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REVIEW OF BUILD TOOL GRADLE FOR JAVA

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Анотація:
У даній доповіді розглянуто систему автоматичного збирання проектів Gradle для мови Java та особливості її використання.
Ключові слова: програмування, тестування, програмне забезпечення, автоматична збірка проектів, Java, Gradle.

Abstract:
This article examines a build automation tool Gradle for Java and peculiarity of its use.
Keywords: programming, testing, software engineering, build automation tool, Java, Gradle.

Introduction

In the world of Java the most popular tools for build automation are Gradle, Maven, Apache Ant, Jenkins, and others. The most widely used tools from the list are Gradle and Maven.

Gradle is a build automation tool for multi-language software development. It controls the development process in the tasks of compilation and packaging to testing, deployment, and publishing. Supported languages include Java (Kotlin, Groovy, Scala), C/C++, and JavaScript [1].

Gradle Environment

Gradle is an open-source tool that helps us to create software with mechanization. This tool is widely used for the creation of different kinds of software due to its high performance. It works on Java and a Groovy-based Domain-Specific Language (DSL) for developing the project structure. Gradle supports the creation of mobile and web applications with testing and deploying on various platforms. With its functionality, it is preferred as an official tool for developing Android applications.

That's a very important point that Android development mostly uses Gradle as the main tool, that is the main field of using this build automation tool.

Main benefits of Gradle: [2]
- This tool is highly customizable as it supports a variety of IDE's.
- It avoids compilation.
- Performance is better than in Maven and other build tools.
- More flexible than other tools. You even can write some code for configuring Gradle in a script.
- A lot of different plugins and platforms which support Gradle
- Usability in different version control systems such as GitHub
- Open-source tool, so it is free.
- Not only for JVM languages, can be used with C/C++ and other languages

Some disadvantages:
- More difficult and complex than other build automation tool
- Has own script language, not like XML using in Maven. So it can be difficult to understand it without learning documentation
- Maven has more examples and more dependencies than Gradle

Here you can see that we use plugins for Spring, setting project directory and Java version. In dependencies, we set what libraries or frameworks we need. Moreover, we can set dependencies for our test configuration and set what we use for tests and how these tests must run. You can set different settings for different tests, like configuration for unit tests and integration tests [3].

Example of Gradle script for Java with Spring framework:

```
plugins {
        id 'org.springframework.boot' version '2.4.4'
        id 'io.spring.dependency-management' version '1.0.11.RELEASE'
        id 'java'
}

group = 'com.example'
version = '0.0.1-SNAPSHOT'
sourceCompatibility = '1.8'

repositories {
        mavenCentral()
}

dependencies {
        implementation 'org.springframework.boot:spring-boot-starter-web'
        testImplementation 'org.springframework.boot:spring-boot-starter-test'
}

test {
        useJUnitPlatform()
}
```

