



# ANDROID

## Android Platform Overview

May 2010

# Android

- Android is an **open platform**, and it's **open source**
- Free, no licensing required
- Develop mostly in Java and XML
  - C/C++ for Native development (NDK)
- Source code available
  - SDK and core apps
  - <http://source.android.com>



# Key Platform Features

- Multiple Screen Sizes
- User Interface
- Concurrent Applications
- Inter-app Communication
- Speech Input
- Location and Mapping Services
- Hardware Sensors
- Native Development Kit



Search

Sound

# Multiple Devices, Single App

- Shipping **100K+ devices** per day
- More devices = more business
- SDK supports:
  - Many screen sizes/resolutions
  - Screen density independence



# Multiple Devices, Single App



~120 / ldpi

~160 / mdpi

~240 / hdpi

Small screen  
~ ≤ 3.0"



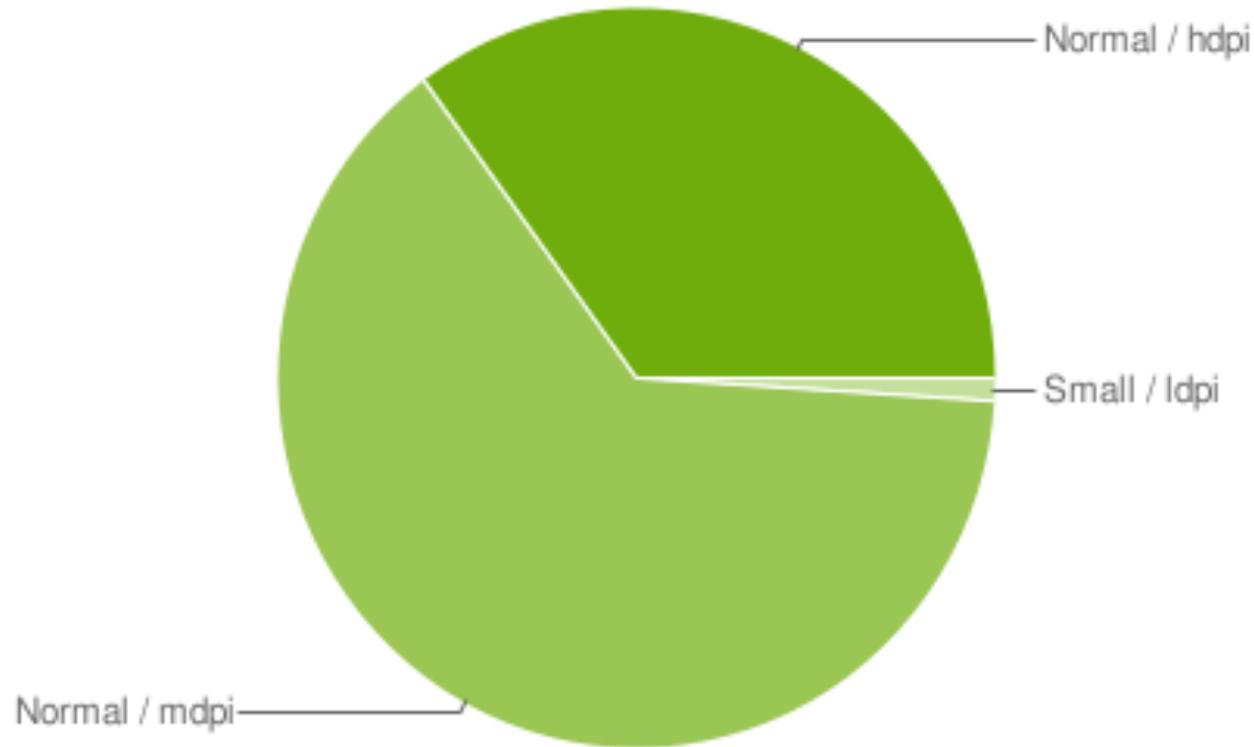
Normal screen  
~ ≤ 4.0"



Large screen  
~ ≥ 4.8"

# Screen Size & Density Breakdown



Note: This data is based on the number of Android devices that have accessed Android Market within a 14-day period ending on May 17<sup>th</sup> 2010

<http://developer.android.com/resources/dashboard/screens.html>

# Application Components



An Android application is actually a collection of several components, each defined in **AndroidManifest.xml**

