Trusting Your Build-to-Deployment Flow with JenkinsCI

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About me

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- Creator of the Artifactory Binary Repo
- CTO at JFrog
- @yoavlandman

Agenda

- The cloud silver bullet
- The right tool for the job
- Binaries all the way
- The Jenkins Artifactory plugin
- The black art of release management

The New Silver Bullet

EVERYTHING *aaS

Why We Need *aaS?

- *aaS features Continuous Delivery

Continuous Delivery FTW

- User advantages :
  - Latest version/features
  - No upgrades/maintenance
- Developer advantages :
  - Agile
  - Rapid feedback
  - Users are the best beta-testers
  - No long-term support
- Everybody wins?

Almost, except DevOps

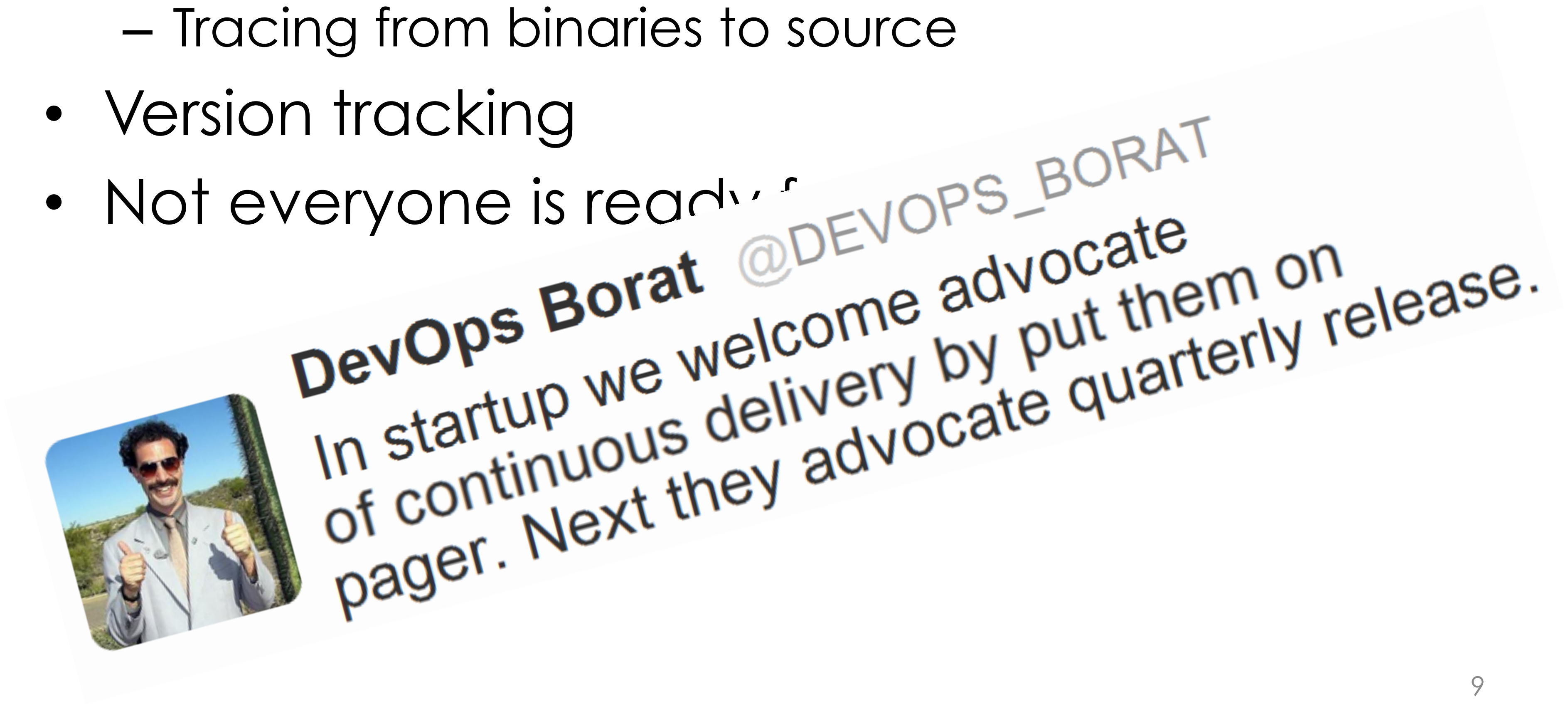
- Very frequent releases
- More than one version in production
- Complicated procedures

Almost, except DevOps

- Root cause analysis
  - Tracing from binaries to source
- Version tracking
- Not everyone is ready for CD

Almost, except DevOps

- Root cause analysis
  - Tracing from binaries to source
- Version tracking
- Not everyone is ready f



DevOps Borat @DEVOPS_BORAT
In startup we welcome advocate of continuous delivery by put them on pager. Next they advocate quarterly release.

