droidconlisbon

dc lisbon 25
04 – 05
september

One codebase to rule them all:

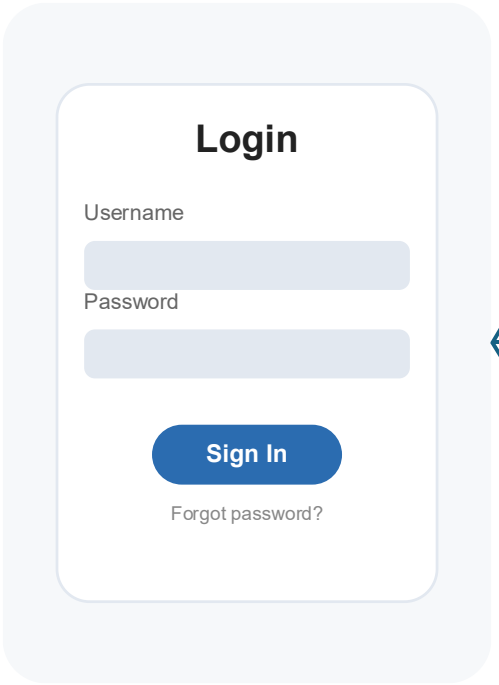
Cross-Platform apps with Kotlin and Compose Multiplatform

Andrea Della Porta
Mobile Tech Lead @ Cegeka

The Cross-Platform challenge

- **Multiple platforms = multiple codebases**
  - Android, iOS, Desktop, Web… each needs its own code
- **Duplicated effort & inconsistent UX**
  - Features must be reimplemented for each platform
  - UI and behavior often differ, leading to a fragmented user experience
- **High maintenance cost**
  - Bug fixes and updates have to be applied everywhere
  - Harder to keep features in sync across platforms

The Cross-Platform challenge




```
@Composable
fun LoginScreen() {
    var username by remember { mutableStateOf("") }
    var password by remember { mutableStateOf("") }
    Column(
        modifier = Modifier.fillMaxSize().padding(32),
        horizontalAlignment = Alignment.CenterHorizontally
    ) {
        Text("Login", fontSize = 28.sp, fontWeight = FontWeight.Bold)
        Spacer(Modifier.height(24.dp))
        OutlinedTextField(
            value = username, onValueChange = { username = it },
            label = { Text("Username") }
        )
        Spacer(Modifier.height(16.dp))
        OutlinedTextField(
            value = password, onValueChange = { password = it },
            label = { Text("Password") }, visualTransformation = PasswordVisualTransformation()
        )
        Spacer(Modifier.height(32.dp))
        Button(onClick = { /* Handle login */ }, shape = RoundedCornerShape(22.dp)) {
            Text("Sign In")
        }
        Spacer(Modifier.height(16.dp))
        Text("Forgot password?", color = Color.Gray)
    }
}
```

```
struct LoginView: View {
    @State private var username = ""
    @State private var password = ""
    var body: some View {
        VStack(spacing: 24) {
            Text("Login").font(.largeTitle).bold()
            TextField("Username", text: $username)
                .textFieldStyle(RoundedBorderTextFieldStyle())
            SecureField("Password", text: $password)
                .textFieldStyle(RoundedBorderTextFieldStyle())
            Button(action: { /* Handle login */ }) {
                Text("Sign In")
                    .frame(maxWidth: .infinity)
                    .padding()
                    .background(Color.blue)
                    .foregroundColor(.white)
                    .cornerRadius(22)
            }
            Text("Forgot password?")
                .foregroundColor(.gray)
                .font(.footnote)
        }
        .padding(32)
    }
}
```

