Configuration as Code

Adoption of the Job DSL Plugin at Netflix

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Who Are We

- Engineering Tools
  - Justin Ryan / jryan@netflix.com / @quidryan
  - Curt Patrick / cpatrick@netflix.com
- Freedom & Responsibility

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Situation

- No single flow that builds everything
- Every team has their own jobs
- Each branch needs multiple jobs

Problem

- Lots of copying of jobs
- Subtle fields hidden in Advanced button
- No ability to mimic another team
- Change in UI can be slow

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Alternatives

- Template Project Plugin from Cloudbees
- Job Generator Plugin
- Literate Plugin
- etc...

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Infrastructure As Code

"The end goal of infrastructure as code is to perform as many infrastructure tasks as possible programmatically. Key word is automation."

(http://www.somic.org/2012/09/28/concise-introduction-to-infrastructure-as-code/)

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Configuration As Code

- Netflix - We understand the value of scaling and automation
- Jobs should be responsible citizens
- Team can own their scripts

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Job DSL Plugin

- Create a Free-form project
- Add a “Process Job DSL” build step
- Enter Groovy script using a Jenkins DSL
- Run job

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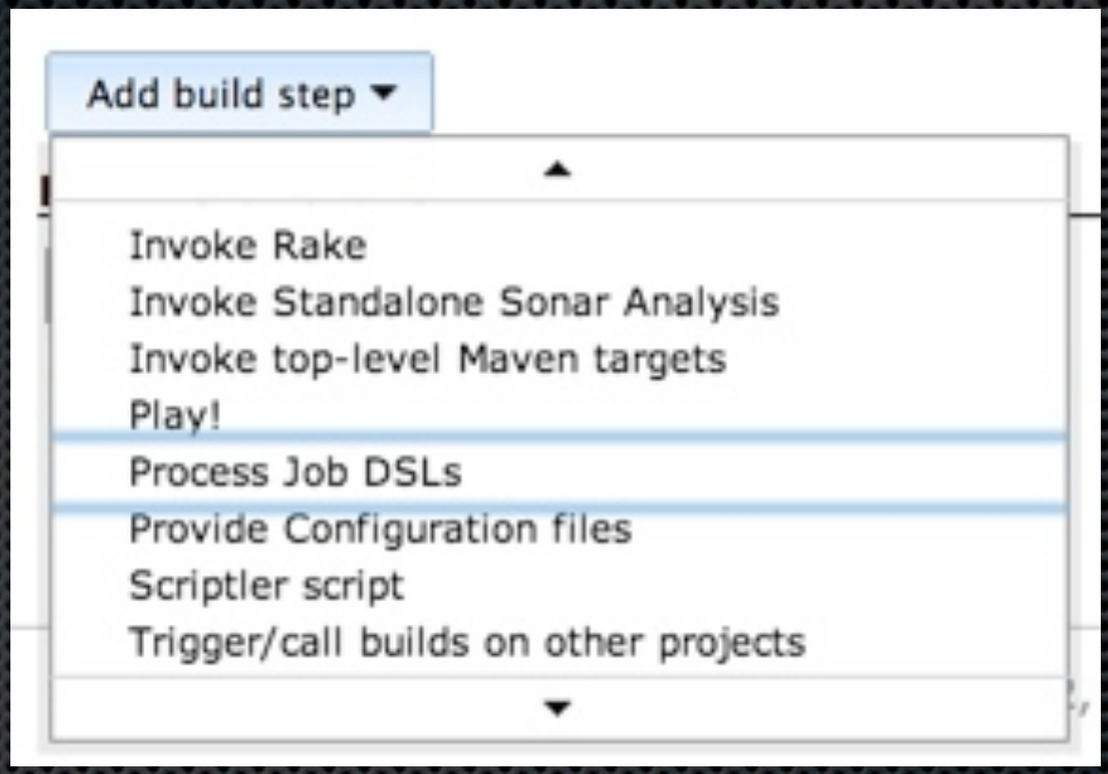
Step 2. Add Build Step



