



# ANDROID

## Bootcamp

### 2014

## Introduction

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DEVELOPERACADEMY

# Agenda

- What is Android
- Android development environment
- Android architecture
- Hello world app
- Android app building blocks

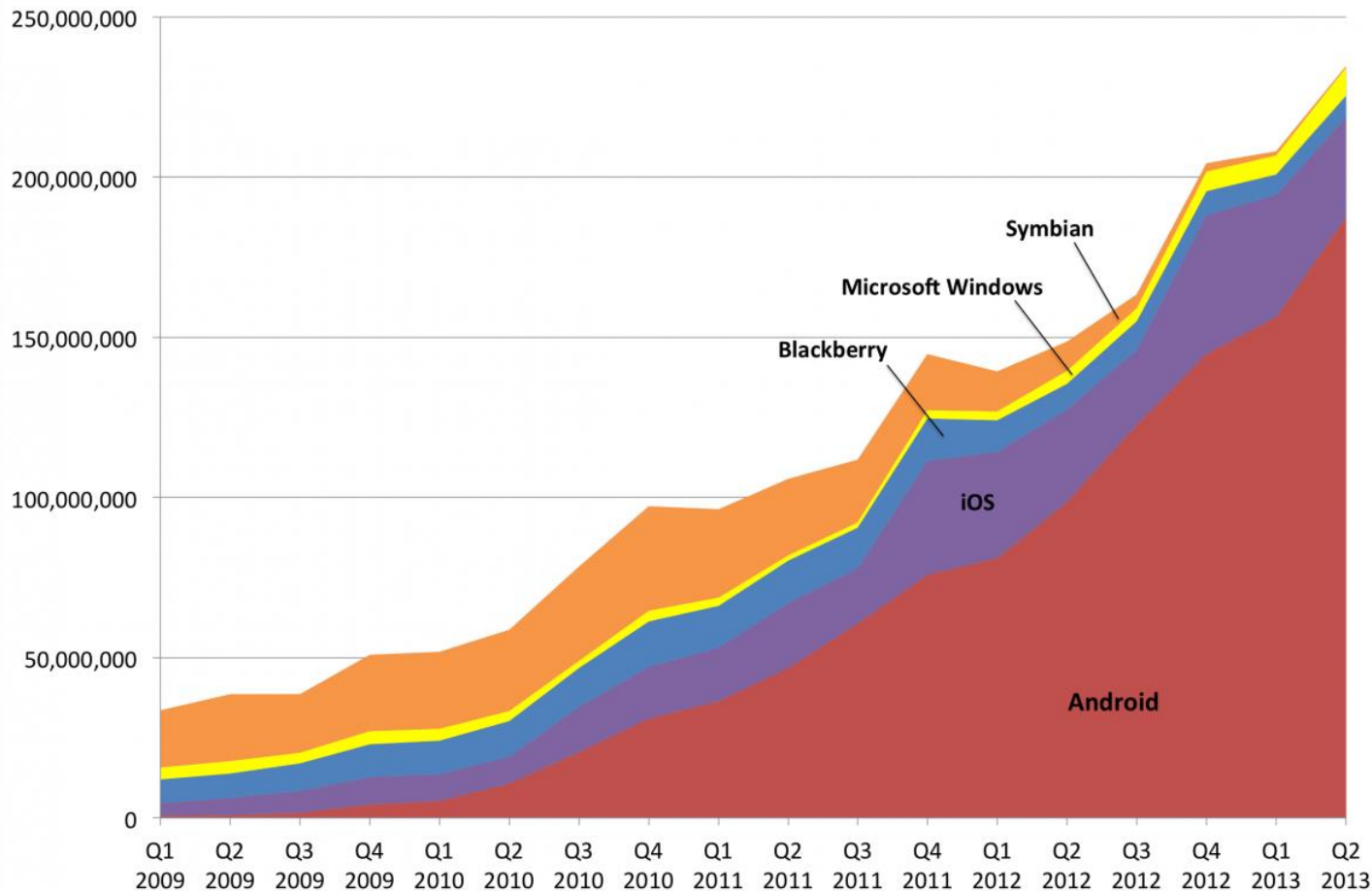
# Android Overview

- Operating System based on Linux
- Designed for touch screen mobile devices
- Open source - Android Open Source Project (AOSP)
  - Part of it
  - Maintained by Google

# Android

- Android delivers a complete set of software for mobile devices: an operating system, middleware and key mobile applications
- Use Java and support native with C/C++

