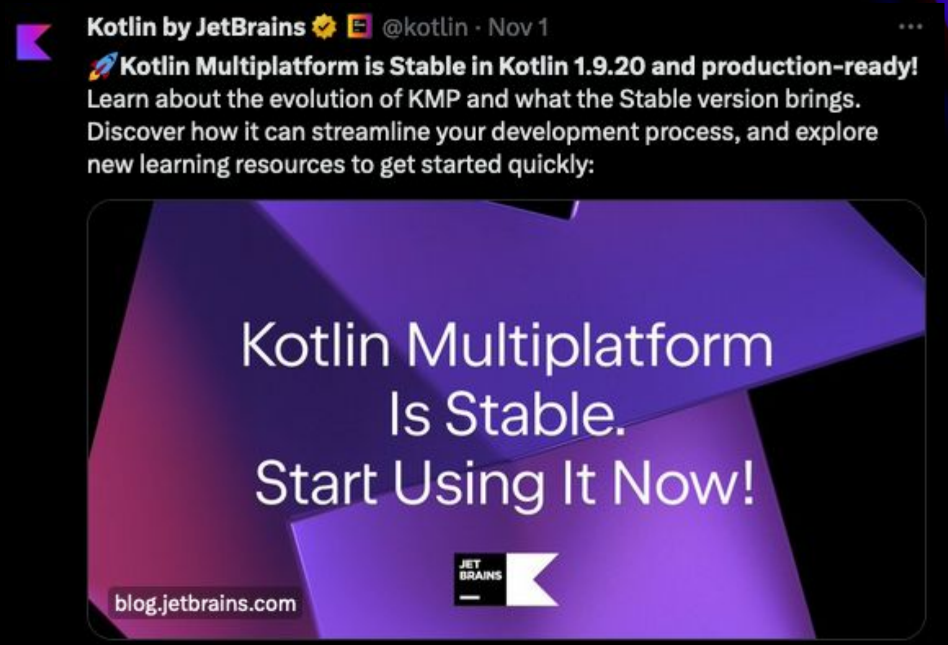
Getting Started With KMP

Build Apps for iOS and Android…
…with Shared Logic and Native UIs

Four Webinars on Kotlin Multiplatform Development

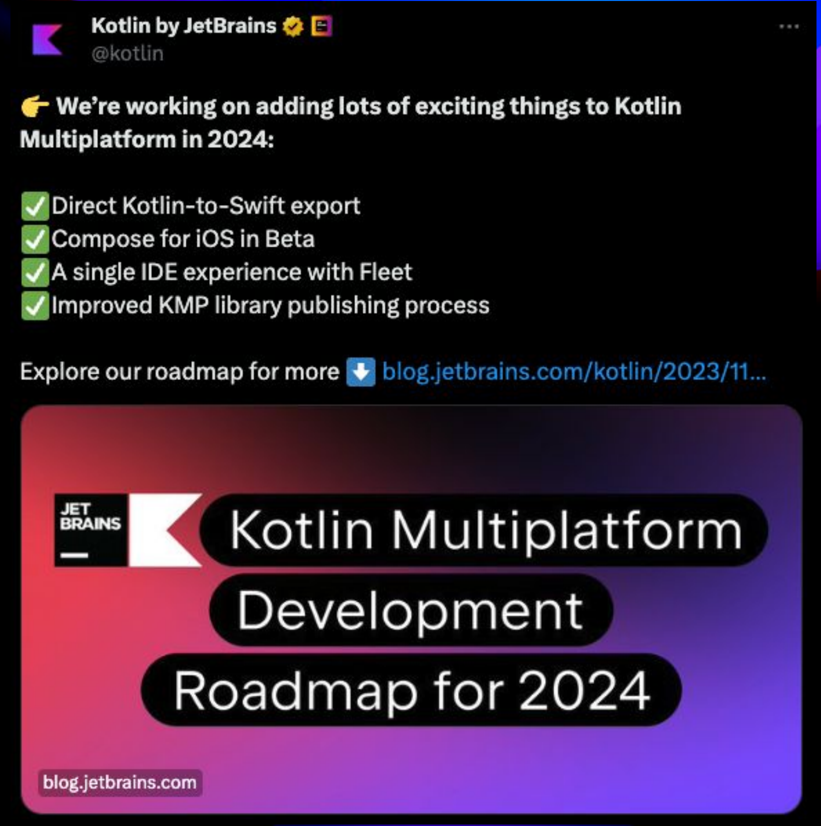
- ➔ **Nov 21:** The State of Kotlin Multiplatform
- ➔ **Nov 23:** Getting Started With KMP: Build Apps for iOS and Android With Shared Logic and Native UIs
- ➔ **Nov 28:** Getting Started With KMP: Build Apps for iOS, Android, and Desktop In 100% Kotlin With Compose Multiplatform
- ➔ **Nov 30:** iOS Development With Kotlin Multiplatform: Tips and Tricks

https://info.jetbrains.com/kotlin-webinars-2023



Kotlin by JetBrains @kotlin · Nov 1

🚀**Kotlin Multiplatform is Stable in Kotlin 1.9.20 and production-ready!**
Learn about the evolution of KMP and what the Stable version brings.
Discover how it can streamline your development process, and explore new learning resources to get started quickly:



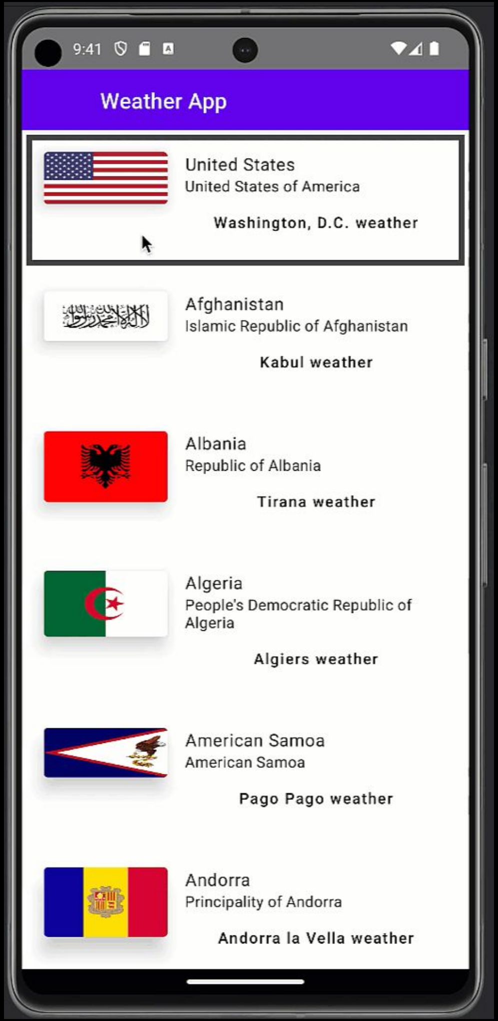
Kotlin by JetBrains
@kotlin

👉 **We're working on adding lots of exciting things to Kotlin Multiplatform in 2024:**

✅Direct Kotlin-to-Swift export
✅Compose for iOS in Beta
✅A single IDE experience with Fleet
✅Improved KMP library publishing process

Explore our roadmap for more ⬇️ blog.jetbrains.com/kotlin/2023/11...

Jetpack Compose



9:41

Weather App

United States
United States of America
Washington, D.C. weather

Afghanistan
Islamic Republic of Afghanistan
Kabul weather

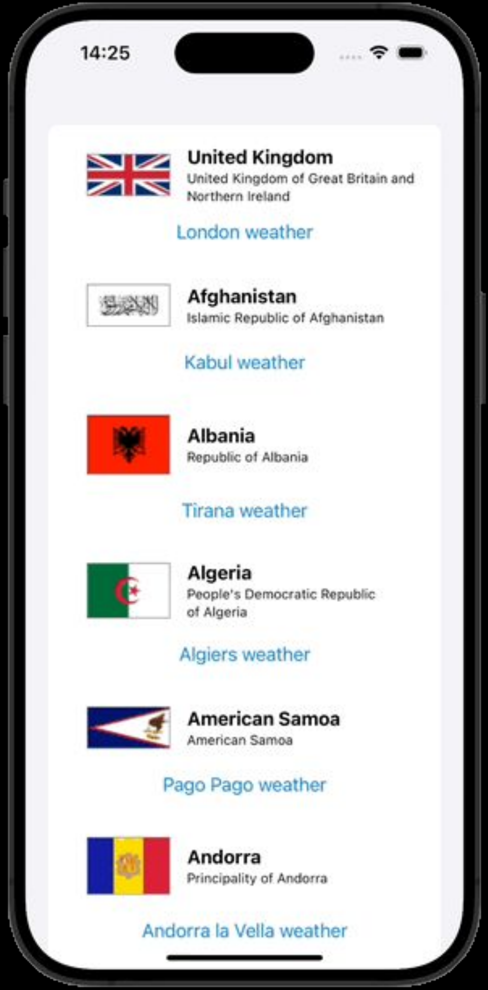
Albania
Republic of Albania
Tirana weather

Algeria
People's Democratic Republic of Algeria
Algiers weather

American Samoa
American Samoa
Pago Pago weather

Andorra
Principality of Andorra
Andorra la Vella weather

SwiftUI



14:25

United Kingdom
United Kingdom of Great Britain and Northern Ireland
London weather

Afghanistan
Islamic Republic of Afghanistan
Kabul weather

Albania
Republic of Albania
Tirana weather

Algeria
People's Democratic Republic of Algeria
Algiers weather

American Samoa
American Samoa
Pago Pago weather

Andorra
Principality of Andorra
Andorra la Vella weather

Access to resources

This webinar is being recorded

Sample code is in the repo below

Shortcut	https://kotl.in/native-ui-webinar
Original	https://github.com/kotlin-hands-on/native-ui-webinar

Slides are included in the project as PDF

Questions we will answer

What is Kotlin Multiplatform / KMP?

To get started, how do I…

- Set up my machine?
- Create a KMP project?
- Start adding and running code?
- Perform platform-specific tasks?

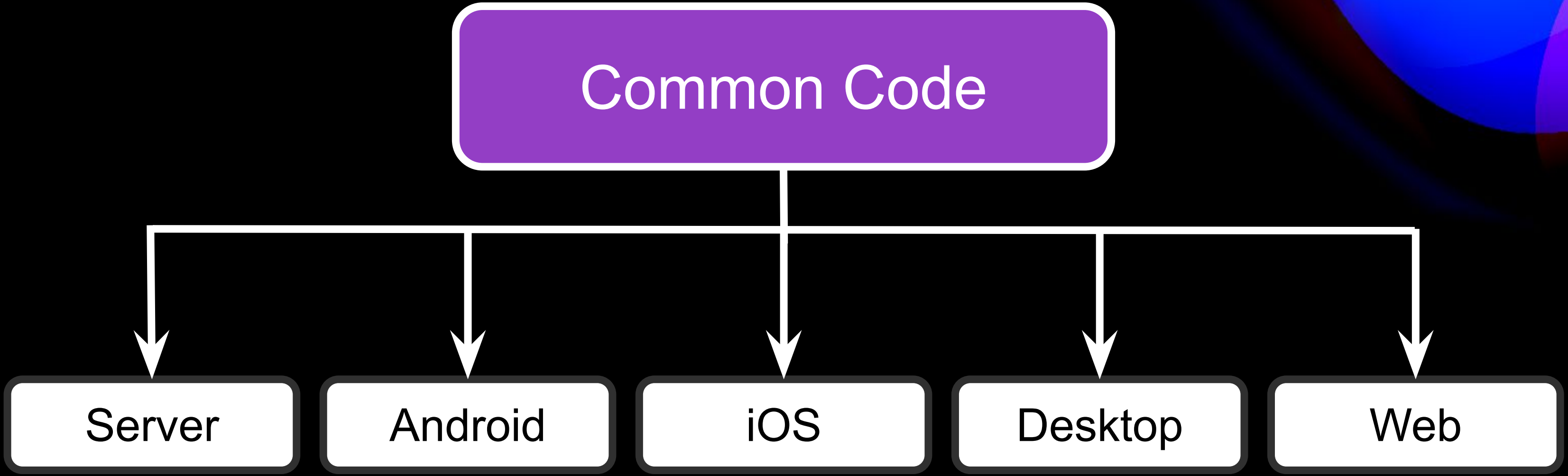
What is Kotlin Multiplatform?
(aka. KMP)

