Native, Hybrid, Cross-Platform

[Mobile Web](#)

[Hybrid](#)

[Cross-platform (or also called Multi-platform, or Hybrid native)](#)

Mobile Web

[Debugging Mobile Web Apps](#) - Chrome browser, Android device
Working with [Chrome Dev Tools](#) in general
[Debugging Chrome apps in iOS](#)
[Debugging Safari app in iOS](#)

Hybrid

Two most popular frameworks for creating hybrid apps -
Apache Cordova and Ionic

[Ionic explains how they are different from React Native](#) - please read to understand what is hybrid if still confused.

Apps built with Cordova https://cordova.apache.org/ (scroll down)

[Cordova Tutorial](#)

Classes in Android and iOS that display web content

[iOS: WKWebView Class](#)

[Android: WebView Class](#)

How to spot a hybrid app? Using Android device. Turn on "Show Layout Bounds" in Developer Options or use the following command

adb shell setprop debug.layout true

Alternatively, try to run uiautomatorviewer tool.

Enter the word uiautomatorviewer into terminal or command prompt and hit enter.

How to use it https://www.guru99.com/uiautomatorviewer-tutorial.html

Cross-platform (or also called Multi-platform, or Hybrid native)

Three most popular solutions:

React Native:

[React Native](#) - A cross-platform native framework developed by Facebook

Apps build with React Native https://facebook.github.io/react-native/showcase

Why Airbnb is moving away from React Native -

https://softwareengineeringdaily.com/2018/09/24/show-summary-react-native-at-airbnb/

Tools suitable for automating React Native

https://medium.com/@ronak8036/react-native-testing-tools-f38d715adb57

Pay attention to https://www.cypress.io/how-it-works/!

Flutter:

[Flutter](#) - A cross-platform native framework developed by Google

"Flutter is an open-source UI software development kit created by Google. It is used to develop applications for Android, iOS, Windows, Mac, Linux, Google Fuchsia and the web."

[Cupertino Widgets - Flutter](#) - How the IOS apps look with Flutter

Apps build with Flutter - https://flutter.dev/showcase

Flutter Driver for automation testing -
https://flutter.dev/docs/cookbook/testing/integration/introduction

Xamarin

[Xamarin](#)

"Xamarin is a Microsoft-owned San Francisco-based software company founded in May 2011 by the engineers that created Mono, Xamarin.Android and Xamarin.iOS, which are cross-platform implementations of the Common Language Infrastructure and Common Language Specifications"

[Built with Xamarin](#)

Example - [Cinemark Theatres app](#)

[Xamarin.UITest](#)

Two conference talks about cross-platform solutions

[Native, React Native, Flutter and More](#) - By **Barlow Tucker** droidcon San Francisco 2019
[Adding Flutter to Your Android App](#) - By **Matt Carroll** droidcon San Francisco 2019