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Gradle Introduction

2021 April

Agenda

- Gradle Introduction
- Gradle Core Concept
- How to Define Tasks
- Build a Java Application
- Declare Dependences in Gradle Application
- Use Gradle Plugins

Gradle Introduction

What’s Gradle

- **Open-source build automation tool**
- **Written in Java, but the build scripts use Groovy, Kotlin DSL**
- **Support Declare Dependences**
- **Support custom by plugin, a wide plugin community**
- **What about Ant and Maven?**
  - Too many XML
  - Too many configuration

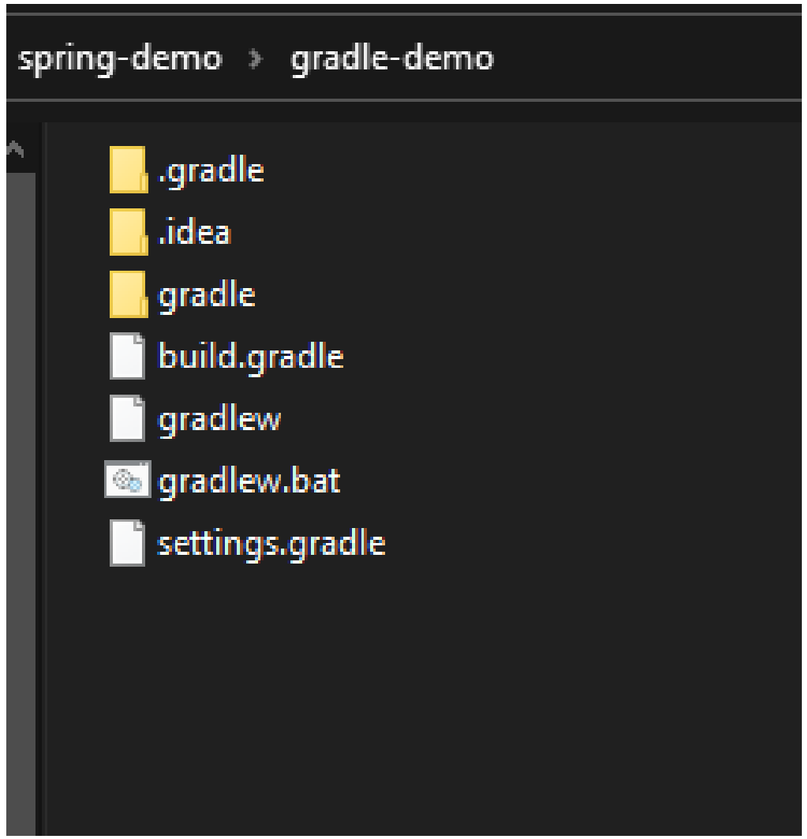
Why do we need Gradle?

- **Automate Build Process**
- **Manage Project Dependencies**
- **Implement CI/CD pipeline**