See Previous Webinar 😄

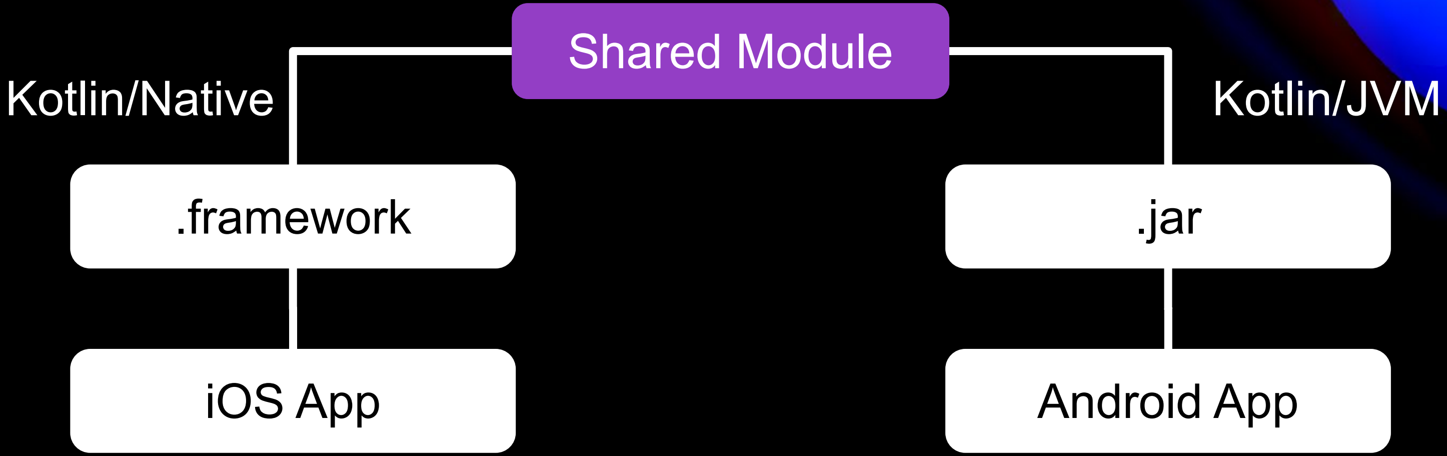
But…

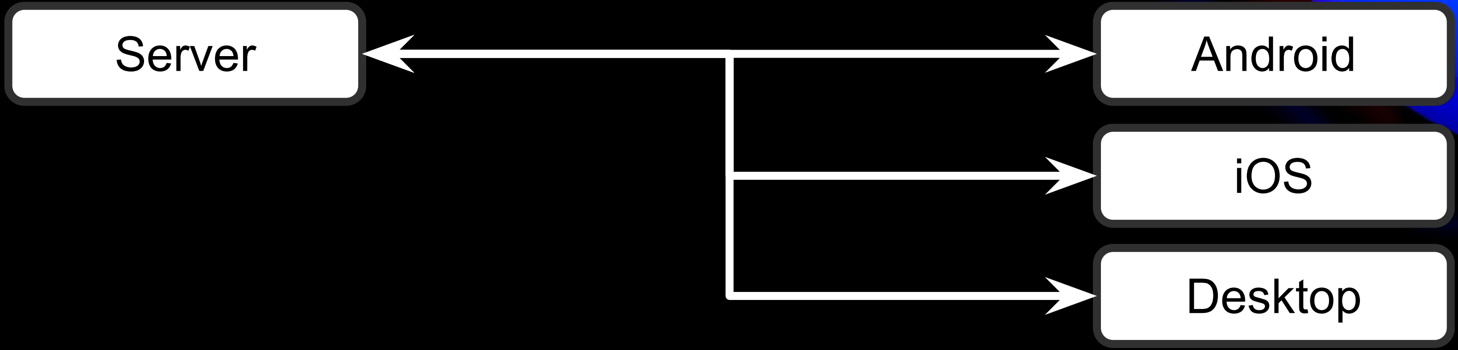
Multiplatform Means Sharing

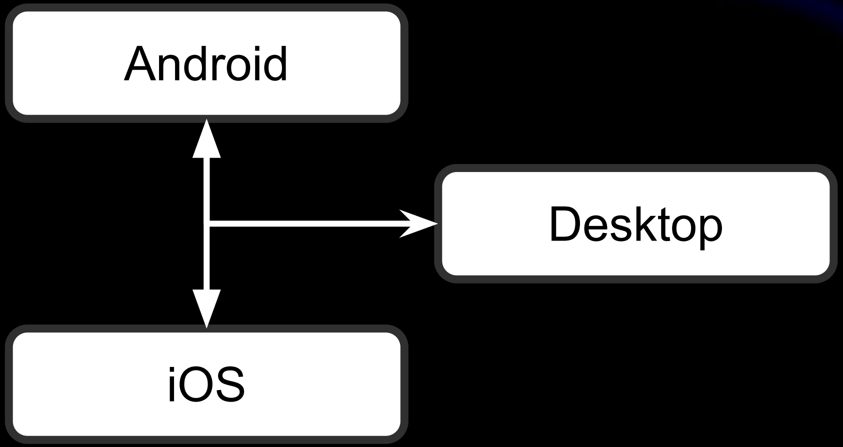
Sharing code across platforms



Sharing code across platforms

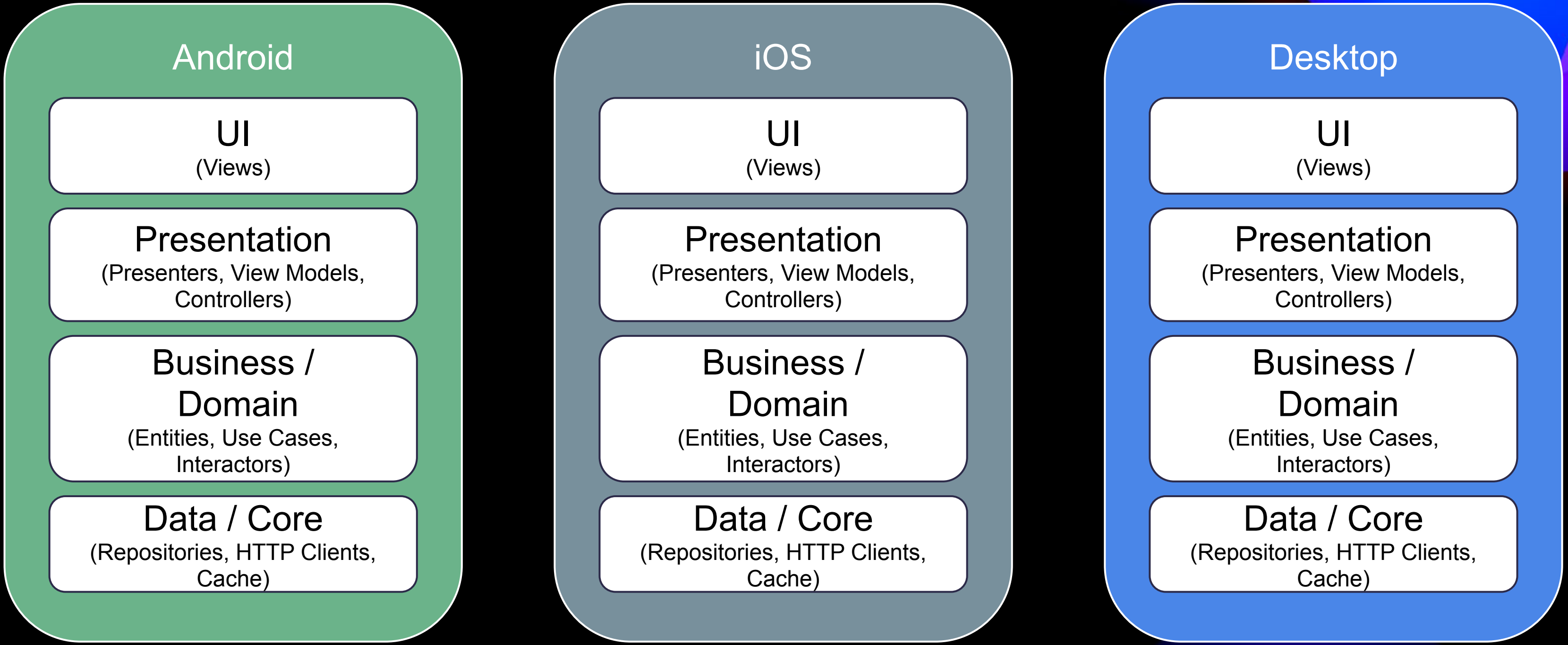



Server
Android
iOS
Desktop


Android
Desktop
iOS

What Do I Share?

Without KMP - separate stacks


Android
UI
(Views)
Presentation
(Presenters, View Models, Controllers)
Business / Domain
(Entities, Use Cases, Interactors)
Data / Core
(Repositories, HTTP Clients, Cache)
iOS
UI
(Views)
Presentation
(Presenters, View Models, Controllers)
Business / Domain
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Desktop
UI
(Views)
Presentation
(Presenters, View Models, Controllers)
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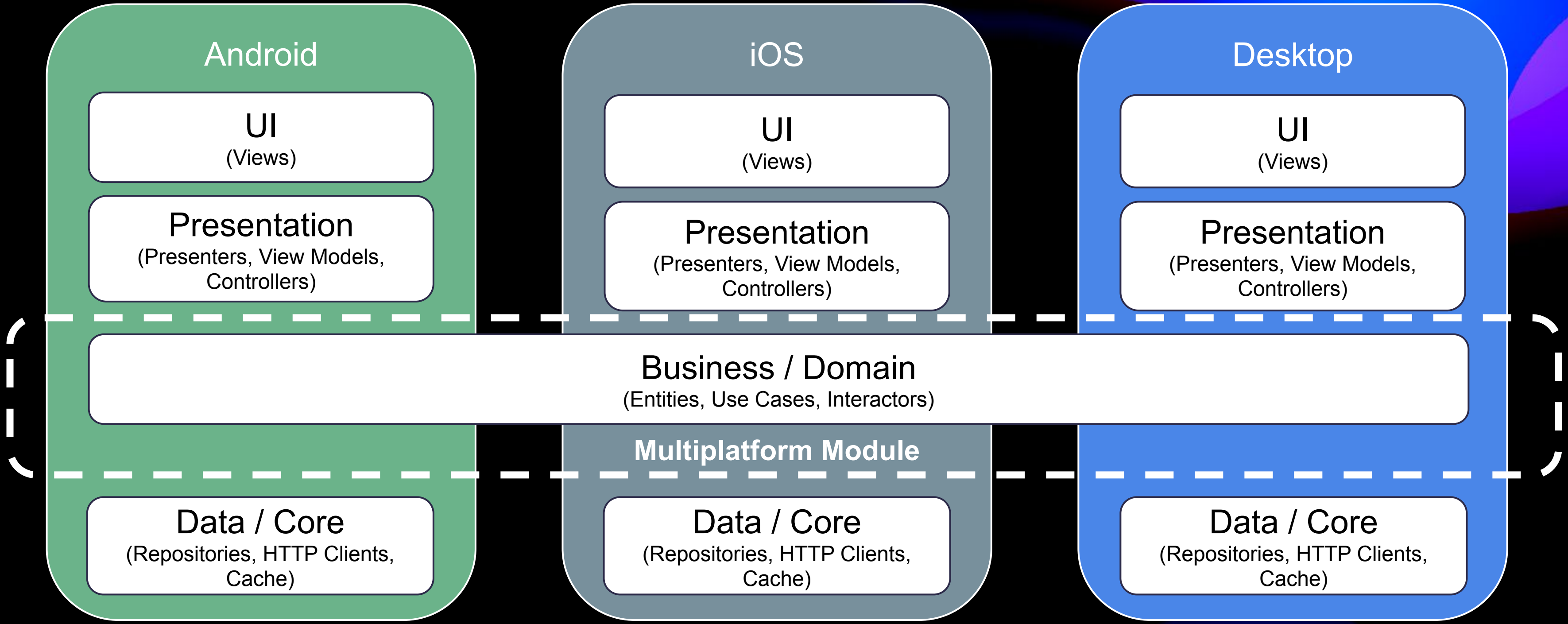
Data / Core
(Repositories, HTTP Clients, Cache)

With KMP - sharing logic & data


Android
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Desktop
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(Views)
UI
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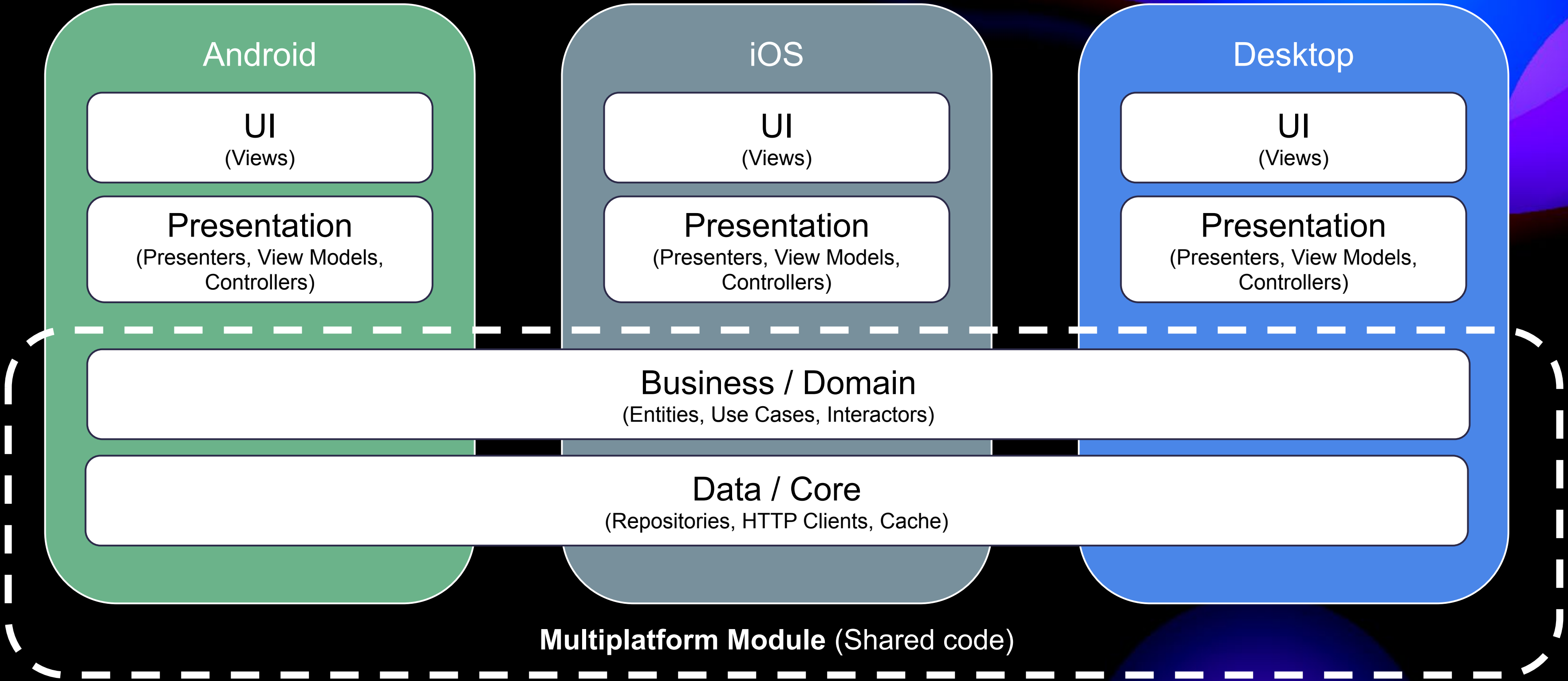
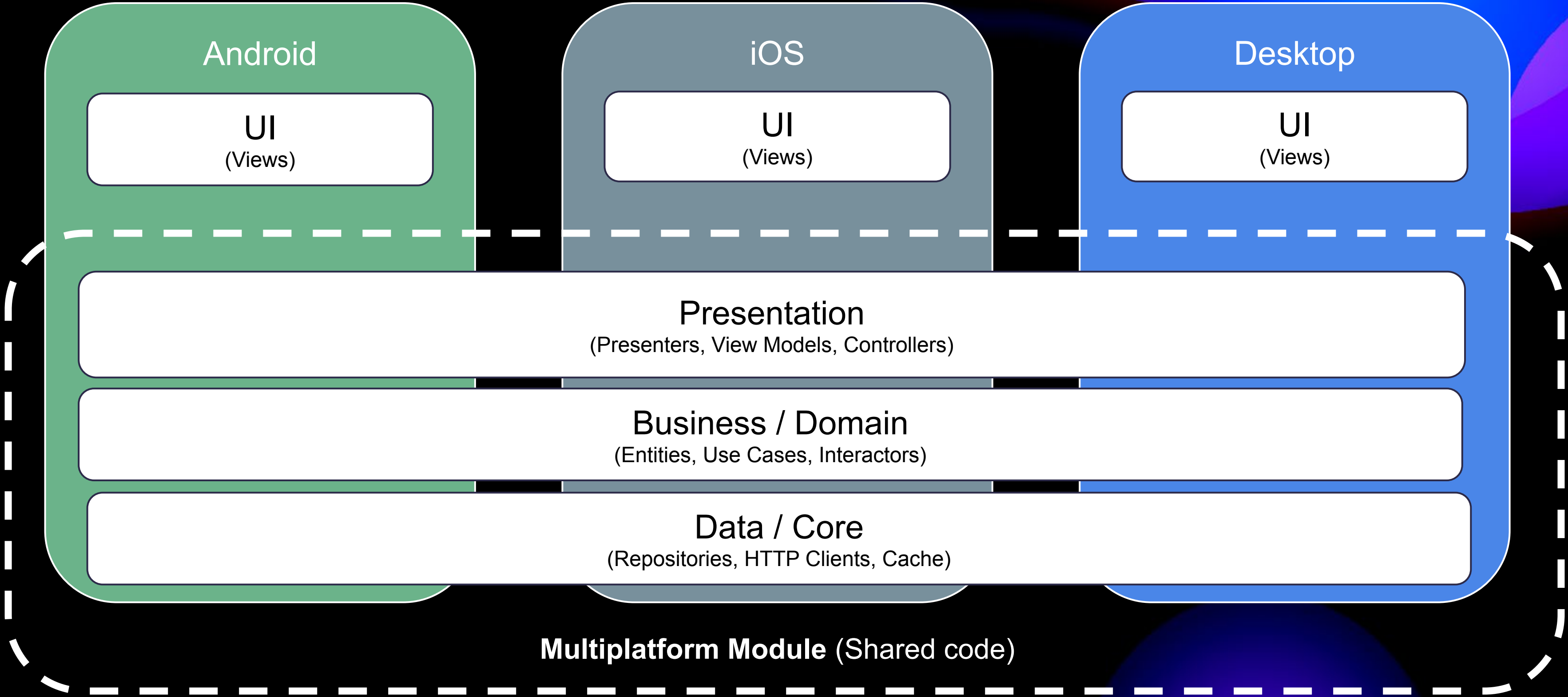
Presentation
(Presenters, View Models, Controllers)
Presentation
(Presenters, View Models, Controllers)
Presentation
(Presenters, View Models, Controllers)
Business / Domain
(Entities, Use Cases, Interactors)
Multiplatform Module
Data / Core
(Repositories, HTTP Clients, Cache)
Data / Core
(Repositories, HTTP Clients, Cache)
Data / Core
(Repositories, HTTP Clients, Cache)

With KMP - sharing logic, data and services



Android
iOS
Desktop
UI
(Views)
Presentation
(Presenters, View Models, Controllers)
Business / Domain
(Entities, Use Cases, Interactors)
Data / Core
(Repositories, HTTP Clients, Cache)
Multiplatform Module (Shared code)

With KMP - sharing logic, data, services & presentation


Android
iOS
Desktop
UI
(Views)
UI
(Views)
UI
(Views)
Presentation
(Presenters, View Models, Controllers)
Business / Domain
(Entities, Use Cases, Interactors)
Data / Core
(Repositories, HTTP Clients, Cache)
Multiplatform Module (Shared code)