Some IDEs such as Intellij IDEA can integrate Gradle automatically [4] and this tool can be configured in settings (Figure 1).
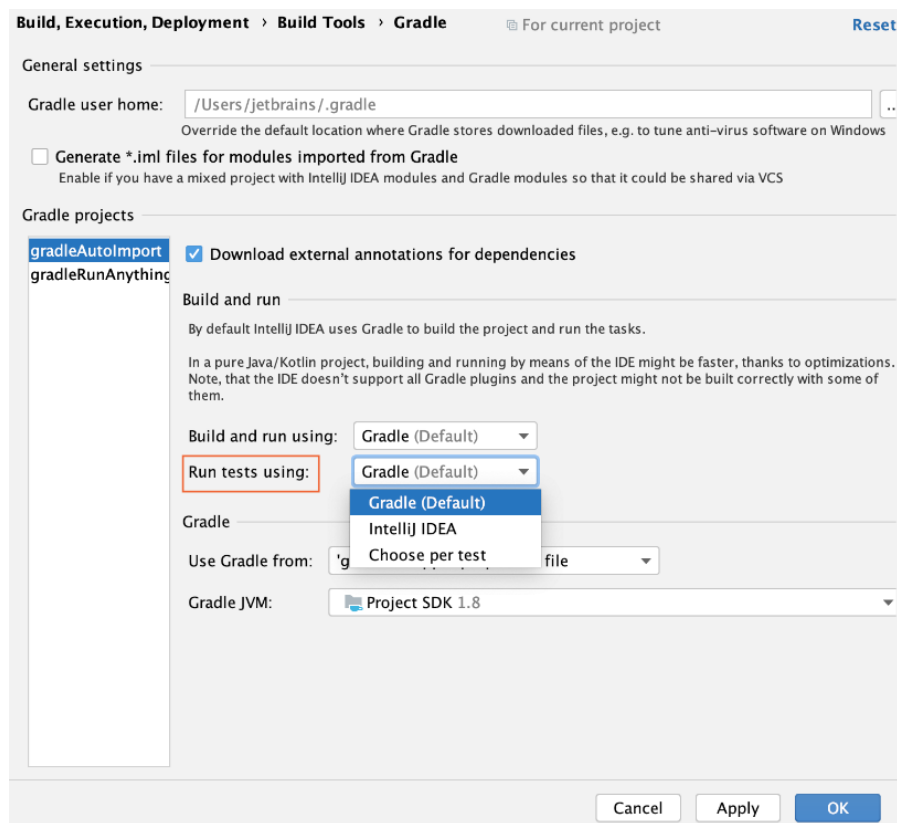

Figure 1 – Gradle settings in Intellij IDEA

A project can be separated into different modules and each module can build separately with Gradle. Also, that is possible to run tests separately (Figure 2).
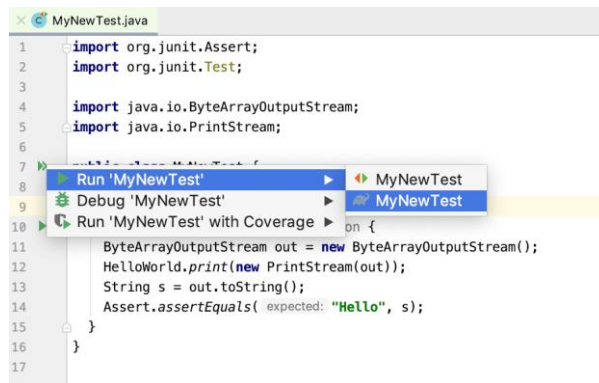
Figure 2 – Run tests with Gradle

Also, Gradle has its own interface with different features in Intellij IDEA (Figure 3).
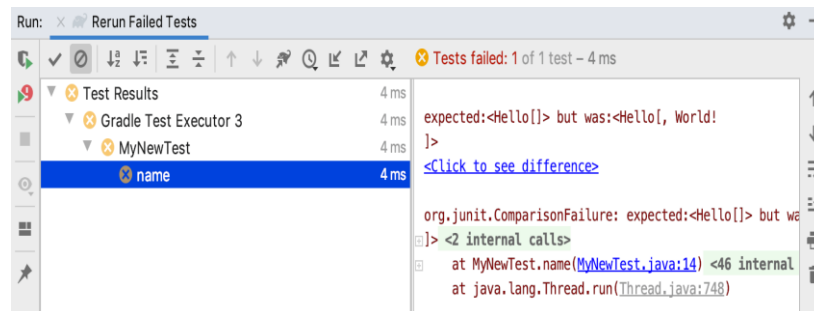

Figure 3 – Gradle interface in Intellij IDEA

Conclusion

In this article, we review the build automation tool Gradle. Described it. Summed up pros and cons. Also review some code examples, configuration, and use. In conclusion, we can say that Gradle is very powerful and complex tool for development and widely used, especially in the Android environment.

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