Agile developer tools

- We have good tooling for Agile development
  - Version control
  - Unit testing and code coverage
  - CI servers
  - Hot swap tools
- What's up with tooling for agile DevOps?

Agile tools for DevOps - checklist

- Versioning
- Access control
- Traceability
- Promotion
- Tags and annotations
- Search

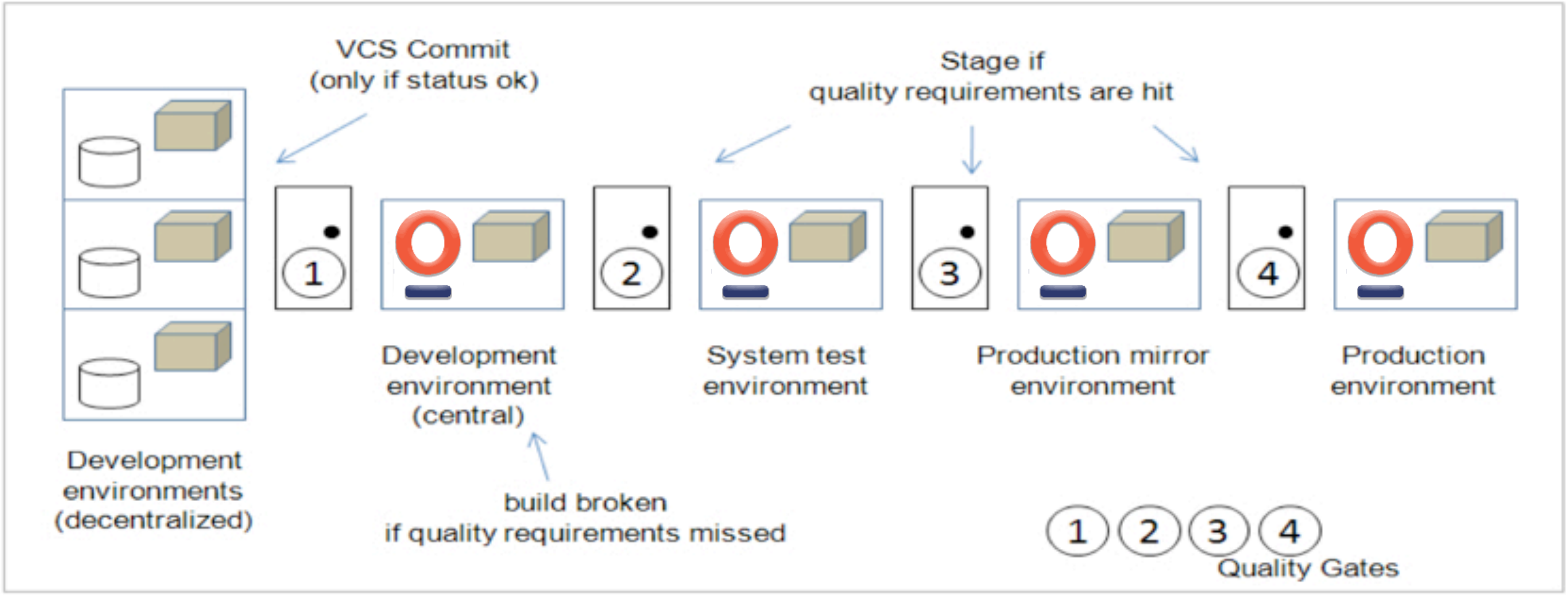
Feeling the pain

- JFrog SaaS offering
  - artifactoryonline.com
    - SpringSource, Grails, Jenkins plugins, etc.
- We build and release continuously

Binaries all the way

- From some point in the release lifecycle, all you care about is binaries
- Lots of things to do after the software is built

The release pipeline


VCS Commit
(only if status ok)
Stage if
quality requirements are hit
1
2
3
4
Development environments (decentralized)
Development environment (central)
System test environment
Production mirror environment
Production environment
build broken
if quality requirements missed
1 2 3 4
Quality Gates

Source: Agile ALM, Michael Hüttermann, Manning Publications Co.

Traceability

- Binaries should be traceable at every stage
  - Sources
  - Dependencies
  - Environment details
  - Tags
- Where's the information?
  - Version control system
  - Build server
  - Issue tracker