Gradle Core Concept

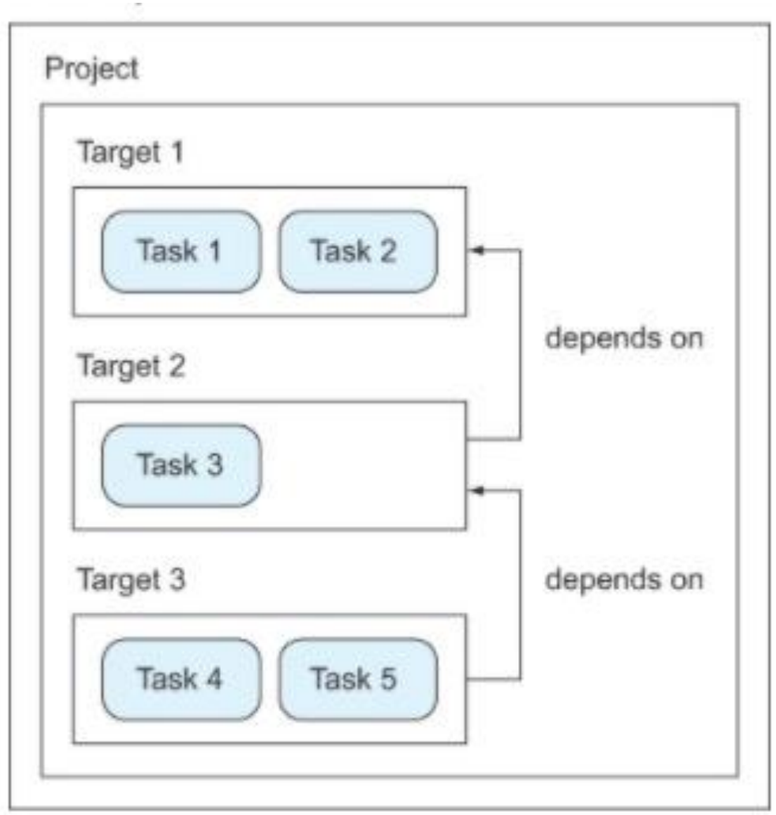
The Directory of a Gradle Project

- build.gradle: build script
- gradlew/gradlew.bat: runnable shell script
- settings.gradle: configuration file
- gradle: wrapper



Project

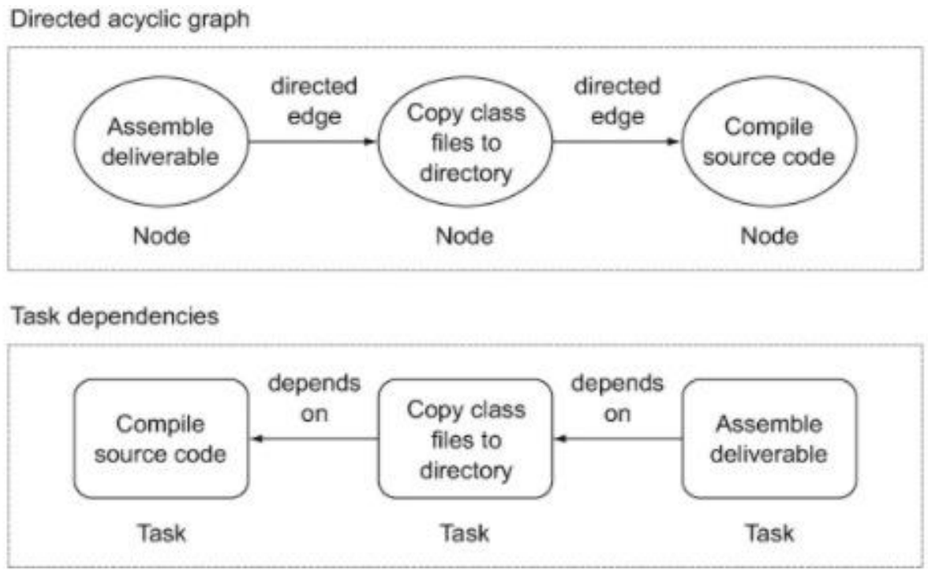
- **The root of a buildable unit**
- **Lifecycle**
  - Initialization
  - Configuration
  - Execution
- **Tasks**
- **Dependence**
- **Multi-project Build**



