

JavaOne 2016

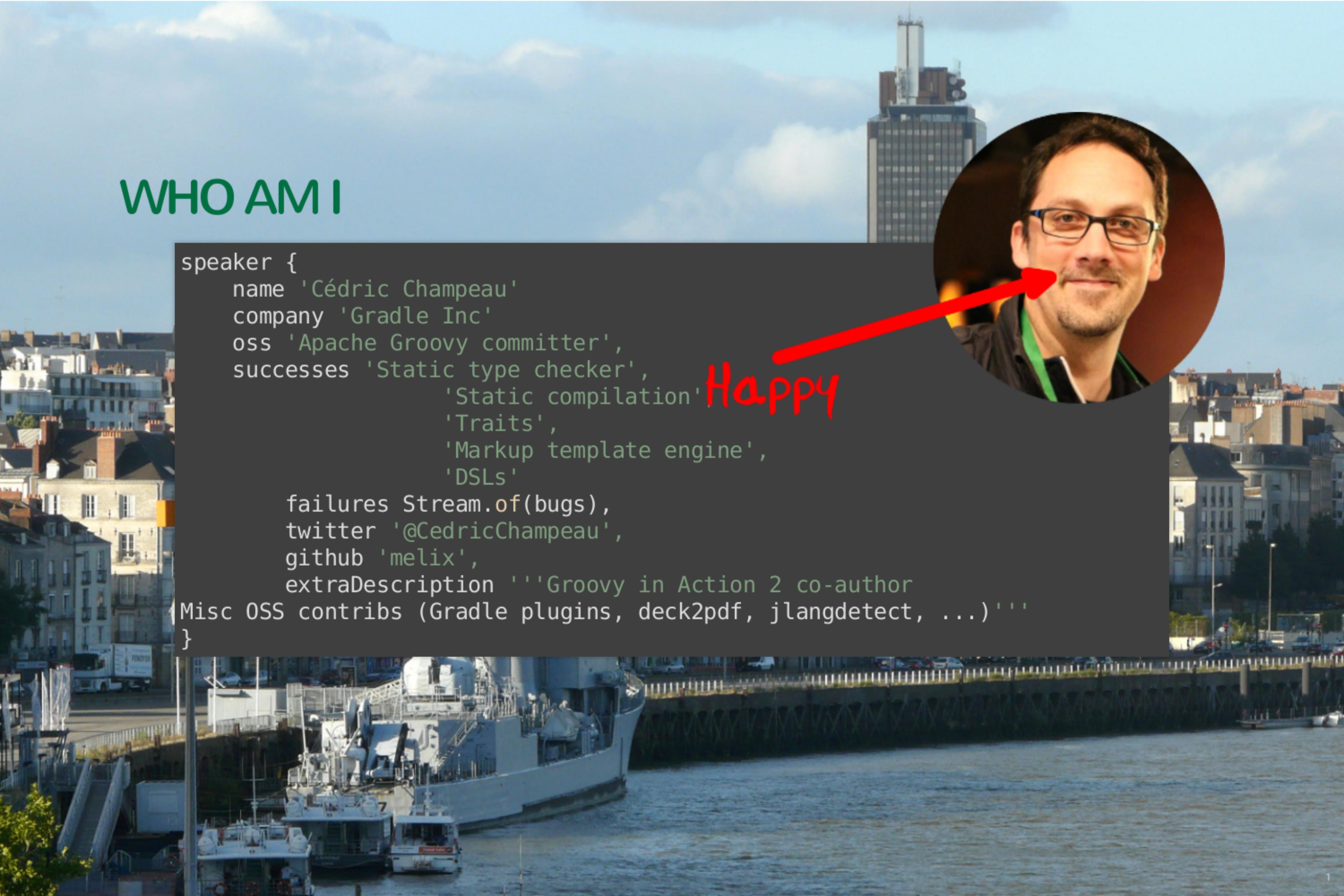
Juggling Multiple Java Platforms and Jigsaw with
Gradle
Cédric Champeau

2016

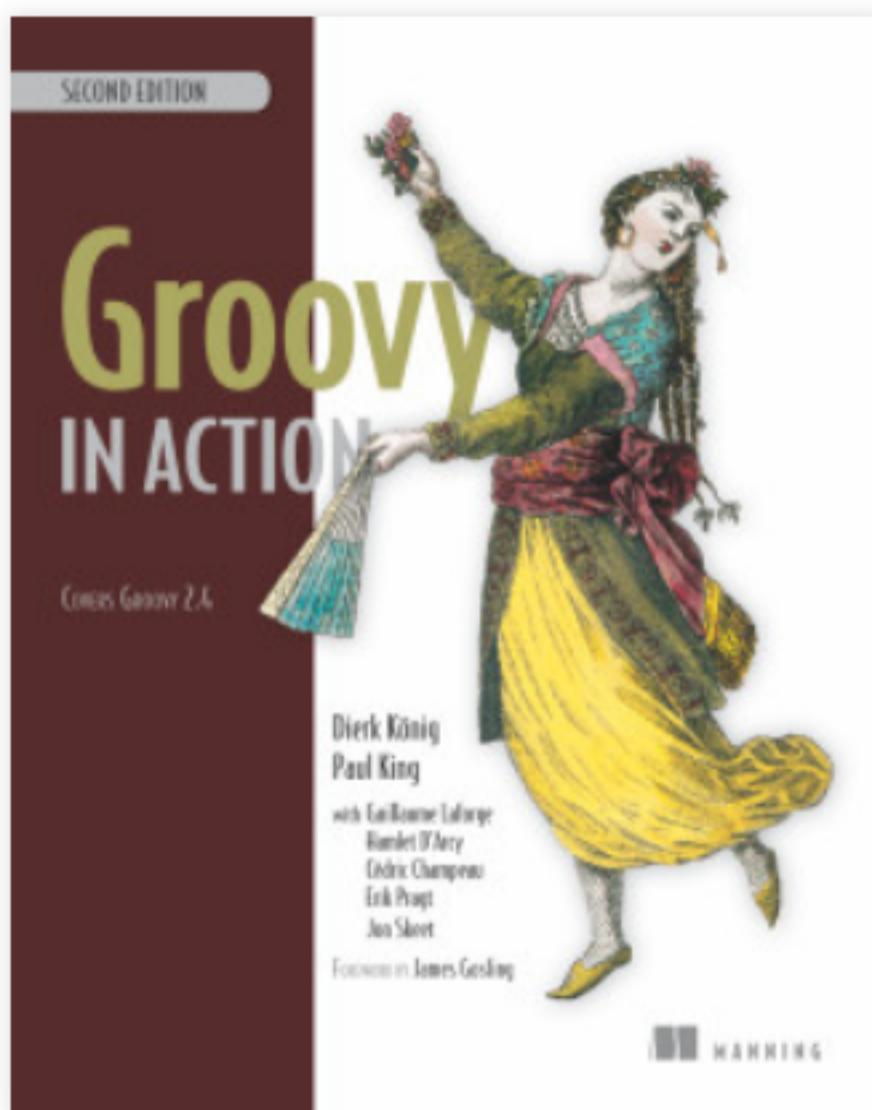
WHO AM I

```
speaker {  
    name 'Cédric Champeau'  
    company 'Gradle Inc'  
    oss 'Apache Groovy committer',  
    successes 'Static type checker',  
              'Static compilation'  
              'Traits',  
              'Markup template engine',  
              'DSLs'  
    failures Stream.of(bugs),  
    twitter '@CedricChampeau',  
    github 'melix',  
    extraDescription '''Groovy in Action 2 co-author  
Misc OSS contribs (Gradle plugins, deck2pdf, jlangdetect, ...)'''  
}
```

