

# The Mobile Development Landscape

Assoc. Professor Donald J. Patterson  
INF 241 Winter 2012



What are the issues around mobile development?

## Issues:

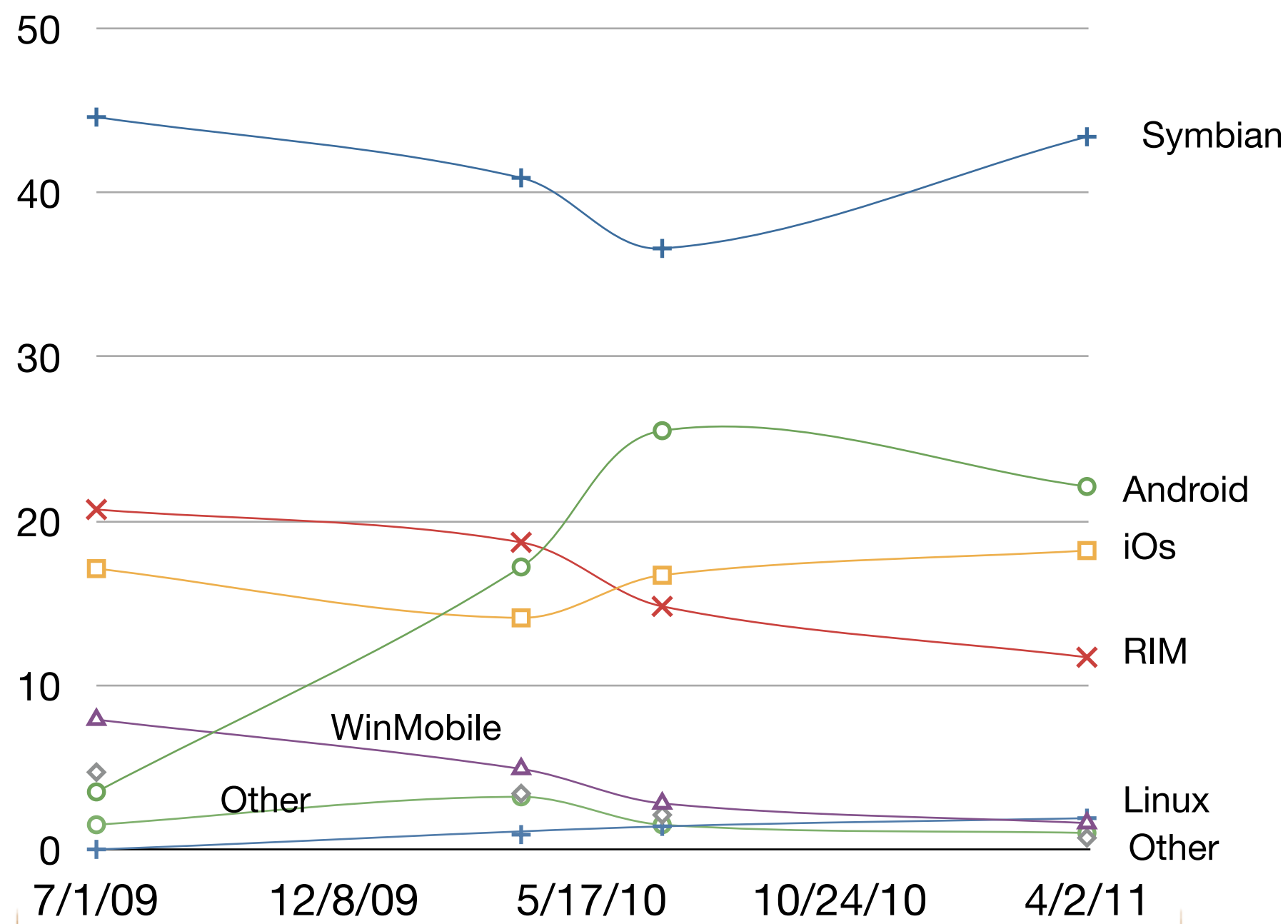
## Issues:

- Market Share

## Issues:

- Market Share
  - Are we talking about OS or hardware?

Mobile OS Market Share

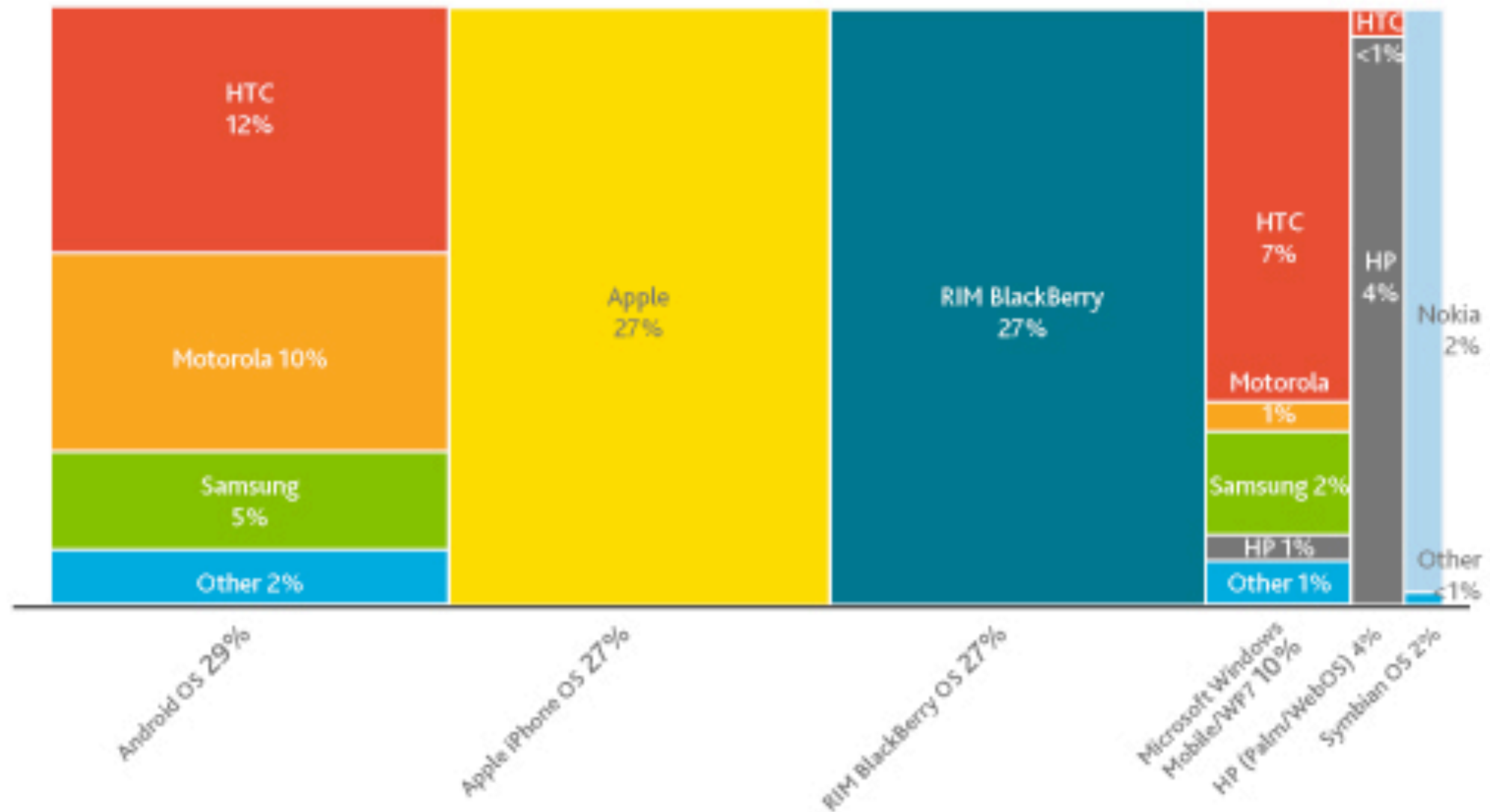


Source: Gartner Research

# Intro to Mobile Development

## Manufacturer operating system share—smartphones

Nov '10 - Jan 11, postpaid mobile subscribers, n=14,701



Source: The Nielsen Company.