The Right Tool for the Job

HERE COMES BINARY REPOSITORY

Here comes binary repository

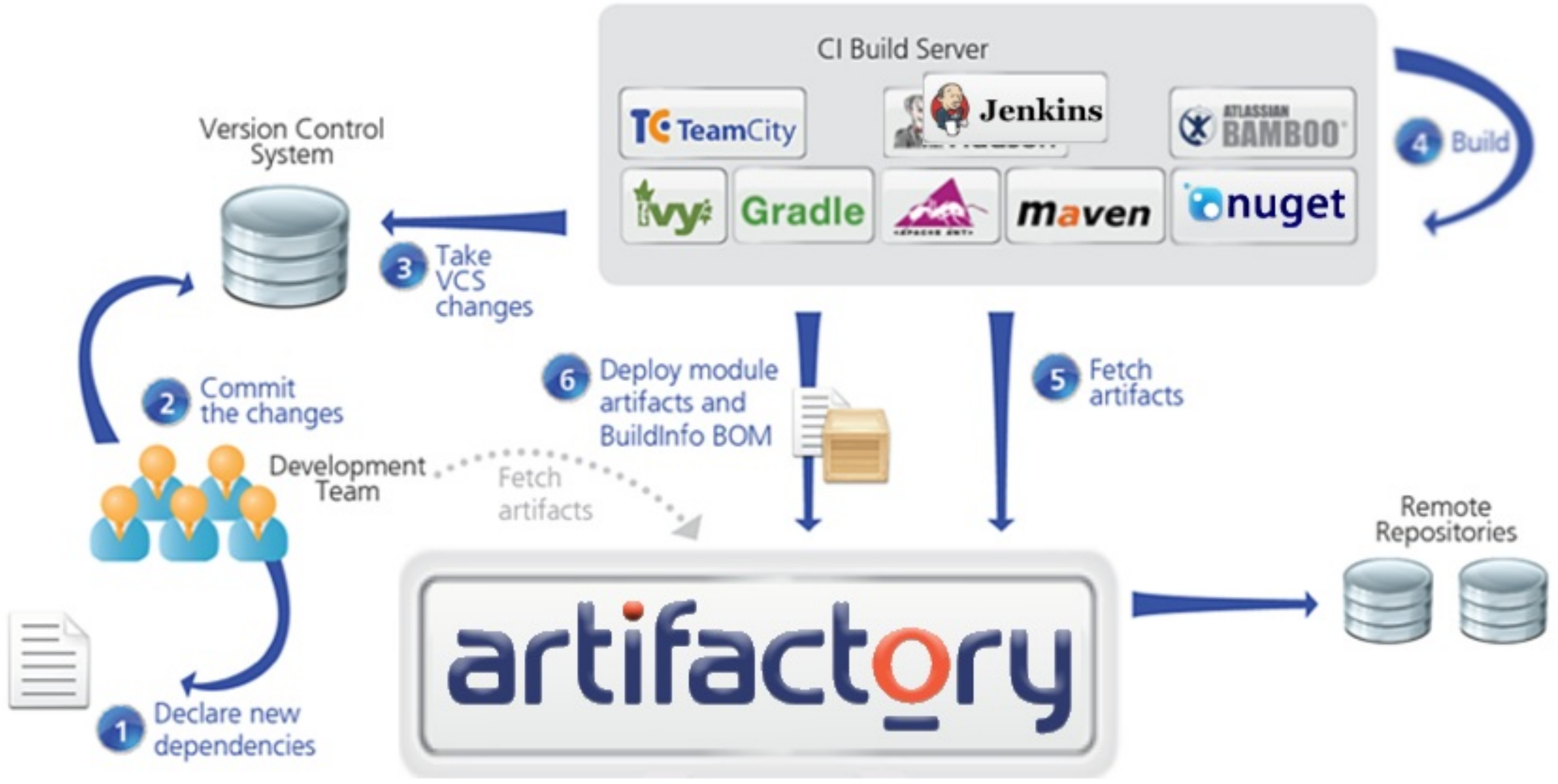
- E.g. Artifactory
- Proxy
- Smart storage
  - Much more than a passive space
- Critical for CI/CD and ALM

Talks to the standard tool stack

git
SUBVERSION
PERFORCE

ivy
maven
yum
yellowdog updater modified
nuget

Artifactory in DevOps Ecosystem

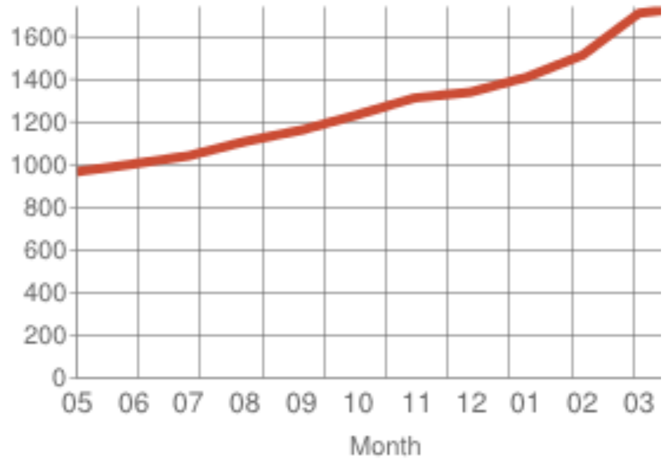


Meet Artifactory

DEMO TIME!