# Global Smartphone Shipments By Platform



Source: Gartner, IDC



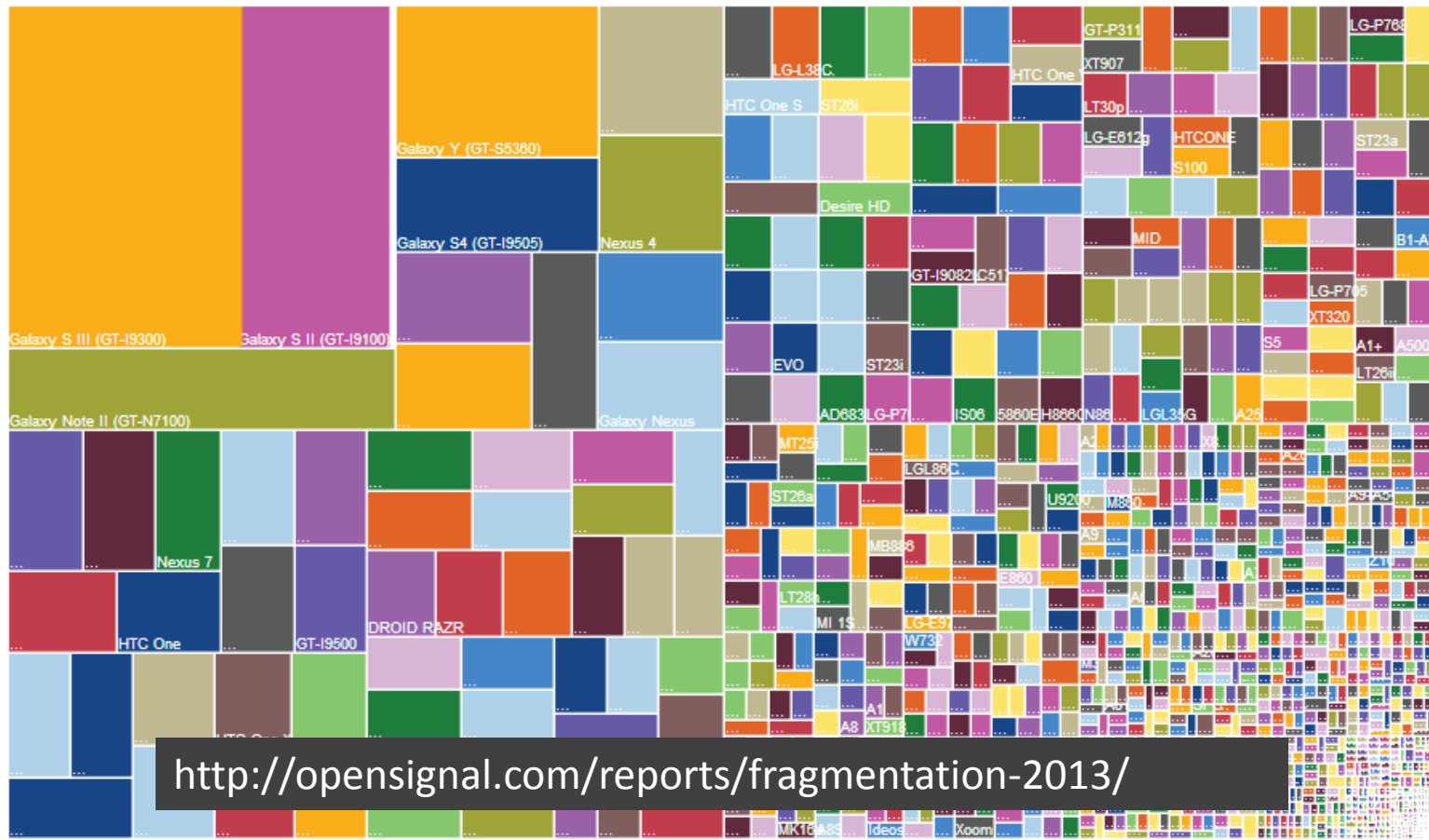
# Who runs Android

- Google – AOSP + Google Mobile Services
- Amazon – AOSP + Amazon Services
- Nokia – AOSP + Nokia-Microsoft Services
- Others

