devfest

Ten Years into Android Gradle Plugin

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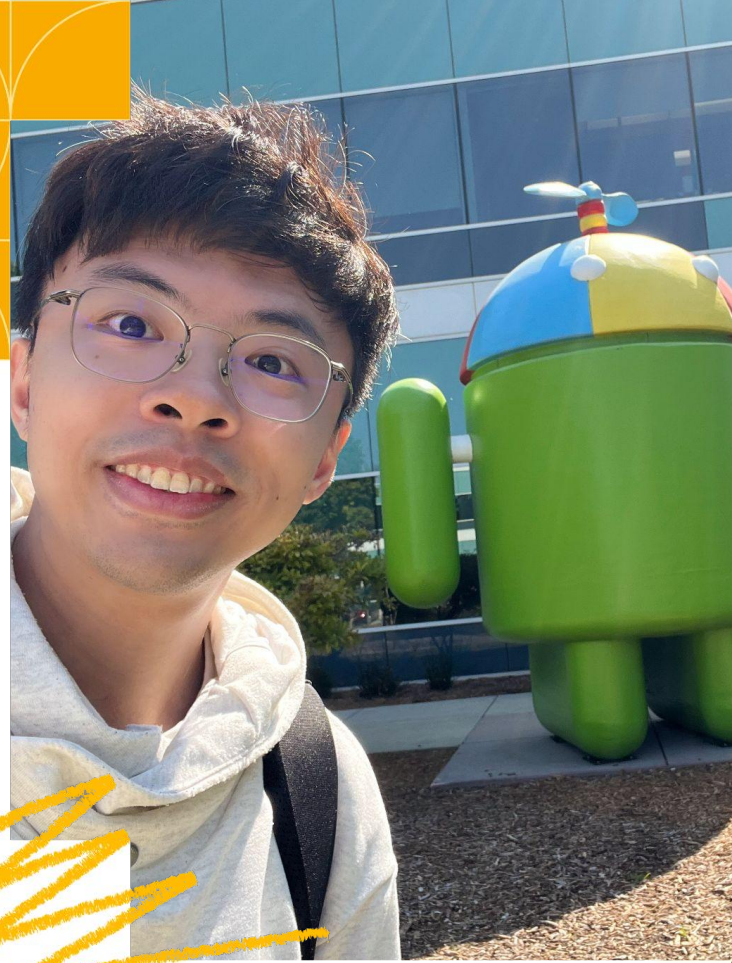

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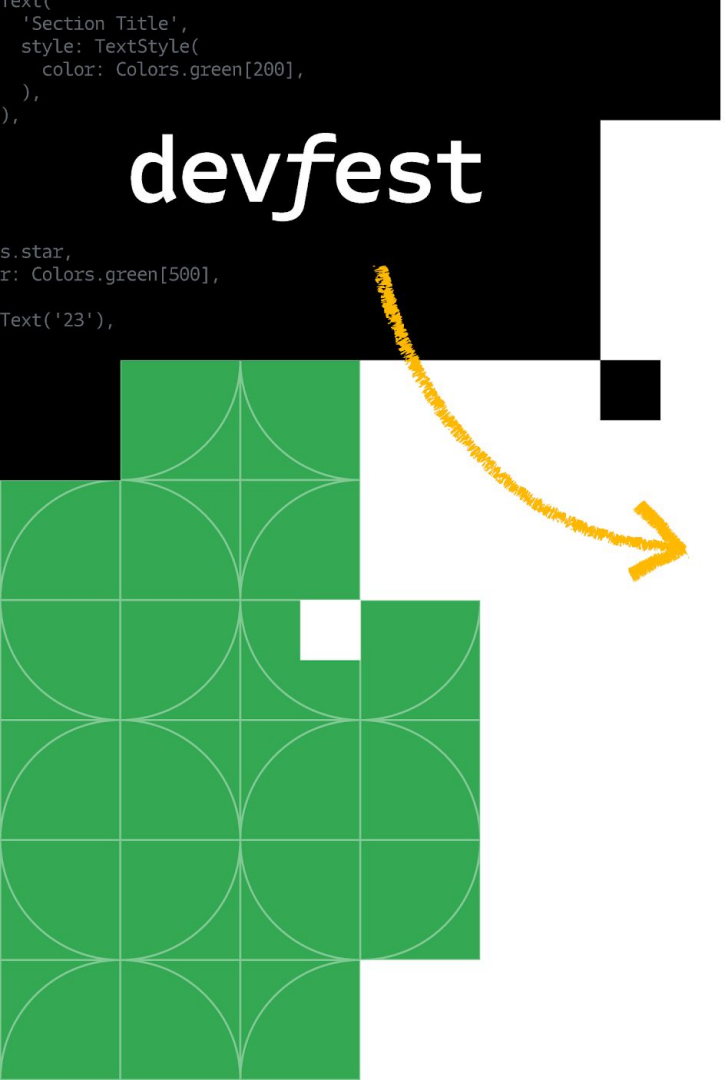