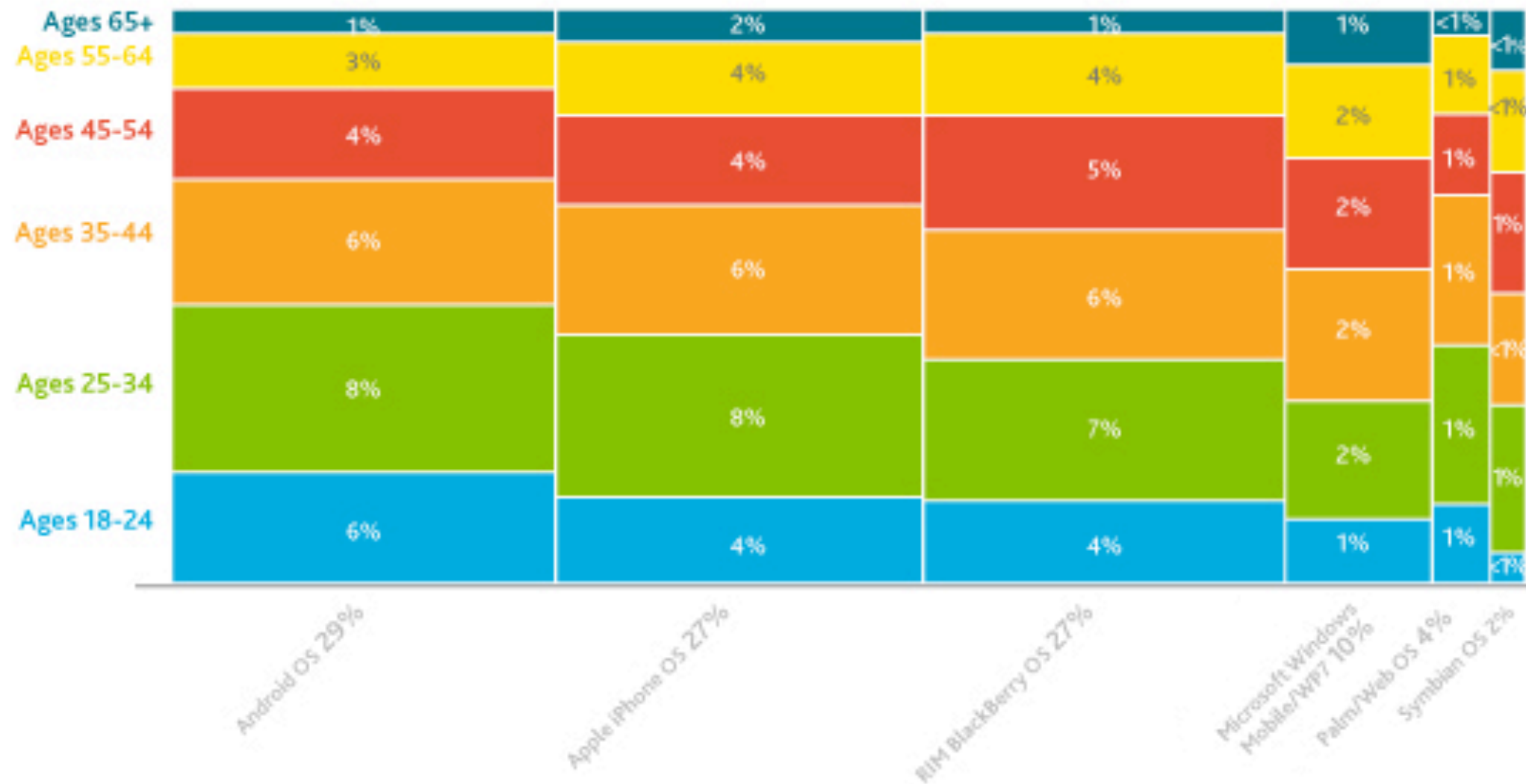
nielsen

Source: [http://blog.nielsen.com/nielsenwire/online\\_mobile/who-is-winning-the-u-s-smartphone-battle/](http://blog.nielsen.com/nielsenwire/online_mobile/who-is-winning-the-u-s-smartphone-battle/)

# Intro to Mobile Development

## Age and operating system share—smartphones

Nov '10 - Jan 11, postpaid mobile subscribers, n=14,701



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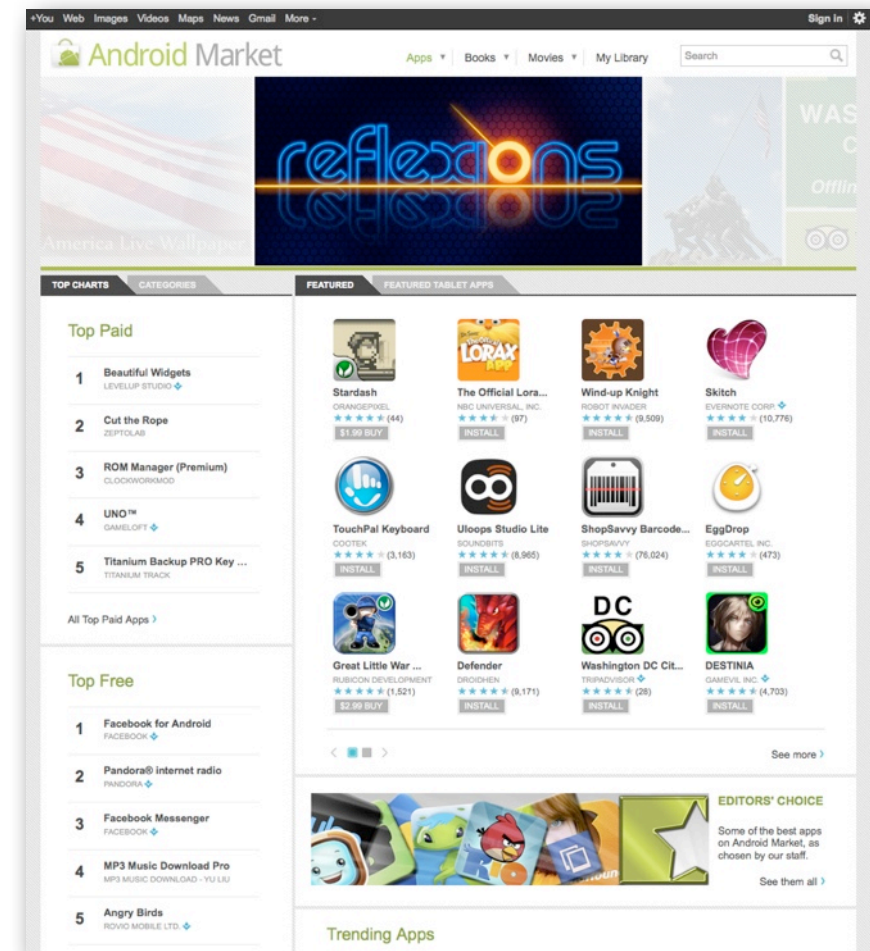


