
Android Mobile Operating System and Architecture

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Abstract: Android mobile operating system is a mobile phone operating body built through Google mainly for touchscreen tools, smartphones, & tablet computers. It will undoubtedly begin with Android Architecture, which is consists of five degrees: first Linux piece, second Libraries, third Application structure, fourth Android runtime, & fifth System apps. Android operating system is multi-user Linux device in which each application is a different customer. Mobile applications have change the interaction from conventional antiqued methods & fast-forwarded.

The Mobile applications softwares have provided more significant than social networking sites functionalities. The Ordering food products, inspecting profile harmony, & creating a grocery store checklist are achievable utilizing mobile phone requests & many more. Apple & Google mobile operating systems have carried out significant improvements in the industry of mobile phones market. Mobile uses made our lifestyles less complicated & easy, yet it has also unfavorably affected our lifestyles too. Current researches state that making use of a mobile phone on continue basis for long time may lead to anxiety. Our research paper describes the information about the android operating system & its components & how they interconnected with each other, & in today's era, it can change the way of communication.

Keywords: Android runtime, Linux Kernel, Mobile application, Operating system, Security.

I. INTRODUCTION

In modern days technology has been widely adopted and employed by human beings in all variety fields. The use of technology has numerous advancements. the android allows the people to keep in touch without gathering at one location. The growth of mobile device technology has attract people's attention from all of their life, facilitating globalization by making the world look like a global village.[1] With the number of mobile users increasing very widely and growing rapidly, the different firms operating in the technology industry are also not relenting to expand to meet the evolving demands of the consumers. Because of this, multiple digital devices and gadgets continue to be developed with phones that were initially designed for calls only have a wide range of uses as they become part of people's lives and transform it. Mobile device users can access the internet, send and receive messages from mobile, or even video conference, serving like portable computers, apart from making and receiving calls. However, it could not have been possible were it not for developing a natural operating system. With only three operating systems procedures for the handheld the devices; Windows by Windows incorporation, iOS by Apple incorporation, and Android by Google, the latter it dominates the market by holding a significant market share in the number of users and units shipped the worldwide. With every Android version release improving users the experience by bringing better and new features [1,3]. Android smartphones poses a significant threat to the Apple iPhone market. It is because Google company was targeting the same consumers targeted by iPhone and has managed to secure both the hearts and minds of the mobile app developers making Android a success. With development of smartphones and more mobile apps, there has been a complete turn in the usage of mobile smartphones, making them become part of the users' daily life. The android operating system was based on the Linux kernel and was u in 2007 after Google purchased the functional system developer in 2005. And Since then, Android has kept updating, bringing the new features to improve user experience and fix the bugs.[3]

II. METHODOLOGY

2.1 BACKGROUND AND HISTORY:

Android is depicted as a mobile operating system. At the beginning improved by Android, Inc. Android was sold to Google in 2005. Google and other Companies of the Open Handset Alliance (OHA) collaborated on Android (design, development, distribution) [2]. The Android Open Source Project (AOSP) governs Android maintenance and the development cycle. The android mobile operating system is based on a revised Linux 2.6.0 kernel. Measure up to a Linux 2.6 environment. However, the many drivers and libraries have been altered or recently established to allow Android to run effectively and essentially potential on mobile devices such as smartphones or internet tablets [1,2]. A some of these collections come up with their origins in open-source developments. Due to some authorizing issue, the Android community take decision to implement their c library (Bionic) and build Android-specific Java runtime engine DVM (Dalvik Virtual Machine – DVM). with Android, the emphasis has always been on enhancing infrastructure based on the limited resources available on the mobile devices. On the way to balance the working world, and Android-specific application framework was designed and implemented[2,13]. that way, Android can best be described as a complete solution stack, incorporating the OS, center-wear components, and applications. In Android operating system, the altered Linux 2.6.0 kernel acts out as the hardware abstraction layer (HAL)[2,13].

The evaluation of the Android operating environment can be labeled as: •

- An accessible platform for mobile expansion
- A hardware source pattern intended for mobile phones
- A modified Linux 2.6 kernel drives the system
- An application and the user interface (UI) framework
- A run time environment.

