배우기
# gradle

#gradle

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1: gradle

Gradle , . Java Android .

Gradle

- Groovy Kotlin .
-
- .
- Maven Ivy . npm `repositories` `repositories` .
-
- Maven , Ant .
- Gradle

Gradle Gradle User Guide .

Gradle . Java Gradle .

Examples

: Java JDK JRE (Gradle 3.x 7)

:

1. Gradle
2.
3. `GRADLE_HOME` . .
4. `GRADLE_HOME/bin` `PATH` (CLI) Gradle .
5. CLI `gradle -v` Gradle . Gradle Gradle .

.

OS X / macOS

homebrew gradle .

```
brew install gradle
```

SdkMan

SdkMan Gradle .

```
sdk install gradle
```

```
sdk list gradle
sdk install gradle 2.14
sdk use gradle 2.12
```

Gradle

Eclipse Gradle .

1. Eclipse -> **Eclipse Marketplace .**
2. **buildship** Enter **.**
3. **"Buildship Gradle Integration 1.0" Install** .
4. .
5. .
6. Eclipse .

Gradle build.gradle Groovy . `> gradle [taskname]` Eclipse IDE .

gradle Hello World Groovy . Groovy `printLn` Java `System.out.printLn` .

build.gradle

```
task hello {
    doLast {
        println 'Hello world!'
    }
}
```

`> gradle hello` `> gradle -q hello` . `-q` gradle .

`> gradle -q hello` :

```
> gradle -q hello
Hello world!
```

`<<` (leftShift) `doLast {closure}` . **gradle 3.2** . **build.gradle** .

. , JAR , Javadoc , .

Gradle .

.

```
task hello {
    doLast{
       //some code
    }
}
```

:

```
task(hello) {
    doLast{
        //some code
    }
}
```

. dependsOn , mustRunAfter , type . .

```
task hello {
    doLast{
       println 'Inside task'
    }
}
hello.doLast {
    println 'added code'
}
```

.

```
> gradle -q hello
    Inside task
    added code
```

.

:

:

```
    task hello {
        doLast{
        println "Hello from a simple task"
        }
    }
```

. . :

```
task hello(type: HelloTask)

class HelloTask extends DefaultTask {
    @TaskAction
    def greet() {
        println 'hello from our custom task'
    }
}
```

.

```
class HelloTask extends DefaultTask {
    String greeting = "This is default greeting"
    @TaskAction
    def greet() {
        println greeting
    }
}
```

.

```
   //this is our old task definition style
task oldHello(type: HelloTask)
   //this is our new task definition style
task newHello(type: HelloTask) {
    greeting = 'This is not default greeting!'
}
```

.

```
> gradle -q oldHello
This is default greeting

> gradle -q newHello
This is not default greeting!
```

gradle

gradle : https://riptutorial.com/ko/gradle/topic/894/gradle-

2: Android Gradle

Examples

```
gradle.taskGraph.whenReady {taskGraph ->
    if (taskGraph.hasTask(assembleDebug)) {  /* when run debug task */
        autoIncrementBuildNumber()
    } else if (taskGraph.hasTask(assembleRelease)) { /* when run release task */
        autoIncrementBuildNumber()
    }
}
```

```
 /*Wrapping inside a method avoids auto incrementing on every gradle task run. Now it runs
only when we build apk*/
ext.autoIncrementBuildNumber = {

    if (versionPropsFile.canRead()) {
        def Properties versionProps = new Properties()
        versionProps.load(new FileInputStream(versionPropsFile))
        versionBuild = versionProps['VERSION_BUILD'].toInteger() + 1
        versionProps['VERSION_BUILD'] = versionBuild.toString()
        versionProps.store(versionPropsFile.newWriter(), null)
    } else {
        throw new GradleException("Could not read version.properties!")
    }
}
```

def versionPropsFile = file ('version.properties') def versionBuild

```
/*Setting default value for versionBuild which is the last incremented value stored in the
file */
if (versionPropsFile.canRead()) {
    def Properties versionProps = new Properties()
    versionProps.load(new FileInputStream(versionPropsFile))
    versionBuild = versionProps['VERSION_BUILD'].toInteger()
} else {
    throw new GradleException("Could not read version.properties!")
}
```

Android Gradle : https://riptutorial.com/ko/gradle/topic/10696/android---gradle------

3: Gradle Init

Examples

gradle init.gradle . init.gradle .

```
Unix: ~/.gradle/init.gradle
```

init .