## Issues:

- Stores
  - iTunes
  - Android
  - Blackberry
  - OVI

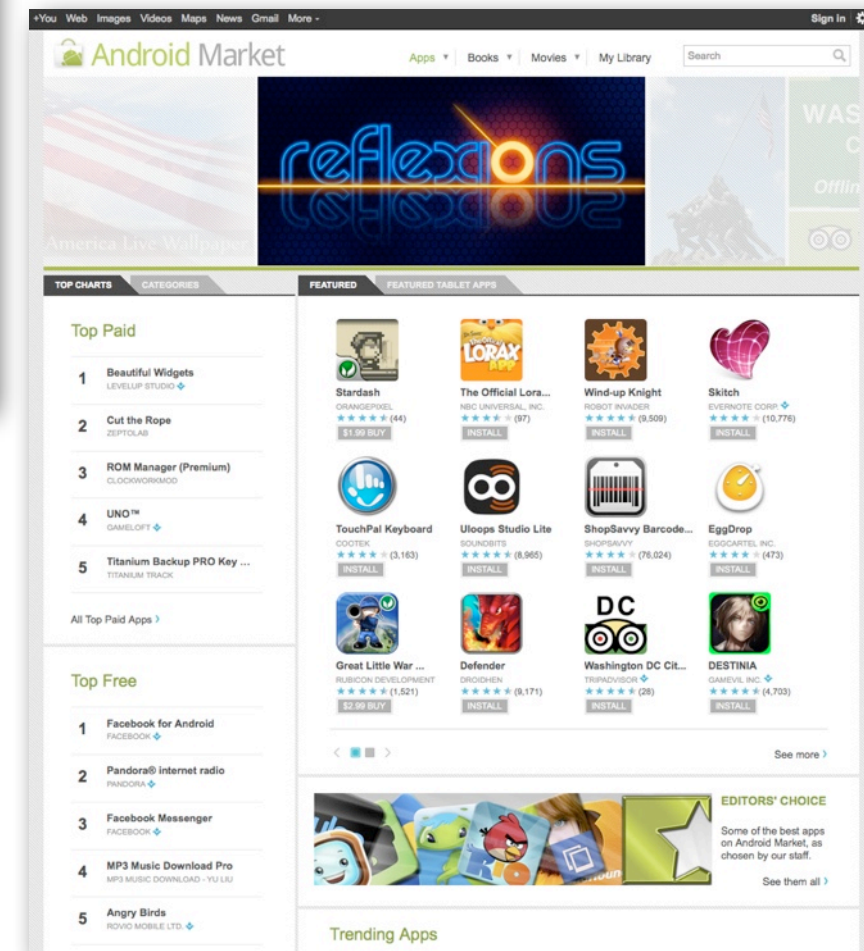
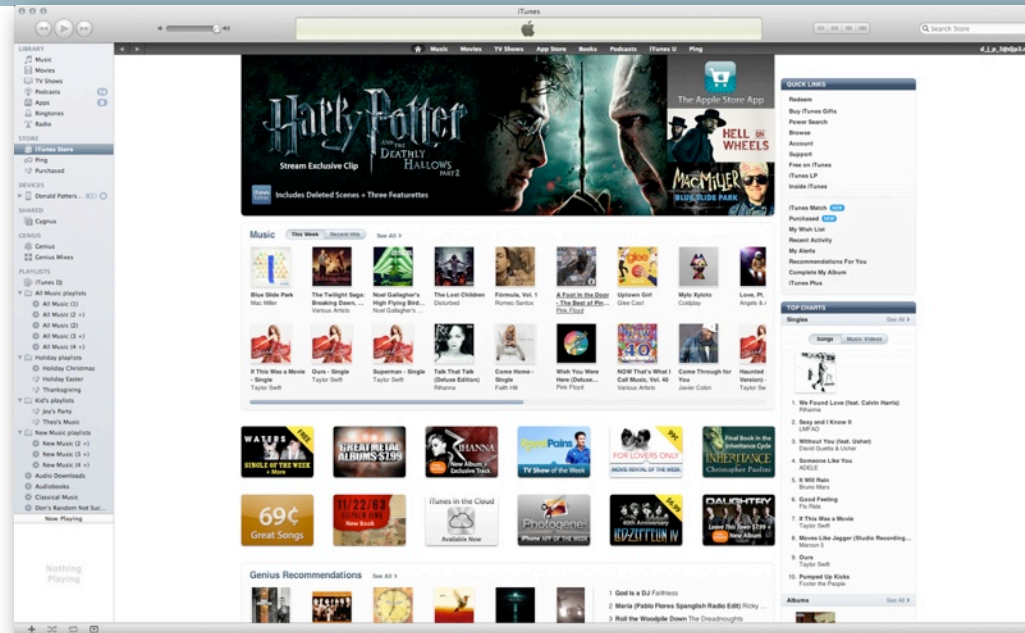
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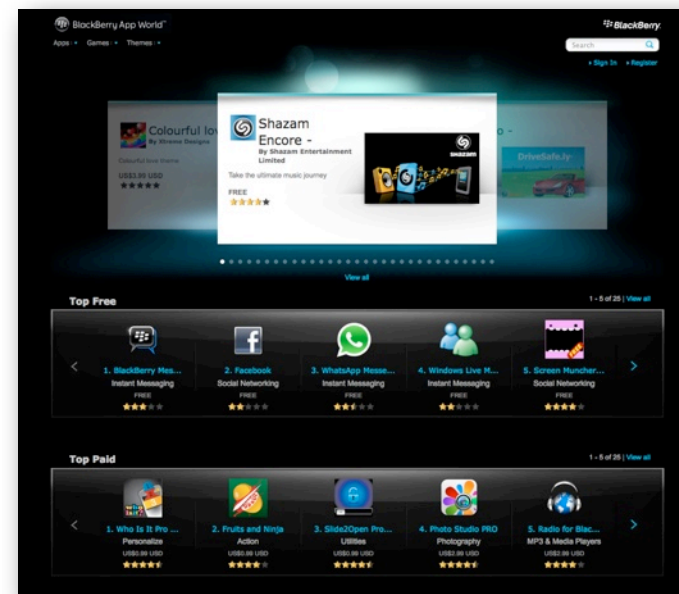
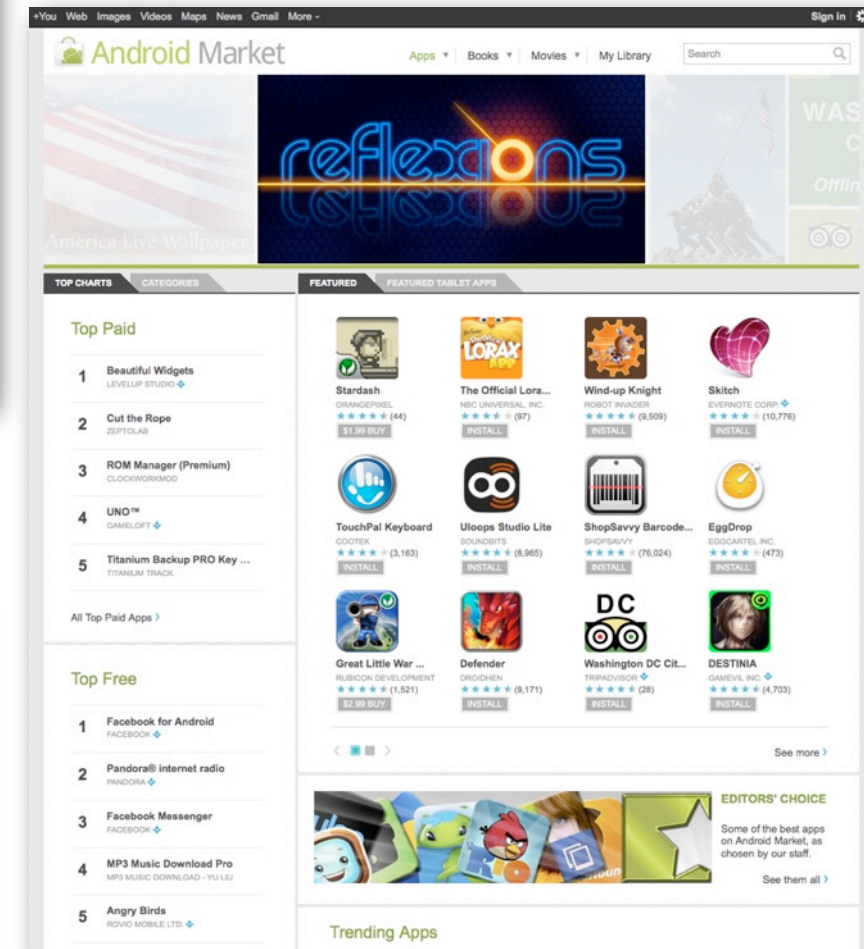
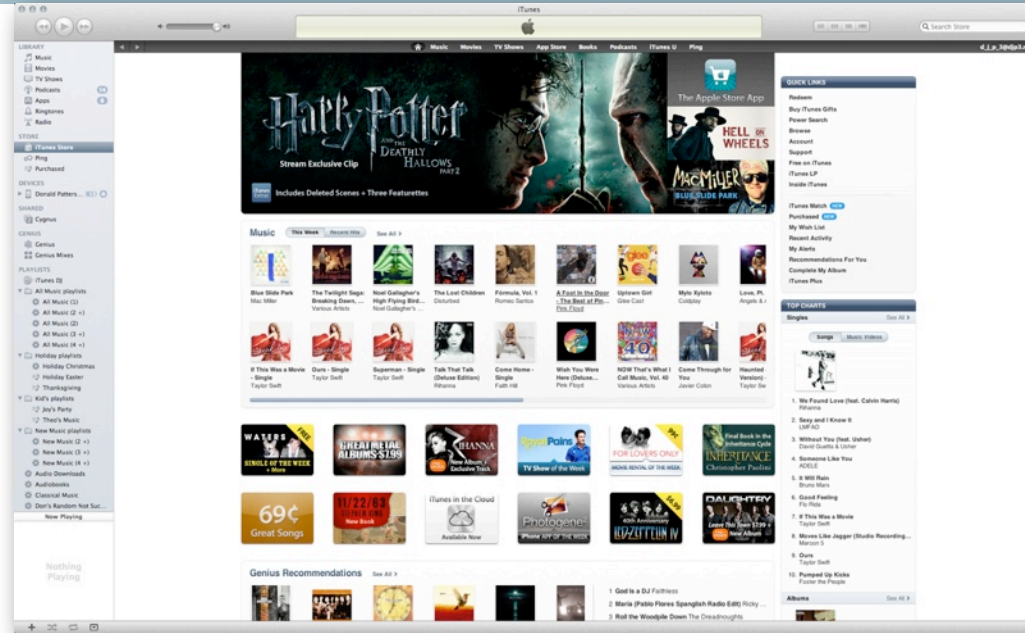