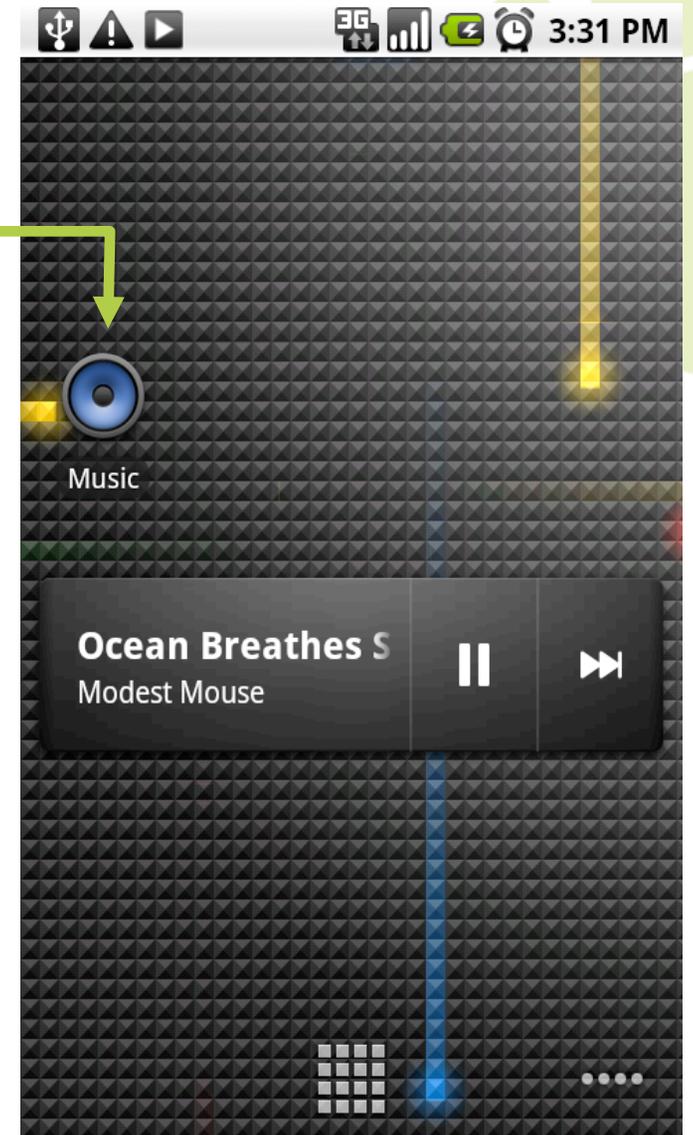
# Application Components

- Activities
- Services
- Content Providers
- Broadcast Receivers



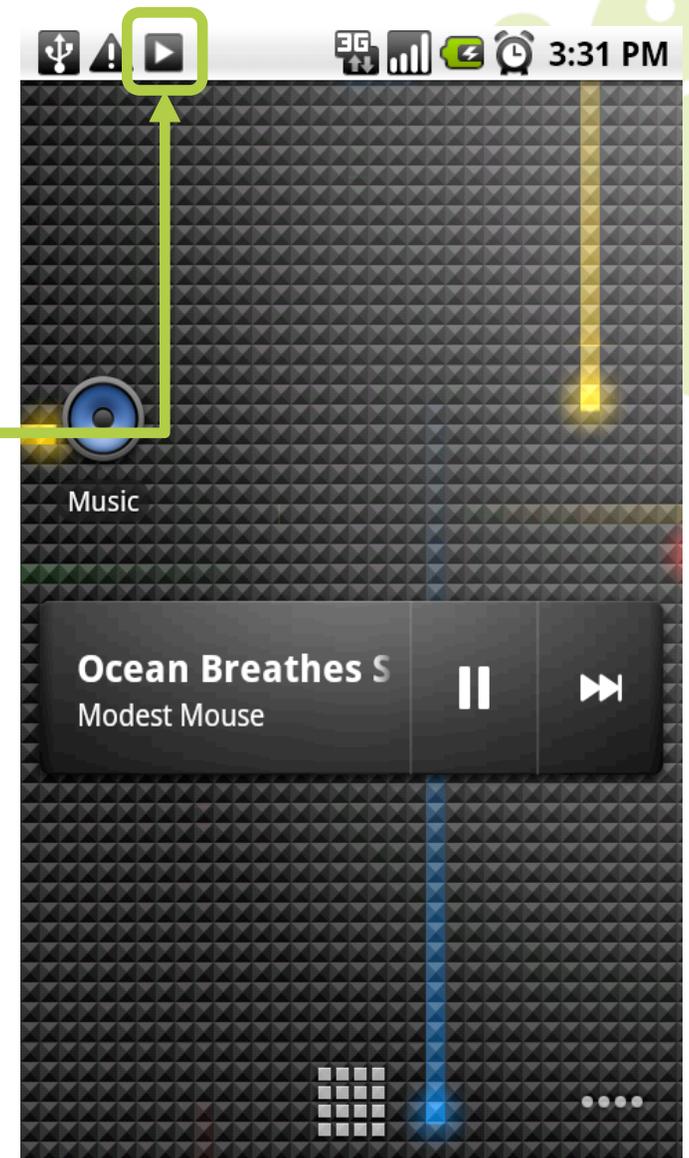
# Surfacing your UI

- Launcher icons
- Status bar notification
- Widgets
- Quick Search Box integration
- Live Folders
- Live Wallpapers