- **USER_HOME / .gradle / init.d * .gradle**
- Gradle **init.d * .gradle**

mavenLocal init.gradle.

```
allprojects {
    repositories {
        mavenLocal()
    }
}
```

Maven . build.gradle mavenLocal / "gradle install" jar .

Gradle Init : https://riptutorial.com/ko/gradle/topic/4234/gradle-init-

4: Gradle Wrapper

Examples

Gradle Wrapper Git

, `gradlew` gradle wrapper . `gradlew` .

```
Error: Could not find or load main class org.gradle.wrapper.GradleWrapperMain
```

.gitignore Java `*jar` . `gradle/wrapper/gradle-wrapper.jar` . git . .

```
git add -f gradle/wrapper/gradle-wrapper.jar
git ci
```

`-f` .

Gradle

Gradle . Gradle . . gradle .

.

```
> ./gradlew <task> # on *Nix or MacOSX
> gradlew <task>   # on Windows
```

.

1. :

```
gradle wrapper [--gradle-version 2.0]
```

`--gradle-version X` ( ) gradle .

1. `build.gradle` .

```
task wrapper(type: Wrapper) {
    gradleVersion = '2.0'
}
```

`gradle wrapper` .

```
the_project/
  gradlew
  gradlew.bat
  gradle/wrapper/
    gradle-wrapper.jar
    gradle-wrapper.properties
```

https://docs.gradle.org/current/userguide/gradle_wrapper.html .

Gradle Wrapper   Gradle

- Gradle Wrapper `wrapper` `distributionUrl` .

```
task wrapper(type: Wrapper) {
    gradleVersion = '2.0'
    distributionUrl = "http\://server/dadada/gradle-${gradleVersion}-bin.zip"
}
```

`gradle wrapper` , `gradlew` `gradle/wrapper/gradle-wrapper.properties` URL Gradle .

Gradle

`gradlew`   .

1. gradle ~ / .gradle / wrapper / dists .
2. .

2   ( ). *JVM*   .

`JAVA_OPTS` `GRADLE_OPTS` .

```
-Dhttps.proxyPort=<proxy_port> -Dhttps.proxyHost=<hostname>
```

Windows   .

```
set JAVA_OPTS=-Dhttps.proxyPort=8080 -Dhttps.proxyHost=myproxy.mycompany.com
```

https://docs.oracle.com/javase/8/docs/api/java/net/doc-files/net-properties . html .

:   .