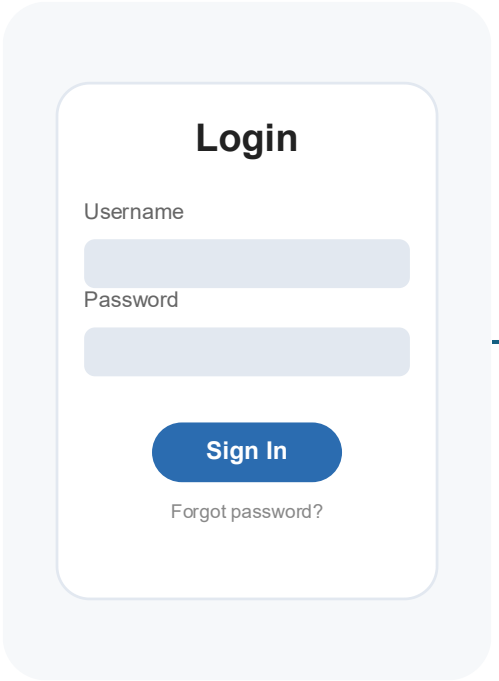
```
import React, { useState } from "react";
function LoginScreen() {
  const [username, setUsername] = useState("");
  const [password, setPassword] = useState("");
  return (
    <div style={{ maxWidth: 320, margin: "48px auto", padding: 32, background: "#fff", borderRadius: 24 }}>
      <h2>Login</h2>
      <input
        type="text"
        placeholder="Username"
        style={{ width: "100%", marginBottom: 16, padding: 8, borderRadius: 8, border: "1px solid #ccc" }}
        value={username}
        onChange={e => setUsername(e.target.value)}
      />
      <input
        type="password"
        placeholder="Password"
        style={{ width: "100%", marginBottom: 24, padding: 8, borderRadius: 8, border: "1px solid #ccc" }}
        value={password}
        onChange={e => setPassword(e.target.value)}
      />
      <button style={{ width: "100%", padding: "12px 0", borderRadius: 22, background: "#2B6CB0", color: "#fff", fontWeight: "bold" }}>
        Sign In
      </button>
      <div style={{ marginTop: 16, color: "#888", textAlign: "center" }}>Forgot password?</div>
    </div>
  );
}
export default LoginScreen;
```

The Dream

What if you could write your app **once** and run it **everywhere**?

Imagine: a single codebase powering Android, iOS, Desktop, Web...

Consistent experience, faster development, easier maintenance



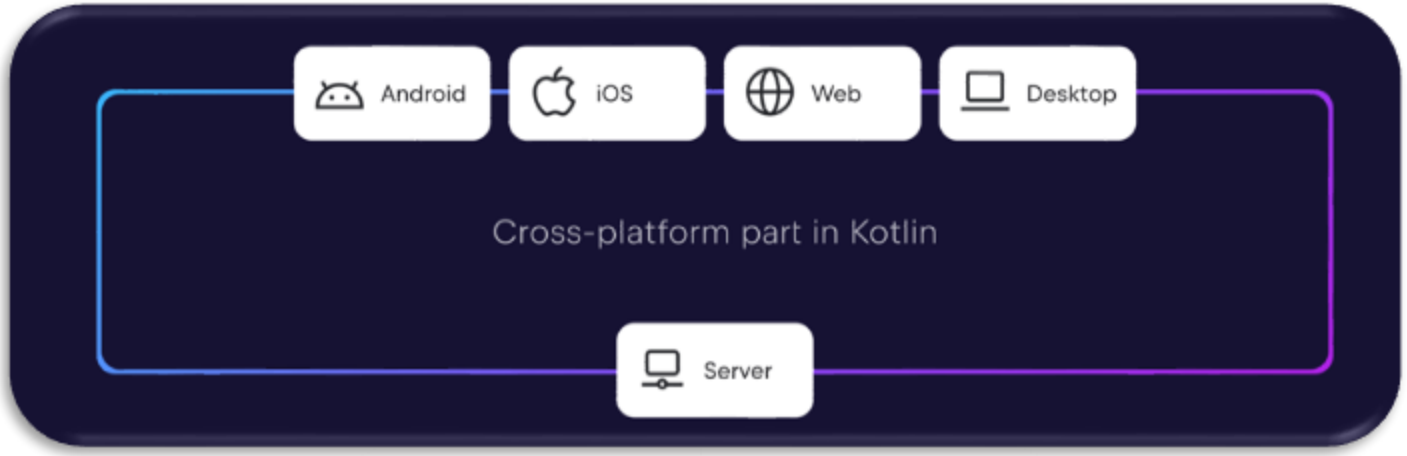

```
@Composable
fun LoginScreen() {
    var username by remember { mutableStateOf("") }
    var password by remember { mutableStateOf("") }
    Column(
        modifier = Modifier.fillMaxSize().padding(32.dp),
        horizontalAlignment = Alignment.CenterHorizontally
    ) {
        Text("Login", style = MaterialTheme.typography.headlineMedium)
        Spacer(modifier = Modifier.height(24.dp))
        OutlinedTextField(
            value = username,
            onValueChange = { username = it },
            label = { Text("Username") },
            singleLine = true,
            modifier = Modifier.fillMaxWidth()
        )
        Spacer(modifier = Modifier.height(16.dp))
        OutlinedTextField(
            value = password,
            onValueChange = { password = it },
            label = { Text("Password") },
            visualTransformation = PasswordVisualTransformation(),
            singleLine = true,
            modifier = Modifier.fillMaxWidth()
        )
        Spacer(modifier = Modifier.height(32.dp))
        Button(
            onClick = { /* handle login */ },
            shape = MaterialTheme.shapes.extraLarge,
            modifier = Modifier.fillMaxWidth()
        ) {
            Text("Sign In")
        }
        Spacer(modifier = Modifier.height(16.dp))
        Text("Forgot password?", color = MaterialTheme.colorScheme.outline)
    }
}
```

