

OVERVIEW ON ANDROID AND ITS VERSIONS

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Abstract:- Android is a mobile based operating system and is rapidly gaining market share with thousand of smartphones and tablets either released or set to be released. Various new smartphones are released everyday. Thousands of new android apps are released every day on Play Store. It is mobile operating system that uses a modified version of the Linux kernel 2.6. Google developed Android as part of the Open Handset Alliance, a group of more than 30 mobile and technology companies working to open up the mobile handset environment.

Index Terms- Android, smartphones, tablets, play store.

I. INTRODUCTION

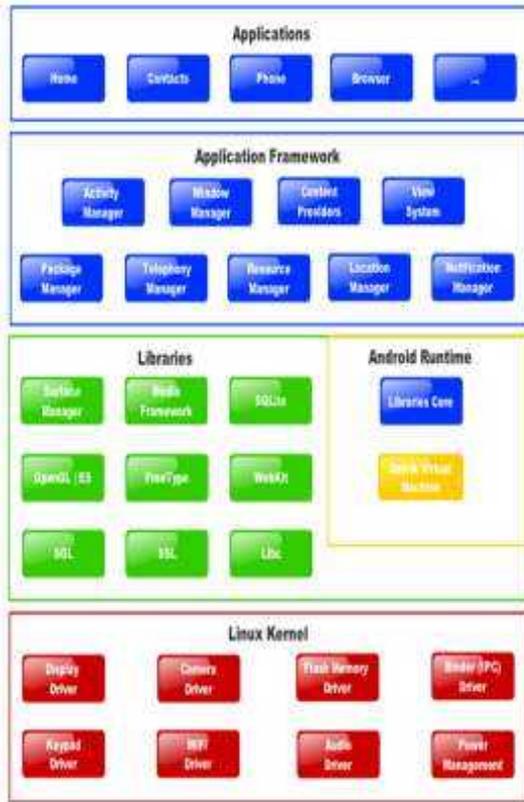
Android is a mobile operating system (OS) currently developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. In addition to touchscreen devices, Google has further developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras, and other electronics. As of 2015, Android has the

largest installed base of all operating systems. It is the second most commonly used mobile operating system in the United States, while iOS is the first.

Initially developed by Android, Inc., which Google bought in 2005, Android was unveiled in 2007, along with the founding of the Open Handset Alliance – a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices. As of

July 2013, the Google Play store has had over one million Android applications ("apps") published, and over 50 billion applications downloaded. An April–May 2013 survey of mobile application developers found that 71% of developers create applications for Android, and a 2015 survey found that 40% of full-time professional developers see Android as their priority target platform, which is comparable to Apple's iOS on 37% with both platforms far above others. At Google I/O 2014, the company revealed that there were over one billion active monthly Android users, up from 538 million in June 2013.

Android's source code is released by Google under open source licenses, although most Android devices ultimately ship with a combination of open source and proprietary software, including proprietary software required for accessing Google services. Android is popular with technology companies that require a ready-made, low-cost and customizable operating system for high-tech devices. Its open nature has encouraged a large community of developers and enthusiasts to use the open-source code as a foundation for community-driven projects, which add new features for advanced users or bring Android to devices originally shipped with other operating systems. At the same time, as Android has no centralised update system most Android devices fail to receive security updates: research in 2015 concluded that almost 90% of Android phones in use had known but unpatched security vulnerabilities due to lack of updates and support. The success of Android has made it a target for patent litigation as part of the so-called "smartphone wars" between technology companies.



ANDROID ARCHITECTURE

II. VERSIONS

Android is updating day by day since its release. These updates to the base operating system mainly focusing on fixing bugs as well as adding new features to provide more comfortable environment. Generally each new version of the Android operating system is developed under a code name based on a dessert item. Various android versions are as:

Android 1.0 – It was the first commercial version released on September 23, 2008. The first commercially available Android device was HTC Dream.

