1.4FRAMEWORKS AND TOOLS

A framework, or software framework, is a platform for developing software applications. It provides a foundation on which software developers can build programs for a specific platform

- For example, a framework may include predefined classes and functions that can be used to process input, manage hardware devices, and interact with system software.
- A framework is similar to an application programming interface (API), though technically a framework includes an API.
- Depending on the operating system that is selected, the developer would then create the app using a corresponding language.
- All you need is to code your app using the languages you are comfortable with and the framework will render a hybrid version of your app that works across multiple platforms.

1. Cordova/PhoneGap

- **Designed by Adobe, PhoneGap is a combination that not only allows developers to create their apps using HTML, CSS andJavaScript, but also package the app, make it portable and release it to multiple app stores.**
- It can also extend the features of HTML and JavaScript, to create apps with a Native look and feel.
- Cordova **provides a set of JavaScript APIs** that allow the apps to use native functions such as Camera, Compass, Contacts, and Geo location. And it supports multiple operating systems such as iOS, Android, Windows Phone, Web OS, Blackberry, etc.

Benefits of Cordova/Phone Gap: -

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2. Ionic / Ionic 2

- **Ionic is one of the most popular hybrid frameworks that is**

currently on the market.

- It uses the JavaScript MVVM framework and AngularJS, which power the framework, making it faster and better than the other frameworks on the list.
- **The best part about Ionic is that it provides all the functionality that can be found in native mobile developmentSDKs,** which means that when users build their apps on Ionic, they can access all the native functions of the device, including camera, contacts, etc.
- Additionally, by using Angular, Ionic provides custom components and methods for interacting with them.

Benefits of Ionic/Ionic 2:

- **Free:** Ionic is an open source project under MIT and has been designed by a worldwide community.
- **Fully Cross-Platform:** Ionic follows the write once, run anywhere philosophy, which means that apps written on Ionic can be run on multiple operating systems including iOS, Android, Windows Phone and Blackberry.
- **Premier Native Plugins:** Ionic offers over 120 native device features that can be used within your app.
- **Performance:** Ionic places a special focus on performance, by leveraging hardware and requires no additional third party JS applications.
- **Native and web optimized:** Emulates native app UI guidelines and uses native SDKs, combining the UI standards and device features of native apps together with the full power and flexibility of the open web.

3. jQuery Mobile

- **jQuery Mobile is a great mobile framework to create cross- platform apps for platforms** such as regular desktop, smart phone, tablet, or an e-reader device like Nook or Kindle.
- Built on top of solid jQuery and jQuery UI foundation, jQuery Mobile is a great framework to develop apps, mobile and web, to run seamlessly with unique user experience across mobiles, tablets and desktops. Rather than focus on providing the native look, jQuery focuses on performance.

Benefits of jQuery Mobile:

- **Cross-Platform and Cross-Device:** With a focus on _write-less, do more‘ mantra, jQuery is not only a great framework for creating apps on multiple operating systems, but also for multiple devices including smartphones, desktops, tablets, etc.
- **Easy to Learn:** If you already know jQuery and JavaScript, you don‘t

have to learn any new syntax.

- **ThemeRoller:** jQuery is designed as a theming framework, which allows developers to create customized themes for their apps.
- **Download Builder:** jQuery's download builder allows building a custom bundle that contains only the components that are needed. The builder also generates a custom JavaScript file and full and structure-only stylesheets for production use.
- **Layout Grid:** jQuery's layout grids make it easy to create client's product page, result page, and other custom pages.

4. React Native

- React Native separates itself from the rest of the frameworks on the list by shifting its focus from creating hybrid apps to creating actual real native apps.
- **React Native was designed on the heels of React, by Facebook** and it stemmed from their Ads Manager app.
- **React Native comes with fast development cycles and declarative self-contained UI components, while retaining the speed and feel of native apps.**
- The application logic is written and run in JavaScript, while the UI is fully native. This offers developers a chance to maintain the native look and feel of the app, without having to use traditional languages.

Benefits of React Native:

- **Parallelize Work:** Facebook's Async display kit allows rendering off the main thread, which results in super smooth animations.
- **Declarative Style:** The codes can now be written in a declarative format, which means the codes are now readable, flexible and not manipulative.
- **Sophisticated Gesture Handling:** Reactive Native allows access to native gesture functionality, so it results in better gestures on the app.
- **Native Capabilities:** Allows access to platform specific capabilities and components, including widgets.
- **Faster Iterations:** React Native allows Hot Reloading and Live Reloading, reducing feedback loop and also offers over-the-air code updates to your app.
- **Cross-Platform:** An app can be designed across multiple platforms, mainly iOS and Android.