# Mobile Development

## Issues:

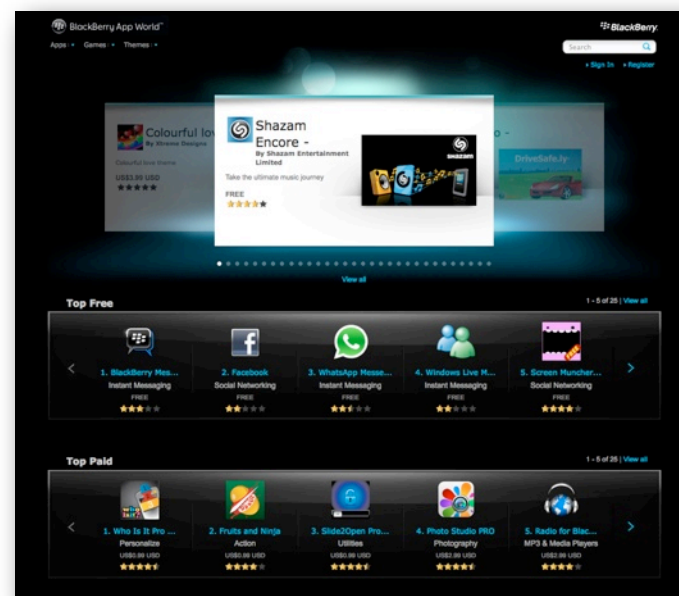
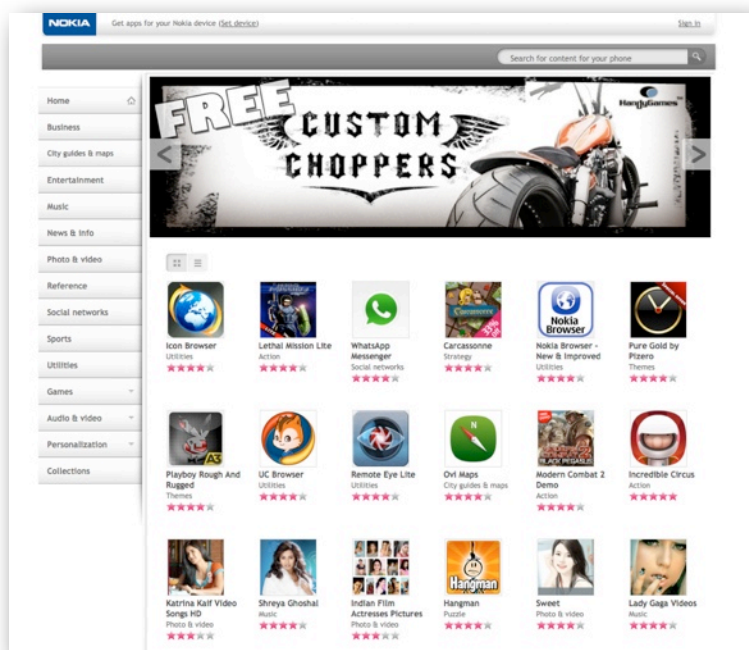
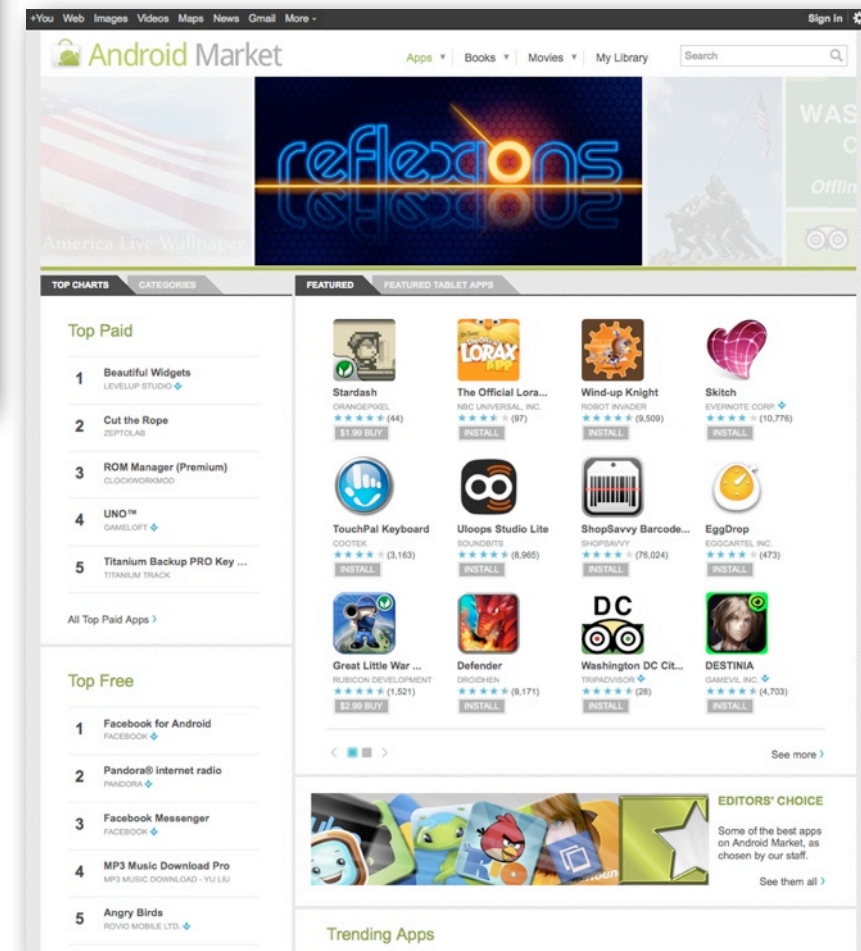
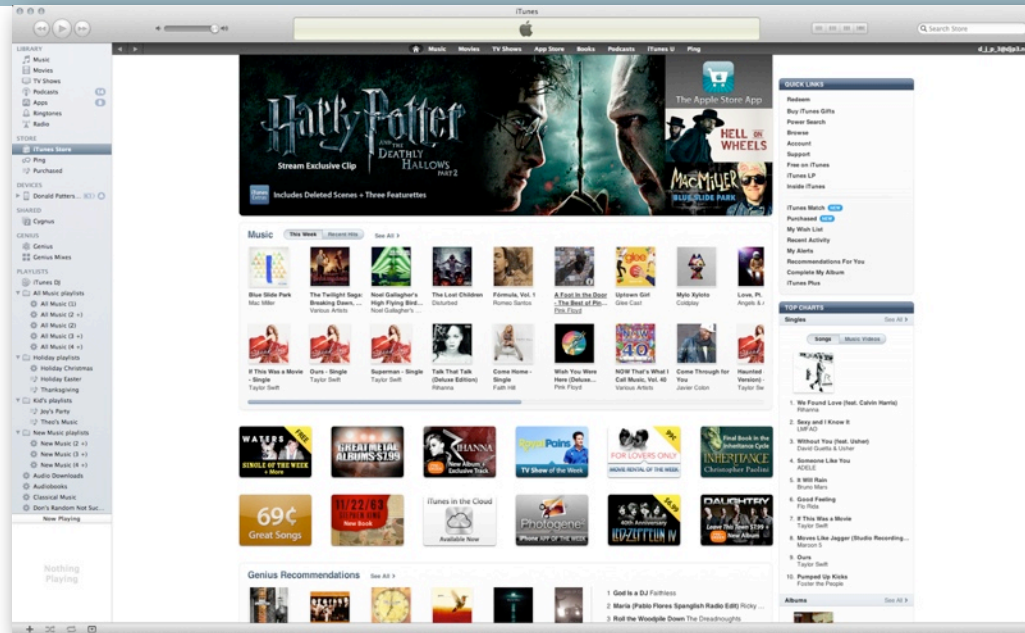
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# Mobile Development