The Jenkins Artifactory plugin

- 1st Release – 14 Dec 2009
- Installations ~1,800, May 2012
- Integrates with other plugins:
  - Maven
  - Gradle
  - Ivy
  - Subversion
  - Git
  - Perforce
  - JIRA



Traceability w. the Artifactory plugin

- Gathers build information
  - And build-related
- Uploads artifacts in a bulk
- Uploads build information
- Maintains bi-directional links
- Powerful staging and promotion

Tracing Artifacts

DEMO TIME!

Put your repository to work

THE ART OF RELEASE MANAGEMENT

Release candidates

- Your next build is a release-candidate
- Once successfully built and tested, click a button
  - Automatic versions switch
    - From integration to release
  - Right place to put your binaries
    - Move from Staging to Public
  - Automatic VCS tagging

Releasing with release candidates

- Process:
  1. Produce and build snapshots until satisfied
  2. Once satisfied, build a release candidate
  3. Stage RC, check and verify
  4. Once verified, release

Releasing w. the Artifactory plugin

- Changes versions in build script
- Allows choosing a target deploy repository
- Creates a VCS tag/branch

Releasing with Release Candidates

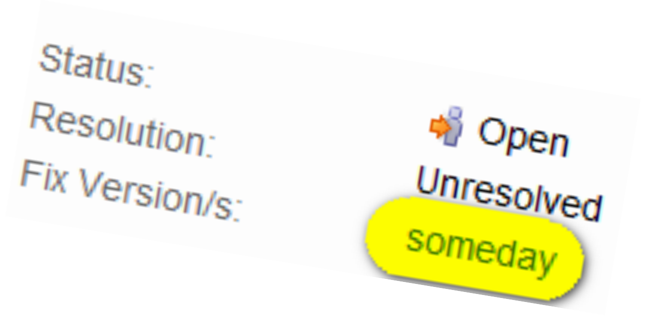
DEMO TIME!

Staging-based release management

- Pros
  - Supports the "by the book" release cycle
  - Supports majority of the tools
- Cons
  - Limited extensibility
  - May not fit your requirements

Controlling Versioning Scheme

- Classic versioning scheme:
  - Release version
    - 2.0.3
  - Integration version
    - 2.0.4-SNAPSHOT
- YMMV
  - Write your own strategy for versioning
  - Dynamic Groovy code



Status: Open
Resolution: Unresolved
Fix Version/s: someday

Example: using the latest build

```
BuildRun latestReleaseOrLatestBuild(
                                      List<BuildRun> buildRuns) {
     BuildRun[] allReleasedBuilds =
            buildRuns.findAll { buildRun ->
                    (buildRun.releaseStatus == 'released') }
     if (allReleasedBuilds) {
          buildRuns = allReleasedBuilds
     }
     buildRuns.max {buildRun -> buildRun.startedDate }
}
```

Your own release strategy

DEMO TIME!

Releasing with release candidates

- Process:
  1. Produce and build snapshots until satisfied
  2. Once satisfied, build a release candidate
  3. Stage RC, check and verify
  4. Once checked, release

Can you spot the problem?

Releasing with release candidates

- Process:
  1. Produce and build snapshots until satisfied
  2. Once satisfied, build release candidate
  3. Stage RC, check and verify
  4. Once checked, release

Redundant build

Releasing with release candidates

- Lots of things can change during one more build
- If we won't build it, we won't screw it
- Process:
  1. Produce and build snapshots until satisfied
  2. When satisfied, check and verify
  3. Once checked, release

Target: automation

- It's impossible to release frequently with manual procedures
  - While maintaining quality
- Use your binaries storage to release

A more flexible release

- Code your release strategy
  - Versioning scheme
  - VCS (tagging, branching, commit comments)
  - Target repo
  - Promotion hooks (copy/move, comments, status)
- Automated with REST

Example: snapshot promotion

- Choose existing build to become a release
- Using REST - no UI
- Invoke promotion plugin
  - Convert to next version
  - Tag, branch, etc.
  - Promote (copy/move)

Plugin What?

CODE TIME!

