Starting a New Compose Multiplatform Project

Miłosz Kałucki
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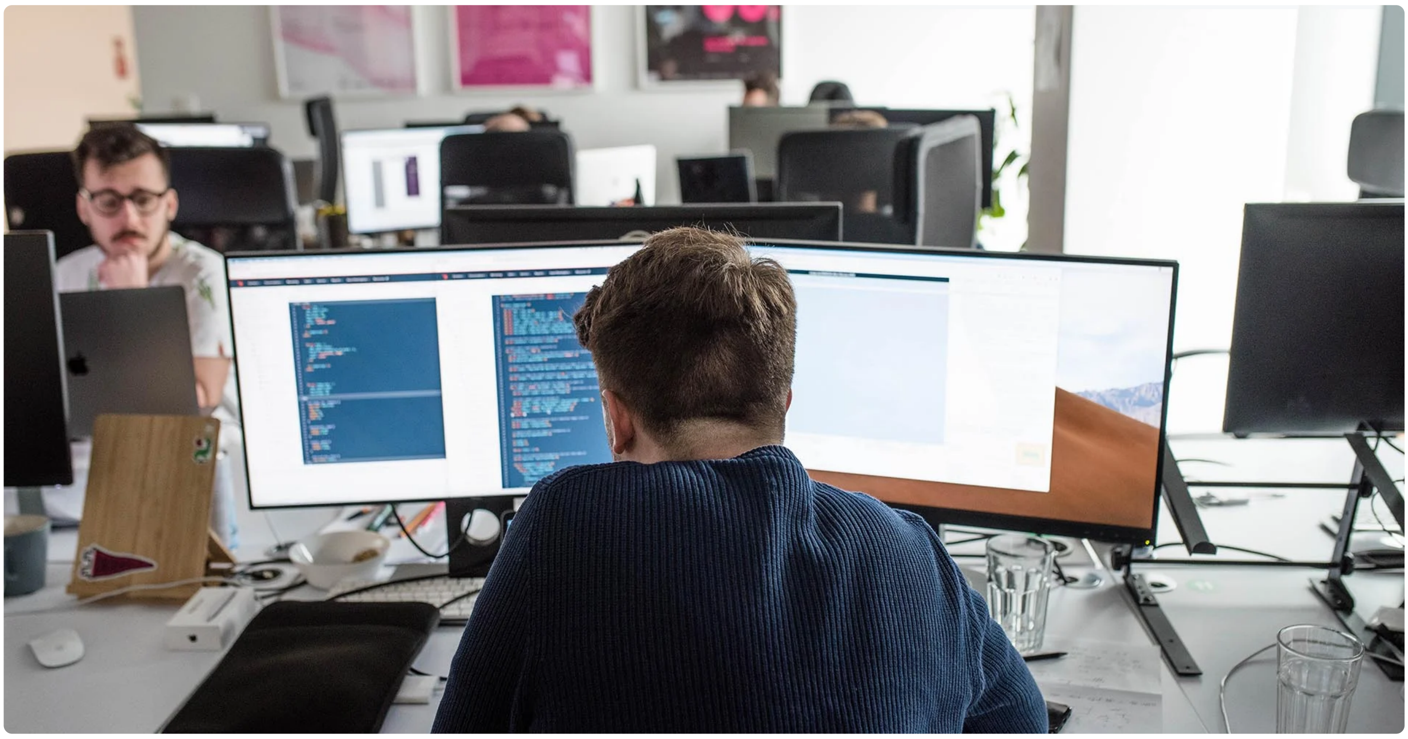


Compose Multiplatform (CM) was a result of the collaboration between Google and the company behind Android Studio and IntelliJ.

It's a UI framework that simplifies and speeds up desktop app development with the use of Kotlin. CM uses part of the same technology as Jetpack Compose but extends it to work across p orms.

The Compose Multiplatform framework brings the declarative UI model known to Android ~~develope~~rs to other platforms, including:

- Desktop apps (Linux, macOS, and Windows)
- Web apps
- iOS apps (currently under development)

This technical guide aims to explain how you can create your own Compose Multiplatform project, add modules, and perform basic setup.