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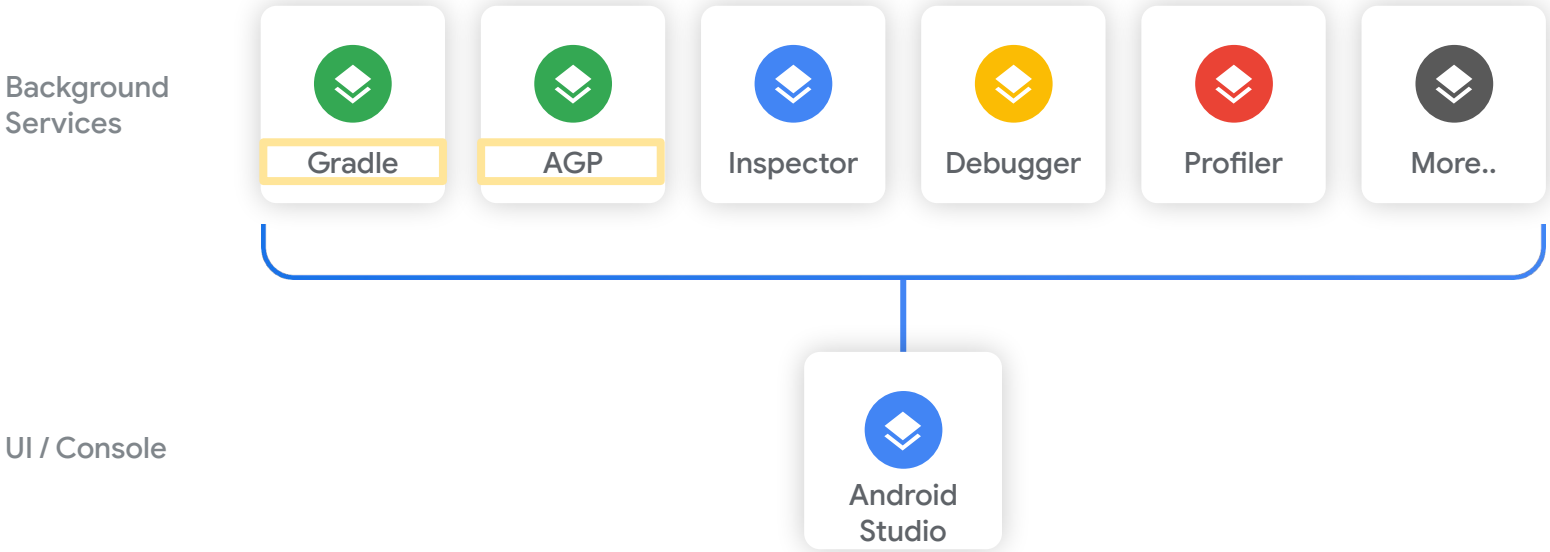
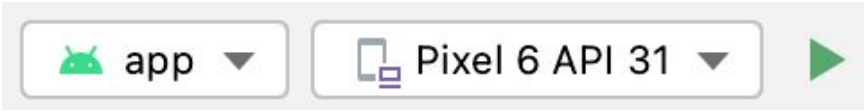
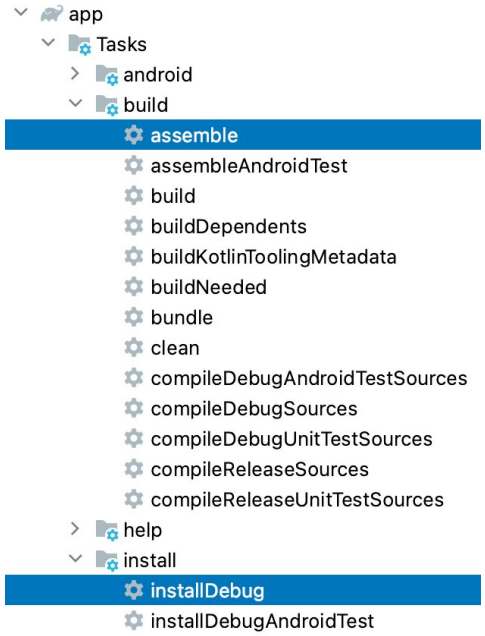
Android Gradle Plugin (AGP) and Android Studio (AS)

Android Studio - Features







android gradle plugin

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How about CI/CD?
What should we expect from AGP and Gradle?

Extended use cases of the Gradle and AGP

Business-as-usual

Triple-T/gradle-play-publisher

GPP is Android's unofficial release automation Gradle Plugin. It can do anything from building, uploading, and then promoting your App Bundle or APK to publishing app listings and other metadata.

Kotlin ★ 4.0k 342

Architecture

2BAB/Seal

A Gradle Plugin for resolving AndroidManifest.xml merge conflicts.

Kotlin ★ 228 23

Troubleshooting

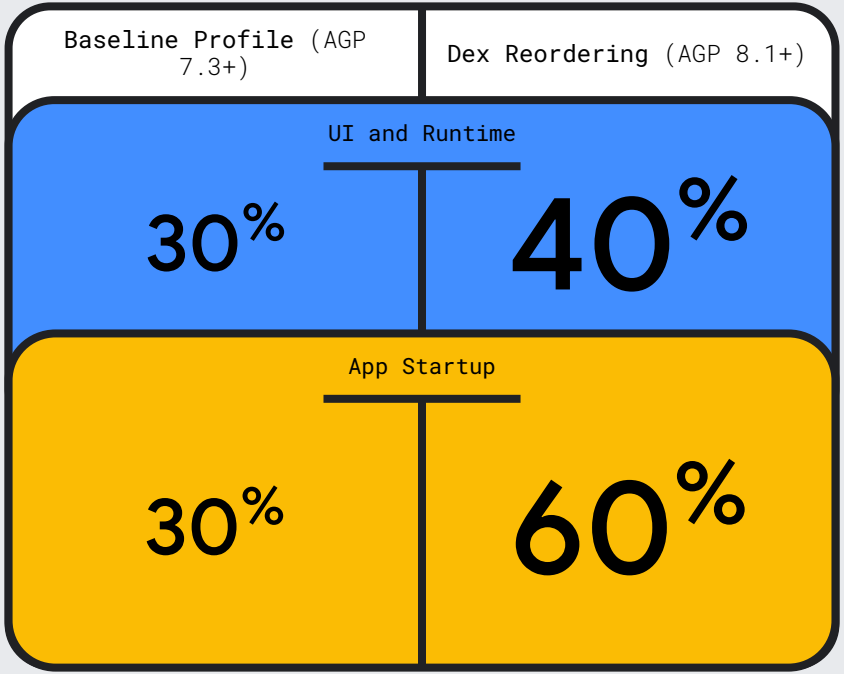
akaita/easylauncher-gradle-plugin

Add a different ribbon to each of your Android app variants using this gradle plugin. Of course, configure it as you will

Java ★ 1.0k 55

Baseline Profiles

Baseline profiles further improves **startup time** and **overall UI performance** with R8 and Dex reordering. Integrating them requires **latest AGP** with a bunch of advanced configurations.



goo.gle/android-perf-news-io23

* Google internal research data. Note that this does not affect network and non-code disk access

