AN OVERVIEW ON ANDROID OPERATING SYSTEM

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Abstract:

With the continuous development of the electronic industry, mobile phones are also developing towards convenient and intelligent direction. The system of mobile devices is constantly expanding, and Android has certain advantages over the system of wire transmission. In this paper, the architecture of The Android platform and the composition and working mechanism of Android

applications are first described. As the Android platform is widely used for embedded systems including smart mobile devices, the needs for systematic performance analysis have significantly increased.

Keywords: Android Architecture, Applications Development, Benchmark.

1. INTRODUCTION

Android is one of the operating systems for smartphones and tablets that is used the most. Android is an open-source mobile operating system developed by Google and used by the majority of all users worldwide. Since Android is open-source, anyone can download the source code, edit it in accordance with these requirements, and launch his own custom ROM. As a result, Android is available for almost all devices, regardless of manufacturer. Android is based on the Linux kernel (a modified system). It gives you tools like the SDK to write code, debug it, and create amazing apps for all generations. Because Android is so widely used throughout the world, developers must choose it. Other operating systems include Ti Zen and IOS. The greater part of the cell phones accessible in the market use Android as their operating system, making it accessible to additional clients.

2 ANDROID PLATFORM

Android is a mobile device operating system, middleware, and key application software stack. It is made and maintained as an open source project under the direction of OHA (Open Handset Alliance), with the intention of making a phone that is better for consumers. Linux kernel 2.6 serves as Android's foundational system. Security, memory management, process management, the network stack, and the device driver model are all supported by it.

The Android system makes use of a collection of C and C++ libraries. They include the surface manager for the display subsystem, the standard C system library (libc), the web browser engine LibWebCore, the 2D graphics engine SGL, the 3D graphics libraries, FreeType for font rendering, and SQLite, a lightweight relational database engine.

A collection of core libraries for the Java programming language is included in the Android runtime. An Android Java application runtime environment is supported by the Dalvik virtual machine. With its own instance of the Dalvik virtual machine, each Android application runs in its own process. Dalvik is a register-based machine that executes files in the Dalvik Executable (.dex) format, whereas the conventional Java virtual machine is a stack-based machine.

When developing programmes using Java and XML, application developers typically have access to the application framework layer through numerous APIs. View management, content providers, resource managers, notification managers, and activity managers are all part of the open application framework, a platform for software development. The framework provides many reusable components, and the

developer can either publish its own capabilities or replace existing ones.

There are a number of different kinds of tools that can be used to evaluate and analyse the performance of applications or systems. We looked into and tried a few application developer benchmark tools and software for measuring performance. They can be obtained for free from open websites or the open marketplace.

The Android SDK (software development kit) includes several software tools that help developers debug, monitor, and profile. The most useful and handy tools are DDMS (Dalvik Debug Monitor Server) and Traceview which provide a graphical view. When it comes to smartphones, absolute speed is an important issue, but responsiveness is more important to user satisfaction. In addition to gaming applications that require complex 3D graphics manipulation, the user also finds that simply browsing web or browsing address book or notepad apps slows down the response to touch input.

3. BENCHMARK

A programming application called the benchmark tool is used to evaluate or gauge a system's relative performance. It gathers performance data, displays it as a quantitative value, and runs a specialised programme on the system and device being targeted. Benchmark applications are good tools for evaluating and estimating the relative level of each device and overall system, which can help us choose hardware or adjust system variables to achieve higher performance. However, it is difficult to indicate which part affects performance or which part we should manipulate for better performance. Figure 1 shows the results of a well-known benchmark application, AnTuTu-Benchmark. It can run a full test of a key project through "Memory Performance", "CPU Integer Performance", "CPU Floating Point Performance", "2D 3D Graphics Performance", "SD card reading/writing speed", and "Database IO Performance" testing. The final score represents the relative value of the tested system and can be compared with other devices results.

Figure 1: Benchmark
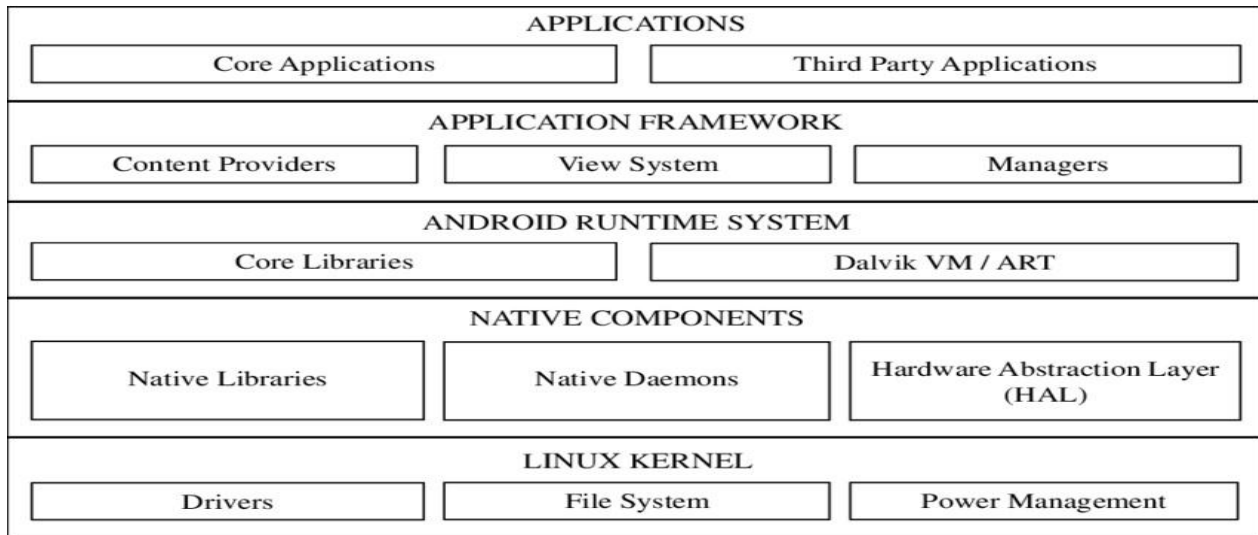
4 ANDROID ARCHITECTURE