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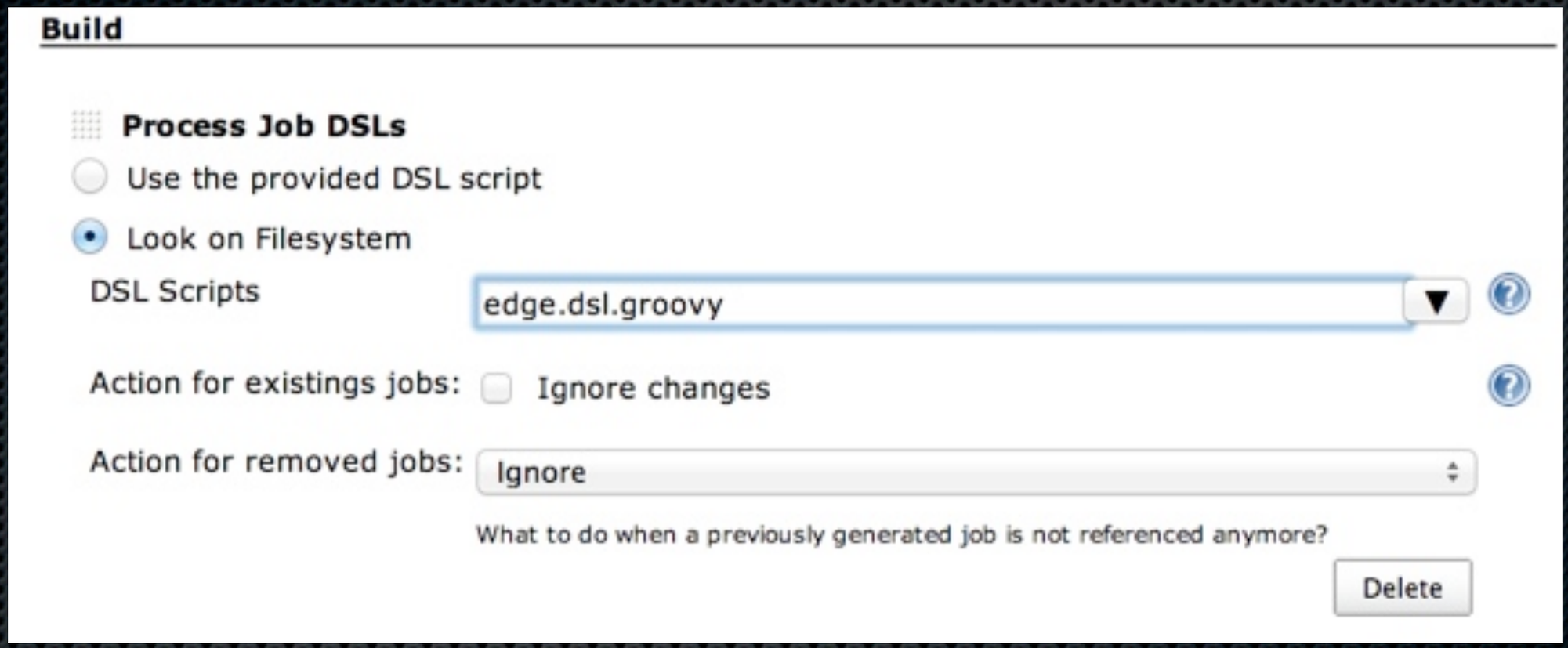
Step 3. Specify Script



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Step 4. Run

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Job DSL Language

- Groovy
- One additional method, “job”
- Documentation in Github Wiki
  - https://github.com/jenkinsci/job-dsl-plugin/wiki
  - Job DSL Commands
  - Job Reference Page

Single Job from Github

```
job {
  name "RxJava-Test”
  scm {
    github(“git@github.com:Netflix/RxJava.git”)
  }
  steps {
    gradle("test")
  }
}
```

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Leveraging Groovy

```
import groovy.json.JsonSlurper

def project = 'quidryan/aws-sdk-test'
def github = 'https://api.github.com'
def api = new URL("${github}/repos/${project}/branches")
def branches = new JsonSlurper().parse(api.newReader())
branches.each {
    def branchName = it.name
    job {
        name "${project}-${branchName}".replaceAll('/','-')
        scm {
            git("git://github.com/${project}.git", branchName)
        }
        steps {
            maven("test -Dproject.name=${project}/${branchName}")
        }
    }
}
```

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Disadvantages

- Learning Curve
- Can get complicated
- Not all plugins exist
- Possible problems with plugin version skew

The Project

- 408 installs at last check
- Active Google Group, with 78 members
- Regular Google Hangout
- Constant stream of contributors
- Core contributors - myself, Daniel Spilker, Stefan Wolf, Andrew Harmel-Law

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Use Case - Opower

"Grab json blobs, which define pipeline, from an internal Rails app then loop through with Job DSL. I now have only one job to set up manually. So, in theory, I set up one job and I end up with 600 jobs. Throw each set into a folder and you've got yourself a red/green dashboard."