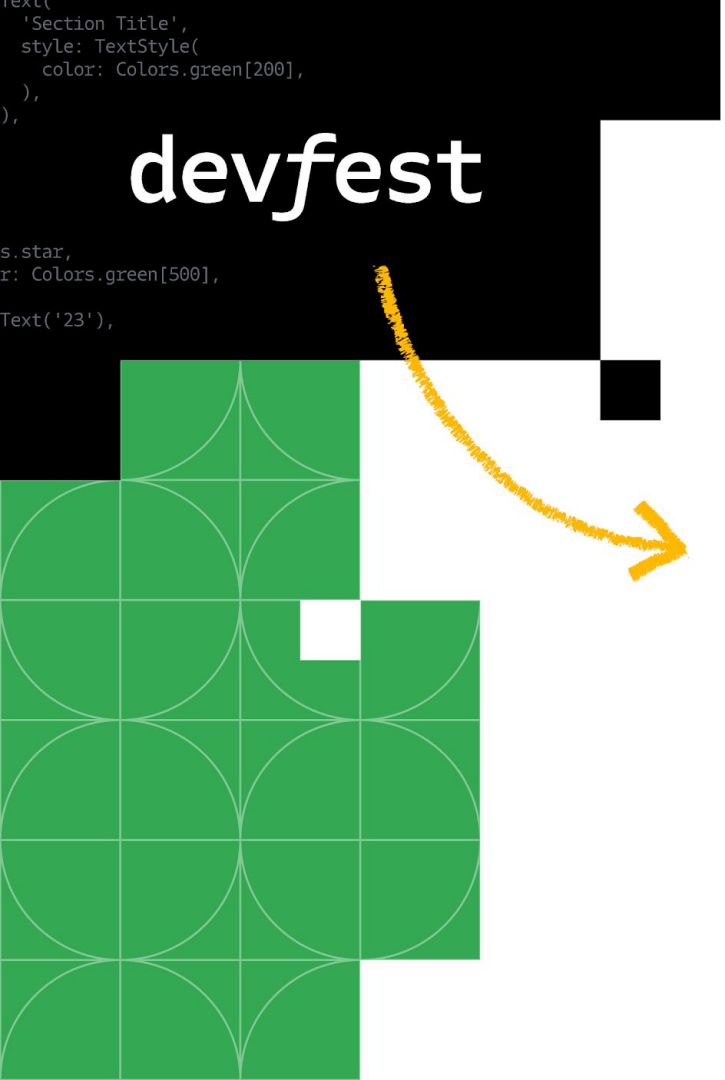
Productivity boosts

By adapting to the **Configuration Cache**, Square's Developer Experience (DX) team has reclaimed an estimated **$1.1 million** in annual productivity losses.

The code we don’t understand

1. Limited understanding of the underlying API in Groovy DSL, including source code navigation challenges.
2. Uncertainty about modifying AGP intermediates and finding intervention points.
3. Lack of clarity on where to place the logic or a new Gradle plugin.

Copy, paste, and it works like a charm!



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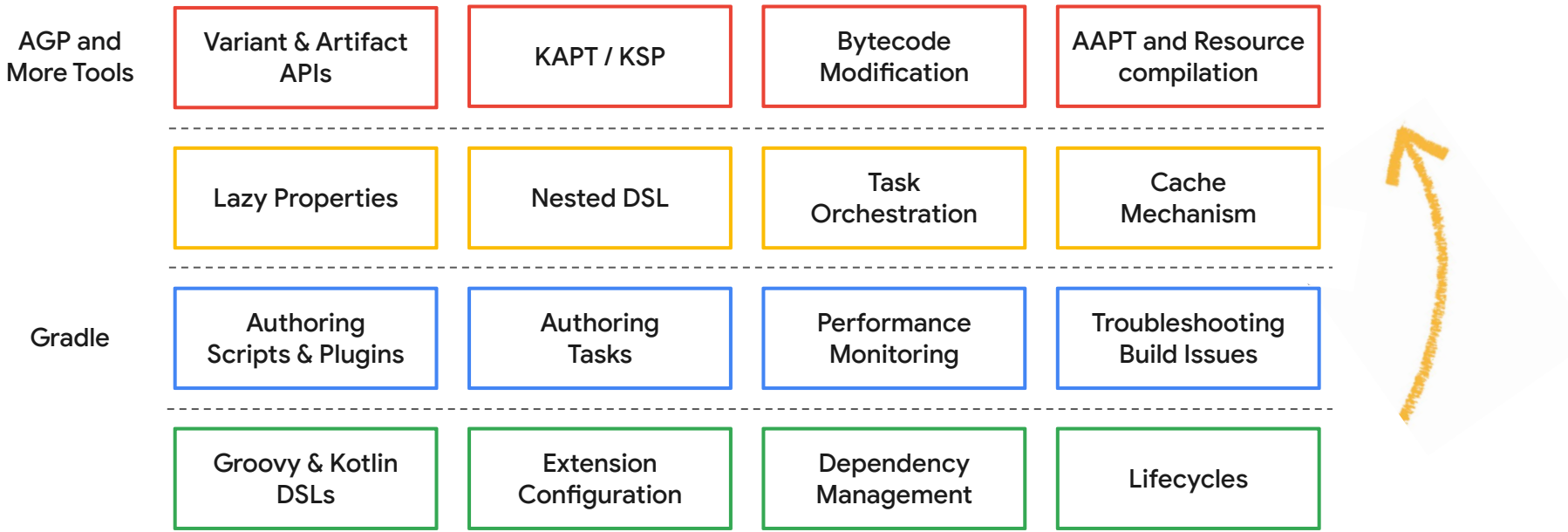
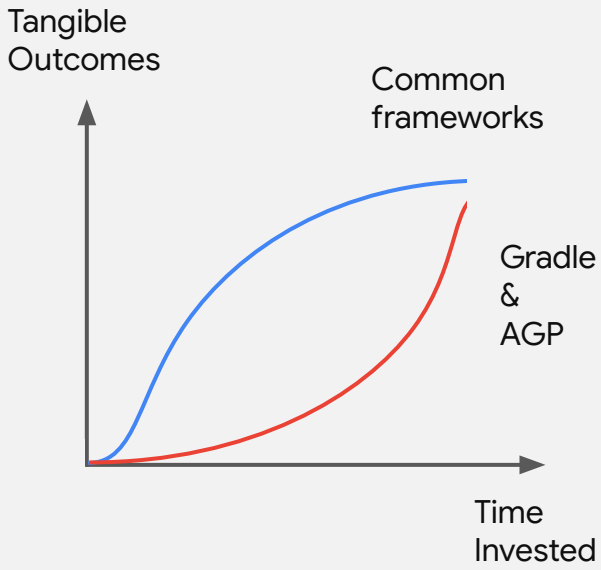
Obstacles on Gradle and AGP Learning Paths

Knowledge Graph of Gradle and AGP



Investment & Returns

Gradle and AGP typically require a greater investment of time to yield corresponding returns. They cover two stages: learning the configuration and customized plugin.