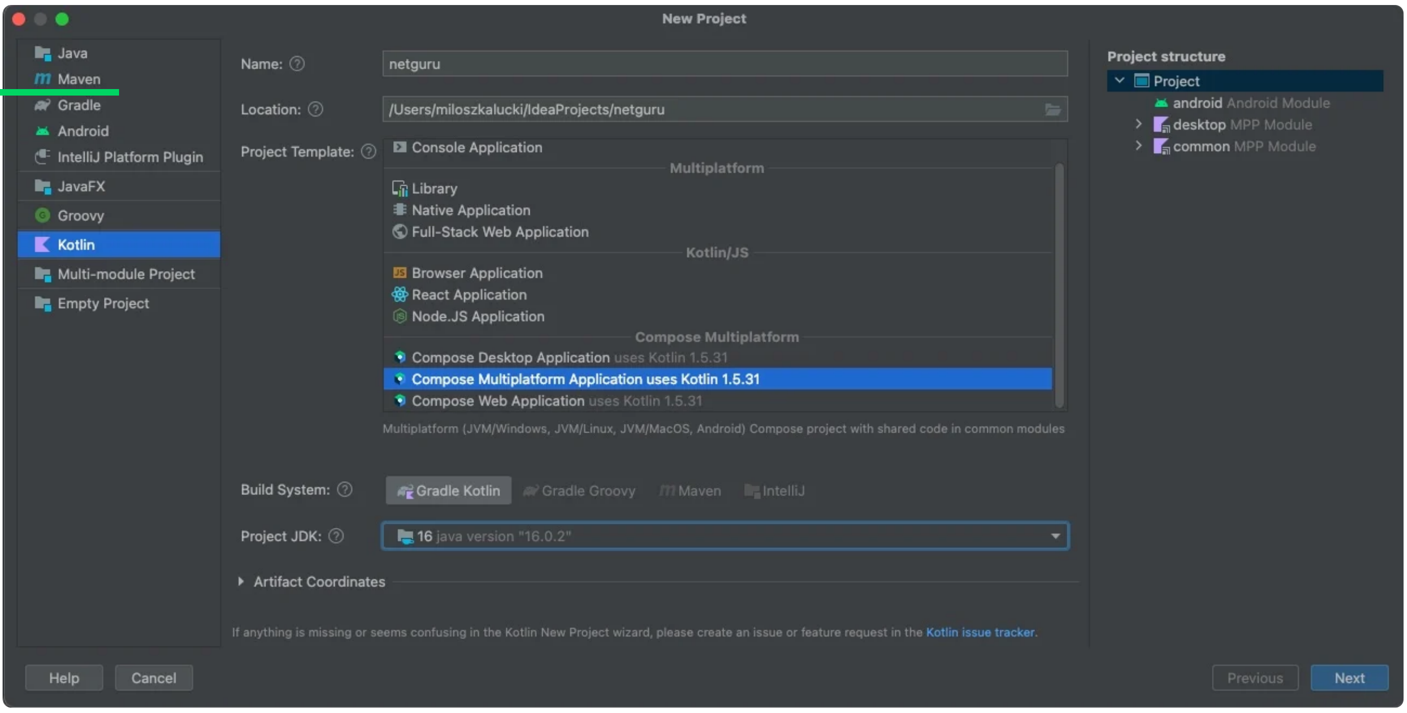
Compose Multiplatform app template

To start a new Compose Multiplatform project, you first need to install IntelliJ IDEA

After selecting `New Project`, proceed to select `Kotlin`. Then, pick `Compose Multiplatform Application`… from the available templates.

Note that your JDK must be at least JDK 11. Furthermore, to be able to use native distribution packaging, you must use JDK 15 or later.

After choosing a name and location for the new project, click `Next`.