Figure 2: Android Architecture

Linux kernel

The Linux kernel contains all of the drivers for low-level devices, such as the audio, wi-fi, flash memory, Bluetooth, camera, and keypad drivers. It is also Android's abstract layer.

Libraries/Native Components

There are a number of libraries that offer a variety of features for Android development. These libraries are written in C/C++ and are a fundamental piece of architecture.

Android Runtime System

The Android Runtime gives us a place to run and troubleshoot our Android application.

Application Framework

It has many bundles in it that are carried out in Java.

Application

The application is located at the architecture's highest level. Applications may belong to the system, the user, or even the original equipment manufacturer. Phone, Message, Camera, and Gallery are a few of the most common apps on Android devices.

Prerequisites for Android

Android development does not require many prerequisites. However, you should ensure that you have met the following requirements prior to beginning Android development:

Java/Kotlin: You should be familiar with Kotlin or Java at the very least.

Database: It's pretty good if you know a little bit about SQL and SQLite.

XML: XML fundamentals are required.

OOP: Having a basic understanding of Object-Oriented Programming (OOP) would be helpful during app development.

5 ANDROID APPLICATIONS

You'll be talking about various Android applications. Android makes our lives easier and more enjoyable. There are many different kinds of applications that solve many different problems. Weather, finances, food ordering, travel, games, navigation, messaging, lifestyle, social media, etc.

Navigation: There are apps like Google Maps that help us find where we are and how to get to the place we want to go.

Lifestyle: You offer applications like Cult. You can keep track of your fitness, how many calories you burn, and how many daily walking steps you take with Fit and Step Set Go.

Messaging: There are apps like Telegram, Whatsapp, and others that enable us to communicate with any individual or group of individuals.

Travel: There are apps like MakeMyTrip and RedBus that make it easy and convenient for us to book hotels, travel, and other services.

6. LIMITATION OF ANDROID

There are a few drawbacks to Android that can be summed up as follows:

Low security: Android apps frequently get hacked or breached, letting people's data out. However, when it's at its best, Google always comes up with security updates and fixes for problems like these.

Testing: Now and then, testing an Android application is crazy as its exhibition or state might change from one gadget to another and even at various Android forms.

Power Consumption: Android is a more power-hungry operating system.

Lost Tracks: It's getting harder and harder to get used to new Android SDK tools as new versions of Android come out.

Restrictions Occasionally: Developers must adhere to the new standards for their existing applications. If you don't, your current app will depreciate.

7. CHALLENGES OF ANDROID DEVELOPMENT

Starting out with Android App Development can present a number of obstacles. These are simple to track, and by practising more and creating more apps, you can easily overcome these obstacles. Numerous designers frequently face these difficulties while creating applications for Android. However, as novices, we frequently overlook or ignore these difficult aspects, resulting in a less secure app that does not fit the user's window or occasionally crashes.

When working on Android, you should always keep the following things in mind:

Security: When developing an app, you should make sure that the user's device is safe for both system and user data.

Compatibility: Your app should be compatible with the majority of Android versions. Some individuals do not use the most recent versions of Android on their devices. Consequently, developing a supportive app would enable you to target a larger user base.

Performance: An app that responds quickly and doesn't lag should always be your goal. Most users don't have high-performance devices with more memory or RAM. Therefore, you should ensure that your application does not consume a lot of memory or generate a lot of junk.

Screen Variations: Your app should be able to adapt to any screen resolution or size. Some people might use your app on smartphones with wide screens or tablets. Therefore, your application ought to fit those screen sizes.

Comments: You should always make an effort to comment on your code and work so that anyone who wants to add a feature to your application in the future can easily understand where and what changes they need to make.

8. CONCLUSION

Today, Android is an emerging technology that is used in smart phones and has changed the lives of everyone. There are different types of apps for which an application is developed based on the type of operating system. We can design our own apps based on our requirements by following the steps of the development process. To develop apps, there are certain challenges that an application needs to address. As one of the most widely used operating systems, Android necessitates applications developed by Android developers. As a result, Android developers may find employment opportunities in the future. As the number of Android users grows over time, there will be a greater demand for Android developers. As a result, learning Android could assist you in launching your career by allowing you to start your own business and use that app to reach the most users worldwide.

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