

Android 5.0: Lollipop OS

Meenakshi

M.Tech Student, Department of CSE, NGF College of Engineering & Technology, Palwal, Haryana, India
8930218403

Inderjeet Yadav

Department of CSE, NGF College of Engineering & Technology, Palwal, Haryana, India
8901597962

Abstract

Nowadays android becomes most usable mobile operating system. Rather than other mobile operating system android has more users, more phones and more tablets. It's a Linux based operating system contains Linux kernel, middleware and key applications. Android market shares are increasing rapidly year by year. It's an open source easily available on Google. Android has various versions like cupcake, donut, eclair, froyo, gingerbread etc. Applications developed by android based on Java, SDK and audio/video player. Application developed by android are easily available on Google play store basically Google play store contain all the applications and games. This paper will contain detailed study of android 5.0: Lollipop OS.

Keywords

Android, Lollipop, Android 5.0, Versions, Android SDK, Smartphone's etc.

1. Introduction

In recent years, use of android increasing rapidly. It's a platform for mobile devices. It's completely open and integrated platform for smart phones. Firstly we have to download and installed the SDK. It contains eclipse IDE, ADT Plug-In, AVD. Android SDK provides various tools and API's to develop applications. Android applications are easily download from play store and also from third party sites. Over 15, 00,000 applications are available on play store. There are various categories of applications: lifestyle, Business, Social, Educational, Shopping, transport etc. Android designed primarily for touch screen mobile devices such as phones and tablets with specialized user interfaces. The language that is more in use to develop android application is Java even though other languages can be used.

To improve mobile experience for users android project aims to create successful real world products. Android is a mobile OS but it's not limited to mobile only. It's currently used in smart phones, tables and televisions. There are many code name of android such as Lollipop, Kitkat, Jelly Bean, Ice cream Sandwich, Froyo, Ecliar, Donut etc. In this paper we are discussing about Lollipop, its features, its issues and comparison of all versions.

Background

Android was founded in October 2003 by Andy Rubin, Rich Miner, Nick Sears and Chris White to develop applications for smart phones. Later Android Inc. was purchased by Google in July 2005. In 2007, android was developed by open handset alliance. Group of 78 companies formed a new group OHA. Android framework is released under Apache License by Google. Later in 2010, Google launched its Nexus series of devices like Nexus one, Nexus 5, Nexus 7etc. Version history of android:

- Cupcake(1.5)
- Donut(1.6)
- Eclair(2.0–2.1)
- Froyo(2.2–2.2.3)
- Gingerbread(2.3–2.3.7)
- Honeycomb(3.0–3.2.6)
- IceCream Sandwich (4.0–4.0.4)
- JellyBean (4.1–4.3.1)
- KitKat(4.4–4.4.4, 4.4W–4.4W.2)
- Lollipop(5.0–5.1.1)

2. Android Architecture

Android architecture contains various layers:

- i. Linux Kernel
- ii. Libraries
- iii. Application Framework

iv. Application

Linux Kernel: It is the core of android architecture and also called as the heart of android architecture because android is based on Linux kernel. It means Linux plays an important role in android. It includes display driver, camera driver, USB driver etc. It also acts as a hardware layer.

Libraries: It lies on top of Linux kernel. Android has various in-built libraries like OpenGL, SQLite, WebKit and it also support third party libraries.

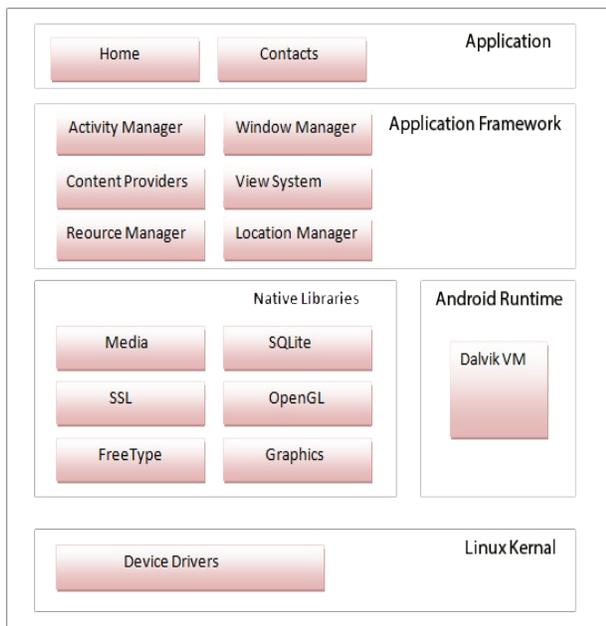


Figure: 1 Android Architecture

Android Runtime: Android runtime lies on the same layer means it presents on the libraries layer. Runtime includes core libraries and DVM. Core libraries contain webkit, widget, media, net etc. These libraries are written in C/C++. DVM means Dalvik virtual machine is like JVM. It is used to run android application.

Application Framework: This layer is designed to reuse components. All the API's of android are access by application framework. It contains telephony Manager, Activity Manager, Resource Manager etc. Reusable component means one application release functional component than other applications access the release resources.

Application: This is the top layer of android architecture. It contains all the applications like home, browser and it also contain third party library.

3. Lollipop 5.0

Android Lollipop is the latest version of android OS, which was released on November 3, 2014 by Google. Android Lollipop is the successor over previous versions. Lollipop is the 5th android OS which will be available on Nexus 6 and Nexus 9. Every OS having their own pros and cons. Major improvement of Lollipop over Kitkat is user interface, notification security, battery life etc. Android 5.1 comes into existence after android 5.0. But the most prominent change is the redesigned user interface. There are various features of android.