Happy



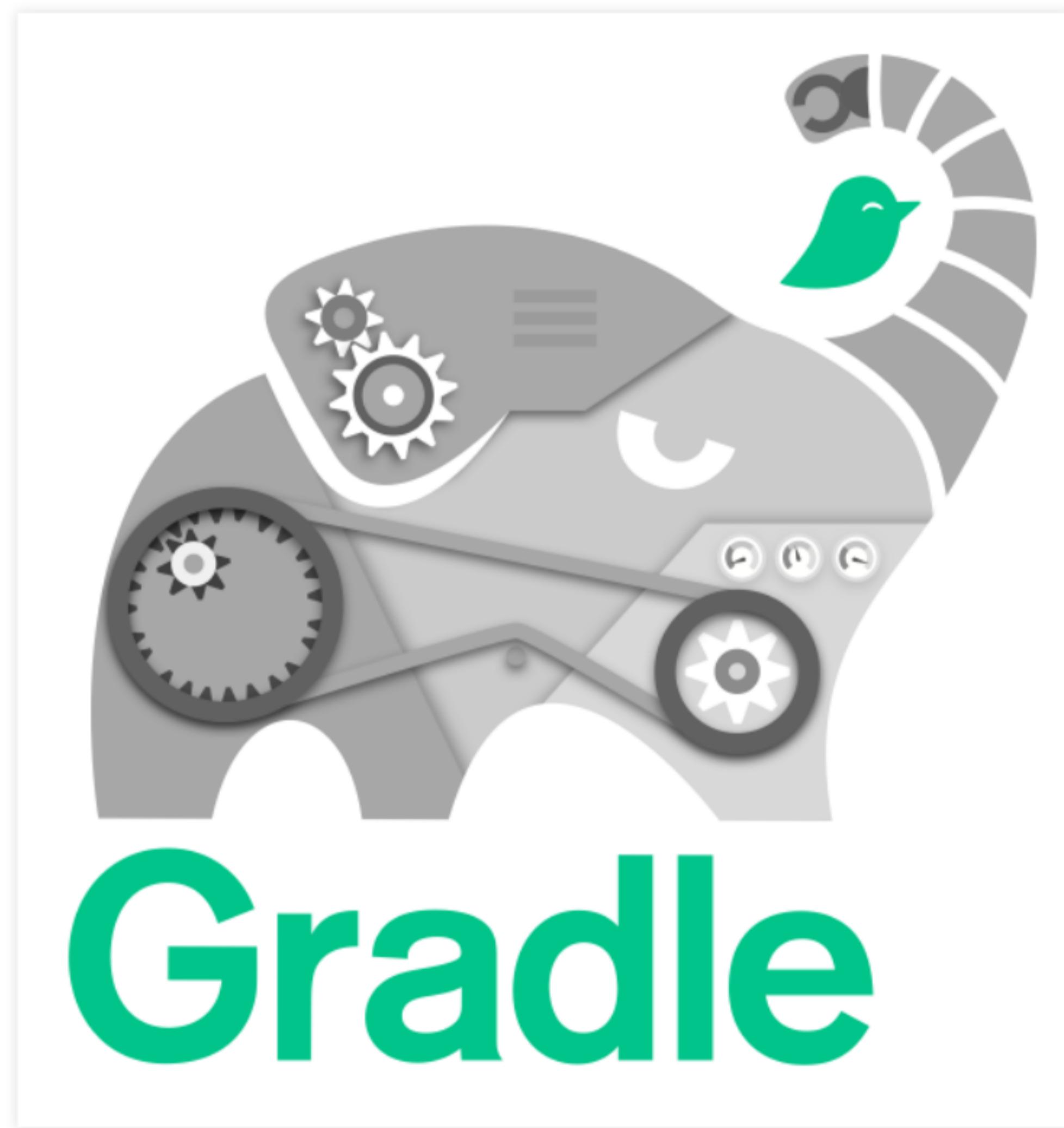
GROOVY IN ACTION 2



<https://www.manning.com/books/groovy-in-action-second-edition>

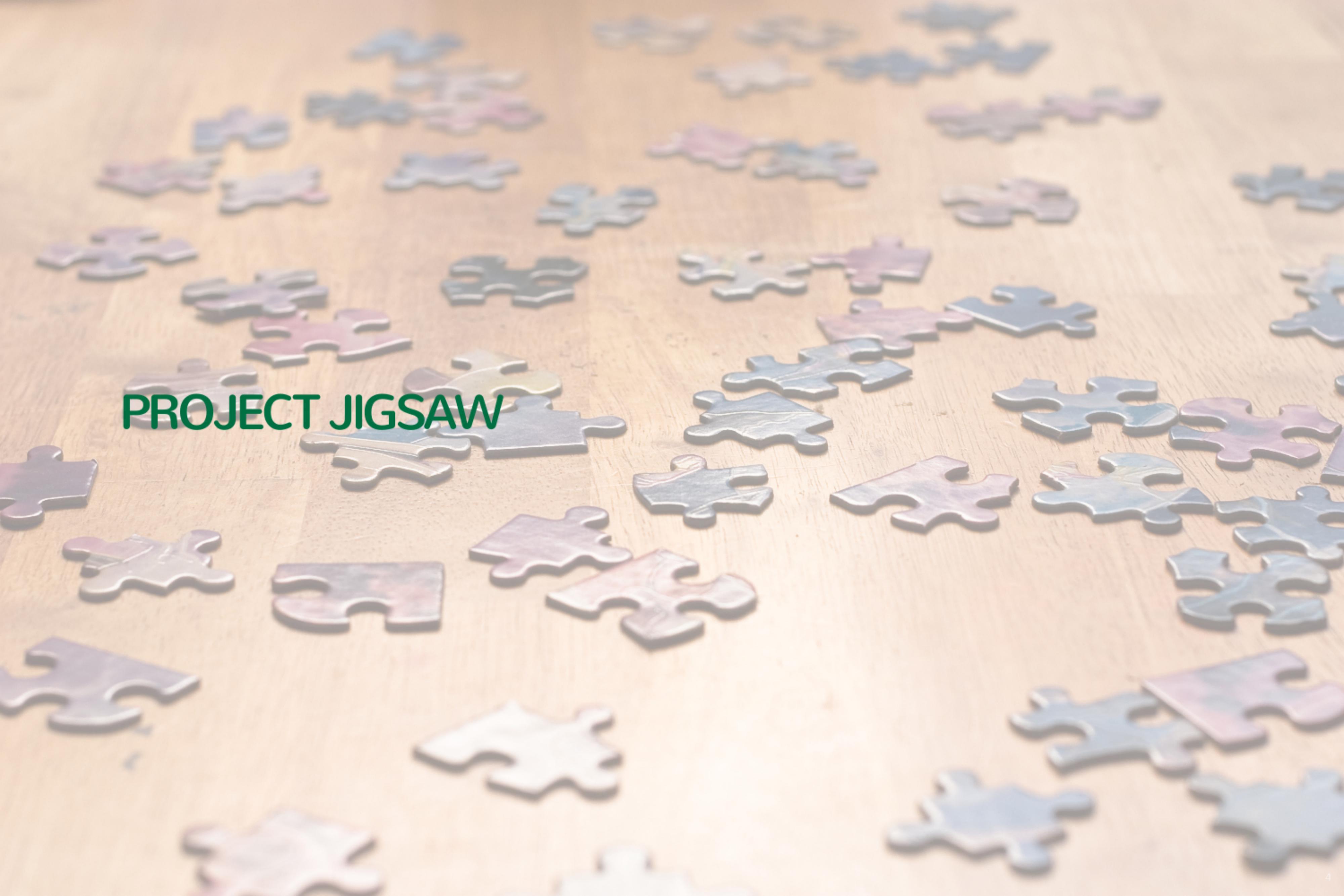
Coupon: groovyjo16 (42% off until Thursday)

WHAT IS GRADLE?



EMERGE FROM BUILD HELL

- Unified, fast, reproducible builds
- Cross-platform
- Language agnostic
- A Build Tool + Cloud Services

A large number of puzzle pieces are scattered across a light-colored wooden surface. The pieces are mostly silver or grey, with some pink and blue ones interspersed. They are arranged in several distinct clusters, suggesting they have been partially assembled. The overall image has a warm, organic feel.

PROJECT JIGSAW

PROJECT JIGSAW

- Modularity for the Java platform
 - Reliable configuration (goodbye classpath)
 - Strong encapsulation (goodbye com.sun)
- Enforce strict boundaries between modules
 - compile-time
 - run-time

JIGSAW MODULES

DECLARING A MODULE

module-info.java

```
module com.foo.bar {  
    requires org.baz.qux;  
    exports com.foo.bar.alpha;  
    exports com.foo.bar.beta;  
}
```

A MODULE

- Declares dependencies onto other modules
 - optionally transitive (public)
- Declares a list of packages it exports
- will be found on modulepath

WHY IT'S GOING TO BREAK YOUR APPS

- Exports are package based
- A non-exported package is not visible to consumers
- 2 modules cannot export the same packages
- 2 modules cannot have the same internal packages

Death to split packages.

HOW GRADLE WILL HELP?

