Kay Gaensler
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https://www.flickr.com/photos/gaensler/5465098412

Maven 102

Best Practices

Brian Demers
Open Source Developer

BrianDemers bdemers

Gradle

Topics

- Maven Demystification
- Speed up your build
- Things to Commit or Omit
- Memes

Who is this guy?

Java™ Champions

Warner River Bees

codemonkey.fm

Apache Directory

openstack™

THE APACHE® SOFTWARE FOUNDATION

Maven™

Sonatype Nexus

source: Silicon Valley

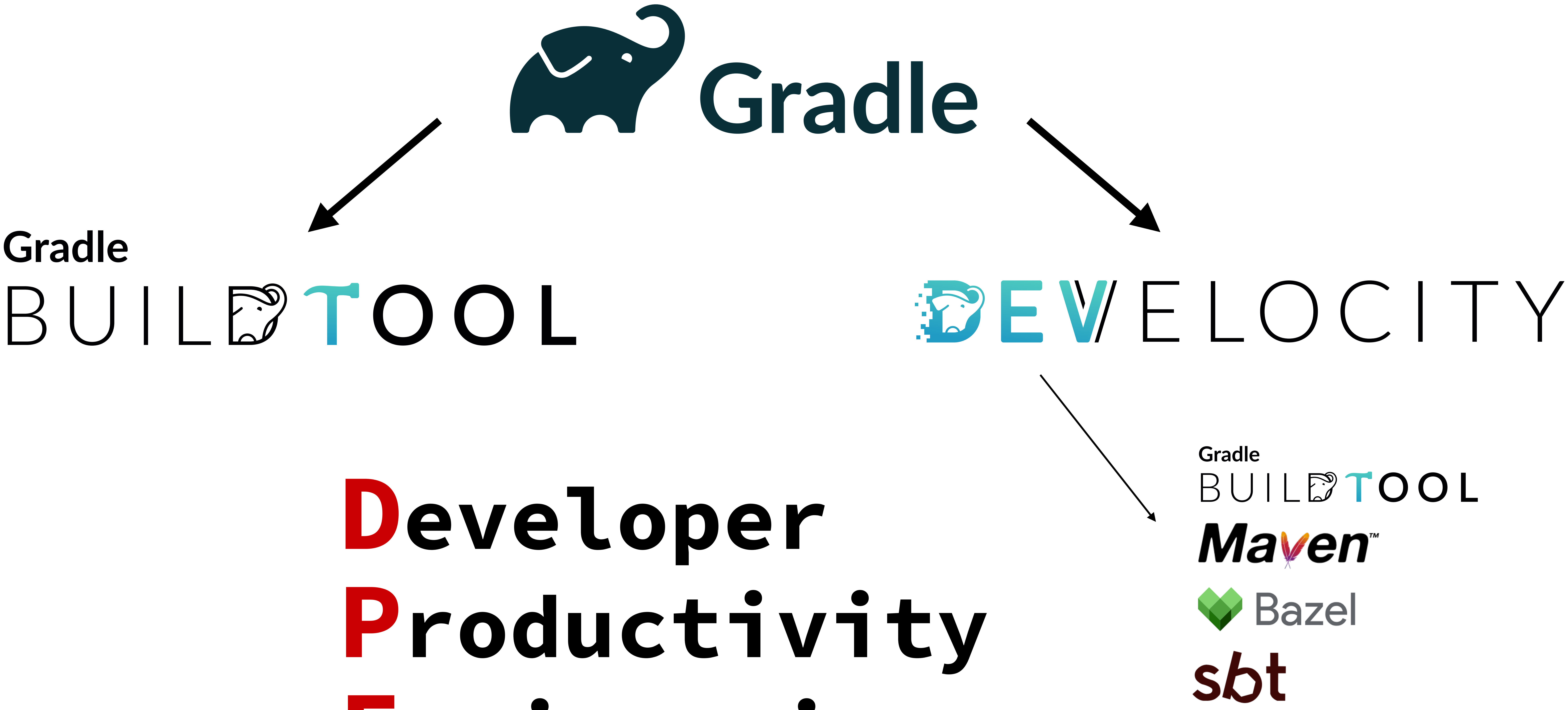
VS

VS

Gradle
BUILD TOOL

vs

Maven™



Developer
Productivity
Engineering

I'm verbophobic
What is that?
It means fear of XML
No, It doesn't
pom.xml
STOP IT, PATRICK! YOU'RE SCARING HIM!
imgflip.com

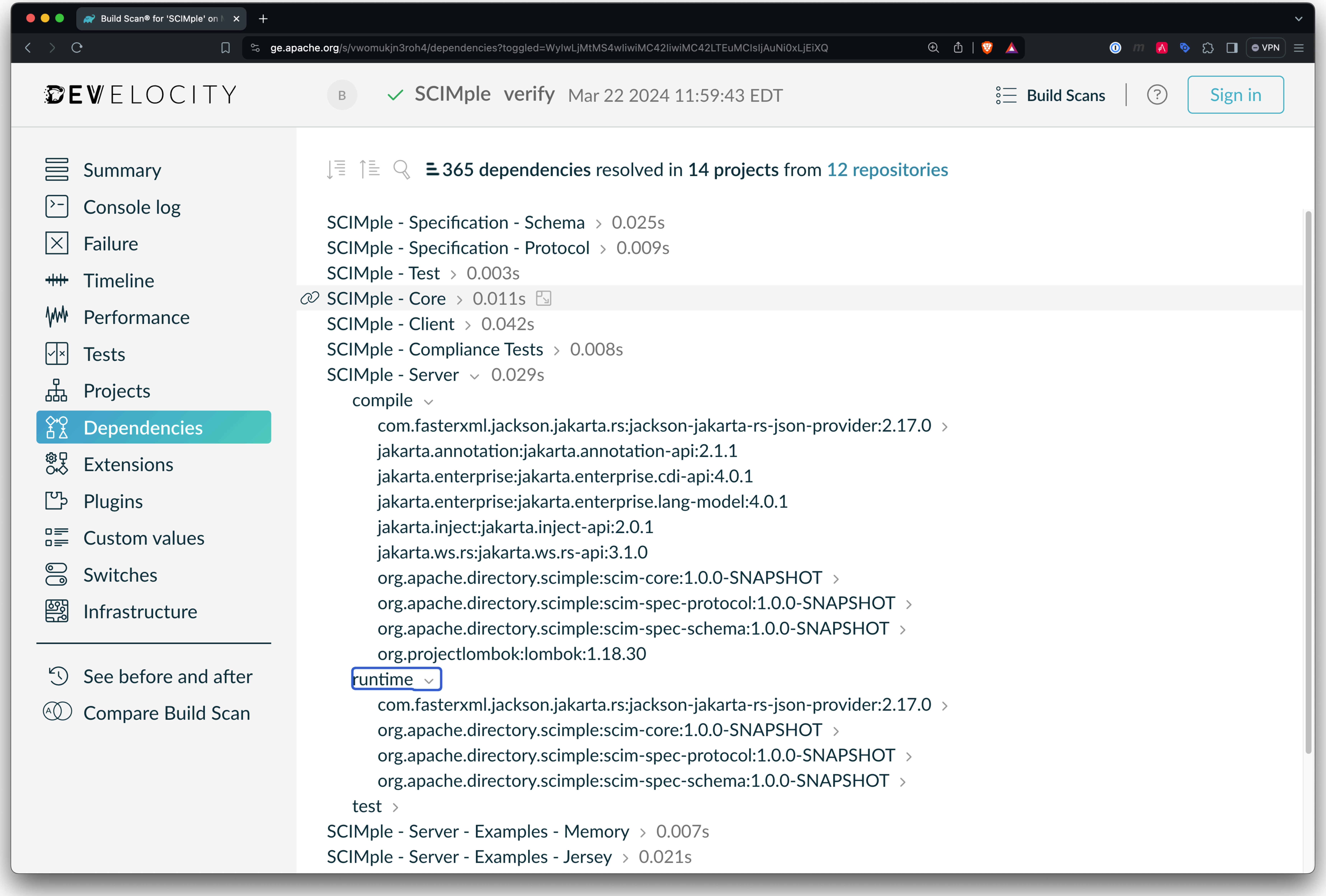
HELL
WELCOME TO HELL.
HUH. LESS FIRE THAN I THOUGHT.
HELL IS UNIQUE TO EACH INDIVIDUAL.
OK. WHAT'S MINE?
CLICK
Dependency Hell
Last Commit: 2010-06-28
#13
HEY BUDDY COMICS

Dependencies are a tree

source: pngitem.com - Anastasiya Alferova

```
$ mvn dependency:tree
junit-jupiter
+- junit-jupiter-api
|  +- opentest4j
|  +- junit-platform-commons
|  \- apiguardian-api
+- junit-jupiter-params
\- junit-jupiter-engine
   \- junit-platform-engine
```

