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}

Achieving Multiple Tool and Technology Build Automation Success

Tom Canova

http://www.dell.com/us/enterprise

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}
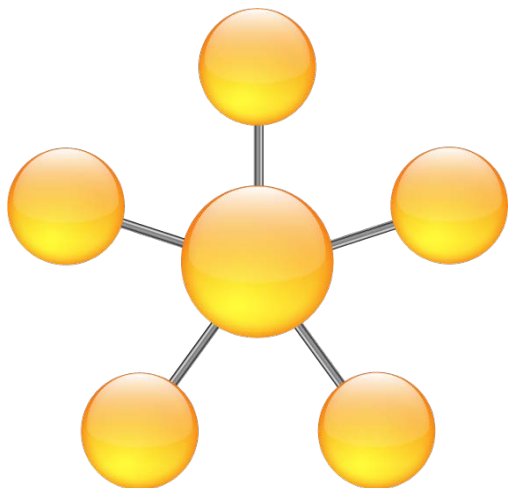
Agenda

- The Multiple Tool Technology Challenge
- The Ultimate Automation Goal
- Automation Tips and Techniques
- Gradle Techniques

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yourBrain << it
}

Speaker Background

- Co-op student on Space Shuttle verification team in 80's
- Started java development in the 90's while working at a major oil company
- Developed balance transfer internet application at major bank in 2000
- Development Lead/Manager, Build Team Manager, Architect, SW Eng in 2000s
- Build Automation Engineer @ Dell supporting new product development

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}

The Multiple Tool Technology Challenge

- Single vendor paradise …
- The right tool for the right job
- Legacy/inherited tools/technologies
- Some technologies in our build technology stack
    - ant
    - maven
    - Jenkins
    - Microsoft TFS
    - subversion
    - Findbugs and Security Static Analysis Tools
    - OpenSuse Build Services (OBS)
    - various VMWare products
    - linux shell scripts, yum, etc…
    - gradle

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The ultimate automation goal

- Increase productivity and quality in the product being developed
  - limit manual tasks to the creative tasks involved in creating the product
  - provide timely and effective communication
  - support quality thru repeatability, automated testing, automated code analysis

Automation Tips and Techniques

- Test First
- Jenkins Plugins
- Taking Jenkins further with Groovy
- Loosely coupled jobs
- Effective Communication
- Reusability and Maintainability Tips

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}

Test First

- Test outside of Jenkins

```
 tfs.gradle
 49
 50    // initialize svn_paths from SVN_URL_
 51    // initialize currentRevisionMap and
 52    svn_paths = []
 53    currentRevisionMap = [:]
 54    currentRevisionXML = ""
 55
 56    if (project.hasProperty('test')) {
 57        // initialize properties for test
 58        env.put('SVN_URL_1','https://omb-
 59        env.put('SVN_REVISION_1','11946')
 60        env.put('SVN_URL_2','https://omb-
 61        env.put('SVN_REVISION_2','10366')
 62        env.put('SVN_URL_3','https://omb-
 63        env.put('SVN_REVISION_3','9862')
```

```
C:\test>gradle -b tfs.gradle -Ptest
:getRevisionFilesTestset.    This par
:getPriorRevisionscally this par
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
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:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLogs
:getSvnLogsTest
:gradleInit

BUILD SUCCESSFUL
```

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}

Test First

- Jenkins Test Environment Options
  - Sandbox Jobs to test Jenkins changes without impacting execution of live jobs

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}

Test First

- Use a Slave to isolate test load so automation changes that are being tested don't have an adverse im

Slave Linux-10.35.178.155 (Linux Slave Node)

Labels: CI LINUX

Projects tied to Linux-10.35.178.155

S	W	Name ↓	Last Success
🟢		Clean-up job repository caches linux slave	4 days 12 hr (#11)
🟢		AAA_CI	2 days 23 hr (#154)
🟢		AAAAppliance_RPMRepo	2 days 17 hr (#2)
🟢		M1Appliance_RPMRepo	16 hr (#12)
🟢		Sandbox-CI	3 days 21 hr (#56)
🟢		SandboxAppliance_RPMRepo	3 days 1 hr (#45)
🟢		Trunk_Fortify	16 days (#17)
🟢		TrunkAppliance_RPMRepo	21 hr (#15)
🟢		testing-regex	8 days 2 hr (#34)