https://docs.gradle.org/current/dsl/org.gradle.api.Project.html

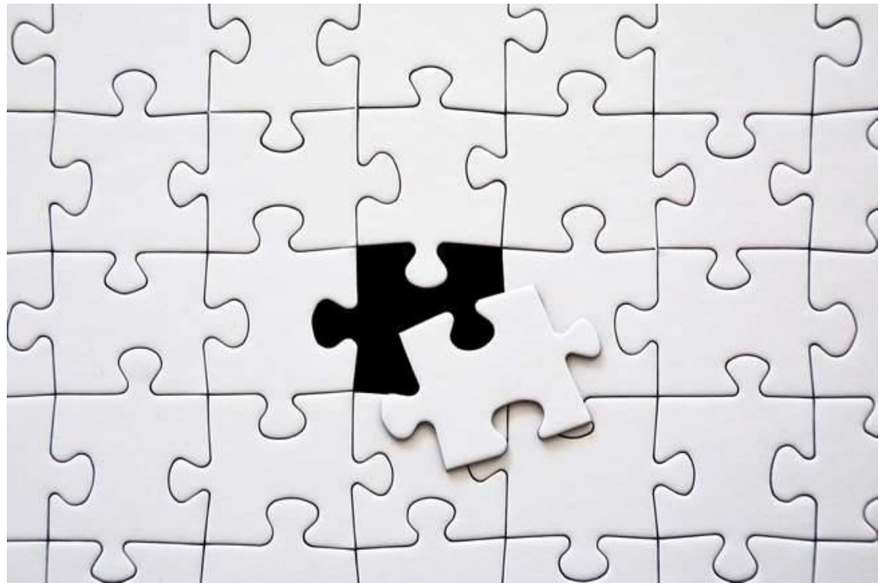
Task

- **The core runnable component**
- **All the build tasks will form a Directed Acyclic Graph(DAG)**



Plugin

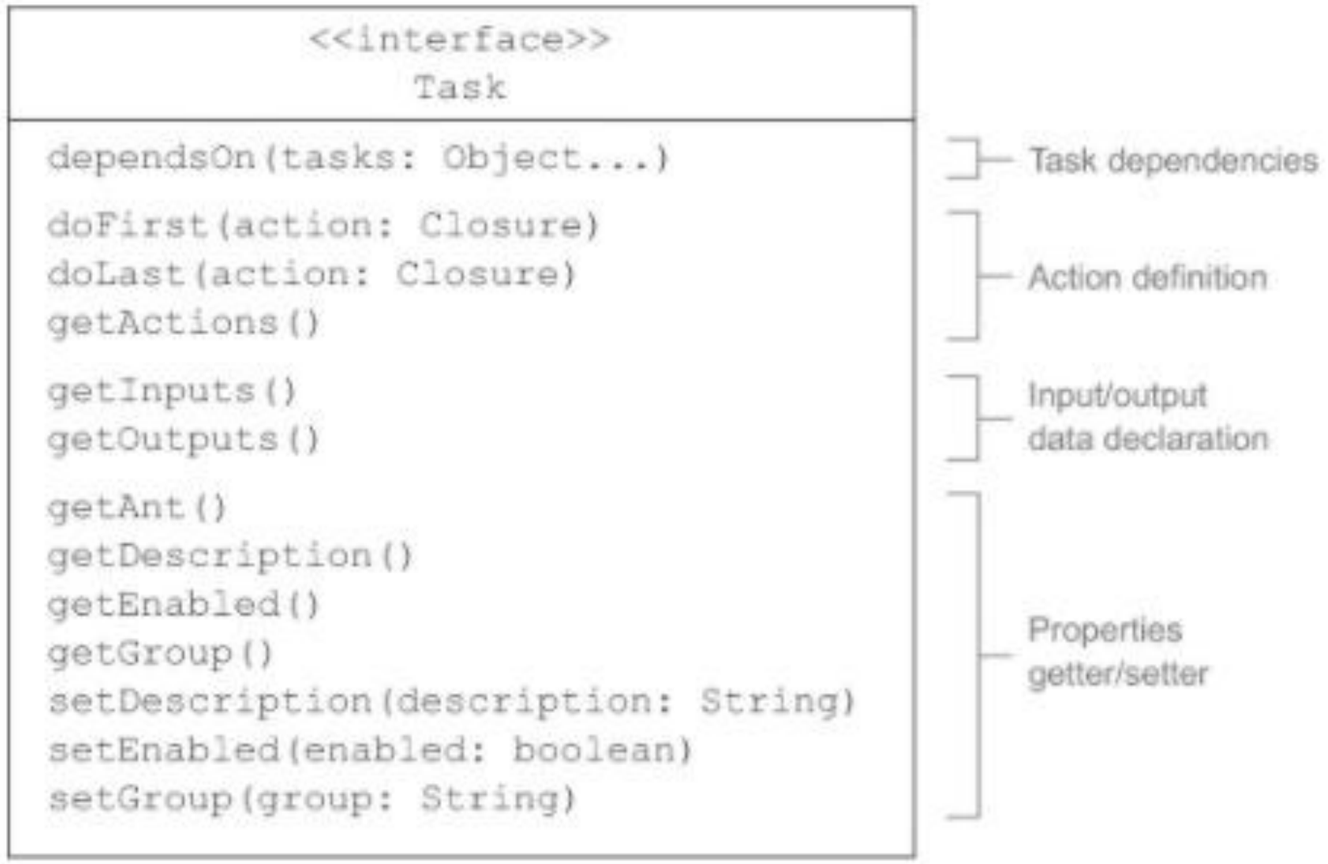
- **Gradle is just a lifecycle kernel.**
- **All the business feature are provided by Plugin**
- **Type:**
  - binary plugins
  - script plugins



