The new Android Build System!

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Android Build System

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Gradle +

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most advanced build system (a.k.a. best)

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Gradle + Android Gradle Plugin + IDE integration

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Gradle + Android Gradle Plugin + IDE integration

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Magnificient piece of engineering by the Android Team

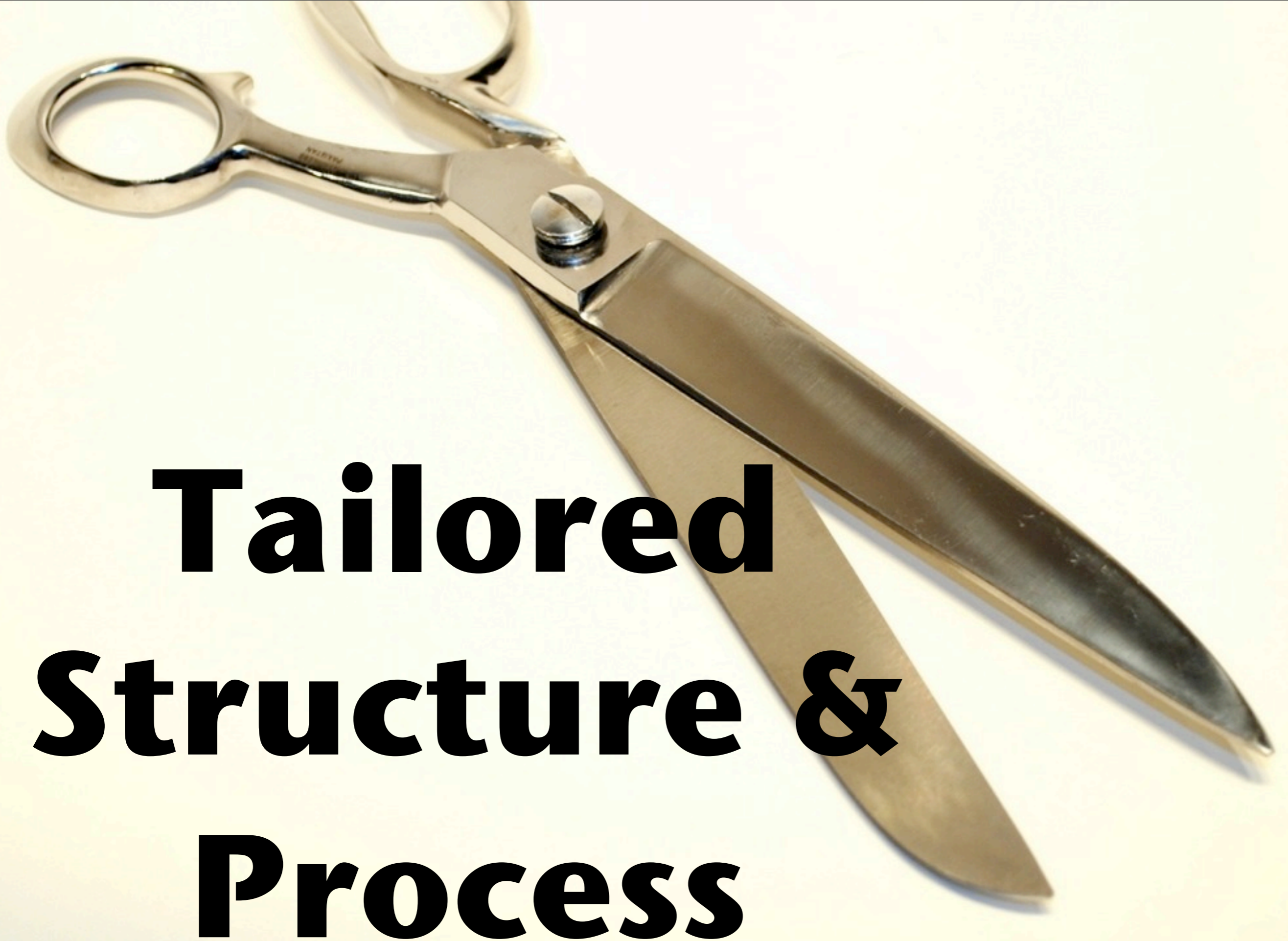# Show case for a state of the art build system

Why a new system?