# Fragmentation

- Lots of device variations
  - Screen size
  - CPU
  - Versions

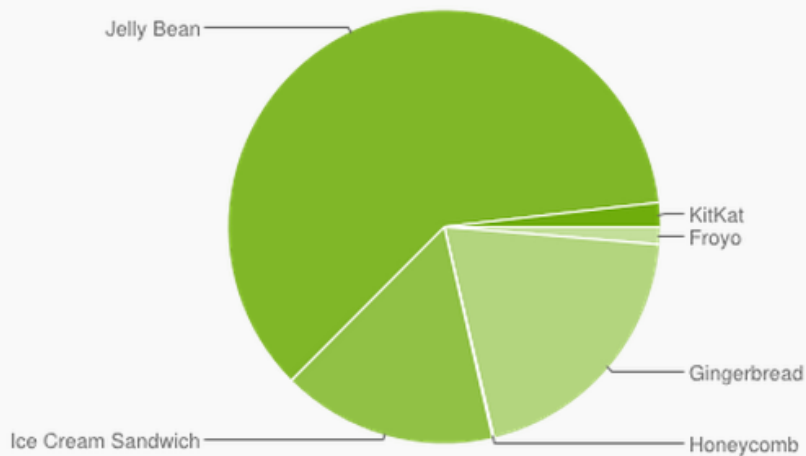
## DEVICE FRAGMENTATION





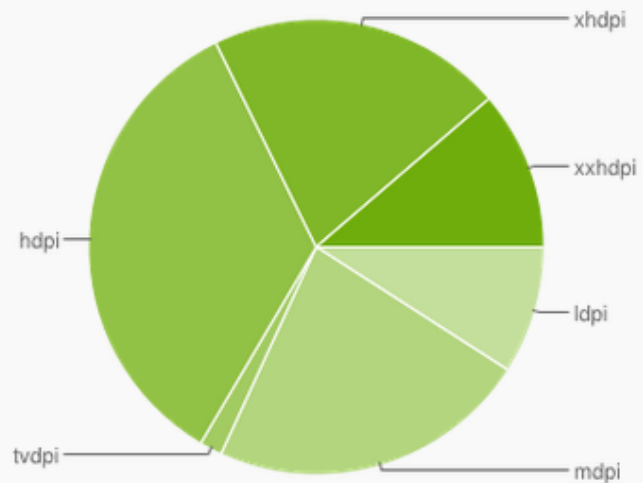
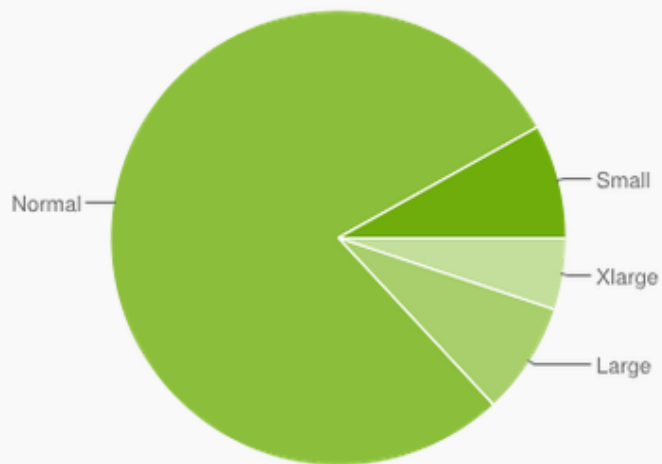


Version	Codename	API	Distribution
2.2	Froyo	8	1.3%
2.3.3 - 2.3.7	Gingerbread	10	20.0%
3.2	Honeycomb	13	0.1%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	16.1%
4.1.x	Jelly Bean	16	35.5%
4.2.x		17	16.3%
4.3		18	8.9%
4.4	KitKat	19	1.8%



<http://developer.android.com/about/dashboards/index.html>

	ldpi	mdpi	tvdpi	hdpi	xhdpi	xxhdpi	Total
Small	8.1%						8.1%
Normal	0.1%	13.9%		33.3%	20.2%	11.3%	78.8%
Large	0.8%	4.4%	1.6%	0.6%	0.6%		8.0%
Xlarge	0.1%	4.5%		0.3%	0.2%		5.1%
Total	9.1%	22.8%	1.6%	34.2%	21.0%	11.3%	



**Table 3.** Various screen configurations available from emulator skins in the Android SDK (indicated in bold) and other representative resolutions.