Material Design: Lollipop 5.0 changes the outlook the phone. Material design is good to make the interface fluid and purposeful motion. It allows shrinking/expanding of the images. Realism and animation plays important role in material design. It adopts real-time shadows to make interface well. It also changes the android widgets means the android default buttons are also changed. It looks good in android 5.0.

Project Volta: Lollipop aims to improve battery consumption by series of optimizations known as "Project Volta." It provides developers with betterment means that which element of application uses the more power. It has new battery saver mode and various APIs that restrict certain tasks to only occur when Wi-Fi is ON. For tracking battery consumption by application is "Battery Historian".

Notifications: In android lollipop there is a major improvement on notification means in these notifications are accessed from the lock screen. In previous versions notifications are shown on the top you have to scroll the bar then you get all the notifications. In Lollipop when you play games, when listening music and doing anything and suddenly a message comes then it shows notifications on the present screen as a pop up on top of the screen and do-not-disturb feature is also added in Lollipop.

Continuity: This feature is similar to IOS 8. Continuity allows your application from where you left off. Suppose you are listening songs and goes outside after some time then in older versions application run in background for some time and after sometime application kills because of android OS but in Lollipop 5.0 you get the application where you left.

Compatibility: Lollipop 5.0 not only support smart phones and tablets but is also compatible with TV,

wearable and cars. Lollipop 5.0 is designed in such a way that it works on all devices.

Security: As you can see there can be guest account on your systems (laptops, computers etc.) you are able to hide your stuff from other users keeping your data safe and secured from unwanted people. This similar feature has comes up in this new version of android. You can manage different accounts on your device. You can create guest user hiding your personal stuff from everyone else as phones are personal devices.

Camera: In this version of android new camera APIs are added. It has greater control over capture image. It adds various new features like recording video in 4K resolution, multimedia tunneling means fine tune settings and other.

Issues of Lollipop 5.0: The main issue of this version is its availability

Availability: Android 5.0 is available only on Nexus but to update or install Lollipop 5.0 devices it will take months to push the update for old devices.

No Silent Mode: In Lollipop 5.0 Google remove the silent mode. In this you can silent the phone but it is a complicated process.

4. Comparison of various versions of android

Android Version	Version Name	Features
1.0	Apple Pie	<ul style="list-style-type: none"> • Web browser • Camera Support • Google Map • YouTube Application
1.1	Banana Bread	<ul style="list-style-type: none"> • Show and Hide numeric keyboard in caller application • Ability to save MMS attachments
1.5	Cupcake	<ul style="list-style-type: none"> • Bluetooth A2DP, AVRCP support • Soft keyboard with text prediction • Record/watch videos

1.6	Donut	<ul style="list-style-type: none"> • Gesture framework • Turn-by-turn navigation
2.0	Eclair	<ul style="list-style-type: none"> • HTML • Digital zoom • Microsoft exchange support • Bluetooth 2.1 • Live wallpapers • Updated UI
2.2	Froyo	<ul style="list-style-type: none"> • Speed improvements • JIT implementation • USB Tethering • Application Installation to the expandable memory • Upload file support in the browser • Animated GIFs
2.3-2.3.7		<ul style="list-style-type: none"> • Updated UI • WebM video playback capability • Improved copy/paste • Social networking features • Near field communication support • Native VoIP/SIP support • Video call support • Peer to peer communication(NFC API improvements) • Open Accessory API • Voice or video chat using Google talk • Gmail application improvements • Fixed bluetooth issues on the Samsung galaxy S • Voice search issue fixed • Google Wallet support for the Nexus S 4G • Improved network performance for the

		Nexus S 4G
3.0-3.2.6	Honeycomb	<ul style="list-style-type: none"> • Multicore Support • Better tablet support • Updated 3D UI • Google talk video chat • Google eBooks • Private browsing • UI improvements • Open Accessory API • USB host API • MTP notifications • RTP API for audio • Media sync from SD card • Compatibility display mode • Wi-Fi improvements • Google books update
4.0-4.0.4	Ice Cream Sandwich	<ul style="list-style-type: none"> • Facial Recognition • Better voice recognition • Resizable Widgets • Android Beam app to exchange data through NFC • Control over network data • Improved text input and spell checking • Video stabilization and QVGA video resolution API access. • Calendar provider updates • Stability improvements • Better camera performance • Smoother screen rotation
4.1-4.3	Jelly Bean	<ul style="list-style-type: none"> • Voice Search

		<ul style="list-style-type: none"> • Speed enhancements • Accessibility: gesture mode, smarter keyboard • Enable home screen rotation • Enhance performances • Lock screen Widgets • Right information at right time with Google now • Security and performance enhancement • Bluetooth low Energy support • Camera app UI updated
4.4-4.4.4	Kit Kat	<ul style="list-style-type: none"> • Enhanced notification Access • Performance improvements • Screen Recording • Security enhancement • Enhance the camera of the Nexus 5 • Heartbleed/open SSL vulnerability
5.0	Lollipop	<ul style="list-style-type: none"> • Material Design • Improved Notification • Better Battery Life • Project Volta • Continuity • Security • Performance Improvements

Table: 1 Comparison between android versions

5. Conclusion

This paper describes the detailed description of Android Lollipop 5.0. It is the latest version of android. This version has various advantages over others. The various improvements in lollipop 5.0 are User interface, notification panel, continuity etc.