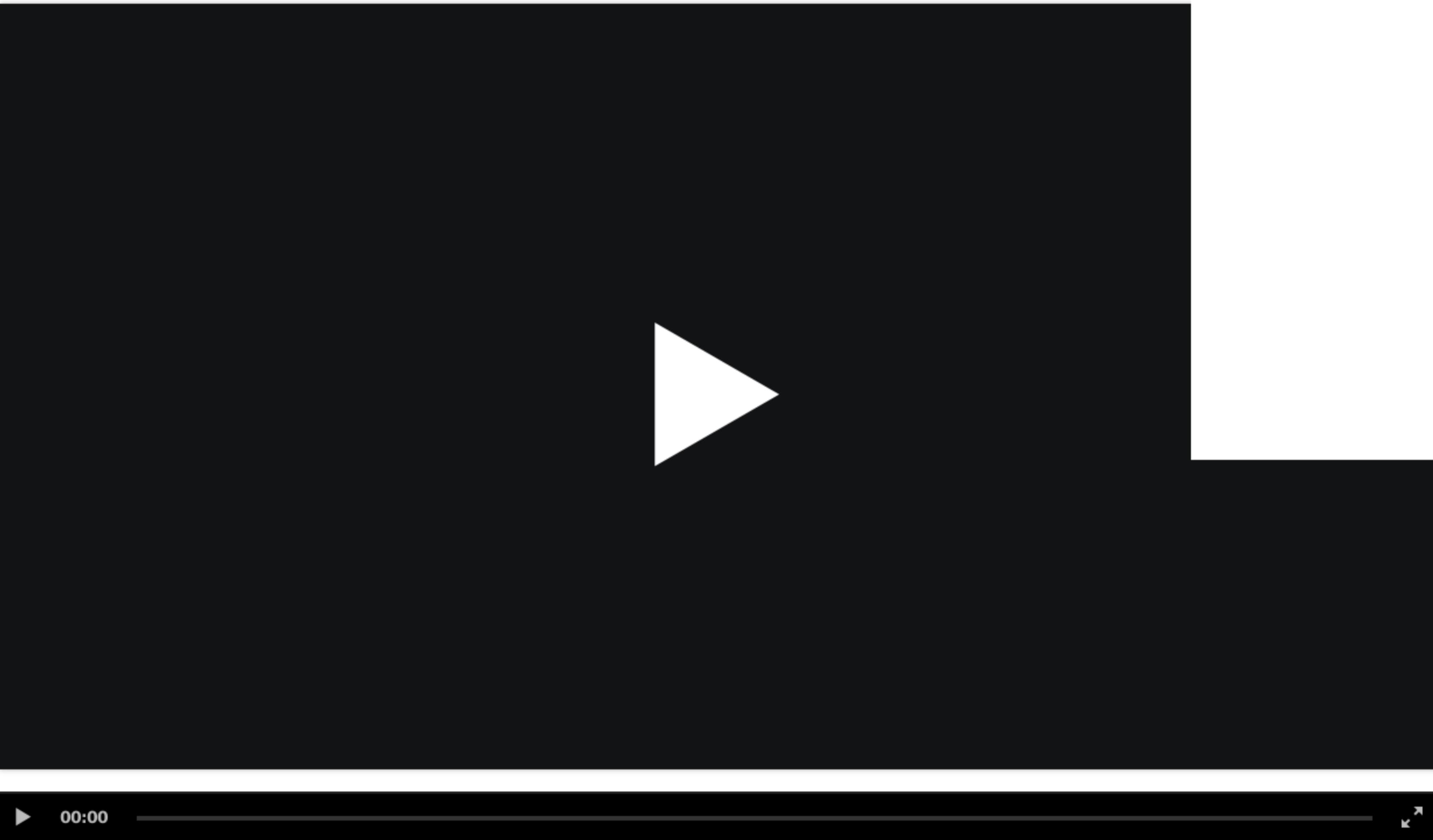
- Find a smooth migration path
- Prepare today, migrate when ready

DISCLAIMER

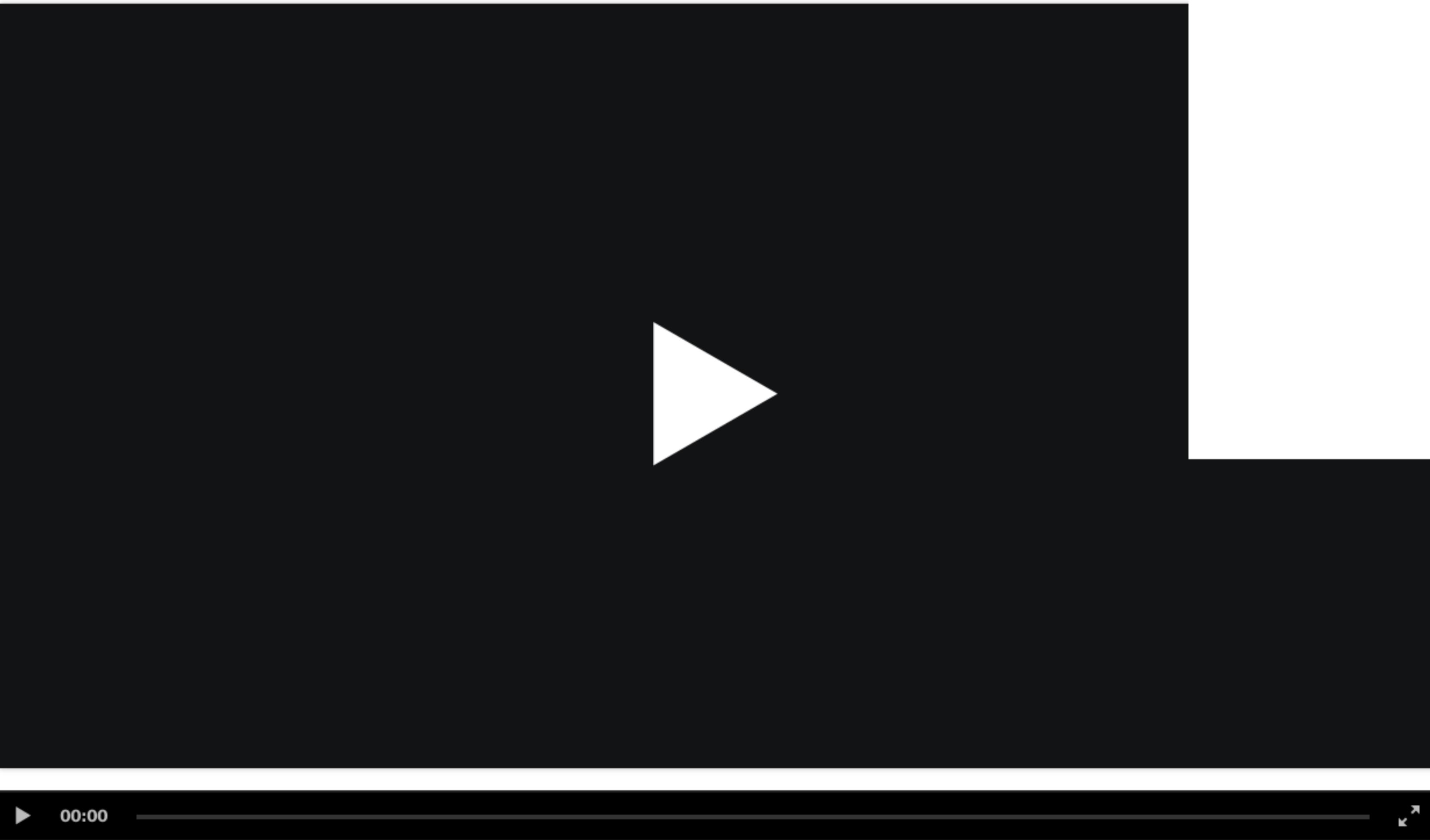
- Work in progress
- Backport from the software model
- Running Gradle on Jigsaw requires Gradle 3.0+
- Works with JDK 9 b119
- Breaks with JDK 9 b136
- Running those samples require master