Gradle Wrapper : https://riptutorial.com/ko/gradle/topic/3006/gradle-wrapper

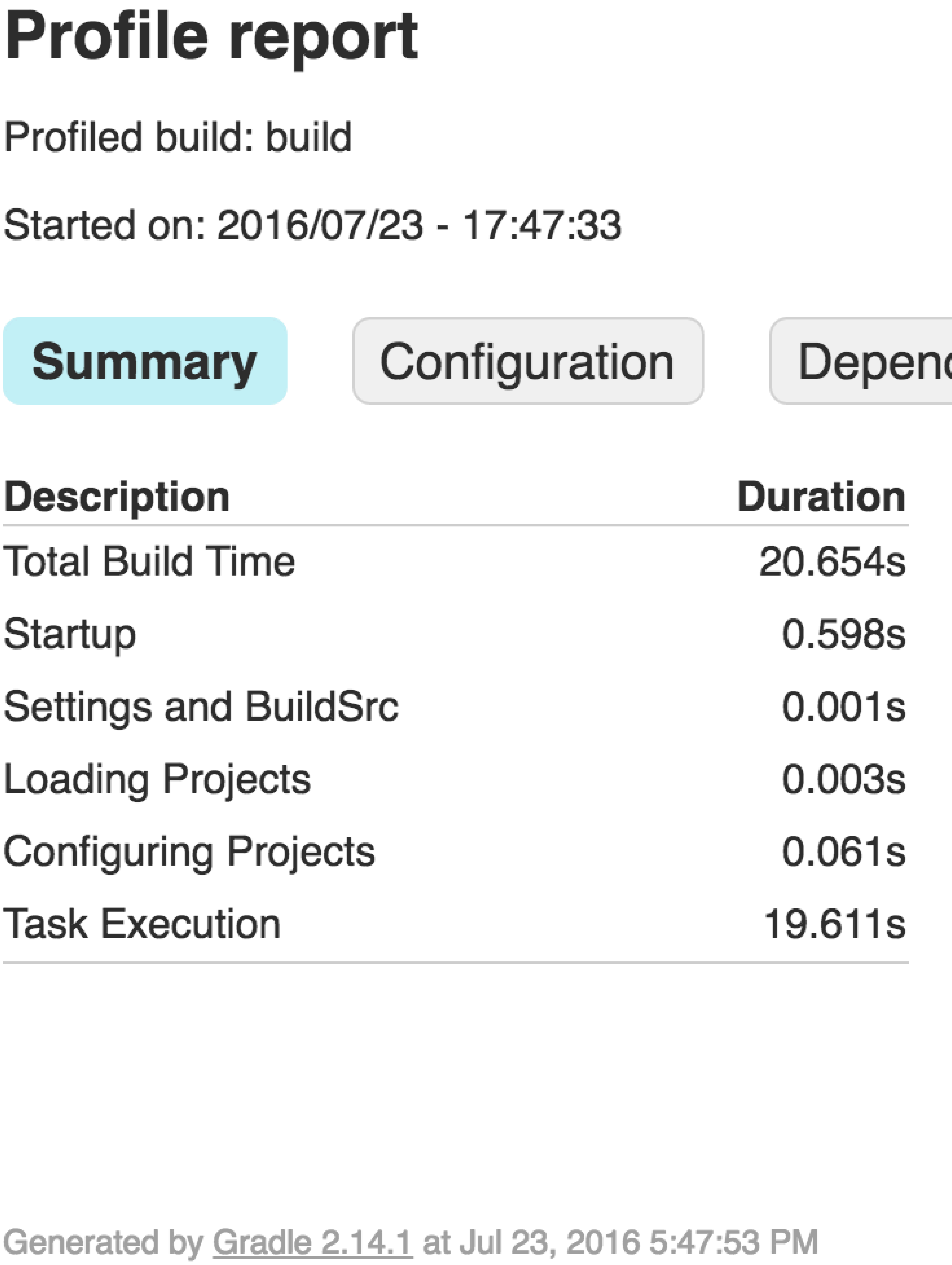
5: Gradle

Examples

Gradle . Gradle `--profile` .

```
gradle --profile
./gradlew --profile
```

`./build/reports/profile/` HTML .



Profile report

Profiled build: build

Started on: 2016/07/23 - 17:47:33

Description	Duration
Total Build Time	20.654s
Startup	0.598s
Settings and BuildSrc	0.001s
Loading Projects	0.003s
Configuring Projects	0.061s
Task Execution	19.611s

Generated by Gradle 2.14.1 at Jul 23, 2016 5:47:53 PM org.gradle.configureondemand .

```
org.gradle.configureondemand=true
```

gradle.properties .

Gradle .

Gralde :

. , build.gradle . . , Gradle .

Gradle JVM

$GRADLE_USER_HOME/.gradle/gradle.properties (~/.gradle/gradle.properties) org.gradle.jvmargs Gradle Gradle (JVM) org.gradle.jvmargs .

gradle.properties .

Gradle Gradle .

```
org.gradle.jvmargs=-Xmx1024m -XX:MaxPermSize=256m
```

1GB ( ) 256MB "" . .

.

```
org.gradle.jvmargs=-Xmx2024m -XX:MaxPermSize=512m
```

Xmx XX:MaxPermSize .

Gradle

Gradle Daemon .

Gradle Daemon Gradle Framework .

--daemon gradle Gradle Wrapper .

```
gradle --daemon
./gradlew --daemon
```

.

```
org.gradle.daemon=true
```

gradle.properties .