Demo

- Basic Android

Tailored Structure & Process

- Product Flavors
- Build Types
- Build Variants
- SourceSets
- Library Projects
- Testing

Product Flavors

- A way to generate several versions of the same app
- Source code + resources overlay
    - Also custom dependencies
- Customize app parameters:
    - package name
    - min/targetSdkVersion
    - versionCode/Name
    - signing info

BuildType

- Controls how an app is built
- Source code + resources overlay
  - Also custom dependencies
- Customize app parameters:
  - debuggable flag
  - native debug compilation flag
  - package suffix
  - debug signing
  - proguard options
- 2 default types: debug & release
- orthogonal to product flavors

Build Variant

- Build is always a flavor + a type

	Debug	Release
Free	Free-Debug	Free-Release
Paid	Paid-Debug	Paid-Release

Rules to manage overlay
    build type > flavor > main

Demo

- Build Variants

Build Variant, cont'd

- Product Flavor groups
  - add extra dimensions of flavors

		Debug	Release
Free	x86	Free-x86-Debug	Free-x86-Release
	ARM	Free-Arm-Debug	Free-Arm-Release
Paid	x86	Paid-x86-Debug	Paid-x86-Release
	ARM	Paid-Arm-Debug	Paid-Arm-Release

Demo

- Flavor Groups

SourceSets

```
src/
   main/
       AndroidManifest.xml
       java/
       resources/
       assets/
       ...
   debug/
       ...
   release/
       ...
   paid/
       ...
   free/
       ...
```
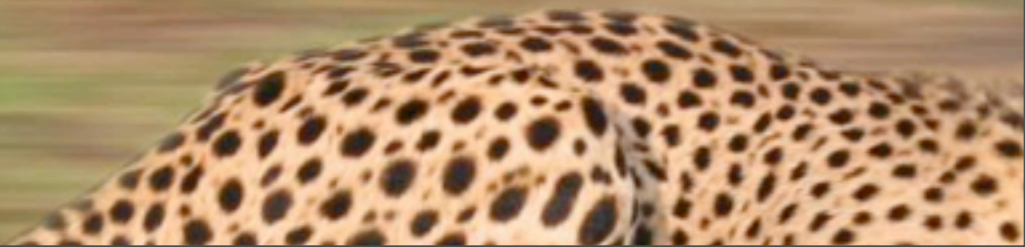
Library Projects

- Binary bundle
- Uploadable to Maven, Ivy, ...
  - Declare their own dependencies
- Contain:
  - Compiled Code
  - Resources
  - + more
    - custom proguard rules?
    - custom lint checks?
    - annotation processor?
    - IDE plugin?

Testing

- Embedded in the project
- test sourceset is default
- test<flavor> sourceset allows flavor specific tests
- APK for library project embed the library to test