Name: netguru

Location: /Users/miloszkalucki/IdeaProjects/netguru

Project Template: Compose Multiplatform Application uses Kotlin 1.5.31

Multiplatform (JVM/Windows, JVM/Linux, JVM/MacOS, Android) Compose project with shared code in common modules

Build System: Gradle Kotlin

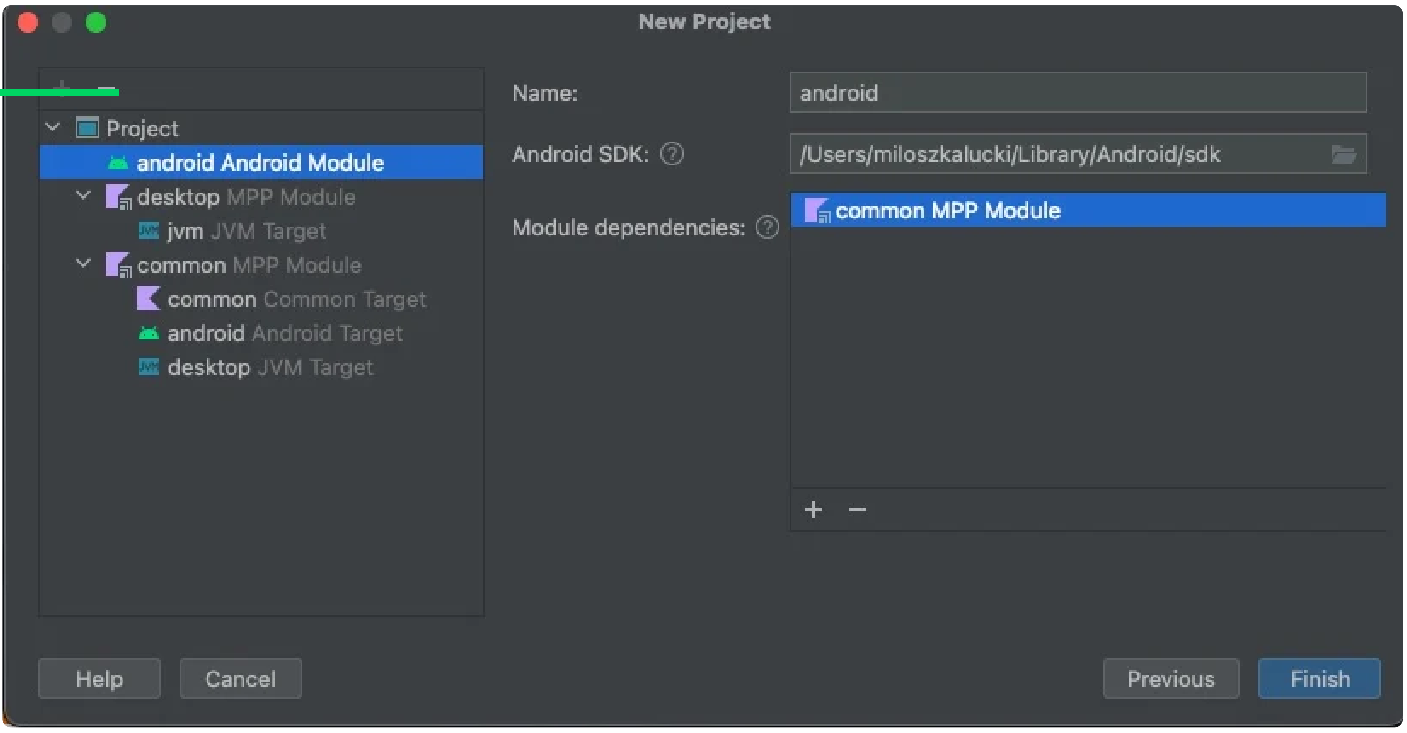
Project JDK: 16 java version "16.0.2"

If anything is missing or seems confusing in the Kotlin New Project wizard, please create an issue or feature request in the Kotlin issue tracker.

New project creator

When using this for Android, you'll be prompted to provide a path to Android SDK. You can use the one that was bundled with your Android Studio installation, which should be located in `/Users/<your name>/Library/Android/sdk.`

If you're having trouble locating it or want to use a standalone SDK, you may want to check out this guide: Finding Android SDK on Mac and adding to PATH.



