

A Study on Development of Mobile Application with Android

Mahesh Singh¹, Ritu Gupta², Dr. Aryan Tyagi³

Students^{1, 2}, Professor³

Department of CSE

College of Technology and Engineering, Rajasthan

Corresponding Author's E-mail: ritu00321@gmail.com²

Abstract

Android is a mobile operating system. It is a Google-developed and-maintained open source and free operating system programme. It was primarily created for touch-screen mobile devices, including as tablets, laptops, smart phones, televisions, and automobiles. Android is one of the most popular mobile operating systems. Android is a platform that includes not just an operating system, but also apps and middleware. The Android operating system is free and open source. The open handset Alliance, headed by Google, and other businesses are working on it. Those who are familiar with Android Studio 2.2.3 and the creation of mobile applications.

Keywords: *Android, Android Architecture, Android Versions, Operating System*

INTRODUCTION

The Android is a piece of technology. It is an open source operating system, which implies that anybody interested in using it may do so by obtaining the whole Android source code. This was used for the creation of mobile and desktop applications. This is a comprehensive software package for mobile devices such as tablet computers, smart phones,

notebook computers, watch and book readers, set-top boxes, and so on. It contains three items. Operating system, middleware, and essential applications. The Android operating system is based on Linux. More than 30 businesses are trying to make the mobile phone ecosystem more open. In the market, there is a high need for mobile application development. The applications are often written in the java

programming language and built using the Android development tools. There are development tools on the market such as native development kit for application or extension in C or C++, Google app inventor, and so on. It can run on a wide range of devices from a wide range of vendors. Android is a sophisticated and well-known operating system that can run a wide range of apps on touch-screen phones. The hardware is compatible with Android software, which is built on the ARM architecture platform. These apps provide users with a higher level of comfort and sophistication. Android is an open source operating system, which means that it is free to use and that people may simply access and utilise it via the android application. There are millions of applications available for Android. The android helps us to manage our lives in some manner, and the applications are accessible in the market at a cheap cost, which is why the android is so popular across the globe.

HISTORY

In 2003, the world's most popular mobile operating system was released. In October 2003, Andy Rubin established the Android Corporation in Palo Alto, California, United States. Google purchased Android Incorporation on August 17, 2005. Since then, Android has been a subsidiary of Google Inc. Android Incorporation's main workers include Rich Miner, Andy Rubin, Nick Sears, and Chris White. Because cameras were more costly at the time, Android included cameras into smart phones. Andy Rubin is a big fan of robots, which is why he gave Android the nickname "Android" to his colleagues. Google announces the development of Android OS in 2007. HTC released the first Android phone in 2008.

Android versions:

There are many Android versions; however Versions 1.0 and 1.1 were not published with a particular codename.

Table 1 Versions of Android

Version	Code name	API level	Release date
1.0	No codename	1	September 23, 2008
1.1	No codename	2	February 9, 2009
1.5	Cupcake	3	April 27, 2009
1.6	Donut	4	September 15,
2.1	Éclair	5-7	October 26, 2009
2.2	Froyo	8	May 20,2010

2.3	Gingerbread	9-10	December 6,2010
3.1-3.3	Honeycomb	11-13	February 22,2011
4.0	Ice Cream Sandwich	14-15	October 18,2011
4.1-4.2- 4.3	Jelly Bean	16-18	July 9,
4.4	KitKat	19-20	October 31,2013
5.0	Lollipop	21-22	November 12,2014
6.0	Marshmallow	23	October 5,2015
7.0	Nougat	24-24	August 22,2016
8.0-8.1	Oreo	26-27	August 21,2017



Figure 1 Android Versions

FEATURES OF ANDROID

- **Storage:** SQLite, a lightweight relational database, is utilised for data storage.
- **Connection:** It supports a variety of connectivity technologies such as WIFI, BLUETOOTH, UMTS, WIXMAX, CDMA, and GSM/EDGH.
- **Messaging:** MMS and SMS are both supported by Android.
- **Web browser:** Powered by Chrome's V8 JavaScript engine, which supports CSS3MMS and HTML5, and is built on the open-source Web Kit layout engine.
- **Multi-touch:** Android has a Multitouch functionality that was pioneered by the HTC Hero smartphone.
- **Multi-tasking:** Multiple applications may run at the same time. The user may go from one job to another at any moment.
- **Tethering:** The Android allows you to share Internet connections as a wired or wireless hotspot.

ANDROID ARCHITECTURE

The software stack is spilt into five layers:

- The application layer
- The application frame works
- The libraries
- The runtime
- The kernel

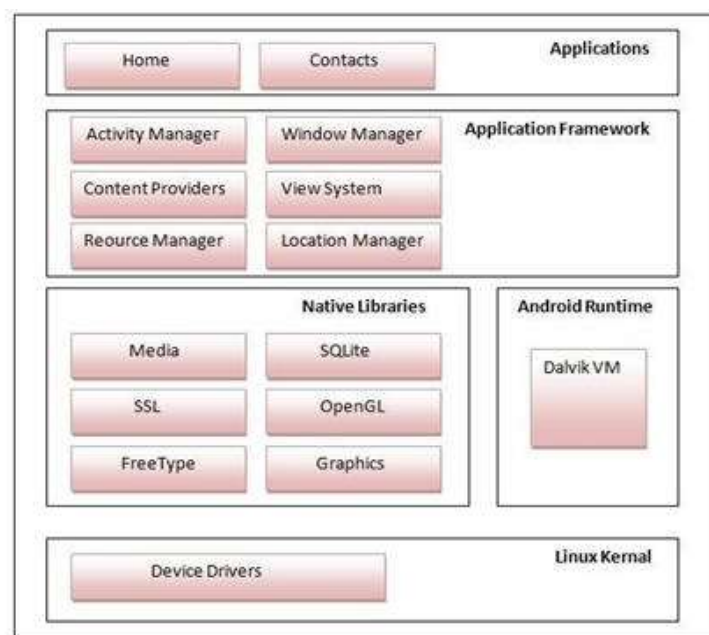


Figure 2 Android Architecture

The Kernel of Knowledge

The Android operating system is built on the Linux 2.6 kernel architecture. This layer is the foundation of Android architecture. It offers services like as processor and power management, security, memory management, and so on.