A SIMPLE PROJECT



INTERNAL APIs



INTERNAL APIs MAINTENANCE NIGHTMARE

THE "JIGSAW" PLUGIN

- WIP
- creates additional configurations for each platform
- adds support for API
- APIs enforced on JDK < 9 too

DEMO



DECLARING INTERNAL APIs

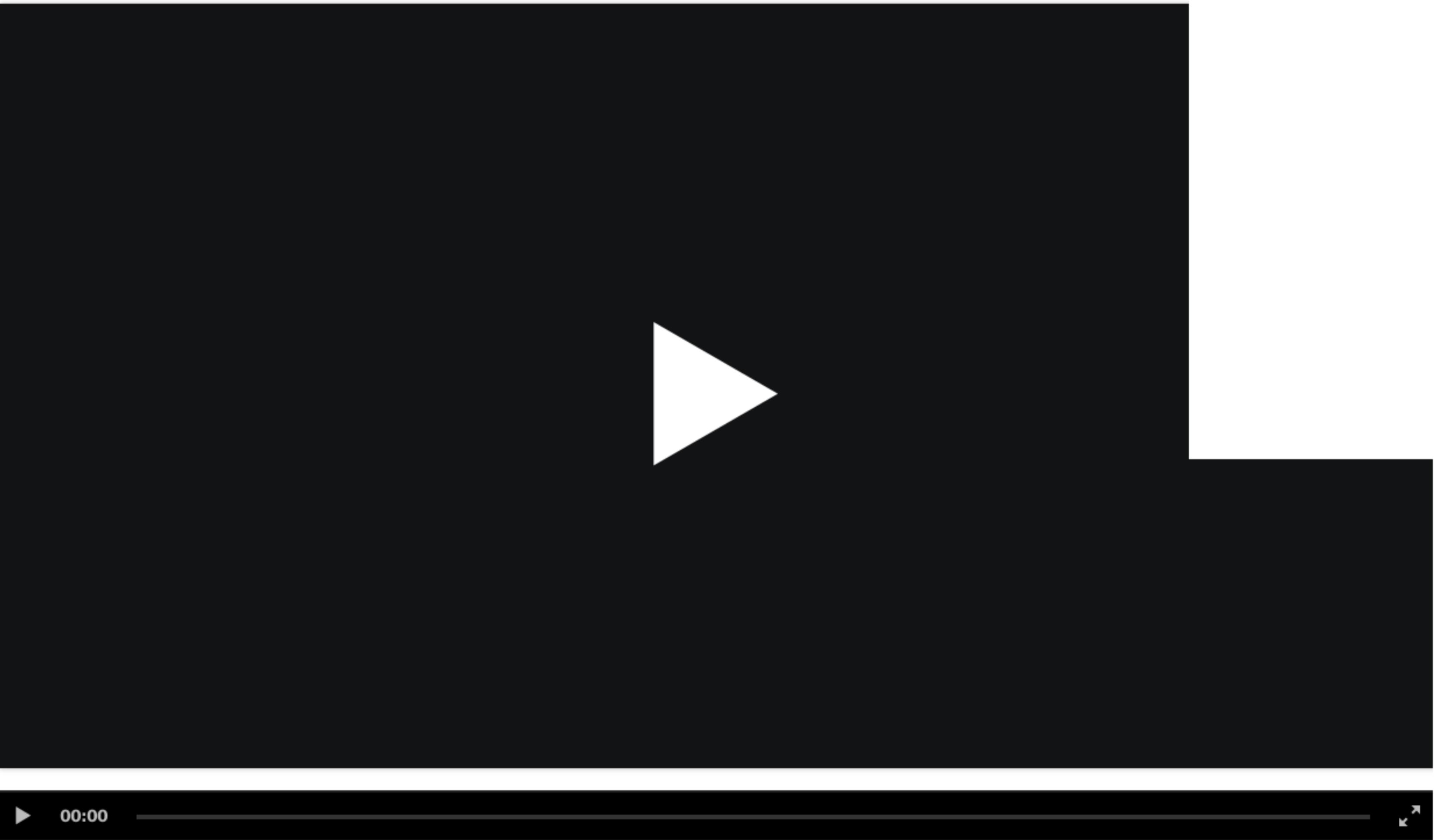
HOW TO DECLARE



COMPILATION FAILS!