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Plugins

- Some plugins we are using to tie our multiple technologies together

Enabled	Name ↓
☑	**Maven 2 Project Plugin**
☑	**Copy Artifact Plugin** Adds a build step to copy artifacts from another project.
☑	**Email-ext plugin** This plugin is a replacement for Jenkins's email publisher
☑	**Parameterized Trigger Plugin**
☑	**Gradle Plugin** This plugin allows Jenkins to invoke Gradle build scripts directly.
☑	**Jenkins TextFinder plugin** This plugin is used to search for strings in workspace files. The out to mark the build as normal or failed.
☑	**PeriodicBackup Plugin** Backup or restore your Hudson configuration files

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}

Taking Jenkins further with Groovy

- When existing plugins won't do it all
- Leverage a powerful language like groovy or ruby that works well with Jenkins
- Why Groovy
  - Java ecosystem
  - Java expertise
  - Gradle, a Groovy DSL (alternative to Mvn+Ant)
  - Jenkins API

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}

Taking Jenkins further with Groovy

- Traceability & TFS, Subversion, Jenkins

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yourBrain << it
}
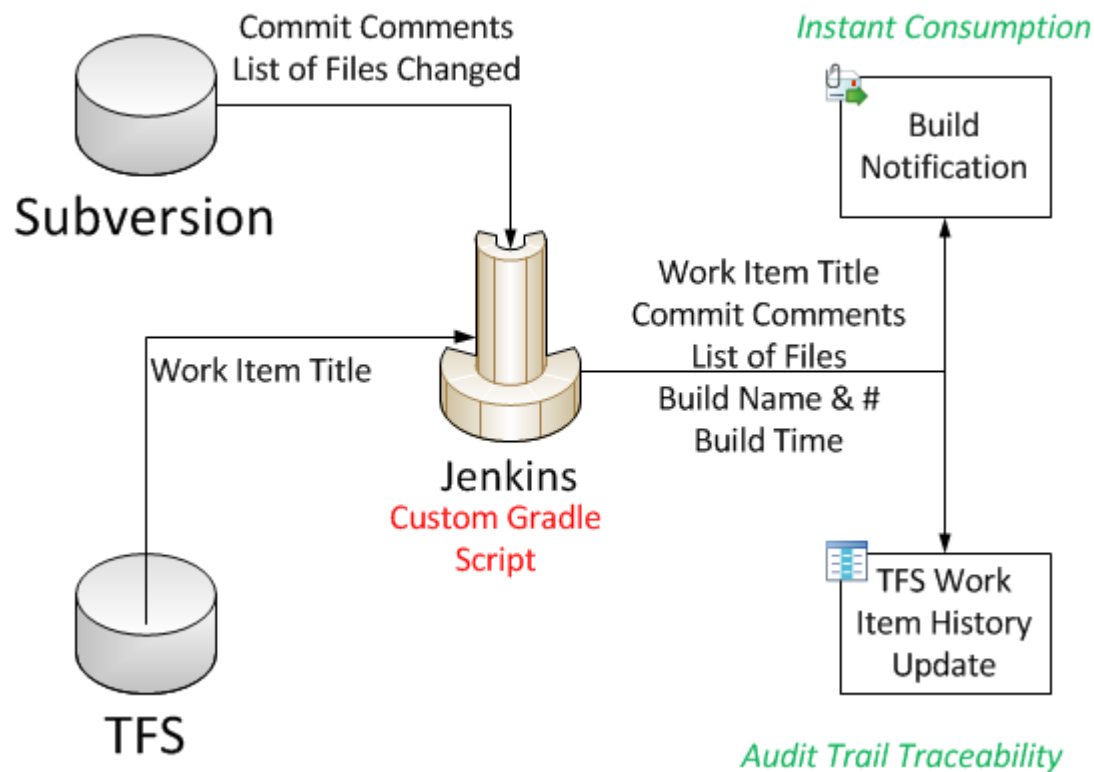
Taking Jenkins further with