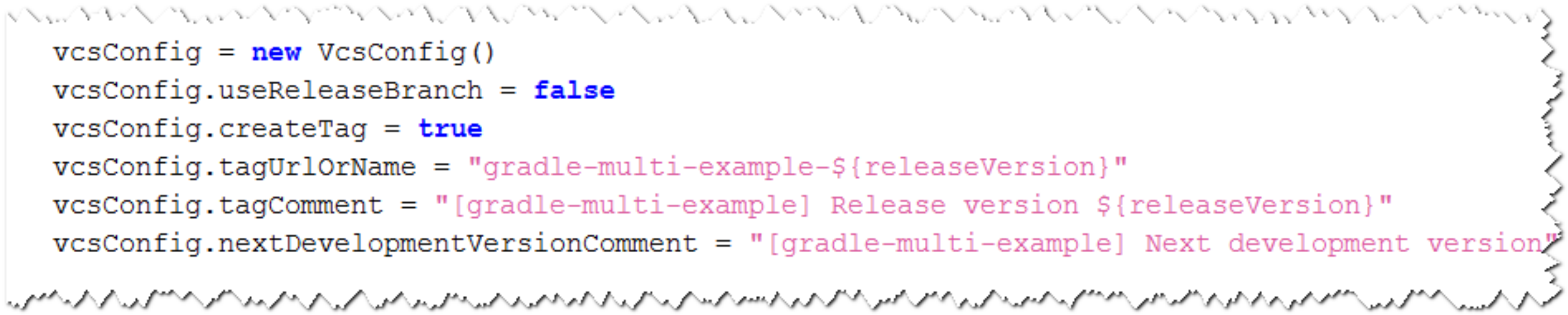
Plugin Code

- Groovy goodness
- Executed directly in Artifactory
- Uses PAPI
  - Searches
  - Artifacts
    - E.g. change versions in descriptors
  - Builds
  - REST execution extensions
  - Jobs

https://github.com/JFrogDev/artifactory-user-plugins

Plugin Code

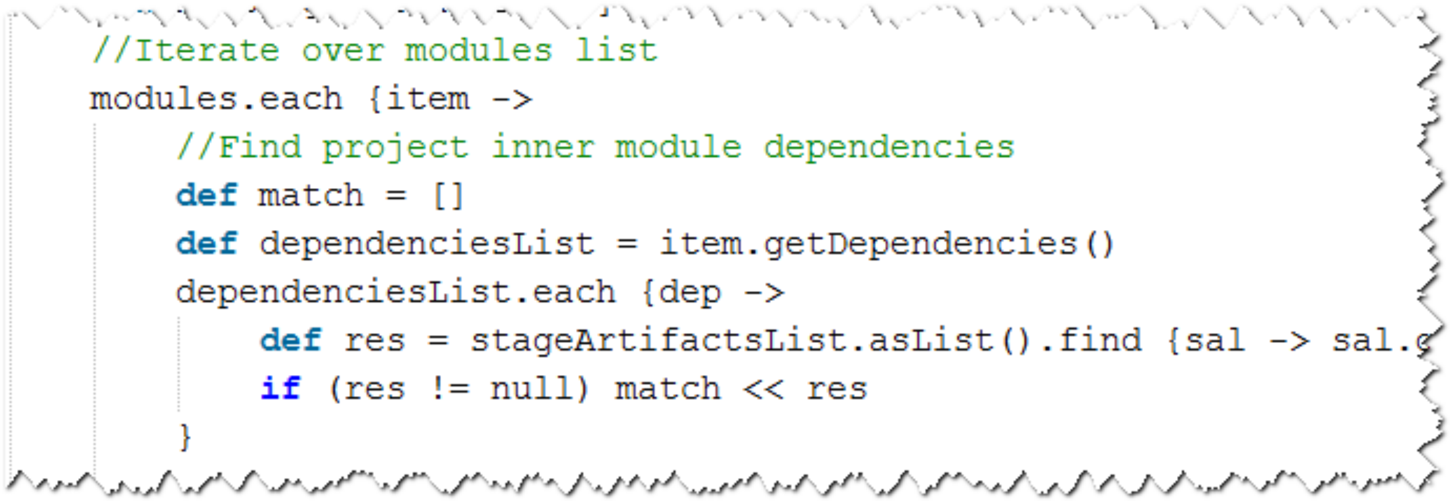
- Manipulating version control



```
vcsConfig = new VcsConfig()
vcsConfig.useReleaseBranch = false
vcsConfig.createTag = true
vcsConfig.tagUrlOrName = "gradle-multi-example-${releaseVersion}"
vcsConfig.tagComment = "[gradle-multi-example] Release version ${releaseVersion}"
vcsConfig.nextDevelopmentVersionComment = "[gradle-multi-example] Next development version"
```