<https://gradle.com/s/xwktle5a6xfgw>

COMPILE AVOIDANCE



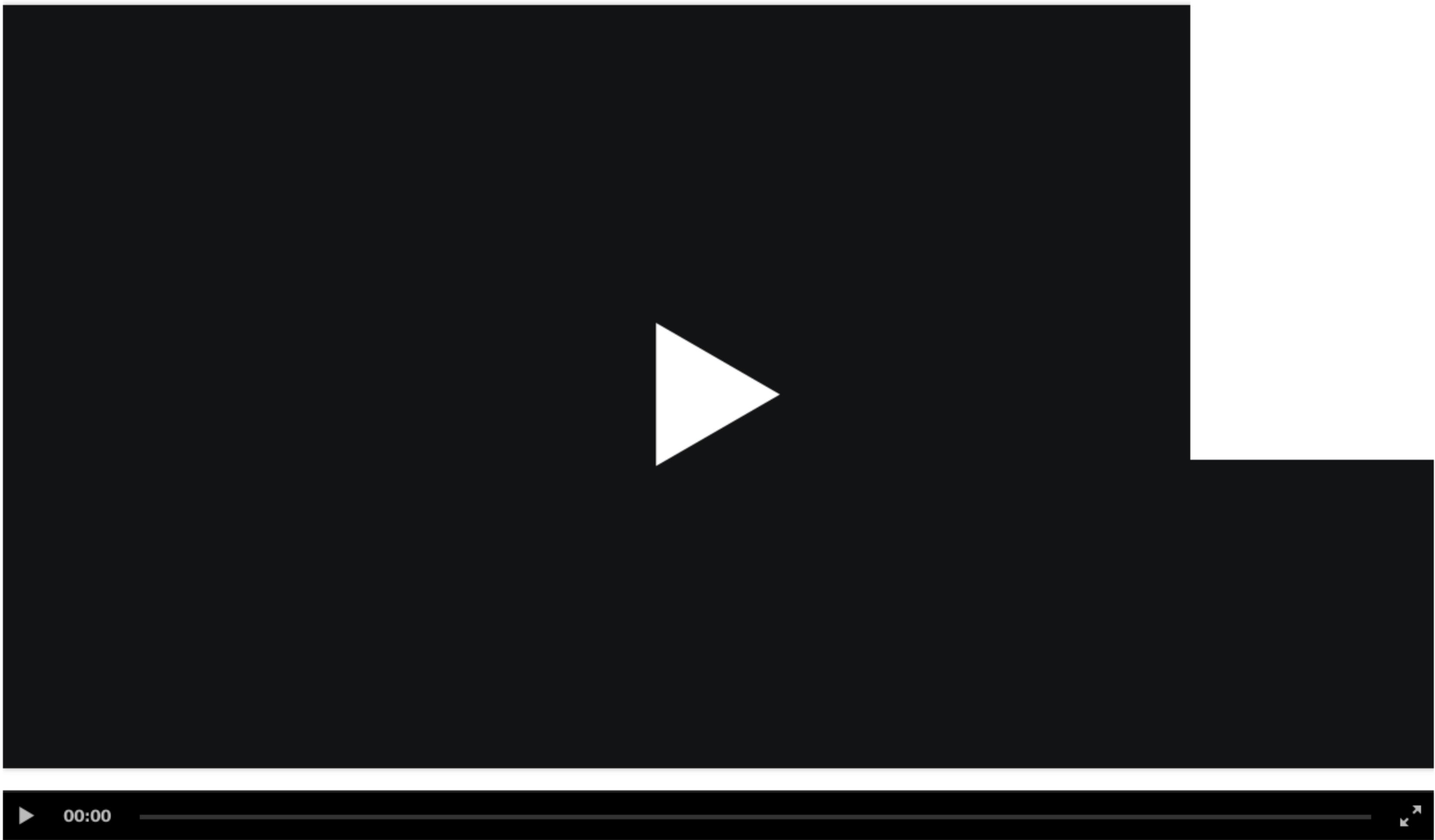
BUILD SCAN

<https://gradle.com/s/6tlwxijqmjxi4a>

COMPILE AVOIDANCE BENEFITS

- Doesn't recompile dependents if:
 - method body changes
 - parameter names change
 - method order changes
 - private method added/removed
- In short: if API stable, do nothing

DECLARING TARGET PLATFORMS



BUILD SCANS

- run only compiled the Java 8 variant of utils:
<https://gradle.com/s/mm2nlbuefyqje>
- compileJavaJava7 only compiled the Java 7 variant of utils: <https://gradle.com/s/e6d3mnbxs7zkk>

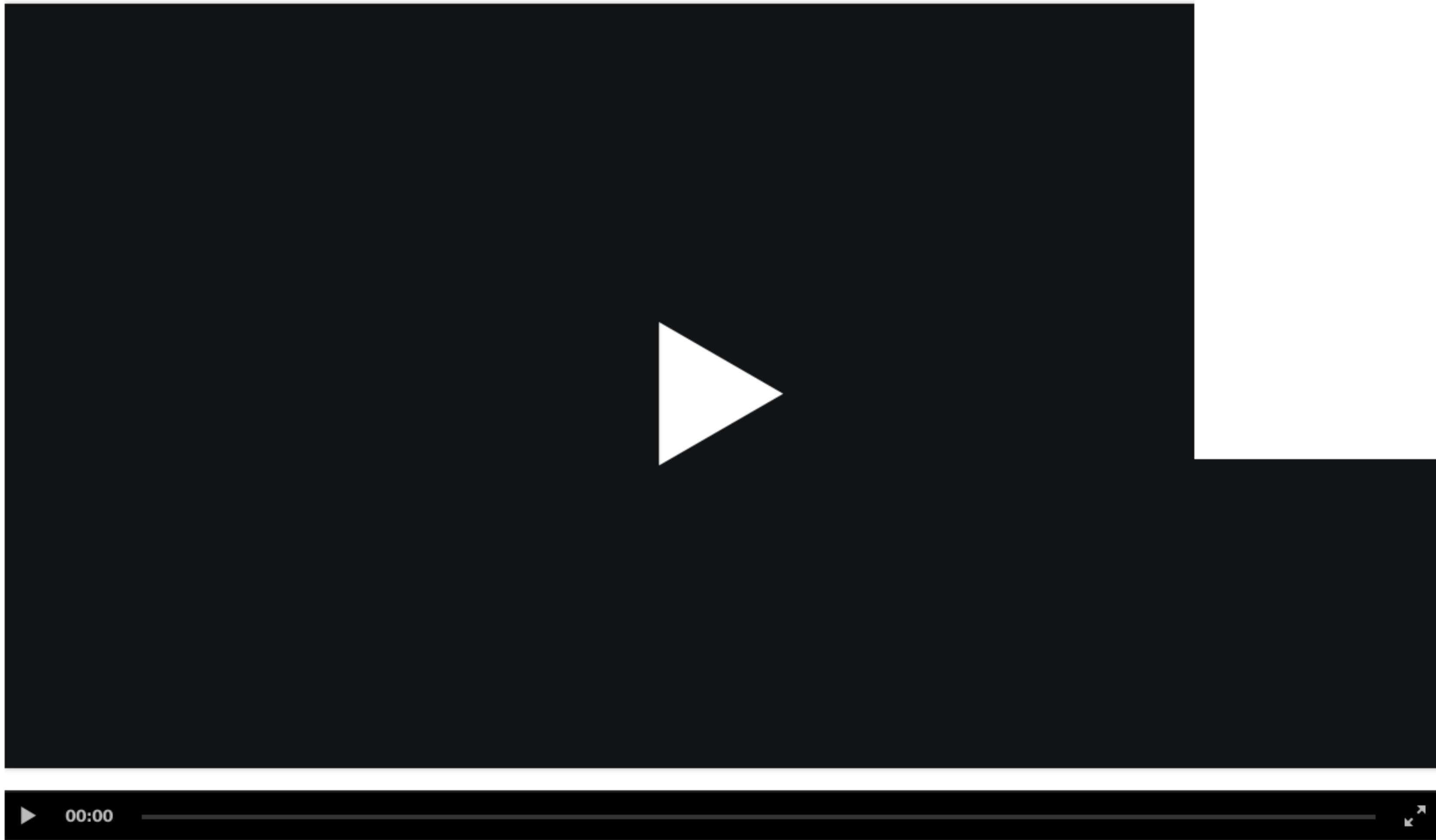
RUNNING ON MULTIPLE PLATFORMS

```
task run {}
platforms.targetPlatforms.each { platform ->
    def platformRun = task "${platform}Run"(type: JavaExec) {
        dependsOn "${platform}Jar"
        classpath = files(tasks."${platform}Jar".archivePath,
                           configurations."runtime${platform.capitalize()}")
        executable = "${platforms.jdkFor(platform)}/bin/java"
        main = 'com.acme.core.Main'
    }
    run.dependsOn(platformRun)
}
```