Dynamic Build-By-Convention

Performance

Demo

- Incremental Build

```
incremental
  ▶ src/main/java
  ▶ src/test/java
  ▶ Groovy Libraries
  ▶ Gradle Dependencies (persisted)
  ▶ Gradle DSLD support
  ▶ JRE System Library (Java SE 6 (Mac
  ▶ Groovy DSL Support
  ▶ build
  ▶ src
    build.gradle
    build-1.gradle
    build-2.gradle
    build-3.gradle
    foo.iml
    foo.ipr
    foo.iws
▶ java-standard
▶ rules
```
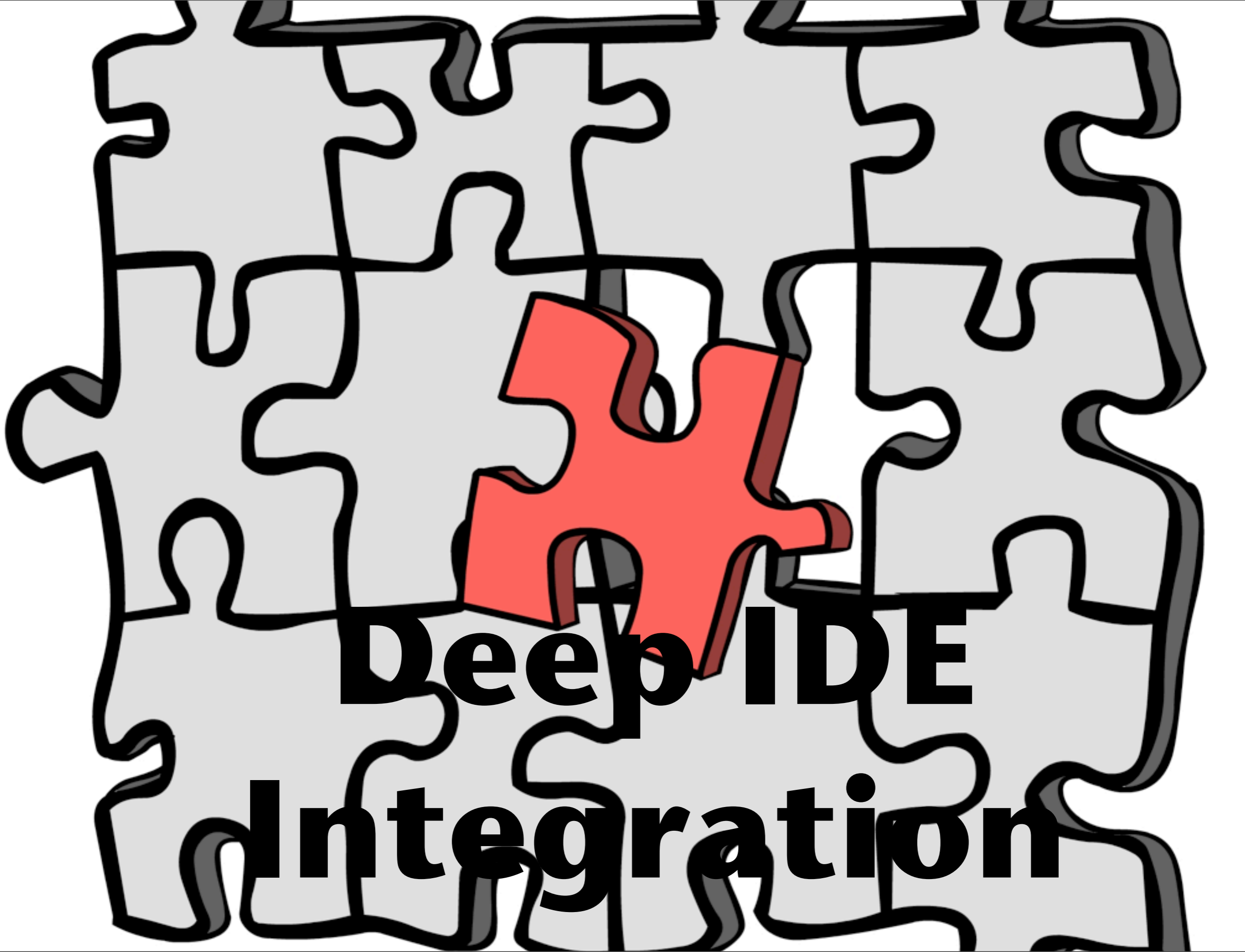
```groovy
apply plugin: 'java'

version = '1.0'

sourceCompatibility = '1.6'

repositories {
    mavenCentral()
}

dependencies {
    compile 'commons-collections:commons-collections:3.2.1'
    testCompile 'junit:junit:4.7'
}
```

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Gradle Daemon

Deep IDE Integration

Relax IDE, ain't need to be a build tool anymore.

Close to canonical build

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Close to canonical build

Optimized Performance

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Optimized Performance

Relax IDE, ain't need to be a build tool anymore.

More automation

Close to canonical build

Optimized Performance

Relax IDE, ain't need to be a build tool anymore.

