Android Development based on Linux

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ABSTRACT

Android software development is used to produce apps for mobile devices that includes an OS (Operating System) and various applications. It can be used to make video applications, music applications, games, editing software etc. The android operating system was showcased by Google after which android development started. The Google initially released the android operating system on 23th September 2008.Google hired some developers and started building applications which started app development and fast production of android applications. The applications and operating system for android are written in Java as the android is based on Linux so it was difficult at the start to write programs for android. But as the technical skills were improving to debug an application so it became easier for developers to solve the issues and debug the errors in the applications. The first android operating system was able to perform some basic task like messaging, calling, downloading some specific applications etc. After that Google released various versions of android operating system with newly added features and design. With every new version of android speed of device and user experience were getting much better in day to day life. As the android was developing faster the manufactures of mobile devices started making their own customized android operating system and also due to this the hardware of device was improving like improving battery size, making camera more robust, adding various sensors and many more. It is said that the android development will be grown in future and will help to ease the life of human being without any means of problems.

Keyword: - *Beta P, NDK, JDK, SDK, AOSP.*

1.INTRODUCTION

Android is a mobile OS (Operating System) which is developed by Google. It was released on 23th September 2008 after that Google started to produce various applications based on android development. It is a major platform which is used in various devices such as in Mobile Phones, TV, Cars, Wrist Watches, Gaming Consoles, Digital Cameras Etc. Android development is a part of application that helps to create applications which provides user to complete a specific task. The Google had created various versions of android operating systems based on Linux with some newly added features and designs. The OS is technically based upon Android Open Source Project (AOSP) which is licensed under Apache license. The android operating system is based on two platforms: - 1) 32-bit (x86), 2) 64-bit (x64). So the applications are built for various devices based on the platform of android operating system.

2. LITERATURE SURVEY

In this paper Mark Andrachek described the different ways of Android Development. These different ways can be used to build Android apps with the help of different languages and/or integrated development environments (IDEs) [1].

Google's Android divisions has named all of its versions codenames after desserts. For example, the fresh version of Android is Oreo, sounds tasty! But the problem with Android OS device is that it takes several months for an update [2].

Android 9 Pie is the latest version of smart phone which get things faster with app actions. That's the aim of Android OS, making the device smarter and more adaptive and also easier to use. Android 9 is not available on all devices yet only those that participated in Beta program [3].

Android P Beta is for developers to make smart phones smarter, helping it learn from the user. It has advantages like Adaptive Battery, App Actions, New System Navigation etc. It provides a standard authentication experience across the growing range of biometric sensors [6].

3. FEATURES AND TOOLS

To use Android applications, programmer can use various languages to create it an app like: -

i) Adobe Flash

ii) Basic4Android

iii) HTML/JavaScript

iv) C#

v) Java

vi) Python

To develop an android app programmer can use: - Eclipse, Android Studio, DroidEdit, Corona etc. But it is recommended that to use the official IDE app development tool that is Android Studio developed by Google itself.

First to create an android application you need full JDK (Java Development Kit) tool (1.6 or later). Next, you'll need the components from Google which are consist of SDK, ADT (Android Developer Tools), and NDK (Native Development Kit).

The SDK Tools contains some Java programs and various command line tools.

The NDK is used to compile and execute C & C++ codes in your application. As an android supports multiple processor architectures such as: - ARMv7-A, x86, MIPS, and ARMv5TE.

Once all this tools are installed in your system you can start creating your android application [1].

4. VARIOUS ANDROID OS

4.1 Android 1.0 & 1.1 (Alpha & Beta)

On October 2008 the HTC was the first phone to get android OS. After that it received and update of Android version 1.1 which was released in February 2009 [2].

4.2 Android 1.5 (Cupcake)

After android Alpha and Beta android cupcake was the first version to receive a codename. In android 1.5 there were many changes like third party keyboard and Widgets were enabled [2].

