

Introduction to Android



Poll

- How many have an Android phone?
- How many have downloaded & installed the Android SDK?
- How many have developed an Android application?
- How many have deployed an Android application to the Android Market?



Agenda

- What is Android?
- Why develop an Android application?
- Fundamentals
- Tools and Environment configuration
- Demonstrations and source code
- Final Questions



What is Android?

- Android was created by Android, Inc. A small startup company in Palo Alto, CA. Acquired by Google in 2005 (prior to first iPhone release)
- In 2007, the Open Handset Alliance unveiled their first product, Android, a mobile device platform built on Linux kernel 2.6. Key members included Google, HTC, Texas Instruments, Intel, Motorola, nVidia, Qualcomm, Samsung, Sprint, T-Mobile and Marvell Technology Group.



What is Android?

- Android is a software stack for mobile devices that includes an operating system, middle-ware 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 is open source under the Apache license.
- Developers receive 70% of an application's sale price from the Android Market. The 30% is distributed between the carriers and payment processors. Google does not take a percentage of the sale.



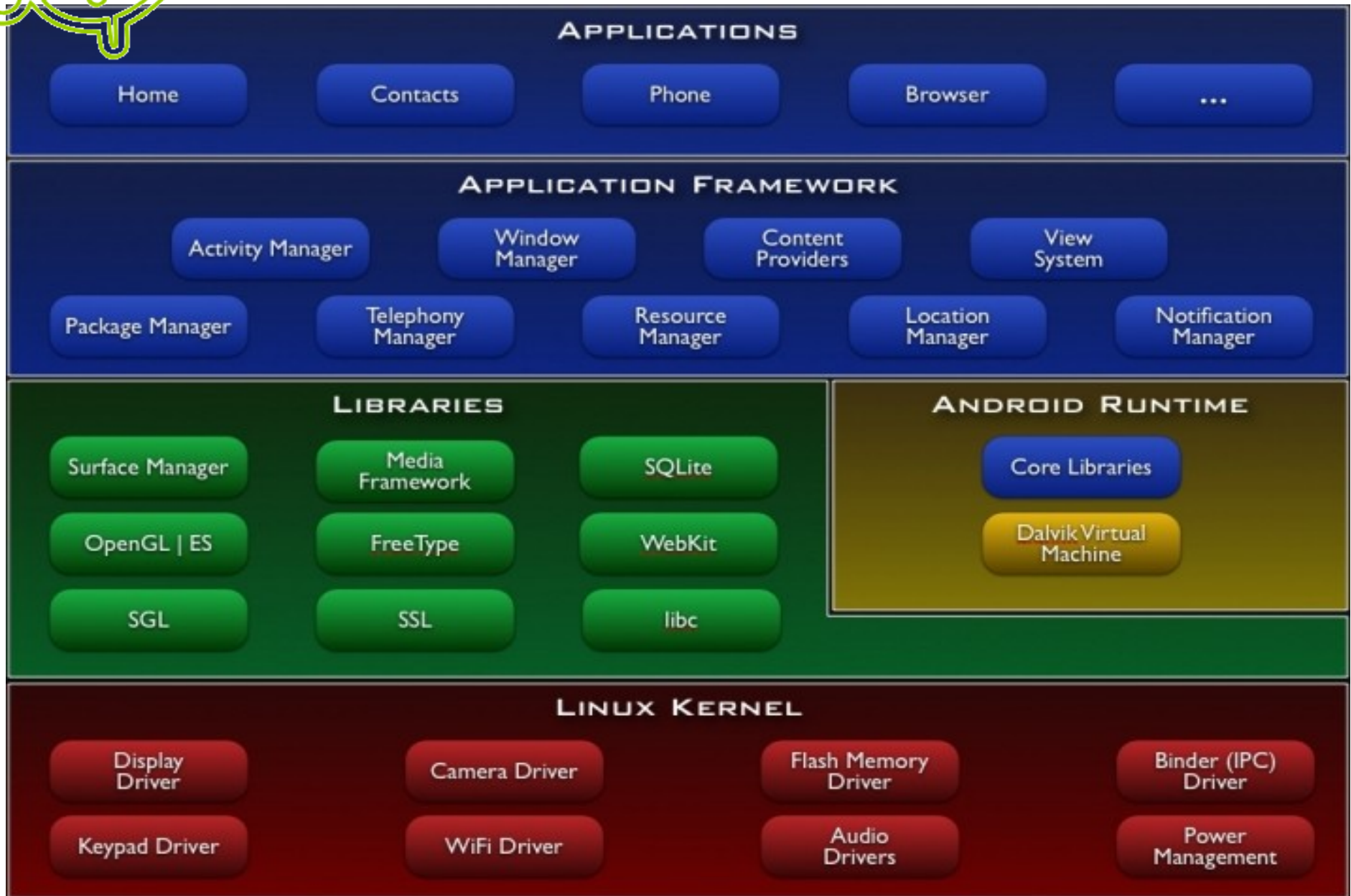
What is Android? (cont'd)