## Issues:

- Stores
- iTunes
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## Issues:

- Programming Languages
  - C++
  - Java
  - Objective-C
  - Python
  - Others?



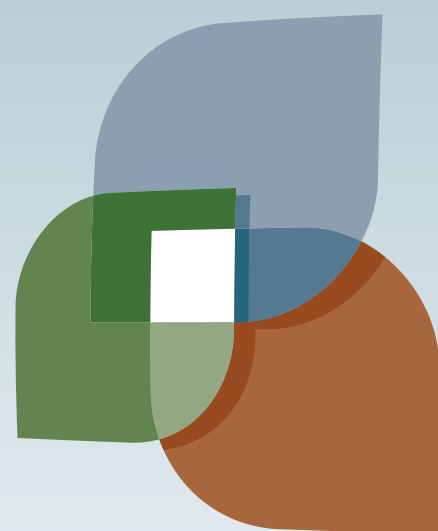
## Issues:

- Device Variability
  - <http://www.gsmarena.com/nokia-phones-1.php>
  - Nokia
    - <http://maps.nokia.com/services-and-apps/ovi-maps/compatible-phones>
  - Apple
    - [http://en.wikipedia.org/wiki/List\\_of\\_iOS\\_devices](http://en.wikipedia.org/wiki/List_of_iOS_devices)
  - Blackberry
    - <http://en.wikipedia.org/wiki/>

## Issues:

- Programmer Freedom
  - Background Processes
  - Device Access
- Profit Models
  - Pay per app
  - In-app payments





L U C I



# Intro to Android

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INF 241 Fall 2012



# A brief history of Android

- Originally a startup that “developed software for mobile phones”
- Business Week quote from founder Andy Rubin in 2003:
  - "Rubin said there was tremendous potential in developing smarter mobile devices that are more aware of its owner's location and preferences.



