenkins - History

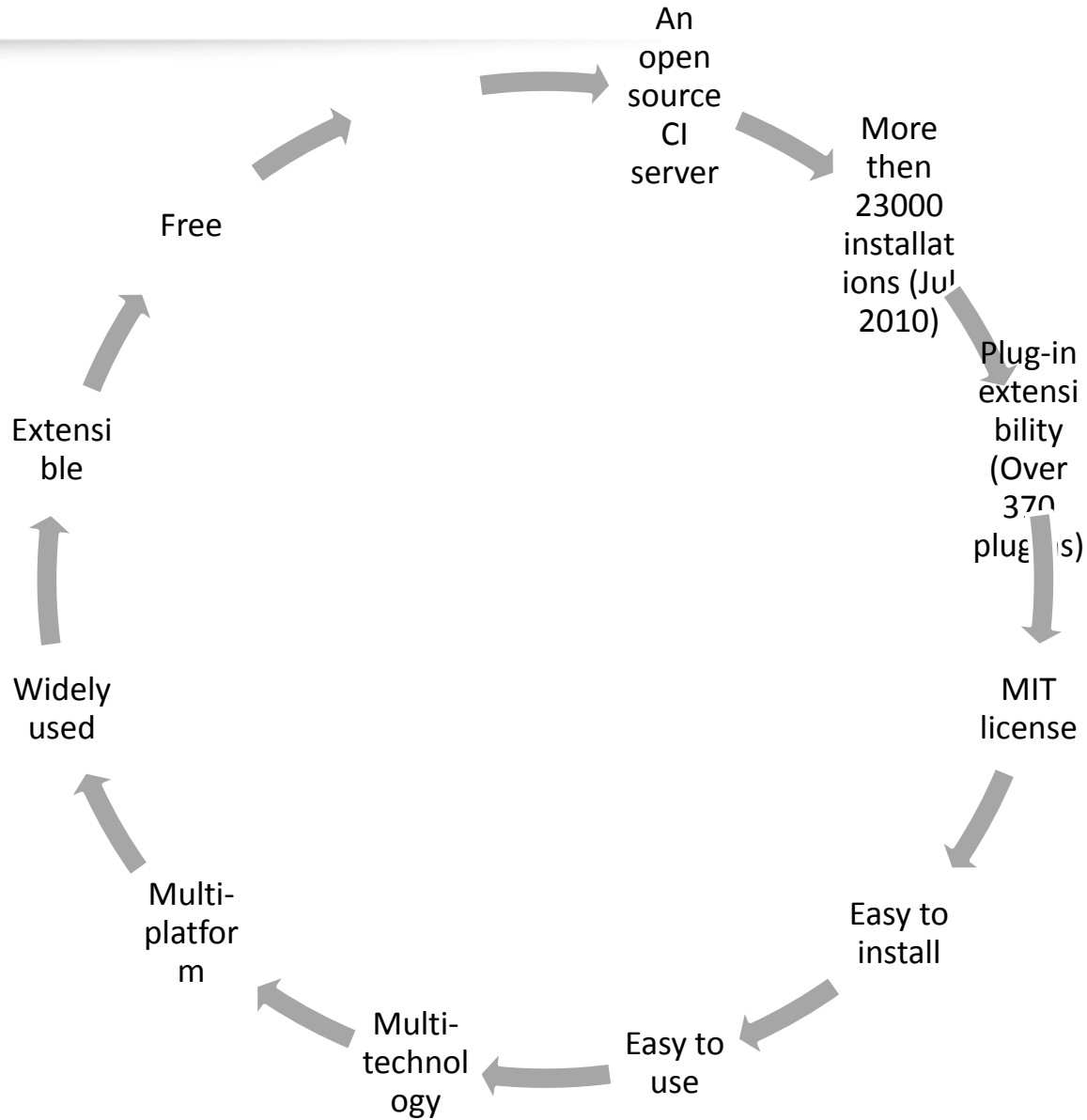
-2005 - Hudson was first release by Kohsuke Kawaguchi of Sun Microsystems

-2010 – Oracle bought Sun Microsystems

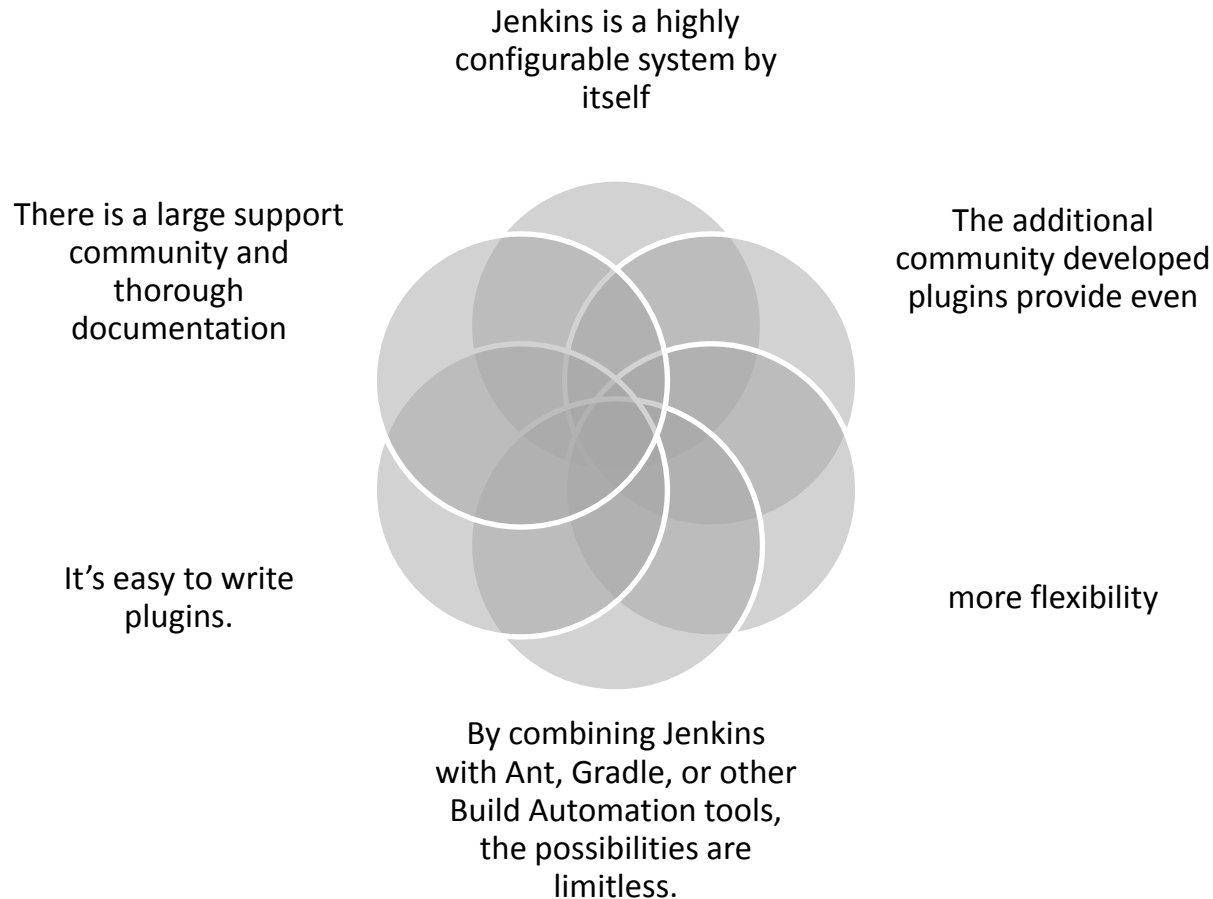
-Due to a naming dispute, Hudson was renamed to Jenkins

Oracle continued development of Hudson (as a branch of the original)