2.2 ANDROID PHONE MARKET GROWTH:

In today's generation, smartphones have grown extensively, with the larger population owning different types of smartphones with varying features. With a substantial section of the people using smartphones in various capacities, it has made a relatively significant impact on the economic activities making use of the handheld technology in one way or another[4]. However, the main factor is the distinguishing the smartphone industry in terms of units shipped across the whole world. As figures from the international data corporation reveal, the smartphone industry has been growing at the rate of a 1.1%. With the number of units shipped amounting to around a 350 million by the third percentile of year, the Android has maintained a leading position in the market share[6,7]. The requirement of Android phones has been the rise on, with the consumers. selecting from the wide variety range of Android phones meets their needs and is within their budget. However, even the vendors in smartphone market the companies are capitalized on the wide acceptance of the Android operation system, making competition stiff in the business environment, with each vendor trying to be maximizing profits. The volatility of the software technology the industry has made Android production keep growing as they make efforts to ensure the operating system is compatible and adaptable with a majority of hardware and have the features that can be improve user's experience. Multiple companies which producing android phones are struggle to ensure they meet quality standards and improve features of their system, especially the data security, which has become a significant challenge in the technology[5].

The smartphone revolution is believed to be geared by the Android process and operating system. However, this will take an optimistic tech seen could have predicted that the Android operating system would be acquire such a significant market share when Google bought the Android developer in the 2005. Later , in 2007 iPhone(Apple) was introduced, giving Google the hard time penetrating the market with their free and open-source mobile operating system, making them try even to have the OS available to phone manufacturers at no direct costs[3].

2.3 THE ANDROID SOFTWARE PLATFORM:

The increasing of the daily usage mobile phones is approximately 3.5 times that of computers, with handheld technology offering more services than initially developed. Smartphones are in today's world being used for entertainment and information, especially with the launching of the android operating system[8]. An android is a free and an open-source software for mobile devices smartphones that comprises an operating system, middleware, and critical applications. Since the android software platform was launched, it has undergone multiple improvements in various dimensions, such as features and compatible hardware, to improve the user's experience. Besides, the android software platform had also extended to other types of devices apart from the mobile ones it targeted when it entered the market by launching a mobile platform [9]. It runs on multiple applications that allow the users to choose among the wide variety range of applications and their carriers in as an operating system. Android has attract the significant attention in the mobile industry and also other industries due to its free and open-source nature and architectural model. Based on Linux kernel architectural model, Android platform contains of several layers providing a complete software

stack. Android is an extensive operating setting that is based on Linux. The piece, along with few variations like V2.6, is separately a split device[10].

2.4 APPLICATION LAYER:

It is the site or root of all Android applications, including an email client, SMS program, maps, browser, contacts, etc. All this applications which mentions are written using the Java programming language[10].

2.4.1 APPLICATION FRAMEWORK LAYER:

This is a layer which defines the Android application framework. All Android applications are established on the application framework. The Android application framework includes:

- A good and attractive set of views can build an application with a beautiful user interface. to simply put in, the outlook may constitute lists, grids, text boxes, buttons, and even an embeddable web browser.
- A Resource Manager responsible to provides access to non-core resources such as localized strings, graphics, and layout files creating, importing & managing.
- A Notification Manager is responsible for enables all the mobile applications to display custom alerts in the status bar like mobile notification bar or pop ups.

2.5 ANDROID RUNTIME:

It is feature of a collection of center collections and a Java online equipment (Dalvik online equipment). it has been improved as well as improved through Google to become ideal for the Android system. Linux bit lies to a lower level of the Android body and also functions as an absorption coating. The components bridge of android software application pile delivers center device solutions such as surveillance, moment monitoring, procedure administration, system pile, and chauffeur version. Moreover, some lower functionalities including the administration of strings of Dalvik[10,13].

FEATURES OF ANDROID OPERATING SYSTEM:

- **Storage:** In today's data era, storage in digital devices is a very critical component, and the Android OS has SQLite, which is a relational database with a relatively big storage capacity to meet the storage needs of the Android mobile devices storage problem. It has attracted significant attention on Android devices in the market, especially for consumers who require the devices for storage purposes[14].
- **Connectivity:** One of the most very critical requirements of users in this digital era is a device that has access to the internet. An android smartphone or tablet supports connectivity technologies like EDGE to Wi- Fi, ensuring that users can access the internet at any place using the Android mobile devices[14].
- **Message-** Android operating system has the supports of two forms of messaging; people widely use the SMS and MMS to send text the messages and share information relatively quickly[14,15].
- **Multiple language support:** Android support the multiple languages. Android mobile applications are written in various programming languages, supported by the Android operating system, making them compatible with most carriers.
- **Web browser:** A browser used in Android operating system has a Web kit layout engine along with others such as Chrome which provides the reliable platform for users to access the internet services. Besides, the platform has a very user-friendly interface and making it easy to to users to browse the different sites online.

