

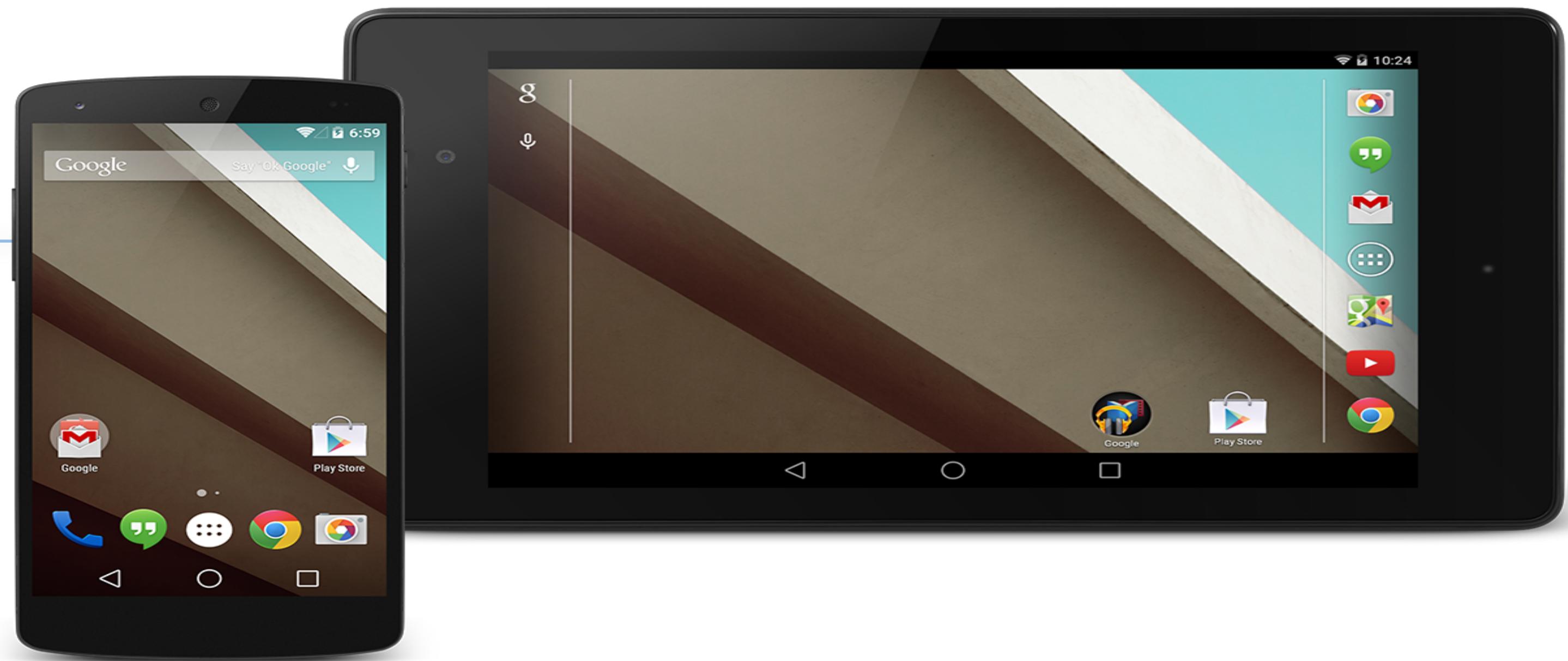
Android Overview

Android
Overview



Introduction to the Android platform - its goals and major components

Background



- Android is a comprehensive open source platform designed for mobile devices
- It is championed by Google and owned by the Open Handset Alliance
- The goal of the alliance is to “accelerate innovation in mobile and offer consumers a richer, less expensive, and better mobile experience.” (November 2007)

Mobile Operators



Software Companies



Commercialization Companies



ARM



QUALCOMM



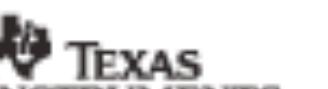
ATHEROS



Synaptics



VIA Telecom



Semiconductor Companies

GARMIN



FIH ZTE 中兴



Handset Manufacturers

Open Handset Alliance

<http://www.openhandsetalliance.com>

Background

- Android, along with iOS, is revolutionising the mobile space.
- Unlike iOS however, Android is an open platform that separates the hardware from the software that runs on it.
- This allows for a much larger number of devices to run the same applications and creates a much richer ecosystem for developers and consumers.