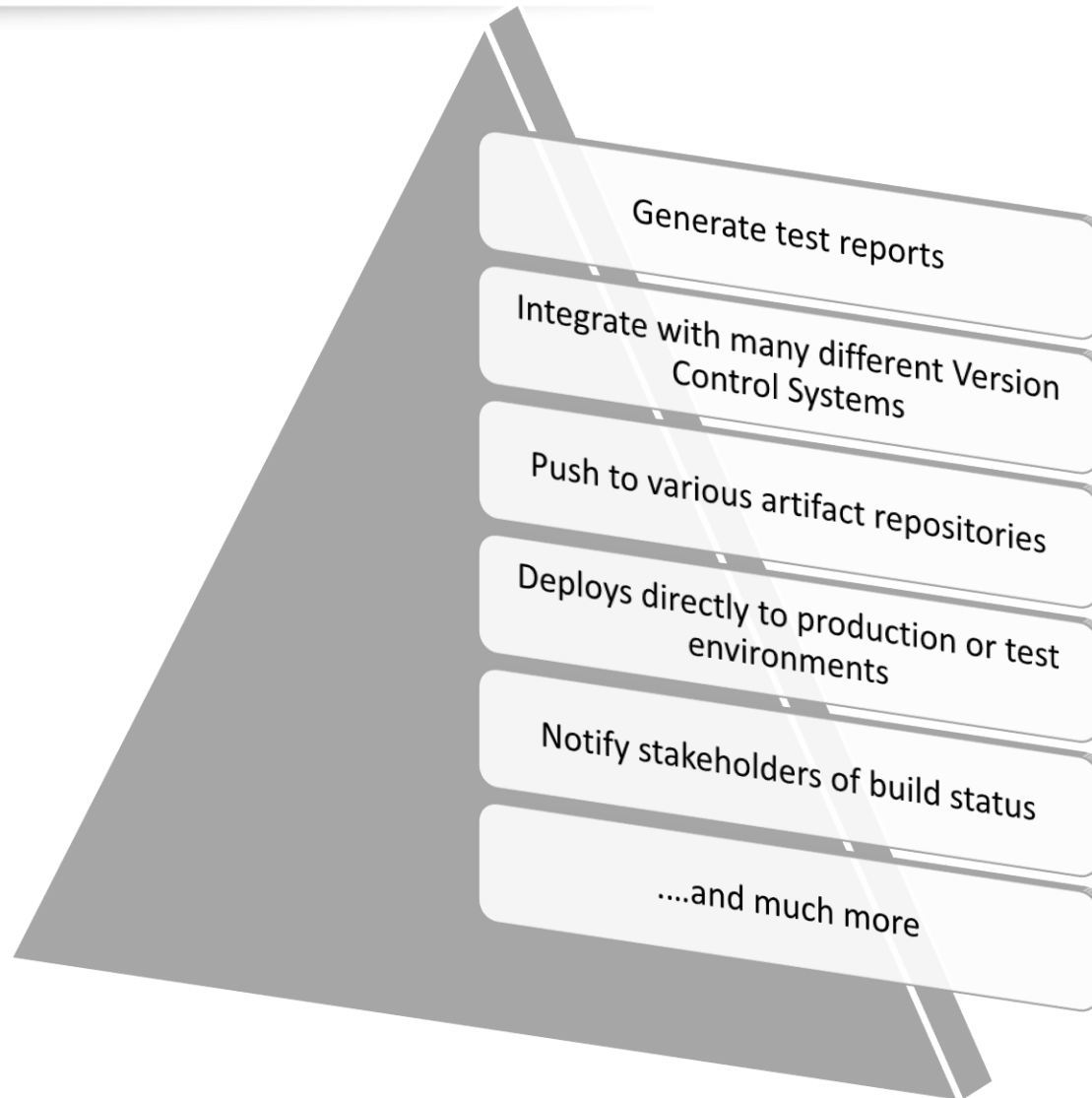
What's Jenkins/Hudson



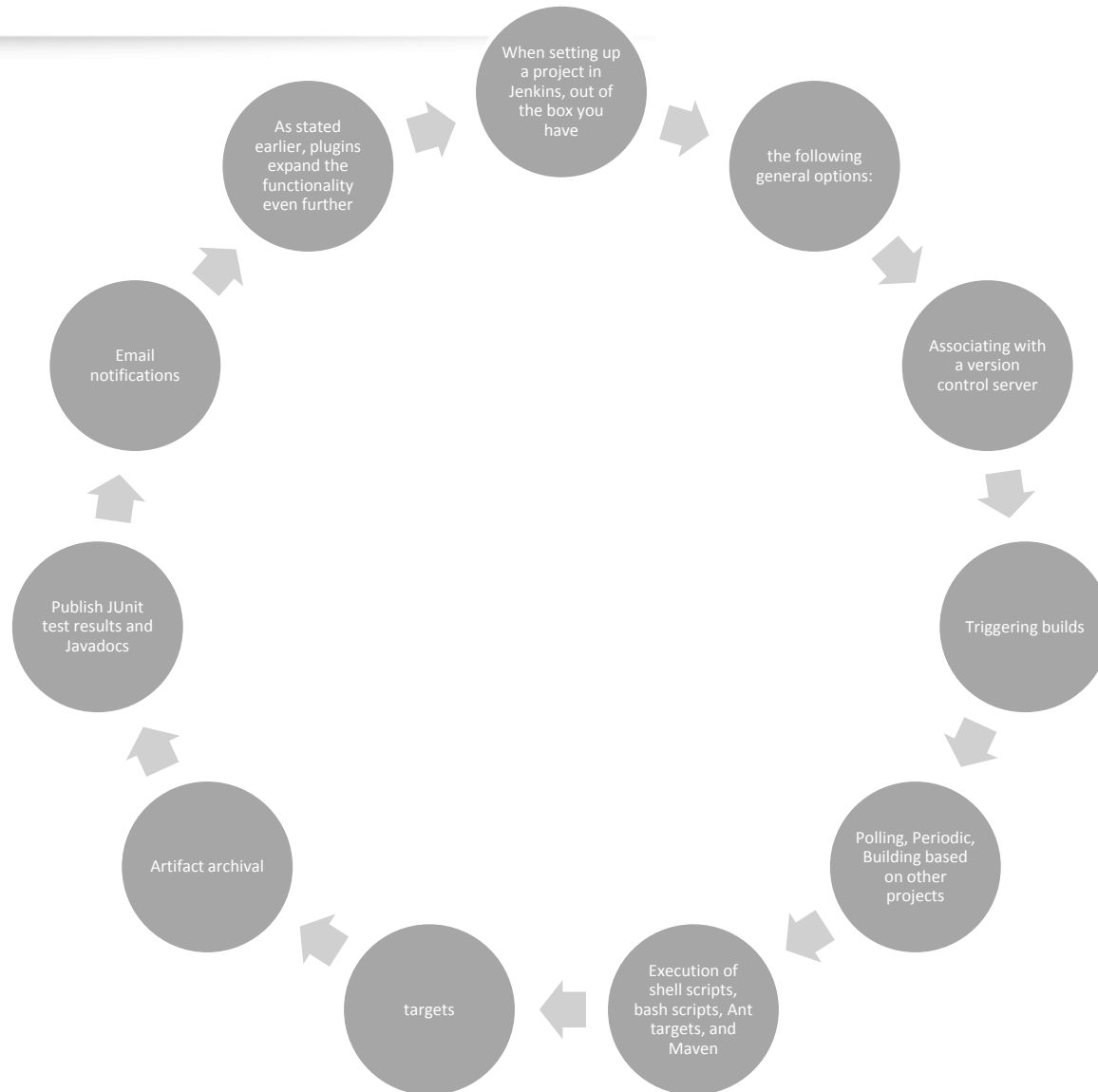
Why Jenkins? Flexibility!!!!



What can Jenkins do?