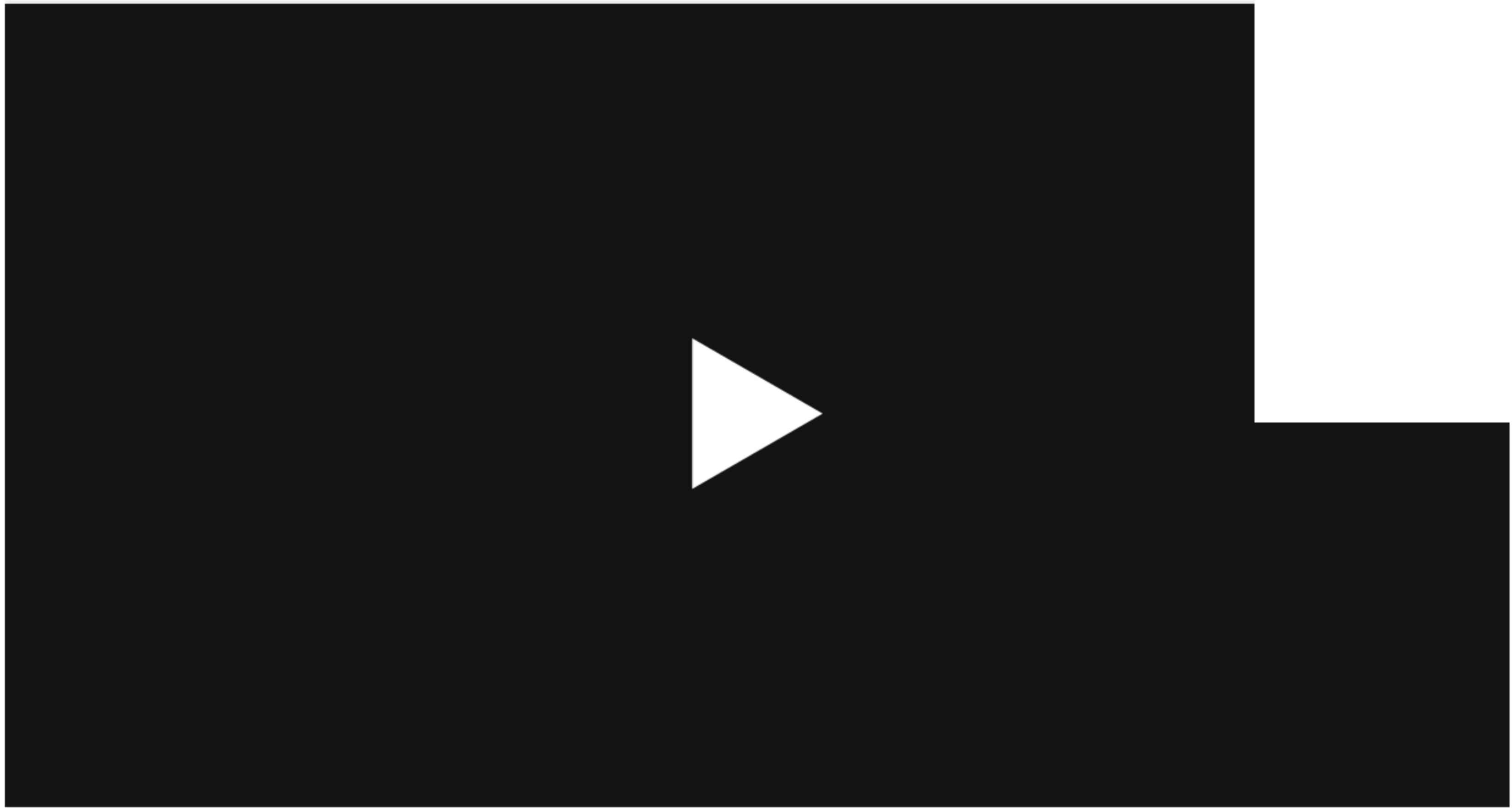
WHY DOES GRADLE HELP?

- Add targetPlatform 'java9'
- Generate module descriptor automatically?
- Profit!

TRYING IT OUT



AUTOMATICALLY GENERATING MODULE-INFO.JAVA?



MULTI-RELEASE JARS

- Good idea: provide different versions of classes depending on runtime
- Bad idea: in general, dependencies will be different so should be different artifacts
- But let's give it a try...