	Low density (120), <i>ldpi</i>	Medium density (160), <i>mdpi</i>	High density (240), <i>hdpi</i>	Extra high density (320), <i>xhdpi</i>
<i>Small screen</i>	<b>QVGA (240x320)</b>		480x640	
<i>Normal screen</i>	<b>WQVGA400 (240x400)</b> <b>WQVGA432 (240x432)</b>	<b>HVGA (320x480)</b>	<b>WVGA800 (480x800)</b> <b>WVGA854 (480x854)</b> 600x1024	640x960
<i>Large screen</i>	<b>WVGA800** (480x800)</b> <b>WVGA854** (480x854)</b>	<b>WVGA800* (480x800)</b> <b>WVGA854* (480x854)</b> 600x1024		
<i>Extra Large screen</i>	1024x600	<b>WXGA (1280x800)<sup>†</sup></b> 1024x768 1280x768	1536x1152 1920x1152 1920x1200	2048x1536 2560x1536 2560x1600

[http://developer.android.com/guide/practices/screens\\_support.html](http://developer.android.com/guide/practices/screens_support.html)

Hello World

# Android Developer Tools

- Download and install ADT
- Set environment variable
- Install Android SDK
- Create Android Virtual Devices (AVDs)

# Hello world app

- Create new Android project
- Run it to Emulator or Device
- Explore Android architecture, runtime and package
- Explore Android project components
  - Manifest, Activity, Layout and View, Resources