- **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 (hardware acceleration optional)
- **SQLite** for structured data storage
- **Media support** for common audio, video, and still image formats (MPEG4, H.264, MP3, AAC, AMR, JPG, PNG, GIF)
- **GSM Telephony** (hardware dependent)
- **Bluetooth, EDGE, 3G, and WiFi** (hardware dependent)
- **Camera, GPS, compass, and accelerometer** (hardware dependent)
- **Rich development environment** including a device emulator, tools for debugging, memory and performance profiling, and a plugin for the Eclipse IDE





What is Android? (cont'd)

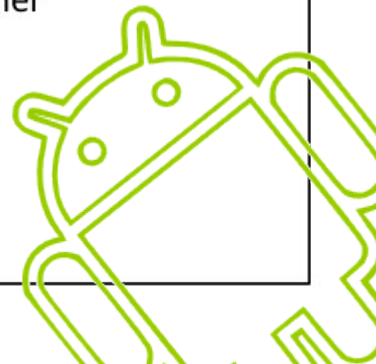
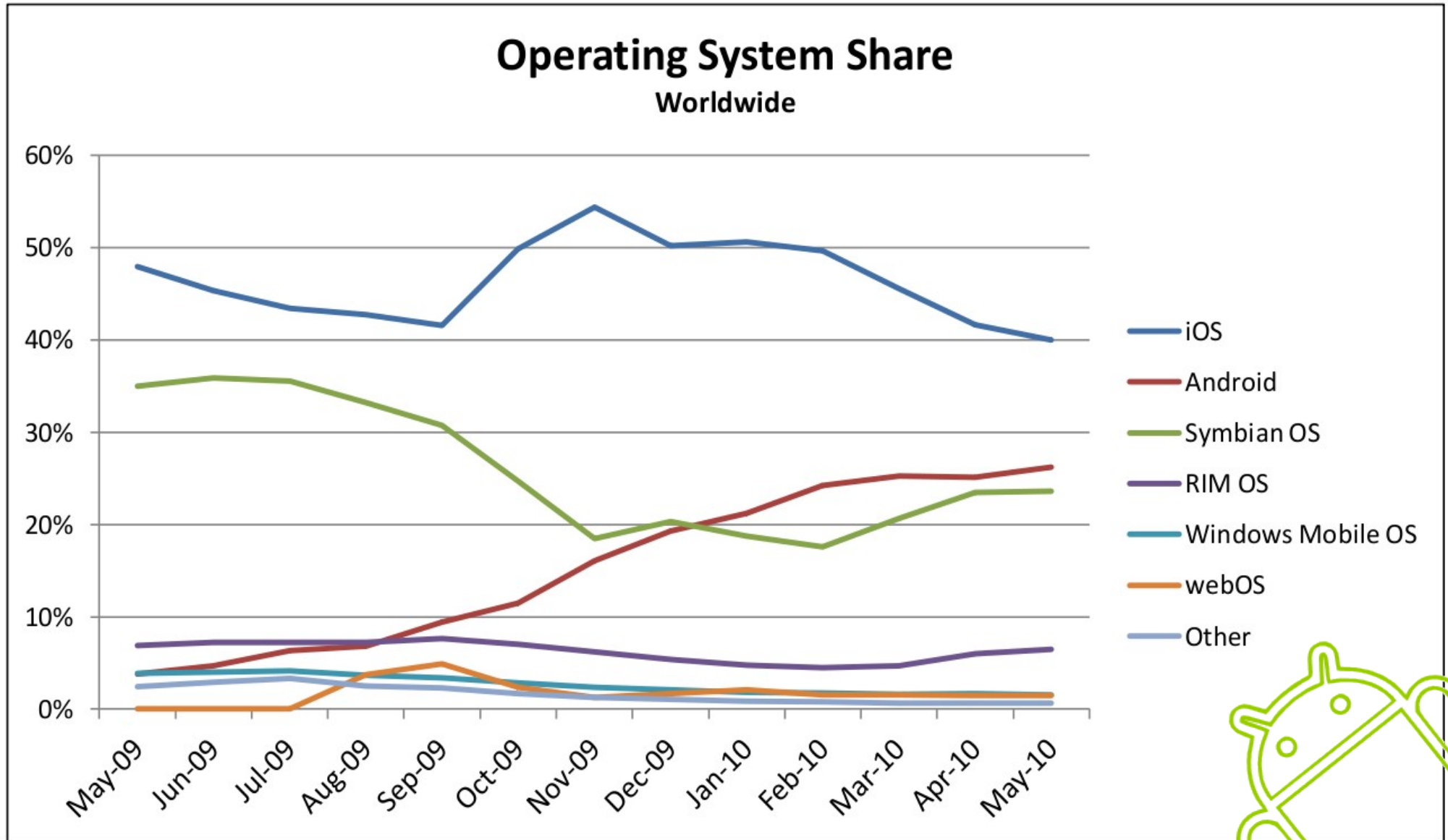