scans.gradle.com

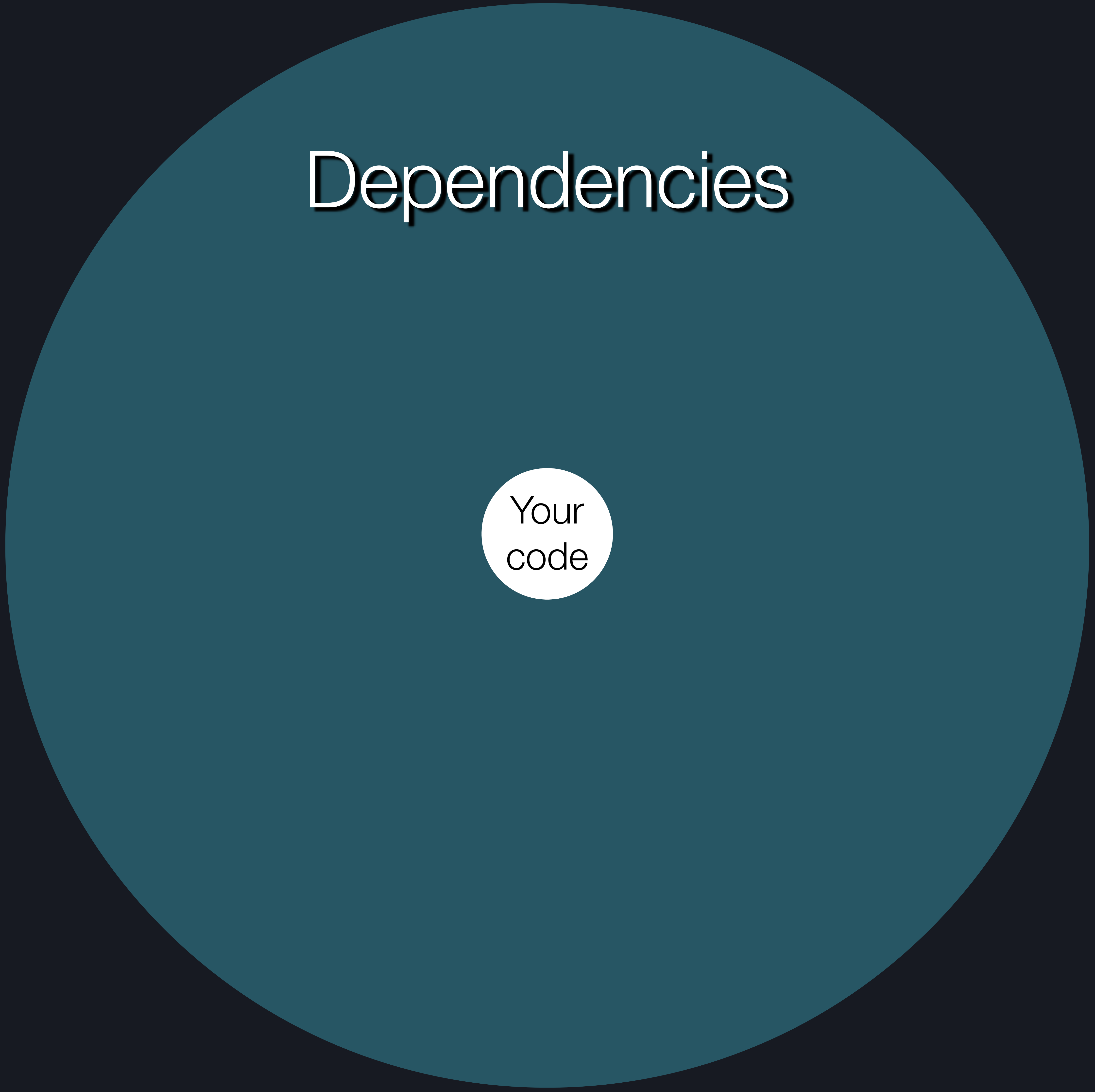


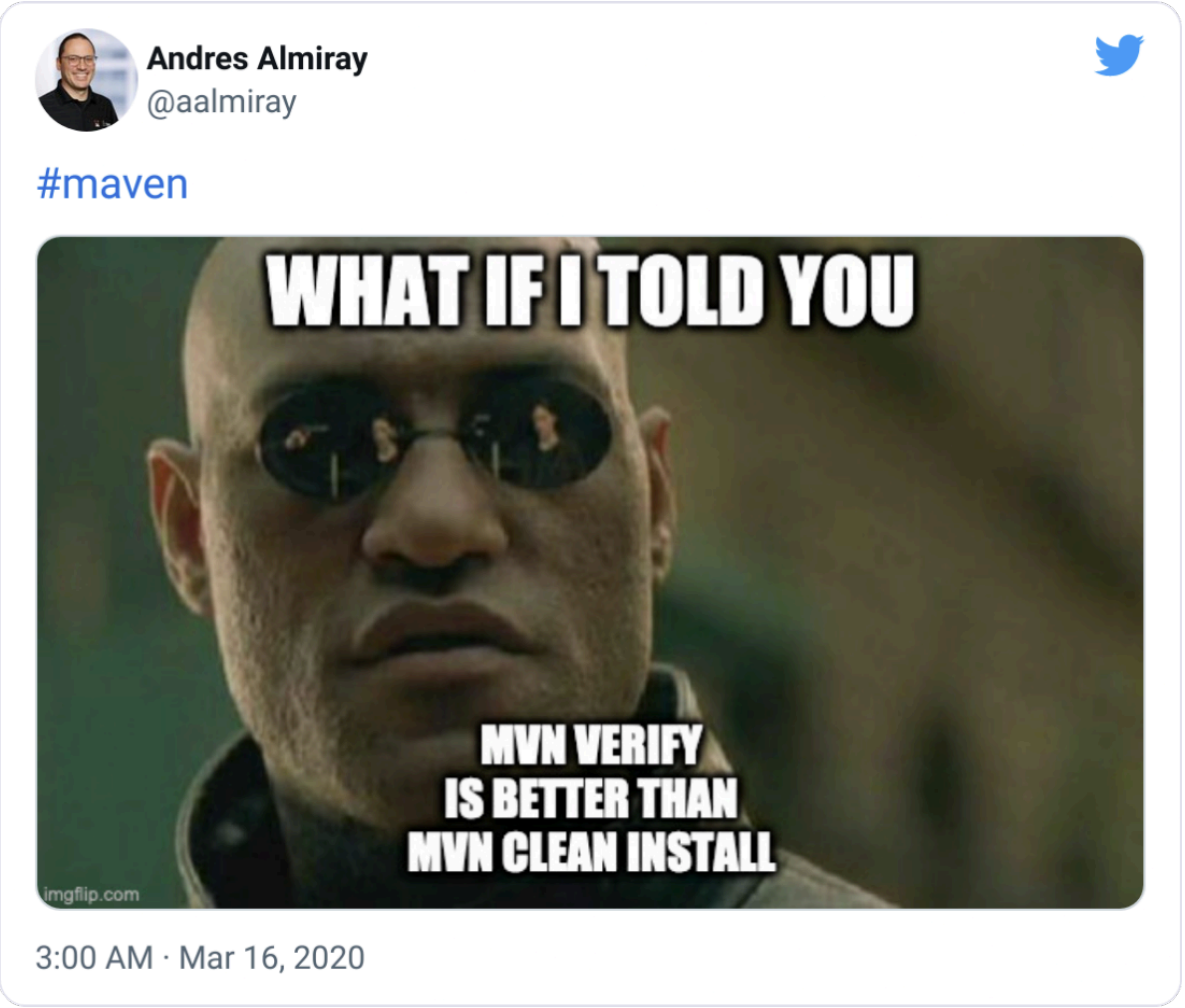
✓ SCIMple verify Mar 22 2024 11:59:43 EDT

365 dependencies resolved in 14 projects from 12 repositories

```
SCIMple - Specification - Schema › 0.025s
SCIMple - Specification - Protocol › 0.009s
SCIMple - Test › 0.003s
SCIMple - Core › 0.011s
SCIMple - Client › 0.042s
SCIMple - Compliance Tests › 0.008s
SCIMple - Server ⌄ 0.029s
  compile ⌄
    com.fasterxml.jackson.jakarta.rs:jackson-jakarta-rs-json-provider:2.17.0 ›
    jakarta.annotation:jakarta.annotation-api:2.1.1
    jakarta.enterprise:jakarta.enterprise.cdi-api:4.0.1
    jakarta.enterprise:jakarta.enterprise.lang-model:4.0.1
    jakarta.inject:jakarta.inject-api:2.0.1
    jakarta.ws.rs:jakarta.ws.rs-api:3.1.0
    org.apache.directory.scimple:scim-core:1.0.0-SNAPSHOT ›
    org.apache.directory.scimple:scim-spec-protocol:1.0.0-SNAPSHOT ›
    org.apache.directory.scimple:scim-spec-schema:1.0.0-SNAPSHOT ›
    org.projectlombok:lombok:1.18.30
  runtime ⌄
    com.fasterxml.jackson.jakarta.rs:jackson-jakarta-rs-json-provider:2.17.0 ›
    org.apache.directory.scimple:scim-core:1.0.0-SNAPSHOT ›
    org.apache.directory.scimple:scim-spec-protocol:1.0.0-SNAPSHOT ›
    org.apache.directory.scimple:scim-spec-schema:1.0.0-SNAPSHOT ›
  test ›
SCIMple - Server - Examples - Memory › 0.007s
SCIMple - Server - Examples - Jersey › 0.021s
```

Your Application





Andres Almiray
@aalmiray

#maven

3:00 AM · Mar 16, 2020

Maven Build Lifecycle

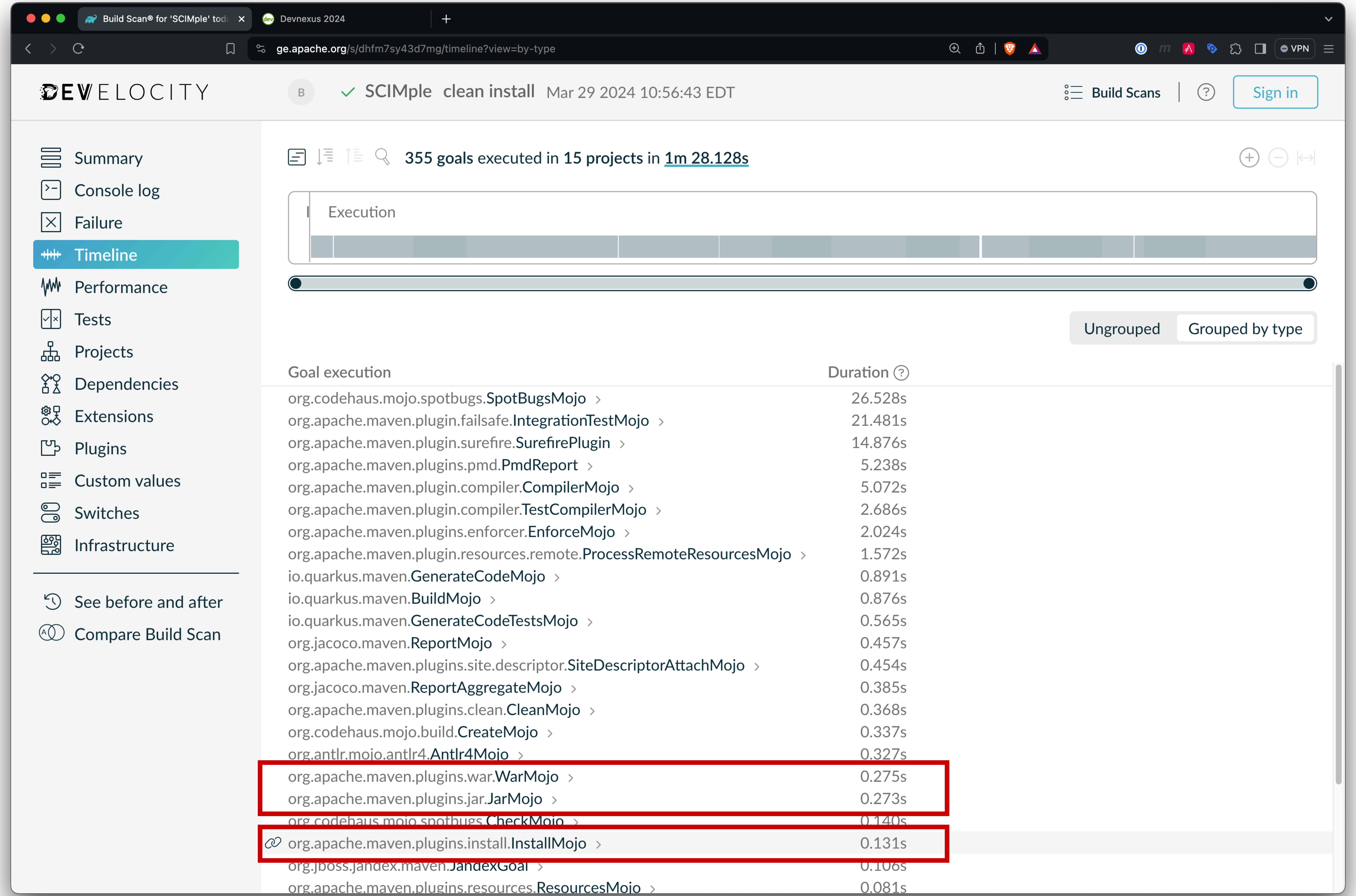
- validate
- initialize
- generate-sources
- process-sources
- generate-resources
- process-resources
- compile
- process-classes
- generate-test-sources
- process-test-sources
- generate-test-resources
- process-test-resources
- test-compile
- process-test-classes
- test
- prepare-package
- package
- pre-integration-test
- integration-test
- post-integration-test
- verify
- install
- deploy