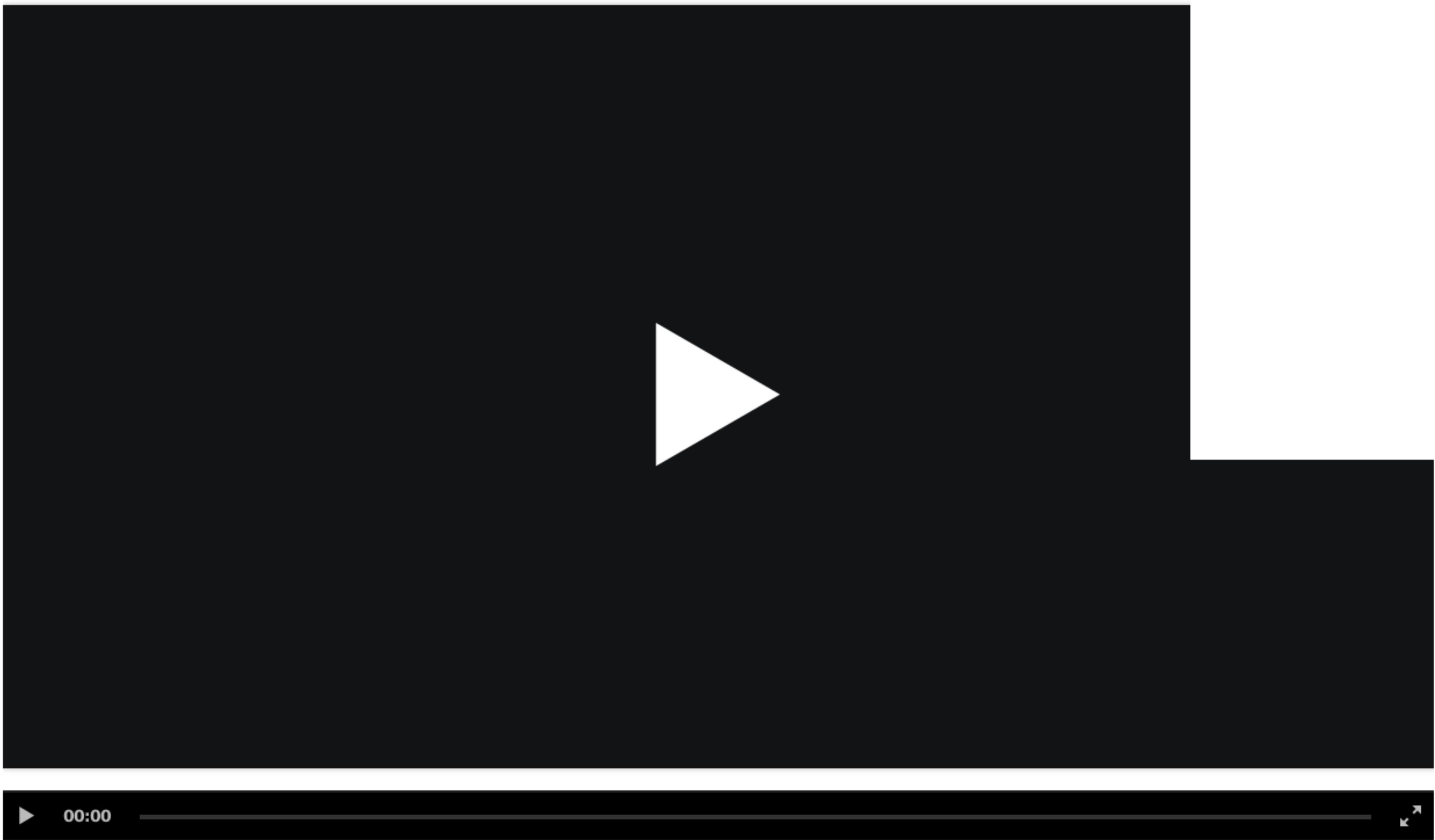
CREATING A MRJAR

```
task multireleaseJar(type:Jar) {  
    dependsOn compileJavaJava7, compileJavaJava9  
    baseName = "${project.name}-multi"  
    from compileJavaJava7.destinationDir  
    into('META-INF/versions/9') {  
        from compileJavaJava9.destinationDir  
    }  
    manifest.attributes('Multi-Release': 'true')  
}
```

FIXING THE RUN CONFIGURATIONS

```
platforms.targetPlatforms.each { platform ->
    def platformRun = task "${platform}Run"(type: JavaExec) {
        dependsOn multireleaseJar
        classpath = files(multireleaseJar.archivePath,
                           configurations."runtime${platform.capitalize()}")
        executable = "${platforms.jdkFor(platform)}/bin/java"
        main = 'com.acme.core.Main'
    }
    run.dependsOn(platformRun)
}
```

CREATE VERSION SPECIFIC CLASSES



WHAT'S NEXT?

- Making this a first class citizen in Gradle
- Automatic toolchain selection
- Toolchain provisioning
- Support for modulepath
- Support for jimage and jlink

BE INVOLVED

- Specs can be found on our GitHub repo



FREE WEBINARS

EXPLORE THE LATEST FEATURES IN GRADLE CLOUD SERVICES

September 28th, 2016 - 11am PDT / 2 pm EDT

By Mark Vieira (Principal Engineer at Gradle Inc)

RSVP: <https://goo.gl/yFsgLD>

Learn how to use Gradle Cloud Services to substantially improve the process of troubleshooting build/test failures, performance tuning of your builds, and analyzing your dependencies and plugins.

The latest release of Gradle Cloud Services will be available end of September. We would like to invite you to a 20 minutes webinar featuring what is new on Wednesday, September 28.

FREE LIVE TRAINING: INTRODUCTION TO GRADLE

Wed - Thurs October 26 - 27 8:30am - 12:30pm PDT

By Gary Hale (Principal Engineer at Gradle Inc)

RSVP: <https://goo.gl/L6mKg4>

Get hands-on training taught live by a Gradle core developer on the fundamentals features of Gradle in 8 hours.

We are very excited to announce a one-time offer to attend Gradle Inc's Introduction to Gradle Training for FREE! For the last few years we have been charging \$700-\$900 per seat for our live, virtual Introduction to Gradle training. Don't miss this chance to get a free seat to one our most popular training classes.

WE'RE HIRING!

<http://gradle.org/gradle-jobs/>



THANK YOU!

- Slides and code : <https://github.com/melix/javaone2016-juggling-jigsaw>
- Gradle documentation : <http://gradle.org/documentation/>
- State of the module system:
<http://openjdk.java.net/projects/jigsaw/spec/sotms>
- Follow me: [@CedricChampeau](https://twitter.com/CedricChampeau)