

A Survey Paper on Introduction to Android and Development Process

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Abstract: *Smart phones are becoming a vital innovation which had modified the human life in many aspects. Day by day, the mobile application development business is growing by leaps and bounds, and today's shoppers square measure progressively adopting mobile as their medium of selection for browsing, researching, and buying things, because the world's preferred mobile platform, android powers many uncountable mobile devices in additional than a hundred ninety countries around the world. on a daily basis another million users power up their Android-powered devices for the primary time and begin trying to find apps, games, and different digital content. This paper additionally provides differing types of mobile applications, challenges to develop android application and its development method.*

Keywords: Android, Mobile applications, SDK, Challenges.

1. INTRODUCTION

Android is based on the Linux kernel, and developed by Google and later the Open Handset Alliance. It is also software platform and OS for mobile devices and permits developers to write code within the Java language, dominant the device via Google developed Java libraries. It will run on many various devices from many different manufactures. Android includes a software package development kit (SDK) that helps you write original code and assemble software package modules to form apps for android users. Android also provides a platform to distribute apps. all at once, android represents an ecosystem for mobile apps. Android could be a freely downloadable open source software package stack for mobile devices that has an OS, middleware and key applications supported LINUX and Java. In 2005 Google purchased the developer of android, and android was released in 2007. Google released the android code as open source beneath the Apache License. Android has various developers writing applications (apps) everywhere in the world. Developers produce apps for a various reasons, they will ought to address business needs or build new

services or businesses, or they will wish to supply games and alternative forms of content for users. Developers like better to develop for android so as to succeed in the bulk of mobile device users.

2. ANDROID ARCHITECTURE

Android software development kit (SDK) is used to develop apps that take advantage of the Android operating system and UI. It includes software libraries of predefined code, a debugger, a emulator, documentation, sample code, and tutorials. SDK is used to create apps that look good and take benefit of the hardware capabilities available on each Android-powered device.

To develop apps using the SDK, which utilize the Java programming language to develop the app and Extensible Markup Language (XML) files to describe data resources. To create an app that can run on both phone and tablet write the code in Java and by creating a single app.

To develop your apps efficiently, Google offers an integrated development environment (IDE) called Android Studio. It offers advanced features for debugging, developing, and packaging Android apps. By using Android Studio, you can develop app for any Android-powered device, or create a virtual devices that emulate any hardware configuration. The components present in the android architecture are explained below as shown in the fig 1.

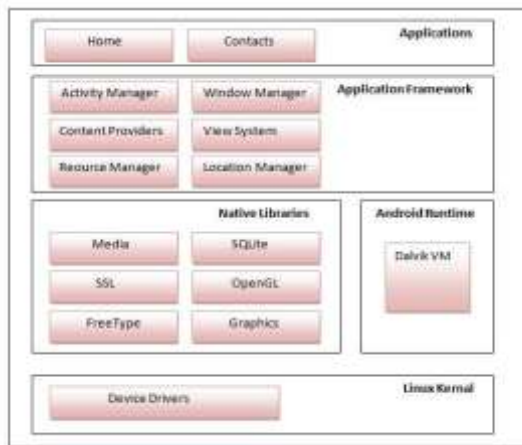


Fig 1: Android Architecture

1) Linux kernel: It is the very important part of android architecture that exists at the top of android architecture. Linux kernel is responsible for memory management, device management, device drivers, power management and resource access.

2) Native Libraries: On next to the Linux kernel, there are Native libraries such as OpenGL, FreeType, WebKit, SQLite, Media, C runtime library (libc) etc. The SQLite is for database, WebKit library is responsible for browser support, FreeType for font support, Media for playing and recording audio and video formats.

3) Android Runtime: In android runtime, there are many core libraries and DVM (Dalvik Virtual Machine) which is responsible to run the android application. DVM is like JVM but it is optimized for mobile devices. It takes less memory and provides fast performance.

4) Android Framework: On next to the Native libraries and android runtime, there is android framework. It includes Android API's such as resources, locations, UI (User Interface), telephony, Content Providers (data) and package managers. Android Framework provides a lot of classes and interfaces for android application development.

5) Applications: On next to the android framework, there are applications. All the applications such as home, contact, settings, games, browsers are using android framework that uses android runtime and libraries. Android runtime and native libraries are using Linux kernel.

3. TYPES OF MOBILE APPS BY TECHNOLOGY

Mobile apps are of three different types:

1. Native Apps: Native apps are built specifically for a mobile device's operating system (OS). Hence, you can use native Android mobile apps or native iOS apps, not to mention all the other platforms and devices. Because they're built for just one platform, you cannot mix and match – say, use a Blackberry app on an Android phone or use an iOS app on a Windows phone.