Why develop an Android app?

- Phenomenal growth (from <http://www.androidtapp.com/android-growth-statistics-projections/>)
 - About 60,000 Android phones sold daily, about 22M a year
 - Motorola DROID slightly out selling iPhone sales in 2-1/2 months time (1.05M versus 1M).
 - Android Market tipped over 30,000 Android Apps (3rd party AndroLib.com reports more than 36,000)
 - About 60% of Android Apps are free compared to iPhone's 25%
 - The average paid Android app prices at \$3.27
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 - Rock star Android developers shine like PolarBit with over 1 million downloads and Edward Kim bringing in \$13k a month from app sales
 - Android Market will hit 100K apps this month. Apple currently exceeds 300K.

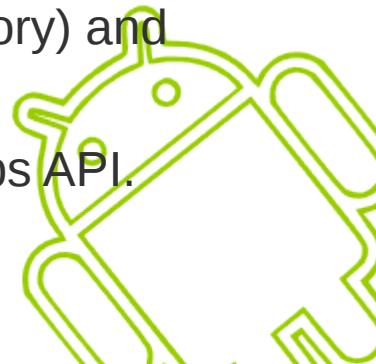


Why develop an Android app?



Fundamentals

- **Activity** - An activity is a single, focused thing that the user can do. Almost all activities interact with the user, so the Activity class takes care of creating a window for you in which you can place your UI with `setContentView(View)`
- **Service** - A Service is an application component representing either an application's desire to perform a longer-running operation while not interacting with the user or to supply functionality for other applications to use.
- **ContentProvider** - Content providers are one of the primary building blocks of Android applications, providing content to applications.
- **Intent** - An intent is an abstract description of an operation to be performed.
- **AndroidManifest.xml** - The deployment descriptor for an application.
- **Application Resources** - External to the source code and often in an XML file. Strings, images, screen layouts, menus, assets, etc...
- **Data Storage** - SQLite database, SD card, internal storage (flash memory) and network storage.
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Tools and Environment configuration

- Android SDK
 - Platforms – Fully compliant android library and system image (production release)
 - Components – Add-ons like Google APIs
 - Virtual Devices – Creation of devices simulating specific handset hardware and platform for emulator behavior.
- Integrated Development Environment
 - Eclipse – Version 3.4 or 3.5 to work with the Android Development Tools (ADT) plugin.