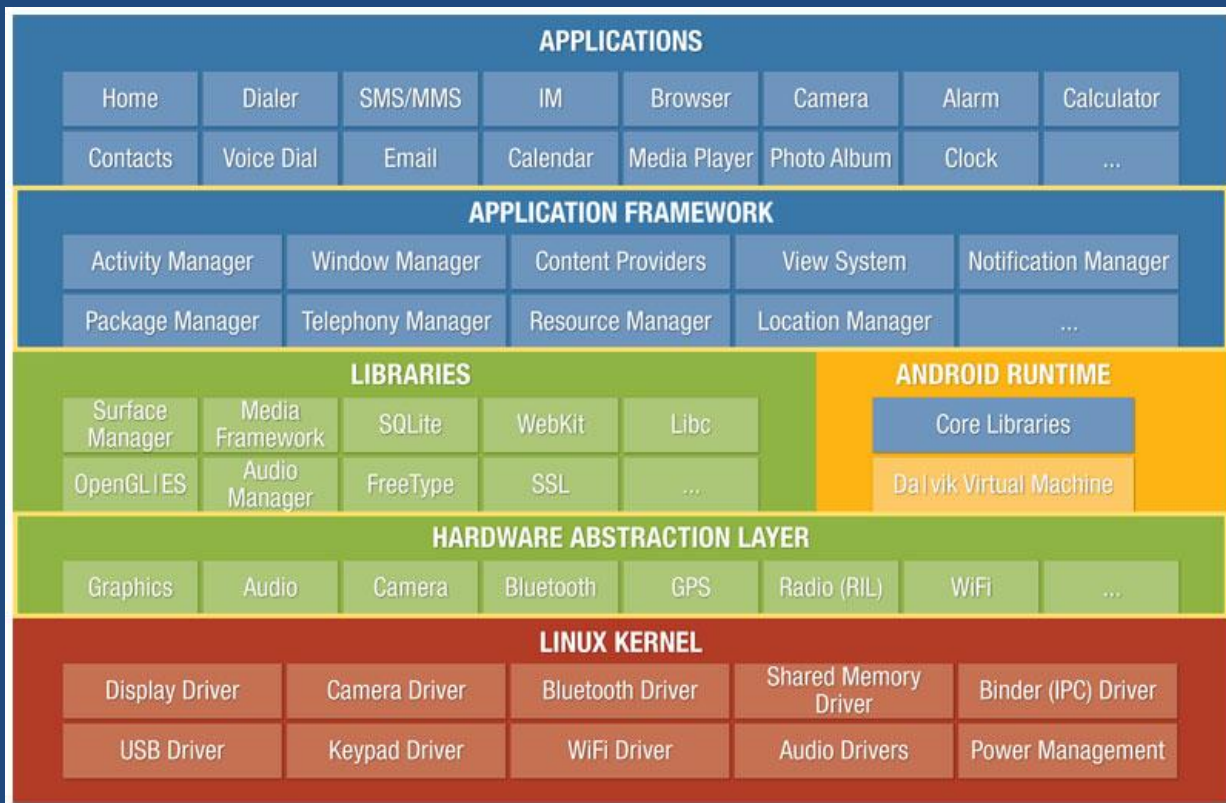
# Hands on

- Hello World

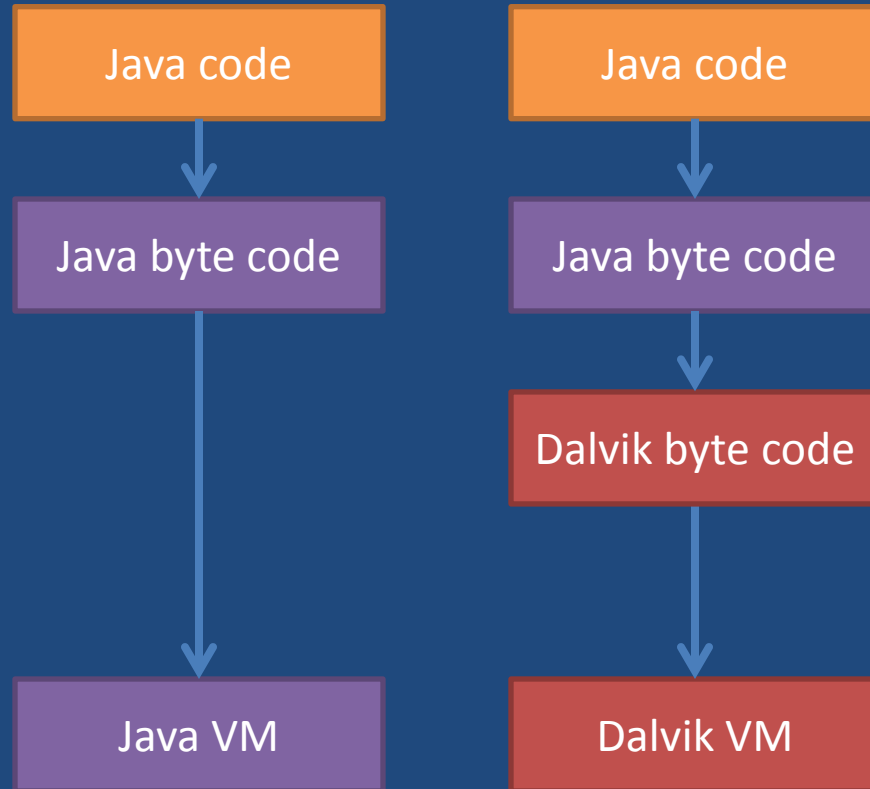




# Android Architecture



# Android Java VM aka Dalvik

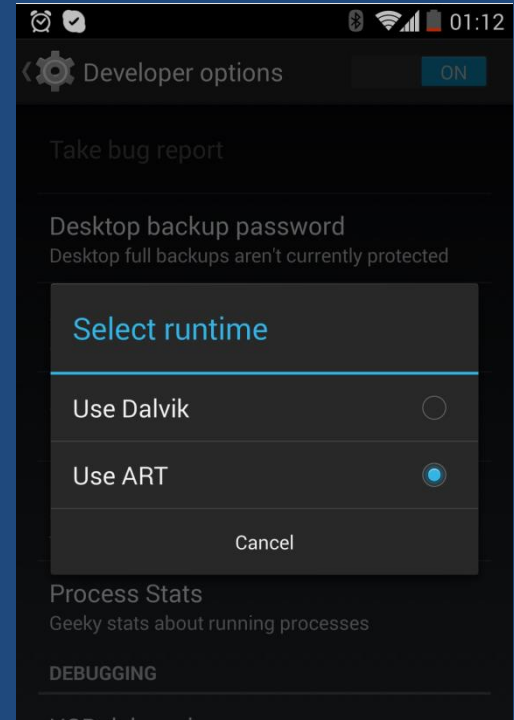


# Sandbox

- Each process has its own user ID and VM
- Isolation from other apps
- One app can access other app through permission

# Android Runtime (ART) VM

- Introduced in 4.4
- Experimental
- AOT (Ahead of Time) compilation
  - Dalvik use JIT (Just in Time)



# Application APK

- Application package file
  - Executable (dex)
  - Resources
  - Manifest
  - Signature

