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### Reference

* [Groovy DSL Reference](http://docs.google.com/dsl/)
* [Gradle API Javadoc](http://docs.google.com/javadoc/)
* [Core Plugins](http://docs.google.com/userguide/plugin_reference.html)
* [Gradle & Third-party Tools](http://docs.google.com/userguide/third_party_integration.html)

### Getting Started

* [Creating New Gradle Builds](https://guides.gradle.org/creating-new-gradle-builds/)
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* [Migrating From Maven](https://guides.gradle.org/migrating-from-maven/)

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* [Command-Line Interface](http://docs.google.com/userguide/command_line_interface.html)
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# Executing Multi-Project Builds

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Only the smallest of projects has a single build file and source tree, unless it happens to be a massive, monolithic application. It’s often much easier to digest and understand a project that has been split into smaller, inter-dependent modules. The word “inter-dependent” is important, though, and is why you typically want to link the modules together through a single build.

Gradle supports this scenario through *multi-project* builds.

[Structure of a multi-project build](#4d34og8)

Such builds come in all shapes and sizes, but they do have some common characteristics:

* A settings.gradle file in the root or master directory of the project
* A build.gradle file in the root or master directory
* Child directories that have their own \*.gradle build files (some multi-project builds may omit child project build scripts)

The settings.gradle file tells Gradle how the project and subprojects are structured. Fortunately, you don’t have to read this file simply to learn what the project structure is as you can run the command gradle projects. Here’s the output from using that command on the Java *multiproject* build in the Gradle samples:

[Example: Listing the projects in a build](#17dp8vu)

**Output of** gradle -q projects

> gradle -q projects  
  
------------------------------------------------------------  
Root project  
------------------------------------------------------------  
  
Root project 'multiproject'  
+--- Project ':api'  
+--- Project ':services'  
| +--- Project ':services:shared'  
| \--- Project ':services:webservice'  
\--- Project ':shared'  
  
To see a list of the tasks of a project, run gradle <project-path>:tasks  
For example, try running gradle :api:tasks

This tells you that *multiproject* has three immediate child projects: *api*, *services* and *shared*. The *services* project then has its own children, *shared* and *webservice*. These map to the directory structure, so it’s easy to find them. For example, you can find *webservice* in <root>/services/webservice.

By default, Gradle uses the name of the directory it finds the settings.gradle as the name of the root project. This usually doesn’t cause problems since all developers check out the same directory name when working on a project. On Continuous Integration servers, like Jenkins, the directory name may be auto-generated and not match the name in your VCS. For that reason, it’s recommended that you always set the root project name to something predictable, even in single project builds. You can configure the root project name by setting rootProject.name.

Each project will usually have its own build file, but that’s not necessarily the case. In the above example, the *services* project is just a container or grouping of other subprojects. There is no build file in the corresponding directory. However, *multiproject* does have one for the root project.

The root build.gradle is often used to share common configuration between the child projects, for example by applying the same sets of plugins and dependencies to all the child projects. It can also be used to configure individual subprojects when it is preferable to have all the configuration in one place. This means you should always check the root build file when discovering how a particular subproject is being configured.

Another thing to bear in mind is that the build files might not be called build.gradle. Many projects will name the build files after the subproject names, such as api.gradle and services.gradle from the previous example. Such an approach helps a lot in IDEs because it’s tough to work out which build.gradle file out of twenty possibilities is the one you want to open. This little piece of magic is handled by the settings.gradle file, but as a build user you don’t need to know the details of how it’s done. Just have a look through the child project directories to find the files with the .gradle suffix.

Once you know what subprojects are available, the key question for a build user is how to execute the tasks within the project.

[Executing a multi-project build](#2s8eyo1)

From a user’s perspective, multi-project builds are still collections of tasks you can run. The difference is that you may want to control *which* project’s tasks get executed. You have two options here:

* Change to the directory corresponding to the subproject you’re interested in and just execute gradle <task> as normal.
* Use a qualified task name from any directory, although this is usually done from the root. For example: gradle :services:webservice:build will build the *webservice* subproject and any subprojects it depends on.

The first approach is similar to the single-project use case, but Gradle works slightly differently in the case of a multi-project build. The command gradle test will execute the test task in any subprojects, relative to the current working directory, that have that task. So if you run the command from the root project directory, you’ll run test in *api*, *shared*, *services:shared* and *services:webservice*. If you run the command from the services project directory, you’ll only execute the task in *services:shared* and *services:webservice*.

For more control over what gets executed, use qualified names (the second approach mentioned). These are paths just like directory paths, but use ‘:’ instead of ‘/’ or ‘\’. If the path begins with a ‘:’, then the path is resolved relative to the root project. In other words, the leading ‘:’ represents the root project itself. All other colons are path separators.

This approach works for any task, so if you want to know what tasks are in a particular subproject, just use the tasks task, e.g. gradle :services:webservice:tasks .

Regardless of which technique you use to execute tasks, Gradle will take care of building any subprojects that the target depends on. You don’t have to worry about the inter-project dependencies yourself. If you’re interested in how this is configured, you can read about writing multi-project builds [later in the user guide](http://docs.google.com/multi_project_builds.html#multi_project_builds).

There’s one last thing to note. When you’re using the Gradle wrapper, the first approach doesn’t work well because you have to specify the path to the wrapper script if you’re not in the project root. For example, if you’re in the *webservice* subproject directory, you would have to run ../../gradlew build.

That’s all you really need to know about multi-project builds as a build user. You can now identify whether a build is a multi-project one and you can discover its structure. And finally, you can execute tasks within specific subprojects.

Docs

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