Android 1.5 Cupcake - On April 27, 2009, the Android 1.5 update was released, based on Linux kernel 2.6.27. This was the first release to officially use a codename based on a dessert item ("Cupcake"), a theme which would be used for all releases henceforth.

Android 1.6 Donut - On September 15, 2009, the Android 1.6 SDK – dubbed Donut – was released, based on Linux kernel 2.6.29. Included in the update were numerous new features.

Android 2.0/2.1 Éclair – It has revamped the user interface and introduced HTML5 and Exchange ActiveSync 2.5 support.

Android 2.2 Froyo – This introduced speed improvements with JIT optimization and the Chrome V8 JavaScript engine, and added Wi-Fi hotspot tethering and Adobe Flash support.

Android 2.3 GingerBread – This refined the user interface, improved the soft keyboard and copy/paste features, and added support for Near Field Communication.

Android 3.0 HoneyComb - On February 22, 2011, the Android 3.0 (Honeycomb) SDK – the first tablet-only Android update – was released, based on Linux kernel 2.6.36. The first device featuring this version, the Motorola Xoom tablet, was released on February 24, 2011.

Android 4.0 IceCream Sandwich - The SDK for Android 4.0.1 (Ice Cream Sandwich), based on Linux kernel 3.0.1, was publicly released on October 19, 2011. Google's Gabe Cohen stated that Android 4.0 was "theoretically compatible" with any Android 2.3.x device in production at that time. The source code for Android 4.0 became available on November 14, 2011. Ice Cream Sandwich was the last version to officially support Adobe Systems' Flash player.

Android 4.1- 4.3 JellyBean – Google announced Android 4.1 (Jelly Bean) at the Google I/O conference on June 27, 2012. Based on Linux kernel 3.0.31, Jelly Bean was an incremental update with the primary aim of improving the functionality and performance of the user interface. The performance improvement involved "Project Butter", which uses touch anticipation, triple buffering, extended vsync timing and a fixed frame rate of 60 fps to create a fluid and "buttery-smooth" UI. Android 4.1 Jelly Bean was released to the Android Open Source Project on July

9, 2012,[98] and the Nexus 7 tablet, the first device to run Jelly Bean, was released on July 13, 2012.

Android 4.4 Kitkat - Google announced Android 4.4 KitKat on September 3, 2013. Although initially under the "Key Lime Pie" ("KLP") codename, the name was changed because "very few people actually know the taste of a key lime pie." Some technology bloggers also expected the "Key Lime Pie" release to be Android 5. KitKat debuted on Google's Nexus 5 on October 31, 2013, and was optimized to run on a greater range of devices than earlier Android versions, having 512 MB of RAM as a recommended minimum; those improvements were known as "Project Svelte" internally at Google. The required minimum amount of RAM available to Android is 340 MB, and all devices with less than 512 MB of RAM must report themselves as "low RAM" devices.

Android 5.0 Lollipop - Android 5.0 "Lollipop" was unveiled under the codename "Android L" on June 25, 2014, during Google I/O. It became available as official over-the-air (OTA) updates on November 12, 2014, for select devices that run distributions of Android serviced by Google, including Nexus and Google Play edition devices. Its source code was made available on November 3, 2014.

Lollipop features a redesigned user interface built around a responsive design language referred to as "material design". Other changes include improvements to the notifications, which can be accessed from the lockscreen and displayed within applications as top-of-the-screen banners. Furthermore, Google made internal changes to the platform, with the Android Runtime (ART) officially replacing Dalvik for improved application performance, and with changes intended to improve and optimize battery usage, known internally as Project Volta.

Android 6.0 MarshMallow - Android 6.0 "Marshmallow" was unveiled under the codename "Android M" during Google I/O on May 28, 2015, for the Nexus 5 and Nexus 6 phones, Nexus 9 tablet, and Nexus Player set-top box, under the build number MPZ44Q.[191] The third developer preview (MPA44G) was released on August 17, 2015 for the Nexus 5, Nexus 6, Nexus 9 and Nexus Player devices,

and was updated to MPA44I that brought fixes related to Android for Work profiles.