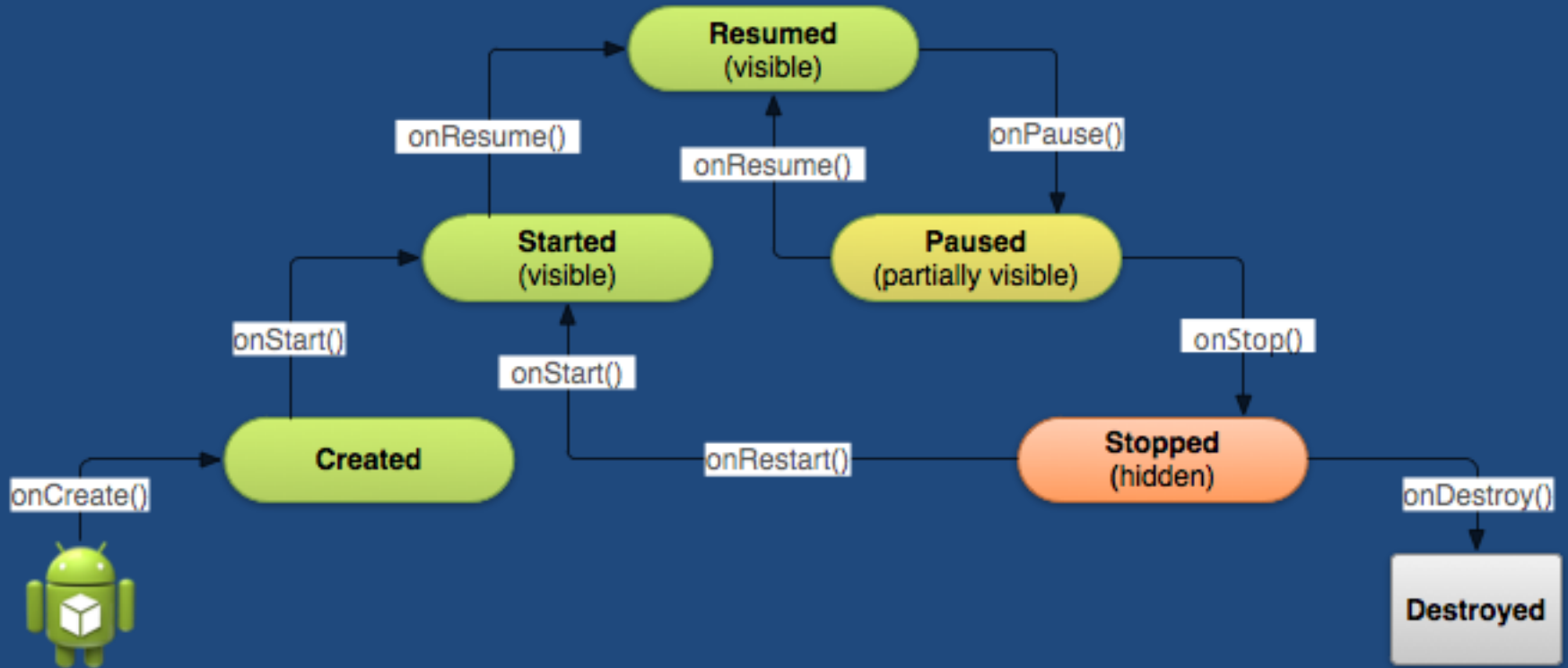
# Manifest

- The manifest file glues everything together.
- It explain
  - what the application consists of
  - what all its main building blocks are
  - what permissions it requires and uses

# Activity

- An activity represents a single screen with a user interface
- An application typically has multiple activities
- Manage by `ActivityManager`
  - One activity at a time.