ANDROID WEAR



PHONES



TABLETS



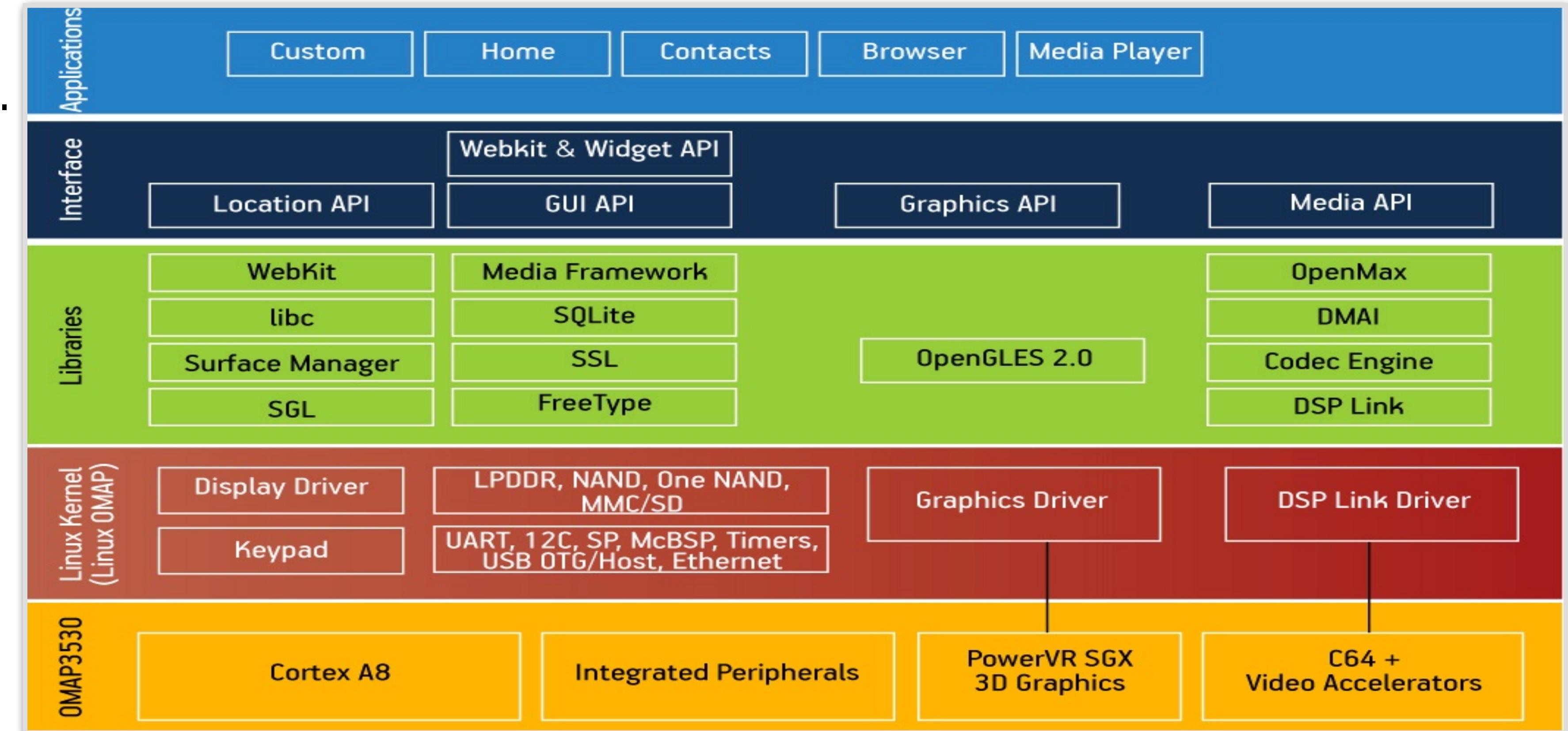
ANDROID TV



ANDROID AUTO

Comprehensive

- A complete software stack for a mobile device.
- The Android SDK is all you need to start developing for Android; you don't even need a physical device.