Groovy DSL and Raw API

- **Unexpected: Groovy DSL make it hard to raw APIs.**
- **Expected:** List out the comparison of DSL and raw API differences, especially for Gradle managed properties/classes.

```
android {
    compileSdkVersion 30
    buildToolsVersion "30.0.3"
```

Cannot find declaration to go to

①

```
buildTypes { this: NamedDomainObjectContainer<ApplicationBuildType>
    getByName( name: "debug") { this: ApplicationBuildType
        isMinifyEnabled = false
    }
}
```

②

Since 2010

Lack of Tutorial

- **Unexpected:** Simple **API / Java docs** are provided, however **tutorials** are not.
- **Expected:** More use cases and comparison in both Groovy and Kotlin languages to be friendly for beginners.

```
buildTypes { this: NamedDomainObjectContainer<ApplicationBuildType>
    getByName( name: "debug") { this: ApplicationBuildType
        isMinifyEnabled = false
    }
}
```

Package org.gradle.api

Interface NamedDomainObjectContainer<T>

Type Parameters:

`T` - The type of objects in this container.

All Superinterfaces:

`java.util.Collection<T>`, `Configurable<NamedDomainObjectContainer<T>>`

All Known Subinterfaces:

`ArtifactTypeContainer`, `AuthenticationContainer`, `BuildTypeContainer`, `C`
`MutableVersionCatalogContainer`, `NativeToolChainRegistry`, `PlatformCont`

Since 2010

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```
buildTypes { this: NamedDomainObjectContainer<ApplicationBuildType>
    getByName( name: "debug") { this: ApplicationBuildType
        isMinifyEnabled = false
    }
}
```

Example 8. Managing a collection of objects

DownloadExtension.java

```
public interface DownloadExtension {
    NamedDomainObjectContainer<Resource> getResources();
}

public interface Resource {
    // Type must have a read-only 'name' property
    String getName();

    Property<URI> getUri();

    Property<String> getUserName();
}
```

Since 2019

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Lack of Extensibility

- **Unexpected**: Challenging to engage with the **intermediary products** of AGP.
- **Expected**: Revealing as many APIs as possible to meet the requirements of developers.

Build Tools for *FrontEnd

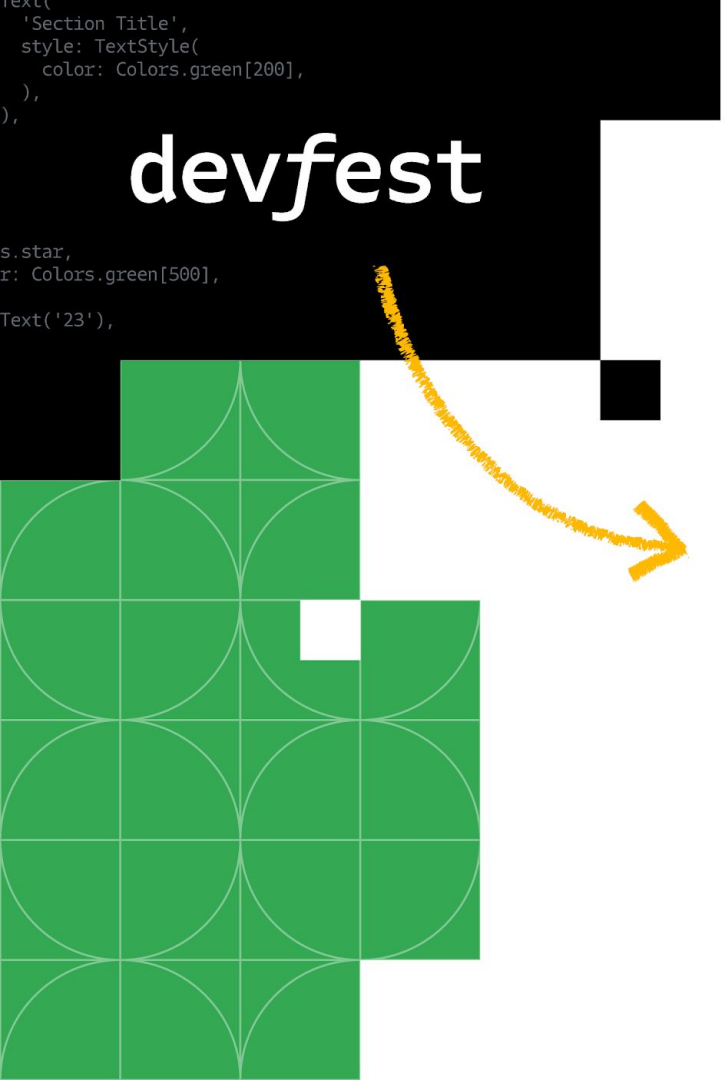
* 'Frontend' refers to all client interfaces that interact directly with end users.

Lack of Extensibility

- **Unexpected**: Using a **Task** as an API to **connect two plugins** is not ideal, as it requires **awareness** of the other's **implementation**.
- **Expected**: The public API should be separate from its internal implementation.