Plugin Code

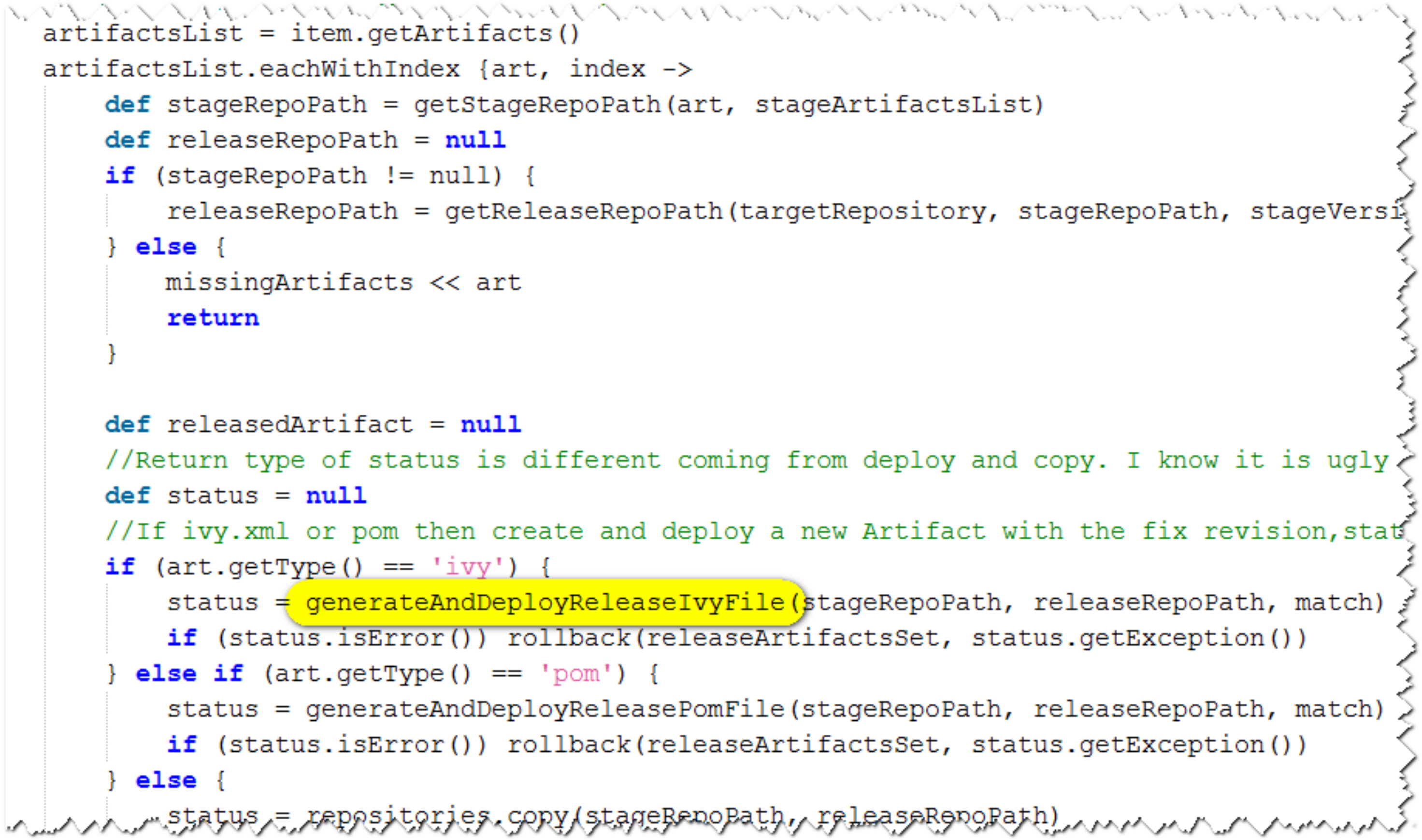
- Manipulating the BuildInfo object



```
//Iterate over modules list
modules.each {item ->
    //Find project inner module dependencies
    def match = []
    def dependenciesList = item.getDependencies()
    dependenciesList.each {dep ->
        def res = stageArtifactsList.asList().find {sal -> sal.
        if (res != null) match << res
    }
```

Plugin Code

- Creating and replacing artifacts



```
artifactsList = item.getArtifacts()
artifactsList.eachWithIndex {art, index ->
    def stageRepoPath = getStageRepoPath(art, stageArtifactsList)
    def releaseRepoPath = null
    if (stageRepoPath != null) {
        releaseRepoPath = getReleaseRepoPath(targetRepository, stageRepoPath, stageVersi
    } else {
        missingArtifacts << art
        return
    }

    def releasedArtifact = null
    //Return type of status is different coming from deploy and copy. I know it is ugly
    def status = null
    //If ivy.xml or pom then create and deploy a new Artifact with the fix revision,stat
    if (art.getType() == 'ivy') {
        status = generateAndDeployReleaseIvyFile(stageRepoPath, releaseRepoPath, match)
        if (status.isError()) rollback(releaseArtifactsSet, status.getException())
    } else if (art.getType() == 'pom') {
        status = generateAndDeployReleasePomFile(stageRepoPath, releaseRepoPath, match)
        if (status.isError()) rollback(releaseArtifactsSet, status.getException())
    } else {
        status = repositories.copy(stageRepoPath, releaseRepoPath)
```

Calling REST API With CURL

```
http://repo-demo:8080/artifactory/api/plugins/build/promote/snapshotToRelease/gradle-multi-example/1?params=snapExp=d14|targetRepository=gradle-release-local
```