More automation

More feedback

Tool Integration
=
First Class Gradle citizen

Provisioning

Tool Integration
=
First Class Gradle citizen

Back & Forwards
compatibility

Provisioning

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=
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First Class Gradle citizen

Tailored Models

Deep IDE customization

Declarative Elements

Deep IDE customization

Declarative Elements

Deep IDE customization

Programmatic Access

```
eclipse.classpath.file {
    whenMerged { classpath ->
        classpath.entries.findAll { entry ->
            entry.kind == 'lib' }*.exported = false
    }
}
```

Android Studio based on IntelliJ is available!

Version 0.4

- Proguard Support
- NDK Support
- Lint Support

Version 0.5

- Emma
- AVD Management

Version 0.6

- T.b.d.

Build Masters Delight

Demo

- Gradle Wrapper

```
▶ 🅖incremental
▼ 🅖java-standard
   ▶ 🗁 src/main/java
   ▶ 🗁 src/test/java
   ▶ ➠ Groovy DSL Support
   ▶ ➠ Groovy Libraries
   ▶ ➠ Gradle Dependencies (persisted)
   ▶ ➠ Gradle DSLD support
   ▶ ➠ JRE System Library [Java SE 6 (MacOS X D
   ▶ 🗁 build
   ▶ 🗁 gradle
   ▶ 🗁 src
     🅖 build.gradle
     🅖 build-1.gradle
     🅖 build-2.gradle
     🅖 build-3.gradle
     🅖 build-4.gradle
     🅖 build-5.gradle
     🅖 build-6.gradle
     📄 gradle-app.setting
     📄 Java.iws
     🗲 java-standard.iml
     🗲 Java-standard.ipr
     📄 Java-standard.iws
▼ 🅖rules
   ▼ 🗁 src/main/java
      ▼ ⊞ org.gradle
         ▶ 🅹 Person.java
   ▼ 🗁 src/test/java
      ▼ ⊞ org.gradle
         ▶ 🅹 PersonTest.java
   ▶ ➠ Groovy Libraries
   ▶ ➠ Gradle Dependencies
   ▶ ➠ Gradle DSLD support
```

build.gradle ⌗

```groovy
apply plugin: 'java'

version = '1.0'

repositories {
    mavenCentral()
}

dependencies {
    compile "commons-collections:commons-collections:3.2"
    testCompile "junit:junit:4.8.2"
}
```

Console ⌗

`<terminated> rules _springJars [Gradle Build] Gradle Build on rules`

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Friday, May 24, 13

Demo

- Init Scripts

Project

- ▶ init
- ▶ java-standard
- ▶ rules
- ▶ sts-eclipse
- ▶ test-with-failures
- ▶ test-with-outofmemory
- ▼ testing-with-gradle
  - ▶ .gradle
  - ▶ .settings
  - ▶ bin
  - ▶ build
  - ▶ gradle
  - ▶ src
  - .classpath
  - .gitignore
  - .project
  - build-1.gradle
  - build-2.gradle
  - build-3.gradle
  - build-4.gradle
  - build.gradle
  - README.md
- .gitignore
- live-demos.iml
- live-demos.ipr
- live-demos.iws
- readme.txt

build.gradle ×

Groovy SDK is not configured for module 'live-demos'   Configure Groovy SDK...

```groovy
apply plugin: 'java'
apply from: '../helper-plugins/test-generator.gradle'


version = '1.0'


repositories {
    mavenCentral()
}


dependencies {
    compile group: 'commons-collections', name: 'commons-collect
    testCompile group: 'junit', name: 'junit', version: '4.7'
}
```

Structure

Nothing to show in the Structure...

6: TODO   Version Control   9: Changes   Event Log

9:18   UTF-8   Git: master   128M of 791M

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Build Environment

Project specific gradle.properties

```
org.gradle.daemon=true
org.gradle.java.home=/Library/Java/JavaVirtualMachines/
1.7.0.jdk/Contents/Home
org.gradle.jvmargs=-Xmx512M
```

Gradle Summit 2013
June 13-14
Santa Clara, CA, USA

http://gradlesummit.com

http://tools.android.com/tech-docs/
new-build-system

http://www.gradle.org

http://m.gradleware.com
http://gradleware.com/subscribe

Register for 'The new Android Build System' webinar on April 16th
http://gradle.org/webinars

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Questions?

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