```
processManifestTask.doLast( actionName: "postUpdateAction") { this: Task
    val task = this as ProcessApplicationManifest
    val targetValue = task.inputs.properties["replace_value"].toString()
    val modifiedManifest = task.mergedManifest.get().asFile.readText()
        .replace( oldValue: "allowBackup=\"true\"", targetValue)
    task.mergedManifest.get().asFile.writeText(modifiedManifest)
}
```

TaskA.doLast{...}



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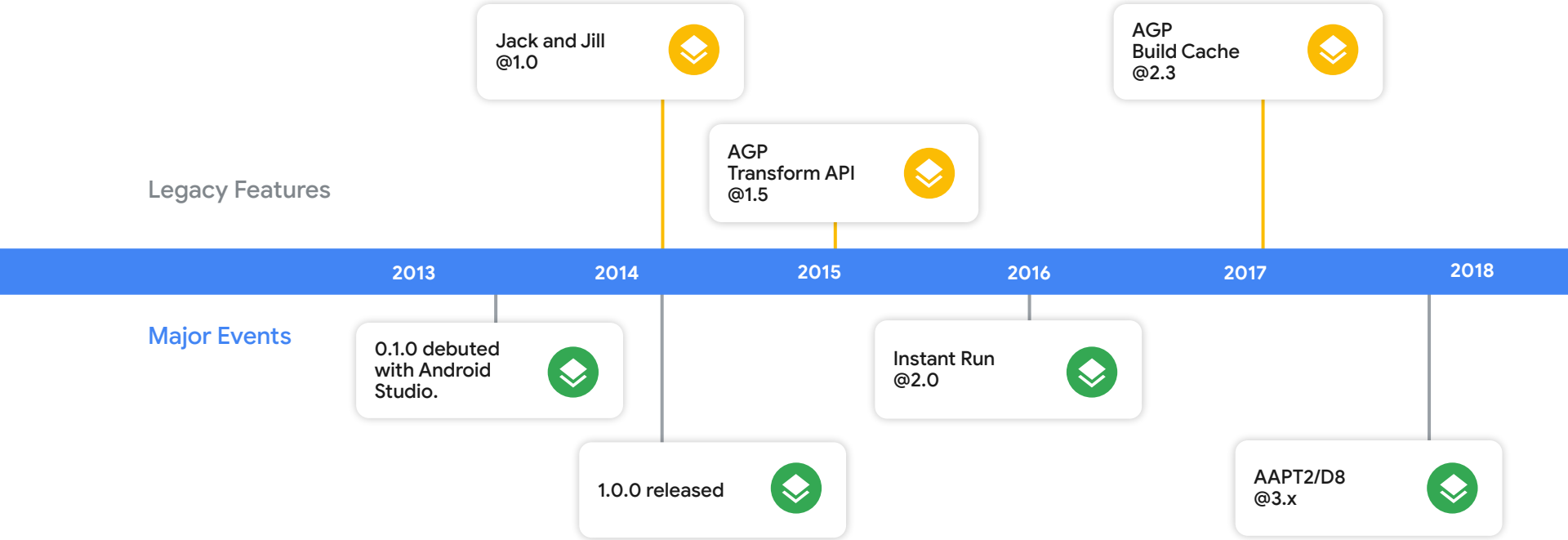
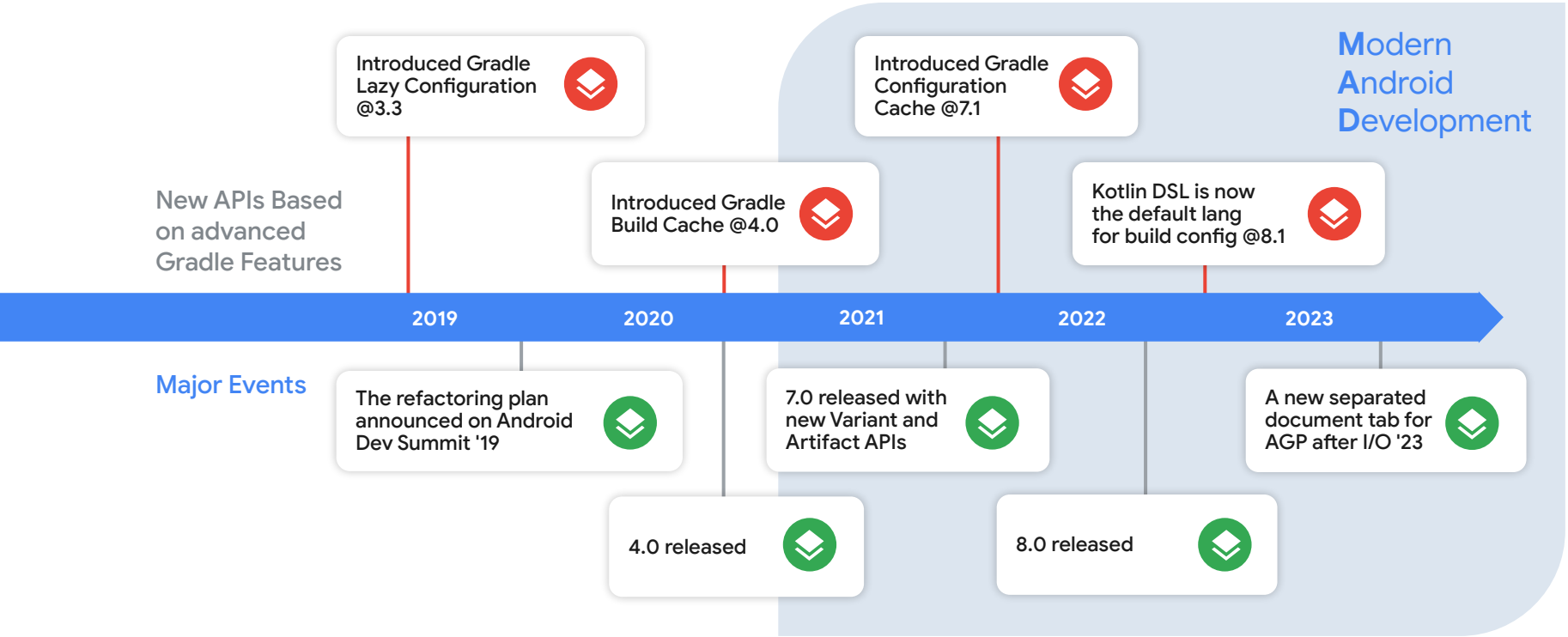
Evolution of Android Gradle Plugin

Milestones of AGP 2013-2018

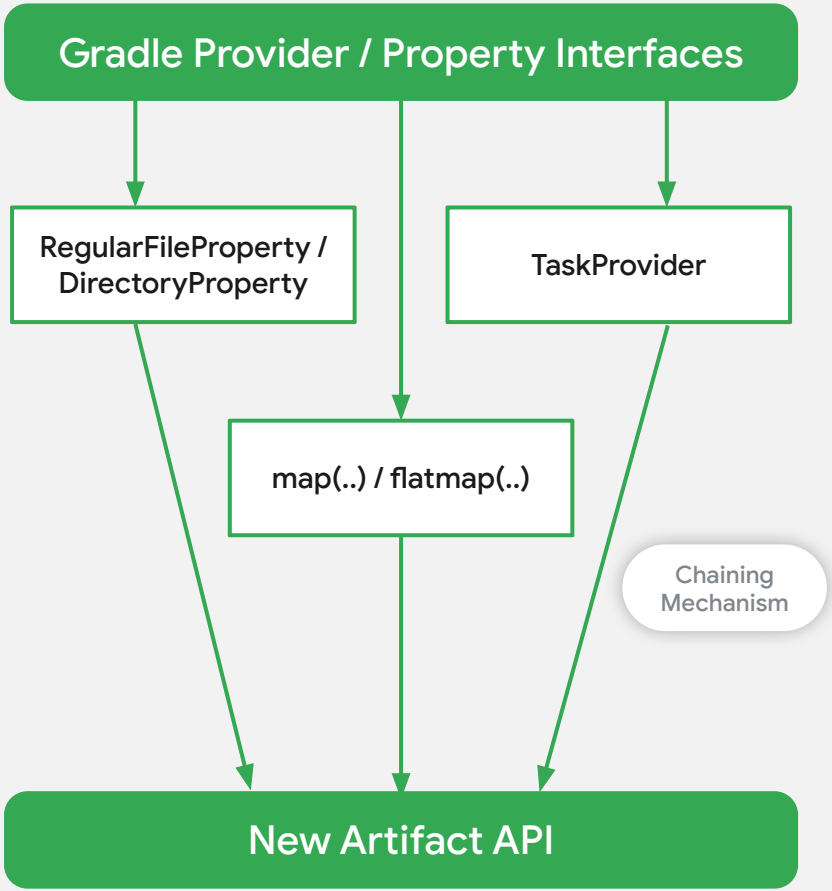


Milestones of AGP 2019-2023



Lazy Configuration

It's the cornerstone of the modern AGP architecture, offering **separation of focus for read and write operations** and **decoupling direct dependencies between Tasks**.



New Artifact APIs

A series of standardized public APIs for third-party developers, eliminating the dependency on Task API and allowing for sustainable expansion.