James Levinson <james.levinson@opower.com>

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```
while(it.hasNext()) {
    Object a = it.next();
    def job_name = "${task}_"+ a.name.toUpperCase()
    println "> Processing ${job_name}..."
    def addresses = config.getAddressesForArtifact(a.name)
    println "addresses: ${addresses}"
    all_string = all_string.concat("${job_name}, ")
    scm_url = "svn+ssh://svn.opower.com/opt/svnroot/main/clients/${a.name}/trunk"

    /* START DSL */
    job(type: Maven) {
        name "${job_name}"
        description Config.managed_by + Config.add_your_email
        logRotator (-1,10,-1,-1)
        label 'javaapps'
        scm { svn "${scm_url}" }
        goals '-U clean deploy'
        triggers { scm '*/15 * * * *' }
        publishers {
            mailer addresses, true, false
            buildDescription "\\[INFO\\] Uploading repository metadata for: \\'snapshot com.[^\\
        }
        configure { project ->
            project / mavenName << 'maven-2.2.1'
        }
    }
    /* END DSL */
    counter++
}
println "Processed " + counter + " ${bucket}.";
```

Use Case - Chicago Trading

"I use the Job DSL to create gerrit build and release build jobs, parameterized on the git repository. Then I use the Build Flow plugin to orchestrate those jobs"

Alan Beale <alan.beale@chicagotrading.com>

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Netflix Conventions

- Utilities methods to create common jobs
- Groovy Category to enhance “job” object
- Published as a jar

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Merge Jobs

```
import netflix.Merge

Merge.nfMergeJobs( [jobFactory: this, securityGroup: ‘nbs’,
    base: '//depot/IT_Engineering/NBS/nbsrules',
    projectPrefix: 'BILLING-rules'] )

Merge.nfMergeJobs( [jobFactory: this, securityGroup: ‘nbs’,
    base: '//depot/IT_Engineering/NBS/Phoenix',
    projectPrefix: 'BILLING-phoenix'] )
```

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Merge Jobs

- BILLING-rules-dev-force-to-test
- BILLING-rules-test-force-to-prod
- BILLING-rules-prod-merge-to-test
- BILLING-rules-test-force-to-dev
- BILLING-phoenix-dev-force-to-test
- BILLING-phoenix-test-force-to-prod
- BILLING-phoenix-prod-merge-to-test
- BILLING-phoenix-test-force-to-dev

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Jobs as Objects

```
import netflix.*
def defaults = [...]
def jobs = [‘dev’,’test’,’prod’].collectMany {[
    CBFQuickBuild(defaults + [branch:branch]),
    CBFQualityBuild(defaults + [branch:branch]),
    nfBakeJob(defaults + [branch:branch])
]}

jobs.each {
    it.publishers {
        extendedEmail('jryan@netflix.com', 'Oops') {
            trigger(triggerName: 'StillUnstable',
                    subject: 'Subject',
                    recipientList:'RecipientList',
                    sendToDevelopers: true,
                    sendToRequester: true,
                    includeCulprits: true,
                    sendToRecipientList: false)
    }
}
```

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Extra features

- Environment variables
- Queue jobs to run
- Read files workspace
- Configure blocks
- @Grab
- @Category

@Category

```
use(netflix.Conventions) {
  def myjob = job {
    name ‘BuildFromP4’
  }
  myjob.addPerforce("//depot/webapps/astrid/...")
}
```

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Good Practice

- Respect “source of truth”
- All scripts go in version control
- Use configure block if needed
- Trigger “seed” job on SCM changes

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Future of project

- Plugins provide DSL methods
- Produce DSL from real job
- Support for utility classes
- Produce jobs from build, e.g. Gradle or Maven

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Thank You

We're hiring.

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