III. FIGURES AND TABLES

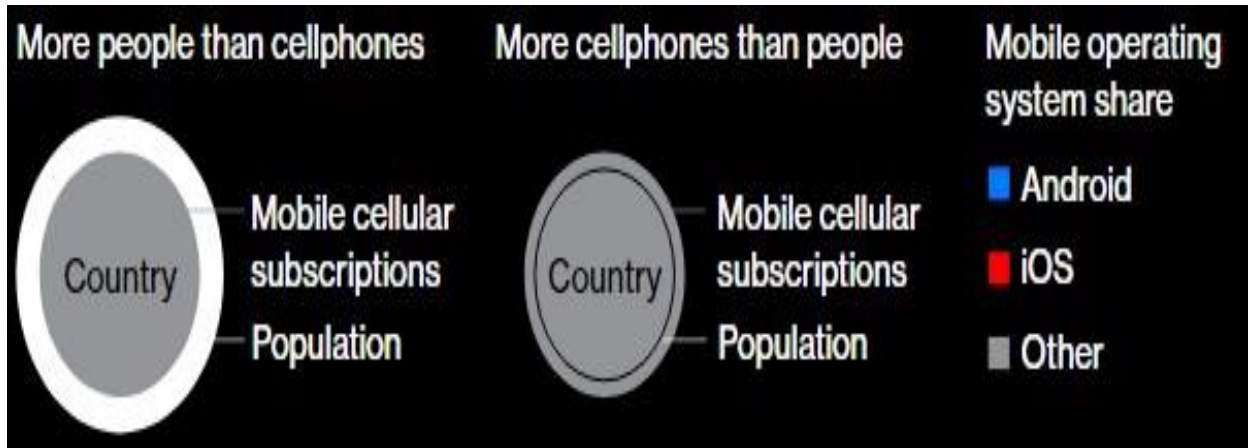


Fig 2.2 Mobile market growth

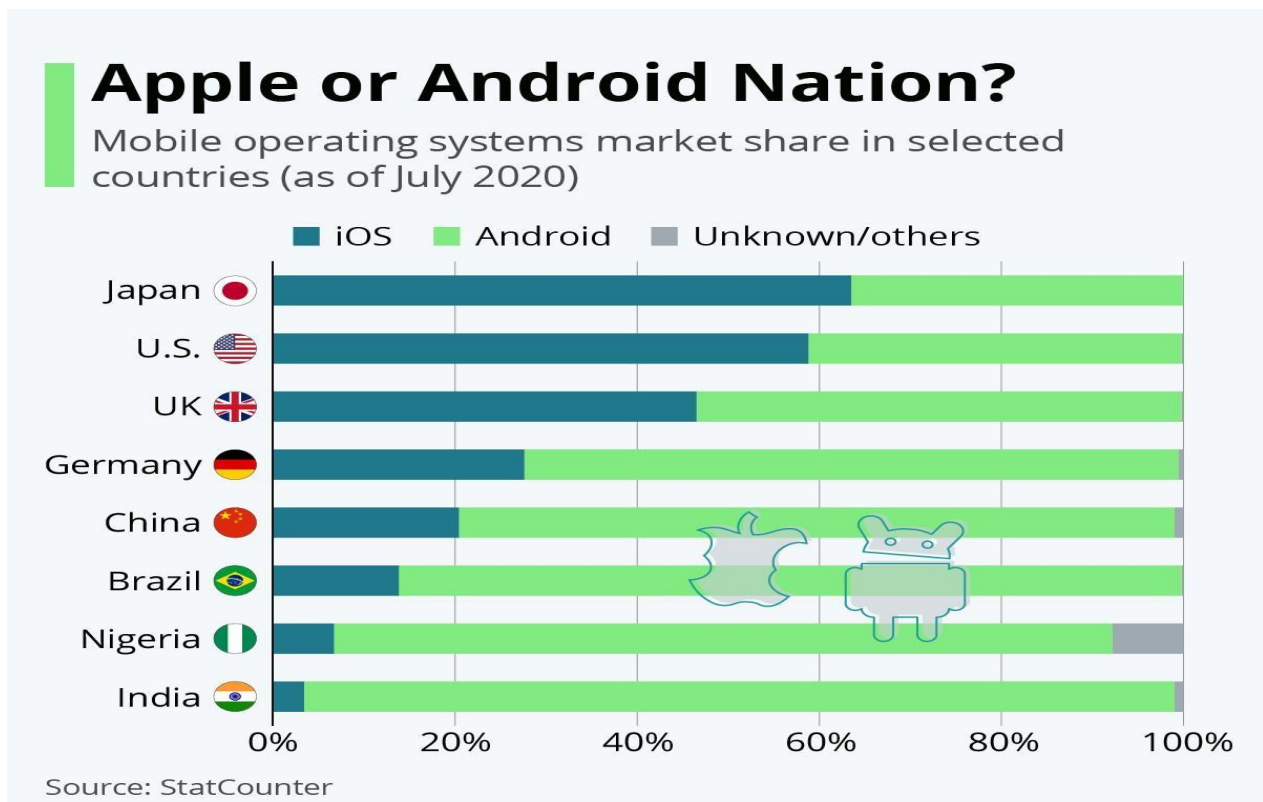


Fig 2.2.1 Market Capture

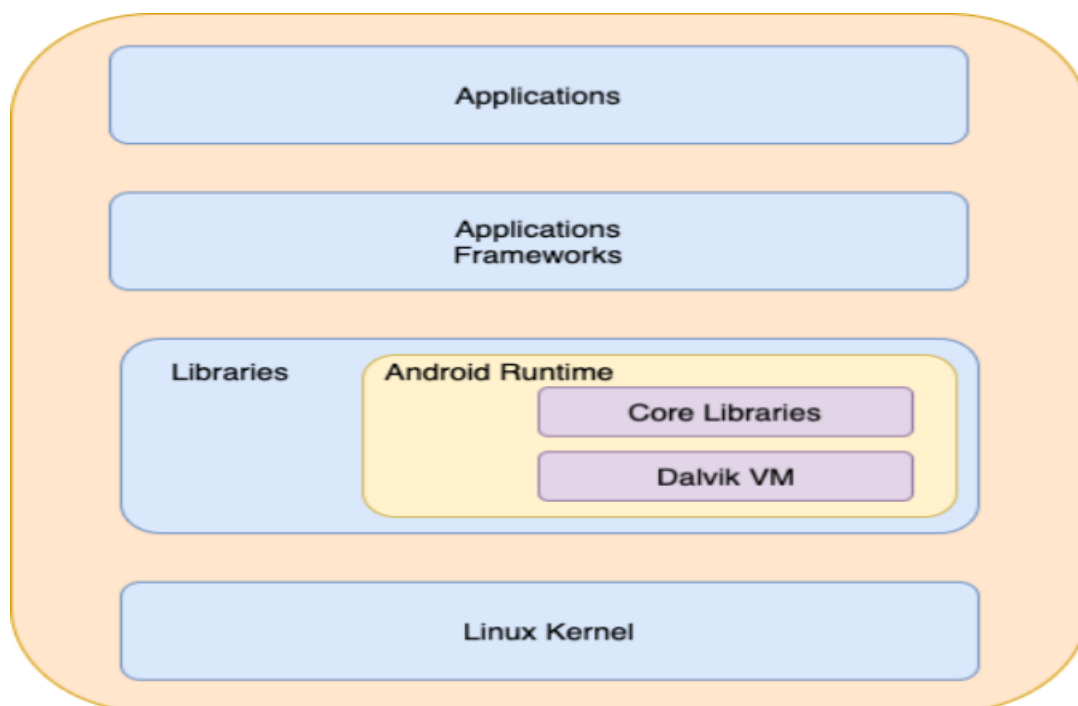


Fig 2.3 Android Software Platform

IV. CONCLUSION

In the conclusion, from the research, it is clear that the Android operating system is very diverse and more advanced than the iPhone Apple and Microsoft Windows operating systems. The Android operating system by Google dominates market by holding a luminous huge market share both in the number of users (Customers) and units shipped all across the world. With each any every Android version release android improving the user's experience by bringing better new features, Android smartphones pose a significant threat to the Apple iPhone market. Google was also targeting the same consumers targeted by Apple(iPhone) and has managed to win together with the mobile app developers' hearts and minds, making Android a success. The Android is free and open-source software for mobile devices that comprises an operating system, middleware, and critical applications. Since the software platform was launched android operating system, it has undergone lots improvements in various dimensions, such as their features and compatible hardware, to improve their users experience. Besides, the android software platform had also extended to other different types of devices apart from the mobile ones it targeted when it entered the market by launching a their mobile platform. It's very important to note that in todays times, people's experiences in the computing and mobile devices have very quickly changed due to the richness and quality of the mobile applications.

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