Maven Build Lifecycle

Phase	Plugin Goal
process-resources	resources:resources
compile	compiler:compile
process-test-resources	resources:testResources
test-compile	compiler:testCompile
test	surefire:test
package	jar:jar
install	install:install
deploy	deploy:deploy

Maven Build Lifecycle

Phase	Plugin Goal
process-resources	resources:resources
compile	compiler:compile
process-test-resources	resources:testResources
test-compile	compiler:testCompile
test	surefire:test
package	jar:jar
verify	pmd:check, checkstyle:check, jacoco:check
install	install:install
deploy	deploy:deploy



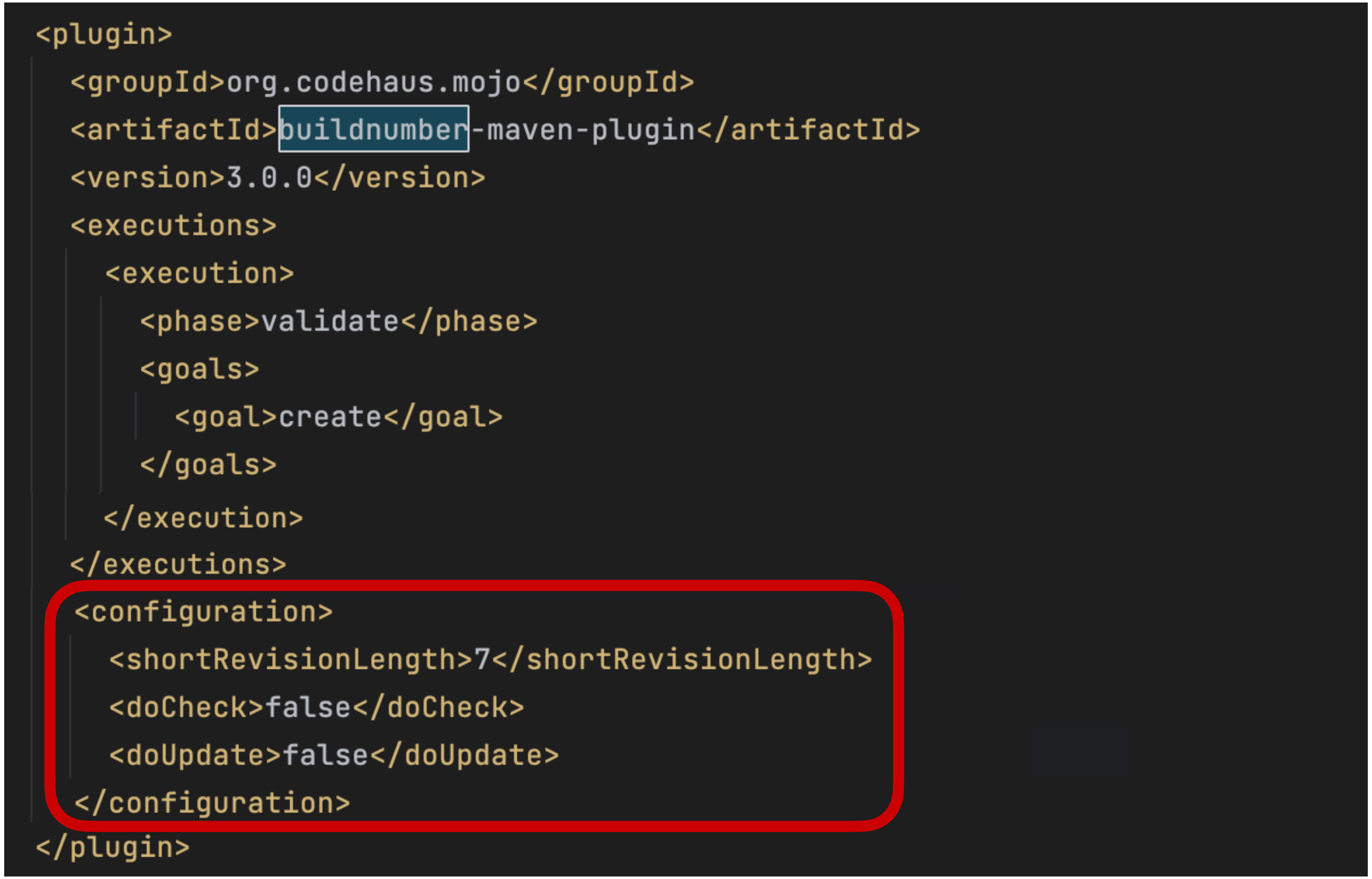
✓ SCIMple clean install Mar 29 2024 10:56:43 EDT

355 goals executed in 15 projects in 1m 28.128s

Goal execution	Duration
org.codehaus.mojo.spotbugs.SpotBugsMojo ›	26.528s
org.apache.maven.plugin.failsafe.IntegrationTestMojo ›	21.481s
org.apache.maven.plugin.surefire.SurefirePlugin ›	14.876s
org.apache.maven.plugins.pmd.PmdReport ›	5.238s
org.apache.maven.plugin.compiler.CompilerMojo ›	5.072s
org.apache.maven.plugin.compiler.TestCompilerMojo ›	2.686s
org.apache.maven.plugins.enforcer.EnforceMojo ›	2.024s
org.apache.maven.plugin.resources.remote.ProcessRemoteResourcesMojo ›	1.572s
io.quarkus.maven.GenerateCodeMojo ›	0.891s
io.quarkus.maven.BuildMojo ›	0.876s
io.quarkus.maven.GenerateCodeTestsMojo ›	0.565s
org.jacoco.maven.ReportMojo ›	0.457s
org.apache.maven.plugins.site.descriptor.SiteDescriptorAttachMojo ›	0.454s
org.jacoco.maven.ReportAggregateMojo ›	0.385s
org.apache.maven.plugins.clean.CleanMojo ›	0.368s
org.codehaus.mojo.build.CreateMojo ›	0.337s
org.antlr.mojo.antlr4.Antlr4Mojo ›	0.327s
org.apache.maven.plugins.war.WarMojo ›	0.275s
org.apache.maven.plugins.jar.JarMojo ›	0.273s
org.codehaus.mojo.spotbugs.CheckMojo ›	0.140s
org.apache.maven.plugins.install.InstallMojo ›	0.131s
org.jboss.jandex.maven.JandexGoal ›	0.106s
org.apache.maven.plugins.resources.ResourcesMojo ›	0.081s

