Continuous Integration

SUNCORP

What is Continuous Integration?

- Continuous Integration is a software development practice where members of a team integrate their work frequently.

- Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible.

- When CI works well, it helps the code stay robust enough that customers and other stakeholders can play with the code whenever they like.

- Like refactoring, continuous integration works well if you have an exhaustive suite of automated unit tests that ensure that you are not committing buggy code.

CI overview

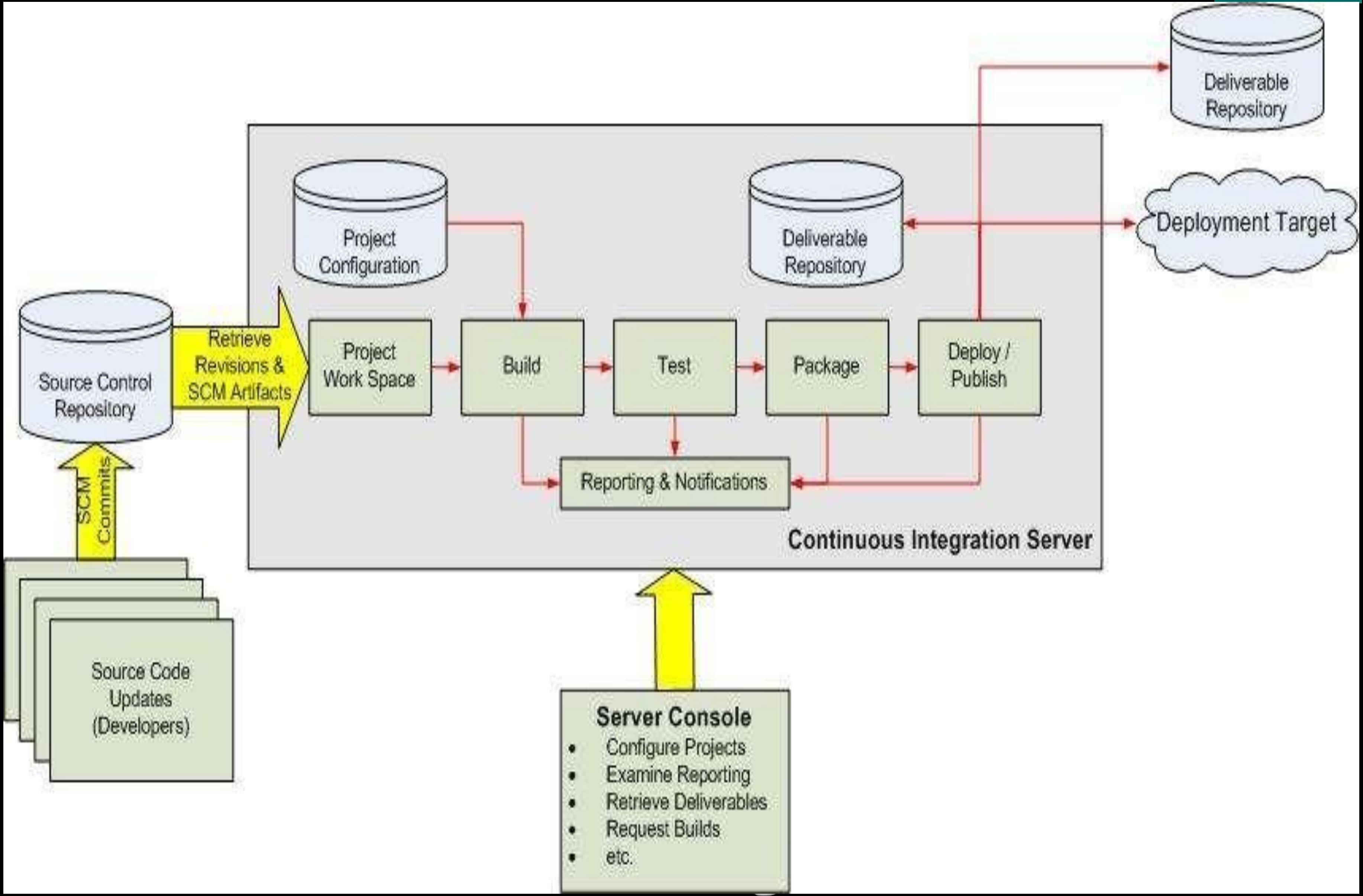

Deliverable Repository
Project Configuration
Deliverable Repository
Deployment Target
Source Control Repository
Retrieve Revisions & SCM Artifacts
Project Work Space
Build
Test
Package
Deploy / Publish