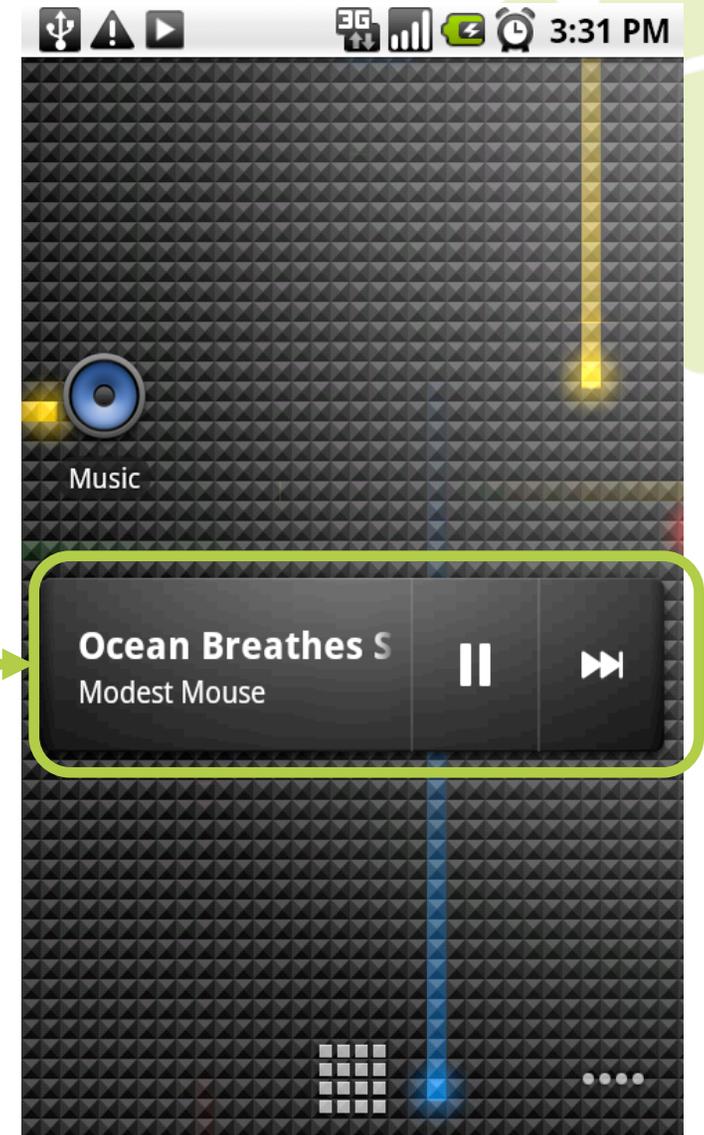
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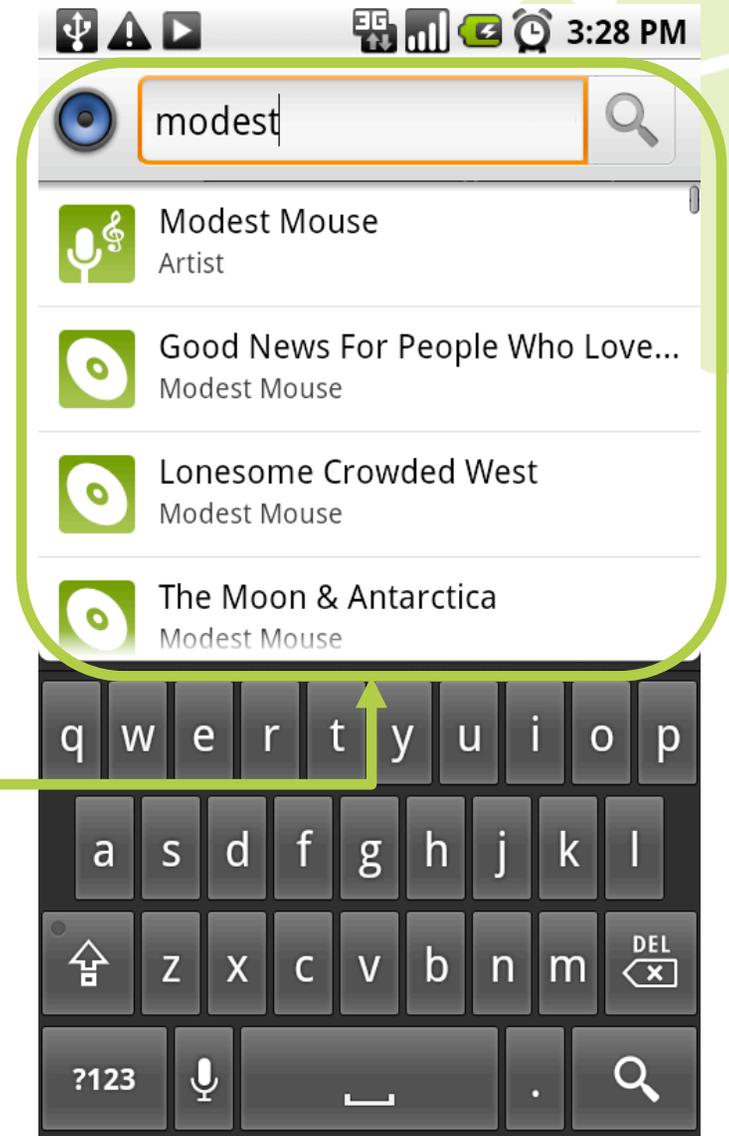
# Surfacing your UI