# Activity Lifecycle

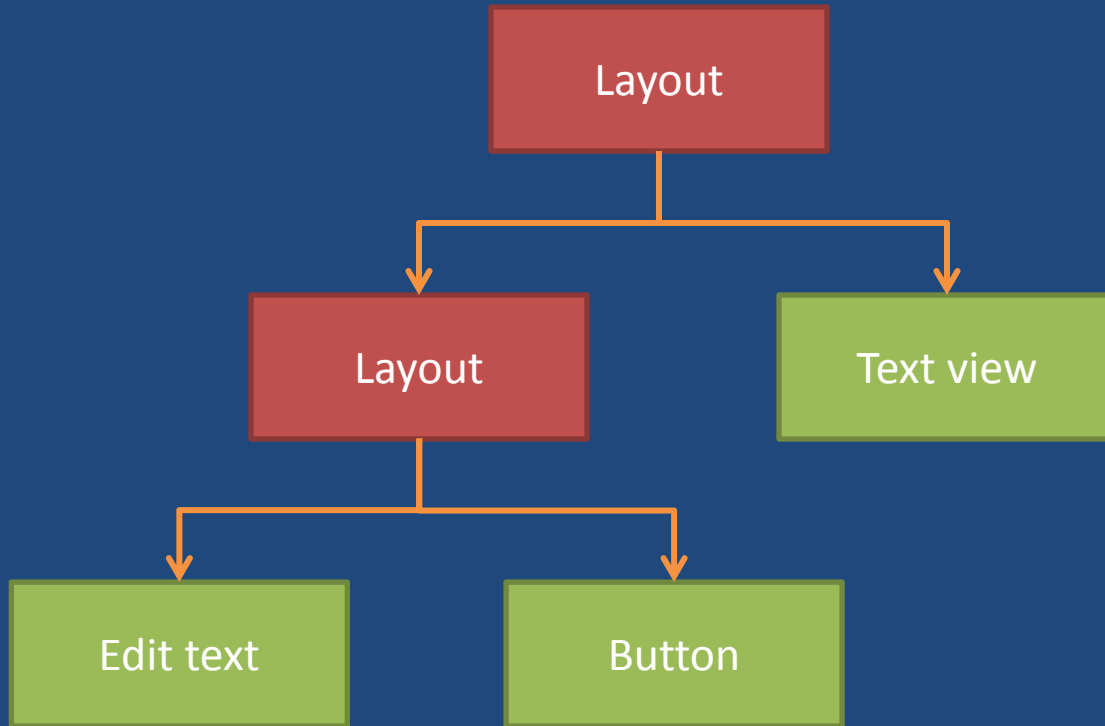




# Layout and View

- Everything you see, such as a button, label, or text box, is a view.
- Layout or ViewGroup organize views, such as grouping together a button and label or a group of these elements.

# Layout and View



# Resources

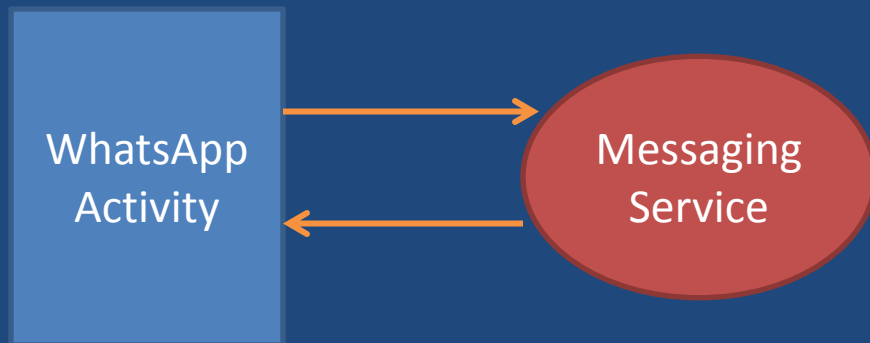
- Strings
- Images
- Layout XML

# Application Building Block

- Activity
- Service
- Content Provider
- Broadcast Receiver

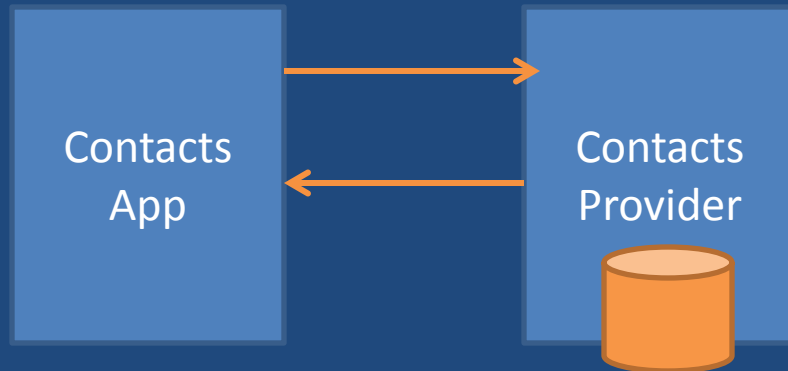
# Service

- Runs in the background to perform long-running operations
- Does not provide a user interface.
- Example: Messaging service in WhatsApp



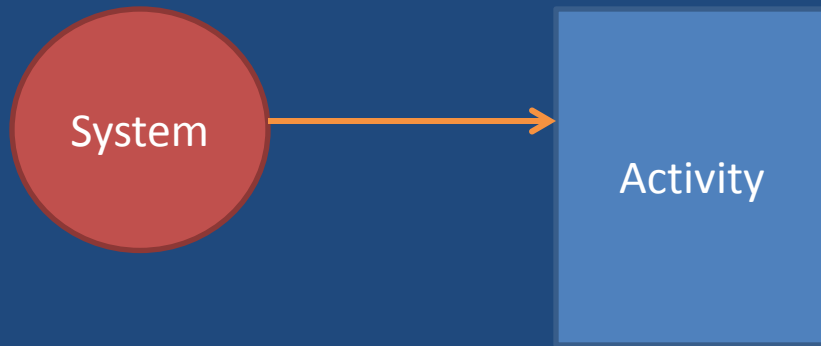
# Content Provider

- Manages a shared set of app data.
- Through the content provider, other apps can query or even modify the data (given permission)
- Example : Contacts, Calendar