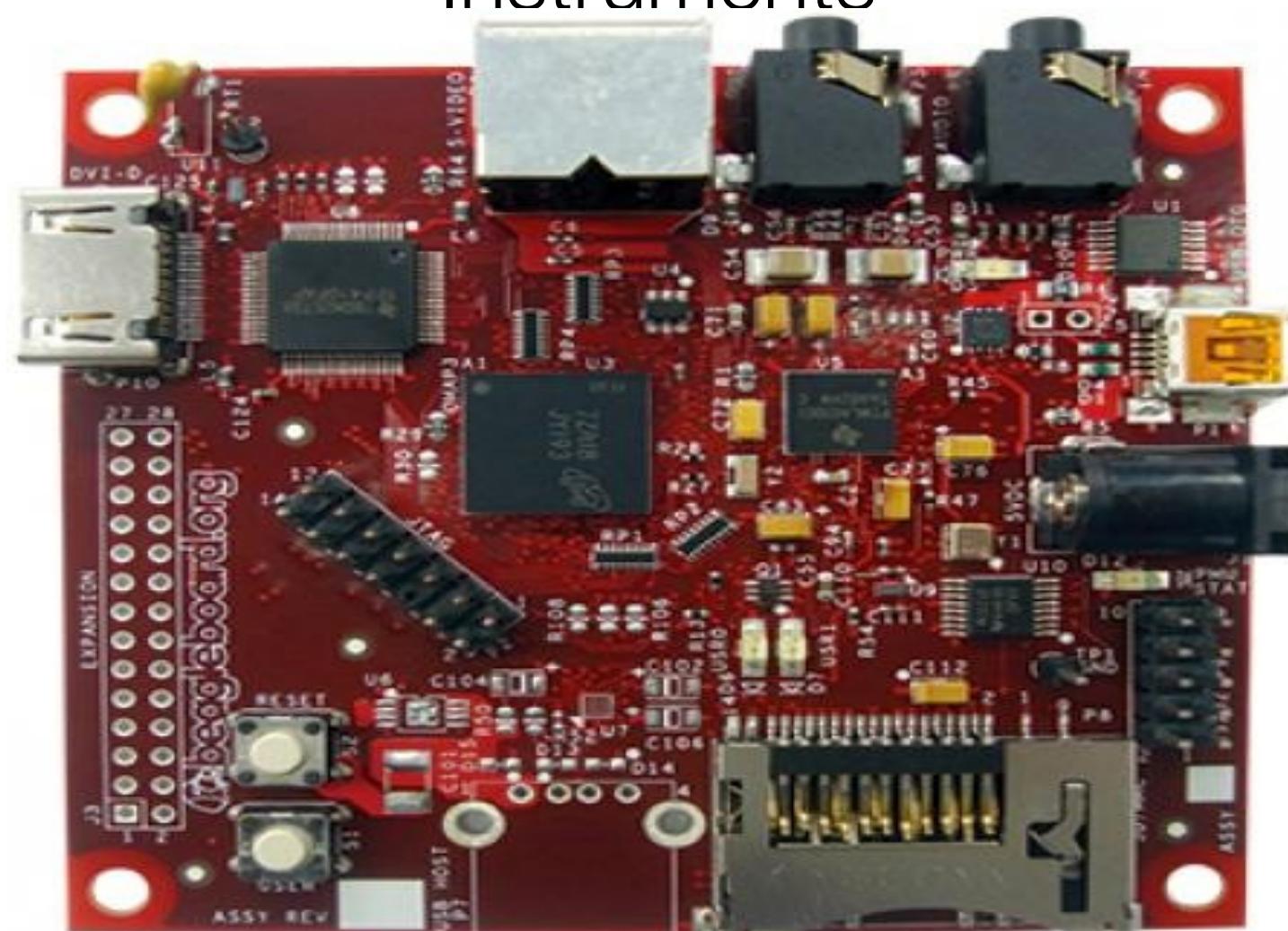


- Users can customize their phone experience substantially.
- Manufacturers can also customise the platform in substantial ways - even generating complete 'forks' of the original project (Amazon).

Open Source

- Android is an open source platform.
- Aside from the Linux kernel itself, Android is licensed under business-friendly licenses (Apache/MIT/BSD)
- Manufacturers can port Android OS to specific hardware.
- Android has many hooks at various levels of the platform, allowing extension in unforeseen ways.

BeagleBoard, a low-power open-source hardware single-board computer produced by Texas Instruments



Designed for Mobile Devices

- Mobile device constraints were likely not going to change for the foreseeable future:

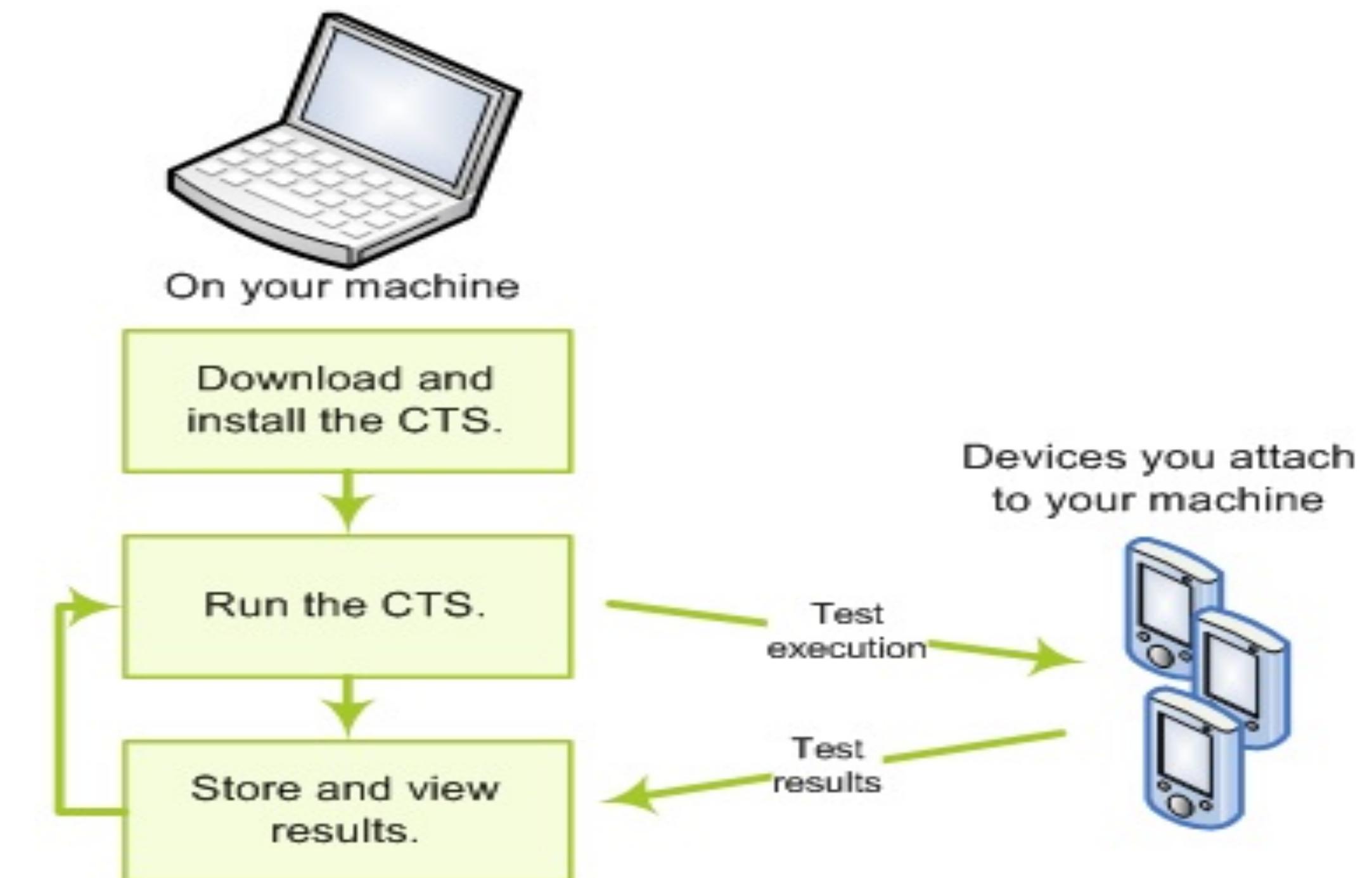
- Battery power, and battery performance
- Many devices will remain limited in terms of memory and speed.
- Screen size, resolution, chipset may vary considerably