Calling REST API With CURL

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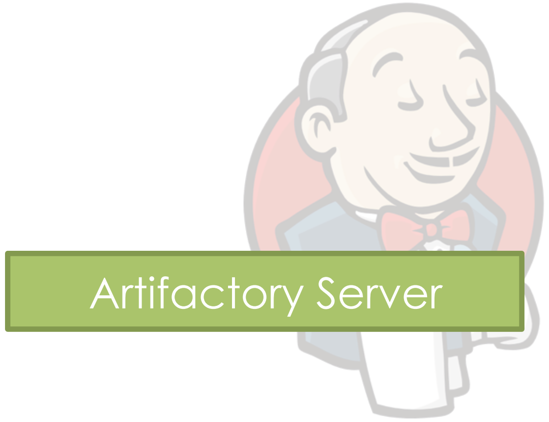

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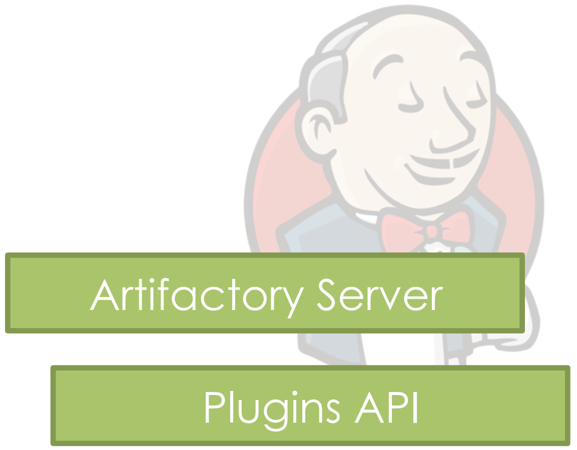

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targetRepository=gradle-release-local
```

Artifactory Server

Plugins API

Plugin Name

Calling REST API With CURL

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http://repo-demo:8080/
artifactory/api/plugins/
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gradle-multi-example/1
?params=snapExp=d14|
targetRepository=gradle-release-local
```

Artifactory Server

Plugins API

Plugin Name

Build Name and Number

Calling REST API With CURL

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http://repo-demo:8080/
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gradle-multi-example/1
?params=snapExp=d14|
targetRepository=gradle-release-local
```

Artifactory Server

Plugins API

Plugin Name

Build Name and Number

Param: Versioning Scheme

Calling REST API With CURL

```
http://repo-demo:8080/
artifactory/api/plugins/
build/promote/snapshotToRelea
gradle-multi-example/1
?params=snapExp=d14|
targetRepository=gradle-release-local
```

Artifactory server

Plugins API

Plugin name

Build name and number

Param: versioning scheme

Target repository for release

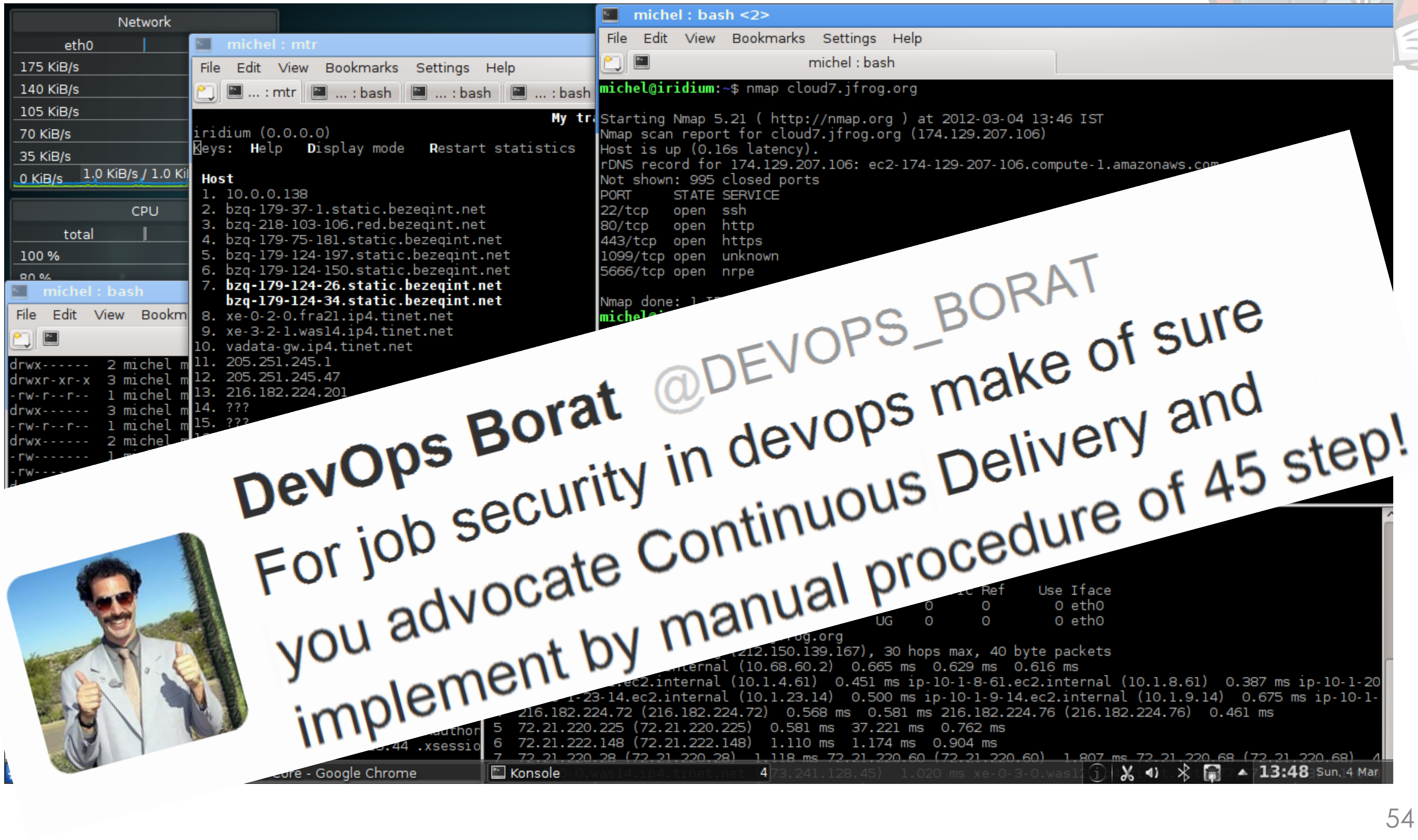
Recap: Promotion of Snapshots

- Choose existing build to become a release
- Using the REST API without building
- Invoking the promotion plugin
  - Convert to next version
  - Tag, branch, etc.
  - Promote (copy/move)

Release by Snapshot Promotion

DEMO TIME!

Strive for minimal input!



DevOps Borat @DEVOPS_BORAT

For job security in devops make of sure you advocate Continuous Delivery and implement by manual procedure of 45 step!