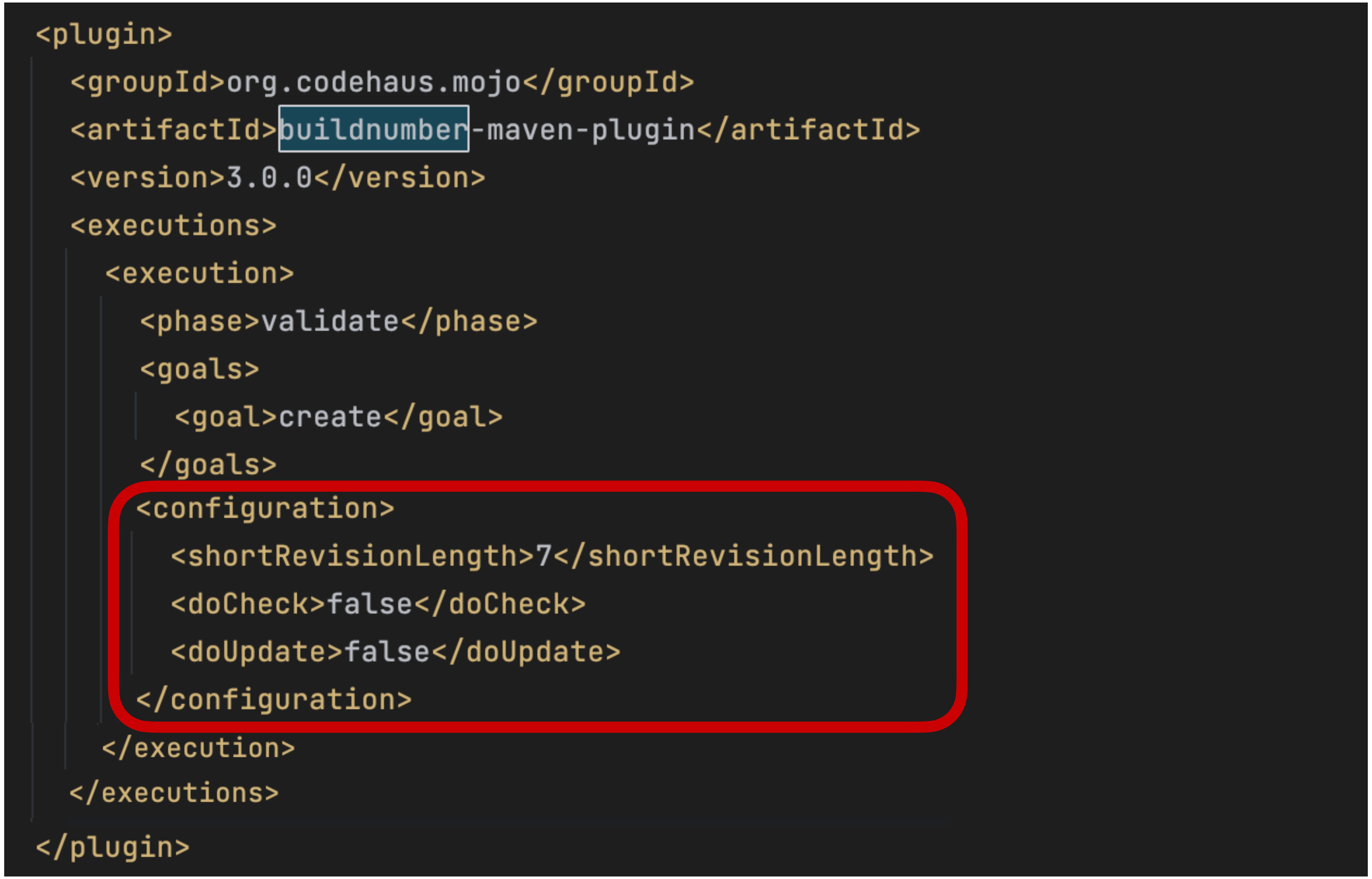
Gradle

Plugin Configuration



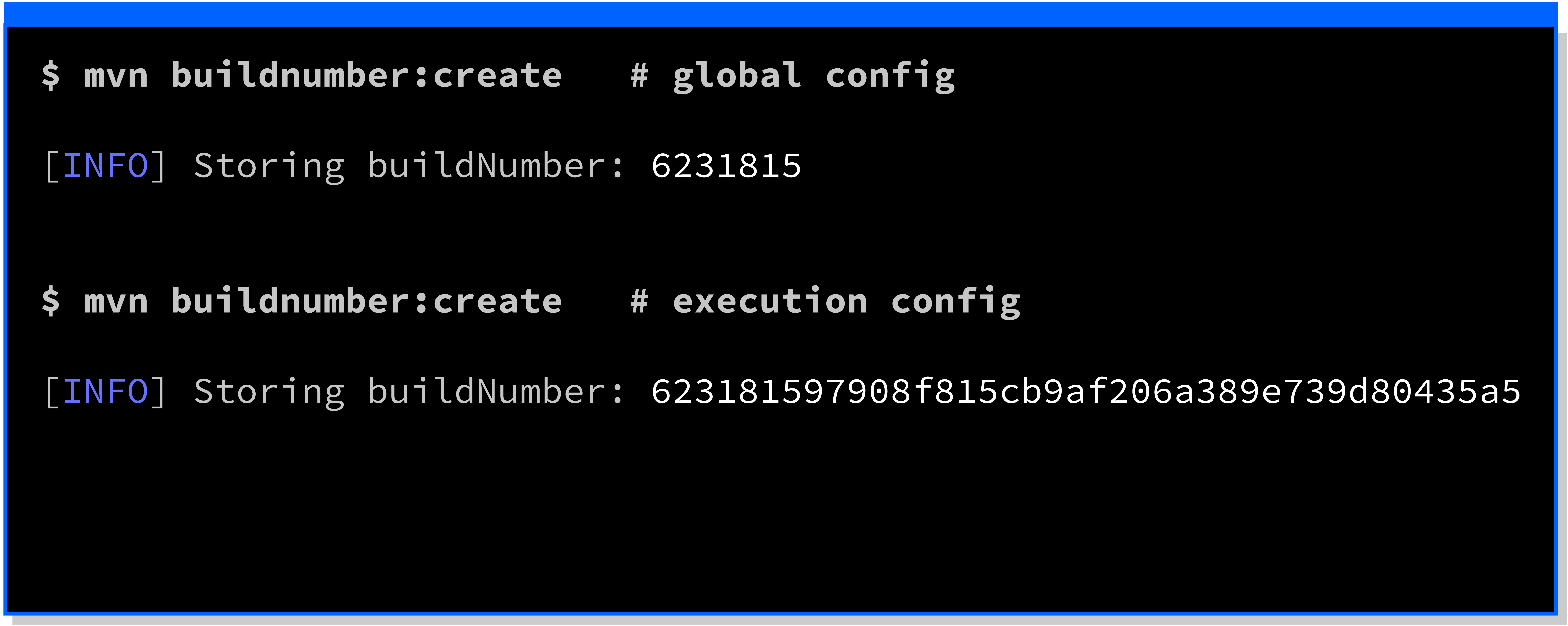
```
<plugin>
  <groupId>org.codehaus.mojo</groupId>
  <artifactId>buildnumber-maven-plugin</artifactId>
  <version>3.0.0</version>
  <executions>
    <execution>
      <phase>validate</phase>
      <goals>
        <goal>create</goal>
      </goals>
    </execution>
  </executions>
  <configuration>
    <shortRevisionLength>7</shortRevisionLength>
    <doCheck>false</doCheck>
    <doUpdate>false</doUpdate>
  </configuration>
</plugin>
```

Plugin Configuration



```
<plugin>
  <groupId>org.codehaus.mojo</groupId>
  <artifactId>buildnumber-maven-plugin</artifactId>
  <version>3.0.0</version>
  <executions>
    <execution>
      <phase>validate</phase>
      <goals>
        <goal>create</goal>
      </goals>
      <configuration>
        <shortRevisionLength>7</shortRevisionLength>
        <doCheck>false</doCheck>
        <doUpdate>false</doUpdate>
      </configuration>
    </execution>
  </executions>
</plugin>
```

Plugin Configuration (example)



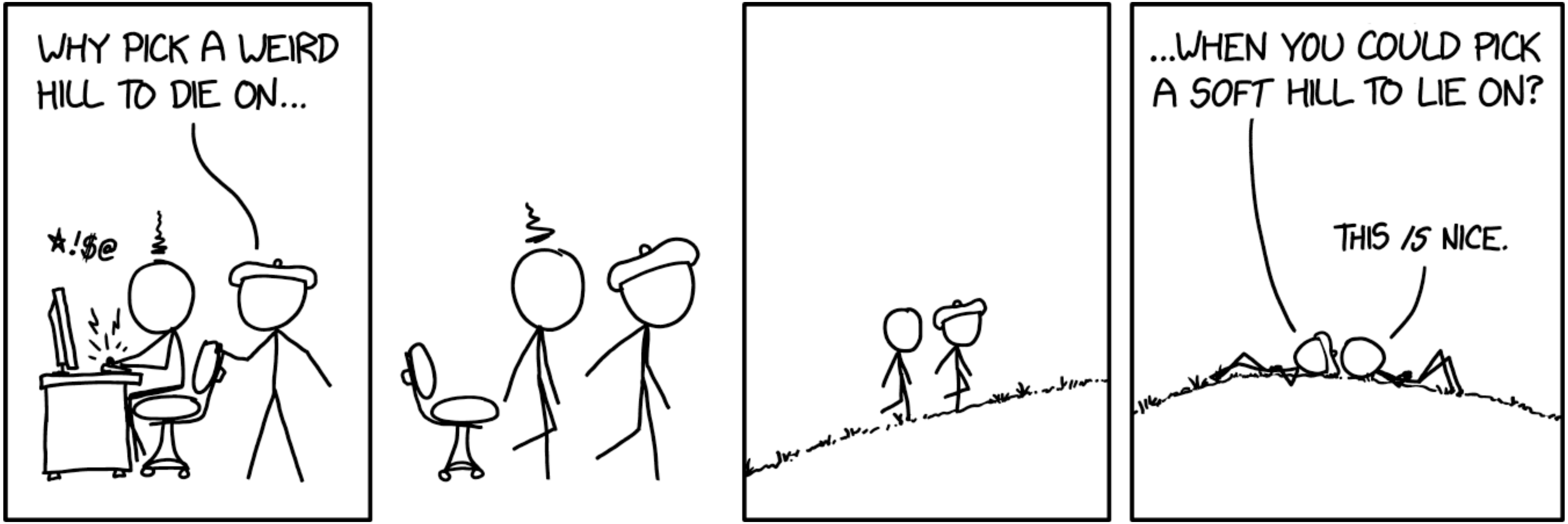
```
$ mvn buildnumber:create   # global config

[INFO] Storing buildNumber: 6231815


$ mvn buildnumber:create   # execution config

[INFO] Storing buildNumber: 623181597908f815cb9af206a389e739d80435a5
```

Custom Maven Plugins

```
@Mojo(name = "roll", defaultPhase = LifecyclePhase.VERIFY)
public class DiceMojo extends org.apache.maven.plugin.AbstractMojo {

  @Parameter(property = "expression", defaultValue = "1d20")
  private String expression;

  public void execute() throws MojoExecutionException,
                               MojoFailureException {

    getLog().info("Dice eval: " + Dice.roll(expression));

  }
}
```

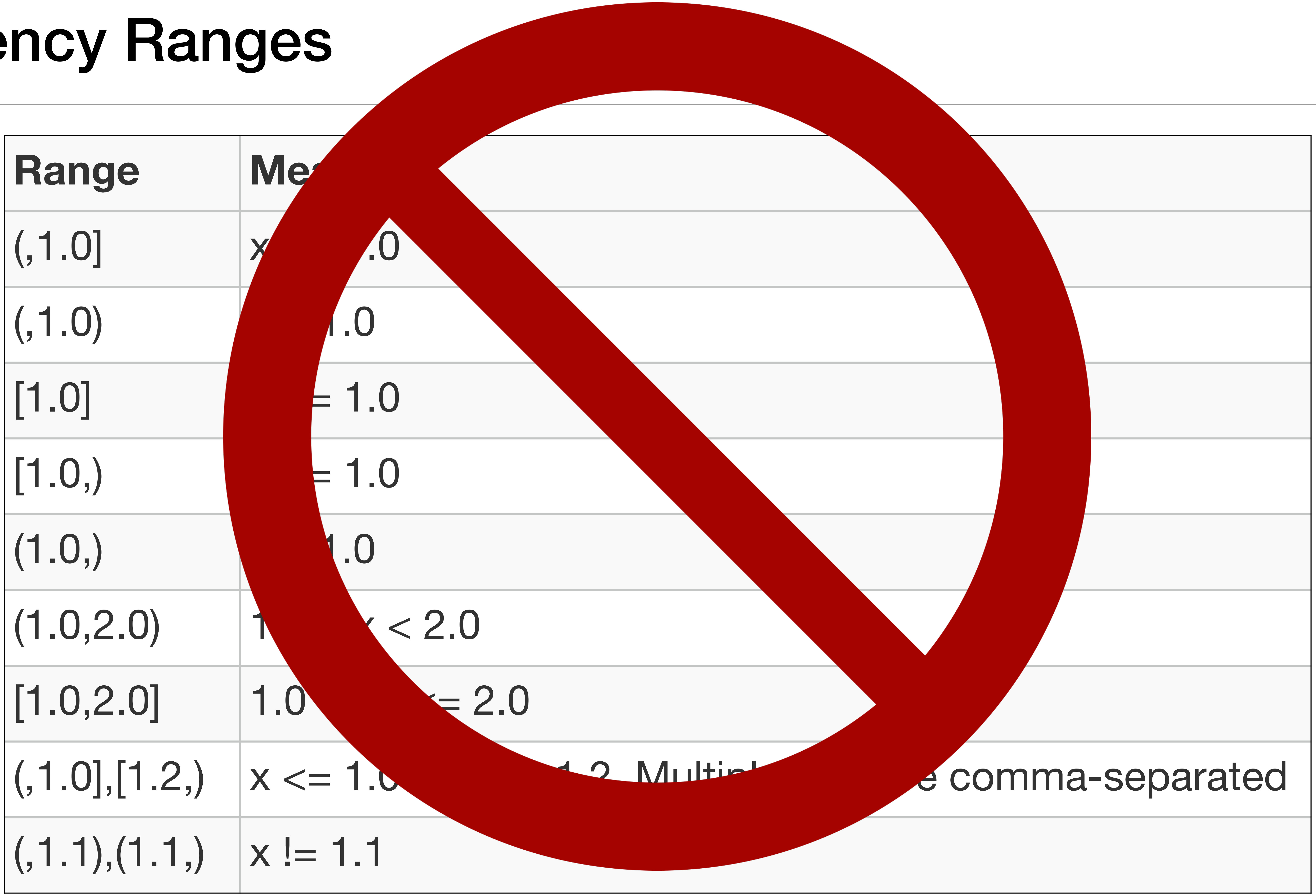
Commit or Omit!