McDonald's®

NETFLIX

PHILIPS PHILIPS

vmware®

AUTODESK

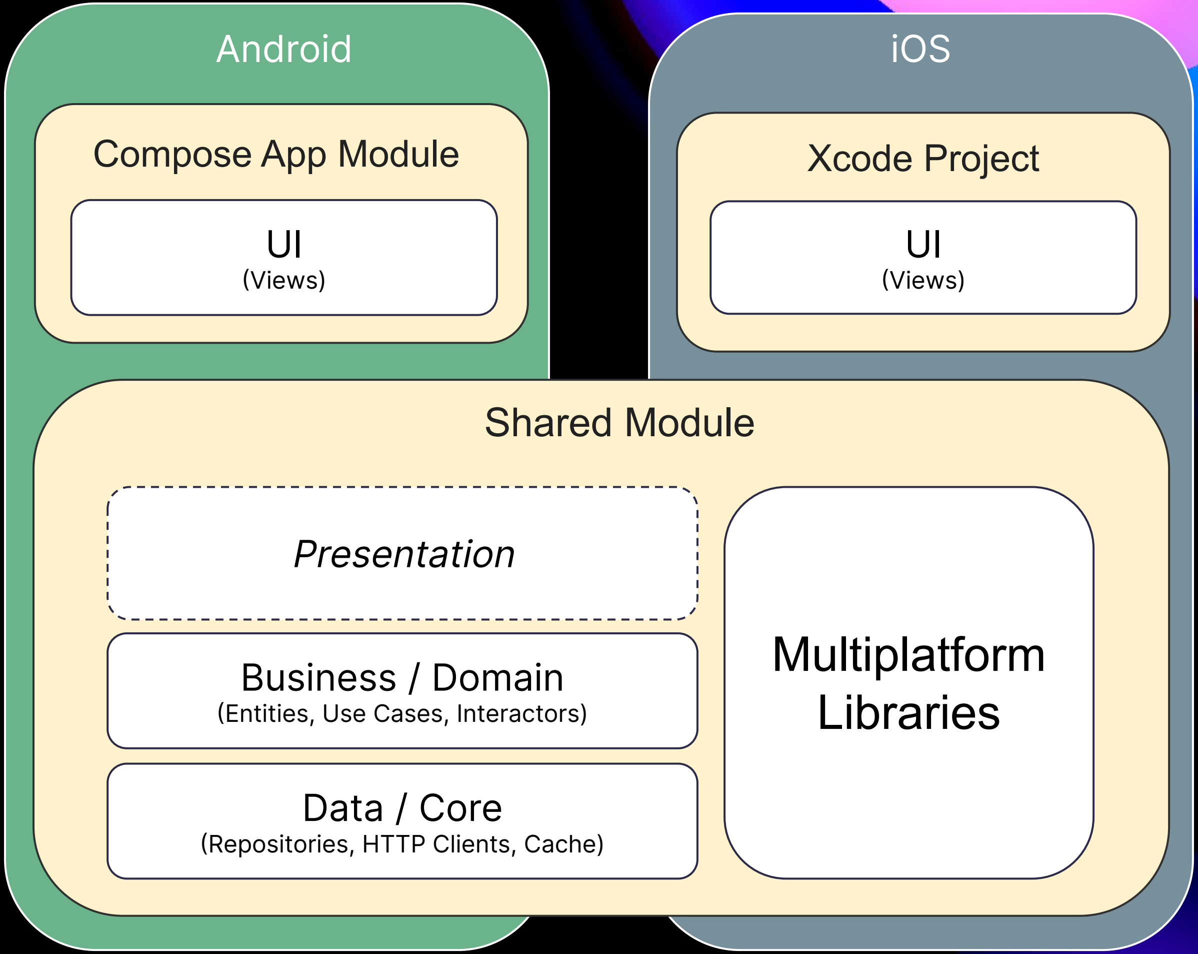
meetup

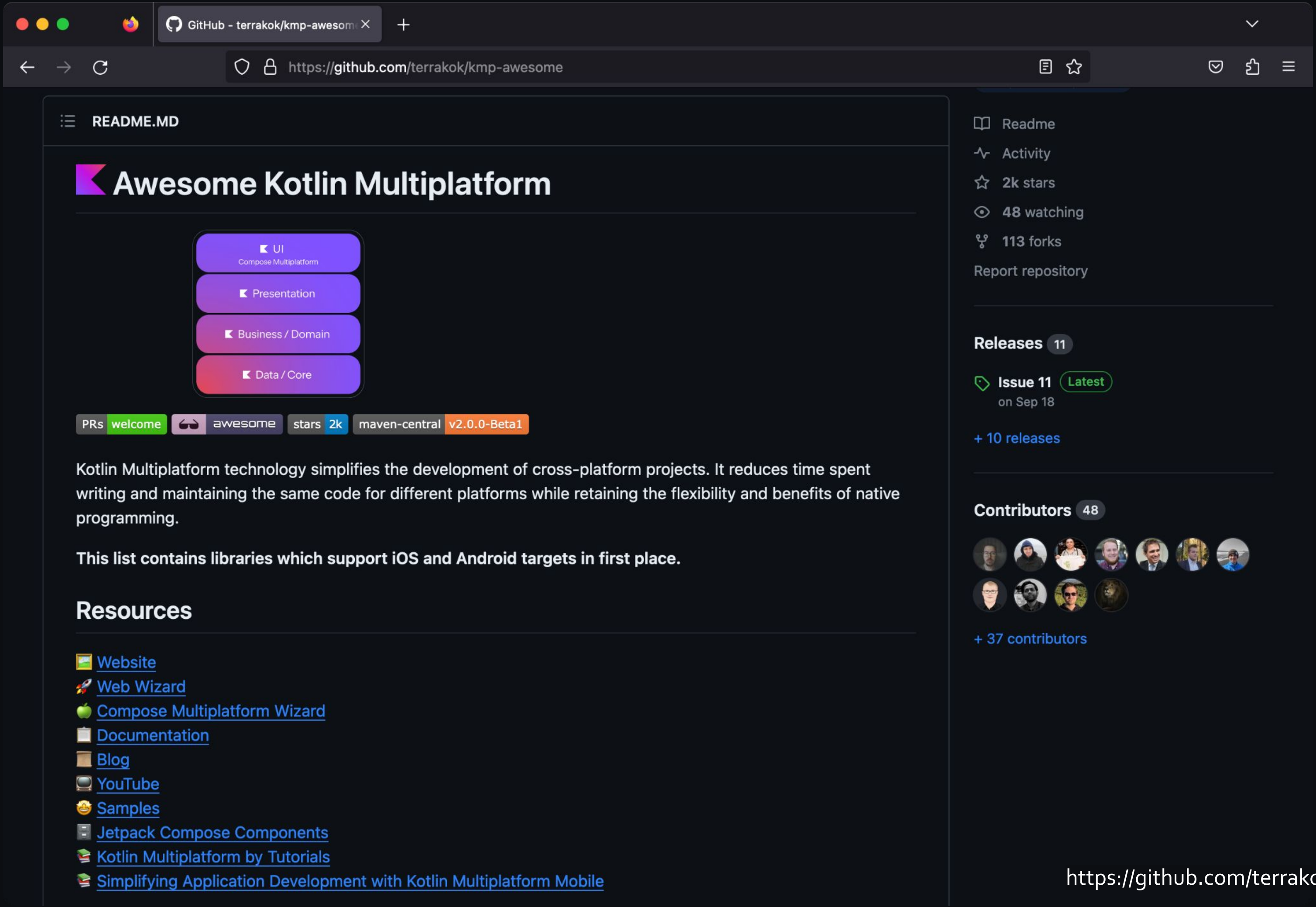
chalk

Forbes

https://www.jetbrains.com/help/kotlin-multiplatform-dev/case-studies.html

Let’s Get Started

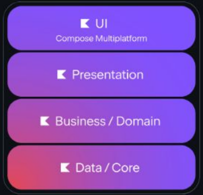

Android
Compose App Module
UI
(Views)
iOS
Xcode Project
UI
(Views)
Shared Module
Presentation
Business / Domain
(Entities, Use Cases, Interactors)
Data / Core
(Repositories, HTTP Clients, Cache)
Multiplatform Libraries


GitHub - terrakok/kmp-awesome

https://github.com/terrakok/kmp-awesome

README.MD

Awesome Kotlin Multiplatform



PRs welcome | awesome | stars 2k | maven-central v2.0.0-Beta1

Kotlin Multiplatform technology simplifies the development of cross-platform projects. It reduces time spent writing and maintaining the same code for different platforms while retaining the flexibility and benefits of native programming.

This list contains libraries which support iOS and Android targets in first place.

Resources

- 🖼️ Website
- 🚀 Web Wizard
- 🍏 Compose Multiplatform Wizard
- 📋 Documentation
- 📜 Blog
- 📺 YouTube
- 🤩 Samples
- 🗄️ Jetpack Compose Components
- 📚 Kotlin Multiplatform by Tutorials
- 📚 Simplifying Application Development with Kotlin Multiplatform Mobile

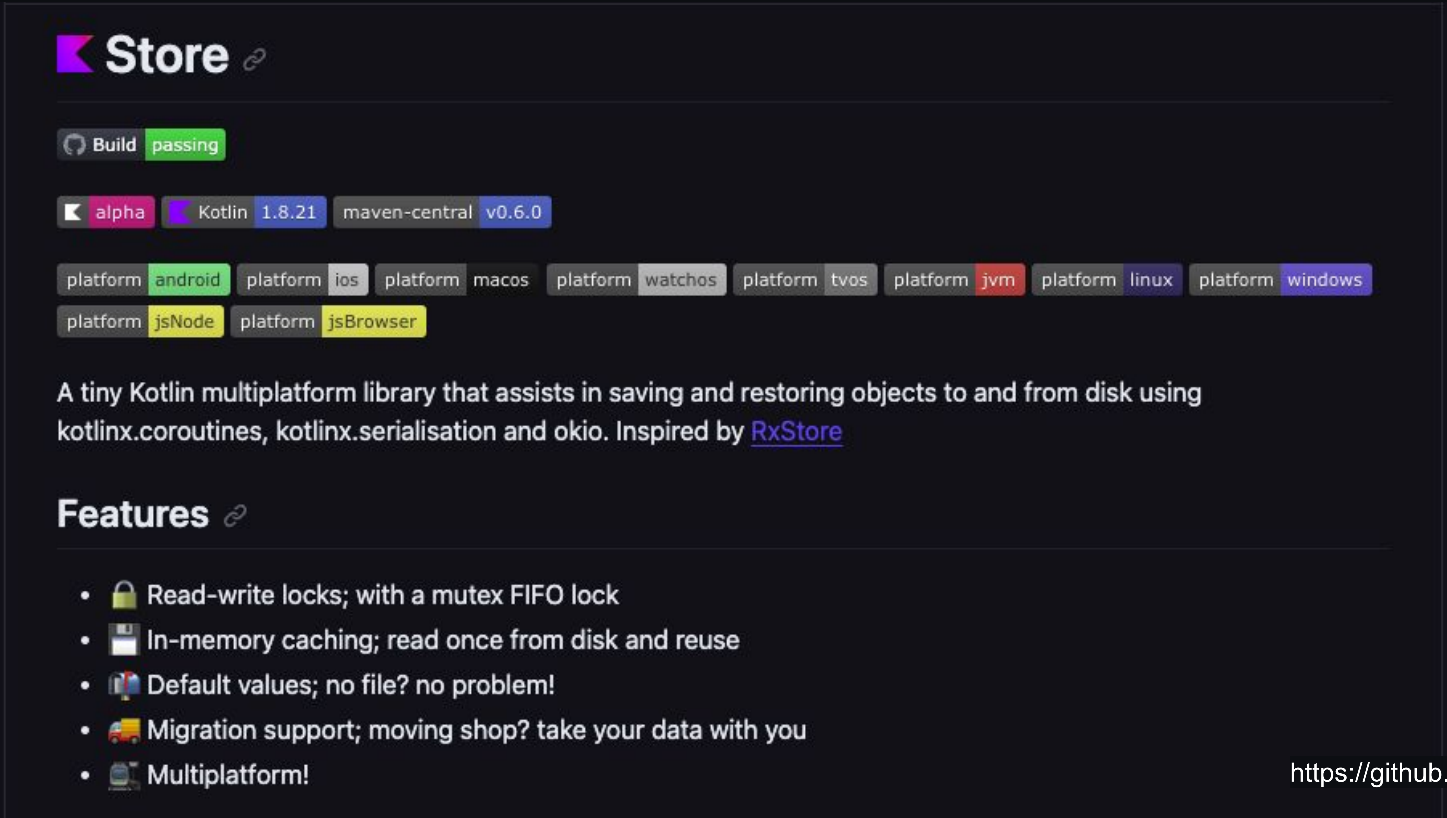
Readme
Activity
2k stars
48 watching
113 forks
Report repository

Releases 11
Issue 11 Latest
on Sep 18
+ 10 releases

Contributors 48
+ 37 contributors

https://github.com/terrakok/kmp-awesome

We will use KStore



Store

Build passing

alpha Kotlin 1.8.21 maven-central v0.6.0

platform android platform ios platform macos platform watchos platform tvos platform jvm platform linux platform windows platform jsNode platform jsBrowser

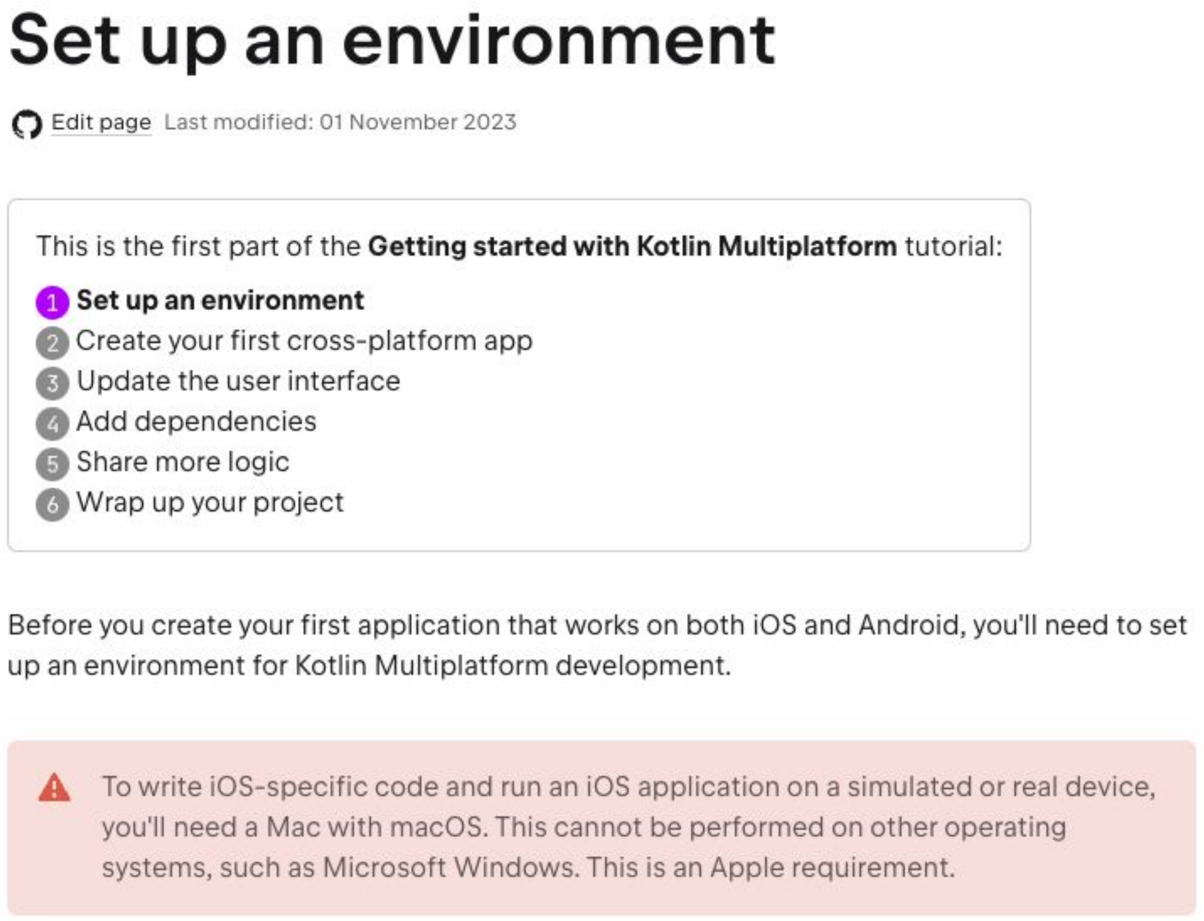
A tiny Kotlin multiplatform library that assists in saving and restoring objects to and from disk using kotlinx.coroutines, kotlinx.serialisation and okio. Inspired by RxStore

Features

- 🔒 Read-write locks; with a mutex FIFO lock
- 💾 In-memory caching; read once from disk and reuse
- 📬 Default values; no file? no problem!
- 🚚 Migration support; moving shop? take your data with you
- 💻 Multiplatform!

https://github.com/xxfast/KStore

How Do I…
Set Up My Machine?



Set up an environment

Edit page Last modified: 01 November 2023

This is the first part of the **Getting started with Kotlin Multiplatform** tutorial:

1. **Set up an environment**
2. Create your first cross-platform app
3. Update the user interface
4. Add dependencies
5. Share more logic
6. Wrap up your project

Before you create your first application that works on both iOS and Android, you'll need to set up an environment for Kotlin Multiplatform development.

To write iOS-specific code and run an iOS application on a simulated or real device, you'll need a Mac with macOS. This cannot be performed on other operating systems, such as Microsoft Windows. This is an Apple requirement.

https://www.jetbrains.com/help/kotlin-multiplatform-dev/multiplatform-setup.html

To target Android

Install Android Studio

Create a Virtual Device

Ignore it

Android Developers > Develop > Android Studio > Android Studio editor

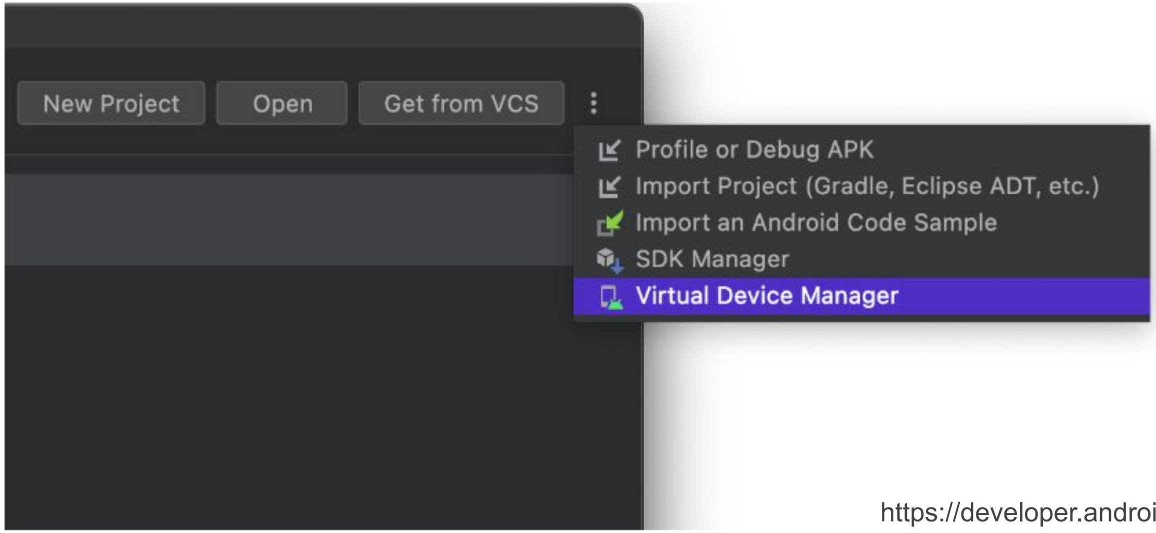
Was this helpful?

Create and manage virtual devices

An Android Virtual Device (AVD) is a configuration that defines the characteristics of an Android phone, tablet, Wear OS, Android TV, or Automotive OS device that you want to simulate in the Android Emulator. The Device Manager is a tool you can launch from Android Studio that helps you create and manage AVDs.

To open the new **Device Manager**, do one of the following:

- From the Android Studio Welcome screen, select **More Actions > Virtual Device Manager**.



https://developer.android.com/studio/run/managing-avds

To target iOS

Install Xcode

Launch Xcode

Accept license terms

Restart on updates

Otherwise ignore it

What about CocoaPods?