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# Surfacing your UI

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# Surfacing your UI

- Launcher icons
- Status bar notification
- Widgets
- Quick Search Box integration
- **Live Folders**
- Live Wallpapers



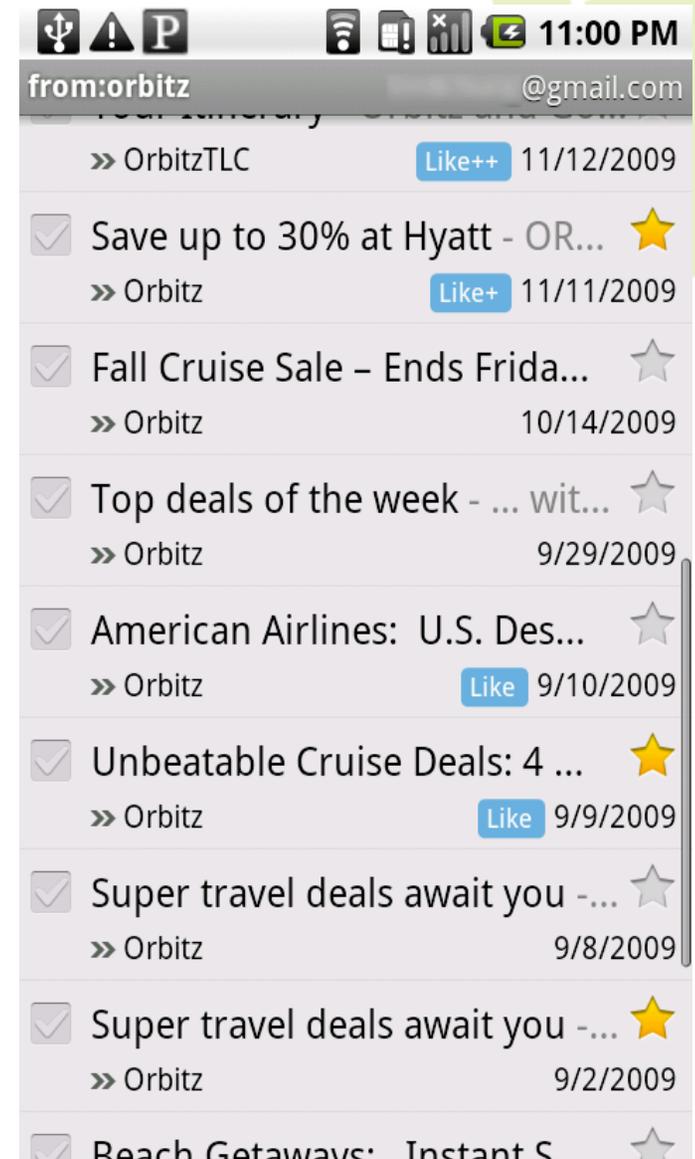
# Surfacing your UI

- Launcher icons
- Status bar notification
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- Quick Search Box integration
- Live Folders
- **Live Wallpapers**



# Concurrent Applications

- Users can multitask
  - Apps get **paused**, not closed
- Background services
  - Invisible apps with no GUI
  - Unobtrusive event notifications
  - Listen to music and check email simultaneously



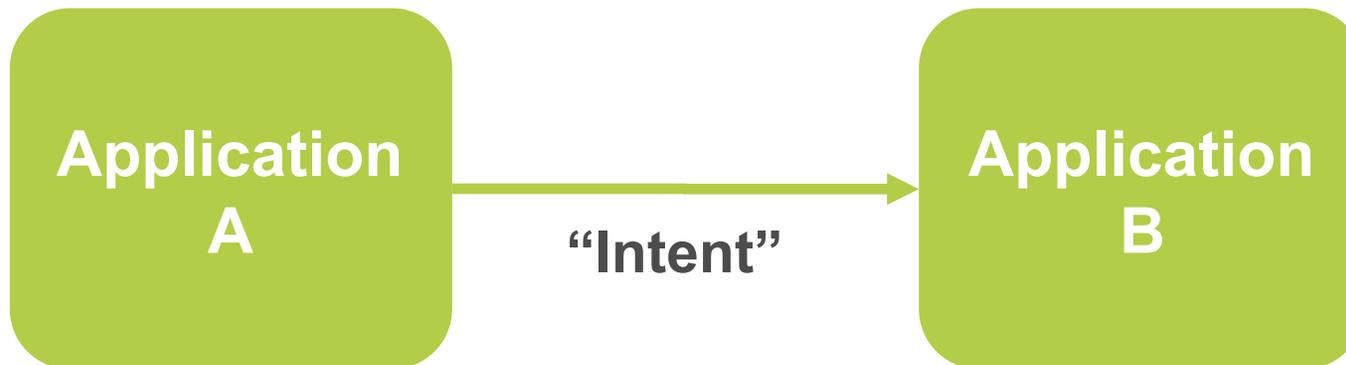
# Intents

- **Intents** “link” activities, services, and receivers together
- Intents consists of
  - An **action** (i.e. **`ACTION_VIEW`**)
  - Data (i.e. **`content://contacts/people/123`**)
  - Categories (i.e. **`CATEGORY_DEFAULT`**)
  - “**Extras**” metadata
- Intents can also be to hard-coded class names (`com.foo.FooActivity`)

