ANDROID INTRODUCTION

Peter Larsson-Green
Jönköping University
Spring 2020
THE ANDROID STORY

2005:
• July: Google buys Android Inc.

2007:
• June: Apple releases iPhone.
• November: Open Handset Alliance established.
  • Mission: to develop open standards for mobile devices.
  • Flagship: Android

2008:
• October: First device running Android: HTC Dream
THE ANDROID SUCCESS

http://www.idc.com/prodserv/smartphone-os-market-share.jsp
IS ANDROID OPEN SOURCE?

Android is open source.
• Android Open Source Project (AOSP):
  • https://source.android.com/index.html
• Successfully forked by Amazon: Fire OS.

The name *Android* is a trademark of Google Inc.
• https://developer.android.com/legal.html
DOES GOOGLE CONTROL ANDROID?

• Next version always developed behind closed doors.
• Google has abandoned many original AOSP apps in favor of their own.
  • Google's apps are not part of AOSP; they are closed source.
• Google improves Google Play Services instead of AOSP.
  • Many applications depend on Google Play Services.

Users ♥ Google's apps  ⇒  Manufacturers want Google's apps  ⇒  Manufacturers dependent on Google
SAMSUNG'S PLAN B

ANDROID

• Smartphones
• Tablets
• Wear
• TV
• Auto
• Things
HISTORY LESSON

2008, Android 1.0
• Designed for mobile phones with touchscreen.
• Can only handle single touch.
• Four hardware buttons: Back, Home, Menu and Search.
• Status bar at the top.
• Title bar at the top of applications.

Android 1.5 added:
• Widgets.
• Accelerometer-based application rotations.

https://en.wikipedia.org/wiki/File:Android_1.5_Cupcake_Screenshot.png
HISTORY LESSON

2009, Android 2.0
  • Multi touch support.

Android 2.3 added:
  • Front camera support.

https://commons.wikimedia.org/wiki/File:Android_screenshot.png
HISTORY LESSON

2011, Android 3.0
• Better tablet support.

• Added system and action bar.
• Software navigation buttons (in the system bar) instead of hardware buttons.
• The Menu and Search buttons deprecated.
• The Recent button added.

Android 3.1 added:
• Resizable home screen widgets.

Has not been used on many devices.

https://commons.wikimedia.org/wiki/File:Android3.0.png
HISTORY LESSON

2011, Android 4.0
- Access applications directly from the lock screen.

Android 4.2 added:
- Widgets on lock screen.
- Multiple user accounts (only tablets).

https://commons.wikimedia.org/wiki/File:Android_4.4.4_KitKat.png
HISTORY LESSON

2014, Android 5.0
• Android RunTime (ART) replacing Dalvik.
• User accounts for smartphones too.
• Widgets no longer supported on lock screen.
• Material design

https://commons.wikimedia.org/wiki/File:Android_5.0-en.png
2015, Android 6.0
• Ask for permissions at runtime.
• Finger print support.

2016, Android 7.0
- Double tap overview button
  → Switch app
- Multi-window

Android 7.1 added:
- App shortcuts

https://upload.wikimedia.org/wikipedia/en/7/78/Android_7.0_Home_Screen.png
HISTORY LESSON

2017, Android 8.0
  • Picture-in-picture.
  • Autofill framework.

HISTORY LESSON

2018, Android 9.0
• New recent task list
• The Dashboard

https://commons.wikimedia.org/wiki/File:Android_Pie_9.0_screenshot.png
# Platform Versions Today

Data collected during a 7-day period ending on October 26, 2018

<table>
<thead>
<tr>
<th>Version</th>
<th>Codename</th>
<th>API</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.3 - 2.3.7</td>
<td>Gingerbread</td>
<td>10</td>
<td>0.2%</td>
</tr>
<tr>
<td>4.0.3 - 4.0.4</td>
<td>Ice Cream Sandwich</td>
<td>15</td>
<td>0.3%</td>
</tr>
<tr>
<td>4.1.x</td>
<td>Jelly Bean</td>
<td>16</td>
<td>1.1%</td>
</tr>
<tr>
<td>4.2.x</td>
<td></td>
<td>17</td>
<td>1.5%</td>
</tr>
<tr>
<td>4.3</td>
<td></td>
<td>18</td>
<td>0.4%</td>
</tr>
<tr>
<td>4.4</td>
<td>KitKat</td>
<td>19</td>
<td>7.6%</td>
</tr>
<tr>
<td>5.0</td>
<td>Lollipop</td>
<td>21</td>
<td>3.5%</td>
</tr>
<tr>
<td>5.1</td>
<td></td>
<td>22</td>
<td>14.4%</td>
</tr>
<tr>
<td>6.0</td>
<td>Marshmallow</td>
<td>23</td>
<td>21.3%</td>
</tr>
<tr>
<td>7.0</td>
<td>Nougat</td>
<td>24</td>
<td>18.1%</td>
</tr>
<tr>
<td>7.1</td>
<td></td>
<td>25</td>
<td>10.1%</td>
</tr>
<tr>
<td>8.0</td>
<td>Oreo</td>
<td>26</td>
<td>14.0%</td>
</tr>
<tr>
<td>8.1</td>
<td></td>
<td>27</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

[https://developer.android.com/about/dashboards/index.html](https://developer.android.com/about/dashboards/index.html)
DIFFERENT LOOKS

Manufacturers usually customize Android a bit.
- They use their own launcher application.
- They use their own standard applications.

This does usually not matter for your own applications.
OLD & NEW, SMALL & LARGE
ANDROID FRAGMENTATION

**IOS VS ANDROID**

**iPhone SE**
- Power button
- Volume +
- Volume -
- Recent apps (double click)
- Home Button

**Samsung Galaxy S6**
- Power button
- Volume +
- Volume -
- Recent apps
- Home Button
- Back
iOS VS ANDROID

iOS widgets

iOS installed apps

Android widgets/shortcuts

Android installed apps
iOS VS ANDROID

iOS Control Center
(pull up from button)

Android Status Bar
(pull down from top)
IOS VS ANDROID
IOS VS ANDROID

YouTube
(searching for Nintendo)

Spotify
(start screen)

Gmail
(reading an email)
ANDROİD ARCHİTECTURE


AOSP developers improves Android everywhere

Each app run as its own Linux user.

• *App A* can create files *App B* can't access.

Used by app developers

OEM implements HAL