Reporting & Notifications
Continuous Integration Server
SCM Commits
Source Code Updates (Developers)
Server Console
Configure Projects
Examine Reporting
Retrieve Deliverables
Request Builds
etc.

Image: http://www.the-marketing-it-process-strategist.com/marketing-database-blog.html

“…members of a team integrate work …frequently…”

Image: http://www.the-marketing-it-process-strategist.com/marketing-database-blog.html

"…usually each person integrates at least daily…"

Image: http://www.the-marketing-it-process-strategist.com/marketing-database-blog.html

"…leading to multiple integrations per day."

Image: http://www.the-marketing-it-process-strategist.com/marketing-database-blog.html

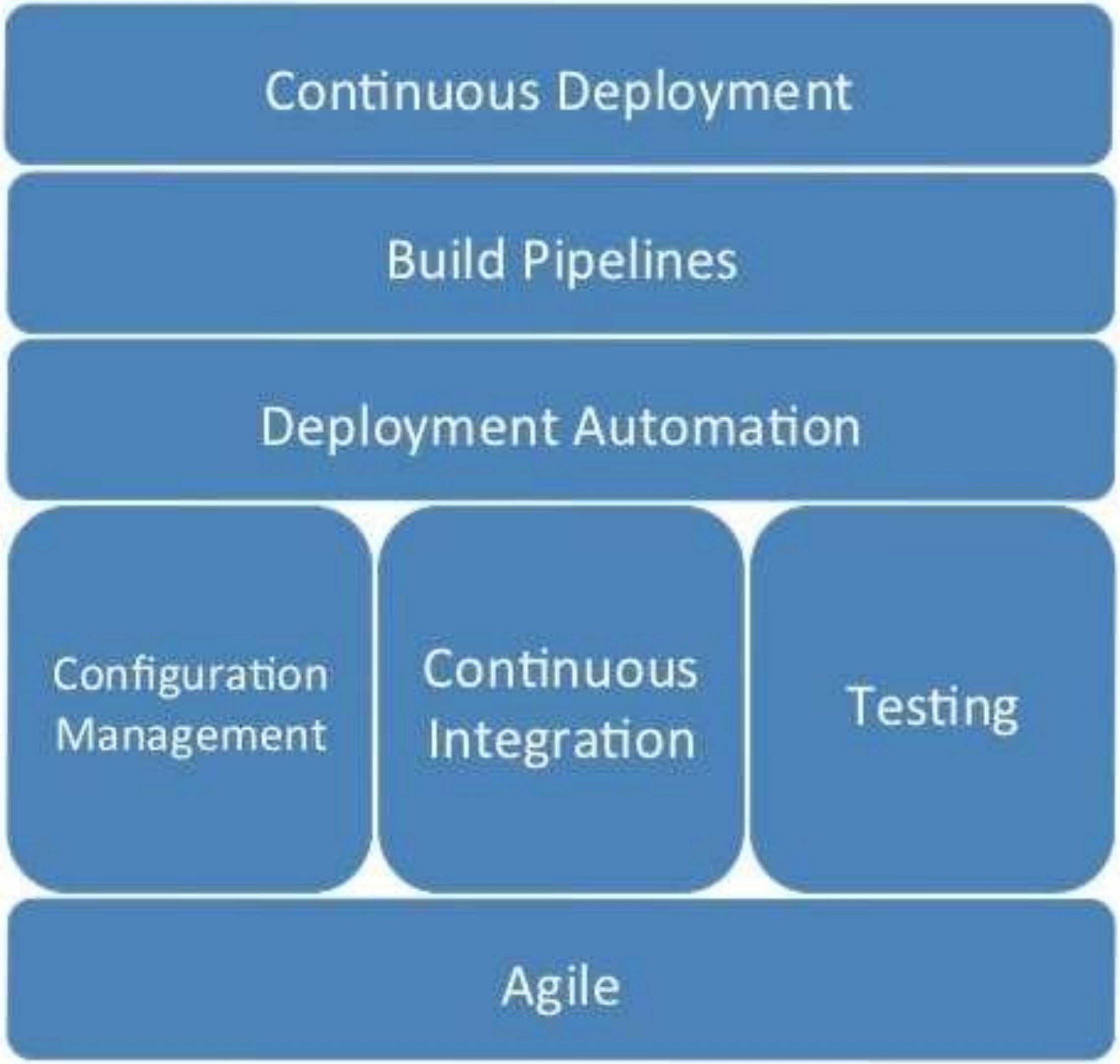
”Each integration is verified by an automated build…”