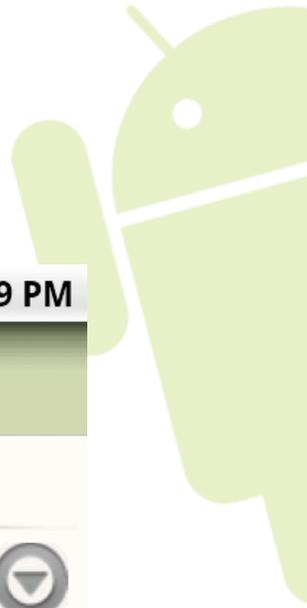


# Inter-App Communication

- Apps can communicate with each other by **providing** and **consuming** each other's Intents



# Example: Inter-App Communication



Overview In words Reviews Map

**Ozumo - San Francisco**  
Restaurants, Japanese  
(415) 882-1333  
161 Steuart St  
San Francisco, CA 94105  
Neighborhoods: Central East, South Beach  
0.2 mi  
★★★★★  
View the Menu  
Website  
Flag Venue Incorrect  
Save Reserve Now

Find a Table

**LOCATION**  
Ozumo - San Francisco

**DATE & TIME**  
Tue, Jan 19, 2010 10:00PM

**PARTY SIZE**  
2

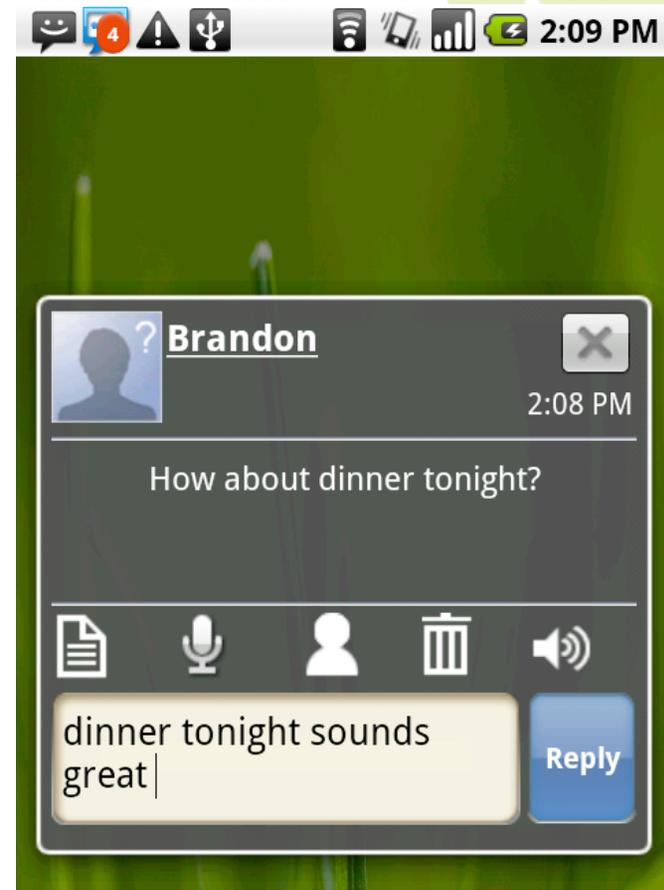
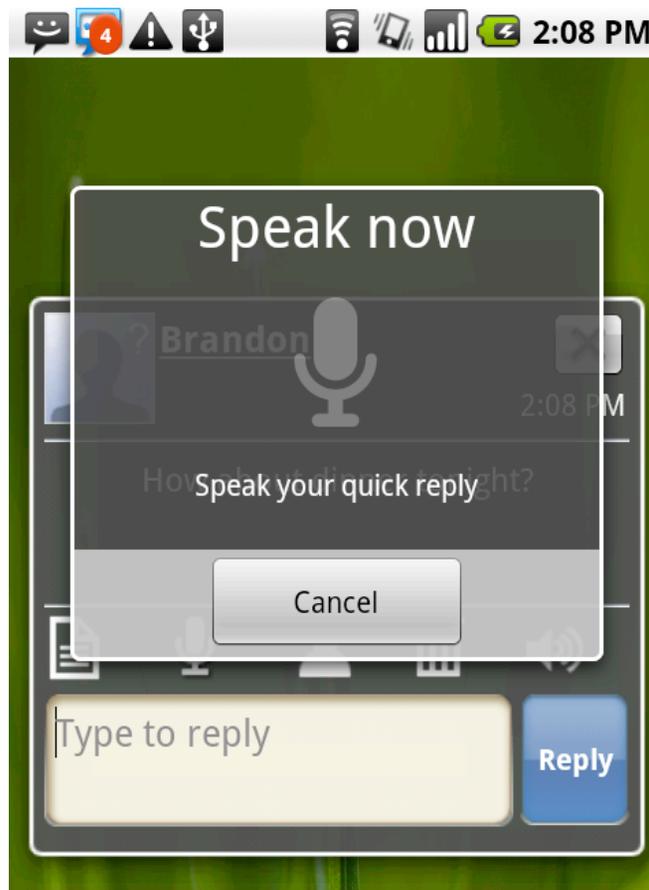
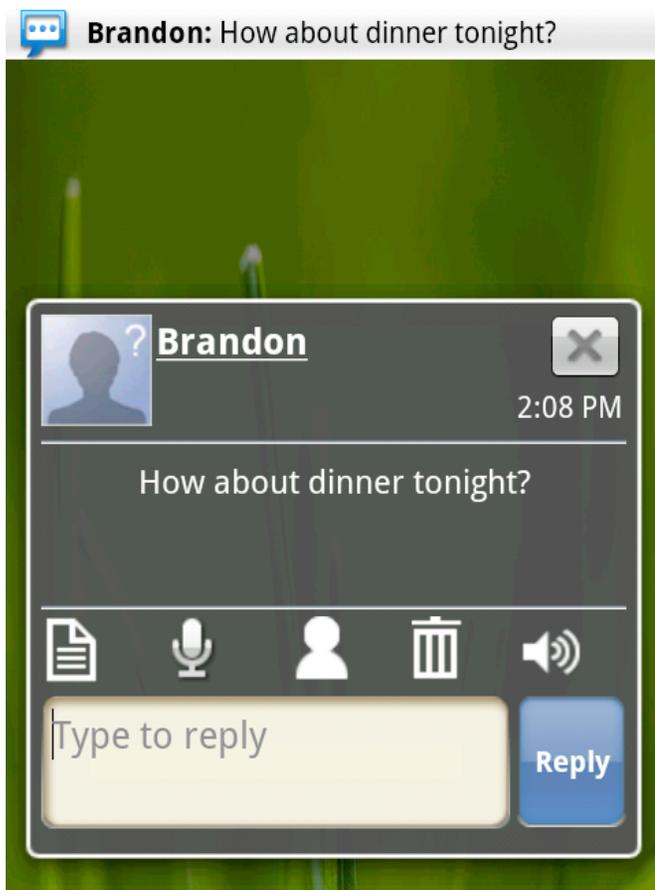
Find a Table