Dependency Ranges


WHY PICK A WEIRD HILL TO DIE ON...
★!$@
...WHEN YOU COULD PICK A SOFT HILL TO LIE ON?
THIS *IS* NICE.

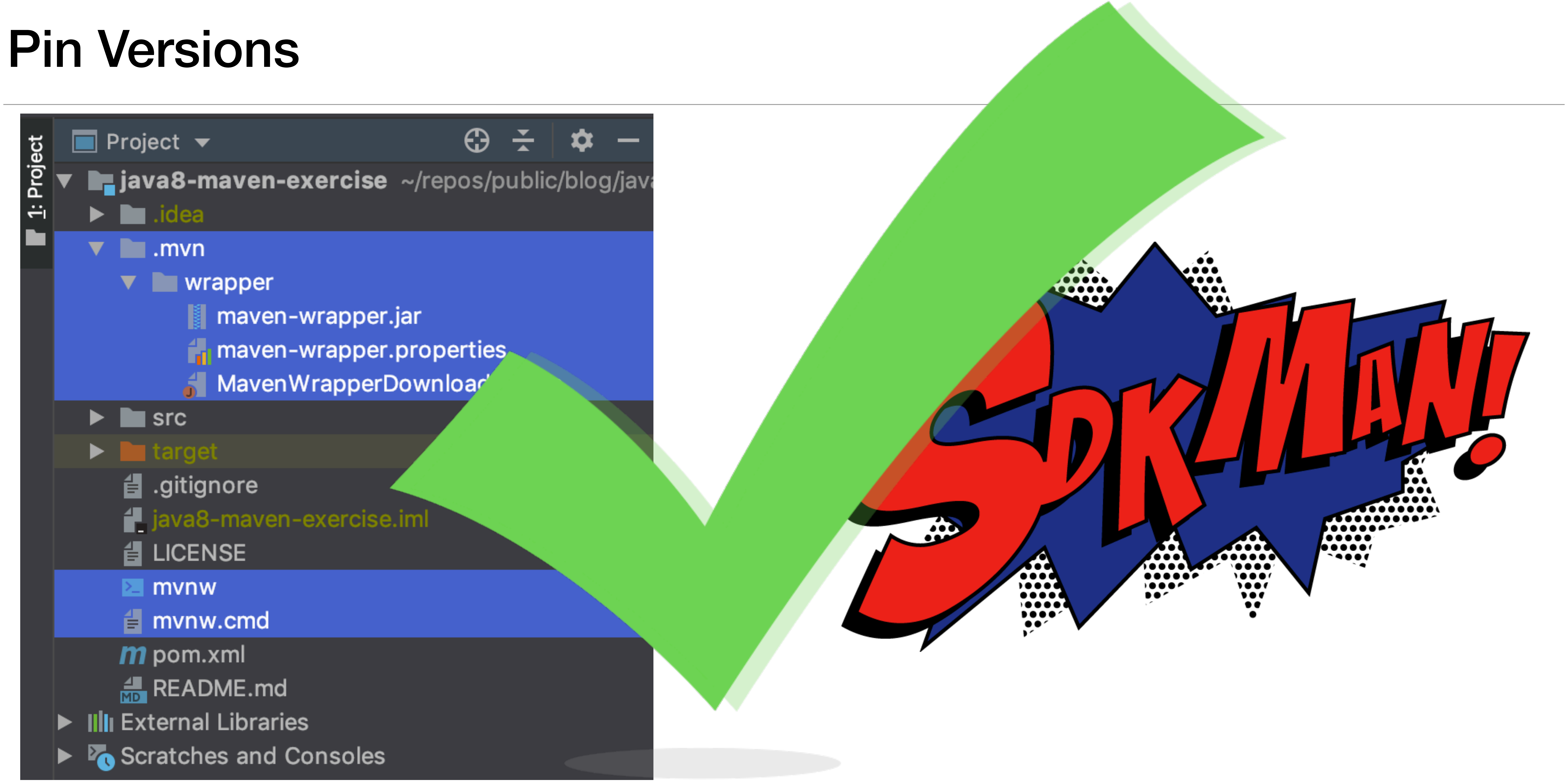
source: xkcd.com/2247

Dependency Ranges



Range	Me
(,1.0]	x .0
(,1.0)	1.0
[1.0]	= 1.0
[1.0,)	= 1.0
(1.0,)	1.0
(1.0,2.0)	1 < 2.0
[1.0,2.0]	1.0 = 2.0
(,1.0],[1.2,)	x <= 1.0 1.2. Multipl e comma-separated
(,1.1),(1.1,)	x != 1.1

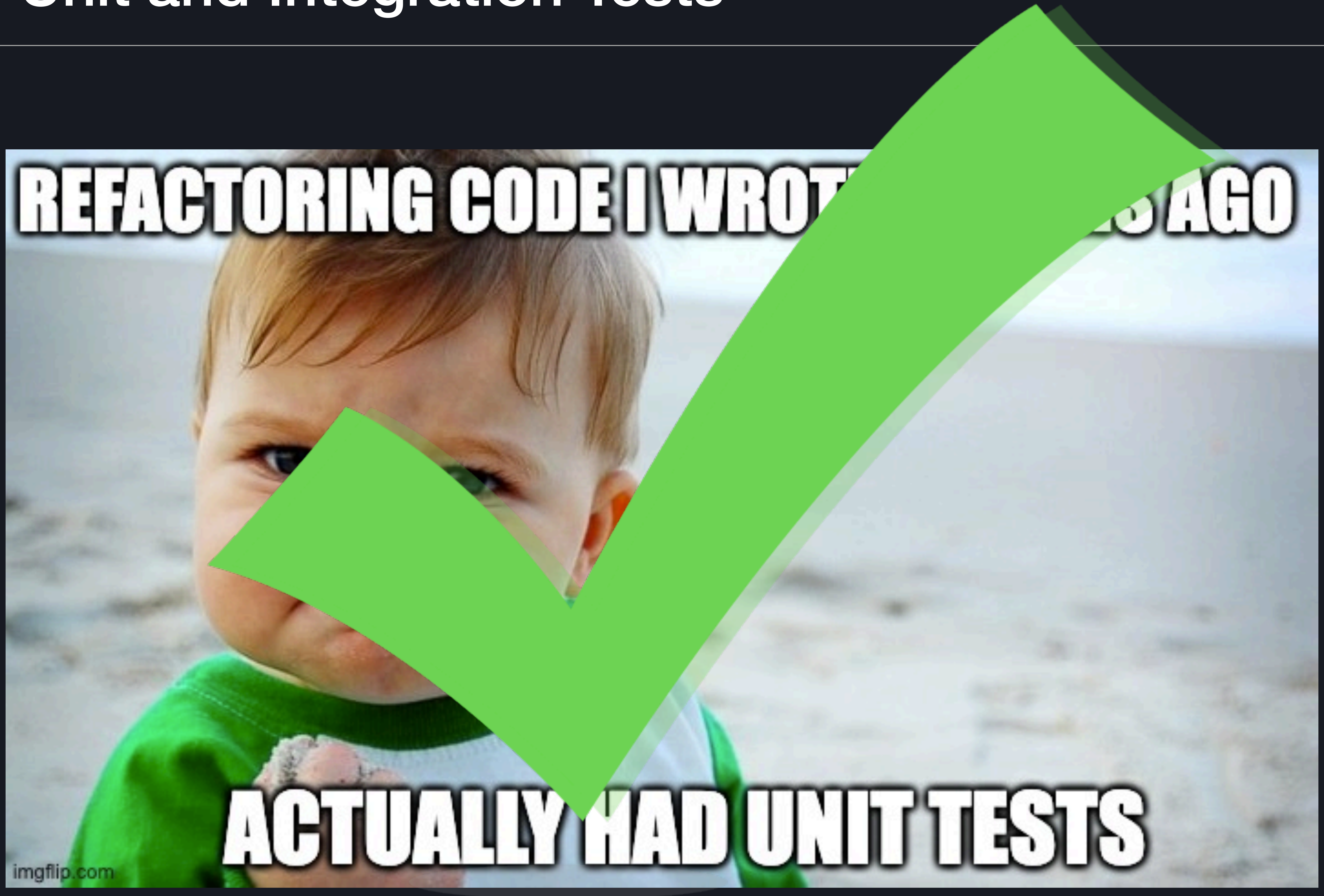
Pin Versions



```
Project
▼ java8-maven-exercise  ~/repos/public/blog/java
  ▶ .idea
  ▼ .mvn
    ▼ wrapper
        maven-wrapper.jar
        maven-wrapper.properties
        MavenWrapperDownload
  ▶ src
  ▶ target
    .gitignore
    java8-maven-exercise.iml
    LICENSE
    mvnw
    mvnw.cmd
    pom.xml
    README.md
▶ External Libraries
▶ Scratches and Consoles
```

https://area-b.com/blog/2019/05/04/1210/

Separate Unit and Integration Tests



Use Profiles

mvn verify -Pci

Pull Request Builds

+123-456-7890

ci@example.com

ample.com

cond Build St.

