Jenkins as a code

Łukasz Szczęsny & Marcin Zajączkowski

FOSDEM, 30-31th January 2016
About Łukasz

- Software engineer @ Uber
- FOSS and Open Hardware lover
- Co-organizer of the Warsaw Linux User Group
About Marcin

• Areas of expertise
  ○ Automatic Testing / TDD
  ○ Software Craftsmanship / Code Quality
  ○ Java8 / Groovy
  ○ Concurrency / Parallel Computing / Reactive Systems
  ○ Deployment Automation / Continuous Delivery

• FOSS projects author and contributor, blogger

• Leads a small software house - Codearte
  ○ targeted at clients who care about the quality
Agenda

- Manual Jenkins maintenance
Agenda

- Manual Jenkins maintenance
- Job configuration as code
  - Jenkins Job DSL
Agenda

• Manual Jenkins maintenance
• Job configuration as code
  ◦ Jenkins Job DSL
• Infrastructure as code
Agenda

• Manual Jenkins maintenance
• Job configuration as code
  ○ Jenkins Job DSL
• Infrastructure as code
• Case study - Continuous Delivery in Jenkins
Manual Jenkins maintenance
Manual Jenkins maintenance
Manual Jenkins maintenance

- configuration via GUI does not scale
  - slow, error prone, and boring
Manual Jenkins maintenance

- configuration via GUI does not scale
  - slow, error prone, and boring
- problematic with dozens of jobs and plugins
Manual Jenkins maintenance

- configuration via GUI does not scale
  - slow, error prone, and boring
- problematic with dozens of jobs and plugins
- mission impossible with
  - several microservices
  - deployed in several countries
  - for multiple products
  - using deployment pipeline with several steps each
Automation to the rescue!
Jenkins Job DSL
Job configuration in code
(Jenkins) Job DSL - 2 parts
(Jenkins) Job DSL - 2 parts

- Domain Specific Language
  - to specify job configuration
(Jenkins) Job DSL - 2 parts

- Domain Specific Language
  - to specify job configuration
- Jenkins plugin
  - to transform configuration DSL into real jobs in Jenkins
Job DSL - part 1 - configuration
Job DSL - part 1 - configuration

- Groovy based DSL (Domain Specific Language)
- job/view/dashboard configuration
- developed as "normal" code in IDE with
  - auto-completion
  - type check
  - Groovy magic if needed
- outside Jenkins instance
Job DSL - simple example
Job DSL - simple example

```
job('FOSDEM-website-publish') {
  scm {
    github('FOSDEM/website')
  }
  triggers {
    scm('*/15 * * * *')
  }
  steps {
    rake('publish')
  }
}
```
Job DSL - dynamic example

String repo = 'FOSDEM/mobile-app'

URL branchUrl = "https://api.github.com/repos/$repo/branches".toURL()
List branches = new JsonSlurper().parseText(branchUrl.text)

branches.each { branch ->

    String safeBranchName = branch.name.replaceAll('/\/', '-

    job("$repo-$safeBranchName-build") {
        scm {
            github repo, branch.name
        }
        triggers {
            scm 'H/10  *  *  *  *'
        }
        steps {
            gradle 'check'
        }
    }
}
Job DSL - features
Job DSL - features

- comprehensive support for Jenkins Core stuff
- extensive support for additional plugins
  - 177 plugins in version 1.42
  - active community - continuous flow of new pull requests
Job DSL - features

- comprehensive support for Jenkins Core stuff
- extensive support for additional plugins
  - 177 plugins in version 1.42
  - active community - continuous flow of new pull requests
- powerful configuration block for
  - not yet supported features
  - custom stuff
- virtually everything possible in XML should be achievable
Job DSL - part 2 - Jenkins plugin
Job DSL - part 2 - Jenkins plugin

- installed in Jenkins instance
- used in *seed jobs* on Jenkins
- leverages DSL configuration
- updates jobs & views in Jenkins
  - to bring them to desired state
  - by XML configuration files modification
Job DSL - benefits
Job DSL - benefits

- source code instead of XML or GUI
- single source of truth
- manageable jobs and views
  - backed by SCM
  - reviewable - possibly with pull requests
Job DSL - benefits

- source code instead of XML or GUI
- single source of truth
- manageable jobs and views
  - backed by SCM
  - reviewable - possibly with pull requests
- testable
  - automatic "unit" testing
  - pre-production environment
Job DSL - benefits