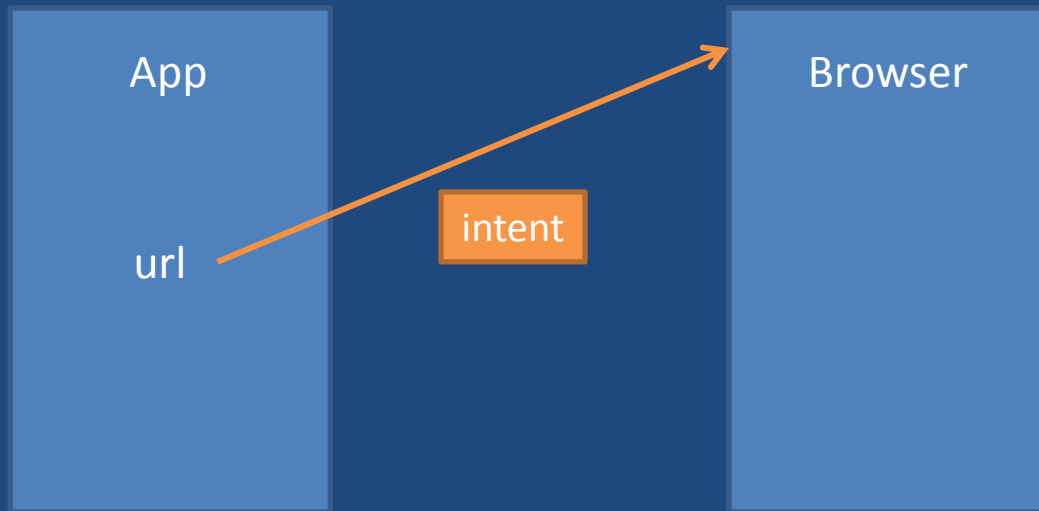
# Broadcast Receiver

- Responds to system-wide broadcast announcements.
- Example: a broadcast announcing that the screen has turned off, the battery is low, or a picture was captured.



# Intent

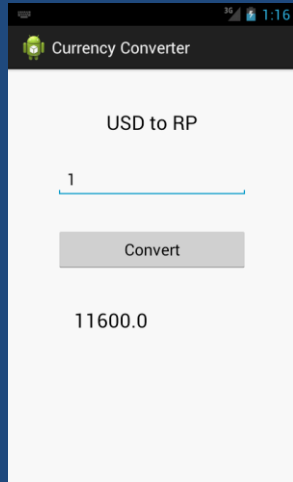
- Messaging object you can use to request an action from another app component.



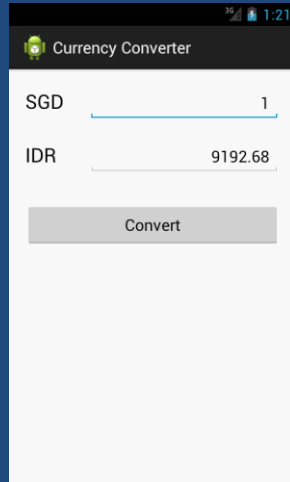


# First App – Currency Converter

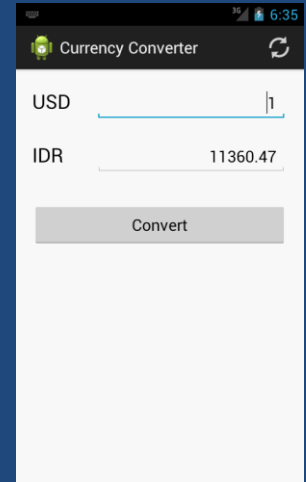
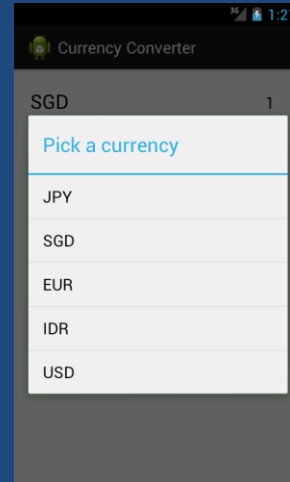
# Currency Converter App



simple



List of currencies



Network data  
Data Storage

# Steps

- Create new Android project
- Modify layout
  - Add button, text view and edit text
- Modify Activity to handle event and give response
- Working app

# Let's Start

