

# Evolving Trends in Android OS

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Under The Guidance Of

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## Abstract:

The android operating system is an for mobiles and is rapidly getting market shares, with lots of smart phones and tablets either launched or set to be launched. It uses a modified version of Linux kernel 2.6. Google created android as part of Open Handset Alliance.

## INTRODUCTION:

Android is an operating system and software platform for mobile devices, based on the Linux kernel, and developed by Google and later the Open Handset Alliance. It permits developers to put in writing managed code within the Java language, controlling the device via Google- developed Java libraries. Android is available as open source. Android may be a freely downloadable open supply software package stack for mobile devices that features an OS, middleware and key applications based on Linux and Java. Google purchased the developer of Android in 2005, and Android was revealed in 2007. Google launched the Android code as open-source under the Apache License. Android has lots of developers writing applications all over the world. First of all the developers write their script in Java, so transfer the apps from the third party sites or on-line stores.



Android Logo

## ANDROID VERSIONS:

### 1. Android Version 1.0 – 1.1: (No Code name)

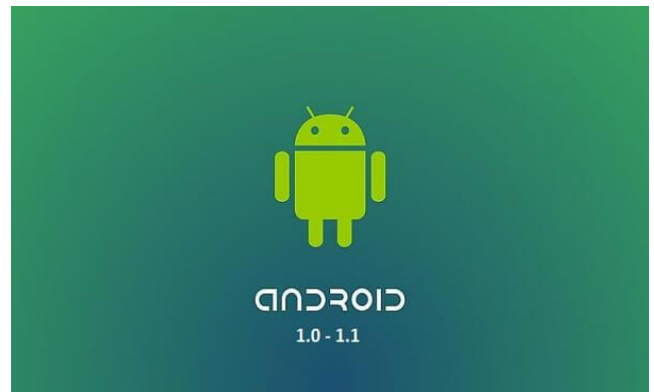


Fig- 1 : ANDROID 1.0-1.1

Google released its first commercial Android version 1.0(No Code name) in 2008 in HTC Dream.

- This version of Android was very basic but had Google applications like Gmail, YouTube, Calendar, Maps, Search, Instant Messaging, and many more. All of these applications were integrated into the Android Operating System directly.
- It also supported features like HTML and XHTML web pages, a camera, Wi-Fi, and came with Bluetooth support.

## 2. Android Version 1.5: Cupcake



**Fig-2:** ANDROID VERSION 1.5 : CUPCAKE

- In 2009, Android released its second release, Android version 1.5 Cupcake.
- With this release, the tradition of naming the Android versions after confectionaries started.
- With Cupcake, Android introduced the first on-screen keyboard as people moved to touchscreen smartphones from keypad style handsets.
- They also introduced a framework for the third-party app widgets, which was a significant step.
- Cupcake also introduced the platform's first video recording option.

## 3. Android Version 1.6: Donut



**Fig-3:** ANDROID VERSION 1.6 DONUT

- In the fall of 2009, Android dropped its next update, Android 1.6 Donut.
- It came out at the right time, as the world slowly transitioned towards bigger screens phones and resolution phones.
- Donut came with built-in support for CDMA networks, which helped Android grow fastly.

- This version introduced many new features like voice and text entry search, bookmark history, and WVGA resolution.
- It also allowed users to select multiple photos for deletion at a time.

## 4. Android Versions 2.0 – 2.1: Eclair



**Fig-4:** ANDROID VERSION 2.0-2.1:ECLAIRE

Android 2.0 Eclair was released just six weeks after Donut version.

- Android with Eclair version, became popular among the masses, due to the hype created around Motorola's DROID phone and the marketing campaign led by Verizon.
- It introduced SMS, MMS, voice-guided turn-by-turn navigation and real-time traffic information, pinch-to-zoom capability (which only Apple had at that time), Bluetooth 2.1, fixed minor API, and few bug fixes.

## 5. Android Version 2.2: Froyo

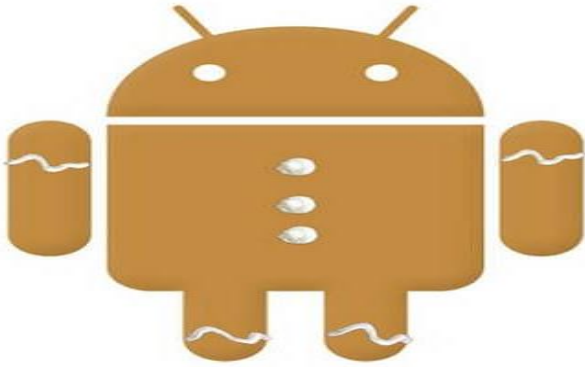


**Fig-5:** ANDROID VERSION 2.2:FROYO

- Froyo update was released four months after Eclair's introduction.
- This version of Android mainly focused on back-end performance, speed, and memory optimization.