Gradle Daemon $GRADLE_USER_HOME/.gradle/gradle.properties (~/.gradle/gradle.properties)

.

```
org.gradle.daemon=true
```

Mac / Linux / * nix .

```
touch ~/.gradle/gradle.properties && echo "org.gradle.daemon=true" >>
~/.gradle/gradle.properties
```

Windows :

```
(if not exist "%USERPROFILE%/.gradle" mkdir "%USERPROFILE%/.gradle") && (echo
org.gradle.daemon=true >> "%USERPROFILE%/.gradle/gradle.properties")
```

`--no-daemon` `gradle.properties` `org.gradle.daemon=false` `--no-daemon` .

`gradle --stop` `gradle --stop` . `--stop` Gradle Gradle . ** 3* .

Gradle

Gradle . `--parallel` Gradle ( ) .

```
gradle build --parallel
```

gradle.properties .

```
org.gradle.parallel=true
```

Gradle

Gradle Gradle . Gradle , . Gradle . Gradle .

Gradle `gradle/wrapper/` `gradle/wrapper/` `gradle-wrapper.properties` . .

```
distributionBase=GRADLE_USER_HOME
distributionPath=wrapper/dists
zipStoreBase=GRADLE_USER_HOME
zipStorePath=wrapper/dists
distributionUrl=https\://services.gradle.org/distributions/gradle-X.X.X.zip
```

`XXX` ( ) `YYY` ( ) .

Gradle : https://riptutorial.com/ko/gradle/topic/3443/gradle-

6: Gradle

- (Task) - . inputs , outputs .
- dependencies {} - File . , org.slf4j:slf4j-api:1.7.21 Maven .
- repositories {} - Gradle . , . : jcenter() Bintray Maven maven { url 'http://jcenter.bintray.com/' } } .

Examples

Java

: Gradle

Gradle .

```
cd $PROJECT_DIR
gradle init --type=java-library
```

Java .

.

```
.
├── build.gradle
├── gradle
│   └── wrapper
│       ├── gradle-wrapper.jar
│       └── gradle-wrapper.properties
├── gradlew
├── gradlew.bat
├── settings.gradle
└── src
    ├── main
    │   └── java
    │       └── Library.java
    └── test
        └── java
            └── LibraryTest.java
```

`gradle tasks` `build.gradle` `jar` , `test` , `javadoc` .

```
apply plugin: 'java'

repositories {
    jcenter()
}

dependencies {
    compile 'org.slf4j:slf4j-api:1.7.21'
    testCompile 'junit:junit:4.12'
}
```

Gradle : https://riptutorial.com/ko/gradle/topic/2247/gradle--

7: Gradle

Examples

`buildSrc` gradle

gradle DSL .

.

.

-
- buildSrc
-

buildSrc .

.

```
// project's build.gradle
build.gradle
// build.gradle to build the `buildSrc` module
buildSrc/build.gradle
// file name will be the plugin name used in the `apply plugin: $name`
// where name would be `sample` in this example
buildSrc/src/main/resources/META-INF/gradle-plugins/sample.properties
// our DSL (Domain Specific Language) model
buildSrc/src/main/groovy/so/docs/gradle/plugin/SampleModel.groovy
// our actual plugin that will read the values from the DSL
buildSrc/src/main/groovy/so/docs/gradle/plugin/SamplePlugin.groovy
```

build.gradle :

```
group 'so.docs.gradle'
version '1.0-SNAPSHOT'

apply plugin: 'groovy'
// apply our plugin... calls SamplePlugin#apply(Project)
apply plugin: 'sample'

repositories {
    mavenCentral()
}

dependencies {
    compile localGroovy()
}

// caller populates the extension model applied above
sample {
    product = 'abc'
    customer = 'zyx'
}
```

```
// dummy task to limit console output for example
task doNothing <<{}
```

buildSrc / build.gradle

```
apply plugin: 'groovy'

repositories {
    mavenCentral()
}

dependencies {
    compile localGroovy()
}
```