23-456-7890

en.apache.org/guides/

mvn verify -Pquick

Fast Build

ELEASE BUILDS

verify -Prelease

ITY FOCUSED

+123-456-7890

release@example.com

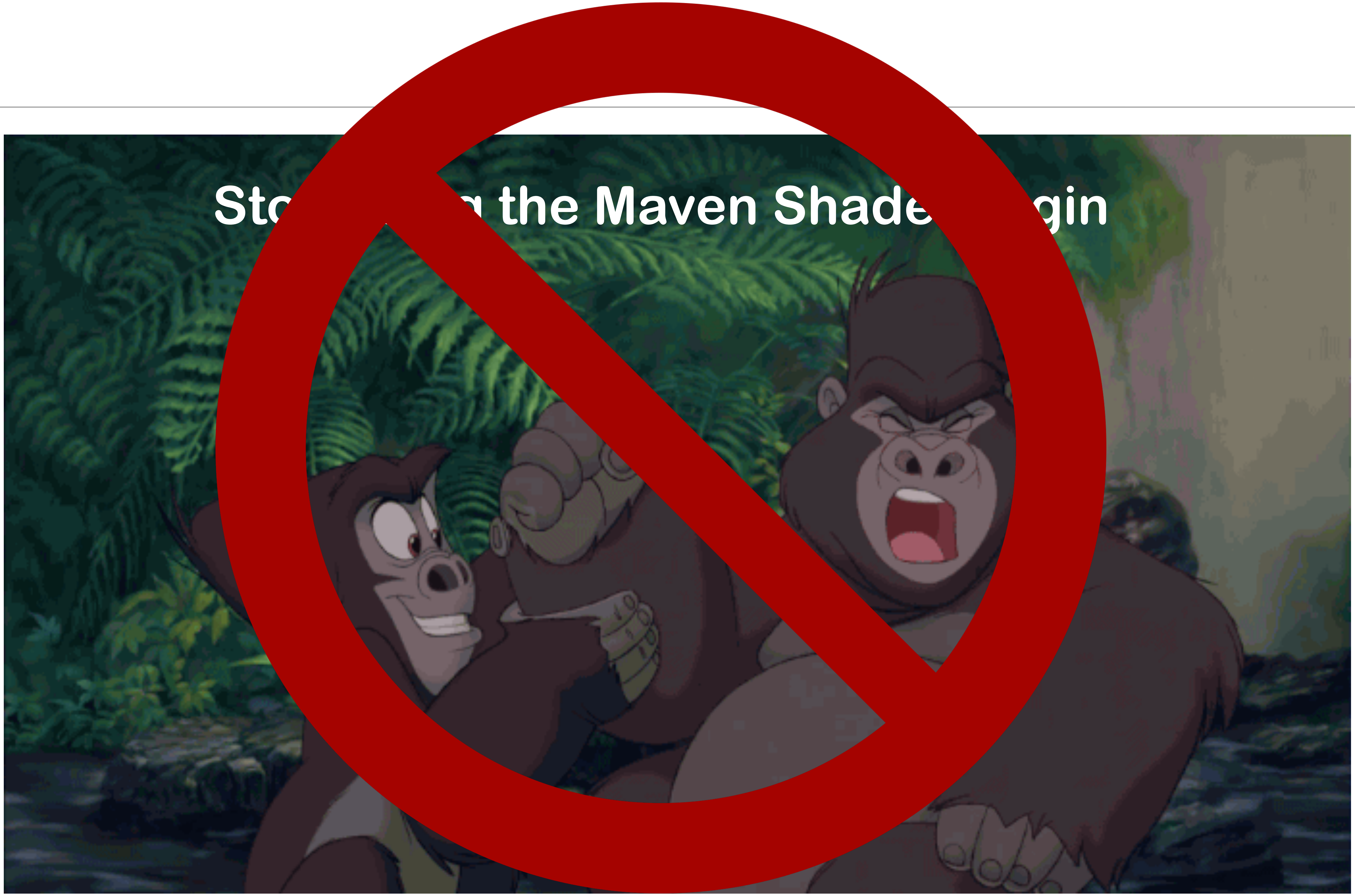
https://maven.apache.org/guides/

Inspector #5

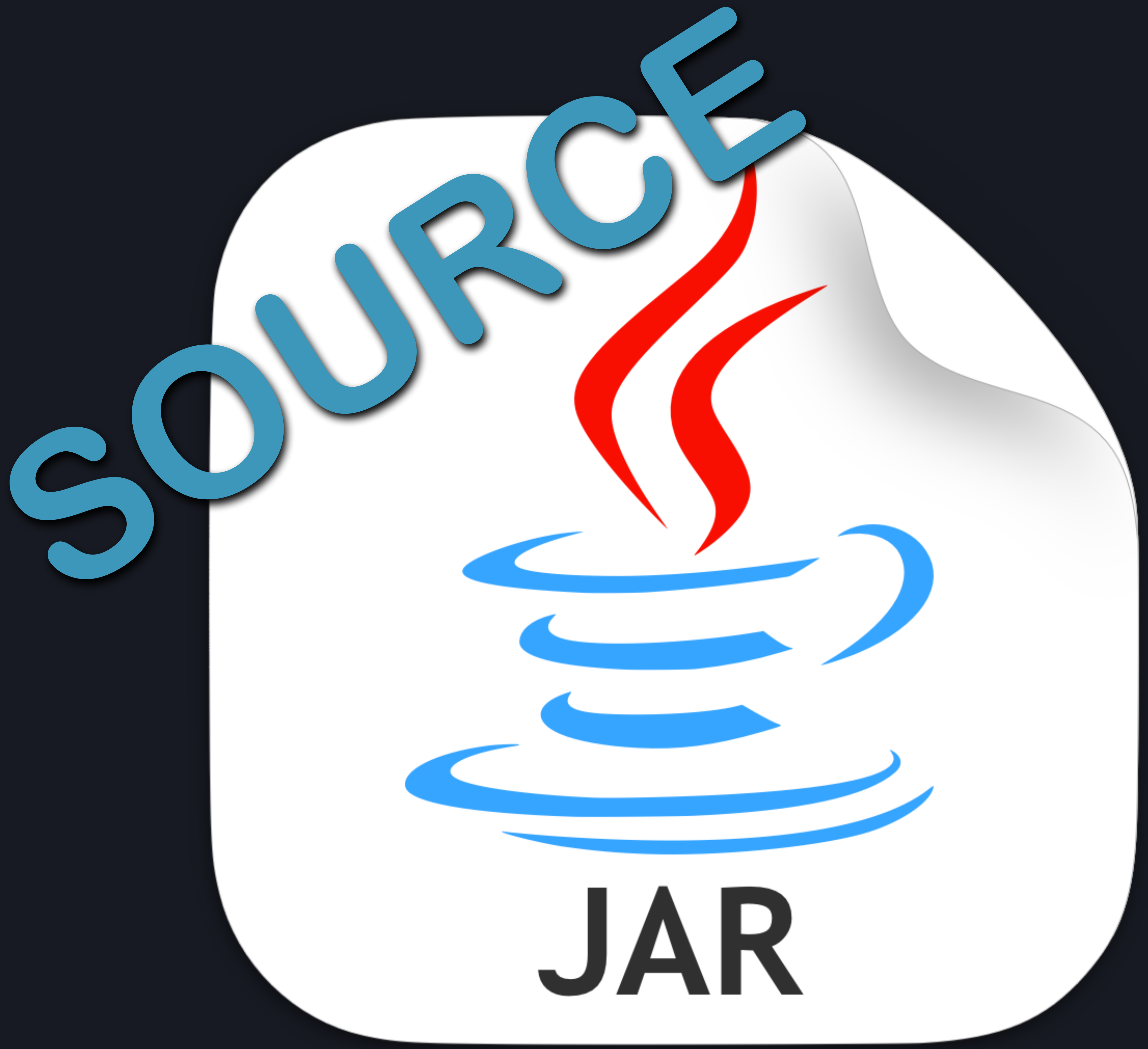
headshots: xkcd.com

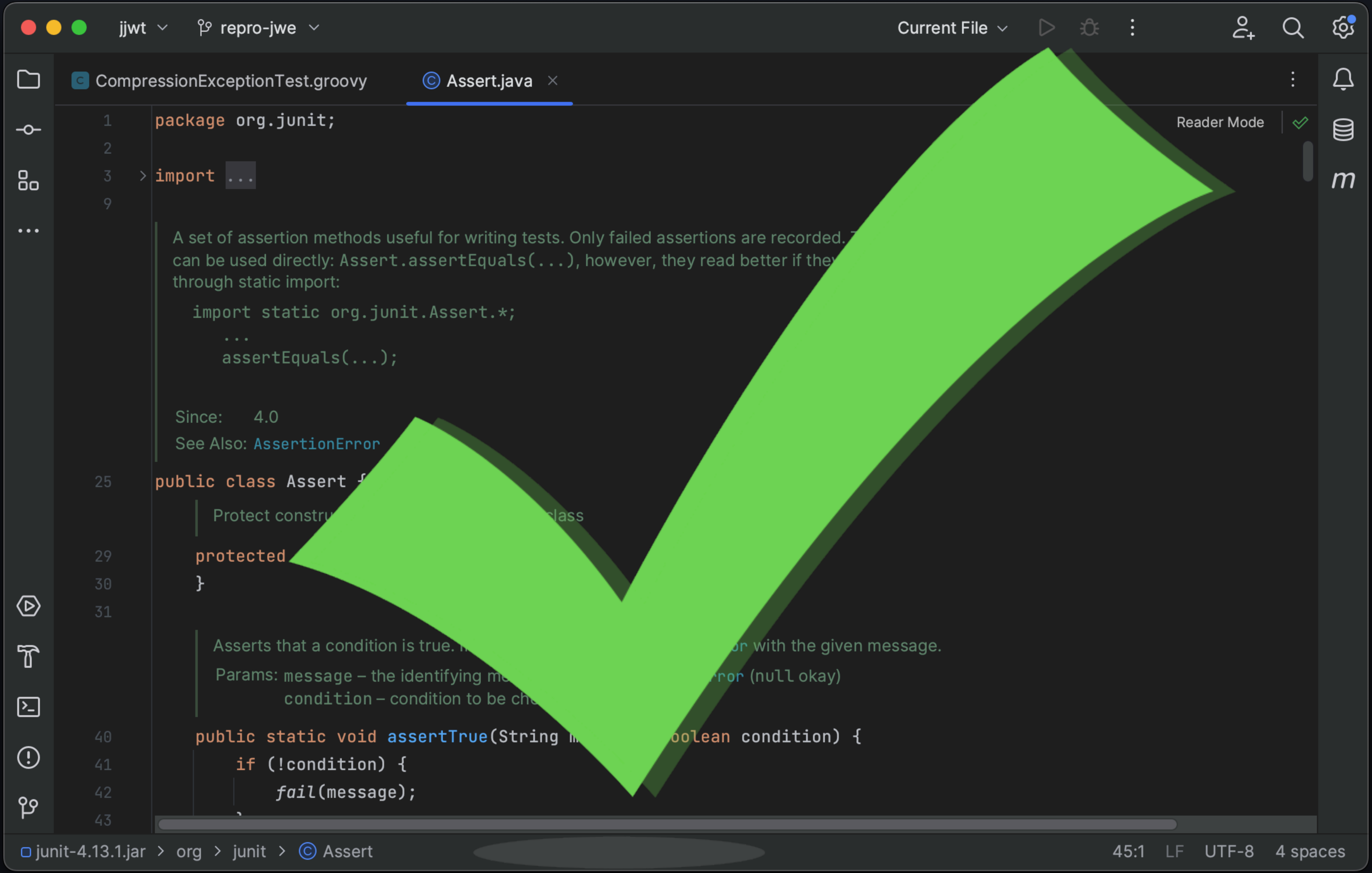
Test Jars

Uberjars

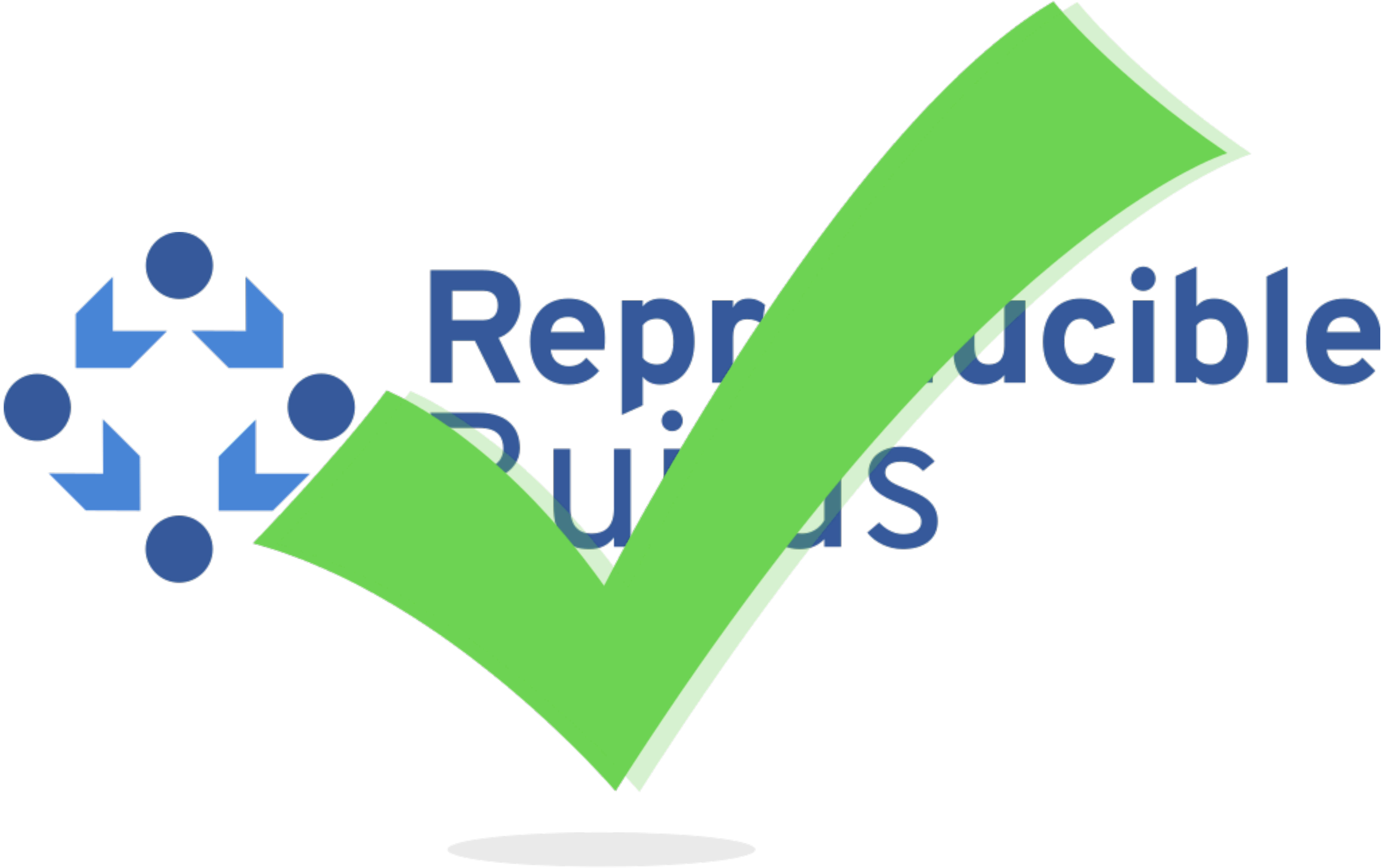


Source jars

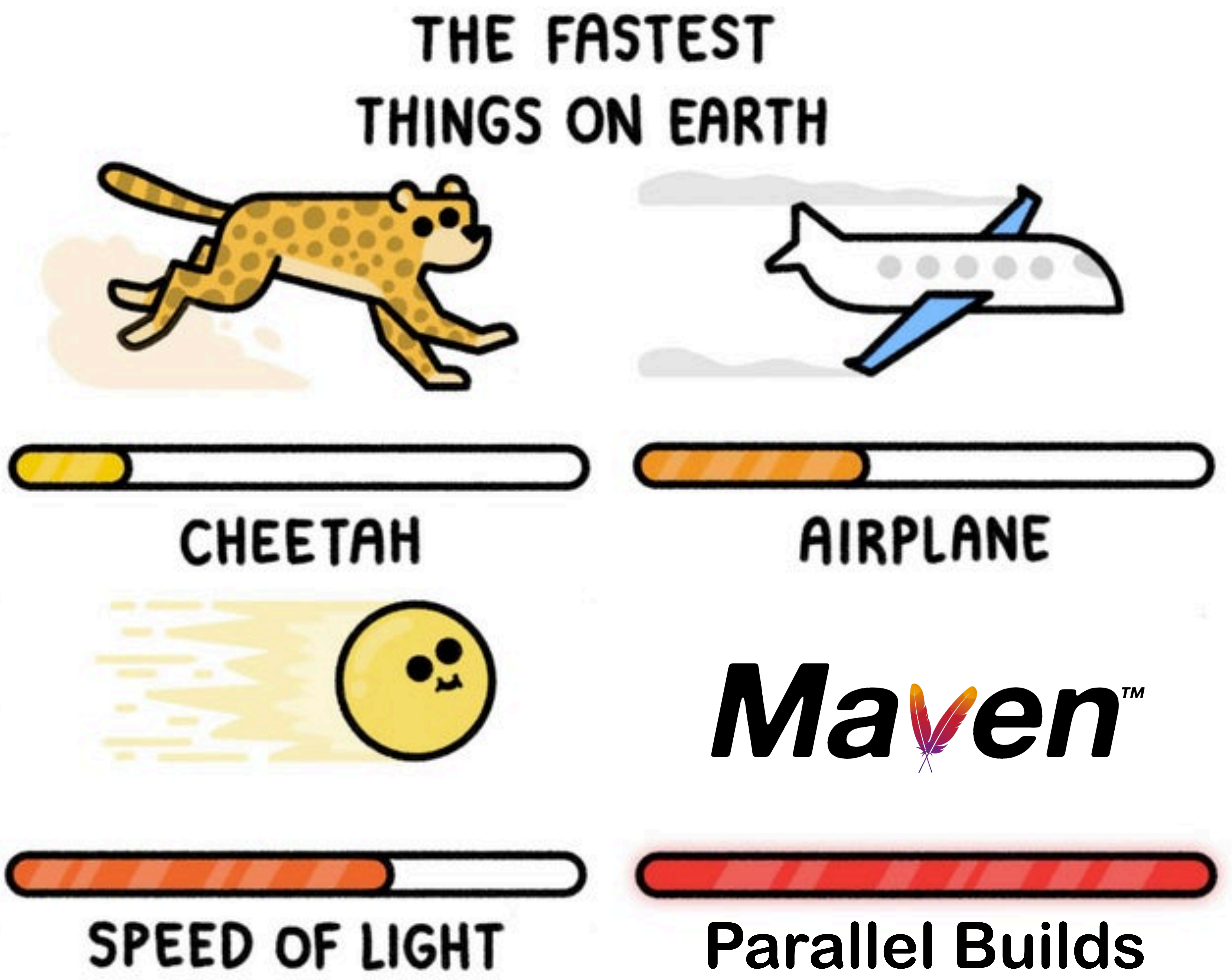



jjwt
repro-jwe
Current File
CompressionExceptionTest.groovy
Assert.java
Reader Mode
junit-4.13.1.jar > org > junit > Assert
45:1
LF
UTF-8
4 spaces

```
package org.junit;

import ...

A set of assertion methods useful for writing tests. Only failed assertions are recorded.
can be used directly: Assert.assertEquals(...), however, they read better if they