How Jenkins works - Setup

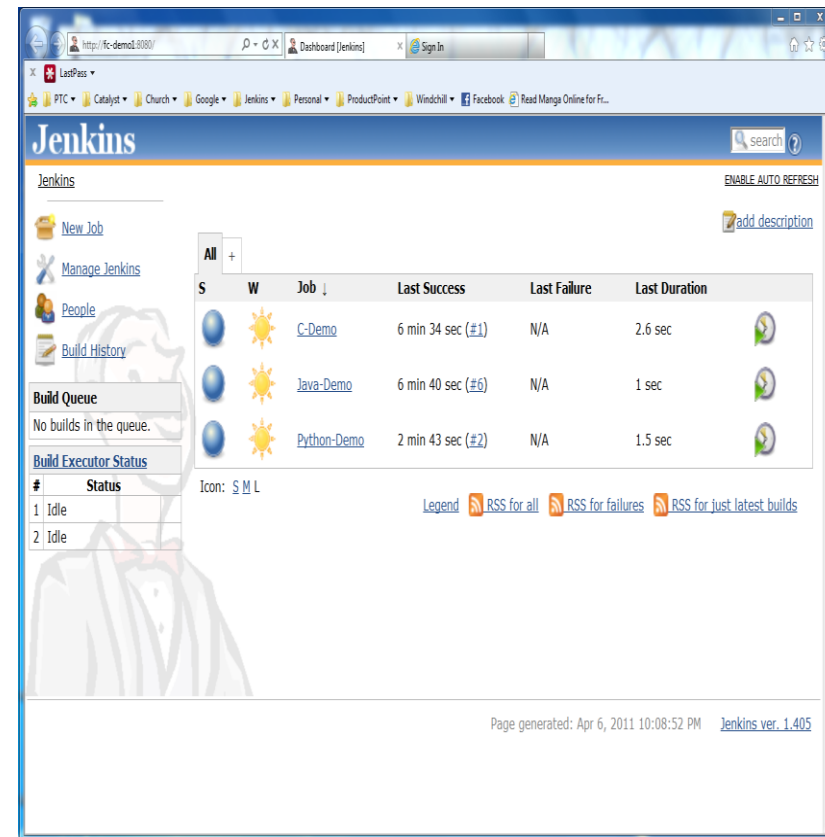


Jenkins – Integration for You

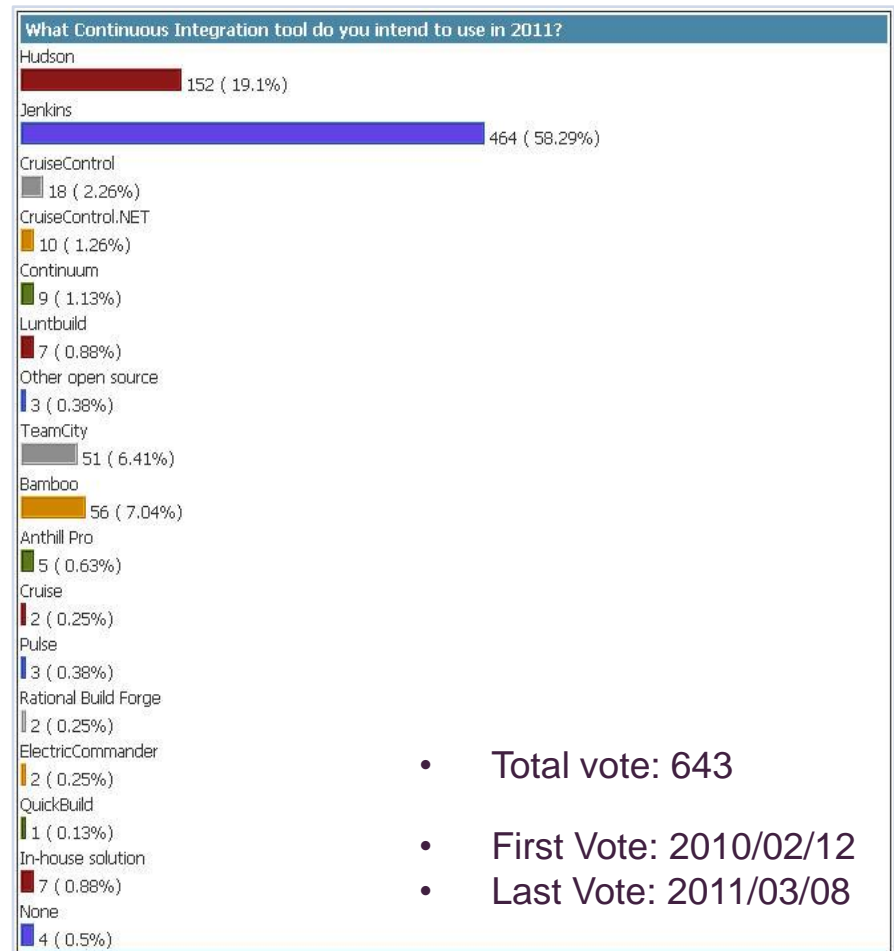
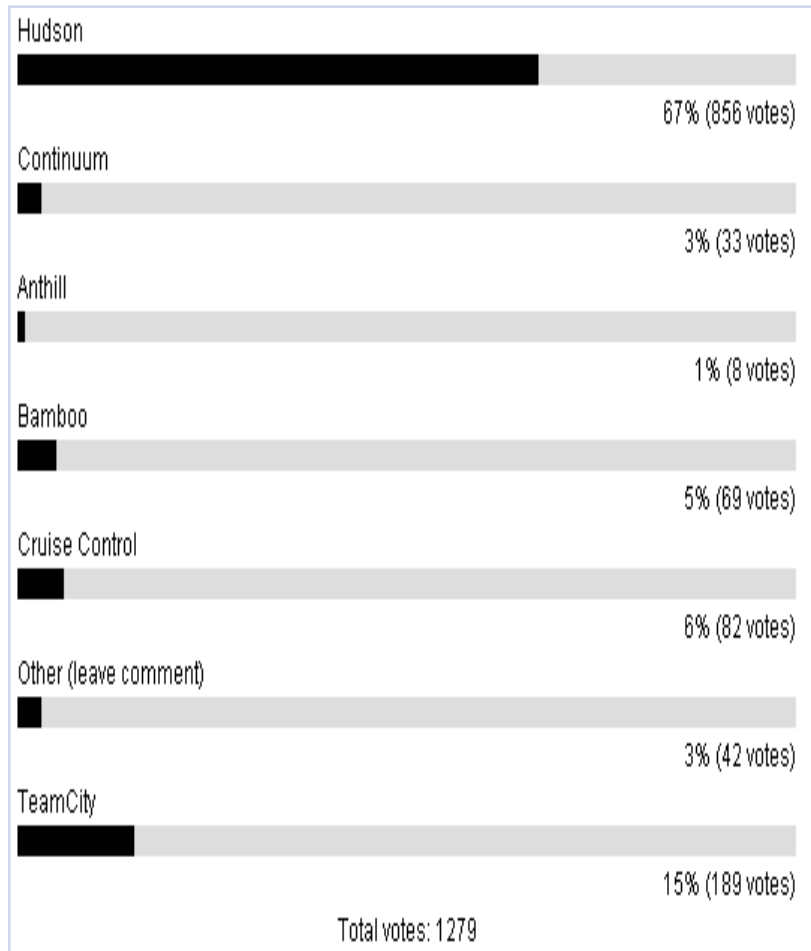
Jenkins can help your development be