5. Meteor

- **Meteor is an amazing open-source JavaScript web framework that is written using Node.JS.** It simplifies the process of developing apps by allowing rapid prototyping and producing cross-platform code.

- A full JavaScript, Meteor is made up of a collection of libraries and packages that are bound together, making it easier, flexible, faster and it requires it less codes. This also results in the codes being less buggy and of a higher quality.

Benefits of Meteor:

- **Fast:** Using JavaScript for front-end and back-end development, creating apps using Meteor is simple and easy. It also allows you to ship more with less code, reducing the lines of code required for building apps.
- **One Language Development:** For JavaScript lovers, this great advantage. No more multiple languages for front-end and back-end development.
- **Easy to Learn:** If the developer already knows JavaScript, then they don‘t have to learn anything new. However, if they don‘t, then JavaScript is a pretty easy language to learn.
- **Real-time Applications:** Real-time is built in Meteor‘s core, which means developers get to produce real-time apps right out of the box.
- **Packages:** Already built smart packages to simplify coding and make building faster, for items such as User accounts, Javascript libraries, Extras like Bootstrap or Stylus, and more.

Some other popular Cross-platform Frameworks for Mobile Development are:

1. Corona SDK
2. Xamarin
3. Appcelerator Titanium
4. TheAppBuilder
5. NativeScript
6. Sencha Touch

TOOLS

What are Mobile Development Tools?

- Mobile Development Tools are software designed to assist in the creation of mobile applications. This can be accomplished in multiple ways, for example, there are ***native mobile development tools***, but also ***cross-platformmobile development tools***.

1. **Native mobile development tools** can help you create specialised apps that operate with ease and high quality, and can take advantage of all features on their designated platform.

2. **Cross-platform mobile development tools** – on the other hand – make it possible to create a generic app for multiple platforms simultaneously,

greatly cutting the costs and time needed to create an app, but this comes with a
trade-off. Non-platform specific applications made in a cross-platform environment tend to have more issues and lower quality compared to native applications.

Native Mobile Development Tools

A **native development tool** is a software which allows developers to create applications for use in a single particular system family, platform or device, like Android, iOS, or Windows (note: support for Windows Mobile ends in December 2019). A native app is specially made and coded for a specific mobile platform in its native programming language, these being:

- iOS (Objective-C or Swift)
- Android (Java or Kotlin)
- Windows Phone (C#)

1. Xcode

- Xcode introduces a new way to design and build software.
- Live rendering within Interface Builder displays your hand-written UI code within the design canvas, instantly reflecting changes you type in code.
- Xcode includes everything developers need to create applications for Mac, iPhone, iPad, Apple TV, and Apple Watch. Xcode provides developers a unified workflow for user interface design, coding, testing, and debugging.

2. Android Studio

- Android Studio is an Android development Software built by Google. Its implementation editor is very useful for Android developers.
- Android studio provides shortcuts for coding and designing and its layout designer makes it very easy to use, which helps reduce time spent on coding. Android studio also provides drag and drop features to design the layout of your projects.

3. AppCode

- AppCode is an IDE for iOS/macOS development. In addition to working with Objective-C, Swift and C/C++ programming languages, it supports web technologies such as JavaScript, HTML, XML, CSS, and more.
- It provides a variety of valuable integrations including among others CocoaPods manager and built-in Reveal support.
- In addition to the benefits AppCode provides to developers (such as

saving their time on automating routine tasks, locating and fixing errors, taking advantage of intelligent support from the IDE, and increasing their overall productivity), it can be an equally valuable asset for your business.

Cross-Platform Mobile Development Tools

- With **cross-platform mobile development**, programmers on one platform can develop apps for one or more other platforms or mobile operating systems simultaneously.
- This can also enable developers to essentially use the same code base for different platforms. Meaning that such generic apps can be published and used on both an Android Phone and an iPhone.

Furthermore, this category has also been split into three platforms:

- **Coding Platforms –Appcelerator, xamarin, ionic, react native**
- **Low-Coding Platforms**
- **No-Coding Platforms**