



CI Server Jenkins

DevOps Training

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EXECUTIVE SUMMARY

- Continuous integration systems are a vital part of any Agile team because they help enforce the ideals of Agile development
- Jenkins, a continuous build tool, enables teams to focus on their work by automating the build, artifact management, and deployment processes
- Jenkins' core functionality and flexibility allow it to fit in a variety of environments and can help streamline the development process for all stakeholders involved

WHAT IS CI?

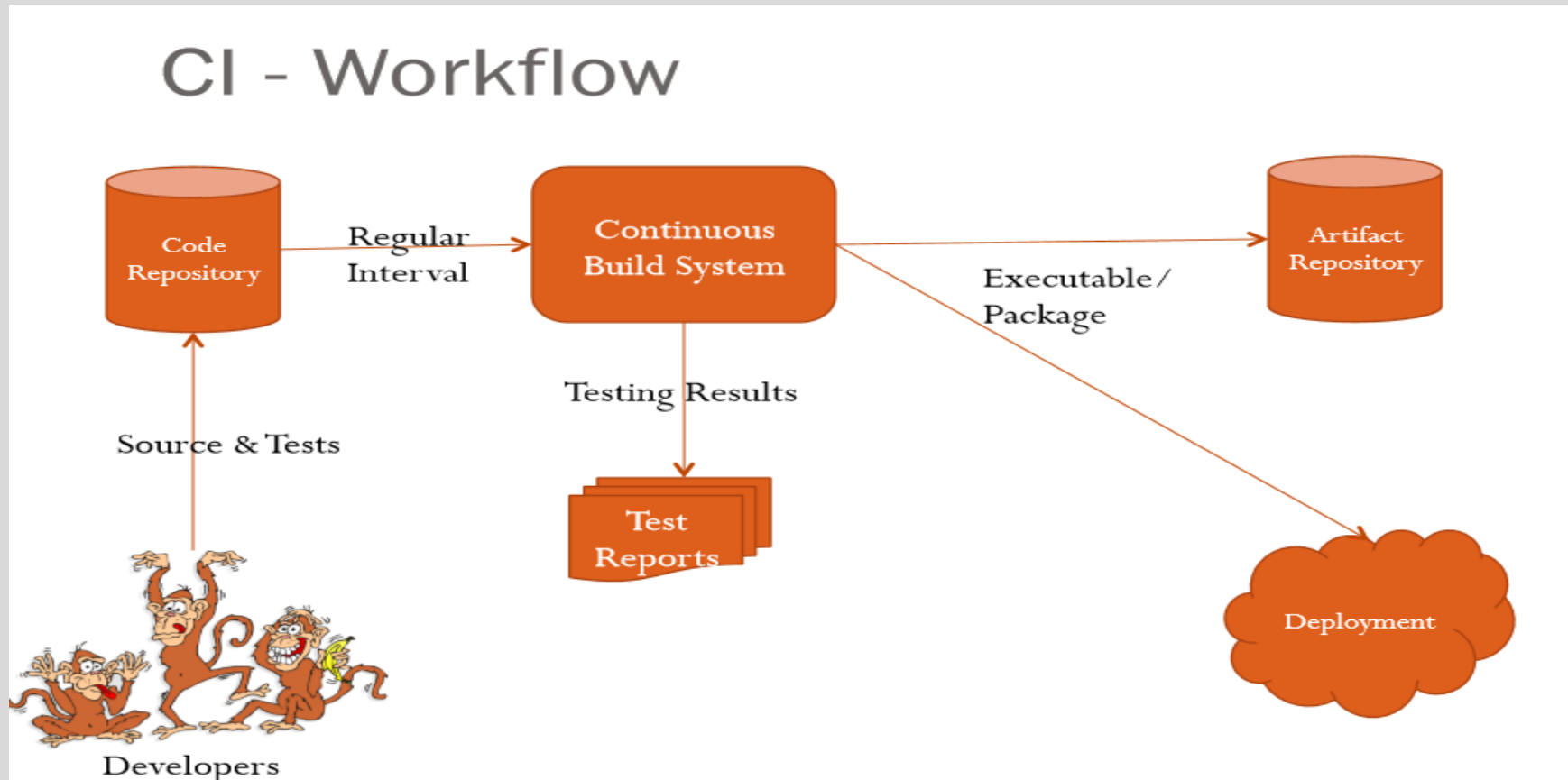
“Continuous Integration is a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily - leading to multiple integrations per day. Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible” – Martin Fowler

CI – WHAT DOES IT REALLY MEAN?