# gPhone concepts



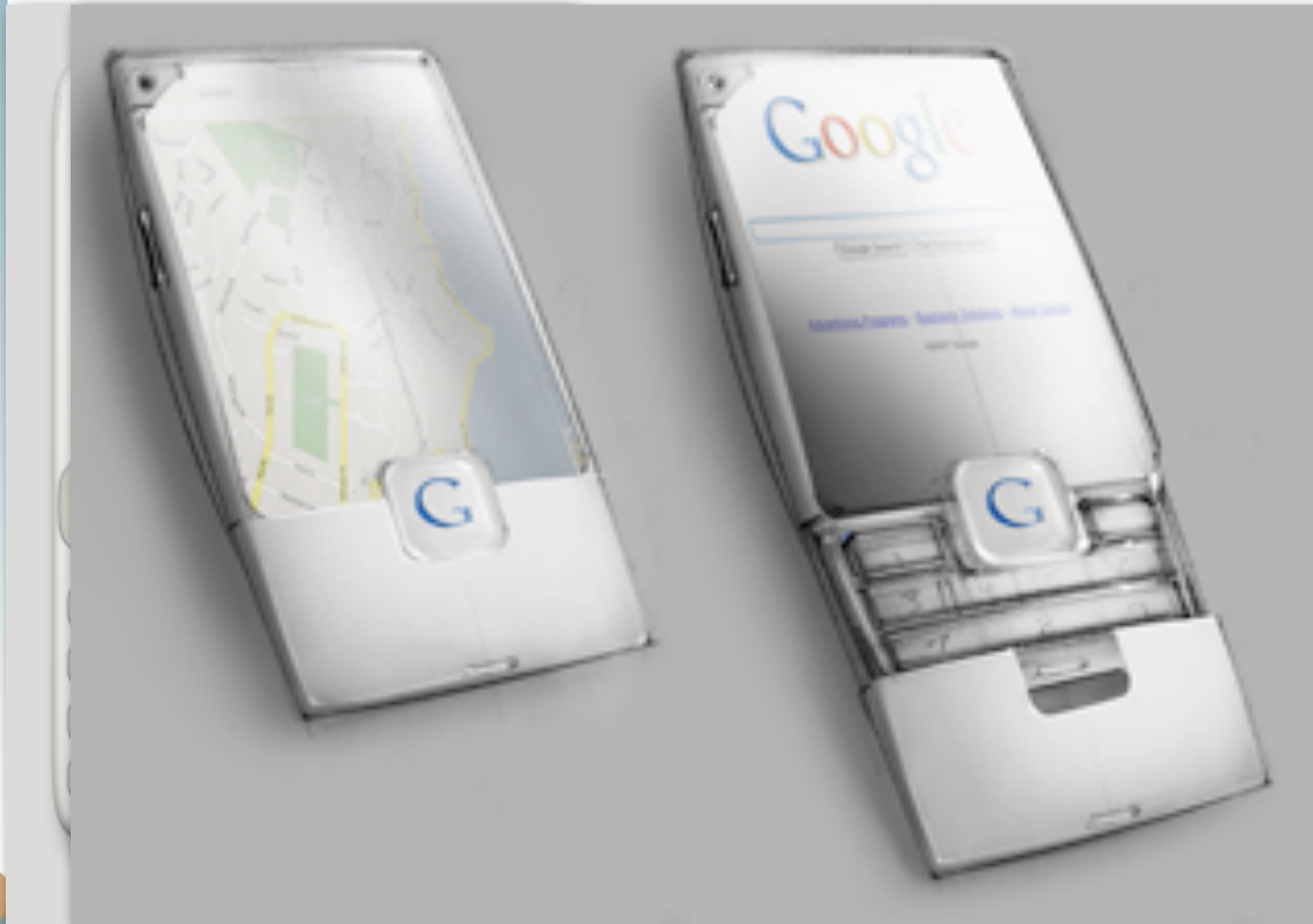
<http://www.google-phone.com/google-phone-or-gphone-concept-designs>

# gPhone concepts



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Google



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## A brief history of Android

- Rumors of the “gPhone” started about the time the iPhone launched
- Google dropped the bomb on 11/5/2007
  - It wasn't working on a handset
  - It was working on an operating system
    - to compete with Microsoft, Symbian, telephone companies. Who else ?



# What is Android?

- “Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language.”

ANDROID



# A brief history of Android

- Why would Google do this?
  - It doesn't want to be locked out of mobile advertising
  - It's the same reason they support Firefox
  - It's the same reason they built Chrome
  - It's the same reason they bought YouTube
  - It's about maintaining access to advertising channels today, and having access to tomorrow's innovations
  - Competitors don't need to let Google advertise





## A brief history of Android

- Actually it wasn't just Google
- It was the Open Handset Alliance (OHA)
  - including HTC, LG, Samsung, T-Mobile and more
  - pushing
- Based on Linux
  - optimized for mobile devices



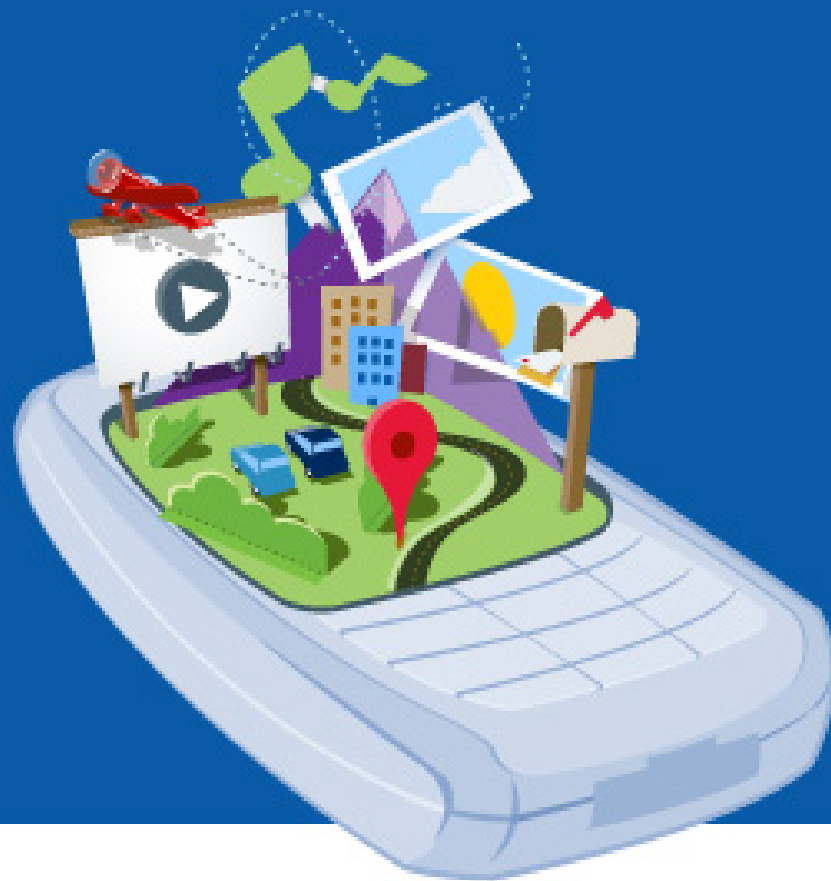
## A brief history of Android

- The architecture is highly modular
  - “Location” can come from many places
  - Text messaging handling can be done by any software component
- It is predominantly open-source
- It is predominantly Java-based





## A brief history of Android



### What would it take to build a better mobile phone?

A commitment to openness, a shared vision for the future, and concrete plans to make the vision a reality.

Welcome to the Open Handset Alliance™, a group of 47 technology and mobile companies who have come together to accelerate innovation in mobile and offer consumers a richer, less expensive, and better mobile experience. Together we have developed Android™, the first complete, open, and free mobile platform.

We are committed to commercially deploy handsets and services using the Android Platform.

- **Develop Android applications:** [Get the SDK](#)
- **Contribute to the Android Open Source Project:** [Get the source code](#)

<http://www.openhandsetalliance.com>

- <http://www.youtube.com/watch?v=7Y4thikv-OM>



## A brief history of Android

- First SDK was released on 11/12/2007
- Main conceptual competitor is LiMO
  - Linux for Mobile
    - Verizon and Mozilla key initial players
    - Many partners in both projects
    - Outside Asia, no one cares



# A brief history of Android

- 6/24/2008 Nokia announces purchase of Symbian from Sony Ericsson in response
  - starts the Symbian Foundation to open-source their main platform, gets released in 2011 as “shared-source”
- 10/21/2008, Google puts all of Android into open source using the Apache License
- 12/9/2008 Sony Ericsson joins the OHA
  - Google denies rumors of the gPhone at the same time



<http://www.engadget.com/2008/06/24/nokia-buys-symbian/>

# A brief history of Android

- 8/12/2010 Oracle sues Google over intellectual property in Java
- 2/11/2011 Nokia announces it is abandoning Symbian for Windows 7



<http://www.engadget.com/2008/06/24/nokia-buys-symbian/>

## Overview of Android

- Platforms running Android
  - in 2009
    - T-Mobile G1 phone
    - HTC developer phone
  - in 2011
    - Hundreds