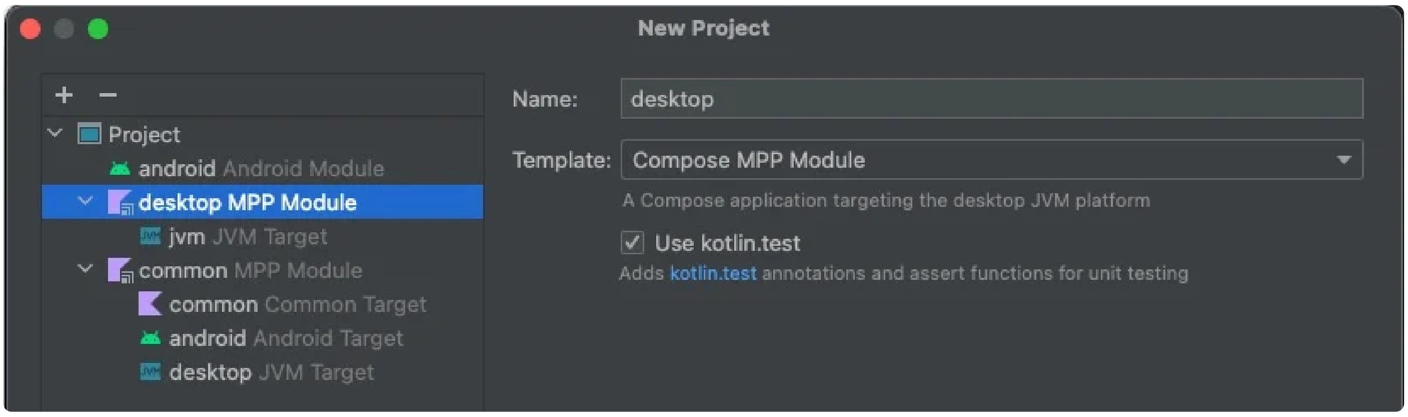
Name: android

Android SDK: /Users/miloszkalucki/Library/Android/sdk

Module dependencies: common MPP Module

Module setup

At this stage, you can also click on your modules and targets. You can modify them to your needs.



Name: desktop

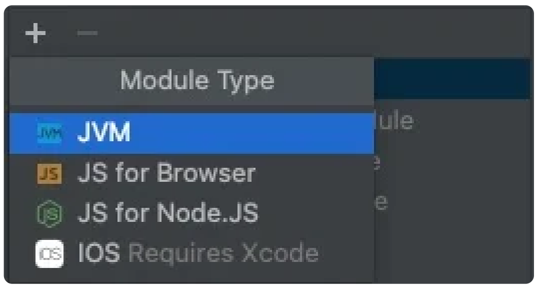
Template: Compose MPP Module

A Compose application targeting the desktop JVM platform

☑ Use kotlin.test

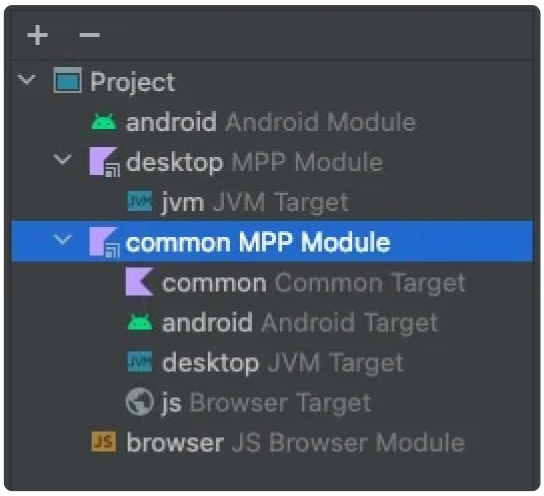
Adds kotlin.test annotations and assert functions for unit testing

You can also include additional modules, such as Web or iOS, by selecting `Project` in the menu and clicking (or right-clicking) the `+` button.