- source code instead of XML or GUI
- single source of truth
- manageable jobs and views
  - backed by SCM
  - reviewable - possibly with pull requests
- testable
  - automatic "unit" testing
  - pre-production environment
- scalable
  - hundreds of jobs created/modified in seconds*
Job DSL - drawbacks/limitations
Job DSL - drawbacks/limitations

- quite steep learning curve
- can become hard to understand for complex configurations
Job DSL - drawbacks/limitations

- quite steep learning curve
- can become hard to understand for complex configurations
- small error in DSL can remove all jobs
  - can be easily recreated, but without execution history
Job DSL - drawbacks/limitations

- quite steep learning curve
- can become hard to understand for complex configurations
- small error in DSL can remove all jobs
  - can be easily recreated, but without execution history
- occasional backward compatibility issues with new versions
Job DSL - drawbacks/limitations

- quite steep learning curve
- can become hard to understand for complex configurations
- small error in DSL can remove all jobs
  - can be easily recreated, but without execution history
- occasional backward compatibility issues with new versions
- very old Groovy 1.8.9 - version bundled in Jenkins 1.x
Job DSL - drawbacks/limitations

- quite steep learning curve
- can become hard to understand for complex configurations
- small error in DSL can remove all jobs
  - can be easily recreated, but without execution history
- occasional backward compatibility issues with new versions
- very old Groovy 1.8.9 - version bundled in Jenkins 1.x
- not suitable for global Jenkins configuration management
  - credentials, machine provisioning, Jenkins and plugin update, ...
Infrastructure
Infrastructure challenges
Infrastructure challenges

- install and configure Jenkins master
- install and configure all required dependencies
- install and configure plugins
- create and connect slaves
- add JDK installation
- configure authentication
- create credentials
- ...

Łukasz Szczęsny & Marcin Zajączkowski
Infrastructure toolbelt

- configuration management tools
  - Ansible
  - Puppet
  - Chef
  - Salt
  - etc.
- Groovy console
- Jenkins CLI
Infrastructure toolbelt

- Slave management
  - Swarm plugin
  - Docker plugin
  - SSH slaves
Continuous Delivery in Jenkins
Case study
Continuous Delivery
Continuous Delivery

• Clearly defined way how to transform source code into project deployed to production
  ◦ a set of steps arranged into pipeline
  ◦ unified way for various projects/variants/realms
Continuous Delivery in Jenkins

Łukasz Szczęsny & Marcin Zajączkowski

@wybczu & @SolidSoftBlog
Continuous Delivery in Jenkins

- not a first class citizen in Jenkins 1.x
- bunch of jobs triggering each other
- can be emulated with various plugins
  - Delivery Pipeline Plugin, Build Flow Plugin, Pipeline Plugin, ...
Continuous Delivery in Jenkins

- not a first class citizen in Jenkins 1.x
- bunch of jobs triggering each other
- can be emulated with various plugins
  - Delivery Pipeline Plugin, Build Flow Plugin, Pipeline Plugin, ...
- no easy (and unified) way to setup
- usually even harder to maintain
Continuous Delivery - case study
Continuous Delivery - case study

- custom Continuous Delivery framework
  - on top of Jenkins Job DSL
- one standardized way for Continuous Delivery
- reused in all projects in the company
Continuous Delivery - case study

- custom Continuous Delivery framework
  - on top of Jenkins Job DSL
- one standardized way for Continuous Delivery
- reused in all projects in the company
- Ansible for infrastructure management
- Rundeck for deployment
Continuous Delivery - case study

- custom Continuous Delivery framework
  - on top of Jenkins Job DSL
- one standardized way for Continuous Delivery
- reused in all projects in the company
- Ansible for infrastructure management
- Rundeck for deployment
- open sourced to make live easier to others
  - jenkins-pipeline-dsl - core library
  - sample-jenkins-microservice-pipeline - sample pipeline

Łukasz Szczęsny & Marcin Zajączkowski

@wybczu & @SolidSoftBlog
Live demo
The whole delivery pipeline with one click!
Summary
Summary

- automation is good for you!
- Jenkins DSL is great but there are other tools
  - jenkins-job-builder
  - Pipeline (formerly Workflow) plugin
  - ...
- looking forward to Jenkins 2.0 release!
Questions?
Thank you

Marcin Zajączkowski
@SolidSoftBlog
http://blog.solidsoft.info
m.zajaczkowski@gmail.com
IRC: szpak@freenode

Łukasz Szczęsny
@wybczu
https://wybcz.pl
luk@{uber.com,wybcz.pl}
IRC: wybczu@freenode