The Indigenous Libraries

Android has its own libraries that are developed in C/C++. These libraries are

not immediately accessible. We may access these libraries by using the application framework. There are libraries that may let you access many different types of web browsers. For example, there is a web library as well as libraries for video and android formats.

Android's Run Time

The Android Runtime is a programme. That is the run time environment. It is

used by the Android operating system. Where there is a limited battery, a restricted CPU, and a limited memory. Dalvik is the name of Android's virtual machine. It is powered by an Android application. Dalvik is a programming language that is utilised in mobile devices such as tablets and phones. Java programmes are frequently written and compiled as byte code.

Run Time on Android

This is written in the java programming language, as shown by the blue colour. The internal library includes all collection utilities, classes, IO, and utilities.

Framework for Applications

The application framework is the toolkit that all applications utilise, and it is built entirely in the java programming language. These apps include those that come with a phone, such as the phone application, as well as home applications. It contains applications created by Google as well as apps that you will create. Every application makes use of the same APIs and framework.

These are the following:

- Activity manager: handles the application's lifetime. It allows for the effective administration of all

activities. The manager is in charge of all actions.

- Resource manager: it gives you access to non-code resources like graphics and so on.
- Place manager: whether it sends notifications when a user enters or exits a certain geographical location.
- Package manager: This programme is used to obtain information about installed packages on a device.
- Window manager: this programme is used to build views and layouts.
- Telephony manager: it is used to manage network connection settings and all service information on the device.

Layer of Application

The top layer contains the application layer. This layer is responsible for data exchange and file transmission. It includes the contacts app, the home app, applications, and the browser. It is the most important layer in Android architecture. All native applications, such as Google maps, camera, SMS, browser, calendars, and contacts, are available. This

programme works with the end user with the assistance of a framework application.

SECURITY

All Android is designed with more technological security measures that are simply displayed to the user, implying that they may be readily managed through the interface. To improve the security of your Android smartphone, use a pin or fingerprint, password, set your phone to lock after a time of inactivity, only enable wireless connections that you use, and only install Android applications that you trust and have personally checked.

Google lets Android apps into its marketplace, and these programmes have been vetted and confirmed to be safe by Google, which means that the user will be secured and there will be less of a risk of downloading a virus or harmful software. The Android security system asks the user to authorise the installation of an application. That is, it is not feasible to install and execute a programme remotely. Users may protect their Android smartphones against attackers by applying system updates on a regular basis.

Android is a multi-process system, which means that each programme (and component of the system) operates in its

own process. The security between the system and the application is achieved using normal Linux capabilities such as group IDs and user IDs given to the apps. When attackers assault a device, the Android platform assists in protecting the smart from the attackers.

There are many important components of Android security, which are as follows:

- Design review: the security model's design is evaluated by the developers. As a result, the risk level will be extremely low when utilising this model.
- Code review and penetration testing: the primary goal of code review is to evaluate how powerful the system will become.
- Open source and community review: Android, like the Linux kernel, has open source and community review.

ANDROID BENEFITS AND DISADVANTAGES

There are many benefits and drawbacks to using an Android application.

Advantages of Android

- Android phones are simple to use.
- It is lightweight and portable.
- It has a higher level of security.

- The user may alter the screen display with the help of numerous applications.
- It is platform agnostic.
- The main benefit of Android is its ability to multitask.
- It is compatible with the Google service.
- It provided you with greater notification.
- A more developed platform.

Disadvantages of Android

- Android may be attacked at times.
- Because of this Android OS hang, the Android operating system has a lot of processes.
- If your phone's memory is full, it will become sluggish.
- Extremely inconsistent design among applications.
- It is unstable and sometimes crashes.

CONCLUSION AND FUTURE APPLICATIONS

Because Android is an open source platform, it is simple to create mobile-based applications. To build these apps, all APIs are accessible. It is highly secure and helps to defend against intruders. There are many Android versions available, the most recent of which being Oreo 8.1. Many types of helpful robots that will be required in the future may be created in

the area of artificial intelligence. Which is being developed for usage in automobiles, watches, and Android TV.

REFERENCES

1. <http://www.android.com>
2. S.A. Gadhiya, K.H. Wandra, V.B. Vaghela, "Role of mobile augmentation in mobile application development", in Proc. 2012 IEEE International Conference on Engineering Education: Innovative Practices and Future Trends, India, 2012, pp. 1-5.
3. K.W. Tracy, "Mobile Application Development Experiences on Apple's iOS and Android OS", IEEE Trans. IEEE Potentials, vol. 31, pp. 30-34. August 2012.
4. Li Ma, Lei Gu and Jin Wang "Research and Development of Mobile Application for Android Platform" International journal of Multimedia and Ubiquitous Engineering.