Introducing Kotlin Multiplatform

Kotlin Multiplatform is a technology from JetBrains and Google → Share code across Android, iOS, Desktop, Web, Server.

How does it work?

- Write core logic (business rules, networking, models) in Kotlin
- KMP compiles your code for each platform (JVM, JS, Native)
- Platform-specific code only where needed (UI, device APIs)

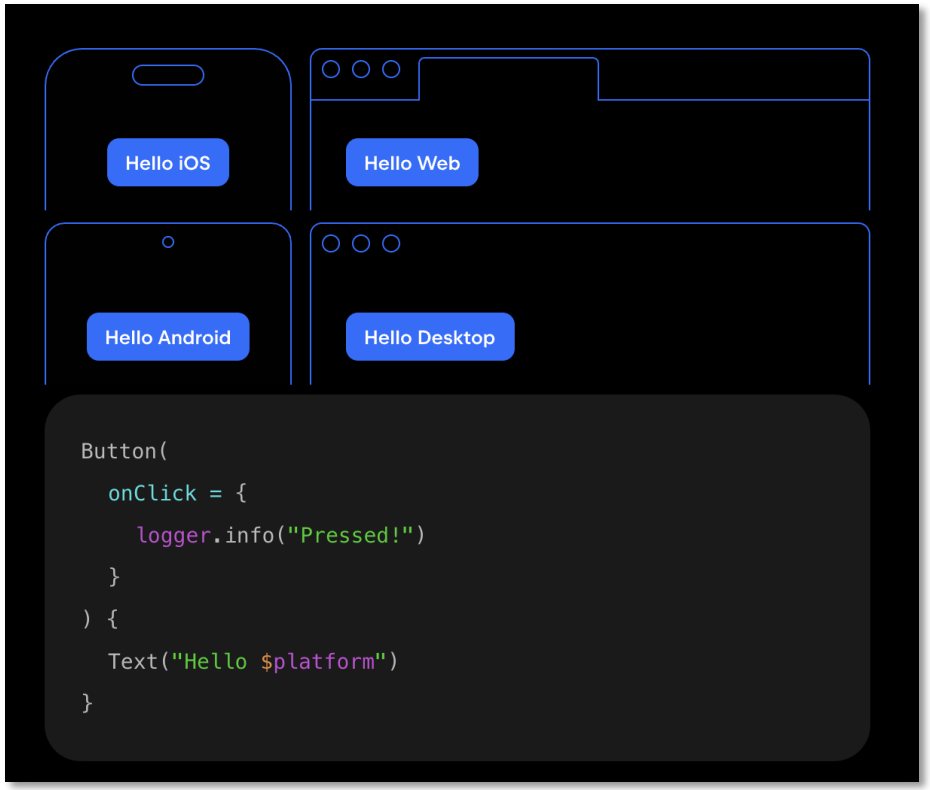


Benefits

- No need to rewrite business logic for each platform
- One set of tests, one source of truth
- Great interoperability with platform code (Swift, JavaScript, Java, etc.)

Compose Multiplatform

Compose Multiplatform brings Jetpack Compose's declarative UI to
→ Android, iOS, Desktop and Web (alpha)



How does it work?