buildSrc / src / main / groovy / so / docs / gradle / plugin / SamplePlugin.groovy :

```
package so.docs.gradle.plugin

import org.gradle.api.Plugin
import org.gradle.api.Project

class SamplePlugin implements Plugin<Project> {
    @Override
    void apply(Project target) {
        // create our extension on the project for our model
        target.extensions.create('sample', SampleModel)
        // once the script has been evaluated the values are available
        target.afterEvaluate {
            // here we can do whatever we need to with our values
            println "populated model: $target.extensions.sample"
        }
    }
}
```

buildSrc / src / main / groovy / so / docs / gradle / plugin / SampleModel.groovy :

```
package so.docs.gradle.plugin

// define our DSL model
class SampleModel {
    public String product;
    public String customer;

    @Override
    public String toString() {
        final StringBuilder sb = new StringBuilder("SampleModel{");
        sb.append("product='").append(product).append('\'');
        sb.append(", customer='").append(customer).append('\'');
        sb.append('}');
        return sb.toString();
    }
}
```

buildSrc / src / main / resources / META-INF / gradle-plugins / sample.properties

```
implementation-class=so.docs.gradle.plugin.SamplePlugin
```

DSL

```
 $ ./gradlew -q doNothing
SampleModel{product='abc', customer='zyx'}
```

java (Groovy) Gradle .

```
plugin
|-- build.gradle
|-- settings.gradle
|-- src
    |-- main
    |   |-- java
    |   |-- resources
    |       |-- META-INF
    |           |-- gradle-plugins
    |-- test
```

`build.gradle` .

```
apply plugin: 'java'
apply plugin: 'maven'

dependencies {
    compile gradleApi()
}
```

`java` .

`gradleApi()` Gradle .

`settings.gradle` .

```
rootProject.name = 'myplugin'
```

Maven **ID** .

`settings.gradle` .

`Plugin` `src/main/java/org/sample/MyPlugin.java` .

```
import org.gradle.api.Plugin;
import org.gradle.api.Project;

public class MyPlugin implements Plugin<Project> {

    @Override
    public void apply(Project project) {
         project.getTasks().create("myTask", MyTask.class);
    }
}
```

DefaultTask .

```
import org.gradle.api.DefaultTask;
import org.gradle.api.tasks.TaskAction;

public class MyTask extends DefaultTask {

    @TaskAction
    public void myTask() {
        System.out.println("Hello World");
    }
}
```

META-INF/gradle-plugins implementation-class .

META-INF/gradle-plugins/testplugin.properties

```
implementation-class=org.sample.MyPlugin.java
```

filename ID .

build.gradle build.gradle .

```
apply plugin: 'java'
apply plugin: 'maven'

dependencies {
    compile gradleApi()
}

repositories {
    jcenter()
}


group = 'org.sample'
version = '1.0'

uploadArchives {
    repositories {
        mavenDeployer {
        repository(url: mavenLocal().url)
        }
    }
}
```

plugin/build.gradle Maven Gradle .

```
$ ./gradlew clean uploadArchives
```

build.gradle   build.gradle .

```
buildscript {
     repositories {
         mavenLocal()
     }
 dependencies {
    classpath group: 'org.sample',    // Defined in the build.gradle of the plugin
              name: 'myplugin',       // Defined by the rootProject.name
              version: '1.0'
    }
 }

apply plugin: 'testplugin'            // Defined by the properties filename
```

.

```
 $ ./gradlew myTask
```

Gradle   : https://riptutorial.com/ko/gradle/topic/1900/gradle-

8: IntelliJ IDEA

- groovy.util.Node = node.find {childNode -> true || }
- node.append (nodeYouWantAsAChild)
- groovy.util.Node parsedNode = (XmlParser ()). parseText (someRawXMLString)
- " ' ( )' "

IntelliJ - ipr, iws iml - gradle .

```
project.ipr
module.iml
workspace.iws
```

.withXml xml . .asNode () Groovy XML .

:

```
project.ipr.withXml { provider ->
    def node = provider.asNode()
```

- IntelliJ gradle , (IntelliJ) . XML . xml .

gradle IntelliJ . .

:

find == . . .contains .

null .