L f available modules

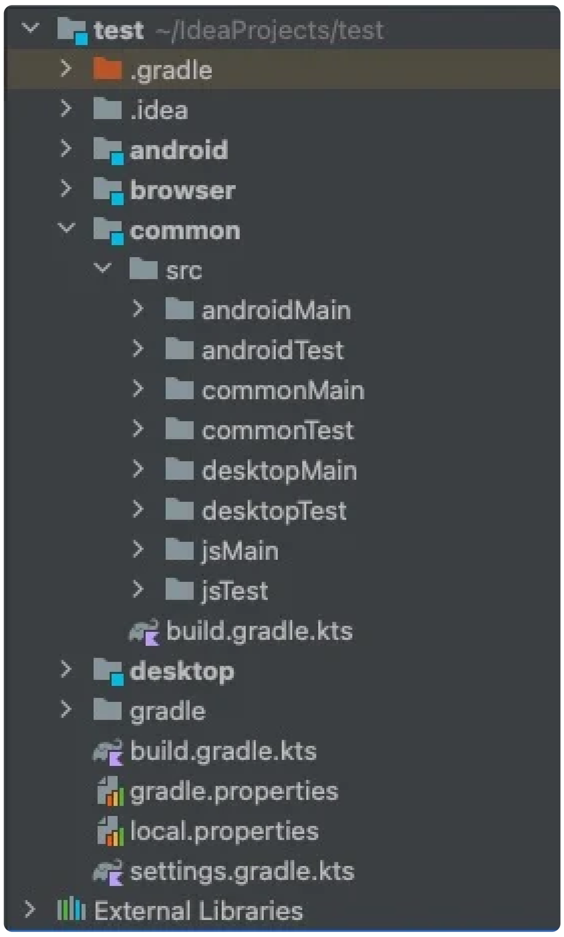
After adding the `browser` module, you can proceed to add a `js` target to the `common` module if ~~you want~~ to reference it in the `browser` module.



```
+ −
Project
    android Android Module
  desktop MPP Module
      jvm JVM Target
  common MPP Module
      common Common Target
      android Android Target
      desktop JVM Target
      js Browser Target
  browser JS Browser Module
```

You can also remove any unwanted `modules` and `targets` by right-clicking on them and selecting `Remove …:.`

If you're ready with the configuration, click Finish to jump into your new project. This should be the result of your template configuration:



```
test ~/IdeaProjects/test
  .gradle
  .idea
  android
  browser
  common
    src
      androidMain
      androidTest
      commonMain
      commonTest
      desktopMain
      desktopTest
      jsMain
      jsTest
    build.gradle.kts
  desktop
  gradle
  build.gradle.kts
  gradle.properties
  local.properties
  settings.gradle.kts
External Libraries
```

Project structure straight out of configuration phase

Modules and their purpose

Now, a module directory for each platform — `Android`, `browser`, and `desktop` — has been generated. They are what you might consider as entry points to the application. For example, the `Android` module could be thought of as a traditional `app` module in an Android multi-module project. You've put the main Activity there and from inside it, you can set the content from the `common` module.

These platform-specific modules each reference the `common` module, where you can put common code like Compose Multiplatform composables, domain, and data code.

Out of all the directories that were generated inside the common module, the main one that you should take interest in is `commonMain` where you'll be putting most of the multiplatform code. I'lll explain the other directories further down in this guide.

How is Compose for Web different?

Although Compose for Web works in a similar manner to classic Jetpack Compose (i.e. view is made out of composable functions that recompose when their parameters' value changes), it has unique elements that create the layout.

As of writing, it's not possible to use Compose's `Column()`, `Row()`, and `Box()`. Instead, the view in Compose for Web needs to be made out of the DOM elements, which can be added using composable functions like `Div()`, `Span()`, and `Button()`, which is different to the classic Compose Button(). To theme these elements, you would need to use the style builder to apply CSS in Compose.

```
Div({ style { padding(25.px) } }) {
    Button(attrs = {
        onClick { console.log("Clicked") }
    }) {
        Text("Click me")
    }
}
```

Due to these reasons, I'm skipping web implementation and pushing it further down in this article.