- These constraints have been taken into consideration throughout the platform.



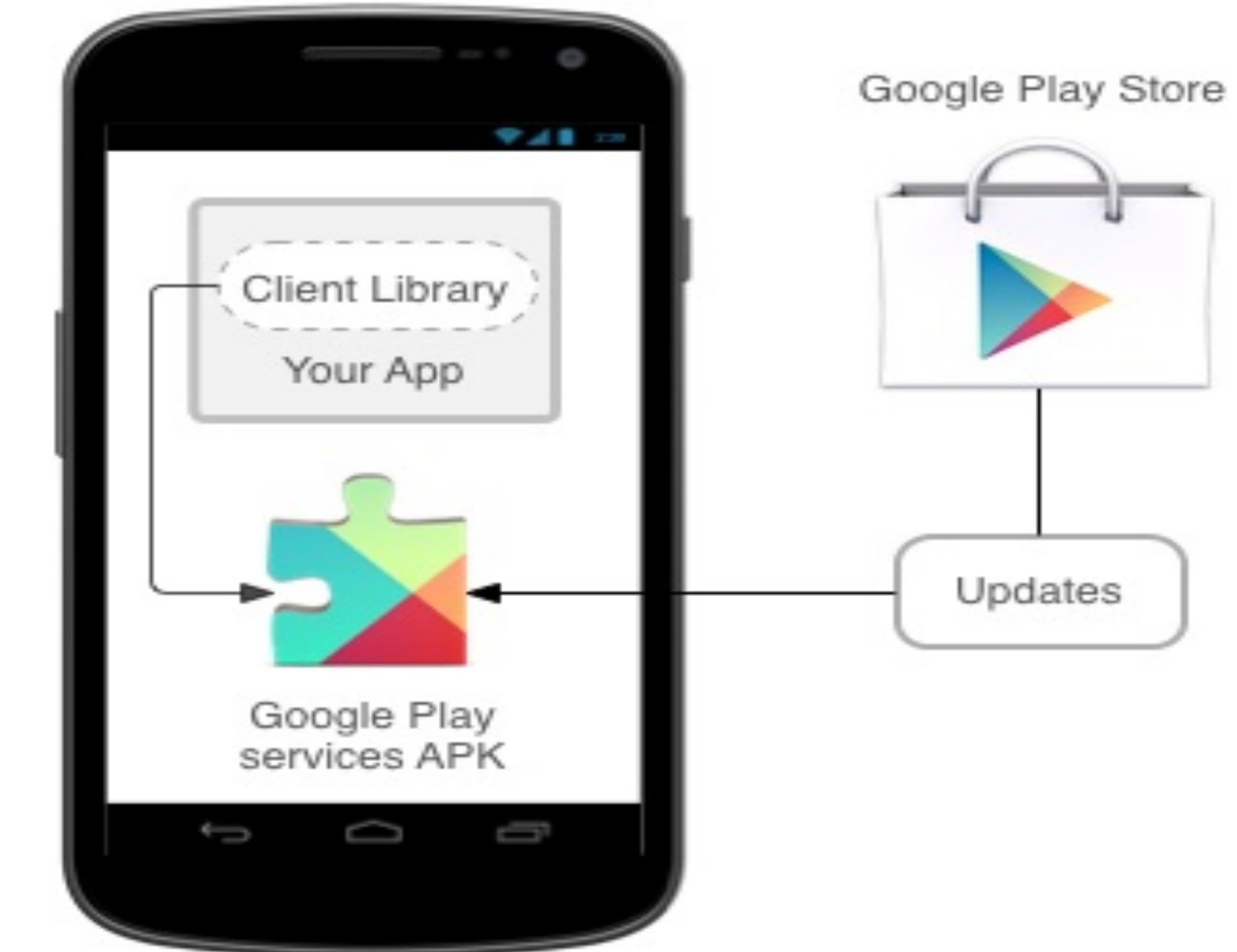
CTS

- The Compatibility Test Suite (CTS), defines what it means to be an Android-compatible device.
- CTS is a combination of automated tests as well as a document that specifies what an Android device must have, should have, or what features are simply optional.
- The goal of CTS is to ensure that, for a regular consumer, an average app from the market will run on an average Android device if that device claims to be supporting a certain version of Android.