Image: http://www.the-marketing-it-process-strategist.com/marketing-database-blog.html

“...to detect integration errors as quickly as possible.”

PRACTICES OF CONTINUOUS INTEGRATION

- Maintain a Single Source Repository
- Automate the Build
- Make Your Build Self-Testing
- Everyone Commits To the Mainline Every Day
- Every Commit Should Build the Mainline on an Integration Machine
- Keep the Build Fast
- Test in a Clone of the Production Environment
- Make it Easy for Anyone to Get the Latest Executable
- Everyone can see what's happening
- Automate Deployment



Continuous Deployment

Build Pipelines

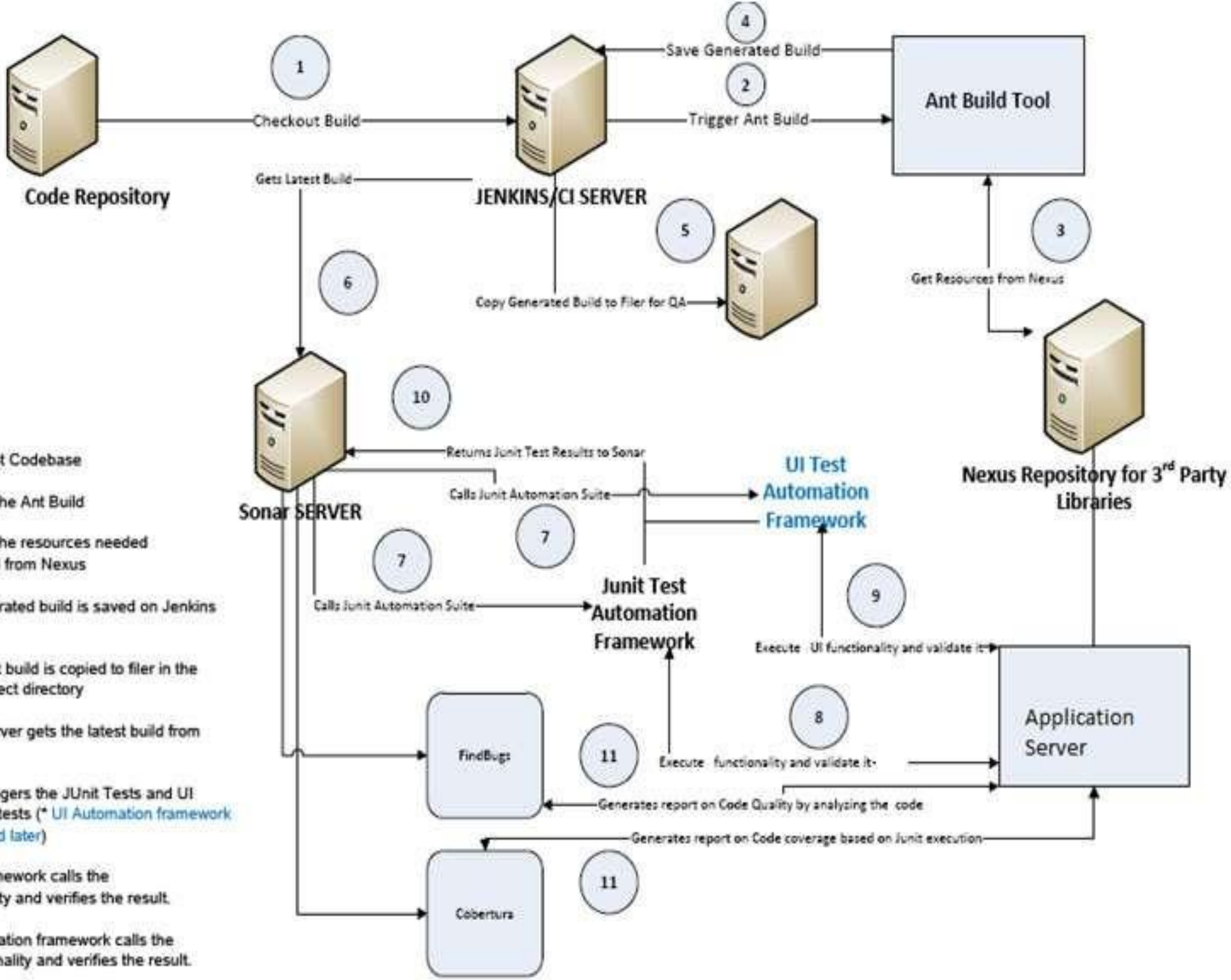
Deployment Automation

Configuration Management

Continuous Integration

Testing

Agile


1
Checkout Build
Code Repository
JENKINS/CI SERVER
4
Save Generated Build
2
Trigger Ant Build
Ant Build Tool
Gets Latest Build
5
Copy Generated Build to Filer for QA
3
Get Resources from Nexus