```
val postUpdateTask = project.tasks.register<ManifestAfterMergeTask>(
    name: "postUpdate${variantCapitalizedName}Manifest")
variant.artifacts Artifacts
    .use(postUpdateTask) TaskBasedOperation<ManifestAfterMergeTask>
    .wiredWithFiles(
        ManifestAfterMergeTask::mergedManifest,
        ManifestAfterMergeTask::updatedManifest
    ) InAndOutFileOperationRequest
    .toTransform(SingleArtifact.MERGED_MANIFEST)
```

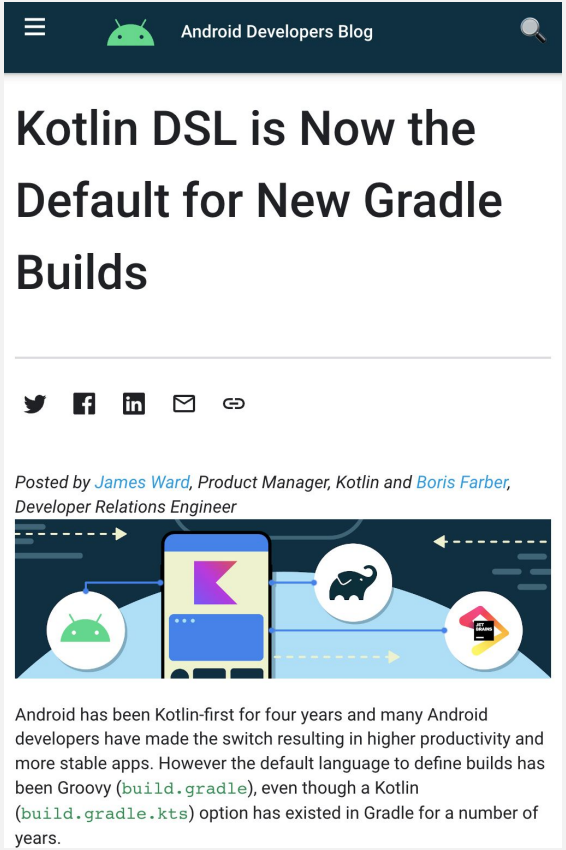
toCreate(..) / toAppendTo(..) / toTransform(..)

* Submit your use case for the proposed Artifact to the issue tracker using the following paths.

Android Public Tracker > App Development > Android Studio >

Kotlin is Default

1. For scripts, it offers enhanced **auto-completion** and **source navigation** in Android Studio, along with **accurate and understandable syntax**.
2. For binary plugins, it offers better compatibility assurances.



Kotlin is Default