- In addition, it introduced voice actions, which allowed the users to perform basic functions like speaking a command, making notes, and getting directions.
- This version also supported Adobe Flash, which Apple never offered to users.

### 6. Android Version 2.3: Gingerbread



**Fig-6:** ANDROID VERSION 2.3:GINGERBREAD

- With Gingerbread, Android started destroying distinctive visual design.
- For example, the Android mascot is green in colour and this version's prominent colours were Green and Black, which was visible throughout their UI.
- In addition, Gingerbread supported an extra-large screens, a simplified interface, enhanced copy/paste functions, NFC (Near Field Communication), and a host of improvements.

### 7. Android Versions 3.0–3.2: Honeycomb



**Fig-7:**ANDROID VERSION 3.0-3.2:HONEYCOMB

- Android released Honeycomb version in 2011 for the first Android-based tablet, the Motorola Xoom.
- With subsequent updates, 3.1 and 3.2, Honeycomb remained a tablet-exclusive entity.

- This was a detour for Android's visual appeal, as this time it had blue coloured holographic design instead of their usual black and green combo.
- In addition, it was different, designed to make most of the tablet's widescreen space.

### 8. Android Version 4.0: Ice Cream Sandwich



**Fig-8:**ANDROID VERSION 4.0:ICE CREAM SANDWICH

- Ice Cream Sandwich marked the entry of Android into the modern design language.
- While the Honeycomb version is considered the connection between old and new design, Ice Cream Sandwich refined all the visual elements with single, unified UI vision that reunited phone and tablet design.
- It carried over the card-like appearance from the Honeycomb and also introduced swiping, common for navigating across the OS.
- It also brought a framework or design standardization known as 'Holo' across OS and Android's application ecosystem.

### 9. Android Versions 4.1–4.3: Jelly Bean



**Fig-9:**ANDROID VERSION 4.1-4.3:JELLY BEAN

- Android Jelly Bean was introduced in 2012 .This version made the best impressions among new users.
- Jelly Bean was built on the foundation built by Android version 4.0 Ice cream sandwich.
- It polished many rough edges, making OS more attractive and appealing.
- In addition, it also improved accessibility and offered multiple features like screen lock, bug removal, 4K support, and Google Now.

### 10. Android Version 4.4: KitKat



Fig-10:ANDROID VERSION 4.4:KITKAT

- Late in 2013, Android released KitKat.
- This Android version introduced the “OK Google” support, offline music support, smart caller ID, better application compatibility, and many other built-in features.

### 11. Android Versions 5.0–5.1: Lollipop



Fig-11:ANDROID VERSION 5.0-5.1:LOLLIPOP

- With the version Lollipop,Android reinvented itself.
- Amongst all these versions in Android list, it established the material design standard, which stands even today. This gave the OS a fresh and new

visual look across all Android applications and even other Google products.

- Furthermore, the team maximized the usage of card-based concept, which became a core pattern for the Android team.
- It also introduced at-a-glance access for all the notifications from lock screen itself.
- In addition, Lollipop improved the ‘OK Google’ command support. This feature of voice activation was extended to work even when the device’s screen was off.

### 12. Android Version 6.0: Marshmallow



Fig-12: ANDROID VERSION 6.0:MARSHMALLOW

- Marshmallow was little bit updated when compared to the Lollipop version.
- With this version, Android started the trend of releasing a major update each year.
- Marshmallow introduced support for fingerprint readers, USB-C, Application Standby feature, Doze mode to save battery life, and many more.

### 13. Android Version 7.0 – 7.1: Nougat



Fig-13: ANDROID VERSION 7.0-7.1:NOUGAT

- The Android Nougat is popular for releasing Google Assistant feature.

- This Android version offered some improvements, but all of them were meaningful.
- For example, they included split-screen mode, a Data Saver feature, file-based encryption, battery usage alerts, a zoom-in screen, and many more new features.
- Google also released the Pixel, its first self-made phone, at the same time.