- Subversion Commit Comments

Revision 15002 by James
TFSID: 6440 Remove redundant isEmpty check. Reviewed by: N/A

/trunk/main/java/com/dell/commons/integration/DAO.java (diff)

Revision 15001 by James
Ensure file streams are closed using finally blocks in utility functions. Reviewed by: N/A

/trunk/main/java/com/dell/commons/utilities/Utils.java (diff)

Revision 15000 by j f
Change Summary: clear flag on servers if the template has V enabled set to false. (Fix for Defect 5128
Reviewed By: Mohammad
Tested By: Manually enable V on i, and clear the flag.
TFSID:5128

/trunk/main/java/com/dell/business/device/Service.java (diff)

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    yourBrain << it
}

Taking Jenkins further with

- TFS History

Defect 5128 : i: v does not get disabled even if it is disabled in the template

Planning

Severity: Sev 2 Priority: 2-Medium Target Fix Date:

| Description | System Info | Attachments | Fix | Test Cases | Other | All Links | History |

History:

Type your comment here.

⊟ **4/26/2012 6:08:20 PM   Edited by Service**

Work Item Referenced in Build jenkins-:TrunkAppliance-1013
Subversion Revision: 15000 'trunk
Author:j_f   Date:2012-04-26T19:07:06.981323Z
Commit Message: Change Summary: clear flag on servers if the template has V enabled set to false. (Fix f
Reviewed By: Mohammad
Tested By: Manually enable V on i, and clear the flag.
TFSID:5128
Files Changed:
M https://us.dell.com/svn/'trunk/main/java/com/dell/'business/device/Service.java

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    yourBrain << it
}

Taking Jenkins further with *Groovy*

- Email

Subject: SkyhawkTrunkAppliance - Build # 1013 - Successful!

Build 1013 Home Page · Appliance Files · Build Console Log · OBS Console Log · OBS Package Logs
BVT Console Log · BVT SoapUI Logs · BVT Appliance Logs · Unit Test Report
Total Unit Tests:374 .... **Failed Unit Tests**:0

Subversion Changes, Traced to TFS Work Items Where Applicable, Since Last Successful Execution of This Job
TFS ID:5128 *i. v. does not get disabled even if it is disabled in the template*

- **Subversion Revision**: 15000 trunk

  ```
  Author:j_f
  Date:2012-04-26T19:07:06.981323Z
  Commit Message:
  Change Summary: clear flag on servers if the template has V
  enabled set to false. (Fix for Defect 5128
  Reviewed By: Mohammad
  Tested By: Manually enable V on i, and clear the flag.
  TFSID:5128
  Files Changed:
  M trunk/main/java/com/dell/business/device/Service.java
  ```

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yourBrain << it
}
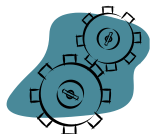
Loosely Coupled Jobs and Scripts

- Use Plugins – don't hardcode a script to point to a related jobs workspace to get artifacts
- Allow parallelism across nodes
- Divide/refactor large jobs along natural functional/technology boundaries
- Loose Coupling Fosters Reuse

Copy artifacts from another project

Project name	$STEP1_PROJECT
	⚠ **Value references a build parameter, so it cannot be validated.**
Which build	Copy from WORKSPACE of latest completed build
	Limitation Note
Artifacts to copy	Appliance${BRANCHPATH}appliance-setup${DEFAULT_RPM_SOURCE_TAG}-${APPLIANCE_VERSION}.tar.bz2,Appliance${BRANCHPATH}pkg/appliance-setup.spec
Target directory	$OBS_PROJECT/appliance-setup

☑ Flatten directories   ☐ Optional

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}

Effective Communication

- Jenkins is nice, but …
- Timely information delivery
- Consumable information

Build 1013 Home Page · Appliance Files · Build Console Log · OBS Console Log · OBS Package Logs
BVT Console Log · BVT SoapUI Logs · BVT Appliance Logs · Unit Test Report
Total Unit Tests:374 .... **Failed Unit Tests**:0