Demonstrations and source code

- Let's see Android in action!



Final Questions



References and such

- <http://www.openhandsetalliance.com>
- <http://developer.android.com/index.html>
- <http://stackoverflow.com/questions/tagged/android>
- <http://groups.google.com/group/android-developers>
- <http://groups.google.com/group/android-discuss>
- <http://www.google.com/support/forum/p/Android+Market>
- <http://www.anddev.org/>
- <http://code.google.com/events/io/2010/sessions.html#Android>



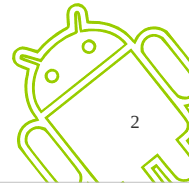
Introduction to Android



Introduce ourselves and welcome the audience...

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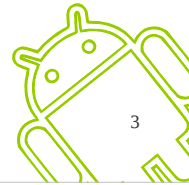


Ask the poll questions and give the audience time to raise their hands...

Interact with people that raised their hands and ask to share their experiences.

Agenda

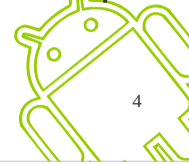
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Give the overview and tell the audience where we are going today.

What is Android?

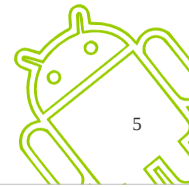
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The unveiling of the Android distribution on 5 November 2007 was announced with the founding of the Open Handset Alliance, a consortium of 71 hardware, software, and telecom companies devoted to advancing open standards for mobile devices.

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Android is powering smart phones (duh), tablets, netbooks, e-Readers (Barnes and Noble's nook) and even future set top boxes and TVs (GoogleTV).

Android Market has a \$25 registration fee for developers.

What is Android? (cont'd)

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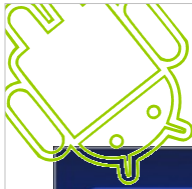
Applications

Android will ship with a set of core applications including an email client, SMS program, calendar, maps, browser, contacts, and others. All applications are written using the Java programming language.