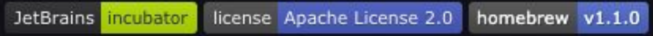
A dependency manager for Swift and Objective-C

You can configure it within your Gradle build file

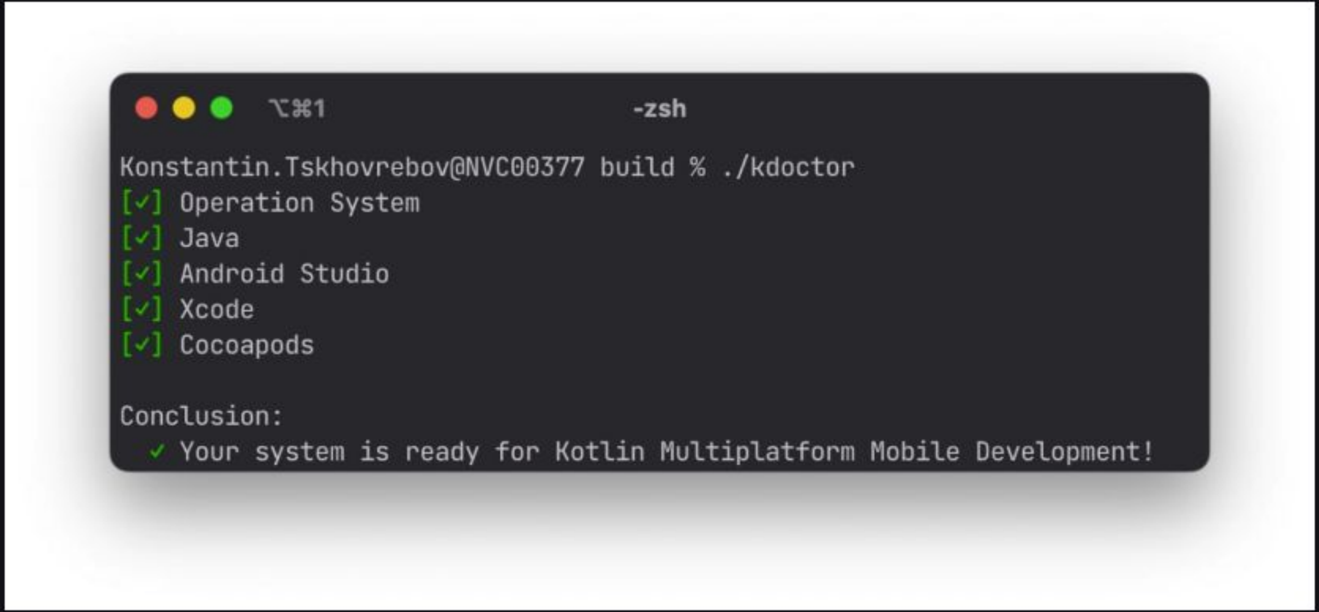
It can be used to declare native dependencies

It’s up to you is you want to use CocoaPods

KDoctor



KDoctor is a command-line tool that helps to set up the environment for Kotlin Multiplatform Mobile app development.



```
Konstantin.Tskhovrebov@NVC00377 build % ./kdoctor
[✓] Operation System
[✓] Java
[✓] Android Studio
[✓] Xcode
[✓] Cocoapods

Conclusion:
  ✓ Your system is ready for Kotlin Multiplatform Mobile Development!
```

https://github.com/Kotlin/kdoctor

Selecting your IDE

Android Studio will work well

IntelliJ IDEA can also be used

But do consider Fleet!

Pros and cons of Fleet

Pro: Code completion and refactoring for Swift

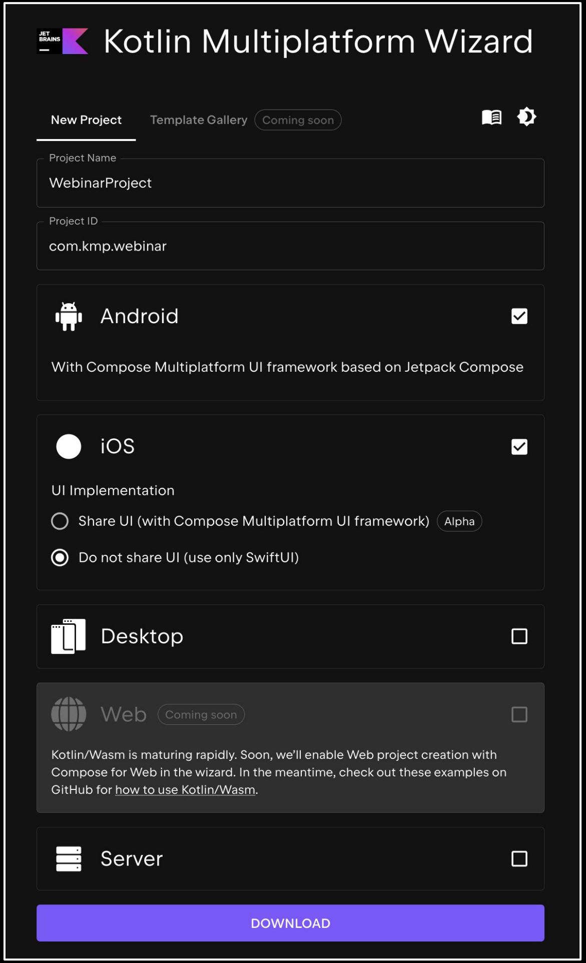
Pro: Cross language navigation and refactoring (Swift ⟷ Kotlin)

Pro: Cross language debugging (Swift ⟷ Kotlin)

Con: Still in Public Preview so expect issues

How Do I…
Create a Project?

kmp.jetbrains.com


Kotlin Multiplatform Wizard

New Project | Template Gallery (Coming soon)

Project Name: WebinarProject

Project ID: com.kmp.webinar

Android [✓]

With Compose Multiplatform UI framework based on Jetpack Compose

iOS [✓]

UI Implementation

- ○ Share UI (with Compose Multiplatform UI framework) Alpha
- [✓ ● Do not share UI (use only SwiftUI)]

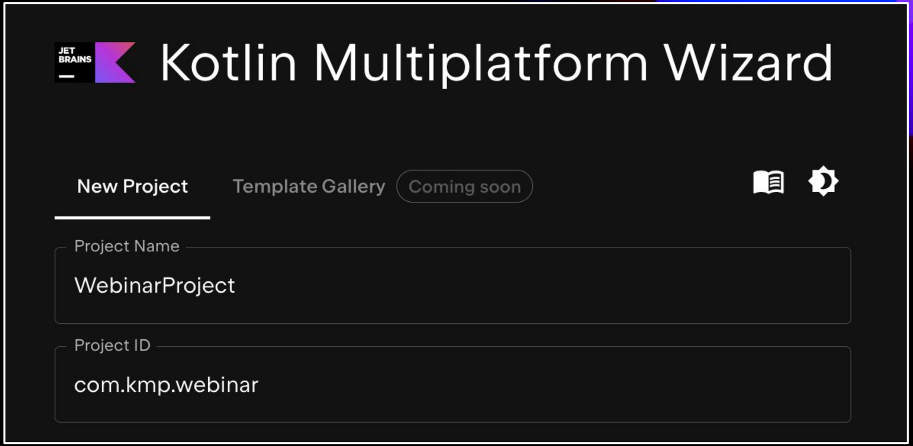
Desktop [ ]

Web (Coming soon) [ ]

Kotlin/Wasm is maturing rapidly. Soon, we'll enable Web project creation with Compose for Web in the wizard. In the meantime, check out these examples on GitHub for how to use Kotlin/Wasm.

Server [ ]

DOWNLOAD


Kotlin Multiplatform Wizard

New Project | Template Gallery (Coming soon)

Project Name: WebinarProject

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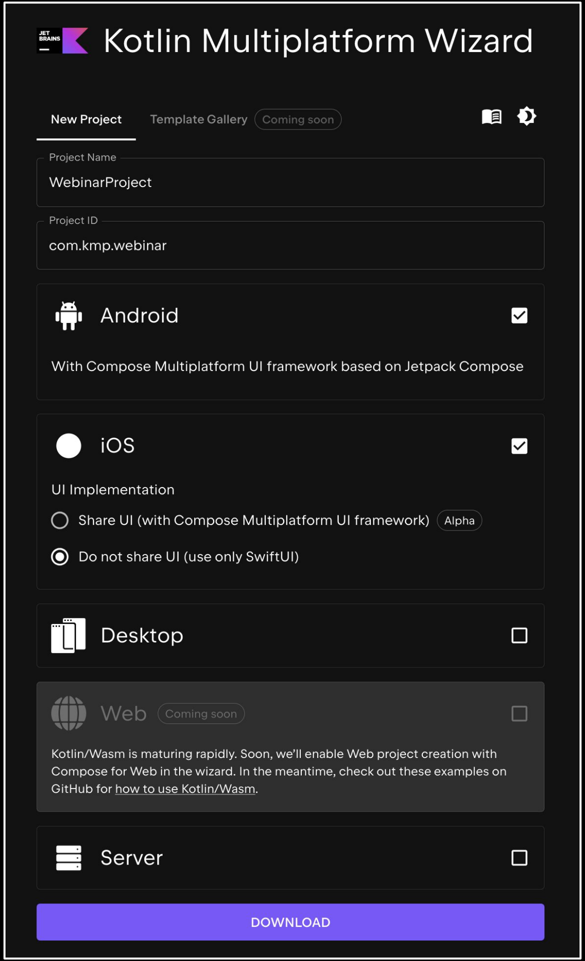

Kotlin Multiplatform Wizard

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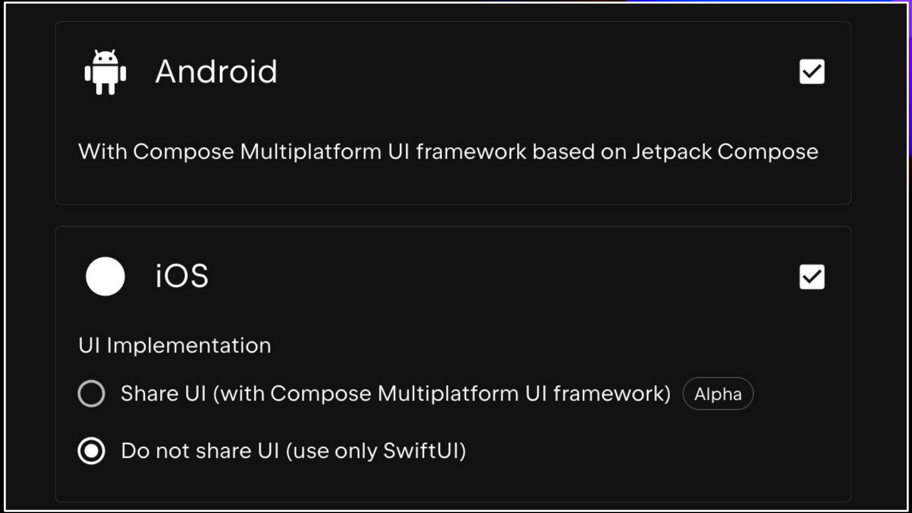

Android [✓]

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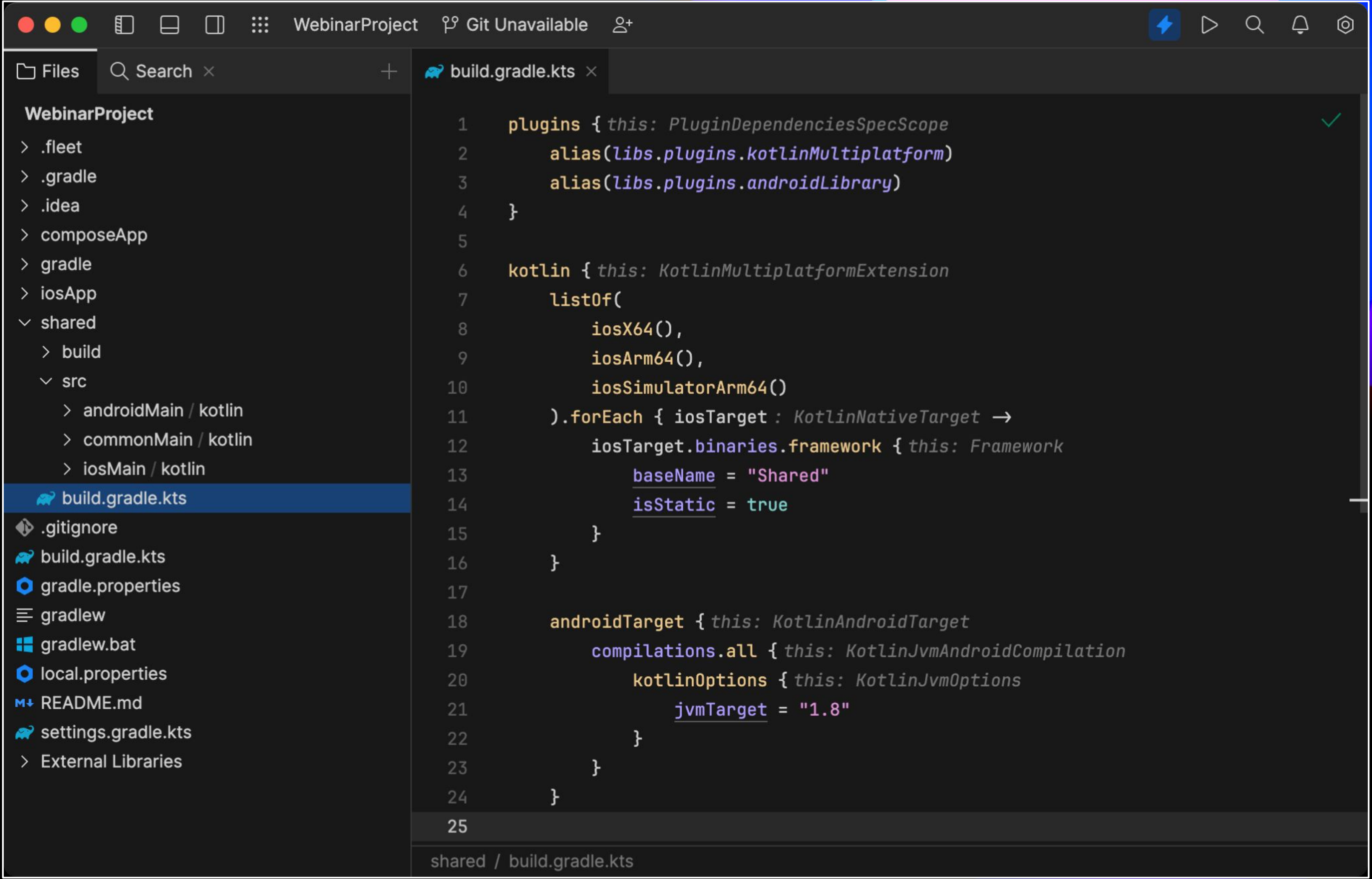
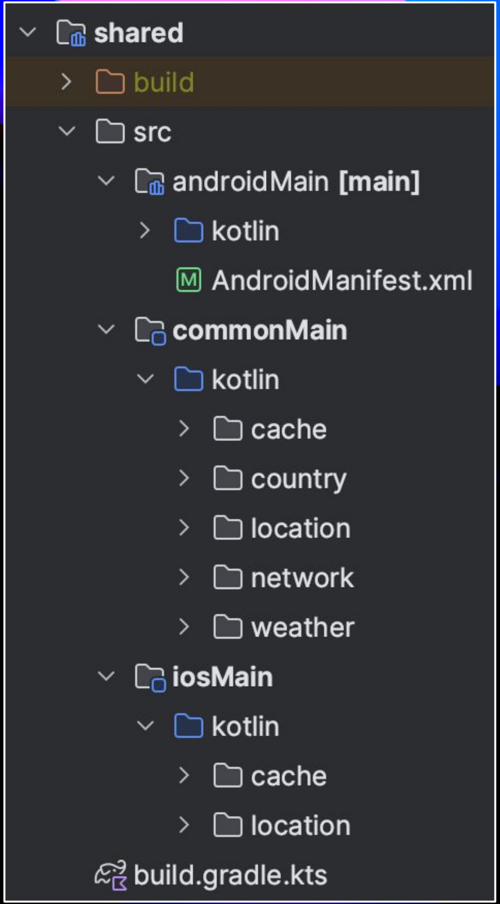


```kotlin
plugins { this: PluginDependenciesSpecScope
    alias(libs.plugins.kotlinMultiplatform)
    alias(libs.plugins.androidLibrary)
}

kotlin { this: KotlinMultiplatformExtension
    listOf(
        iosX64(),
        iosArm64(),
        iosSimulatorArm64()
    ).forEach { iosTarget : KotlinNativeTarget ->
        iosTarget.binaries.framework { this: Framework
            baseName = "Shared"
            isStatic = true
        }
    }

    androidTarget { this: KotlinAndroidTarget
        compilations.all { this: KotlinJvmAndroidCompilation
            kotlinOptions { this: KotlinJvmOptions
                jvmTarget = "1.8"
            }
        }
    }

```

The shared module

~~This only holds code which works on all platforms~~

This is where we develop the code that will be shared across platforms



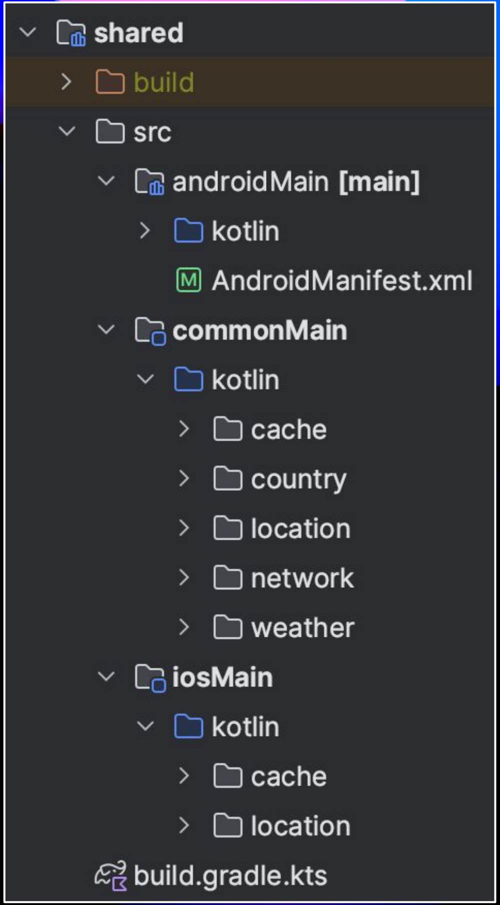
```
shared
  build
  src
    androidMain [main]
      kotlin
      AndroidManifest.xml
    commonMain
      kotlin
        cache
        country
        location
        network
        weather
    iosMain
      kotlin
        cache
        location
  build.gradle.kts
```