Examples

:

- , `foo.bar.Baz` .
- main .
- `fooBar` .

gradle :

```
idea {
    workspace.iws.withXml { provider ->
        // I'm not actually sure why this is necessary
        def node = provider.asNode()

        def runManager = node.find { it.@name.contains('RunManager')}

        // find a run configuration if it' there already
        def runner = runManager.find { it.find ({ mainClass ->
            return mainClass.@name != null && mainClass.@name == "MAIN_CLASS_NAME" &&
mainClass.@value != null && mainClass.@value.contains('Baz');
        }) != null }

        // create and append the run configuration if it doesn't already exists
        if (runManager != null && runner == null){
            def runnerText = '''
                <configuration default="false" name="Baz" type="Application"
factoryName="Application" nameIsGenerated="true">
                  <extension name="coverage" enabled="false" merge="false" runner="idea">
                    <pattern>
                      <option name="PATTERN" value="foo.bar.Baz" />
                      <option name="ENABLED" value="true" />
                    </pattern>
                  </extension>
                  <option name="MAIN_CLASS_NAME" value="foo.bar.Baz" />
                  <option name="VM_PARAMETERS" value="" />
                  <option name="PROGRAM_PARAMETERS" value="" />
                  <option name="WORKING_DIRECTORY" value="file://$PROJECT_DIR$" />
                  <option name="ALTERNATIVE_JRE_PATH_ENABLED" value="false" />
                  <option name="ALTERNATIVE_JRE_PATH" />
                  <option name="ENABLE_SWING_INSPECTOR" value="false" />
                  <option name="ENV_VARIABLES" />
                  <option name="PASS_PARENT_ENVS" value="true" />
                  <module name="foobar" />
                  <envs />
                  <method />
                </configuration>'''
            runner = (new XmlParser()).parseText(runnerText)
            runManager.append(config);
        }

        // If there is no active run configuration, set the newly made one to be it
        if (runManager != null && runManager.@selected == null) {
            runManager.@selected="${runner.@factoryName}.${runner.@name}"
        }
    }
}
```

IntelliJ IDEA : https://riptutorial.com/ko/gradle/topic/2297/intellij-idea---

9: -

model.android.ndk.toolchain	ndk-bundle

Examples

JNI Gradle

root : build.gradle

```
buildscript {
    repositories {
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle-experimental:0.8.0-alpha4'
    }
}

allprojects {
    repositories {
        jcenter()
    }
}
```

: build.gradle

```
apply plugin: 'com.android.model.application'

dependencies {
    compile "com.android.support:support-v4:23.3.0"
    compile fileTree(dir: 'libs', include: '*.jar')
}

model {
    android {
        compileSdkVersion = 23
        buildToolsVersion = '23.0.3'

        defaultConfig {
            applicationId = 'com.example.hello'
            minSdkVersion.apiLevel = 9
            targetSdkVersion.apiLevel = 23

            buildConfigFields {
                create() {
                    type "int"
                    name "VALUE"
                    value "1"
                }
            }
        }
        ndk {
            platformVersion = 9
            moduleName "hello"

            toolchain "clang"

            stl "gnustl_static"
            CFlags.add("-DANDROID_NDK")
            cppFlags.add("-std=c++11")

            ldLibs.add("android")
            ldLibs.add("dl")
            ldLibs.add("log")
        }

        sources {
            main {
                jni {
                    exportedHeaders {
                        srcDirs "../../common/headers"
                    }
                    source {
                        srcDirs "../../common/src"
                    }
                }
            }
        }
    }
}
```

OpenGL ES 2.0

root : build.gradle

```
buildscript {
    repositories {
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle-experimental:0.8.0-alpha4'
    }
}

allprojects {
    repositories {
        jcenter()
    }
}
```