2. Web Apps: Web apps behave similarly to native apps but are accessed via a web browser on your mobile device. They are not standalone apps in the sense of having to download and install code into your device. They are actually responsive websites that adapt its user interface to the device. In fact, when you come across the option to “install” a web app, it is often simply bookmarks the website URL on your device. One kind of web app is the progressive web app (PWA), which is basically a native app running inside a browser.

3. Hybrid Apps: These are web apps that look and feel like native apps. They can have a home screen app icon, fast performance, responsive design, even be able to function offline, but they're really web apps made to look native.

4. THE CHALLENGES OF ANDROID APP DEVELOPMENT

The Android platform provides rich functionality for app development, and there are a number of challenges you need to address, such as:

- Building for a multiscreen world
- Getting performance right
- Keeping your code and users more secure
- Making sure your app is compatible with older versions
- Understanding the market and the user

1. Building for a multi-screen world

Android runs on billions of handheld devices across the world and supports a various form factors including televisions and wearable devices. Devices come in different

sizes and shapes, which affects how you design the screens and UI elements in your apps. The device manufacturers can add their own UI elements, styles, and colors to differentiate their products. Each manufacturer offers different features with respect to camera buttons, keyboard forms, screen size. An app running on one device may look a bit different on one another. Your challenge, as a developer, is to design the UI elements to work on all the devices.

2. Getting the app performance right

An app's performance is determined by how fast it runs, how easily it connects to the network, and how well it manages battery and memory usage. Performance is affected by factors such as multimedia content, battery life, and internet access. Be aware that some features you design for your application may cause performance problems for users. For example, enable background services only when they are necessary to save the user's battery power.

3. Keeping your code and users more secure

You need to take precautions to make your code, and the user's experience when they use your app, as secure as possible.

- Use ProGuard tools, which is provided in Android Studio. It detects and removes unused fields, methods, classes, and attributes.
- Encrypt all your app's code and resources while packaging the app.
- To protect critical user information such as logins and passwords, secure your communication channel to protect data in transit across the internet, as well as data at rest on the device.

4. Making sure your app is compatible with older versions

The Android platform continues to provide and improve new features that you can add in to your apps. However, you should make sure that your app can still run on devices with older versions of Android. It is not good to focus only on the most recent Android version, as not all users may have upgraded or may be able to upgrade their devices to new versions. So Android Studio provides

options for developers to more easily remain compatible with the older versions.

5. Understanding the market and the user

The android app developers must know the business platform where they have to sell there apps. The developers must develop there app basing on the user requirements and their interests of the platform.

5. THE DEVELOPMENT PROCESS

An Android application project begins with an idea and requirements necessary to build that idea. You may want to sketch user interfaces (UIs) for the various application functions. To show what a UI would look like and how it would draw, mock-ups, work, use, and prototypes.

When you are ready to start coding, use the Android Studio to go through the following steps to develop app as shown in the below fig 2:

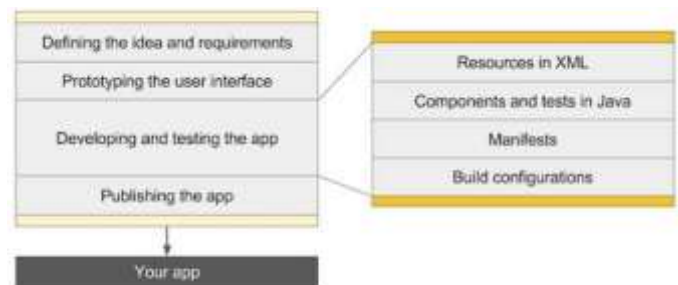


Fig 2: Application development process

- **Defining the idea and requirements:** Most apps start with an idea of what it should do, by market and user research, during this stage the apps requirement are defined.
- **Prototyping the user interface:** Use drawing, mock ups and prototypes to show what the user interface would look like, and how it would work.
- **Developing and Testing the app:** An app consists of one or more activities, For each activity you can use Android studio to do the following in particular order:
- **Create the layout:** Place the UI elements onto the screen in a layout, and assign string resources views and menu items, using the Extensible Markup Language (XML).

- Write the Java code: Create a Java Source code for components and tests, and use testing and debugging tools.
- Register the activity: It declares the activity in the manifest file.
- Define the build: use the default build configuration or create custom builds for different versions of your application.
- Publishing the app: Assemble the final APK (package file) and distribute it through channels like google play store.

6. CONCLUSION

Now a day's android is emerging technology that is used in Smart Phones which has changed the life of everyone. There are different types of apps in which an application is developed based on type of operating system. Smart Phones provides many features that significantly reduce the frequency and impact of application security issues. We can design our own apps based on our requirement by following the development process steps. To develop apps there are certain challenges which an application need to address.

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