III. ANDROID SECURITY

The open nature of Android and its large user base have made it an attractive and profitable platform to attack. Common exploits and tool kits on the OS can be utilized across a wide number of devices, meaning that attackers can perform exploits en masse and reuse attack vectors. Google did take measures in the development of the Android kernel to build security measures in; the OS is sandboxed, preventing malicious processes from crossing between applications. Whilst this attempt to eliminate the concept of infection is admirable in some regards, it fails to address the issue of infection altogether.

Android is a victim of its own success, not just in the way it has attracted malicious attention, but in its very nature. One of the reasons the OS has succeeded in gaining market share so rapidly is that it is open source; it is essentially free for manufacturers to implement. Additionally this has led to substantial fragmentation of Android versions between devices and means that vendors have been reluctant to roll-out updates, presumably out of some concern regarding driving demand for future devices.

IV. ANDROID SERVICES

A Service is code that is long lived and runs without a UI. A good example of this is a media player playing songs from a play list. In a media player application, there would probably be one or more activities that allow the user to choose songs and start playing them. However, the music playback itself should not be handled by an activity because the user will expect the music to keep playing even after navigating to a new screen. In this case, the media player activity could start a service using `Context.startService ()` to run in the background to keep the music going. The system will then keep the music playback service running until it has finished. Note that you can connect to a service (and start it if it's not already running) with the `Context.bindService()` method. When connected to a service, you can communicate with it through an interface exposed by the service. For the music service, this might allow you to pause, rewind, etc.

Features:

1) **Storage:** SQLite, a lightweight relational database, is used for data storage purposes.

2) **Connectivity:** Android supports connectivity technologies including GSM EDGE, IDEN, CDMA, EVDO, UMTS, Bluetooth, WI-Fi, LTE, NFC and WI MAX.

3) **Messaging:** SMS and MMS are available forms of messaging, including threaded text messaging and Android Cloud to Device Messaging (C2DM) and now enhanced version of C2DM, Android Google Cloud Messaging (GCM) is also a part of Android Push Messaging Service.

4) **Multiple language support:** Android supports multiple languages.

5) **Web browser:** The web browser available in Android is based on the opensource. Web Kit layout engine, coupled with Chrome's V8 JavaScript engine. The browser scores 100/100 on the Acid3 test on Android 4.0.

6) **Java support** While most Android applications are written in Java, there is no Java Virtual Machine in the platform and Java byte code is not executed. Java classes are compiled into Dalvik executables and run on Dalvik, a specialized virtual machine designed specifically for Android and optimized for battery-powered mobile devices with limited memory and CPU. J2ME support can be provided via third party applications.

7) **Multi-touch:** Android has native support for multi-touch which was initially made available in handsets such as the HTC Hero. The feature was originally disabled at the kernel level (possibly to avoid infringing Apple's patents on touchscreen technology at the time). Google has since released an update for the Nexus One and the Motorola Droid which enables multi-touch natively.

8) **Bluetooth:** Supports A2DP, AVRCP, sending files (OPP), accessing the phone book (PBAP), voice dialing and sending contacts between phones. Keyboard, mouse and joystick (HID)

support is available in Android 3.1+, and in earlier versions through manufacturer customizations and third – party applications.

9) **Tethering:** Android supports tethering, which allows a phone to be used as wireless/wired Wi-Fi hotspot. Before Android 2.2 this was supported by third party applications or manufacturer customizations.

10) **Screen capture:** Android supports capturing a screenshot by pressing the power and volume-down buttons at the same time. Prior to Android 4.0, the only methods of capturing a screenshot were through manufacturer and third-party customizations or otherwise by using a PC connection (DDMS developer's tool). These alternative methods are still available with the latest Android.

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