```
michel@iridium:~$ nmap cloud7.jfrog.org

Starting Nmap 5.21 ( http://nmap.org ) at 2012-03-04 13:46 IST
Nmap scan report for cloud7.jfrog.org (174.129.207.106)
Host is up (0.16s latency).
rDNS record for 174.129.207.106: ec2-174-129-207-106.compute-1.amazonaws.com
Not shown: 995 closed ports
PORT     STATE SERVICE
22/tcp   open  ssh
80/tcp   open  http
443/tcp  open  https
1099/tcp open  unknown
5666/tcp open  nrpe

Nmap done: 1 I
michel
```

```
                                                    My tra
iridium (0.0.0.0)
Keys:  Help   Display mode   Restart statistics

 Host
 1. 10.0.0.138
 2. bzq-179-37-1.static.bezeqint.net
 3. bzq-218-103-106.red.bezeqint.net
 4. bzq-179-75-181.static.bezeqint.net
 5. bzq-179-124-197.static.bezeqint.net
 6. bzq-179-124-150.static.bezeqint.net
 7. bzq-179-124-26.static.bezeqint.net
    bzq-179-124-34.static.bezeqint.net
 8. xe-0-2-0.fra21.ip4.tinet.net
 9. xe-3-2-1.was14.ip4.tinet.net
10. vadata-gw.ip4.tinet.net
11. 205.251.245.1
12. 205.251.245.47
13. 216.182.224.201
14. ???
15. ???
```

```
drwx------  2 michel m
drwxr-xr-x  3 michel m
-rw-r--r--  1 michel m
drwx------  3 michel m
-rw-r--r--  1 michel m
drwx------  2 michel m
```

```
                                           Ref     Use Iface
                                  0        0         0 eth0
                         UG       0        0         0 eth0
              og.org
  (212.150.139.167), 30 hops max, 40 byte packets
  ternal (10.68.60.2)  0.665 ms  0.629 ms  0.616 ms
  .ec2.internal (10.1.4.61)  0.451 ms ip-10-1-8-61.ec2.internal (10.1.8.61)  0.387 ms ip-10-1-20
  -1-23-14.ec2.internal (10.1.23.14)  0.500 ms ip-10-1-9-14.ec2.internal (10.1.9.14)  0.675 ms ip-10-1-
  216.182.224.72 (216.182.224.72)  0.568 ms  0.581 ms 216.182.224.76 (216.182.224.76)  0.461 ms
5  72.21.220.225 (72.21.220.225)  0.581 ms  37.221 ms  0.762 ms
6  72.21.222.148 (72.21.222.148)  1.110 ms  1.174 ms  0.904 ms
```

Achieving the 4 DevOps "commandments"

1. Automate everything
2. Version everything
3. Trace everything
4. Report/Log everything

Designed by Jessica Allen on Dribbble.com

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