The shared module

This is a Kotlin Multiplatform Module

It contains 3 source sets

- commonMain
- androidMain
- iosMain



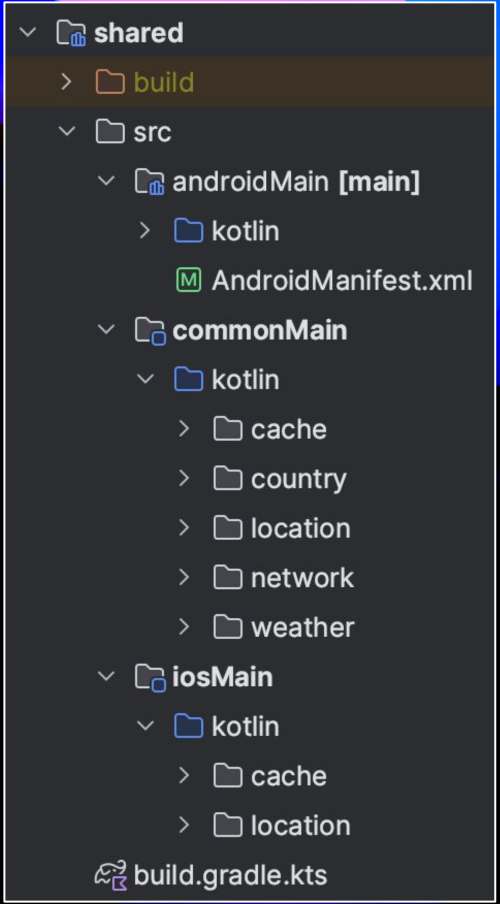
```
shared
  build
  src
    androidMain [main]
      kotlin
      AndroidManifest.xml
    commonMain
      kotlin
        cache
        country
        location
        network
        weather
    iosMain
      kotlin
        cache
        location
  build.gradle.kts
```

The shared module

The source sets are compiled in combination:

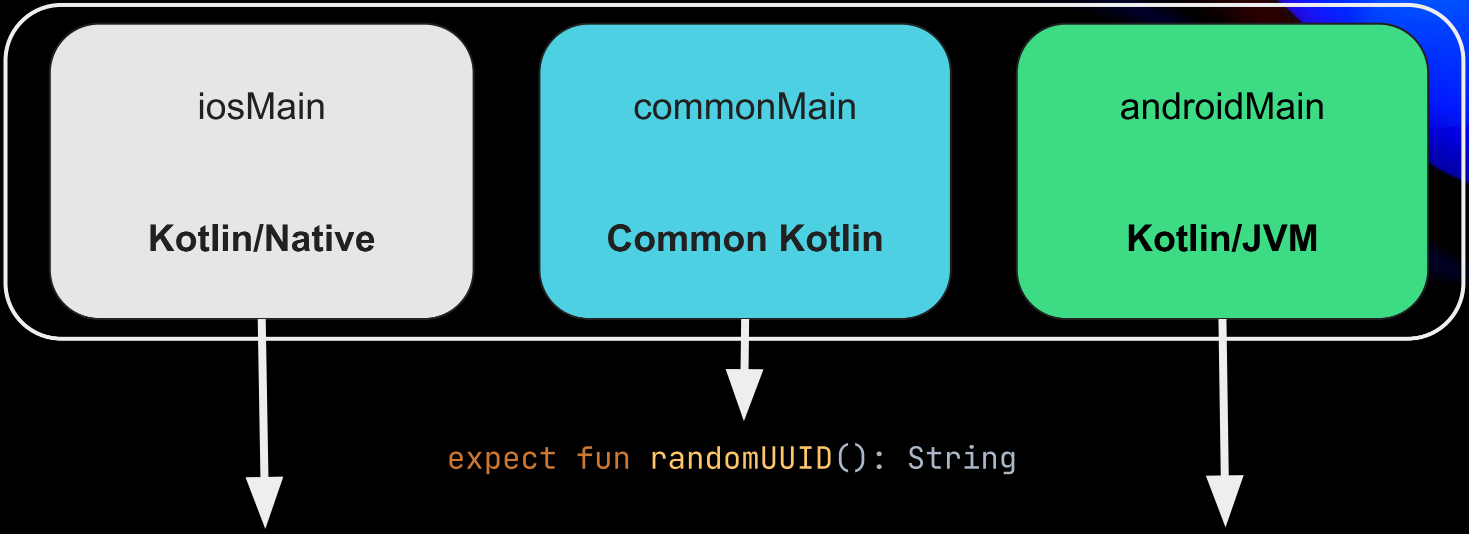
commonMain + androidMain =

commonMain + iosMain =



```
shared
  build
  src
    androidMain [main]
      kotlin
      AndroidManifest.xml
    commonMain
      kotlin
        cache
        country
        location
        network
        weather
    iosMain
      kotlin
        cache
        location
  build.gradle.kts
```

Introducing expect / actual functions



```
expect fun randomUUID(): String
```

```
import platform.Foundation.NSUUID
actual fun randomUUID(): String =
NSUUID().UUIDString()
```

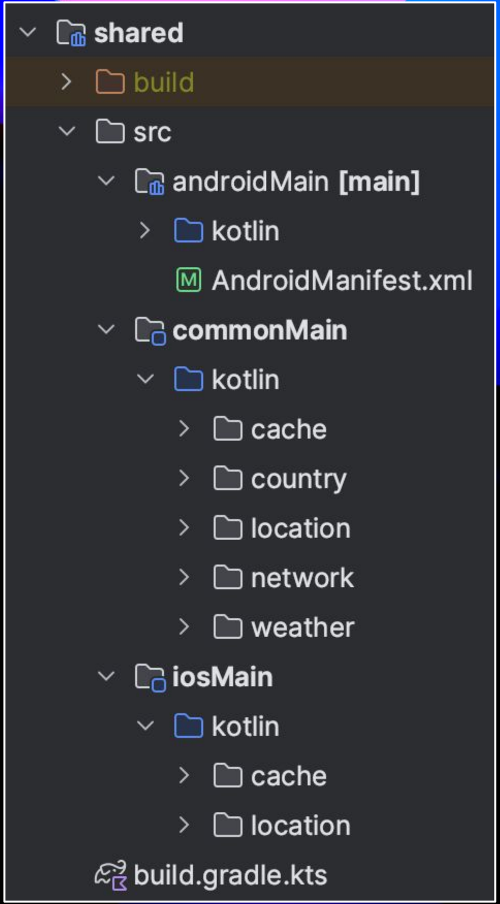
```
import java.util.*
actual fun randomUUID() =
UUID.randomUUID().toString()
```

The shared module (summary)

commonMain contains common code

The only dependencies will be on multiplatform libraries (like KStore)

Expected declarations need matching actual declarations in platform specific source sets



```
shared
  build
  src
    androidMain [main]
      kotlin
      AndroidManifest.xml
    commonMain
      kotlin
        cache
        country
        location
        network
        weather
    iosMain
      kotlin
        cache
        location
  build.gradle.kts
```

Advice on expect / actual functions

A few expected declarations are fine

Lots of them could be a code smell

- Create interfaces to model abstractions
- Use expected functions as factories
- Consider adopting a DI framework

```kotlin
interface Platform {
   val name: String
}

expect fun getPlatform(): Platform
```

```kotlin
class AndroidPlatform: Platform {
    override val name: String =
        "Android ${Build.VERSION.SDK_INT}"

}

actual fun getPlatform() = AndroidPlatform()
```

```kotlin
class iOSPlatform: Platform {
    override val name: String =
        UIDevice.currentDevice.systemName()
        + " "
        + UIDevice.currentDevice.systemVersion
}

actual fun getPlatform() = iOSPlatform()
```

The composeApp module

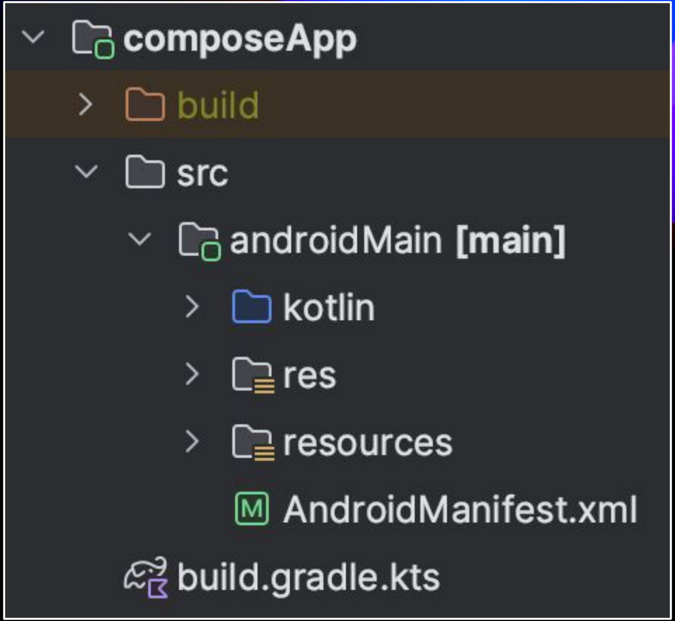
This is a Kotlin Module

It contains a single source set

- In the Native UI use case

This source set holds

- Your Jetpack Compose based UI
- Other Android types (e.g. Activities)



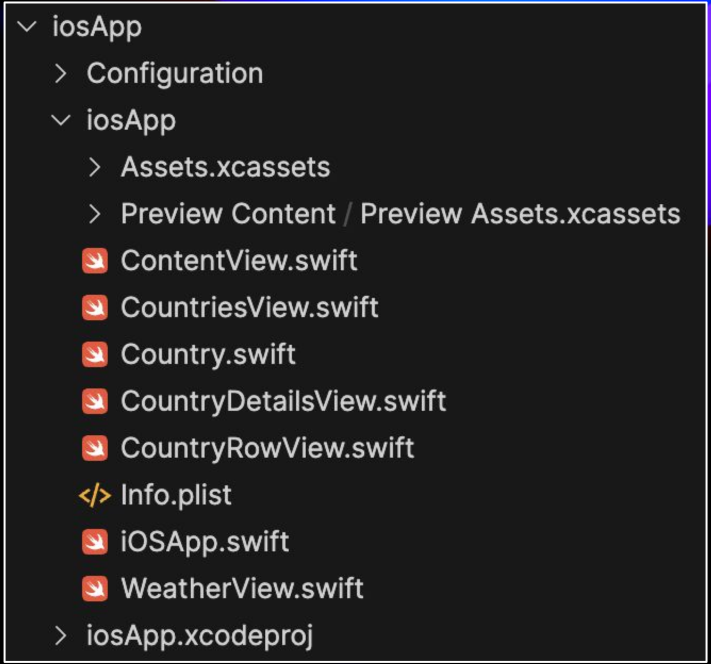
The iosApp Folder

This is an Xcode project

Containing the infrastructure needed to run your application on iOS

This is where we place Swift code

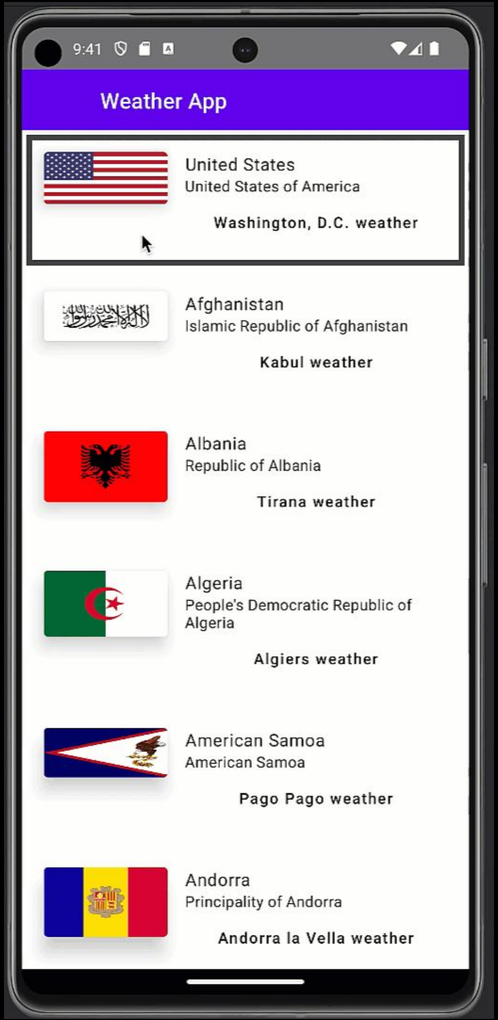
In this case our Native UI



```
iosApp
  Configuration
  iosApp
    Assets.xcassets
    Preview Content / Preview Assets.xcassets
    ContentView.swift
    CountriesView.swift
    Country.swift
    CountryDetailsView.swift
    CountryRowView.swift
    Info.plist
    iOSApp.swift
    WeatherView.swift
  iosApp.xcodeproj
```

How Do I…
Start Adding Code?

Jetpack Compose


9:41

Weather App

United States
United States of America
Washington, D.C. weather

Afghanistan
Islamic Republic of Afghanistan
Kabul weather

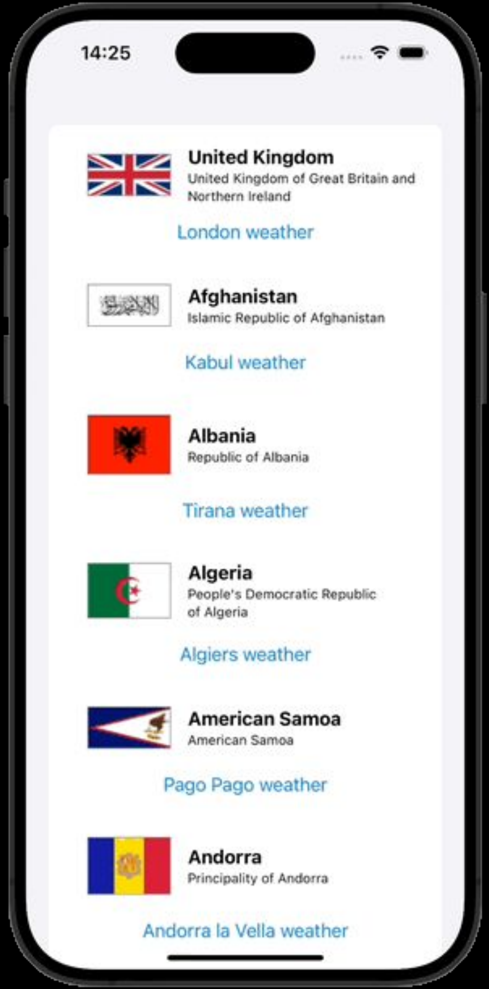
Albania
Republic of Albania
Tirana weather

Algeria
People's Democratic Republic of Algeria
Algiers weather

American Samoa
American Samoa
Pago Pago weather

Andorra
Principality of Andorra
Andorra la Vella weather

SwiftUI


14:25

United Kingdom
United Kingdom of Great Britain and Northern Ireland
London weather

Afghanistan
Islamic Republic of Afghanistan
Kabul weather

Albania
Republic of Albania
Tirana weather

Algeria
People's Democratic Republic of Algeria
Algiers weather

American Samoa
American Samoa
Pago Pago weather

Andorra
Principality of Andorra
Andorra la Vella weather

What do we need?

Domain types

Networking code

Support for caching

Platform specific support:

- For creating the cache file
- For working with locations

A Jetpack Compose based interface

A SwiftUI based interface

Data in interfaces

What do we need?

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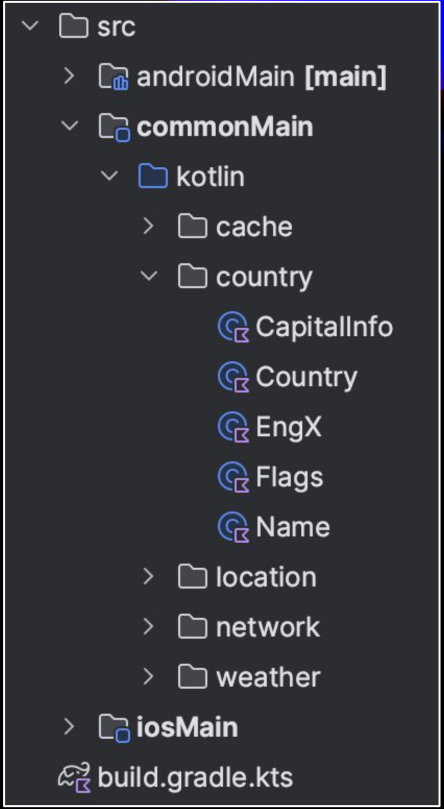
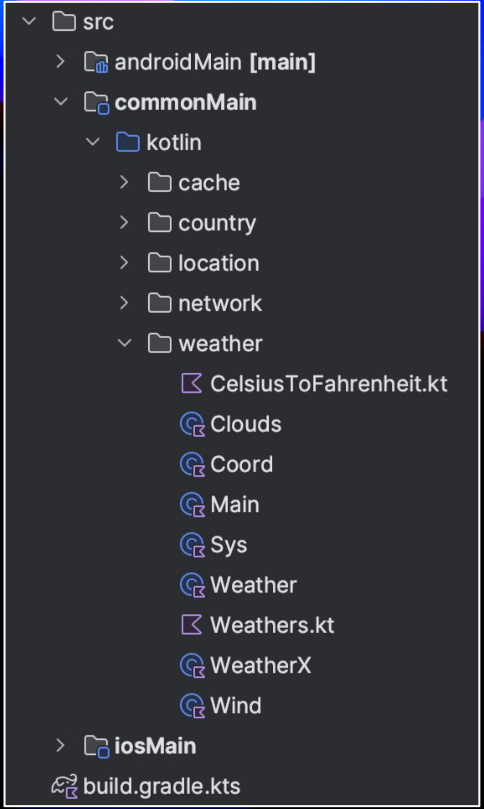
Our domain types

We have two subdomains:

- One to model countries
- Another to model weather



```
src
  androidMain [main]
  commonMain
    kotlin
      cache
      country
        CapitalInfo
        Country
        EngX
        Flags
        Name
      location
      network
      weather
  iosMain
  build.gradle.kts
```



```
src
  androidMain [main]
  commonMain
    kotlin
      cache
      country
      location
      network
      weather
        CelsiusToFahrenheit.kt
        Clouds
        Coord
        Main
        Sys
        Weather
        Weathers.kt
        WeatherX
        Wind
  iosMain
  build.gradle.kts
```

What do we need?