Nexus Repository for 3rd Party Libraries
6
Sonar SERVER
10
Returns Junit Test Results to Sonar
Calls Junit Automation Suite
7
UI Test Automation Framework
7
Calls Junit Automation Suite
Junit Test Automation Framework
9
Execute UI functionality and validate it
Application Server
8
Execute functionality and validate it
FindBugs
11
Generates report on Code Quality by analyzing the code
Generates report on Code coverage based on Junit execution
Cobertura
11

1) Get Latest Codebase

2) Triggers the Ant Build

3) Ant gets the resources needed
for the build from Nexus

4) The generated build is saved on Jenkins server

5) The latest build is copied to filer in the specific project directory

6) Sonar server gets the latest build from Jenkins

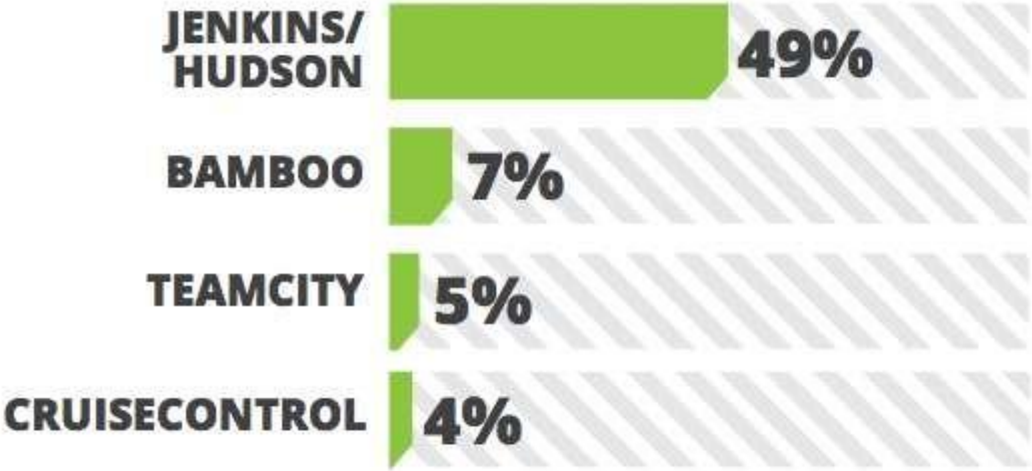
7) Sonar triggers the JUnit Tests and UI Automation tests (* UI Automation framework will be added later)

8) JUnit framework calls the
functionality and verifies the result.