1. For scripts, it offers enhanced **auto-completion** and **source navigation** in Android Studio, along with **accurate and understandable syntax**.
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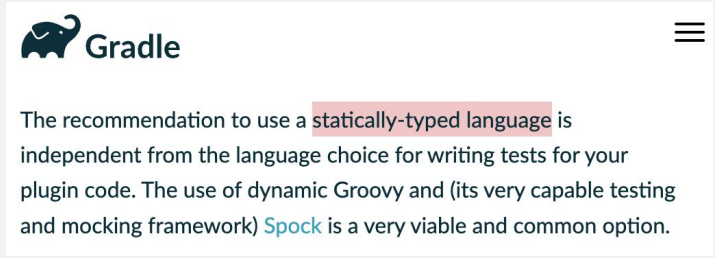
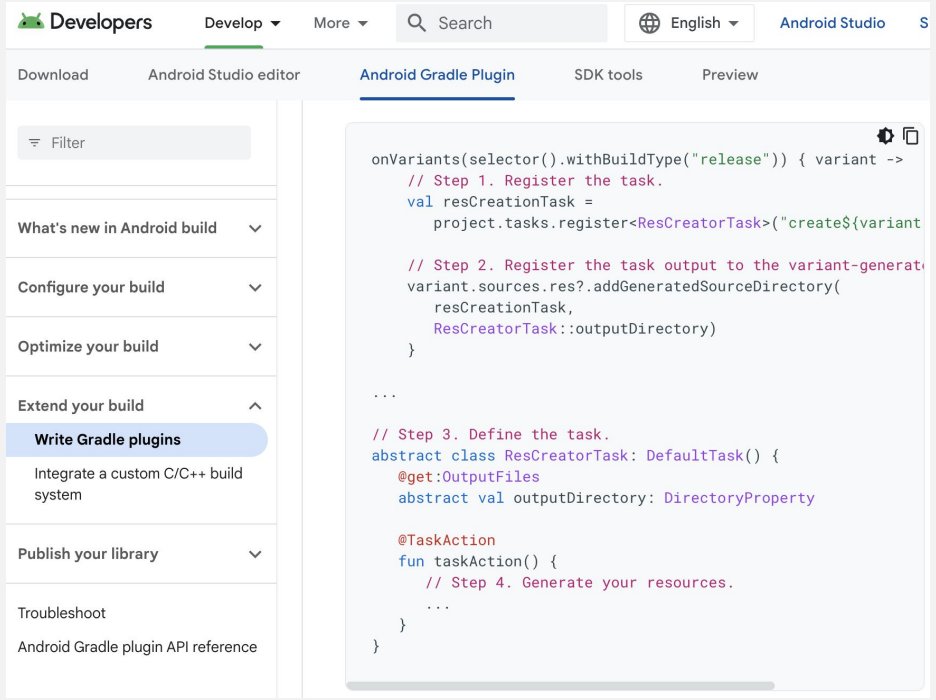
```
buildTypes {
①  getByName("debug") {
     isMinifyEnabled = false
   }
   getByName("release") {
     isMinifyEnabled = false
   }
②  create("staging") {
     isMinifyEnabled = false
   }
//   register("staging") {
//     isMinifyEnabled = false
//   }
}
```

Kotlin is Default

1. For scripts, it offers enhanced auto-completion and source navigation in Android Studio, along with accurate and understandable syntax.
2. For binary plugins, it offers **better compatibility assurances**.





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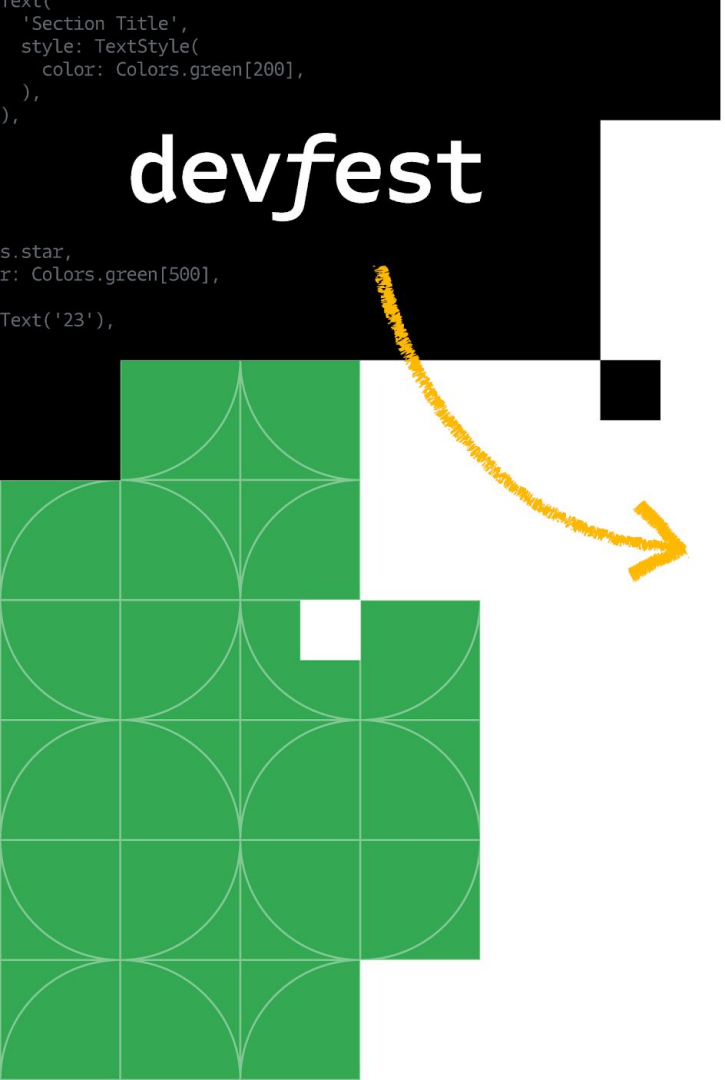

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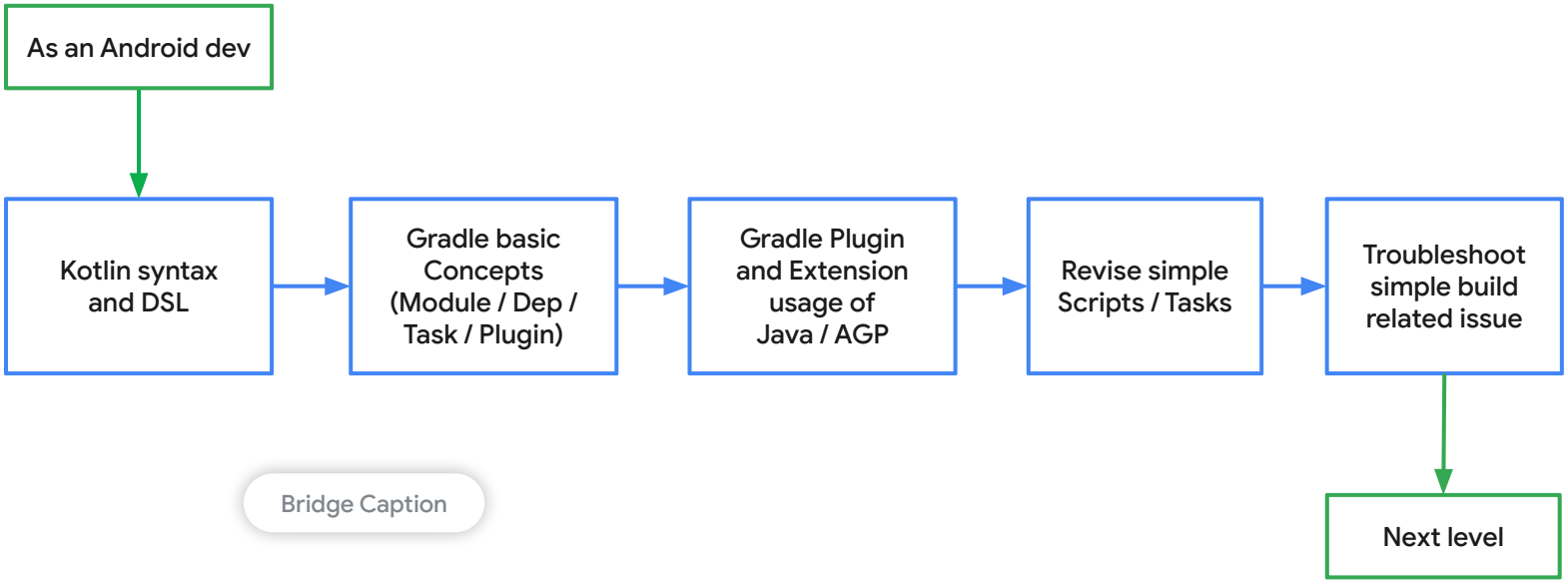