Why Compatibility? - Google Play Services

- The major reason manufacturers would want to ensure Android compatibility is access to Google Play Services, and its rich set of apps.
- It allows apps to take advantage of the latest, Google-powered features such as Maps, Places, Google+, and more, with automatic platform updates distributed as an APK through the Google Play store.
- Makes it faster for phone to receive updates and easier for developers to integrate some new features into their apps.



LineageOS

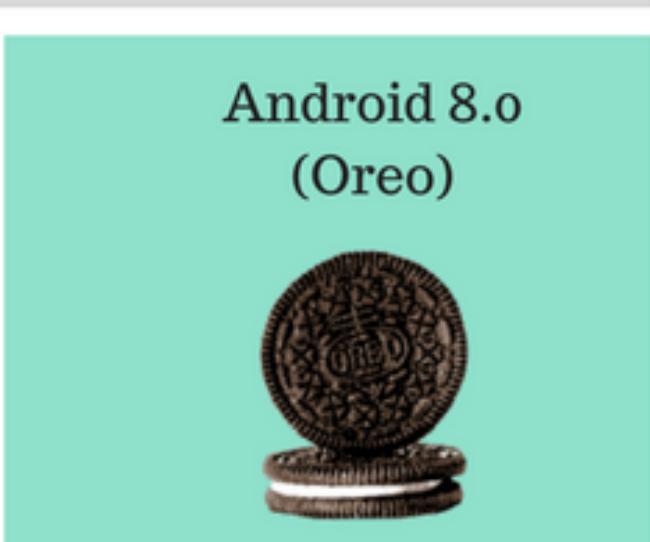
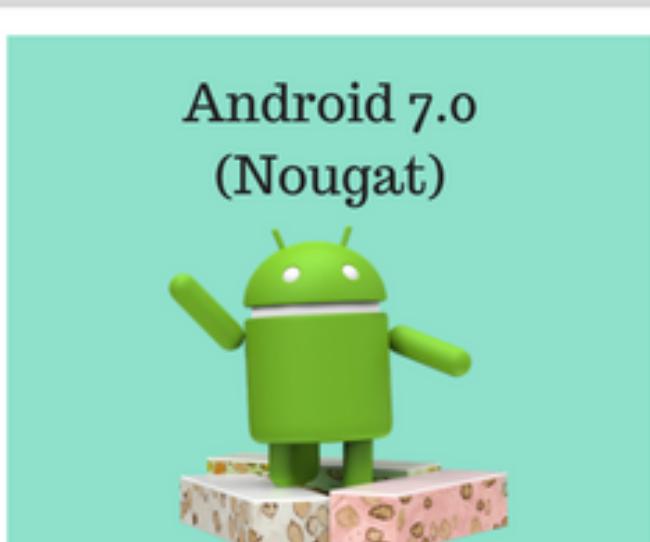
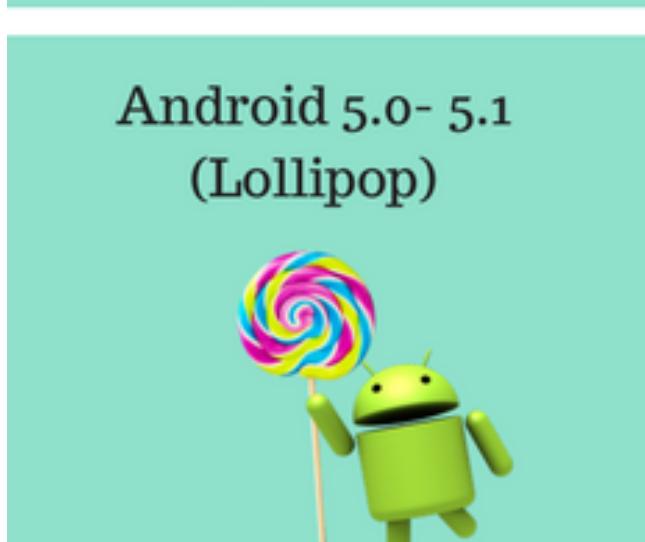
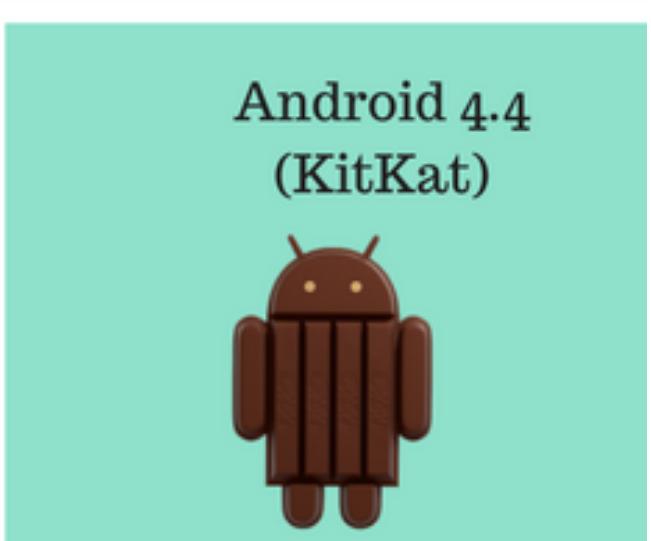
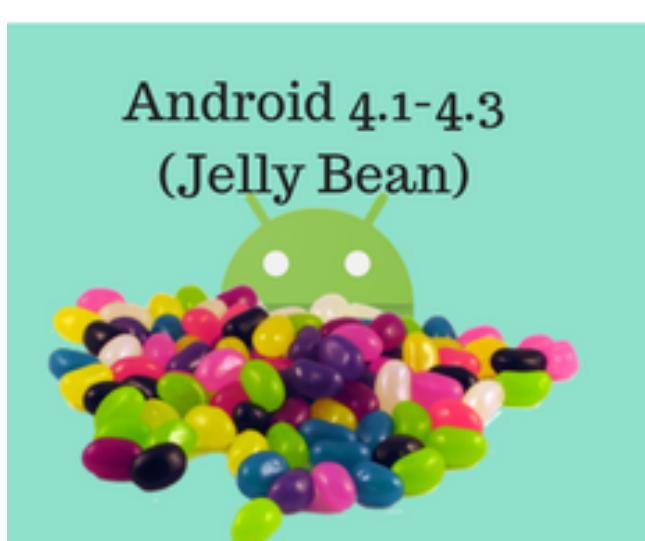
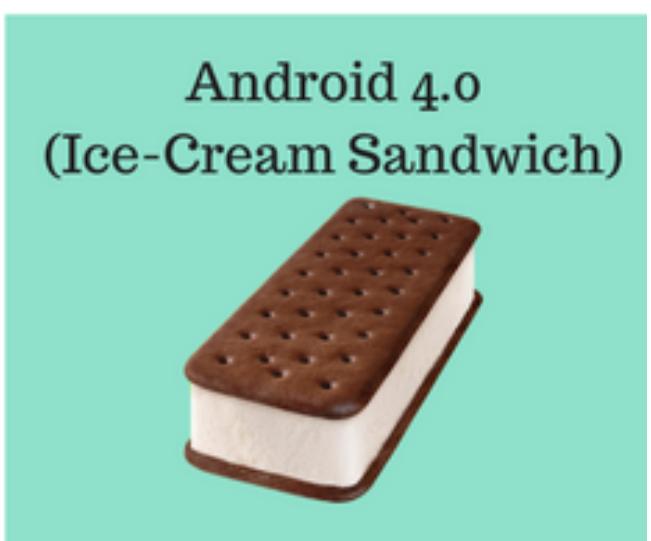
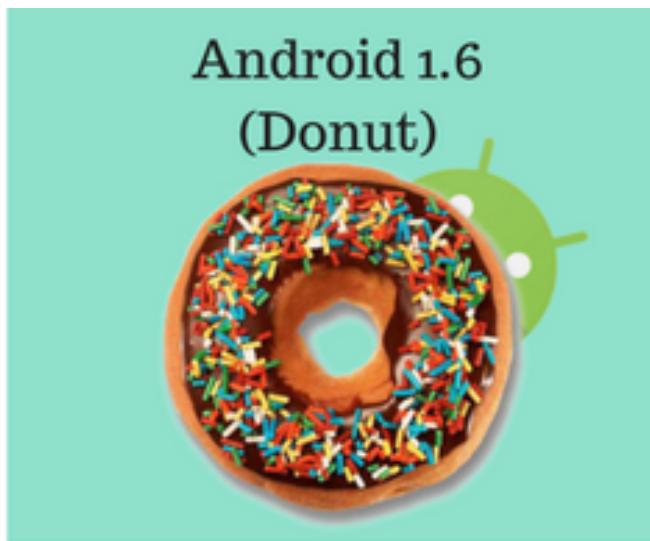
From Wikipedia, the free encyclopedia

LineageOS is a [free and open-source operating system](#) for [set-top boxes](#), [smartphones](#) and [tablet computers](#), based on the [Android](#) mobile platform. It is the successor to the [custom ROM CyanogenMod](#), from which it was [forked](#) in December 2016 when [Cyanogen Inc.](#) announced it was discontinuing development and shut down the infrastructure behind the project.^{[1][2]} Since Cyanogen Inc. retained the rights to the Cyanogen name, the project rebranded its fork as LineageOS.^[3]

LineageOS was officially launched on December 24, 2016, with the [source code](#) available on [GitHub](#).^[4] Since that time, LineageOS development builds now cover more than 185 phone models^[5] with over 1.9 million active installs,^[6] having doubled its user base in the month February–March 2017.^[7]

<https://en.wikipedia.org/wiki/LineageOS>

Android History / Versions so Far *



Android 9.0
Pie
(API 28)

Versions – API Level

- The Android version number itself partly tells the story of the software platform's major and minor releases.
- For the developer, the API level is more important.
- As an application developer, you will want to make sure you know which API level your application is targeting in order to run.
- That API level will determine which devices can and cannot run your application.