At a regular frequency (ideally at every commit), the system is:

- **Integrated:** All changes up until that point are combined into the project
- **Built:** The code is compiled into an executable or package
- **Tested:** Automated test suites are run
- **Archived:** Versioned and stored so it can be distributed
- **Deployed:** Loaded onto a system where the developers can interact with it

CI - Workflow



CI – BENEFITS

- Immediate bug detection
- No integration step in the lifecycle
- A deployable system at any given point
- Record of evolution of the project

CI – The tools

- **Code Repositories:** SVN, Git
- **Continuous Integration Systems:** Jenkins, Circle CI
- **Test Frameworks:** JUnit, Cucumber
- **Artifact Repositories:** Nexus, Artifactory

JENKINS, THE CI



Jenkins

- Branched from Hudson
- Java based Continuous Build System
- Runs in servlet container such as Glassfish, Tomcat
- Supported by over 400+ plugins such as SCM, Testing, Notifications, Reporting, Artifact Saving, Triggers, External Integration
- Under development since 2005
- <http://jenkins-ci.org/>

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)

WHY JENKINS ?

- Jenkins is a highly configurable system by itself
- The additional community developed plugins provide even more flexibility
- By combining Jenkins with Maven, Ant, Gradle, or other Build Automation tools, the possibilities are limitless

WHY JENKINS ? AWARD WINNING

- InfoWorld Bossies Award, 2011



- O'Reilly Open-Source Award, 2011



- ALM&SCM, SDTimes 100, 2010, 2011



- GlassFish Community Innovation Award 2008



- Duke's Choice Award 2008



WHY JENKINS? FREE / OSS

- Jenkins is released under the MIT License
- There is a large support community and thorough documentation
- It's easy to write plugins
- Think something is wrong with it? You can fix it!

WHAT JENKINS CAN DO

- Generate test reports
- Integrate with many different Version Control Systems
- Push to various artifact repositories
- Deploys directly to production or test environments
- Notify stakeholders of build status
- ...and much more

HOW JENKINS WORKS - SETUP

When setting up a project in Jenkins, out of the box you have the following general options:

- Associating with a version control server
- Manual and Automated Triggering of builds
- Projects can be chained together for different steps and activities
- Execution of shell scripts, bash scripts, Ant targets, and Maven targets
- Artifact archival
- Publish JUnit test results and Javadocs
- Email notifications
- As stated earlier, plugins expand the functionality even further

HOW JENKINS WORKS - BUILDING

Once a project is successfully created in Jenkins, all future builds are automatic

- Building: Jenkins executes the build in an executer
- By default, Jenkins gives one executer per core on the build server
- Jenkins also has the concept of slave build servers
- Useful for building on different architectures
- Distribution of load

HOW JENKINS WORKS - REPORTING

Jenkins comes with basic reporting features

- Keeping track of build status
- Last success and failure
- “Weather” – Build trend

These can be greatly enhanced with the use of pre-build plugins

- Unit test coverage
- Test result trending
- Findbugs, Checkstyle, PMD

JENKINS MAIN PAGE EXAMPLE

The screenshot shows the Jenkins main page with the following sections:

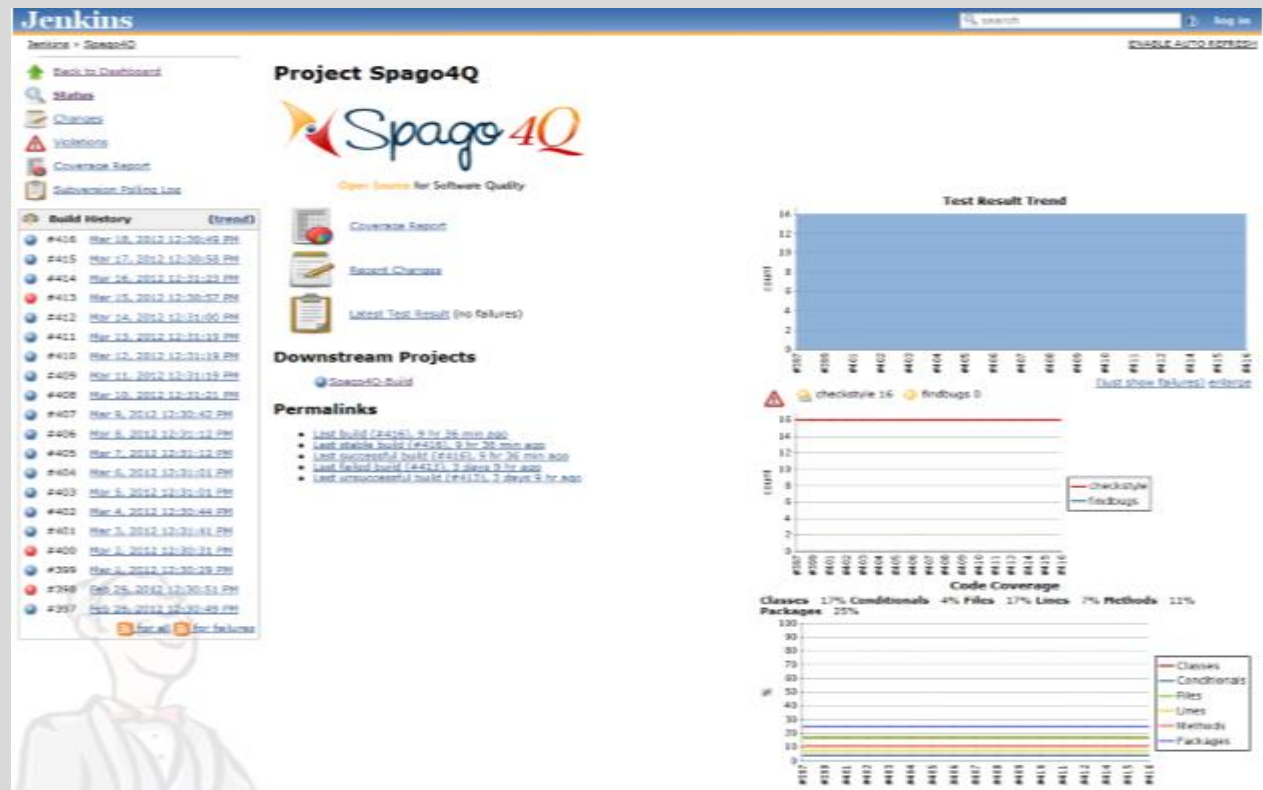
- Build Queue:** No builds in the queue.
- Build Executor Status:** A table showing 2 idle executors.
- Continuous Integration Jobs:** A table listing jobs and their status.

S	W	Job	Last Success	Last Failure	Last D
		Spago4Q	9 hr 32 min (#416)	3 days 9 hr (#413)	N/A
		Spago4Q-Build	9 hr 30 min (#830)	N/A	N/A
		SpagoRIPProject	6 mo 29 days (#2)	N/A	N/A