# Speech Input

- Enables voice-to-text capability
- Invoke via IME or Intent
- English, Mandarin Chinese & Japanese
- Integrate with 3rd party speech recognition service



# Example: Speech Input

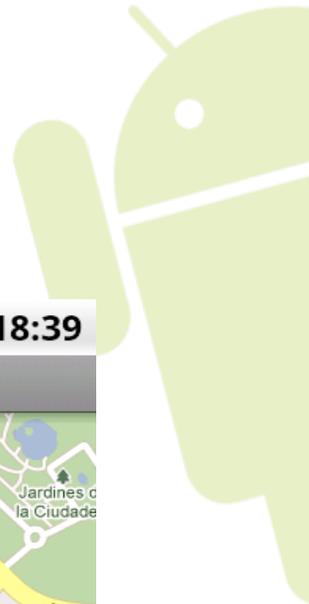


# Location and Mapping



- **LocationManager**
  - Service determines location and bearing
  - Register for periodic updates by time
  - Register for proximity updates by distance
- **Google Maps library**
  - Includes MapView
  - Programmatic access to Google Maps API
  - Handles user interaction to control Map

# Example: Location and Mapping



18:39

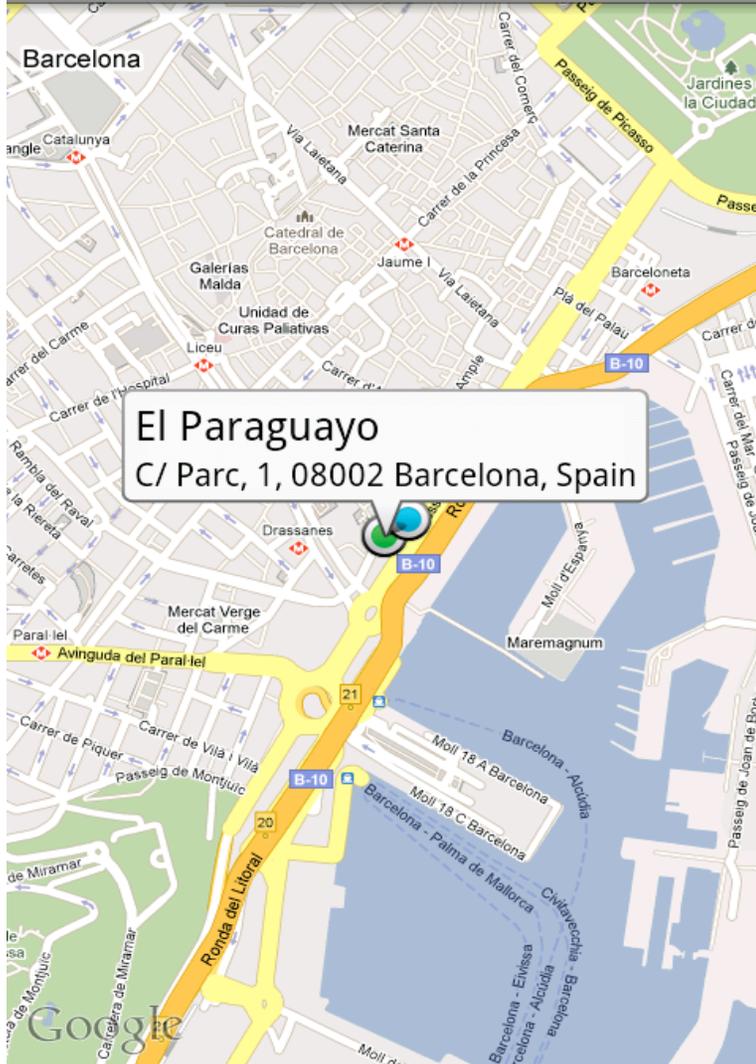
Places Directory: Restaurants

-  ★ **El Paraguayo**  
C/ Parc, 1, 08002 Barcelona  
220 ft  ★★★★★
-  ★ **Burger King**  
C/ Santa Mònica, 26, 08001 Barc...  
0.2 mi 
-  ★ **Arc Cafe**  
C/ Carabassa, 19, 08002 Barcelona  
0.1 mi  ★★★★★
-  ★ **Restaurante-Bar Zoo**  
Metro Drassanes, Calle Escudiller...  
0.2 mi  ★★★★★
-  ★ **LP bar**  
C/ Simó Oller, 3, 08002 Barcelona  
0.2 mi  ★★★★★
-  ★ **Celta**  
C/ Mercè, 16, 08002 Barcelona  
0.2 mi  ★★★★★

● Passatge del Dormitori de Sant Francesc,...