Fig 1: Android Cupcake

4.3 Android 1.6 (Donut)

Android 1.6 was released in September 2009. In this version it fixed various errors in OS, revamped camera interface, and featured search integration. It also added support of larger screen sizes [2].

Fig 2: Android Donut

4.4 Android 2.0 & 2.1 (Éclair)

The next version of android released by Google was Android Éclair which was released in October 2009. After sometimes Android 2.1 was also released. In this version the added features were include – Bluetooth 2.1, Digital zoom and Flash for camera app, multi-touch, and more [2].

Fig 3: Android Eclair

4.5 Android 2.2 (Froyo)

After Éclair android released android 2.2 named Froyo. The major improvements were it support by adding GIF, Flash 10.1 Plug-in, and USB tethering and also WIFI Hotspot capability [2].

Fig 4: Android Froyo

4.6 Android 2.3 & 2.4 (Gingerbread)

Android Gingerbread was released in December 2010. The first phone with Android 2.3 was Google's own Nexus S. It supported SIP calling, NFC transaction capability, download manager and sensors like gravity, barometer, gyroscope, etc. There were also some tweaks to allow usages on tablet [2].

Fig 5: Android Gingerbread

4.7 Android 3.0, 3.1, and 3.2 (Honeycomb)

In February 2011 Google released its next android, Android Honeycomb and was rapidly followed by 3.1 and 3.2 in July & August. Motorola Xoom was first tablet to use Android Honeycomb [2].

Fig 6: Android Honeycomb

4.8 Android 4.0 (Ice Cream Sandwich)

Android 4.0 was released in October 2011 there were major changes in design and font and was the ability to monitor the mobile data usage and other minor tweaks and upgrades [2].

Fig 7: Android Ice Cream Sandwich

4.9 Android 4.1 (Jelly Bean)

Android 4.1 came in year 2012. The major change in Jelly Bean was included "Google now" feature which is an AI assistant that interact with your phone [2].

Fig 8: Android Jelly Bean

4.10 Android 4.4 (KitKat)

Android 4.4 named KitKat was announced on September 2013. Nestle parent company of KitKat launched an advertising campaign at KitKat's release. In KitKat it integrated "Ok Google" feature which allow the people to access Google now feature without touching their phones [2].

Fig 9: Android KitKat

4.11 Android 5.X (Lollipop)

The Android 5 was announced on November 2014. It featured a new runtime ART which no longer have to rely on Dalvik runtime. Android 5 also had major improvements in UI and improved battery life [2].

Fig 10: Android Lollipop

4.12 Android 6.X (Marshmallow)

On October 2015 Google launched its next Android version which is Android 6 Marshmallow. There were not any major improvements. It added the option to grant specific permission to apps and also added doze mode which allow the device go to hibernation will idle [2].

Fig 11: Android Marshmallow

4.13 Android 7.X (Nougat)

Android 7 was released on June 2016, in this version the major changes were included split screen mode and doze for saving battery life. The minor changes were with an added Unicode 9.0 Emoji support, new Vulkan 3D rendering API and JIT complier based on ART engine [2] and also redesigned notification shade [10].

Fig 12: Android Nougat

4.14 Android 8 (Oreo)

After Nougat in Q3 of 2017 Google announced Android Oreo. The major change in Oreo was the "Project Treble" which made the OS upgrades faster by manufactures [2] and other are: - It supported picture in picture mode, support for video calling and battery improvements [9].

Fig 13: Android Oreo

4.15 Android 9 (Pie)

The latest Android released by Google is Android 9 Pie. The Android Pie officially released on August 2018 [3] and the first device to get this was Google Pixel [4]. There are various major improvements made in Pie which are: New interface [5], clock moved to left of notification bar [8], Support for display cutouts [6], Redesign volume slider, New gesture based system interface and many more.

Fig 14: Android Pie

5. CONCLUSION

Android is an open source for developers, industry and users because it is becoming the best in mobile operating system. Due to multitasking, ease of notification, access to millions of apps, widgets, Google support it is attracted the users all over the globe. Google android is going to the next level of mobile internet.

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