How to Define Tasks

Task Interface

- **Task interface provided by Gradle**



Define a Task

- **Define task in build script**

```
task myTest{
    group="Test"
    doLast {
        println 'Hello world!'
    }
}

tasks.register("myTest3"){ Task it ->
    doLast{
        println project.name;
    }
}
```

Define Dependence

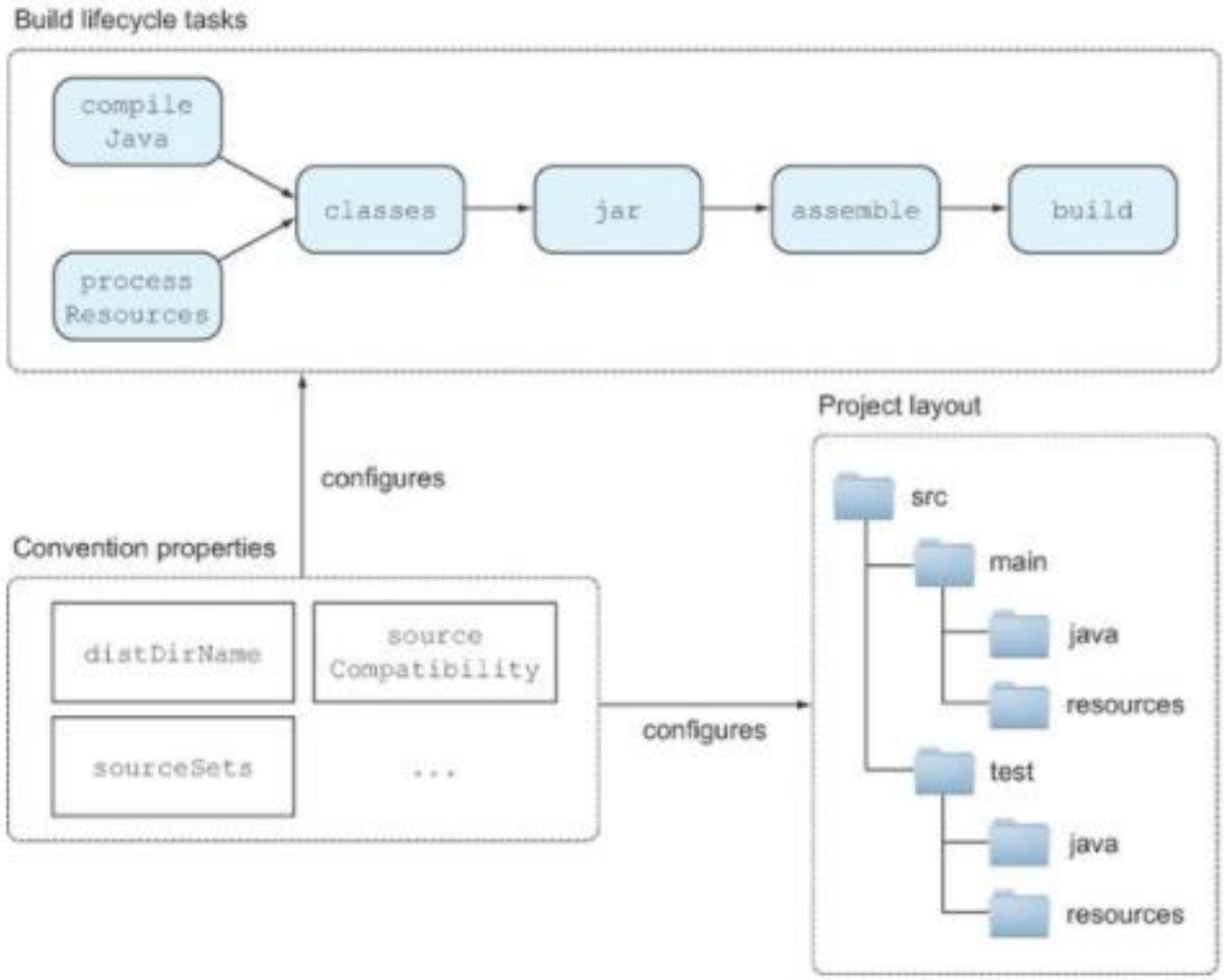
- **Use dependsOn**

```
task myTest2{
    group="Test"
    dependsOn myTest
    doLast {
        println("Hello World 2!")
    }
}
```