18:39

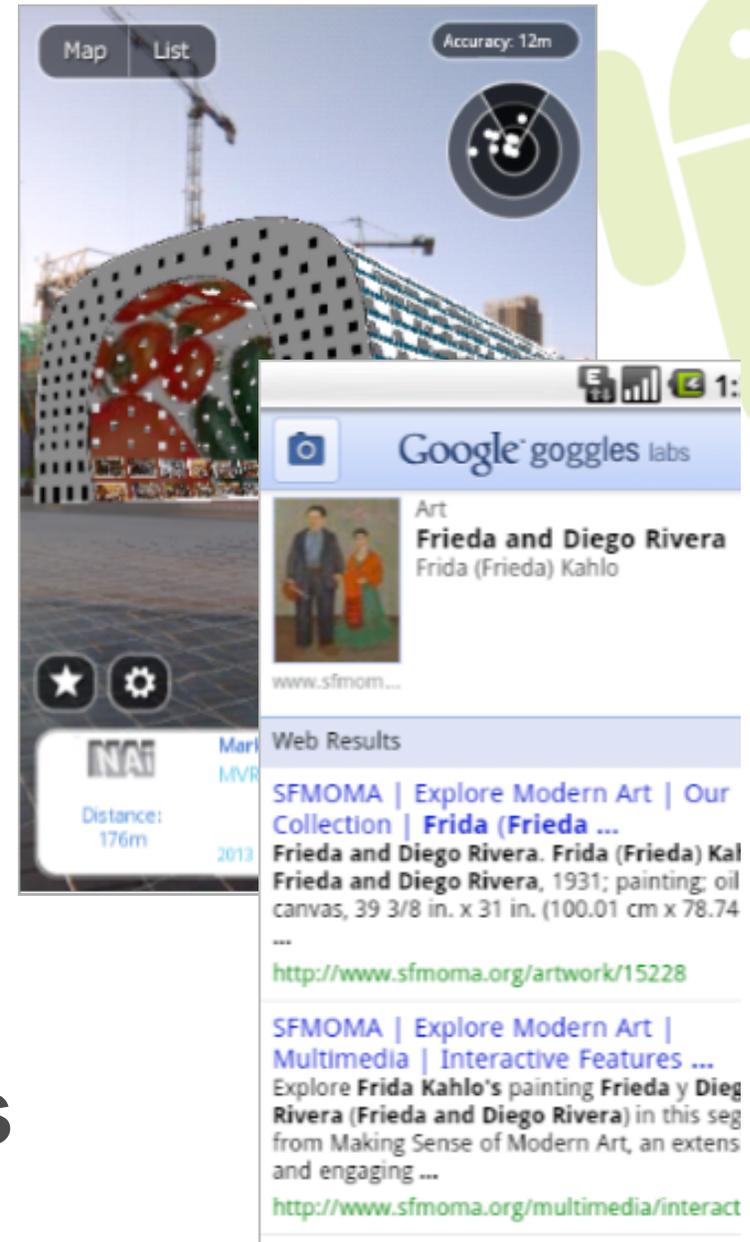
Places Directory



**El Paraguayo**  
C/ Parc, 1, 08002 Barcelona, Spain

# Hardware and Sensors

- Camera
- Microphone
- Accelerometer
- Compass
- Example apps:  
**Layar, Google Goggles**



# Native Development Kit (NDK)

- Used in conjunction with the SDK
- Performance-critical, C/C++ code
- Just launched NDK r3
  - Support for OpenGL ES 2.0
  - Compact, efficient binaries
- Typical uses:
  - Games
  - Re-use existing C/C++ code base



# Getting Started



**[developer.android.com](http://developer.android.com)**

# Getting Started

1. [Download the SDK](#)
2. Install [Eclipse](#) and [ADT](#)
3. Look through [tutorials](#) and [samples](#)
4. Run them on the emulator or your device
5. Write your app!



# Developer Community

- Android has a strong, active developer base