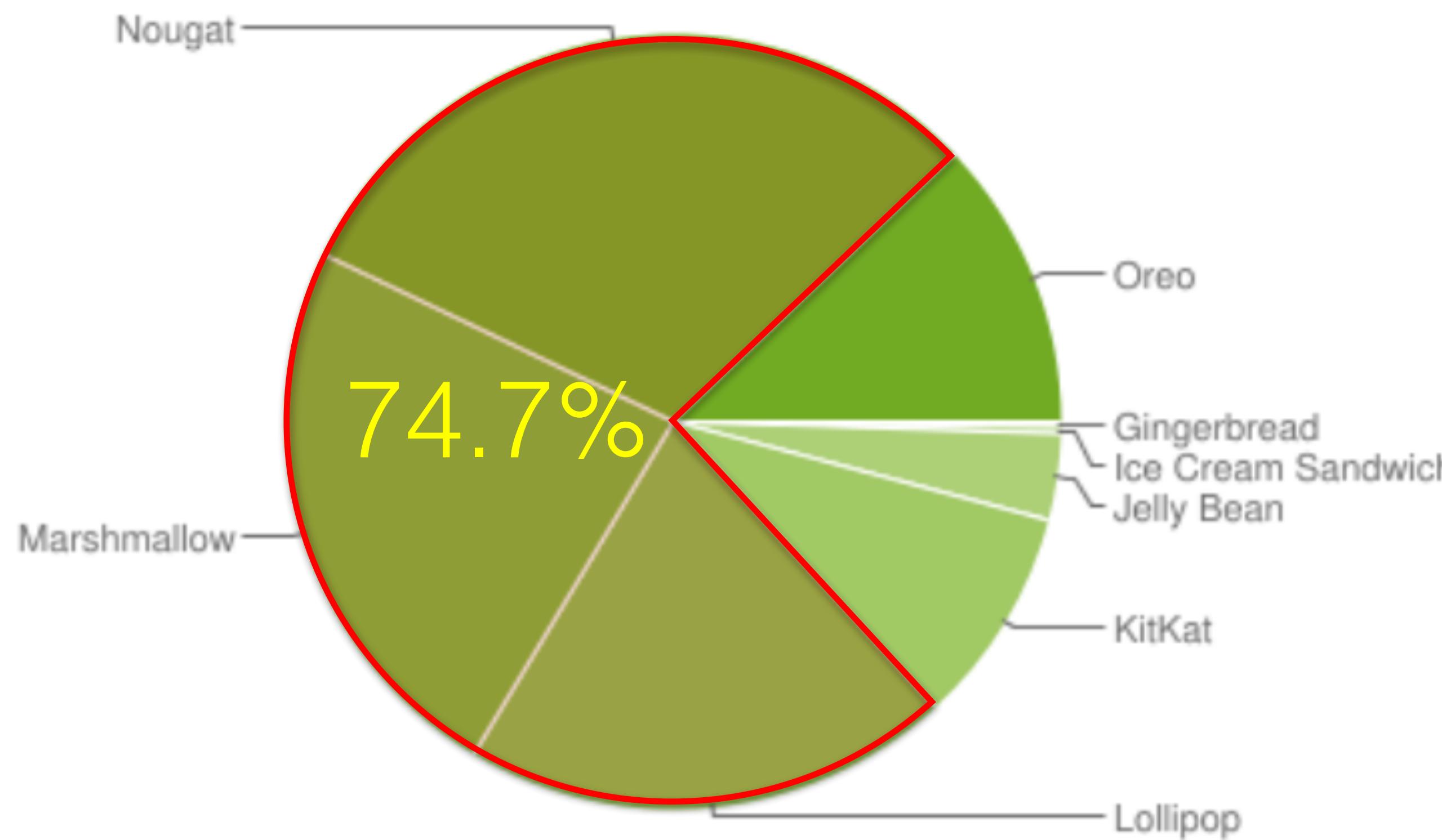
| Version | Codename | API | Distribution |
|------------------|--------------------|-----|--------------|
| 2.3.3 - 2.3.7 | Gingerbread | 10 | 0.2% |
| 4.0.3 - 4.0.4 | Ice Cream Sandwich | 15 | 0.3% |
| 4.1.x | Jelly Bean | 16 | 1.2% |
| 4.2.x | | 17 | 1.9% |
| 4.3 | | 18 | 0.5% |
| 4.4 | KitKat | 19 | 9.1% |
| 5.0 | Lollipop | 21 | 4.2% |
| 5.1 | | 22 | 16.2% |
| 6.0 | Marshmallow | 23 | 23.5% |
| 7.0 | Nougat | 24 | 21.2% |
| 7.1 | | 25 | 9.6% |
| 8.0 | Oreo | 26 | 10.1% |
| 8.1 | | 27 | 2.0% |

Data collected during a 7-day period ending on July 23, 2018.

Any versions with less than 0.1% distribution are not shown.