Add platform-specific Composable

Let's say that in the `common` module inside the `commonMain` directory, that you'd like to have some common code for a dropdown menu. The problem (as of the time of writing this guide) is that there's no common dropdown composable for these two platforms. Because of this, we need platform-specific code for each. How do you do that? In `commonMain`, you can create a `CustomDropdown.kt` file. Inside it, use the `expect` keyword:

```
@Composable
expect fun  CustomDropdownMenu(
    expanded: Boolean,
    onDismissRequest: () -> Unit,
)
```

In `desktopMain`, you can create `DesktopCustomDropdown.kt.`

```
@Composable
actual fun  CustomDropdownMenu(
    expanded: Boolean,
    onDismissRequest: () -> Unit,
) {
    DropdownMenu(
        expanded = expanded,
        onDismissRequest = onDismissRequest,
        focusable = false // Example of a parameter available only on desktop implementation
    ) {
        // desktop dropdown content
    }
}
```

This `DropdownMenu` composable looks identical to the one for Android. Take note that this could be deceiving. They are separate implementations and are platform-specific. They're not the same.

After creating these three files, you can now use a common composable `CustomDropdownMenu()` in the `commonMain` directory.

In the `androidMain` subdirectory, you also need to always have an `AndroidManifest.xml` file with the name of the package inside like so:

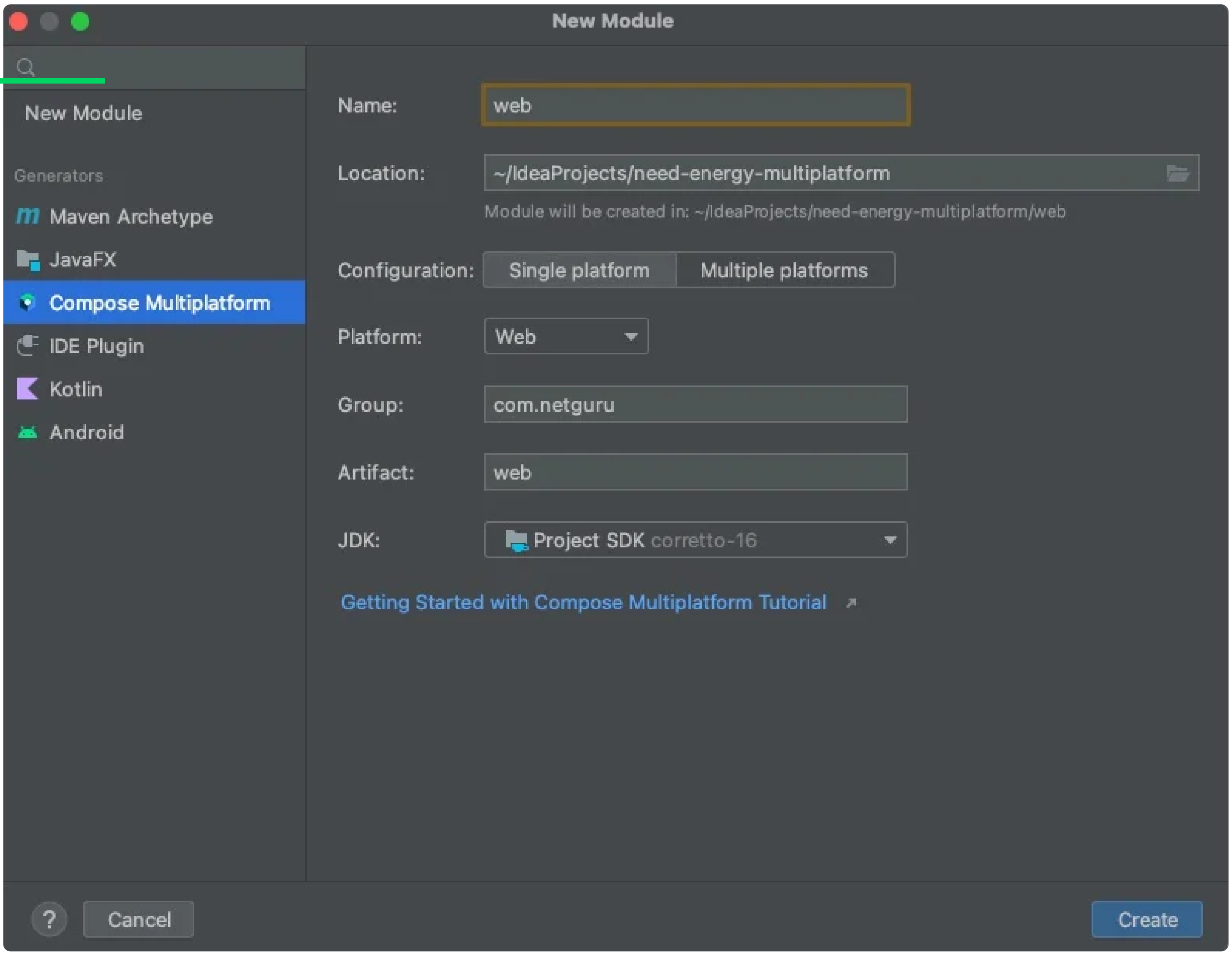
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
package="com.netguru.common" />
```

The directories with the `Test` suffix are, of course, for testing the code in corresponding directories. For example, you should have tests for the `androidMain` code inside `androidTest.`

Manually add new target (with web example)

If you need to add the web module after setting up your project in IntelliJ IDEA, you can do it following these steps:

- In IntelliJ IDEA, select `File` > `New` > `Module`.
- Select the `Compose Multiplatform` generator, pick `Web` for the platform, and fill out the other fields.



Name: web

Location: ~/IdeaProjects/need-energy-multiplatform

Module will be created in: ~/IdeaProjects/need-energy-multiplatform/web

Configuration: [✓ Single platform] Multiple platforms

Platform: Web

Group: com.netguru

Artifact: web

JDK: Project SDK corretto-16

- Click `Create` to create the web module.
- In the common module that you're going to reference in the web module, add js target and the proper source sets in `common/build.gradle.kts`.