Domain types ✓

Networking code

Support for caching

Platform specific support:

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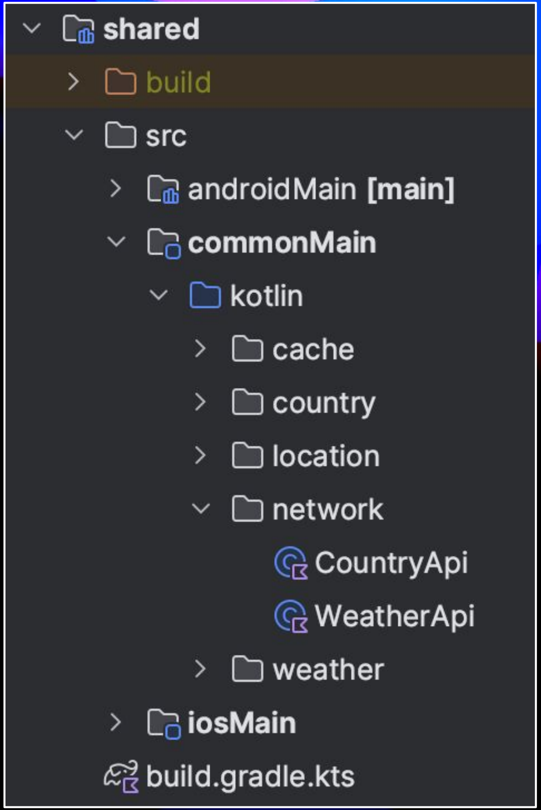
Types to support networking

Our networking code uses two servers:

- restcountries.com for countries
- api.openweathermap.org for weather

We have a client for each one:

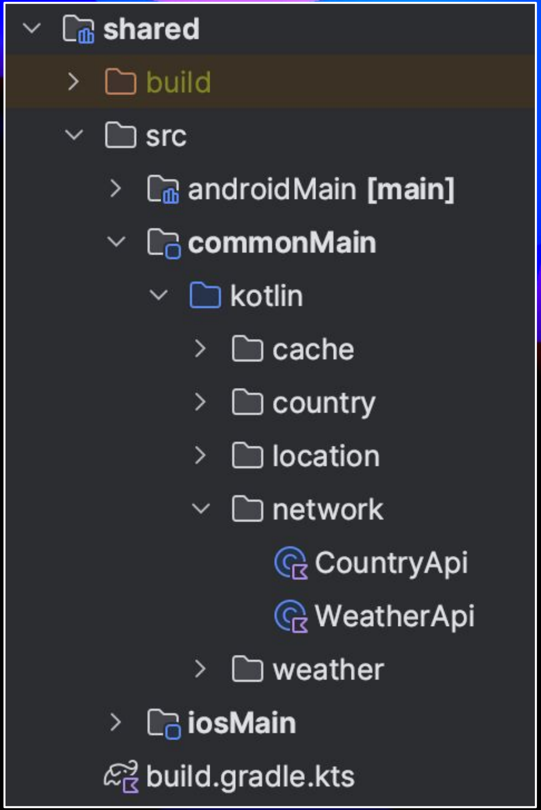
- CountryApi
- WeatherApi



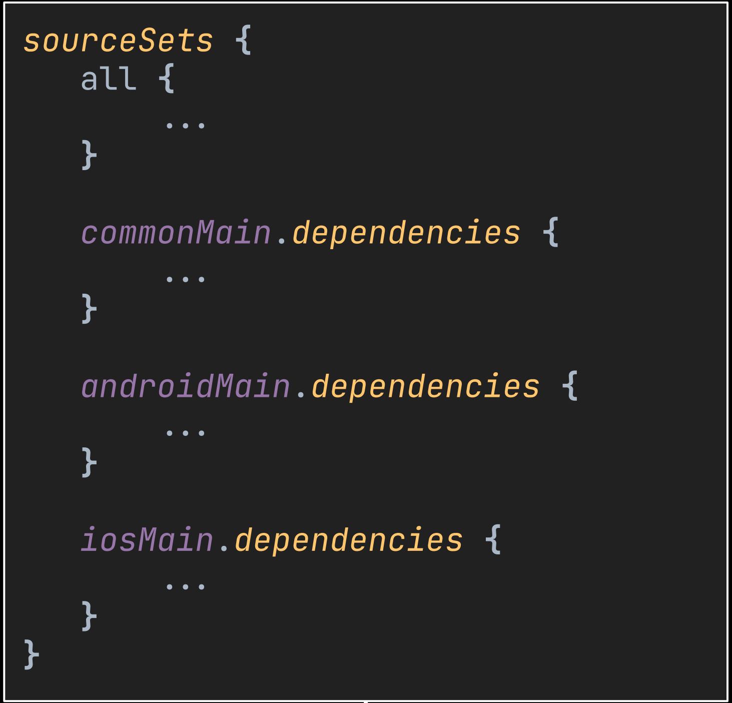
Types to support networking

Multiplatform libraries handle the heavy lifting:

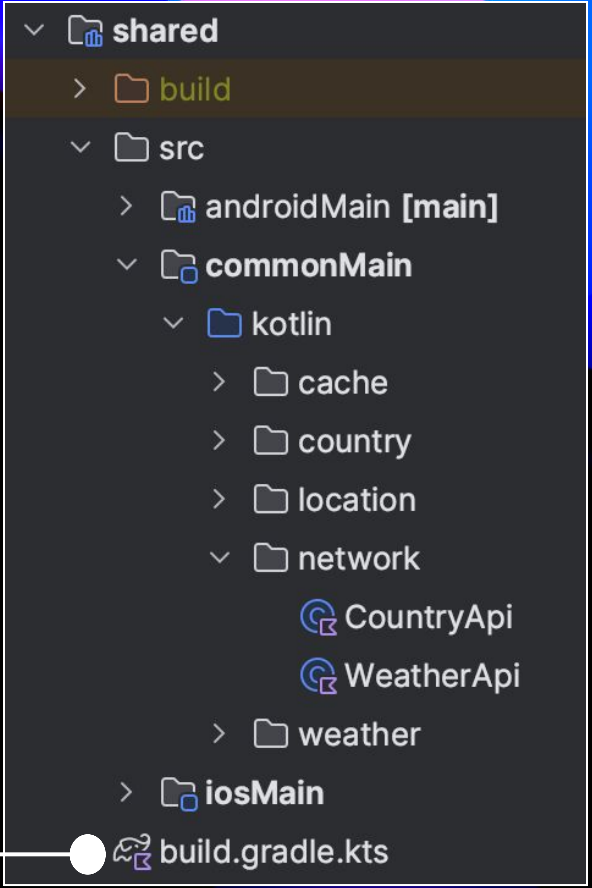
- Ktor Client to send the requests
- Kotlinx Serialization for marshalling
- KStore to cache the results we obtain



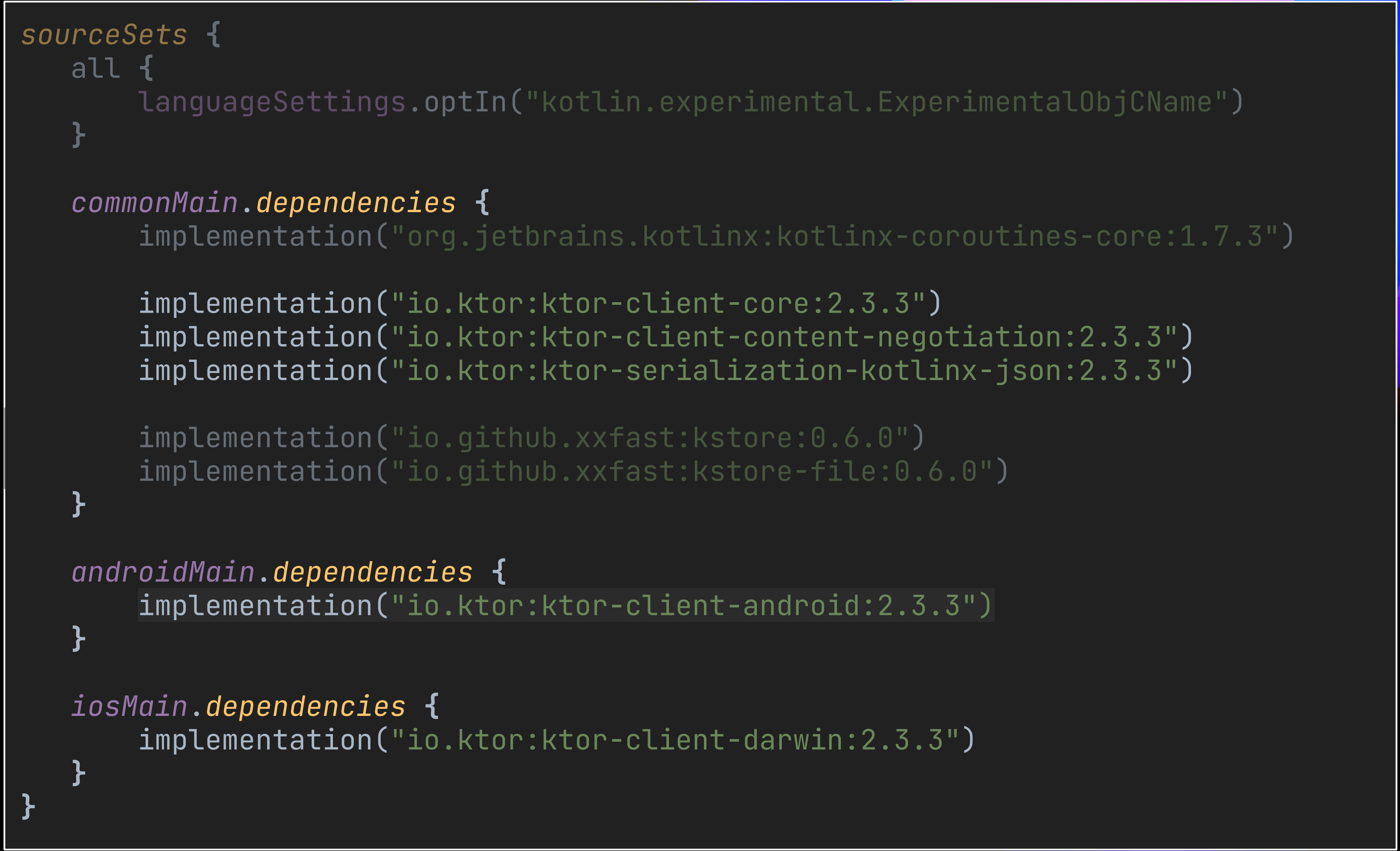
```
shared
  build
  src
    androidMain [main]
    commonMain
      kotlin
        cache
        country
        location
        network
          CountryApi
          WeatherApi
        weather
    iosMain
  build.gradle.kts
```



```
sourceSets {
    all {
        ...
    }

    commonMain.dependencies {
        ...
    }

    androidMain.dependencies {
        ...
    }

    iosMain.dependencies {
        ...
    }
}
```



```
shared
  build
  src
    androidMain [main]
    commonMain
      kotlin
        cache
        country
        location
        network
          CountryApi
          WeatherApi
        weather
    iosMain
  build.gradle.kts
```



```
sourceSets {
    all {
        languageSettings.optIn("kotlin.experimental.ExperimentalObjCName")
    }

    commonMain.dependencies {
        implementation("org.jetbrains.kotlinx:kotlinx-coroutines-core:1.7.3")

        implementation("io.ktor:ktor-client-core:2.3.3")
        implementation("io.ktor:ktor-client-content-negotiation:2.3.3")
        implementation("io.ktor:ktor-serialization-kotlinx-json:2.3.3")

        implementation("io.github.xxfast:kstore:0.6.0")
        implementation("io.github.xxfast:kstore-file:0.6.0")
    }

    androidMain.dependencies {
        implementation("io.ktor:ktor-client-android:2.3.3")
    }

    iosMain.dependencies {
        implementation("io.ktor:ktor-client-darwin:2.3.3")
    }
}
```

```kotlin
suspend fun getAllCountries(): List<Country> {
   return httpClient.get("https://restcountries.com/v3.1/all")
                    .body<List<Country>>()
                    .sortedBy { it.name.common }
}
```

```kotlin
@Serializable
data class Country(
   val capital: List<String> = emptyList(),
   val capitalInfo: CapitalInfo? = null,
   val flags: Flags,
   val name: Name,
   val cca2: String
)
```

```kotlin
suspend fun getWeather(lat: Double, long: Double): Weather {
   val key = Config.WeatherApiKey
   val URL = "https://api.openweathermap.org/data/2.5/weather"
   val queryString = "?lat=$lat&lon=$long&appid=$key&units=metric"

   return httpClient.get("$URL$queryString").body()
}
```

```kotlin
@Serializable
data class Weather(
   val base: String,
   val clouds: Clouds,
   val cod: Int,
   val coord: Coord,
   val dt: Int,
   val id: Int,
   val main: Main,
   val name: String,
   val sys: Sys,
   val timezone: Int,
   val visibility: Int,
   val weather: List<WeatherX>,
   val wind: Wind
)
```

What do we need?

Domain types ✓

Networking code ✓

Support for caching

Platform specific support:

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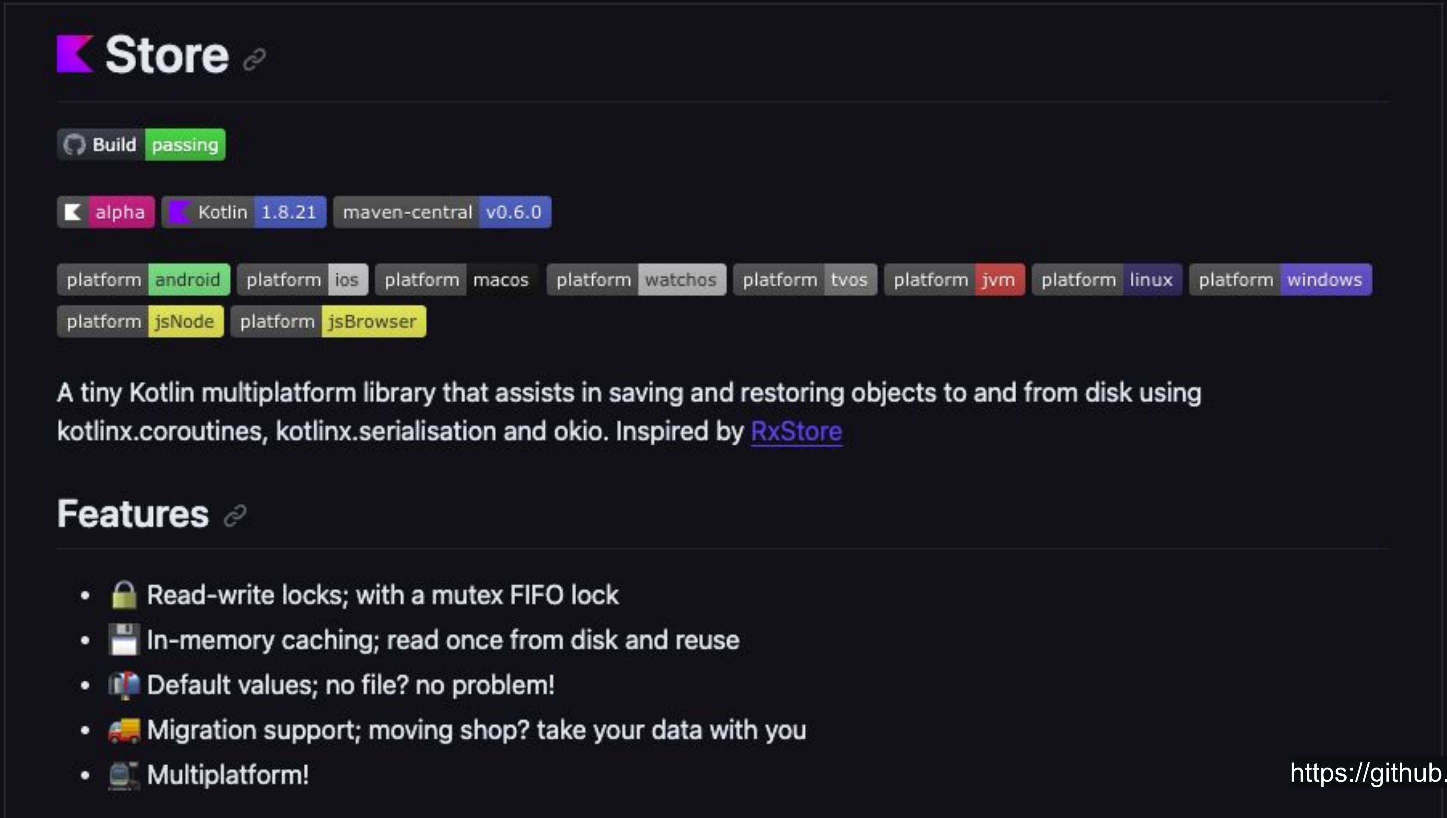
A SwiftUI based interface

Data in interfaces

Using KStore for caching



KStore

Build passing

alpha · Kotlin 1.8.21 · maven-central v0.6.0

platform android · platform ios · platform macos · platform watchos · platform tvos · platform jvm · platform linux · platform windows · platform jsNode · platform jsBrowser

A tiny Kotlin multiplatform library that assists in saving and restoring objects to and from disk using kotlinx.coroutines, kotlinx.serialisation and okio. Inspired by RxStore

Features

- 🔒 Read-write locks; with a mutex FIFO lock
- 💾 In-memory caching; read once from disk and reuse
- 📬 Default values; no file? no problem!
- 🚚 Migration support; moving shop? take your data with you
- 💻 Multiplatform!

https://github.com/xxfast/KStore

```kotlin
sourceSets {
   all {
       languageSettings.optIn("kotlin.experimental.ExperimentalObjCName")
   }

   commonMain.dependencies {
       implementation("org.jetbrains.kotlinx:kotlinx-coroutines-core:1.7.3")

       implementation("io.ktor:ktor-client-core:2.3.3")
       implementation("io.ktor:ktor-client-content-negotiation:2.3.3")
       implementation("io.ktor:ktor-serialization-kotlinx-json:2.3.3")
       implementation("org.jetbrains.kotlinx:kotlinx-datetime:0.4.0")

       implementation("io.github.xxfast:kstore:0.6.0")
       implementation("io.github.xxfast:kstore-file:0.6.0")
   }

   androidMain.dependencies {
       implementation("androidx.startup:startup-runtime:1.2.0-alpha02")
   }

   iosMain.dependencies {
       implementation("io.ktor:ktor-client-darwin:2.3.3")
   }
}
```

Setting up the cache

```
//In shared/src/commonMain/kotlin/cache/CountrySDK.kt

class CountrySDK {

   private val cache: KStore<List<Country>>
                 = storeOf(filePath = pathToCountryCache())


   ...
}
```

Adding logic for caching

```kotlin
//In shared/src/commonMain/kotlin/cache/CountrySDK.kt

private suspend fun getSortedCountries(): List<Country> {
   return cache.get()
           ?: api.getAllCountries().also {
               cache.set(it)
           }
}
```

What do we need?