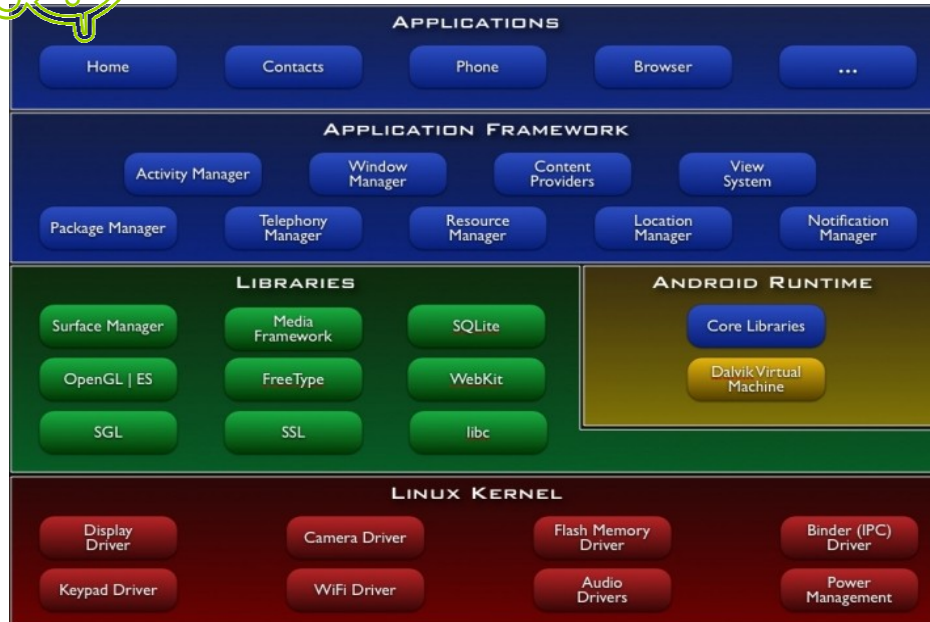
Application Framework

By providing an open development platform, Android offers developers the ability to build extremely rich and innovative applications. Developers are free to take advantage of the device hardware, access location information, run background services, set alarms, add notifications to the status bar, and much, much more.

Developers have full access to the same framework APIs used by the core applications. The application architecture is designed to simplify the reuse of components; any application can publish its capabilities and any other application may then make use of those capabilities (subject to security constraints enforced by the framework).



What is Android? (cont'd)



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Underlying all applications is a set of services and systems, including:

A rich and extensible set of Views that can be used to build an application, including lists, grids, text boxes, buttons, and even an embeddable web browser

Content Providers that enable applications to access data from other applications (such as Contacts), or to share their own data

A Resource Manager, providing access to non-code resources such as localized strings, graphics, and layout files

A Notification Manager that enables all applications to display custom alerts in the status bar

An Activity Manager that manages the lifecycle of applications and provides a common navigation

Android Runtime

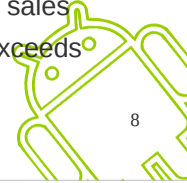
Android includes a set of core libraries that provides most of the functionality available in the core libraries of the Java programming language.

Every Android application runs in its own process, with its own instance of the Dalvik virtual machine. Dalvik has been written so that a device can run multiple VMs efficiently. The Dalvik VM executes files in the Dalvik Executable (.dex) format which is optimized for minimal memory footprint. The VM is register-based, and runs classes compiled by a Java language compiler that have been transformed into the .dex format by the included "dx" tool.

The Dalvik VM relies on the Linux kernel for underlying functionality such as threading and low-level memory management.

Why develop an Android app?

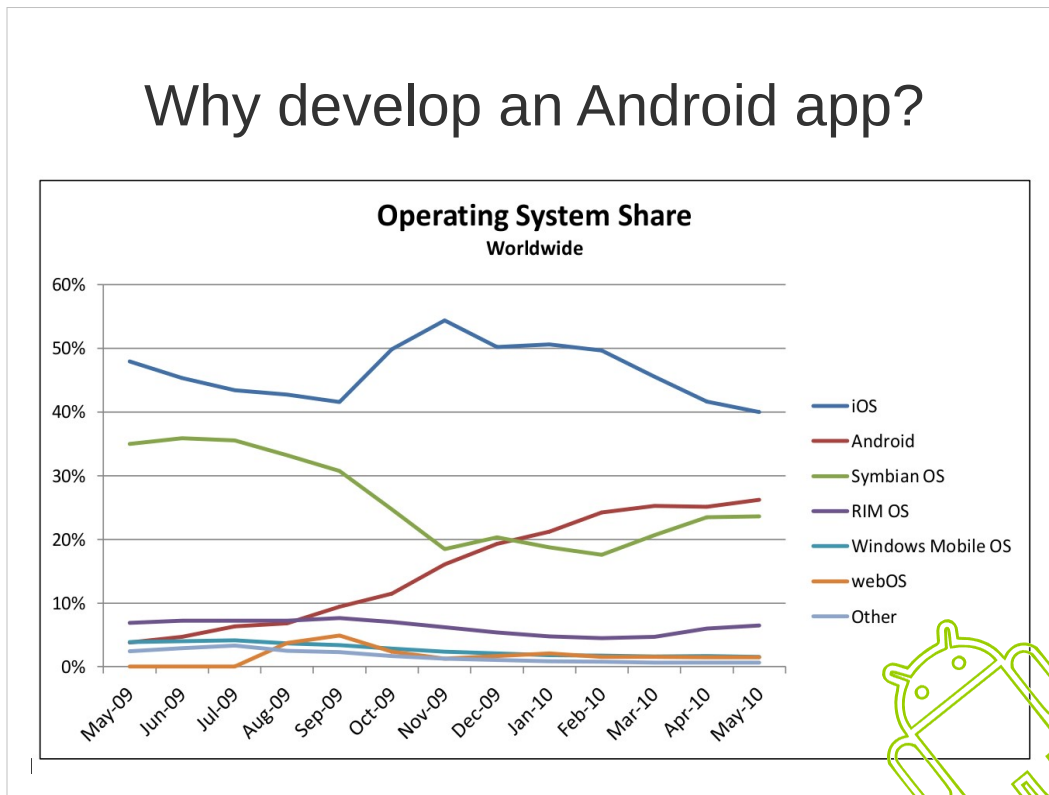
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Device sales for Android OS smartphones ranked second among all smartphone OS handsets sold in the U.S. in the first quarter of 2010. BlackBerry OS and iOS (iPhone) ranked first and third respectively.