```
kotlin {
    ...
    js {
        binaries.executable()
        browser {
            commonWebpackConfig {
                cssSupport.enabled = true
            }
        }
    }
    sourceSets {
        ...
        val jsMain by getting
        val jsTest by getting
    }
}
```

- Add the following directories to the common module:

- src/jsMain/kotlin
- src/jsMain/resources
- src/jsTest/kotlin
- src/jsTest/resources

If you want to manually set up the web module from scratch, consider following the official guide: Getting Started With Compose for Web.

iOS module

While writing UI in Compose is on the horizon for iOS, for now you can strive to achieve universal domain/data application layers with Kotlin and import them to your iOS module as XCFrameworks.

Declaring dependencies

Holding a single source of truth for the dependencies in a multiplatform project is no different from a regular multimodule Android application - you can opt in to use Kotlin objects from buildSrc, or Gradle version catalogues if you prefer.

Common dependencies with platform-specific implementations

Some libraries (such as mockk) don't have one common dependency. They require adding ~~platform-~~specific dependencies next to the common one. In a multiplatform project that uses mockk, you should add the following dependencies in the common module `build.gradle.kts`:

```
...
kotlin {
    ...
    sourceSets {
        val commonMain by getting { ... }
        val androidMain by getting { ... }
        val desktopMain by getting { ... }
        val commonTest by getting {
            dependencies {
                ...
                implementation(libs.mockk.common)
            }
        }
        val androidTest by getting {
            dependencies {
                ...
                implementation(libs.mockk)
                implementation(libs.mockk.agentJvm)
            }
        }
        val desktopTest by getting {
            ...
            implementation(libs.mockk)
        }
    }
}
...
```

You need to keep this in mind when deciding to use a new library in your multiplatform project.

Conclusion

While this Compose Multiplatform template is at this time available only in IntelliJ IDEA, once you h created the desired initial configuration you can return to Android Studio to develop your application. Different targets, such as Desktop or Web, can be run via appropriate `gradlew` commands.

As Compose Multiplatform evolves, I'll be more than happy to share new approaches that will surface. For more technical notes similar to this guide, you may check out our library of resources at Netguru. If you're looking for an extra hand with Kotlin or Compose Multiplatform, reach out to us, and tell us more about your project.

TAGS

Kotlin-Multiplatform

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Miłosz Kałucki

Android Developer at Netguru

netguru

Netguru S.A.

Nowe Garbary Office Center
ul. Małe Garbary 9
61-756 Poznań, Poland

VAT-ID: PL7781454968
REGON: 300826280
KRS: 0000745671

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hello@netguru.com

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