Files Changed:
M Commons/trunk/main/java/com/dell/commons/utilities/Utils.java

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    yourBrain << it
}

Reusability and Maintainability Tips

- Target Multiple platform types

```
C:\test>gradle -b tfs.gradle -Ptest
:getRevisionFilesTestset.    This par
:getPriorRevisionscally this var
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
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:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLog_https://svn1.us.dell.com/svn
:getSvnLogs
:getSvnLogsTest
:gradleInit

BUILD SUCCESSFUL
```

```
16:01:35  [:        ] $ /home/jenkins/.jenkins/tools/Gradle_1.0-milestone-7/bin/gradle -DAPPLIANCE_BUILD_NUMBER=${BUILD_NUMBER} -DOE
D:   AWK_REPO=obs://    awk:trunk/centos5 -DHTMLPATHROOT=file://///  ·builds.aus.amer.dell.com/builds$/hudson/        -DVMWARE_T
DSTEP1_PROJECT=    .awkTrunkAppliance -DYUM_REPO_TARGET=/mnt/builds2/yum/    awk/trunk -DM2_SETTINGS=public-appliance_settings.xml
PFILES_URL_REPLACE_TARGET=svn1.us.dell.com/cgi-bin/viewvc -PFILES_URL_ADD_REVISION_SUFFIX --info printWorkItemChanges -b tfs.gradle
16:01:36  Starting Build
16:01:37  Settings evaluated using empty settings file.
16:01:37  Projects loaded. Root project using build file '/home/jenkins/.jenkins/workspace/awkTrunkAppliance/tfs.gradle'.
```

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   yourBrain << it
}

Reusability and Maintainability Tips

- Help another team to leverage
  - sensitivity to code quality and documentation
  - more people know and support/contribute
  - consider a Jenkins plugin

Subversion Changes, Traced to TFS Work Items Where Applicable, Since Last Successful Execution of This Job

TFS ID:No_Work_Item_ID_In_Commit_Msg *Work Item Title NA*

- **Subversion Revision**: 15001 Commons/trunk

```
Author:James
Date:2012-04-26T19:08:53.752879Z
Commit Message:
Ensure file streams are closed using finally blocks in        utility functions.  Reviewed by: N/A

Files Changed:
M Commons/trunk/main/java/com/dell/commons/utilities/Utils.java
```

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}

Reusability and Maintainability Tips

● Refactor and Iterate
– Paramaterize

☑ This build is parameterized

String Parameter

Name   OVF_BUILD_FOLDER

Default Value   skyhawk-trunk-${BUILD_NUMBER}

String Parameter

Name   APPLIANCE_BUILD_NUMBER

Default Value ${BUILD_NUMBER}

String Parameter

Name   HTMLPATHROOT

Default Value   file://///builds.aus.amer.dell.com/builds$/hudson/

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}

Reusability and Maintainability Tips

- ● Refactor and Iterate
  - – Leverage new plugins and technologies

```
BVTApplianceLogs.template

1   <%
2   def env = System.getenv()
3   def parameters = build.getBuildVariables()
4   // if  parameter not found, then set to defaults for usage in script testing
5   def pathLeaf = parameters['OVF_BUILD_FOLDER'] ?: 'awk-m1-594'
6   try { pathLeaf = build.environment.expand(pathLeaf) } catch (Exception ex) {}
7   def pathRoot
8   def htmlPathRoot = parameters['HTMLPATHROOT'] ?: 'file://///builds.aus.amer.dell.com/builds$/hudson
9   if (env['OS'] && env['OS'].toUpperCase().contains('WINDOWS'))
10  {
11      // println 'setting windows os specific parameters'
12      pathRoot = parameters['PATHROOT'] ?: '\\\\builds\\builds\$\\hudson\\
13  } else {
14      // println 'setting linux specific paramete~~'
15      pathRoot = parameters['PATHROOT'] ?: '/mnt/awk/'
16  }
28  try {
39          applianceLogsDirName = "/Appliance_Logs"
40      }
41  } catch (Exception ex) {
42  }
43  %>
44  <A HREF="${htmlPathRoot}${pathLeaf}/${workflowDirName}${applianceLogsDirName}">BVT Appliance Logs</A>
```