Build a Java Application

Project Structure

- **Generate a Gradle Java App**



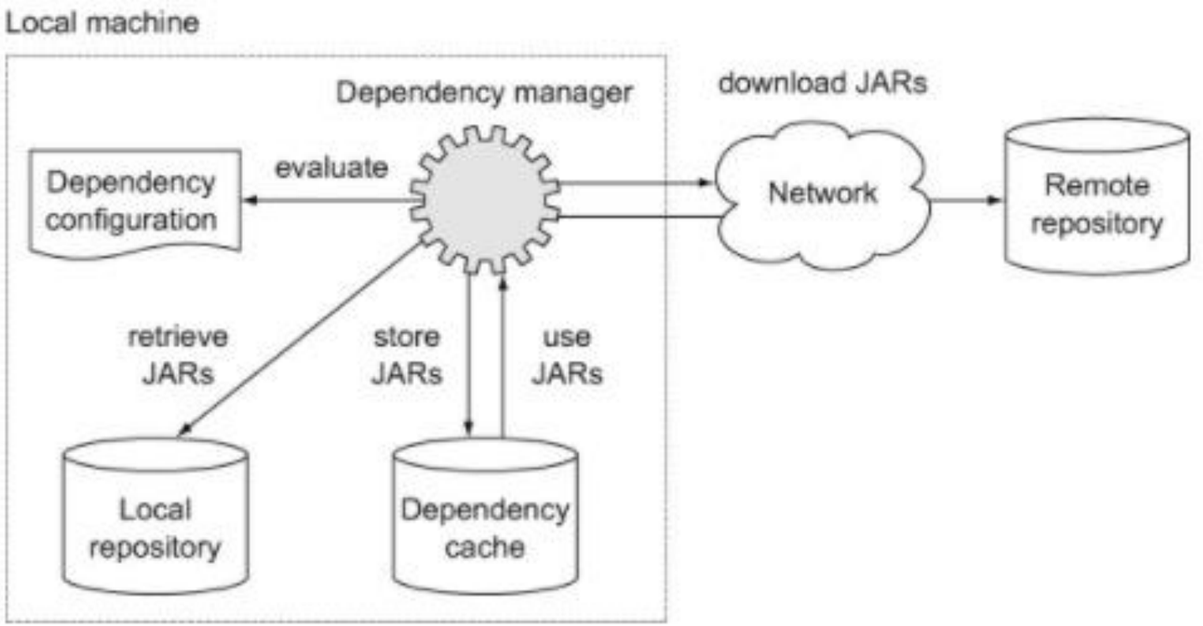
Package the Java Project

- gradle build task
- gradle clean task
- gradle jar task

Declare Dependences in Gradle Application

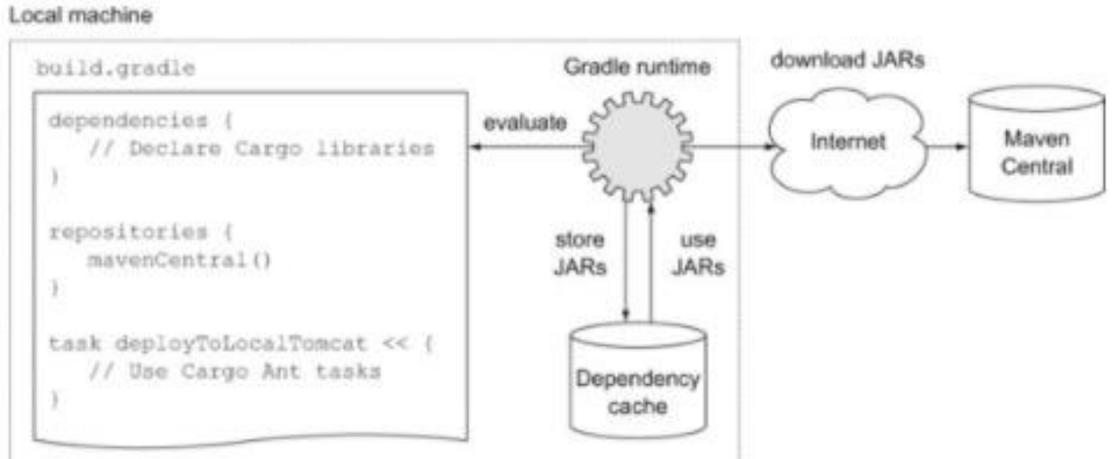
Define Repository

- **Repository: Where to get dependences**



Define Dependences

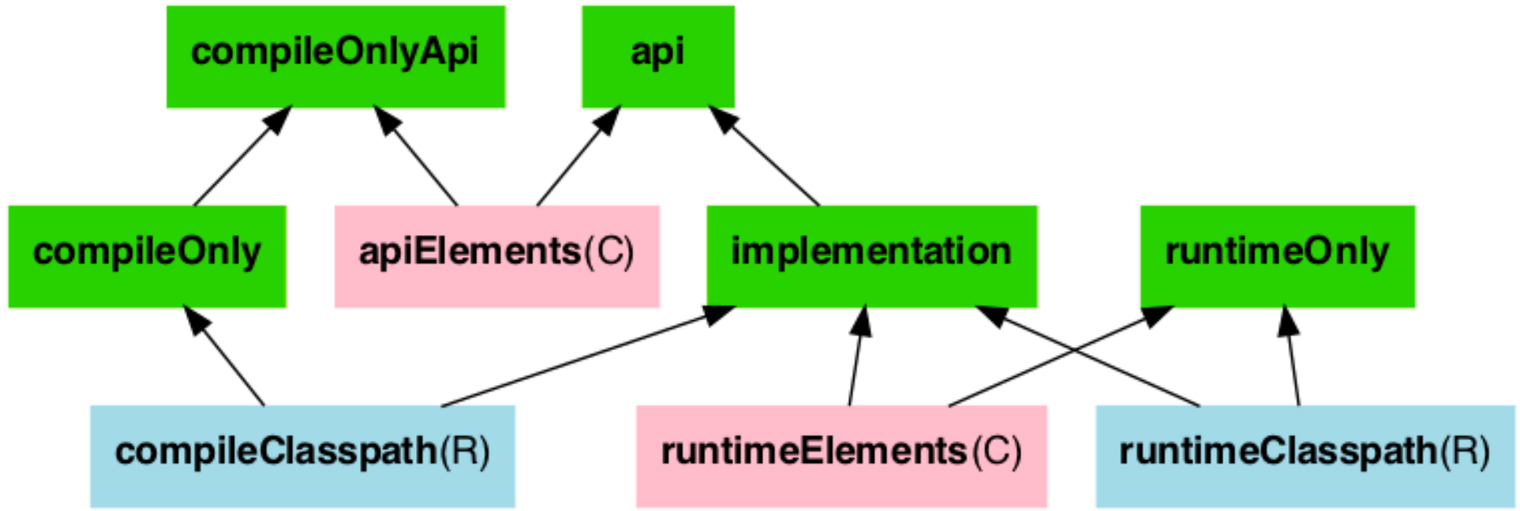
- **How to confirm a dependency**
- **Maven Coordinate**
  - Group
  - Artifact
  - Version




```groovy
dependencies {
    runtimeOnly group: 'org.springframework', name: 'spring-core', version: '2.5'
    runtimeOnly 'org.springframework:spring-core:2.5',
            'org.springframework:spring-aop:2.5'
    runtimeOnly(
        [group: 'org.springframework', name: 'spring-core', version: '2.5'],
        [group: 'org.springframework', name: 'spring-aop', version: '2.5']
    )
    runtimeOnly('org.hibernate:hibernate:3.0.5') {
        transitive = true
    }
    runtimeOnly group: 'org.hibernate', name: 'hibernate', version: '3.0.5', transitive: true
    runtimeOnly(group: 'org.hibernate', name: 'hibernate', version: '3.0.5') {
        transitive = true
    }
}
```