Jenkins User Interface

- Faster
- Safer
- Easier
- Smarter



CI Tool Usage



- Total vote: 643
- First Vote: 2010/02/12
- Last Vote: 2011/03/08

Ref: <http://java.dzone.com/node/28241/results>

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

Jenkins Features

Trigger a build

Get source code from
repository

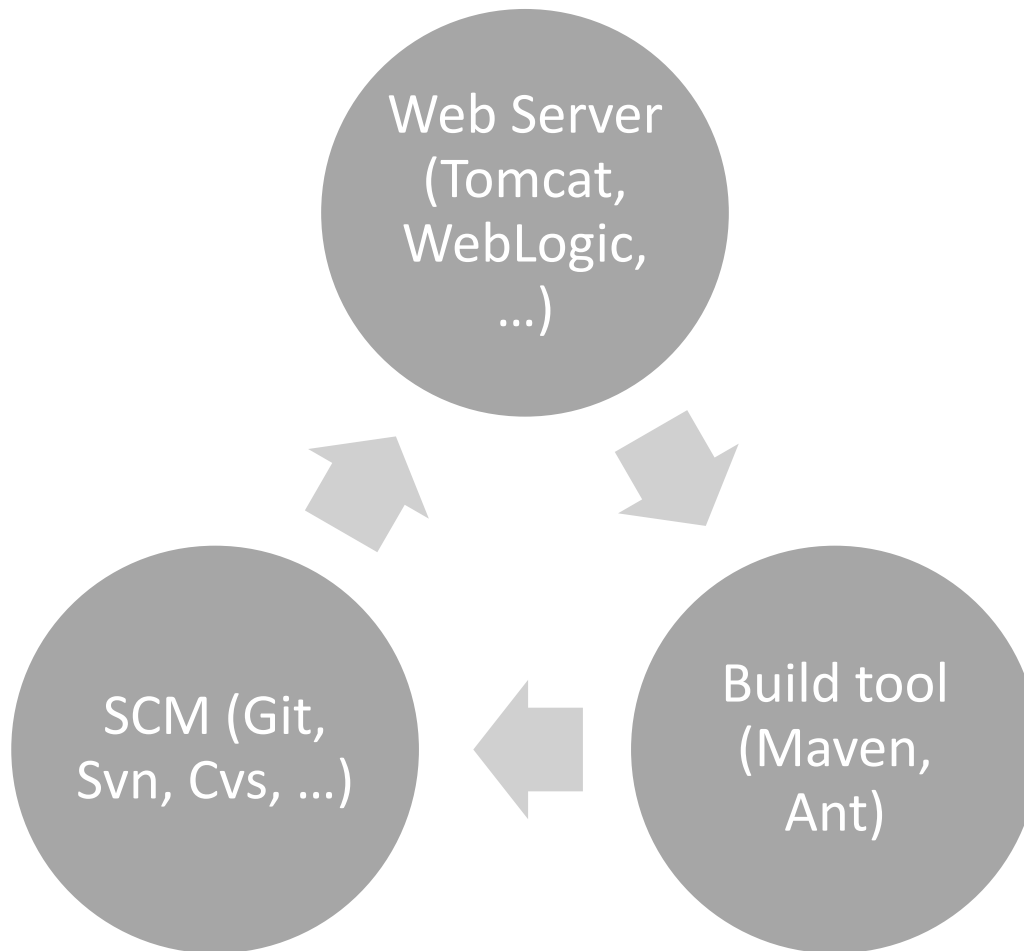
Automatically build and
test

Generate report & notify

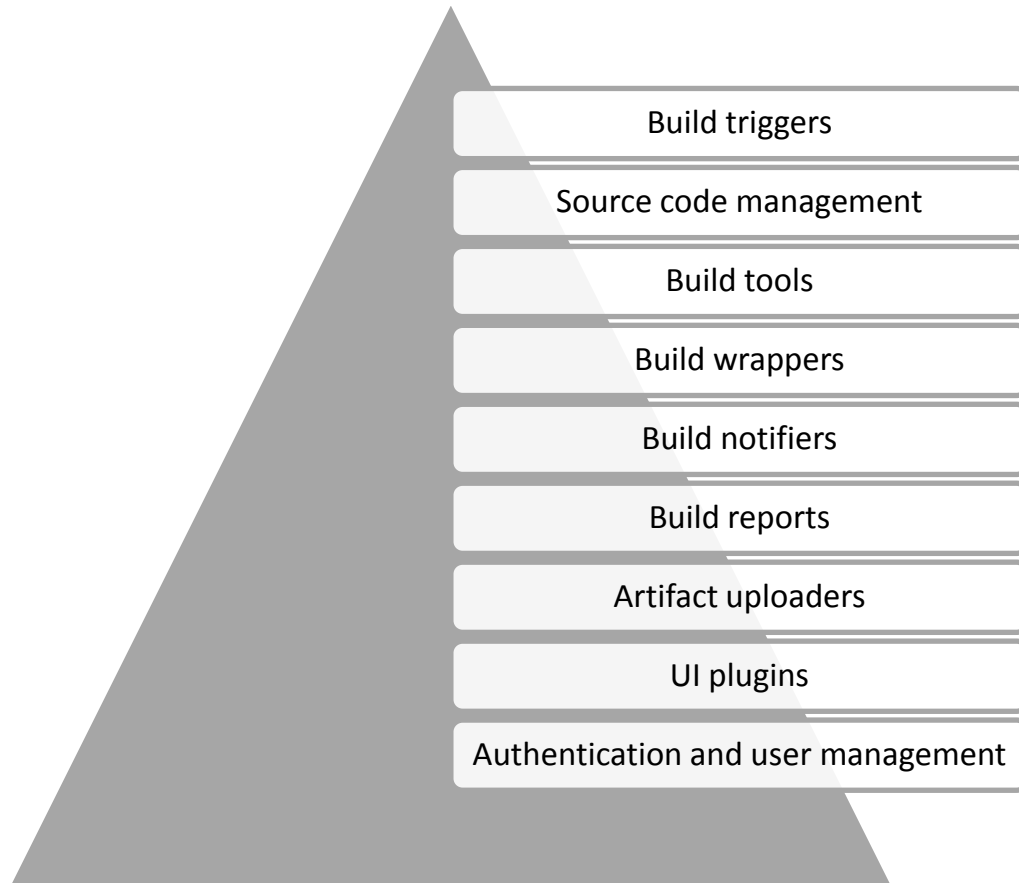
Deploy

Distributed build

Jenkins Requirement



Jenkins Plugins



More Power – Jenkins Plugins

Jenkins has over
300 plugins

- Software configuration management
- Builders
- Test Frameworks
- Virtual Machine Controllers
- Notifiers
- Static Analyzers

Jenkins Plugins - SCM



Version Control Systems

- Accurev
- Bazaar
- BitKeeper
- ClearCase
- Darcs
- Dimensions
- Git
- Harvest
- MKS Integrity
- PVCS
- StarTeam
- Subversion
- Team Foundation Server
- Visual SourceSafe

Jenkins Plugins – Build & Test

Build Tools Plugins

Ant

Maven

MSBuild

Cmake

Gradle

Grails

Scons

Groovy

Test Frameworks plugins

Junit

Nunit

MSTest

Selenium

Fitnessse

Jenkins Plugins – Analyzers

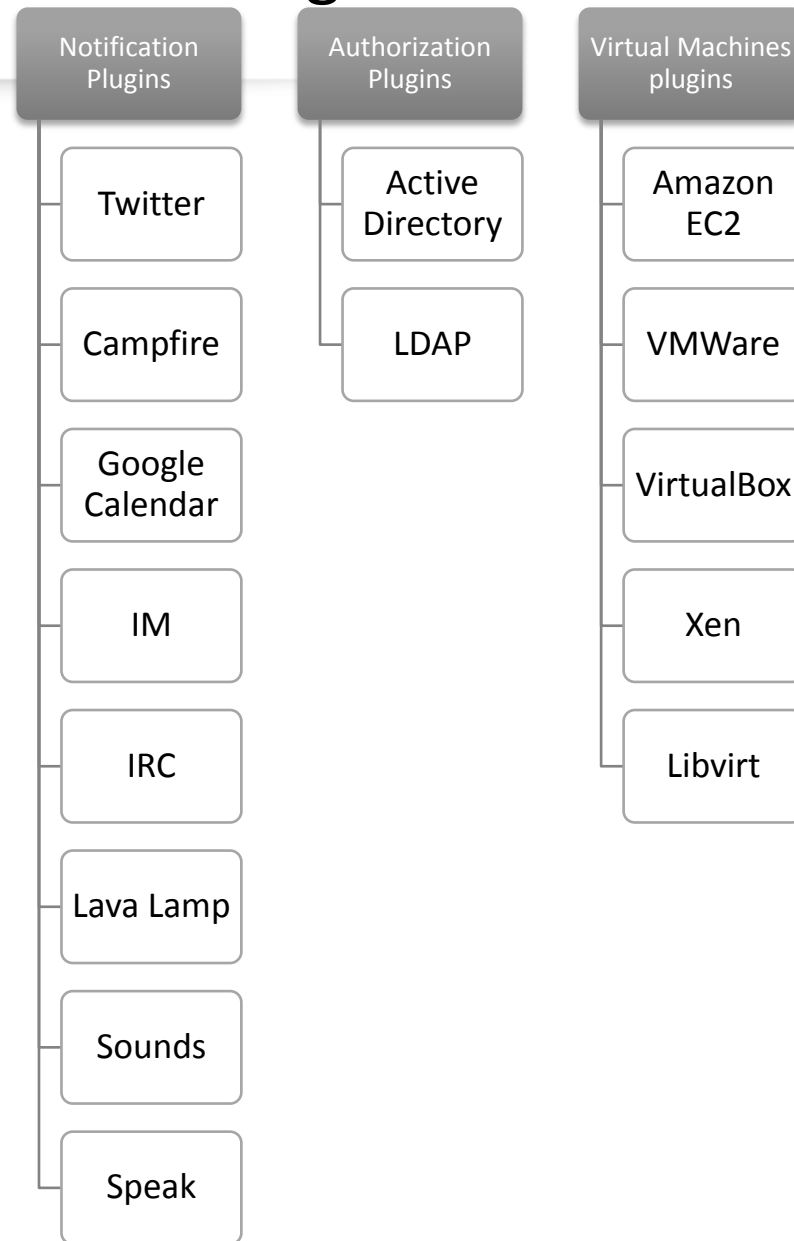
Static Analysis plugins

- Checkstyle
- CodeScanner
- DRY
- Crap4j
- Findbugs
- PMD
- Fortify
- Sonar
- FXCop