Domain types ✓

Networking code ✓

Support for caching ✓

Platform specific support:

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Data in interfaces

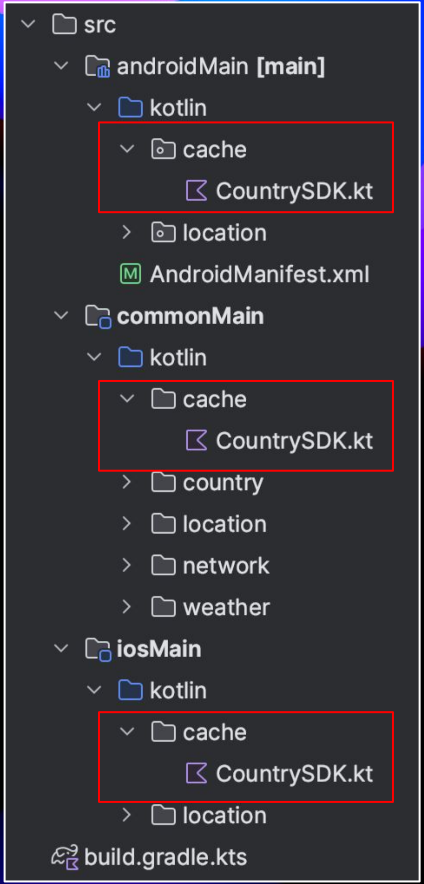
Platform specific types for caching

Our KStore code requires a JSON file

How and where it is created is platform specific

So we expect a function in commonMain

Actual declarations go in androidMain and iosMain



```
src
  androidMain [main]
    kotlin
      cache
        CountrySDK.kt
      location
    AndroidManifest.xml
  commonMain
    kotlin
      cache
        CountrySDK.kt
      country
      location
      network
      weather
  iosMain
    kotlin
      cache
        CountrySDK.kt
      location
build.gradle.kts
```

```kotlin
//In shared/src/commonMain/kotlin/cache

expect fun pathToCountryCache(): String
```

```kotlin
//In shared/src/androidMain/kotlin/cache

lateinit var filePath: String

actual fun pathToCountryCache(): String = filePath

//In composeApp/src/androidMain/kotlin

class WebinarApplication : Application() {

    override fun onCreate() {
        super.onCreate()

        filePath = "${filesDir.path}/country_cache.json"
    }
}
```

```kotlin
//In shared/src/commonMain/kotlin/cache

expect fun pathToCountryCache(): String
```

```kotlin
//In shared/src/iosMain/kotlin/cache

actual fun pathToCountryCache(): String
                = "${NSHomeDirectory()}/country_cache.json"
```

What do we need?

Domain types ✓

Networking code ✓

Support for caching ✓

Platform specific support:

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- For working with locations

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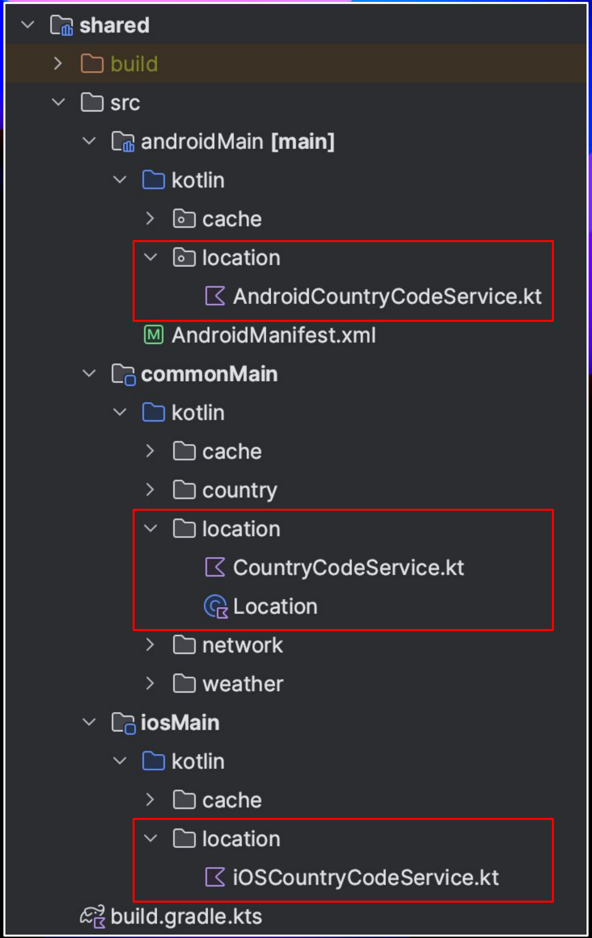
Data in interfaces

Platform specific types for locations

We need to work with Country Codes

The way these are found is platform-specific

So once again we use expect and actual



```
shared
  build
  src
    androidMain [main]
      kotlin
        cache
        location
          AndroidCountryCodeService.kt
      AndroidManifest.xml
    commonMain
      kotlin
        cache
        country
        location
          CountryCodeService.kt
          Location
        network
        weather
    iosMain
      kotlin
        cache
        location
          iOSCountryCodeService.kt
  build.gradle.kts
```

```kotlin
//In shared/src/commonMain/kotlin/location

interface CountryCodeService {
   fun getCountryCode(): String?
}
expect fun getCountryCodeService(): CountryCodeService
```

```kotlin
//In shared/src/androidMain/kotlin/location

class AndroidCountryCodeService() : CountryCodeService {
   override fun getCountryCode(): String? {
       return Locale.getDefault().country
   }
}

actual fun getCountryCodeService(): CountryCodeService
               = AndroidCountryCodeService()
```

```kotlin
//In shared/src/commonMain/kotlin/location

interface CountryCodeService {
   fun getCountryCode(): String?
}
expect fun getCountryCodeService(): CountryCodeService
```

```kotlin
//In shared/src/iosMain/kotlin/location

class iOSCountryCodeService() : CountryCodeService {
   override fun getCountryCode(): String? {
       return NSLocale.currentLocale()
                      .objectForKey(NSLocaleCountryCode)
                      .toString()
   }
}

actual fun getCountryCodeService(): CountryCodeService
                    = iOSCountryCodeService()
```

Sorting logic

```kotlin
//In shared/src/commonMain/kotlin/cache/CountrySDK.kt

@NativeCoroutines
@Throws(Exception::class)
suspend fun getCountries(): List<Country> {
    val countryCode = getCountryCodeService().getCountryCode()

    val tempCountries = getSortedCountries().toMutableList()
    val currentCountry = tempCountries.first { it.cca2 == countryCode }
    tempCountries.remove(currentCountry)
    tempCountries.add(0, currentCountry)
    return tempCountries
}
```

What do we need?

Domain types ✓

Networking code ✓

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A JetPack Compose based interface

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Data in interfaces

The Android UI: Jetpack Compose

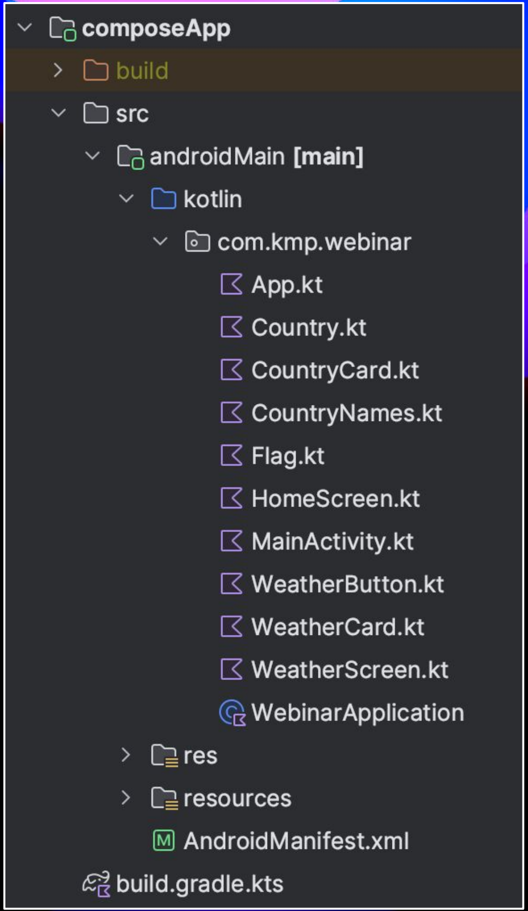
Our Android UI uses Jetpack Compose

- It is made up of Composable Functions

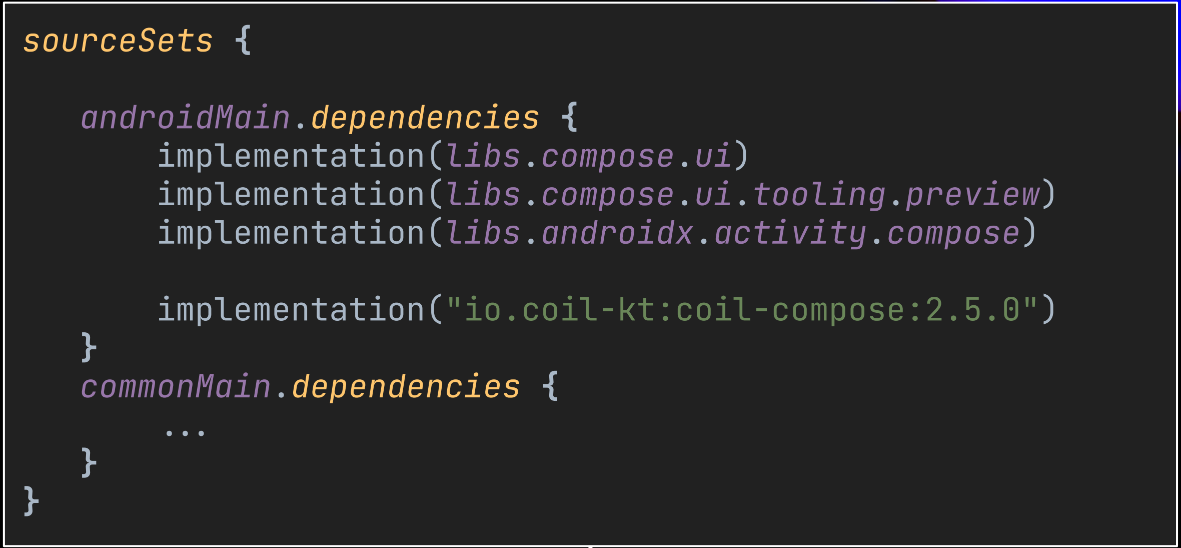
These use Android specific libraries

- E.g. the Coil library to display images

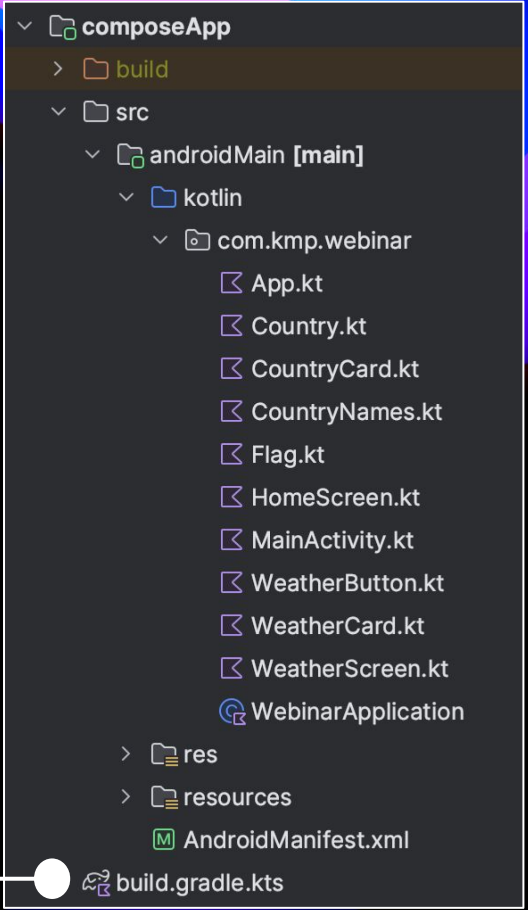
Hence they live in androidMain



```
composeApp
  build
  src
    androidMain [main]
      kotlin
        com.kmp.webinar
          App.kt
          Country.kt
          CountryCard.kt
          CountryNames.kt
          Flag.kt
          HomeScreen.kt
          MainActivity.kt
          WeatherButton.kt
          WeatherCard.kt
          WeatherScreen.kt
          WebinarApplication
      res
      resources
      AndroidManifest.xml
  build.gradle.kts
```

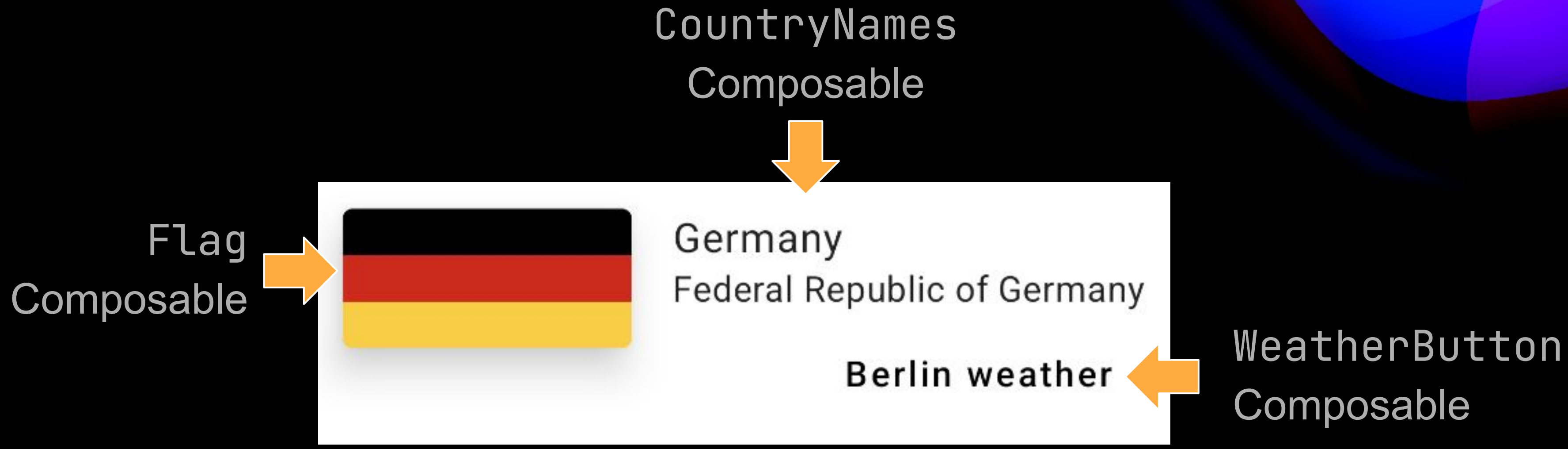


```
sourceSets {

    androidMain.dependencies {
        implementation(libs.compose.ui)
        implementation(libs.compose.ui.tooling.preview)
        implementation(libs.androidx.activity.compose)

        implementation("io.coil-kt:coil-compose:2.5.0")
    }
    commonMain.dependencies {
        ...
    }
}
```



```
composeApp
  build
  src
    androidMain [main]
      kotlin
        com.kmp.webinar
          App.kt
          Country.kt
          CountryCard.kt
          CountryNames.kt
          Flag.kt
          HomeScreen.kt
          MainActivity.kt
          WeatherButton.kt
          WeatherCard.kt
          WeatherScreen.kt
          WebinarApplication
      res
      resources
      AndroidManifest.xml
  build.gradle.kts
```

The Country Composable



```kotlin
@Composable
fun Country(modifier: Modifier, country: Country) {
    Row(modifier = Modifier.padding(8.dp)) {
        Column(modifier = Modifier.width(130.dp)) {
            Flag(
                modifier = Modifier.fillMaxWidth().padding(8.dp),
                Country.flags
            )
        }
        Column(modifier = Modifier.fillMaxWidth().padding(8.dp)) {
            CountryNames(name = country.name)
            val capitalInfo = country.capitalInfo
            if (country.capital.isNotEmpty() && capitalInfo != null) {
                WeatherButton(
                    capitals = country.capital,
                    capitalInfo = capitalInfo
                )
            }
        }
    }
}
```

What do we need?