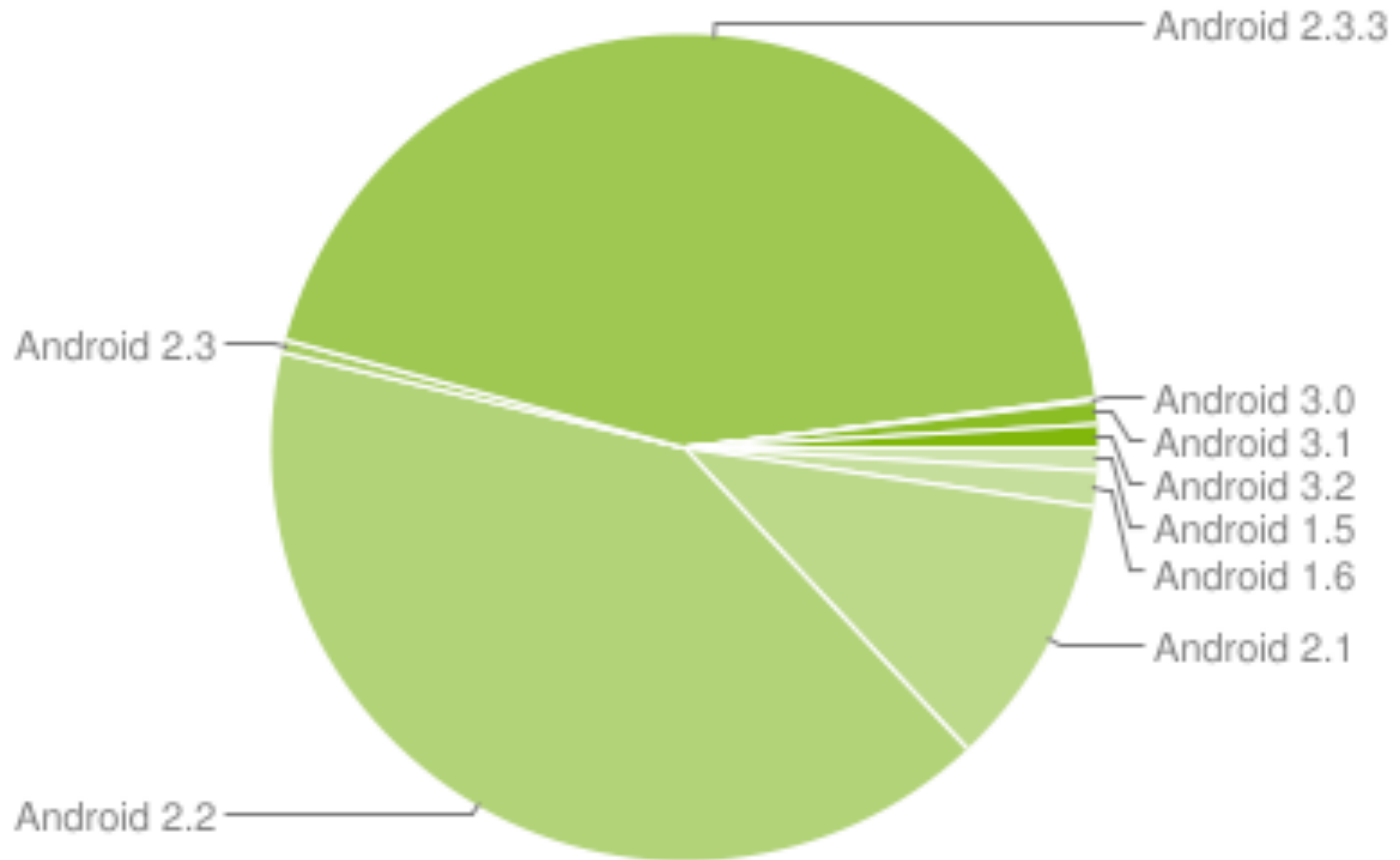


## Overview of Android

- Various code revisions are named after pastries (sort of)
  - Cupcake (released on 4/30/2009) v1.5
  - Donut (released on 9/15/2009) v1.6
  - Eclair (released on 10/26/2009) v2.1
  - Froyo (released on 5/20/2010) v2.2
  - Gingerbread (?) v2.3 (SIP, NFC)
  - Honeycomb (5/2011) v3.0 (tablet)
  - Ice Cream Sandwich (11/14/2011) v4.0 (face recognition)



## Overview of Android 11/2011



# Overview of Android

- Android Marketplace
  - Place to get 3rd-party android apps
  - Utilizes Google Checkout for payment
  - Optimized for mobile use
    - web interface was almost useless until recently
  - Not exclusive source for applications
  - Applications are not “blessed” at all by Google
    - It is merely a convenience for developers

A stylized illustration of a city skyline at the bottom of the slide. It features various buildings in shades of orange, brown, and blue, with green palm trees and foliage in the foreground. The URL is overlaid on the right side of this illustration.

<http://www.android.com/market/>



## Easy Tie

basesign



★★★★★ (98)

\$1.99 BUY

### More from developer



#### Easy Tie Lite

BASESIGN

★★★★★ (557)

Free



#### Lesari - Meine FilmDatenba

BASESIGN

★★★★★ (42)

Free



#### Calc n Con

BASESIGN

★★★★★ (2)

\$1.40

### Users who viewed this also viewed



#### Tie Deluxe

JQ SOFT

★★★★★ (31)

\$0.99

### Users who installed this also installed

### OVERVIEW

### USER REVIEWS

### WHAT'S NEW

### PERMISSIONS

## Description

Don't know how to tie a tie?

Learn it with Easy Tie!

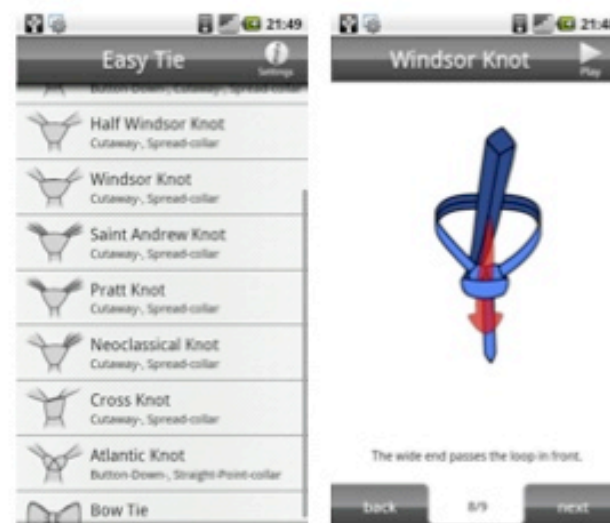
Easy Tie is an app that shows you step-by-step how to tie a necktie.

Knots included:

- Simple Knot
- Double K.
- Small K.
- Half Windsor K.
- Windsor K.

[Visit Developer's Website >](#)

## App Screenshots



MORE

+1 10

[Tweet](#)

### ABOUT THIS APP

RATING:

★★★★★ (98)

UPDATED:

June 21, 2010

CURRENT VERSION:

1.6

REQUIRES ANDROID:

1.5 and up

CATEGORY:

Lifestyle

INSTALLS:

1,000 - 5,000



SIZE:

1.0M

PRICE:

\$1.99

CONTENT RATING:

Everyone

## User Reviews

5 star 71

4 star 10

Average rating:

# Android Features (hardware dependent)

- Application Framework
  - enabling reuse and replacement of components
- Dalvik virtual machine
  - optimized for mobile devices
- Integrated browser
  - based on the open source WebKit engine
- Optimized graphics
  - powered by a custom 2D graphics library; 3D graphics based on the OpenGL ES 1.0 specification

<http://developer.android.com/guide/index.html>

# Android Features (hardware dependent)

- SQLite
  - for structured data storage
- Media support
  - (MPEG4, H.264, MP3, AAC, AMR, JPG, PNG, GIF)
- GSM Telephony
- Bluetooth, EDGE, 3G, and WiFi
- Camera, GPS, compass, and accelerometer



<http://developer.android.com/guide/index.html>

# Android Features (hardware dependent)

- Multi-touch
  - brief concern about patent infringement with Apple
- Multi-tasking support
- Tethering
  - What is this?