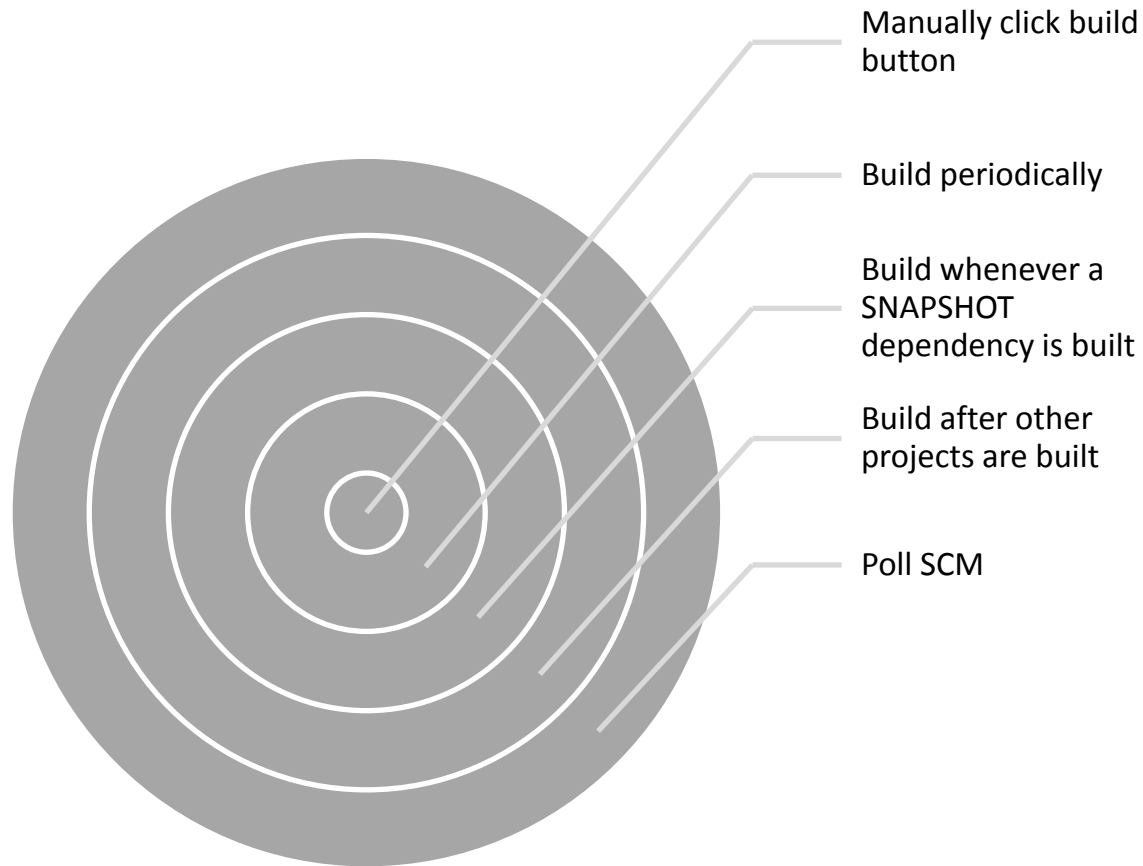
Code Coverage plugins

- Emma
- Cobertura
- Clover
- GCC/GCOV

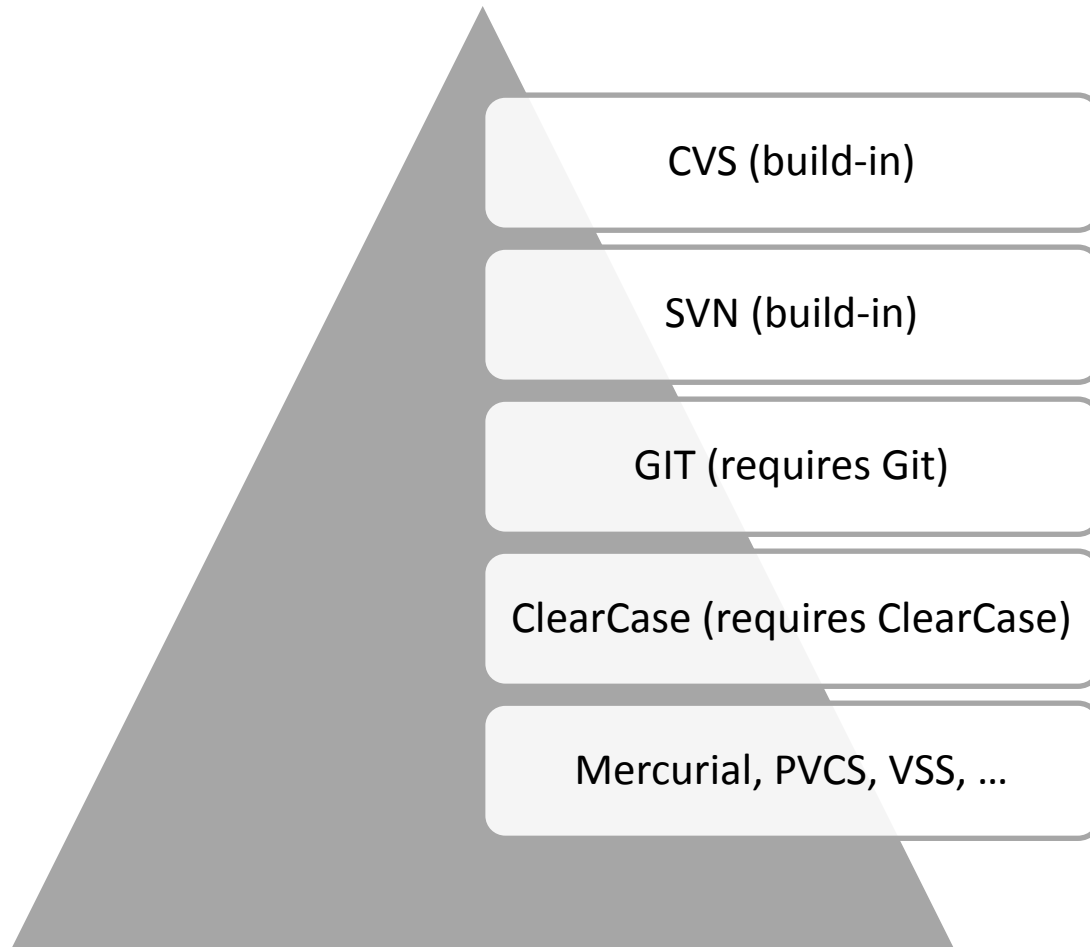
Jenkins Plugins – Other Tools



Build Trigger



Get Source Code (1/2)



Build Tools



Java

- Maven (build-in), Ant, Gradle



.Net

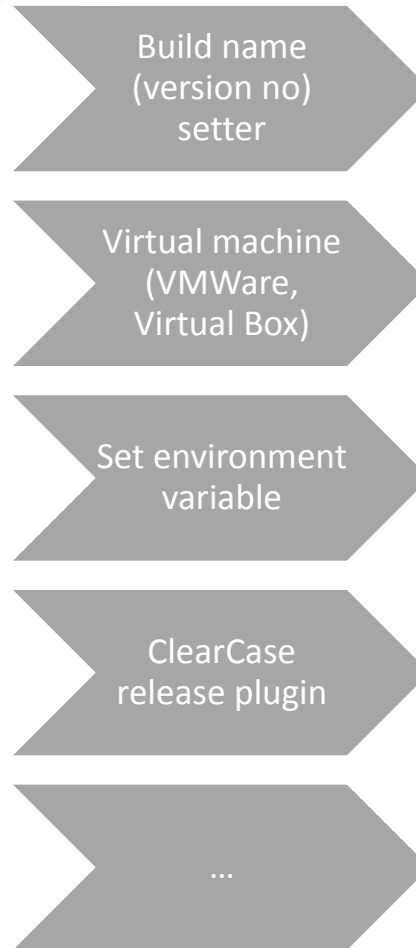
- MSBuild, PowerShell




Shell script

- Python, Ruby, Groovy

Build Wrapper



Build Notifier



E-mail
Twitter
Jabber
IRC
RSS
Google calendar
...