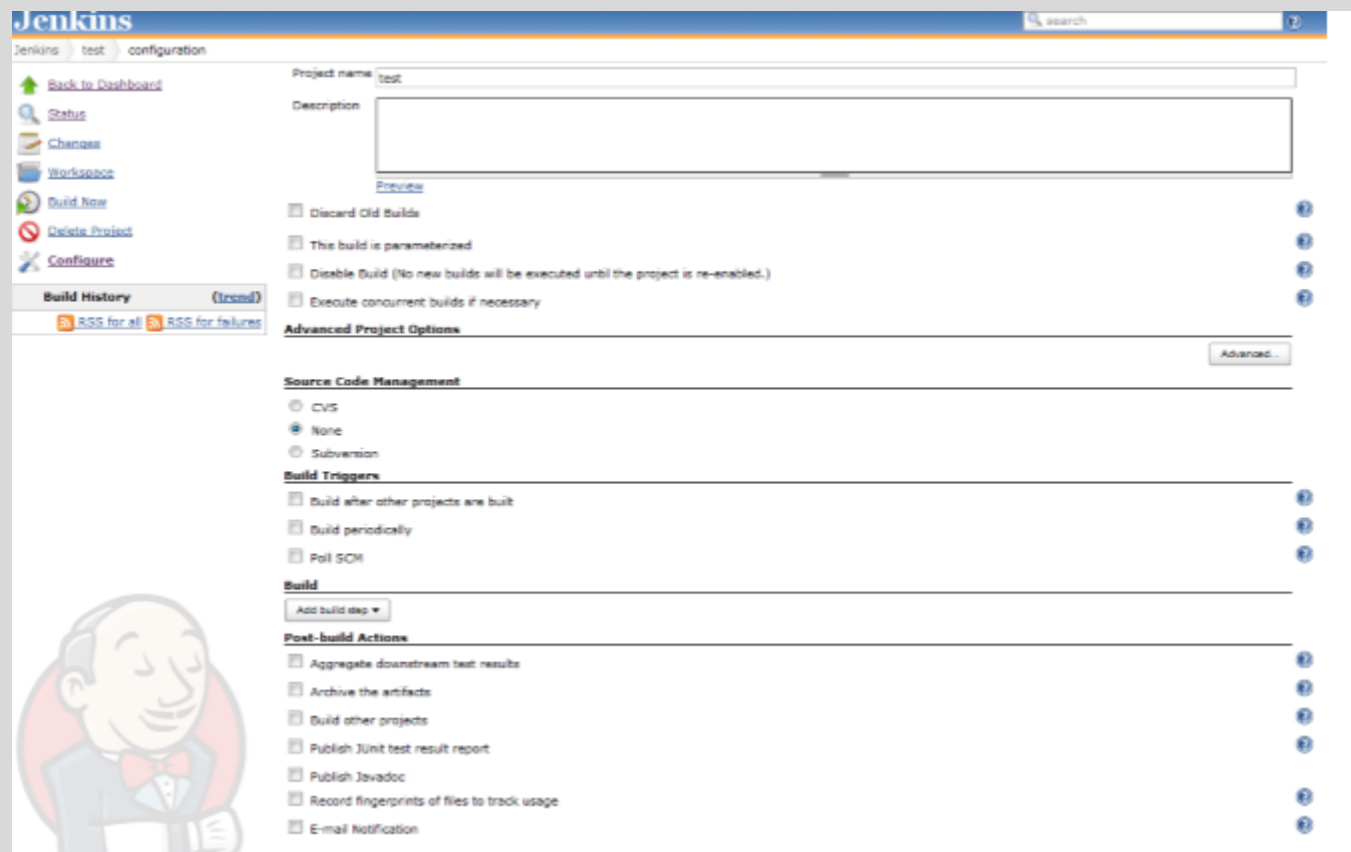
Icons: Legend for all for all

- The main page provides a summary of the projects
- Quick view of
 - What's building ("No builds in the queue")
 - Build Executor Status (both "Idle")
 - Status of the projects

EXAMPLE PROJECT STATUS



JENKINS BY EXAMPLE “NEW PROJECT”



The image shows the Jenkins 'New Project' configuration page. The page has a blue header with the Jenkins logo and a search bar. Below the header, there's a breadcrumb trail: 'Jenkins > test > configuration'. On the left side, there's a sidebar with links: 'Back to Dashboard', 'Status', 'Changes', 'Workspace', 'Build Now', 'Delete Project', and 'Configure'. Below these links, there's a 'Build History' section with a '(load)' button and two RSS feeds: 'RSS for all' and 'RSS for failures'. The main content area is titled 'Project name: test'. Below this, there's a 'Description' text area. To the right of the description, there's a 'Preview' button. Below the description, there are several checkboxes: 'Discard Old Builds', 'This build is parameterized', 'Disable Build (No new builds will be executed until the project is re-enabled.)', and 'Execute concurrent builds if necessary'. Each checkbox has a help icon to its right. Below these checkboxes, there's a section titled 'Advanced Project Options' with an 'Advanced...' button. Under 'Advanced...', there are three sections: 'Source Code Management' with radio buttons for 'CVS', 'None' (selected), and 'Subversion'; 'Build Triggers' with checkboxes for 'Build after other projects are built', 'Build periodically', and 'Poll SCM'; and 'Build' with an 'Add build step' button. Finally, there's a 'Post-build Actions' section with checkboxes for 'Aggregate downstream test results', 'Archive the artifacts', 'Build other projects', 'Publish JUnit test result report', 'Publish Javadoc', 'Record fingerprints of files to track usage', and 'E-mail Notification'. Each checkbox in this section also has a help icon to its right. In the bottom left corner, there is a cartoon illustration of a man in a tuxedo.

Jenkins

Jenkins > test > configuration

Back to Dashboard
Status
Changes
Workspace
Build Now
Delete Project
Configure

Build History (load)
RSS for all RSS for failures

Project name: test

Description

Preview

☐ 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

Advanced Project Options

Advanced...

Source Code Management

☐ CVS
☒ None
☐ Subversion

Build Triggers

☐ Build after other projects are built
☐ Build periodically
☐ Poll SCM

Build

Add build step

Post-build Actions

☐ Aggregate downstream test results
☐ Archive the artifacts
☐ Build other projects
☐ Publish JUnit test result report
☐ Publish Javadoc
☐ Record fingerprints of files to track usage
☐ E-mail Notification

PLUG-IN SUPPORT NOT LIMITED TO

Jenkins plugin system can enable a wide range of features such as:

- **SCM:** Git, Subversion
- **Testing:** Selenium, Cucumber
- **Notifications:** IRC, Twitter, Jabber
- **Reporting:** Sonar, PMD, Findbugs
- **Artifact Host:** Artifactory, Nexus, Amazon S3
- **External Integration:** GitHub, Bugzilla, JIRA

WHO USES JENKINS? NOT LIMITED TO



it's
Q & A
TIME!



THANK YOU!

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