: build.gradle

```
apply plugin: 'com.android.model.application'

dependencies {
    compile "com.android.support:support-v4:23.3.0"
    compile fileTree(dir: 'libs', include: '*.jar')
}
```

```
model {
    android {
        compileSdkVersion = 23
        buildToolsVersion = '23.0.3'

        defaultConfig {
            applicationId = 'com.example.glworld'
            minSdkVersion.apiLevel = 9
            targetSdkVersion.apiLevel = 23

            buildConfigFields {
                create() {
                    type "int"
                    name "VALUE"
                    value "1"
                }
            }
        }

        buildTypes {
            release {
                minifyEnabled = false
                proguardFiles.add(file('proguard-rules.txt'))
            }
        }

        ndk {
            platformVersion = 9
            moduleName "glworld"

            toolchain "clang"

            stl "gnustl_static"
            CFlags.add("-DANDROID_NDK")
            CFlags.add("-DDISABLE_IMPORTGL")
            CFlags.add("-DFT2_BUILD_LIBRARY=1")
            cppFlags.add("-std=c++11")

            ldLibs.add("EGL")
            ldLibs.add("android")
            ldLibs.add("GLESv2")
            ldLibs.add("dl")
            ldLibs.add("log")
        }

        sources {
            main {
                jni {
                    dependencies {
                        library "freetype2" linkage "shared"
                    }
                    exportedHeaders {
                        srcDirs "../../common/headers"
                    }
                    source {
                        srcDirs "../../common/src"
                    }
                }
            }
        }
    }

    repositories {
        prebuilt(PrebuiltLibraries) {
            freetype2 {
                headers.srcDir "../../common/freetype2-android/include"
                binaries.withType(SharedLibraryBinary) {
                    def localLib = "../../common/freetype2-android/Android/libs"
                    sharedLibraryFile =
                            file("$localLib/${targetPlatform.getName()}/libfreetype2.so")
                }
            }
        }
    }
}

// The next tasks compile a freetype library using a make file.
// These `.so`'s are then used as the shared libraries compiled above.
tasks.withType(JavaCompile) {
    compileTask -> compileTask.dependsOn buildNative
}

// Call regular ndk-build (.cmd) script from the app directory
task buildNative(type: Exec) {
    def ndkDir = "/Development/android-sdk-macosx/ndk-bundle"
    commandLine "$ndkDir/ndk-build",
            '-C',
            file('../../common/freetype2-android/Android/jni').absolutePath
}

task cleanNative(type: Exec) {
    def ndkDir = "/Development/android-sdk-macosx/ndk-bundle"
    commandLine "$ndkDir/ndk-build",
            '-C',
            file('../../common/freetype2-android/Android/jni').absolutePath,
            "clean"
}

clean.dependsOn cleanNative
```

- : https://riptutorial.com/ko/gradle/topic/4460/-----

10:

doLast

, gradle 3.x : **doLast {closure}** "leftShift"(<<) . (**gradle leftShift** . 3.2 gradle 5.0 . .)

```
task oldStyle << {
    println 'Deprecated style task'
 }
```

.

```
task newStyle {
    doLast {
    println 'Deprecated style task'
    }
 }
```

Examples

`dependsOn` .

```
task A << {
    println 'Hello from A'
}
task B(dependsOn: A) << {
    println "Hello from B"
}
```

`dependsOn : :

- B A .
- `B` `A` Gradle.

.

```
> gradle -q B
Hello from A
Hello from B
```

```
project('projectA') {
    task A(dependsOn: ':projectB:B') << {
        println 'Hello from A'
    }
}

project('projectB') {
    task B << {
        println 'Hello from B'
    }
}
```

:projectB:B .

.

```
> gradle -q B
Hello from A
Hello from B
```

```
task A << {
    println 'Hello from A'
}

task B << {
    println 'Hello from B'
}

B.dependsOn A
```

.

.

```
> gradle -q B
Hello from A
Hello from B
```

.

```
task A << {
    println 'Hello from A'
}

task B << {
    println 'Hello from B'
}

task C << {
    println 'Hello from C'
}

task D << {
    println 'Hello from D'
}
```

.

```
B.dependsOn A
C.dependsOn B
D.dependsOn C
```

.

```
> gradle -q D
Hello from A
Hello from B
Hello from C
Hello from D
```

:

```
B.dependsOn A
D.dependsOn B
D.dependsOn C
```

.

```
> gradle -q D
Hello from A
Hello from B
Hello from C
Hello from D
```

dependsOn

.

```
task A << {
    println 'Hello from A'
}

task B(dependsOn: A) << {
    println 'Hello from B'
}

task C << {
    println 'Hello from C'
}

task D(dependsOn: ['B', 'C'] << {
    println 'Hello from D'
}
```

.

```
> gradle -q D
Hello from A
Hello from B
Hello from C
Hello from D
```

: https://riptutorial.com/ko/gradle/topic/5545/-

11:

Examples

JAR

JAR

Gradle JAR . .

```
dependencies {
    compile files('path/local_dependency.jar')
}
```

`path` `local_dependency.jar` JAR . `path` .