Build Report

Static Code Analysis

- Checkstyle, PMD, Findbugs, Compiler Warning

Test Report & Code Coverage

- JUnit, TestNG, Cobertura, Clover

Open Tasks











Static Code Analysis

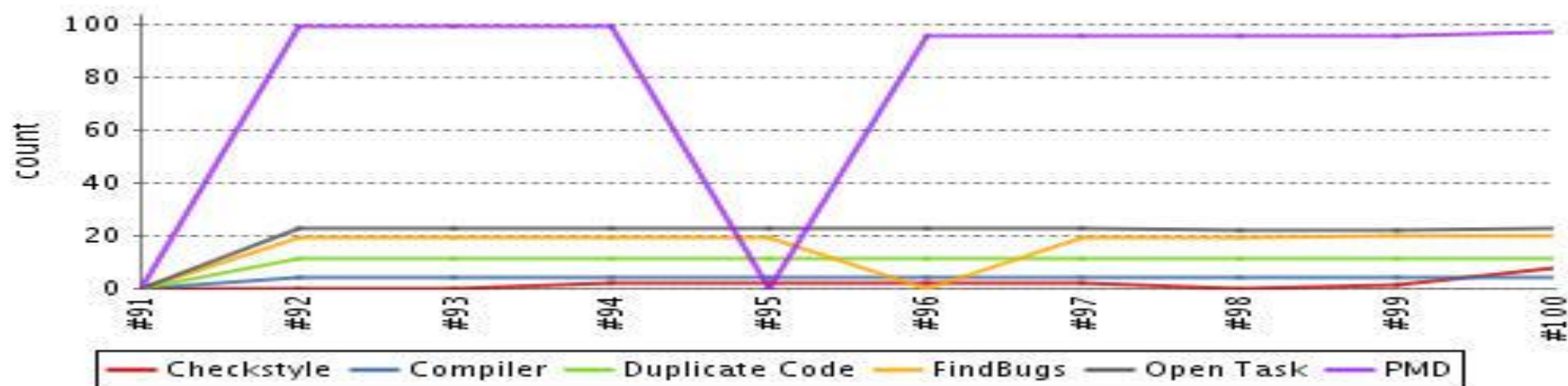
All

DashBoard

+

Warnings per Job

Job ↓	Checkstyle	Duplicate Code	FindBugs	PMD	Open Tasks	Compiler Warnings	Total
 M-Multi-Freestyle	14 	-	0	86 	24	0 	124
 M-Multi-Maven	14	11	12	80	0	4	121
 M-Single-Freestyle	0	0	15	18	99	3	135
 M-Single-Freestyle-Site	5967	2	-	18	5	0	5992
 M-Single-Maven	-	-	-	-	121	0	121
 M-Single-Maven-2	-	4	16	243	4	0	267
 M-Single-Maven-Site	1784	2	72	2	0	-	1860



CheckStyle

CheckStyle Result

Warnings Trend

All Warnings	New Warnings	Fixed Warnings
6766	2	0

Summary

Total	High Priority	Normal Priority	Low Priority
6766	6766	0	0

Details

Modules	Package	Files	Categories	Types	Warnings	Details	New
Type	Total	Distribution					
AvoidInlineConditionalsCheck	47	<div></div>					
AvoidNestedBlocksCheck	2	<div></div>					
AvoidStarImportCheck	1	<div></div>					
ConstantNameCheck	11	<div></div>					
DesignForExtensionCheck	789	<div></div>					
EmptyBlockCheck	29	<div></div>					
FinalClassCheck	5	<div></div>					
FinalParametersCheck	980	<div></div>					
HiddenFieldCheck	288	<div></div>					
HideUtilityClassConstructorCheck	9	<div></div>					
InnerAssignmentCheck	1	<div></div>					
InterfaceIsTypeCheck	8	<div></div>					
JavadocMethodCheck	1472	<div></div>					
JavadocPackageCheck	1	<div></div>					

FindBugs

FindBugs Result

Warnings Trend

All Warnings	New this build	Fixed Warnings
22	0	0

Summary

Total	High Priority	Normal Priority	Low Priority
22	0	0	22

Details

Modules	Package	Files	Categories	Types	Warnings	Details
---------	---------	-------	------------	--------------	----------	---------

Type	Total	Distribution
CN_IMPLEMENTS_CLONE_BUT_NOT_CLONEABLE	1	<div></div>
DLS_DEAD_LOCAL_STORE	1	<div></div>
EI_EXPOSE_REP	4	<div></div>
EI_EXPOSE_REP2	7	<div></div>
EQ_CHECK_FOR_OPERAND_NOT_COMPATIBLE_WITH_THIS	3	<div></div>
EQ_DOESNT_OVERRIDE_EQUALS	2	<div></div>
ICAST_IDIV_CAST_TO_DOUBLE	1	<div></div>
OBL_UNSATISFIED_OBLIGATION	1	<div></div>
RV_RETURN_VALUE_IGNORED_BAD_PRACTICE	1	<div></div>
WA_AWAIT_NOT_IN_LOOP	1	<div></div>
Total	22	

Open Tag

Open Tasks

Open Tasks Trend

All Open Tasks	New Tasks	Fixed Tasks
19	19	0

Summary

Total	High Priority	Normal Priority
19	0	19

Details

PackageFilesWarningsDetailsNew

File	Package	Line	Priority	Type	Category
AbstractClearCaseScm.java	hudson.plugins.clearcase	255	Normal	TODO	
AbstractClearCaseScm.java	hudson.plugins.clearcase	256	Normal	TODO	
AbstractClearCaseScm.java	hudson.plugins.clearcase	257	Normal	TODO	
ClearTool.java	hudson.plugins.clearcase	196	Normal	TODO	
ClearTool.java	hudson.plugins.clearcase	237	Normal	TODO	
ClearTool.java	hudson.plugins.clearcase	238	Normal	TODO	

Duplicate Code

Duplicate Code Result

Warnings Trend

All Warnings	New Warnings	Fixed Warnings
16	0	0

Summary

Total	High Priority	Normal Priority	Low Priority
16	0	10	6

Details

Package	Files	Warnings	Details	Normal	Low
---------	-------	-----------------	---------	--------	-----

File	Number of lines	Duplicated in
NetscapeDraftSpec.java:120	17	BestMatchSpec.java:117
BestMatchSpec.java:117	17	NetscapeDraftSpec.java:120
SSLSocketFactory.java:462	28	PlainSocketFactory.java:154
AbstractAuthenticationHandler.java:82	23	AuthSchemeBase.java:88
RequestProxyAuthentication.java:95	28	RequestTargetAuthentication.java:86
RFC2109DomainHandler.java:47	32	BasicDomainHandler.java:45
AuthSchemeBase.java:88	23	AbstractAuthenticationHandler.java:82
NetscapeDraftSpec.java:137	19	BrowserCompatSpec.java:163
PlainSocketFactory.java:154	28	SSLSocketFactory.java:462
RequestTargetAuthentication.java:86	28	RequestProxyAuthentication.java:95
BrowserCompatSpec.java:163	19	NetscapeDraftSpec.java:137
DefaultRedirectHandler.java:141	44	DefaultRedirectStrategy.java:133
BrowserCompatSpec.java:128	34	BestMatchSpec.java:101
BasicDomainHandler.java:45	32	RFC2109DomainHandler.java:47
DefaultRedirectStrategy.java:133	44	DefaultRedirectHandler.java:141
BestMatchSpec.java:101	34	BrowserCompatSpec.java:128