through static import:
  import static org.junit.Assert.*;
     ...
     assertEquals(...);

Since:    4.0
See Also: AssertionError

public class Assert {
    Protect constru                                  class
    protected
    }

    Asserts that a condition is true.                            r with the given message.
    Params: message – the identifying m                           ror (null okay)
            condition – condition to be ch
    public static void assertTrue(String m          oolean condition) {
        if (!condition) {
            fail(message);
```


Reproducible
Builds

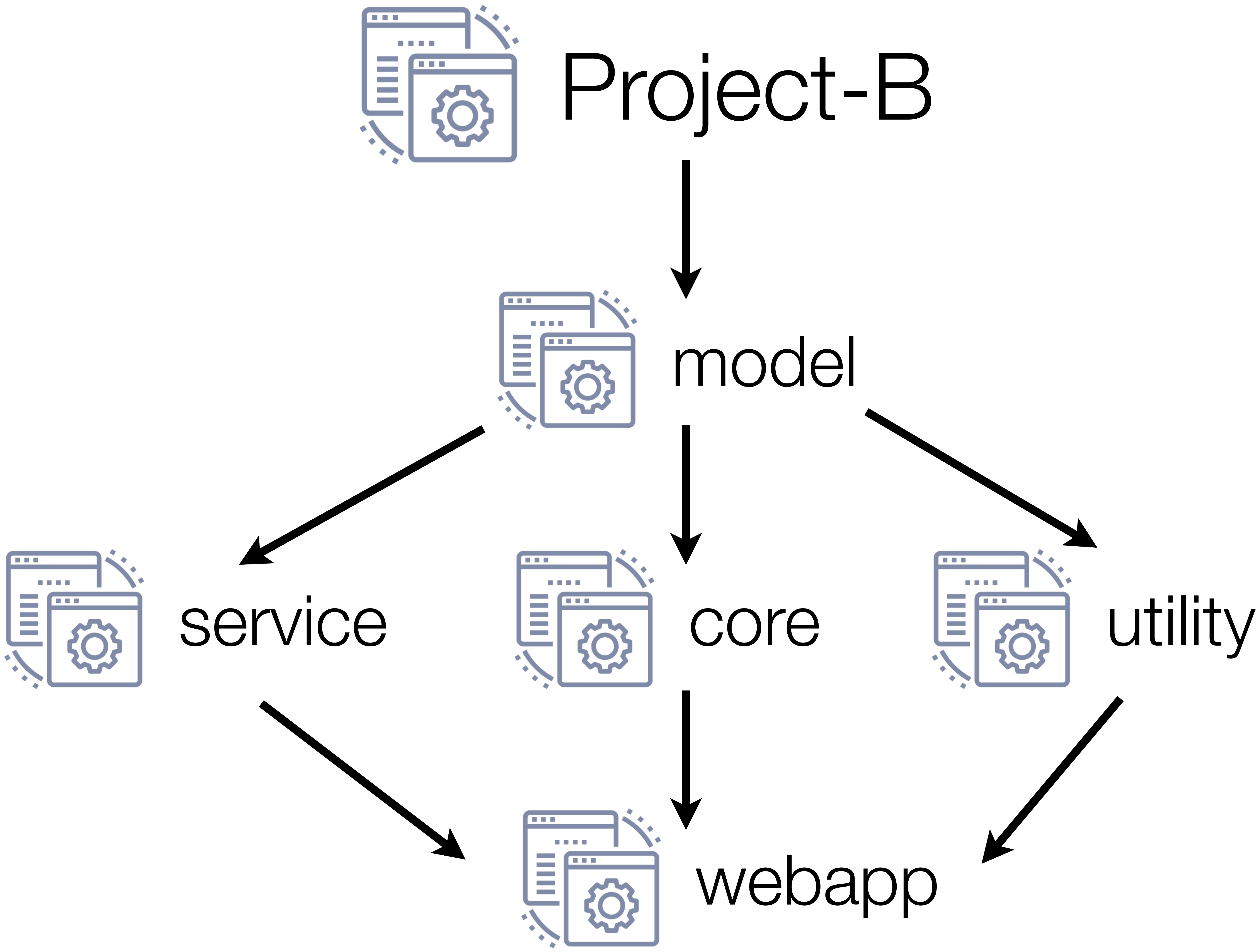
Build Cache


THE FASTEST THINGS ON EARTH
CHEETAH
AIRPLANE
SPEED OF LIGHT
Maven™
Parallel Builds