  - [Google Groups](#)
  - [Stack Overflow](#)
  - IRC office hours



# Appendix



# AdSense for Mobile Applications SDK



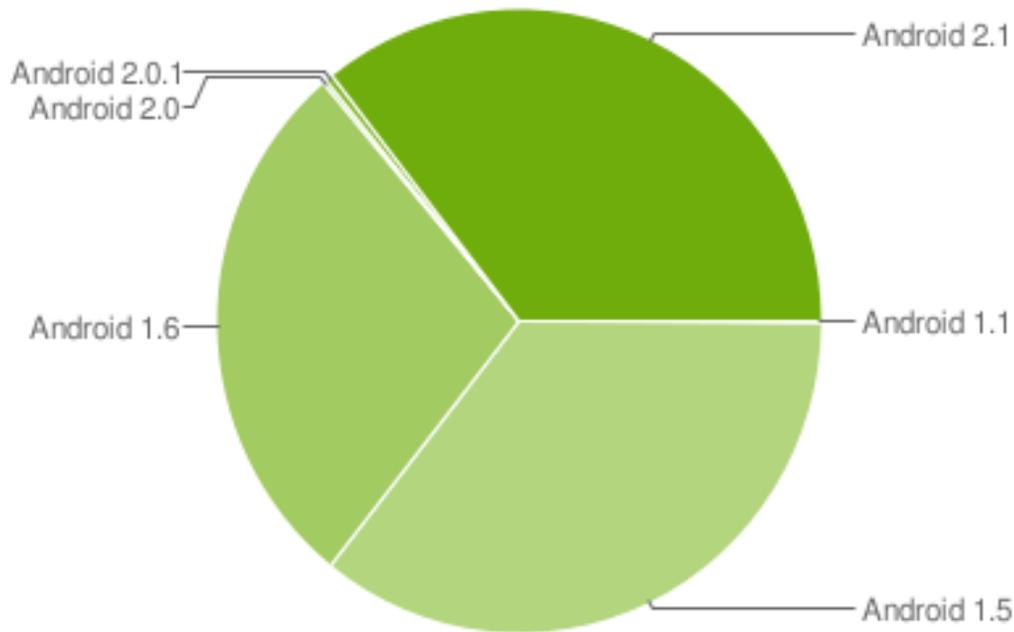
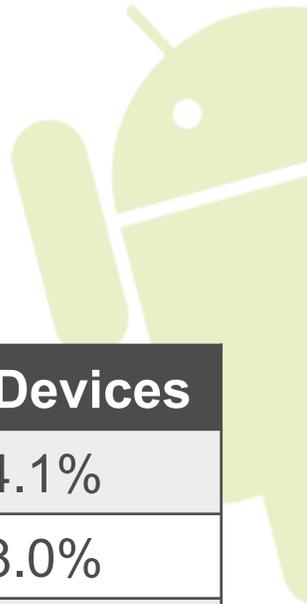
- Monetize!
- Auto display highest paying ads
- Targeting
  - Keyword, demographics, location
  - Ad placement
- Control ad appearance and positioning

# Analytics Tracking for Mobile Apps

- Tracks install referrer
- Tracks Pageviews & Events
- Integrates with Google Analytics dashboard



# Device Dashboard



Version	% of Devices
1.5 (API Level 3)	34.1%
1.6 (API Level 4)	28.0%
2.1 (API Level 7)	37.2%
Other	0.7%

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<http://developer.android.com/resources/dashboard/platform-versions.html>

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