// Feed your brain
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  yourBrain << it
}

Gradle Features

- Tasks – 'Public' api for your script
- Task dependency management
- Library dependency management
- Use Groovy
- Tasks vs Methods
- Configuration Phase/Execution Phase
- Embedded ANT
- Plugins

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}

Gradle Techniques

- Self Documenting Configuration

```
if (! project.hasProperty('svn_username')) {logger.info('Subversion username not speci
fied, so will use current user')}
if (! project.hasProperty('svn_password')) {logger.info('Subversion password will depe
nd on profile password')}

if (! project.hasProperty('BUILD_NUMBER')) {
  logger.warn('BUILD_NUMBER was not set.   This parameter is stored in the history rec
ord of each TFS work item that was linked to by a subversion commit message. Typically
 this parameter should be set by the tool, such as Jenkins, was invokes this script. A
 default value of 9999 is being used.')
  BUILD_NUMBER="9999"
}
if (! project.hasProperty('tfs_profile')) {
  logger.warn('The tfs_profile was not set.   This parameter may be required for TFS t
asks.   It is recommend to set this parameter. \nFor instructions on how to create a TF
S profile see http://msdn.microsoft.com/en-us/library/hh190726.aspx\n /opt/TEE-CLC-10.
0.0>tf profile -new tom_canova@auspecalibersas -string:userName=tom_canova -string:pas
```

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}

Gradle Techniques

● Assertions

Project Level Configuration

```
        assert project.hasProperty('wit'), 'wit, the path to the TFS Everywhere WorkIt
em Tool, is a required property'
```

Task Level Configuration

```
                assert (project.hasProperty('tfs_profile')), 'tfs_profile is a require
d property for the getTitleTest task'
                assert (project.hasProperty('wi_id')), 'wi_id is a required property f
or the getTitleTest task'
```

Method Level Configuration

```
def getTitle(wi_id, profile_name, wit) {
        assert (profile_name), 'profile_name is a required parameter of getTitle'
```

Test Results Confirmation

```
        doLast {
                logger.debug("getRevisionFilesTest.revision = ${revision}")
                logger.debug("getRevisionFilesTest.path = ${path}")
                assert (getRevisionFiles(revision,[ path ]).length() > 0)  ,  'getRevi
sionFiles is expected to return a list of files'
```

// Feed your brain
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    yourBrain << it
}

Gradle Techniques

- When and How To Fail Quietly

```
if (! project.hasProperty('ignoreErrors')) ignoreErrors=true
```

```
} catch (Exception ex) {
        ex.printStackTrace()
        if (! ignoreErrors) throw ex
}
```

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yourBrain << it
}

Gradle Techniques

- Leverage Groovy

```
//convert the map to XML
StringWriter xmlstringwriter = new java.io.StringWriter()
def xmlout = new groovy.xml.MarkupBuilder(xmlstringwriter)
xmlout.revisions() {for (entry in currentRevisionMap) revision(url:entry.key, value:entry.value)}
project.currentRevisionXML = xmlstringwriter.toString()
logger.info( "currentRevisionXML=${project.currentRevisionXML}")
```

// Feed your brain
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    yourBrain << it
}

Gradle Techniques

- Tasks of type Exec
  - Good when:
    - **# Calls Known at Scripting Time**

      ```
      task getPriorRevisions(type:Exec) {
              // configuration phase
              standardOutput = new ByteArrayOutputStream()
              executable = "${wit}"
              ignoreExitValue = ignoreErrors
              def xmlResponse = ""
      ```

    - **# Calls Known at Configuration Time**

      ```
      task wit_edit() {
              // configuration phase
              workItemsToEdit.each { id ->
                      tasks.add(name: "wit_edit_${id}", type: Exec) {
      ```

      ```
      dependsOn(tasks.matching { Task task -> task.name.startsWith("wit_edit_")})
      ```

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More Information

- Gradle
  http://gradle.org/

- Subversion
  http://subversion.apache.org/

- Jenkins
  http://jenkins-ci.org/

- Microsoft TFS Team Explorer Everywhere
  http://www.microsoft.com/en-us/download/details.aspx?id=4240

Questions