Learning Strategies

Unlock better understanding of Gradle with **Kotlin**

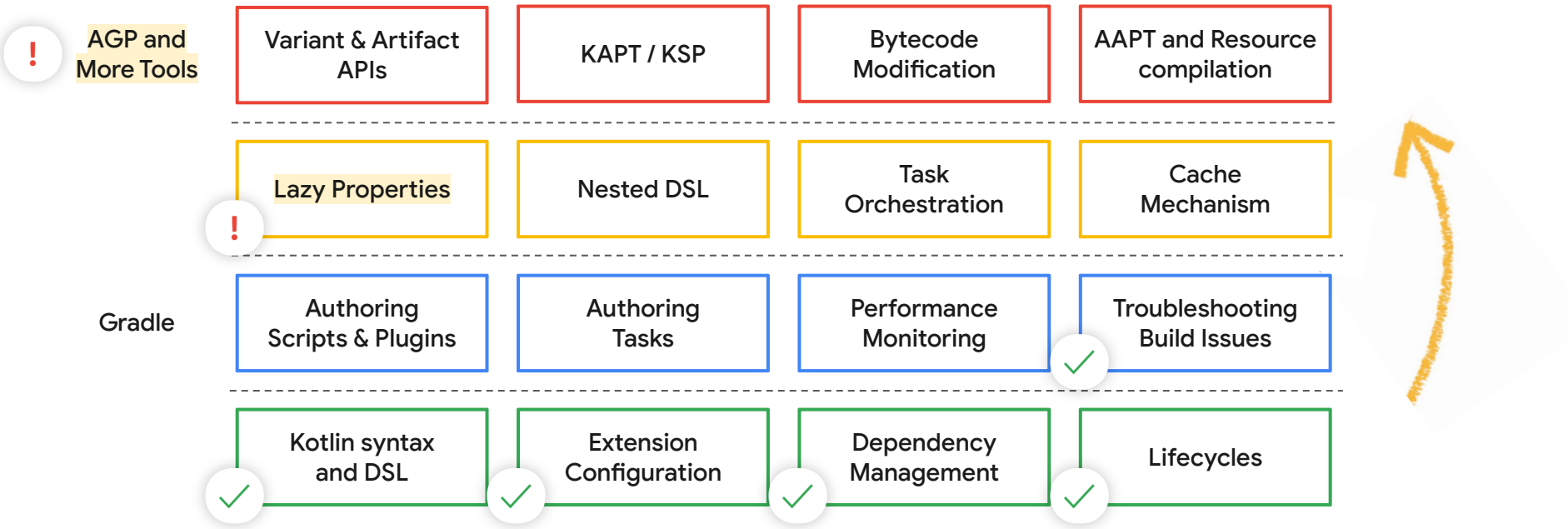
For Beginners (Kotlin-oriented)



Bridge Caption

Remember we are building plugins **over AGP**

For Intermediate Level (Kotlin-oriented)



And More

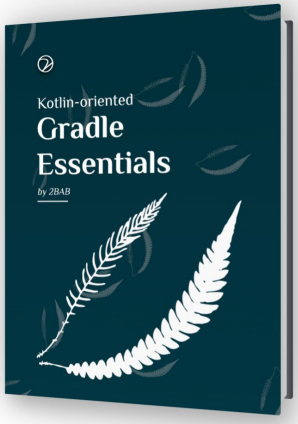
1. *From Gradle properties to AGP APIs (Android Dev Summit '19)*

2. *Gradle and AGP Build APIs - MAD Skills*

3. *android/gradle-recipes*

4. *Document -> Android Gradle Plugin -> Write Gradle plugins*

5. *Issue Tracker -> Android Public Tracker -> Android Development -> Android Studio*
(Submit here and mention it's AGP related, then it will be assigned to a sub-track for AGP)



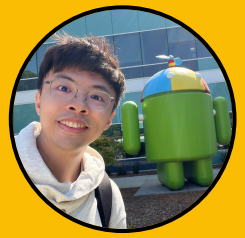
(Scan me to view all resources)

There's no time like the present

(Scan me to view all resources)

xx2bab@gmail.com
github.com/2bab
2bab.com

Thank You



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