Test Report

<u>Tests</u>							
Job	Success		Failed		Skipped		Total
	#	%	#	%	#	%	#
Eden-ActiveWorlds	127	100%	0	0%	0	0%	127
Eden-Eden	266	100%	0	0%	0	0%	266
Eden-MondiDinamiciWebservice	155	100%	0	0%	0	0%	155
Eden-Palm	20	100%	0	0%	0	0%	20
Total	568	100%	0	0%	0	0%	568

Test Result

0 failures (±0) , 2 skipped (±0)

1,513 tests (±0)

Module	Fail	(diff)	Total	(diff)
org.apache.httpcomponents:httpClient	0		582	
org.apache.httpcomponents:httpClient-cache	0		920	
org.apache.httpcomponents:httpmime	0		11	

Test Code Coverage

Packages

[All](#)

[net.sourceforge.cobertura.ant](#)
[net.sourceforge.cobertura.check](#)
[net.sourceforge.cobertura.cover](#)
[net.sourceforge.cobertura.instru](#)
[net.sourceforge.cobertura.merg](#)
[net.sourceforge.cobertura.repor](#)
[net.sourceforge.cobertura.repor](#)
[net.sourceforge.cobertura.repor](#)

All Packages

Classes

[AntUtil](#) (88%)
[Archive](#) (100%)
[ArchiveUtil](#) (80%)
[BranchCoverageData](#) (N/A)
[CheckTask](#) (0%)
[ClassData](#) (N/A)

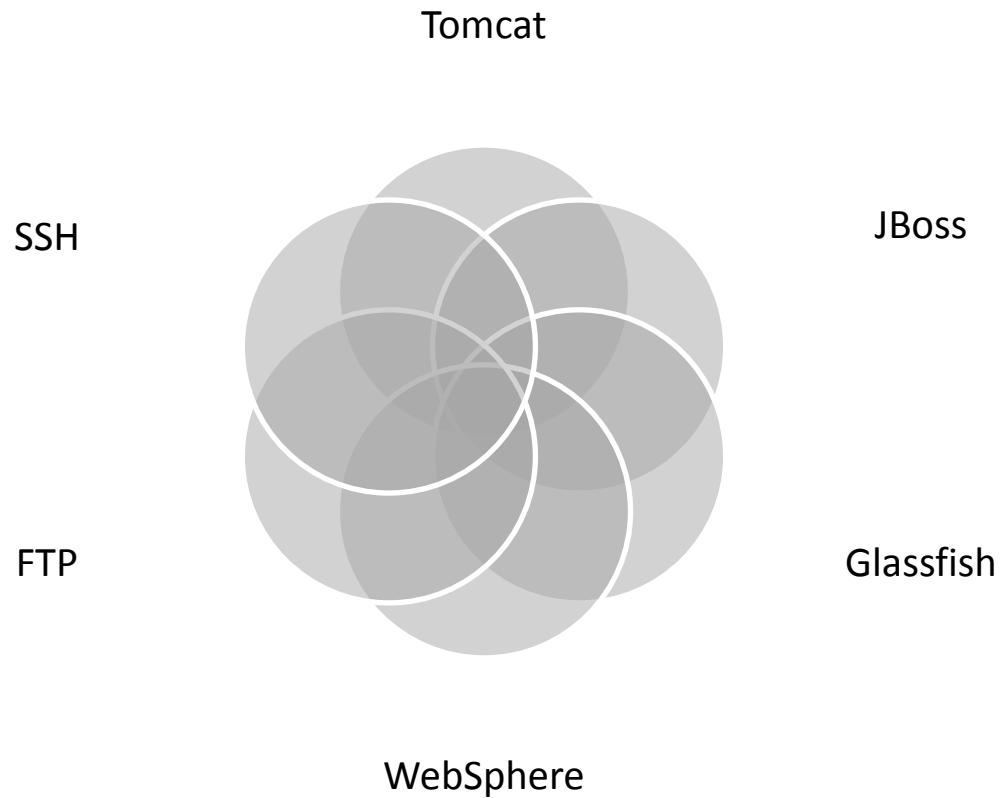
Coverage Report - All Packages

Package	# Classes	Line Coverage		Branch Coverage		Complexity
All Packages	55	75%	1625/2179	64%	472/738	2.319
net.sourceforge.cobertura.ant	11	52%	170/330	43%	40/94	1.848
net.sourceforge.cobertura.check	3	0%	0/150	0%	0/76	2.429
net.sourceforge.cobertura.coveragedata	13	N/A	N/A	N/A	N/A	2.277
net.sourceforge.cobertura.instrument	10	90%	460/510	75%	123/164	1.854
net.sourceforge.cobertura.merge	1	86%	30/35	88%	14/16	5.5
net.sourceforge.cobertura.reporting	3	87%	116/134	80%	43/54	2.882
net.sourceforge.cobertura.reporting.html	4	91%	475/523	77%	156/202	4.444
net.sourceforge.cobertura.reporting.html.files	1	87%	39/45	62%	5/8	4.5
net.sourceforge.cobertura.reporting.xml	1	100%	155/155	95%	21/22	1.524
net.sourceforge.cobertura.util	9	60%	175/291	69%	70/102	2.892
someotherpackage	1	83%	5/6	N/A	N/A	1.2

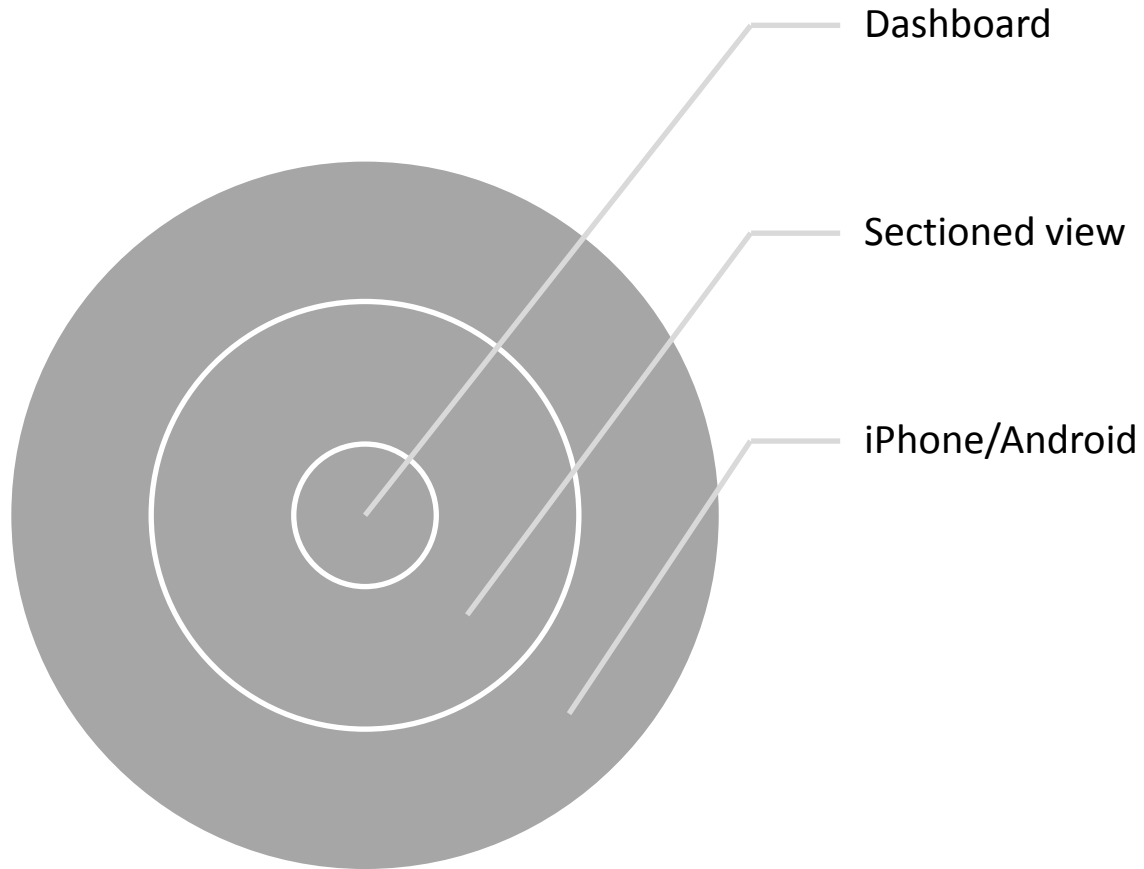
Report generated by [Cobertura](#) 1.9 on 6/9/07 12:37 AM.