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A JetPack Compose based interface ✓

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Data in interfaces

The iOS UI: SwiftUI

Our iOS UI uses SwiftUI

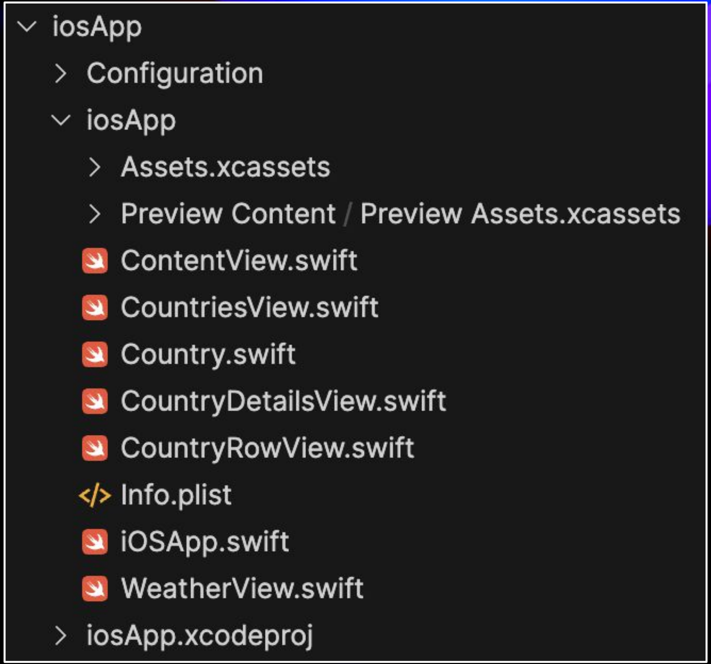
We create structures which inherit from View

Then arrange then as a tree

- Horizontal layouts use an HStack
- Vertical layouts use a VStack

The Kingfisher library is used to load images

- The type is KFImage

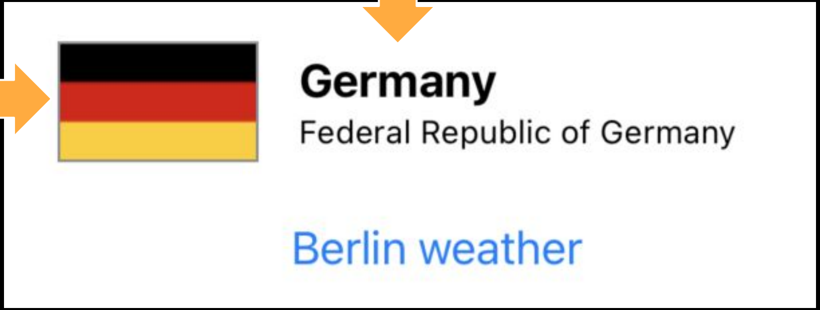


```
⌄ iosApp
  › Configuration
  ⌄ iosApp
    › Assets.xcassets
    › Preview Content / Preview Assets.xcassets
      ContentView.swift
      CountriesView.swift
      Country.swift
      CountryDetailsView.swift
      CountryRowView.swift
      Info.plist
      iOSApp.swift
      WeatherView.swift
  › iosApp.xcodeproj
```

The CountryDetailsView

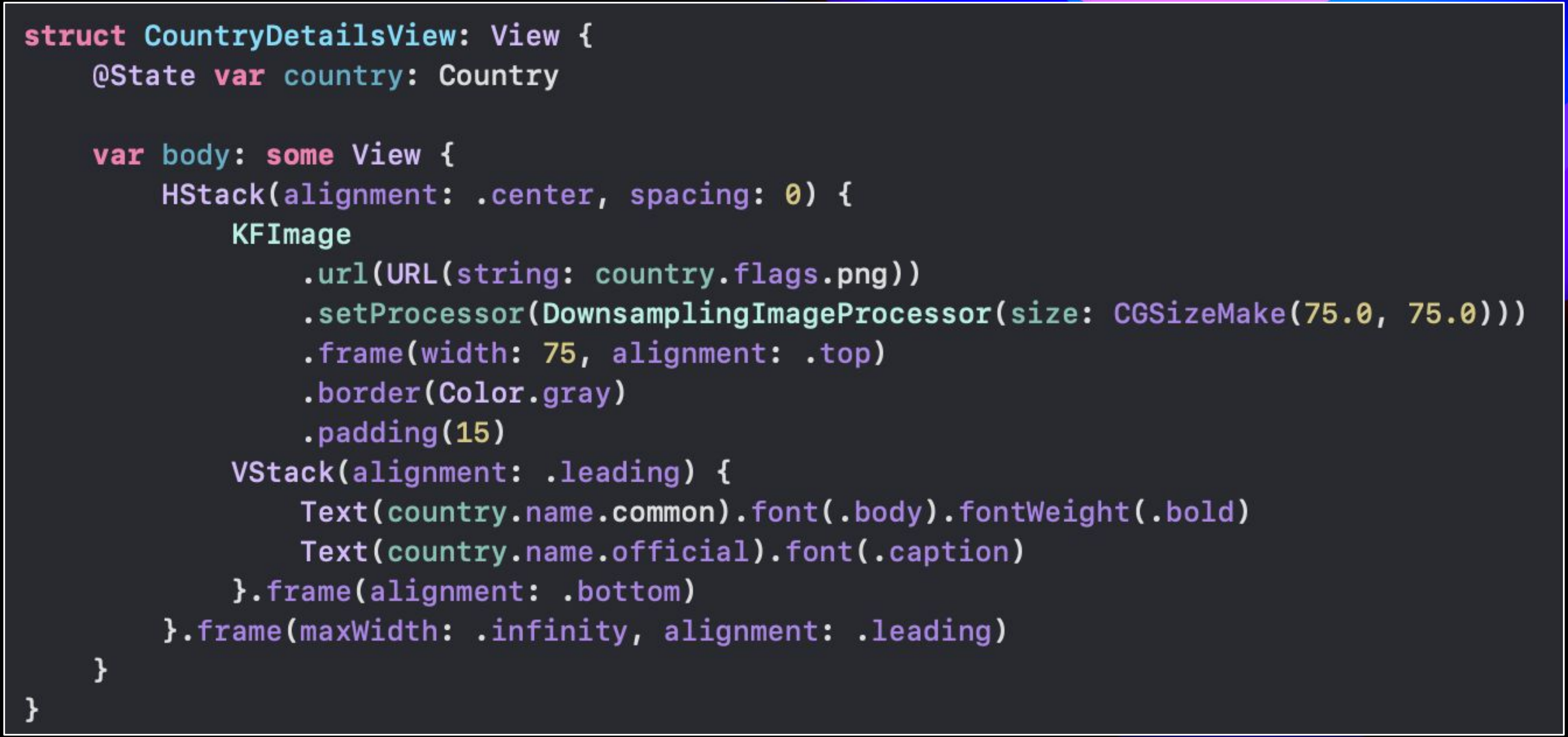
VStack with two Text views

KFImage


Germany

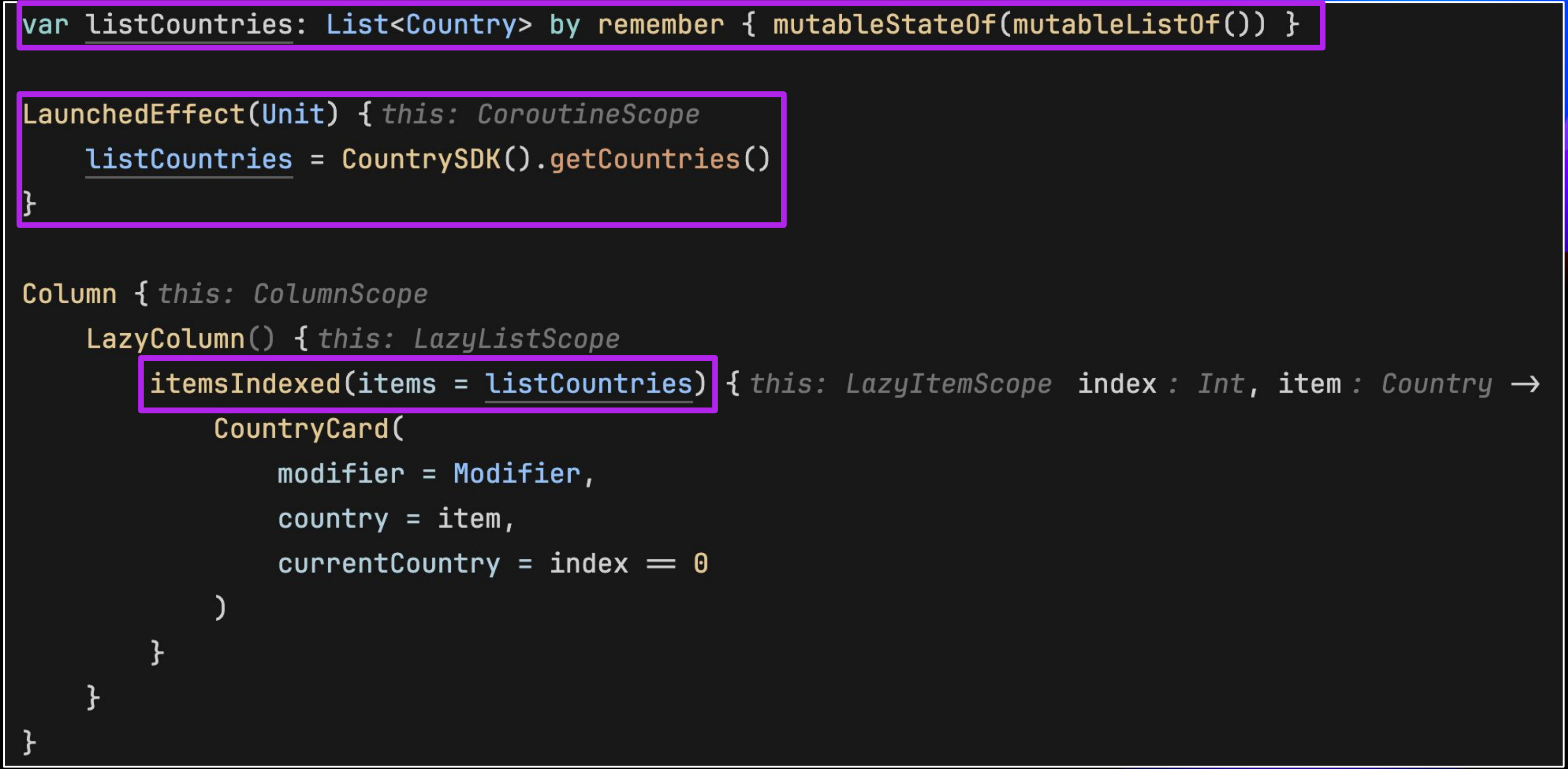
Federal Republic of Germany

Berlin weather



```
struct CountryDetailsView: View {
    @State var country: Country

    var body: some View {
        HStack(alignment: .center, spacing: 0) {
            KFImage
                .url(URL(string: country.flags.png))
                .setProcessor(DownsamplingImageProcessor(size: CGSizeMake(75.0, 75.0)))
                .frame(width: 75, alignment: .top)
                .border(Color.gray)
                .padding(15)
            VStack(alignment: .leading) {
                Text(country.name.common).font(.body).fontWeight(.bold)
                Text(country.name.official).font(.caption)
            }.frame(alignment: .bottom)
        }.frame(maxWidth: .infinity, alignment: .leading)
    }
}
```

Data In Interfaces: Android



```
var listCountries: List<Country> by remember { mutableStateOf(mutableListOf()) }

LaunchedEffect(Unit) { this: CoroutineScope
    listCountries = CountrySDK().getCountries()
}

Column { this: ColumnScope
    LazyColumn() { this: LazyListScope
        itemsIndexed(items = listCountries) { this: LazyItemScope  index : Int, item : Country →
            CountryCard(
                modifier = Modifier,
                country = item,
                currentCountry = index == 0
            )
        }
    }
}
```

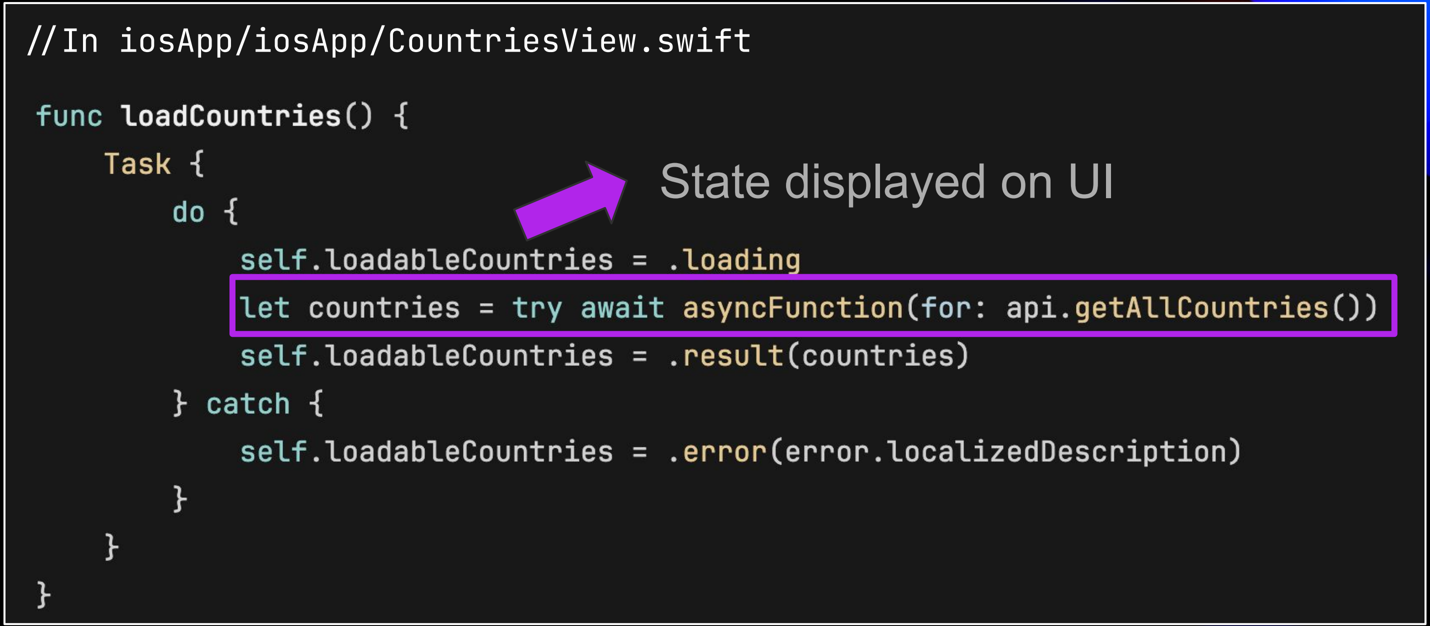
Data In Interfaces: iOS

```
//In shared/build.gradle.kts

plugins {
    id("com.google.devtools.ksp") version "1.9.20-1.0.14"
    id("com.rickclephas.kmp.nativecoroutines") version "1.0.0-ALPHA-20"
}

sourceSets {
    all {
        languageSettings.optIn("kotlin.experimental.ExperimentalObjCName")
    }
```

Data in interfaces: iOS

```kotlin
//In shared/commonMain/kotlin/network/CountryApi.kt

@NativeCoroutines
suspend fun getAllCountries(): List<Country> {
   return httpClient.get("https://restcountries.com/v3.1/all")
                    .body<List<Country>>()
                    .sortedBy { it.name.common }
}
```

Data in interfaces: iOS



```swift
//In iosApp/iosApp/CountriesView.swift

func loadCountries() {
    Task {
        do {
            self.loadableCountries = .loading
            let countries = try await asyncFunction(for: api.getAllCountries())
            self.loadableCountries = .result(countries)
        } catch {
            self.loadableCountries = .error(error.localizedDescription)
        }
    }
}
```

Four Webinars on Kotlin Multiplatform Development

- **Nov 21:** The State of Kotlin Multiplatform
- **Nov 23:** Getting Started With KMP: Build Apps for iOS and Android With Shared Logic and Native UIs
- **Nov 28:** Getting Started With KMP: Build Apps for iOS, Android, and Desktop In 100% Kotlin With Compose Multiplatform
- **Nov 30:** iOS Development With Kotlin Multiplatform: Tips and Tricks

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What do we need?

Domain types ✓

Networking code ✓

Support for caching ✓

Platform specific support:

- For creating the cache file ✓
- For working with locations ✓

A JetPack Compose based interface ✓

A SwiftUI based interface ✓

Data in interfaces ✓

Conclusions

Conclusions

The Native UI story for Kotlin Multiplatform works well

- You can fine tune which code you want to share

You have access to an ecosystem of multiplatform libraries

- But once again, you only use what you want

There is a lot more still to come

- Fleet will provide a polyglot IDE, ideal for KMP
- See the next webinar for Compose Multiplatform

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- **Nov 23:** Getting Started With KMP: Build Apps for iOS and Android With Shared Logic and Native UIs
- **Nov 28:** Getting Started With KMP: Build Apps for iOS, Android, and Desktop In 100% Kotlin With Compose Multiplatform
- **Nov 30:** iOS Development With Kotlin Multiplatform: Tips and Tricks

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Thank you □

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