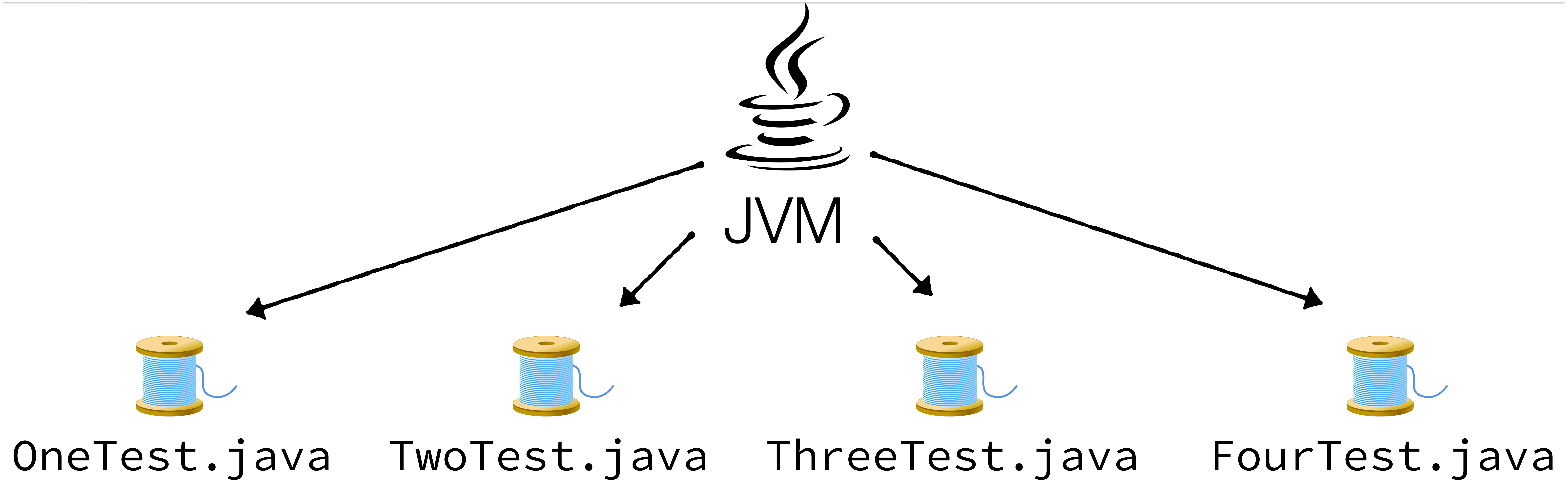
Multiple Threads

- Project-A
  - api
  - impl
  - app

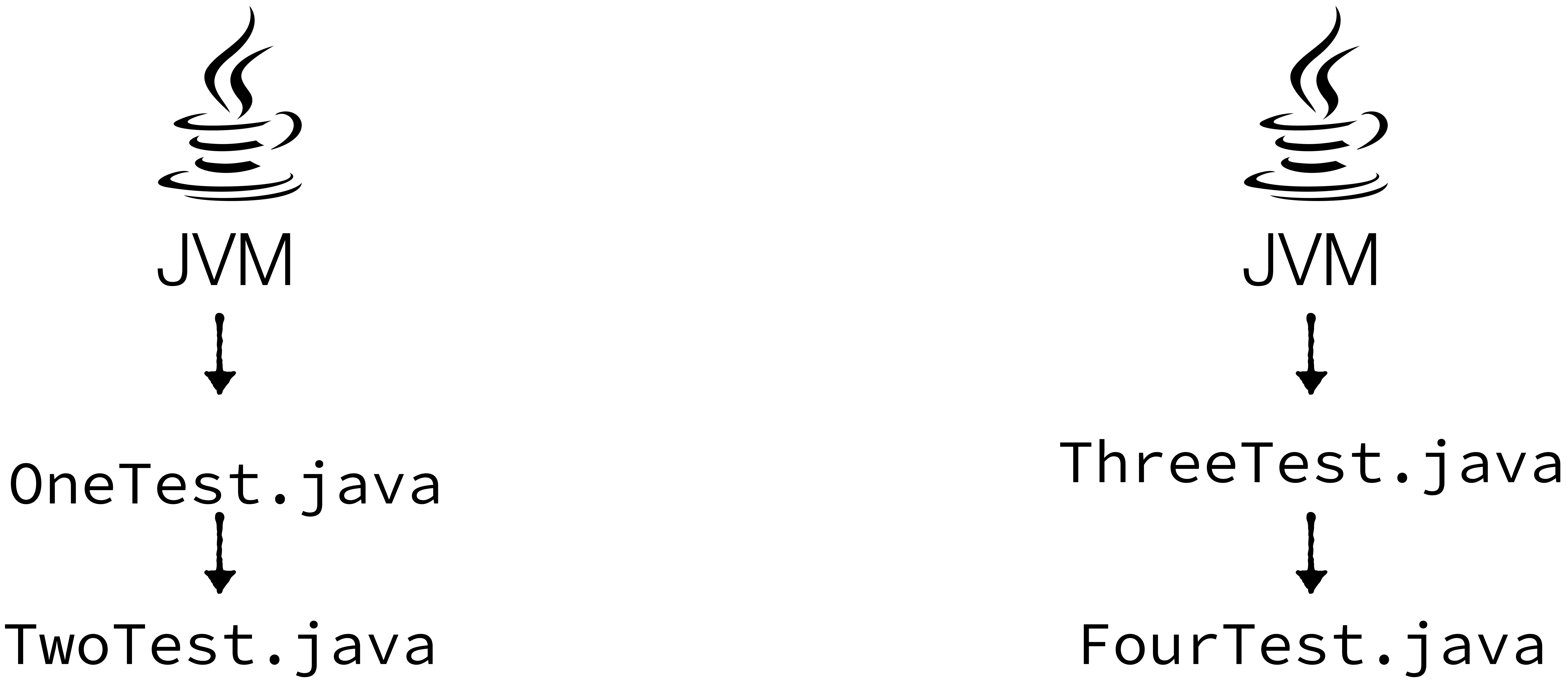
- Project-B
  - model
  - service
  - core
  - utility
  - webapp


Project-B
model
service
core
utility
webapp

Test w/ Multiple Threads



Test w/ Multiple JVMs (`forkCount`)



JVM

`OneTest.java`

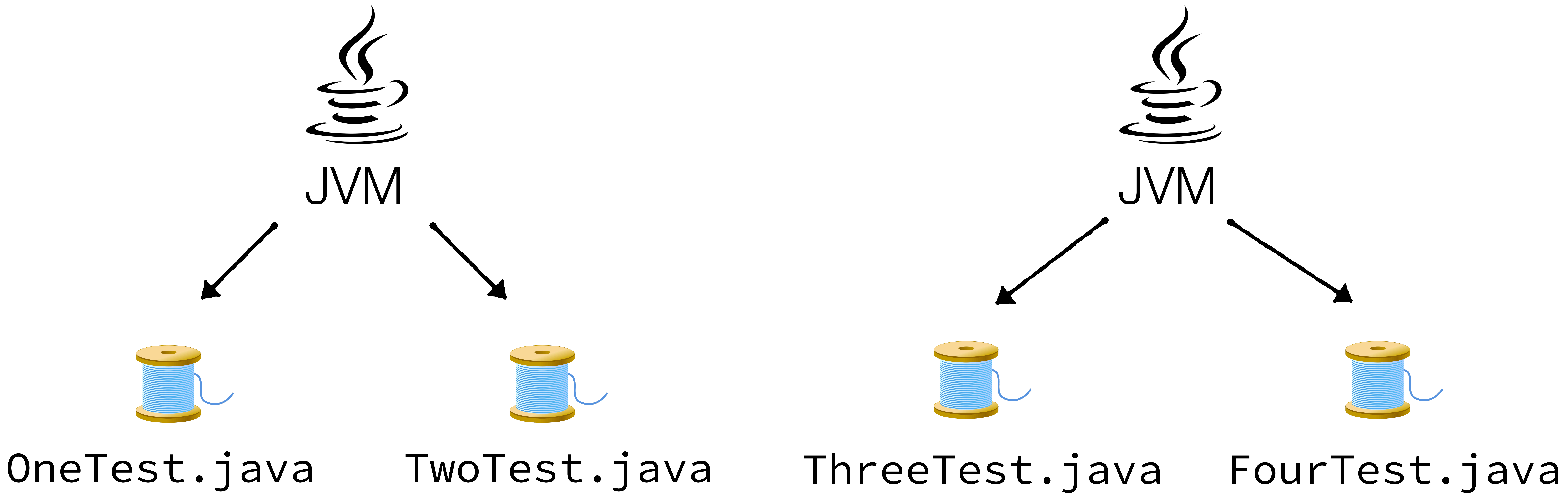
`TwoTest.java`

JVM

`ThreeTest.java`

`FourTest.java`

Test w/ Multiple JVMs & Multiple Threads



JVM

JVM

OneTest.java

TwoTest.java

ThreeTest.java

FourTest.java

Just add .parallel() and everything will be all right

source: https://levelup.gitconnected.com/be-careful-with-java-parallel-streams-3ed0fd70c3d0

> “The future is always beginning now.”
>
> **–Mark Strand**

Maven™
Daemon
Builds are faster
If you keep the
JVM running

Maven™ 4.0.0

BrianDemers

bdemers

Learn more & get free swag