- Compose UI code is written in Kotlin
- The toolkit adapts rendering to each platform (native widgets, HTML/CSS, etc.)
- Supports platform-specific features when needed

Benefits

- Rapid UI development with hot reload and live preview
- Consistent look & feel across devices
- Easy to share components and design system

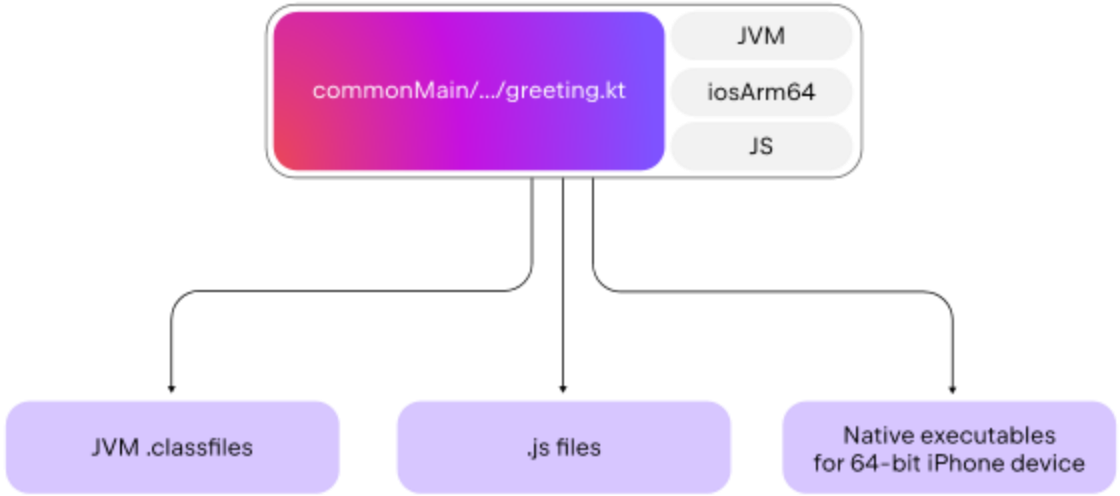
How it works: Architecture

Shared Code

- Business logic, data models, networking written in Kotlin
- UI screens in Compose Multiplatform

Platform-specific code

- Small parts for device APIs (camera, sensors, notifications)
- UI integration with host app if needed (navigation, lifecycle)



Project structure

- **commonMain/ :** Kotlin Multiplatform code (logic, Compose UI)
- **androidMain/, iosMain/, desktopMain/, wasmJsMain/ :** platform modules

What can be shared?

Business logic

- ViewModels, data models, repositories
- Networking, state management, validation

UI

- Screens, components, layouts (Compose Multiplatform)
- Navigation logic, design system

Tests

- Unit tests for shared logic and UI
- Integration tests

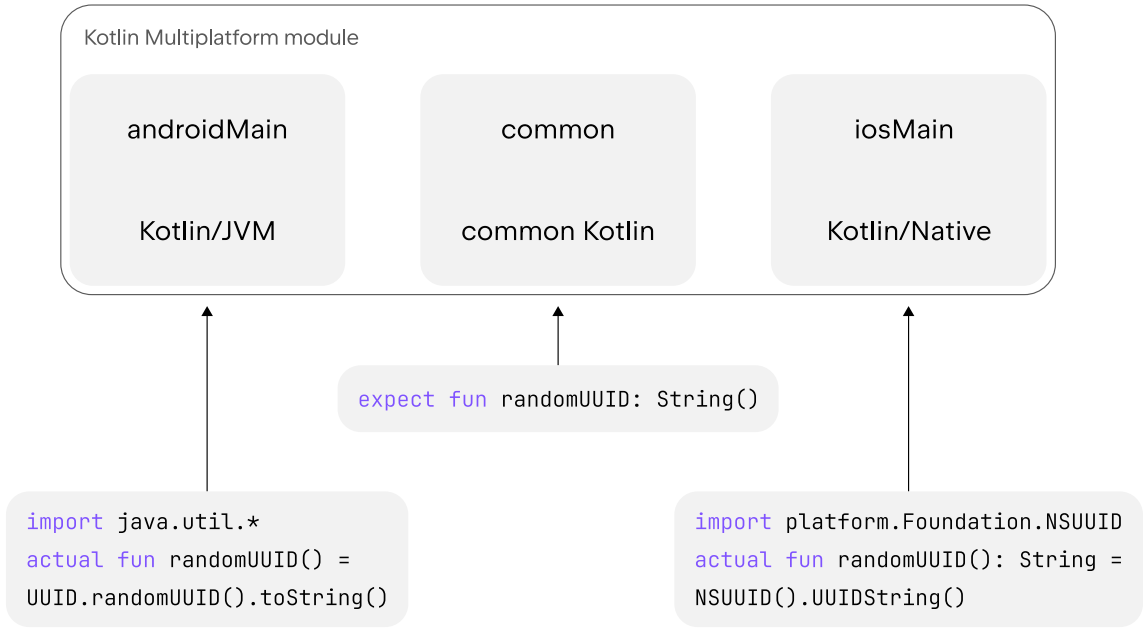
When to go native?