**14. Android Version 8.0 – 8.1: Oreo**



**Fig-14:** ANDROID VERSION 8.0-8.1:OREO

- Oreo was launched in 2017. This version of Android brought in some of the best features, like picture-in-picture support, adaptive icons, 2x booting speed, Google Play Protect, a notification snoozing option, and many features.
- This Android version included many elements aligned with Google’s goal of aligning Android and Chrome Operating System and transforming the Chromebook user experience.
- It also helped in Project Treble, which helped device manufacturers offer more punctual software updates through a modular base for Android’s code.

**15. Android Version 9.0: Pie**



**Fig-15:** ANDROID VERSION 9.0:PIE

- Pie update breathed in some fresh air to the Android mobile Operating System. It transformed and gave a new look to Android to make it more latest.
- The most popular change was mixed gesture/button navigation system, which replaced Android’s Black panel for the Back, Home, and Overview keys.
- Pie also introduced many productivity features, which were not there in previous versions of Android.
- This version added many security features and privacy enhancements and intelligent systems to manage the power and screen brightness.

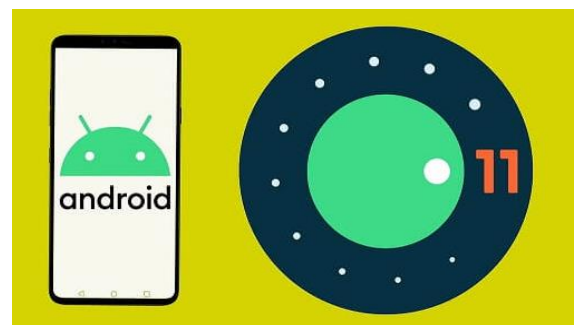
**16. Android Version 10**



**Fig-16:** ANDROID VERSION 10

- With Android 10 version, Android removed the naming tradition of each major release along with an item of confectionery September in 2019.
- This version introduced even more visual interface updates for the Android gestures and a swipe-driven navigation approach.
- Android Version 10 also brought more improvements and enhancements like granular permissions, control over location data, productivity features, and themes across the Operating System.

**17. Android Version 11**



**Fig-17:** ANDROID VERSION 11

- Android 11 was released during the in September 2020.
- It offered a substantial Android update visible on the surface and more back-end improvements.
- Privacy issue was the major concern for mobile users across the globe. Android 11 addressed it appropriately and brought in a loads of privacy-enhanced features. For example, Android 11 introduced more granular app permissions that users can limit.
- It remove the complexities from all the panels and introduced conversation-style notifications, native screen-recording features, and connected-device controls.

### 18.Android Version 12



Fig-18: ANDROID VERSION 12

- Google released Android 12 in 2021 .
- Android 12 version was largely focused on surface designs.
- The Android 12 completely transformed the standard to create something known as Material You, a very visually personalized Android version.
- It also renewed its focus on widgets, other improvements, and easy accessibility with separate Artificial Intelligence sections to function independently.

### 19.Android Version 13



Fig-19: ANDROID VERSION 13

- Android 13 is a stable Operating System launched in 2022 with a new interface design for handheld devices.
- While this version also lays the foundation for multipurpose products, it's gearing up for bigger screens and resolutions, which was ultimately appeared on the newest Google Pixel tablet.
- This Operating System version has made strides in improving security, privacy, and performance.

### 20. Android Version 14



Fig-20:ANDROID VERSION 14

- The name of the latest Android version is Android 14 October 2023.
- It targets to provide rich camera and media experiences with Ultra HDR, loss free USB audio, and more camera extensions to device.
- Android users can personalize their applications further with features like per-app languages, predictive back, grammatical inflection, regional preferences, and more.

- Android 14 also has added features like Health Connect (for health and fitness insights) and Credential Manager (to make simple sign-in).

## 21. Android Version 15



**Fig-21:** ANDROID VERSION 15

- Android 15 is set to be launch in 2024 in Google Pixels with several new features and enhanced capabilities.
- A developer version or preview has been released in February with a second developer version is released in March.
- The version includes features like SDK and tools, APIs, system images, and Flash-to-OTA updates for Google Pixel device.

### CONCLUSION:

We have learned through our analysis that android is far more diverse OS than iOS and Windows Phone Mobile. Android has grown rapidly over the past years becoming the most used smartphone operating system in the world.

It's as a result of android does not launch one phone from one company with one new OS once a year, but countless phones from numerous companies, adding their own twist, throughout the year, developing gradually day-by-day.

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