9) UI Automation framework calls the
UI functionality and verifies the result.

10) JUnit framework and UI Automation framework returns the result to Sonar.

Name	Platform	License	Windows builders	Java builders	Other builders	Notification	IDE Integration	Other Integration
Bamboo	Servlet Container	Proprietary	MSBuild, NAnt, Visual Studio	Ant, Maven 1, Maven 2, Maven 3	custom script, command line, Bash	XMPP, Google Talk,E-mail, RSS, Remote API	IntelliJ IDEA, Eclipse, Visual Studio	FishEye, Crowd, JIRA, Clover
CruiseControl	Cross-platform	BSD-style	NAnt, Rake, andXcode	Phing, Apache Ant,Maven	catch-all 'exec'	E-mail, CCTray	Eclipse	Unknown
Go	Cross-platform	Apache 2.0	Yes	Yes	Cross-platform command-line	E-mail, CCTray	No	RESTful API
Jenkins/Hudson	Servlet Container	Creative Commonsand MIT	MSBuild, NAnt	Ant, Maven 2, Kundo	Cmake, Gant, Gradle, Grails, Phing,Rake, Ruby, SCons, Python, Shell script and Command Line	Android, E-mail,Google Calendar,IRC, XMPP, RSS,Twitter	Eclipse, IntelliJ IDEA,NetBeans	Bugzilla, Google Code, JIRA,Redmine, FindBugs, Checkstyle,PMD and Mantis, Trac
TeamCity	Servlet Container	Proprietary	MSBuild, NAnt, Visual Studio, Duplicates finder for .NET	Ant, Maven 2/3, IDEA.ipr based, IDEAInspections, IDEA Duplicates finder,Gradle	Rake, FxCop, Command Line	E-mail, XMPP, RSS, IDE, SysTray	Eclipse, Visual Studio,IntelliJ IDEA,RubyMine, PyCharm,PhpStorm, WebStorm	Jetbrains Youtrack, JIRA, Bugzilla, FishEye, FindBugs,PMD, dotCover, NCover
Team Foundation Server	Windows,VSTM	Proprietary	MSBuild	Ant, Maven	Custom script, Command line	E-Mail, SOAP	Visual Studio, Eclipse	Unknown


JENKINS/
HUDSON
49%
BAMBOO
7%
TEAMCITY
5%
CRUISECONTROL
4%

"Continuous Integration has become a mainstream technique for software development"

What is the value of continuous integration?

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Reduce risk

Image: http://www.coolest-toys.com/200811/classic-board-games-%E2%80%93-risk.htm

Better project visibility

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Greater software confidence

Image: http://www.coolest-toys.com/200811/classic-board-games-%E2%80%93-risk.htm

Deployable software anytime

Image: http://www.coolest-toys.com/200811/classic-board-games-%E2%80%93-risk.htm

Reduce repetitive manual processes

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Image: http://www.davistechnologiesllc.com/index-4.html

The excuses for not continuously integrating…

Image: http://www.davistechnologiesllc.com/index-4.html

Overhead to maintain

Image: http://www.davistechnologiesllc.com/index-4.html

Too much change required

Image: http://www.davistechnologiesllc.com/index-4.html

“The build keeps failing…”

Image: http://www.davistechnologiesllc.com/index-4.html

Additional hardware costs

Image: http://www.davistechnologiesllc.com/index-4.html

Should be doing this (manually) anyway

Image: http://www.daddyhogwash.com/2009/01/broken-window-theory-gets-a-boost-from-the-university-of-groningen/

DON’T PUT UP WITH BROKEN WINDOWS!