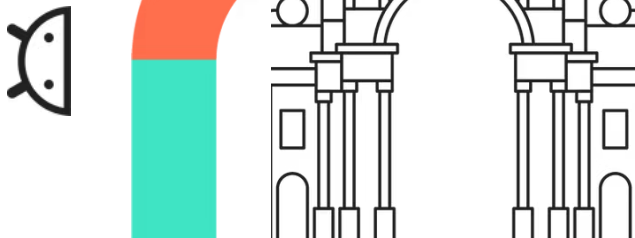
Platform-specific APIs

Camera, sensors, notifications, device permissions

Custom platform UI

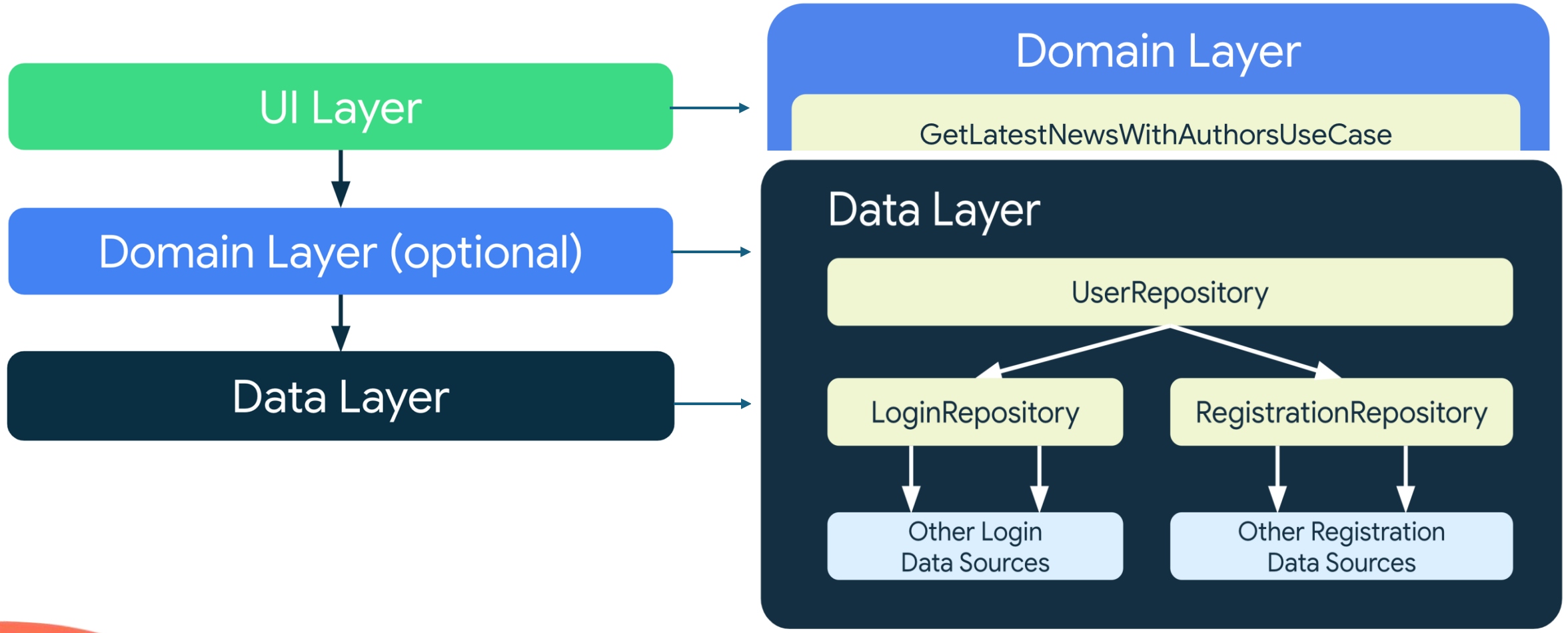
Native controls, advanced animations, platform look & feel





Project structure

Clean code, clear structure: let's build it with clean architecture!



Let’s build a WeatherApp !

https://github.com/andreadellaporta01/weatherapp

android

iOS

WeatherApp

Any Question?

andreadellaporta01

andrea-della-porta-01

AndreaDellaPor5