Ref: <http://cobertura.sourceforge.net/sample/>

Artifact uploaders



UI Enhancement



Security Management

Security Realm

- LDAP
- Jenkins's own user database
- Delegate to servlet container

Authorization

- Anyone can do anything
- Logged-in users can do anything
- Matrix-based security
- Project-based Matrix Authorization Strategy
- Legacy mode

Security Management

- Matrix-based security

☒ Matrix-based security


User/group	Overall		Slave		Job						Run		View			SCM
	Administer	Read	Configure	Delete	Create	Delete	Configure	Read	Build	Workspace	Delete	Update	Create	Delete	Configure	Tag
Anonymous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

User/group to add:

新增

- Project-based Matrix Authorization

☒ Enable project-based security

User/group	Job					Run	
	Delete	Configure	Read	Build	Workspace	Delete	Update
Anonymous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 dennys2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

User/group to add: dennys2

新增

Security Management Plugins

- Active directory, OpenID, MySQL, ...
- Role based privilege control

Global roles

Role	Overall		Slave		Job						Run			View			SCM
	Administer	Read	Configure	Delete	Create	Delete	Configure	Read	Build	Workspace	Delete	Update	Artifacts	Create	Delete	Configure	Tag
admin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
anonymous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
job-creator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Role to add

Add

Project roles

Role	Pattern	Job					Run		
		Delete	Configure	Read	Build	Workspace	Delete	Update	Artifacts
		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sample	Sample.*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Plugin Usage Statistics

	A	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	plugin	2009-06	2009-07	2009-08	2009-09	2009-10	2009-11	2009-12	2010-01	2010-02	2010-03	2010-04	2010-05	2010-06	2010-07
2	TOTAL														
3	INSTALLS	11026	11918	12092	12972	13379	15222	15812	16578	17936	20037	20670	21210	22182	23159
4	ssh-slaves	7715	9306	9985	11081	11759	13668	14415	15302	16712	18832	19515	20059	21054	22040
5	maven-plugin	8568	9983	10483	11459	12076	13941	14617	15424	16762	18823	19462	19981	20937	21917
6	subversion	1791	6391	8035	9505	10614	12653	13563	14551	16071	18289	19035	19711	20771	21792
7	cvs	0	0	0	1	0	0	8	4625	9192	12384	13816	15173	16568	18001
8	scis-ad	0	0	2818	6634	8572	10848	11957	13133	14831	17164	18022	16502	14433	13328
9	analysis-co	0	0	0	1	1	2	1261	2449	3551	4454	4958	5446	5863	6338
10	email-ext	2349	2572	2694	2880	2956	3372	3492	3725	3965	4332	4473	4615	4906	5187
11	greenballs	1183	1417	1508	1700	1853	2198	2460	2698	2978	3376	3536	3708	3949	4248
12	findbugs	2781	2937	2973	3154	3107	3315	3302	3277	3554	3825	3843	3949	4040	4186
13	checkstyle	2354	2534	2588	2781	2728	2996	2914	2951	3228	3484	3595	3654	3754	3908
14	cobertura	2051	2185	2265	2431	2455	2713	2821	2911	3176	3495	3581	3658	3763	3906
15	warnings	2078	2225	2290	2338	2450	2676	2663	2651	2829	3061	3201	3249	3400	3498
16	pmd	2033	2189	2233	2422	2393	2572	2546	2578	2800	3098	3071	3160	3238	3402
17	disk-usage	1666	1803	1886	2026	2080	2369	2489	2535	2663	2928	2979	2980	3068	3169
18	sonar	1024	1137	1178	1332	1454	1730	1798	1869	2019	2368	2549	2641	2875	2944
19	tasks	1868	2004	1998	2055	2085	2329	2305	2306	2387	2600	2692	2662	2780	2833
20	violations	1366	1471	1531	1624	1720	1881	1947	2009	2200	2397	2407	2461	2523	2625
21	deploy	1221	1259	1292	1380	1478	1669	1727	1776	1862	2139	2213	2188	2374	2494
22	jira	1179	1255	1278	1387	1456	1628	1717	1775	1899	2153	2207	2245	2381	2489
23	chucknorri	1	1	1	168	688	985	1203	1419	1678	1972	2137	2262	2344	2476
24	svn-tag	1175	1312	1328	1382	1423	1643	1685	1716	1810	2034	2040	2084	2206	2338
25	git	558	609	661	693	798	938	1046	1159	1325	1613	1778	1853	1951	2265
26	active-directory	1123	1219	1237	1314	1365	1491	1571	1651	1790	1917	1989	2047	2095	2223

Ref: <http://jenkins-ci.org/content/updated-usage-stats-available>

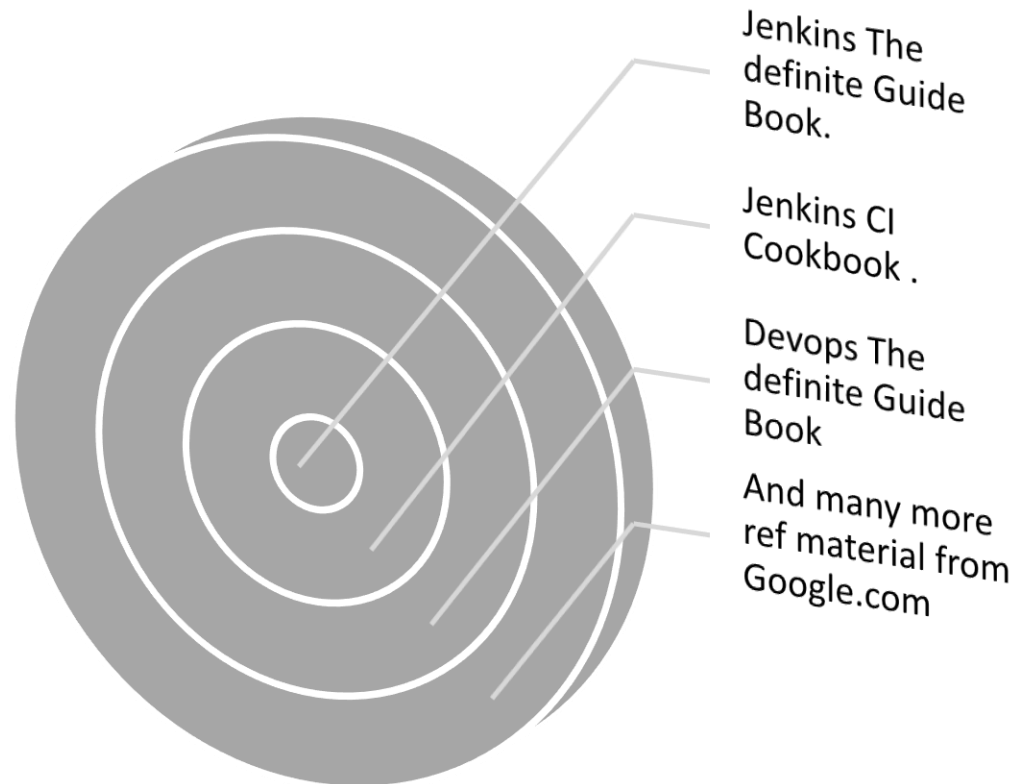
Demo – some Hands on Jenkins



Questions & Answers



References



Thank You

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