A stylized illustration of a city skyline at the bottom of the slide. It features various buildings in shades of orange, blue, and green, with palm trees interspersed among them. The foreground is a solid green band.

<http://developer.android.com/guide/index.html>



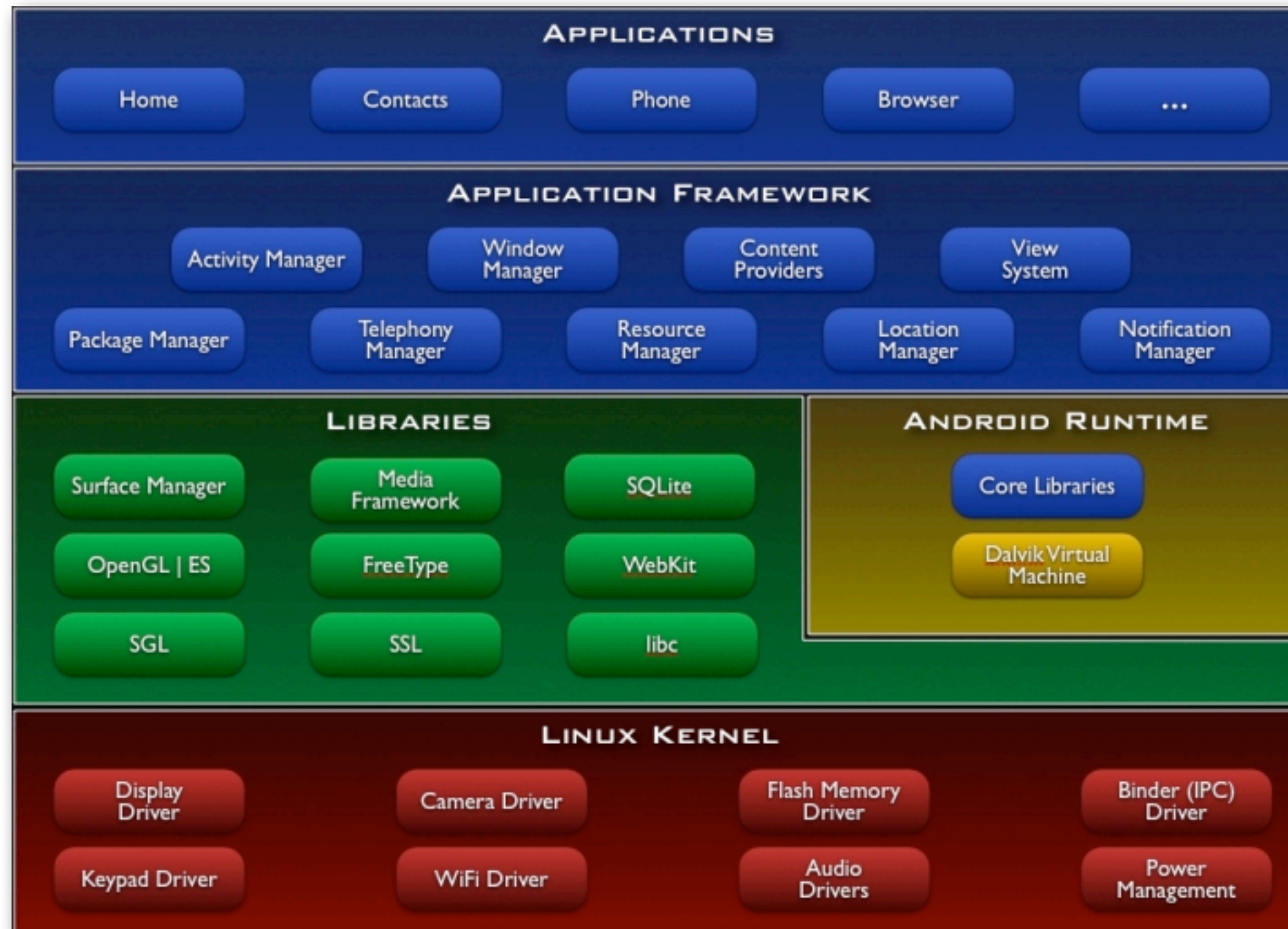
# Android Features (hardware dependent)

- Rich development environment
  - a device emulator
  - tools for debugging
  - tools for memory profiling
  - tools for performance profiling
  - plugin for Eclipse IDE

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<http://developer.android.com/guide/index.html>

## Android Features (hardware dependent)



<http://developer.android.com/guide/index.html>

# Application Fundamentals

- By default:
  - Each application is run in its own process
  - Each process has it's own virtual machine
  - Each process has it's own user that runs it



<http://developer.android.com/guide/index.html>



# Application Fundamentals

- Code reuse is central to Android
  - Applications can be started from several points
    - not just “main()”
- Four components that can be run:
  - Activities
  - Services
  - Broadcast receivers
  - Content providers



<http://developer.android.com/guide/index.html>

# Application Fundamentals

- Activities
  - a user interface for doing a task
    - e.g, a photo browser, a “send-mail” interface
    - subclass of “Activity” base class
  - an application is a collection of activities that call each other (or activities in other applications)



<http://developer.android.com/guide/index.html>

# Application Fundamentals

- Services
  - a task that is typically run in the background
  - e.g, a music player
  - subclass of “Service” base class



<http://developer.android.com/guide/index.html>

# Application Fundamentals

- Broadcast receivers
  - receives broadcast announcements
    - signals from the os and other applications
    - e.g., “user has entered a new location”
      - “user has taken a photo”
  - subclass from “BroadcastReceiver”



<http://developer.android.com/guide/index.html>

# Application Fundamentals

- Content provider
  - provides data
  - extends the “ContentProvider” class

A stylized illustration of a city skyline at the bottom of the slide. It features various buildings in shades of orange, brown, and blue, interspersed with green palm trees and foliage. The entire scene is set against a light green background.

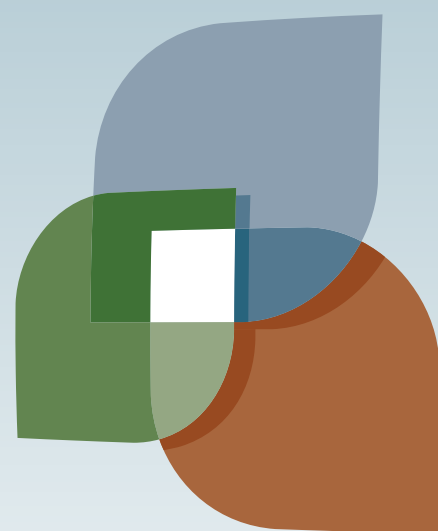
<http://developer.android.com/guide/index.html>

# Actually Developing for Android

- Download and install Eclipse (IDE)
- Download and install the Android SDK (external)
  - <http://developer.android.com/sdk/index.html>
- Download and install the ADT plugin
  - Use Eclipse's built-in installer
  - Set up SDK path
- Download and install the Android Platform (internal)
- Make a virtual device



<http://developer.android.com/guide/index.html>



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