JAR

jar . :

```
dependencies {
        compile fileTree(dir: 'libs', include: '*.jar')
}
```

`libs` jars `*.jar` .

JAR

flatDir .

```
repositories {
    flatDir {
        dirs 'libs'
    }
}
```

`libs` jar *`libs`* .

Gradle Maven . .

```
group:name:version
```

.

```
'org.springframework:spring-core:4.3.1.RELEASE'
```

Gradle `dependency` .

```
compile 'org.springframework:spring-core:4.3.1.RELEASE'
```

.

```
compile group: 'org.springframework', name: 'spring-core', version: '4.3.1.RELEASE'
```

.

. .

```
testCompile group: 'junit', name: 'junit', version: '4.+'
```

Gradle .

gradle . .

```
dependencies {
    compile project(':OtherProject')
}
```

`':OtherProject'` .

`':OtherProject'` `build.gradle` `settings.gradle` .

```
include ':Dependency'
project(':Dependency').projectDir = new File('/path/to/dependency')
```

Gradle .

`dependencies` .

```
gradle dependencies
```

( ). `--configuration` .

```
gradle dependencies --configuration compile
```

`<subproject>:dependencies` . `api` .

```
gradle api:dependencies
```

Gradle Gradle . `build.gradle` `repositories { ... }` `build.gradle` .

, JCenter , Maven Repository Maven   .

```
repositories {
  // Adding these two repositories via method calls is made possible by Gradle's Java plugin
  jcenter()
  mavenCentral()

  maven { url "http://repository.of/dependency" }
}
```

gradle .aar Android .

1. app libs .
2. .aar . : myLib.aar .
3. app build.gradle android .

```
  repositories {
        flatDir {
            dirs 'libs'
        }
    }
```

app libs   .

4. dependencies build.gradle build.gradle .

```
compile(name:'myLib', ext:'aar')
```

: https://riptutorial.com/ko/gradle/topic/2524/

12:

mustRunAfter shouldRunAfter " shouldRunAfter "(Gradle 3.0) . .

.

- mustRunAfter
- shouldRunAfter

mustRunAfter taskA taskB taskB taskA .

shouldRunAfter .

- .
- shouldRunAfter shouldRunAfter .

Examples

mustRunAfter

```
task A << {
    println 'Hello from A'
}
task B << {
    println 'Hello from B'
}

B.mustRunAfter A
```

B.mustRunAfter A Gradle .

.

```
> gradle -q B A
Hello from A
Hello from B
```

A B .

A B .

.

```
> gradle -q B
Hello from B
```

: https://riptutorial.com/ko/gradle/topic/5550/-

13:

Examples

build.gradle 3

Gradle ( ) *gradle*

buildscript build.gradle .

```
buildscript {
  repositories {
    maven {
      url "https://plugins.gradle.org/m2/"
    }
  }
  dependencies {
    classpath "org.example.plugin:plugin:1.1.0"
  }
}

apply plugin: "org.example.plugin"
```

Gradle (2.1) *Gradle 2.1* .

```
plugins {
  id "org.example.plugin" version "1.1.0"
}
```

build.gradle

Gradle ( )

buildscript (All) Plugin (2.1+) .

```
buildscript {
  repositories {
    maven {
      url "https://plugins.gradle.org/m2/"
    }
  }
  dependencies {
    classpath "org.example.plugin:plugin:1.1.0"
    Classpath "com.example.plugin2:plugin2:1.5.2"
  }
}

apply plugin: "org.example.plugin"
apply plugin: "com.example.plugin2"
```

Gradle (2.1)

```
plugins {
  id "org.example.plugin" version "1.1.0"
  id "com.example.plugin2" version "1.5.2"
}
```

: https://riptutorial.com/ko/gradle/topic/9183/--

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