Different Kinds of Dependencies

- api
- implementation
- compileOnly
- runtimeOnly
- testImplementation



https://docs.gradle.org/current/userguide/java_library_plugin.html#sec:java_library_configurations_graph

Exclude dependencies

- **Why should we control the version some dependencies?**
- **Why should we exclude some dependencies?**
    - direct dependencies
    - transitive dependencies

```
dependencies {
    implementation('commons-beanutils:commons-beanutils:1.9.4') {
        exclude group: 'commons-collections', module: 'commons-collections'
    }
}
```

Use Gradle Plugins

What’s Plugin and What can we do with Plugin?

- The components that extend the feature of Gradle
- Extend the Gradle model
- Add new tasks
- Promotes reuse
- Modularization

```
plugins {
    id 'java'
    id 'jacoco'
    id 'pmd'
}
```

How to use PMD Plugin to check the code style

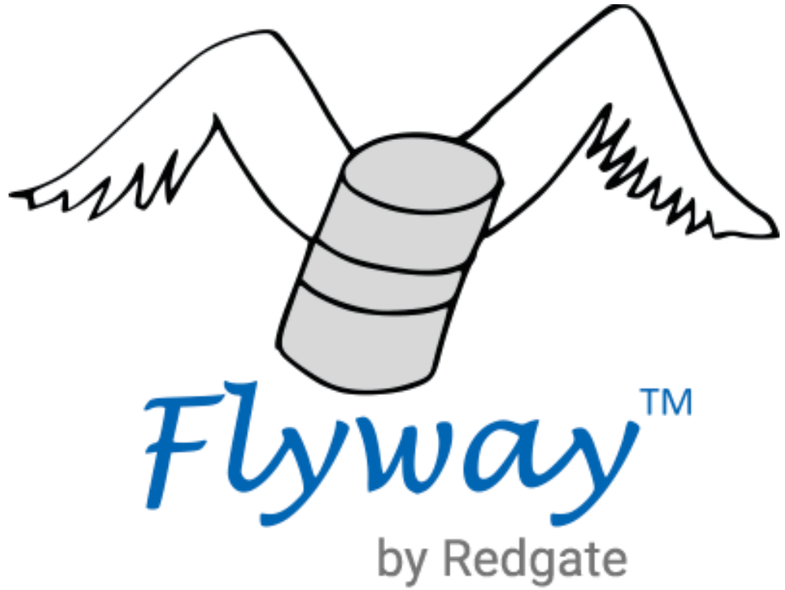
- PMD: https://pmd.github.io/
- Declare Plugin
- Configure Plugin
- Run
    - gradle check

How to use JUnit and JaCoCo Plugin

- **JUnit: the most popular unit test framework**
- **JaCoCo: a code coverage library for Java**
- **Integrate with Gradle**
  - gradle test

How to use Flyway Plugin

- **Maintain database version by Gradle and Flyway**
- **Declare plugin**
- **Configure plugin**
- **Run**
  - gradle flywayMigrate
  - gradle flywayClean



How to use Spring Boot Plugin

- **The Plugin provided by Spring Boot**
- **Run and package a Spring Boot Application**
- **Run**
  - gradle bootRun
  - gradle bootJar
  - gradle bootBuildImage

https://docs.spring.io/spring-boot/docs/2.4.5/gradle-plugin/reference/htmlsingle/

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