Versions – Platforms

- Aim for the low API - but bear in mind the available features
- 74.7% of users on Android 5.x & 6.x & 7.x. in 2018
- This hasn't always been the case because OEMs tended to be very slow in upgrading their OS versions.
- However, there are still a small number of people (10%+) who have anything from the 2.3.3 version to the 4.3



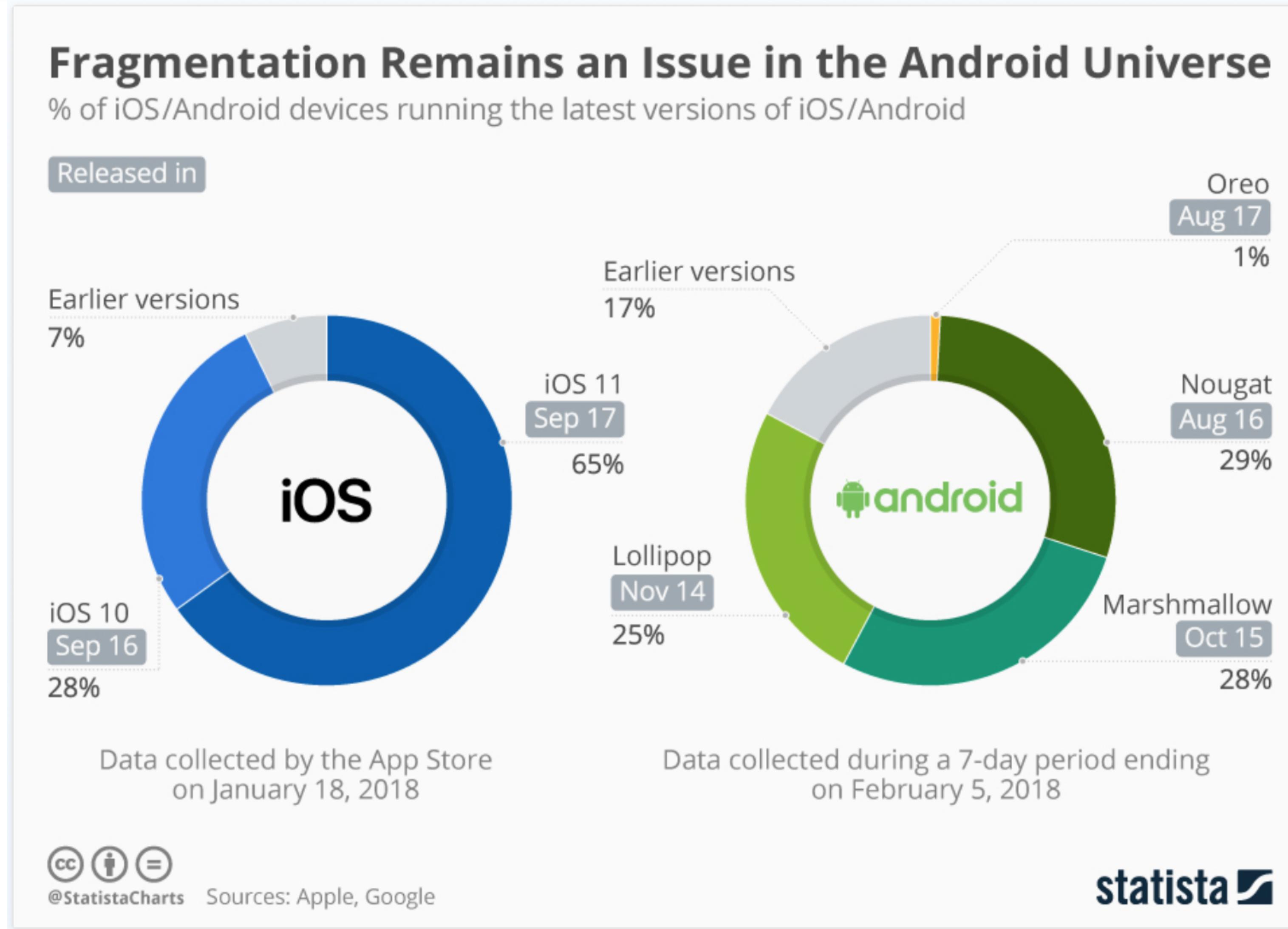
Data collected during a 7-day period ending on July 23, 2018.

Any versions with less than 0.1% distribution are not shown.

Android Pie Version 9.0 - API level 28

- Official Release Date August 6th 2018
- New Features
 - App Navigation
 - Notifications
 - Do Not Disturb
 - Digital Wellbeing
 - App Actions
 - Adaptive Battery / Adaptive Brightness modes
- Available for Google Pixel devices and the Essential Phone

Adoption Rates



[https://www.statista.com/
chart/5930/adoption-of-
ios-and-android-versions/](https://www.statista.com/chart/5930/adoption-of-ios-and-android-versions/)

Android Applications

- Android applications are distributed in a .apk file
- APK == “Android Package”
- It is simply a zip file that has a particular file structure (similar to JAR files that take snapshots of the file system)
- An APK contains:
 - The Android Manifest file (an XML file with lots of metadata)
 - A Resource bundle containing sounds, graphics, etc.
 - The ART bytecodes that make up your application



APK