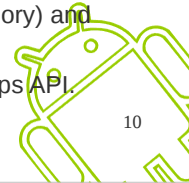
Why develop an Android app?



A recent study yields another signal that Android is gaining steam on Apple's iOS, which will power the new iPhone 4, Bloomberg Businessweek.com reported. With some **60 Android-based devices** and **more than 70,000 apps available**, the operating system is **adding more than 100,000 users daily**, according to Mountain View, California-based Google. **Android will eclipse iOS as the world's second-most-popular mobile operating software in 2012**, researcher Gartner Inc. has said.

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Activities

An activity is usually a single screen in your application
One activity is designated as the entry point for your application

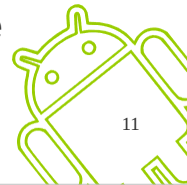
Intents

An Intent is a simple message object that represents an 'intention' to do something

“An intent is an abstract description of an operation to be performed”

Tools and Environment configuration

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- Integrated Development Environment
 - Eclipse – Version 3.4 or 3.5 to work with the Android Development Tools (ADT) plugin.



The Android Development Tools (ADT) plugin for Eclipse adds powerful extensions to the Eclipse integrated development environment. It allows you to create and debug Android applications easier and faster. If you use Eclipse, the ADT plugin gives you an incredible boost in developing Android applications:

It gives you access to other Android development tools from inside the Eclipse IDE. For example, ADT lets you access the many capabilities of the **Dalvik Debug Monitor Server (DDMS)** tool: take screenshots, manage port-forwarding, set breakpoints, and view thread and process information directly from Eclipse.

It provides a New Project Wizard, which helps you quickly create and set up all of the basic files you'll need for a new Android application.

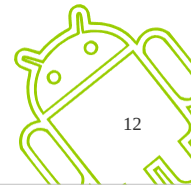
It automates and simplifies the process of building your Android application.

It provides an Android code editor that helps you write valid XML for your Android manifest and resource files.

It will even export your project into a signed APK, which can be distributed to users.

Demonstrations and source code

- Let's see Android in action!



Demo the Android Development Tools in Eclipse

- Show the AVD Manager and add a device
- Show the “MyFirstAndroidApplication” App structure
- Show how to run an application
- Show the layout WYSIWYG tool
- Demo the App
- Show the DDMS and LogCat

Final Questions



References and such

- <http://www.openhandsetalliance.com>
- <http://developer.android.com/index.html>
- <http://stackoverflow.com/questions/tagged/android>
- <http://groups.google.com/group/android-developers>
- <http://groups.google.com/group/android-discuss>
- <http://www.google.com/support/forum/p/Android+Market>
- <http://www.anddev.org/>
- <http://code.google.com/events/io/2010/sessions.html#Android>

