

#pragma mark

# iOS Ecosystem

Paolo Tagliani  
@pablosproject

# #pragma me

- Paolo Tagliani (@PablosProject)

- iOS Developer @Superpartes Innovation Campus
- Founder of #pragma mark 
- various stuff...



- [@PablosProject](https://twitter.com/PablosProject) 
- <http://www.pablosproject.com> 
- <https://www.facebook.com/paolo.tagliani> 
- <https://github.com/pablosproject> 
- More...   

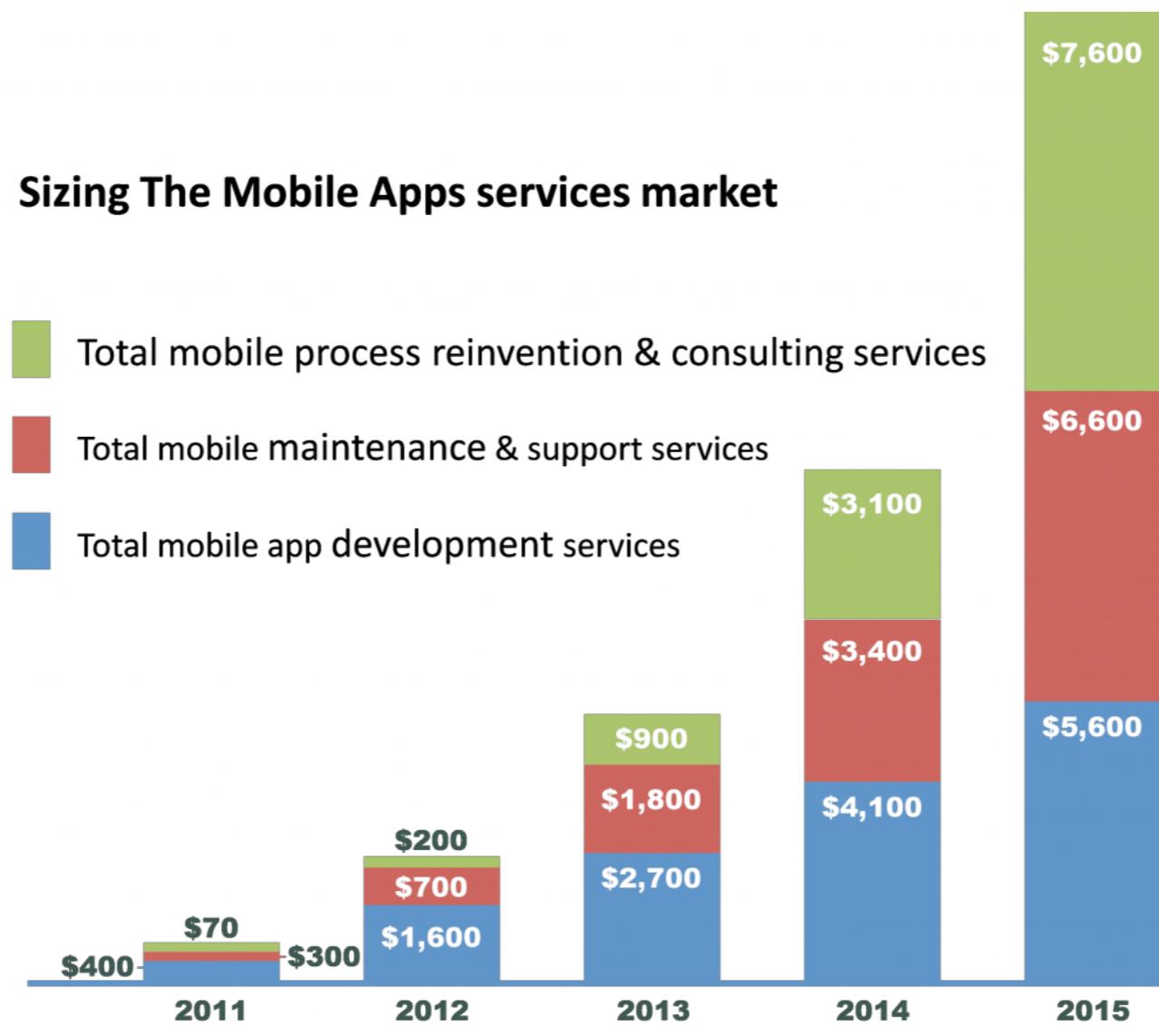
# Agenda

Context	Environment	Distribution	Tools
Mobile Market AppStore	iOS Devices Programming languages SDK	Apple Developer Programs  Distribution Profile  Beta	Xcode  Simulator  Instruments

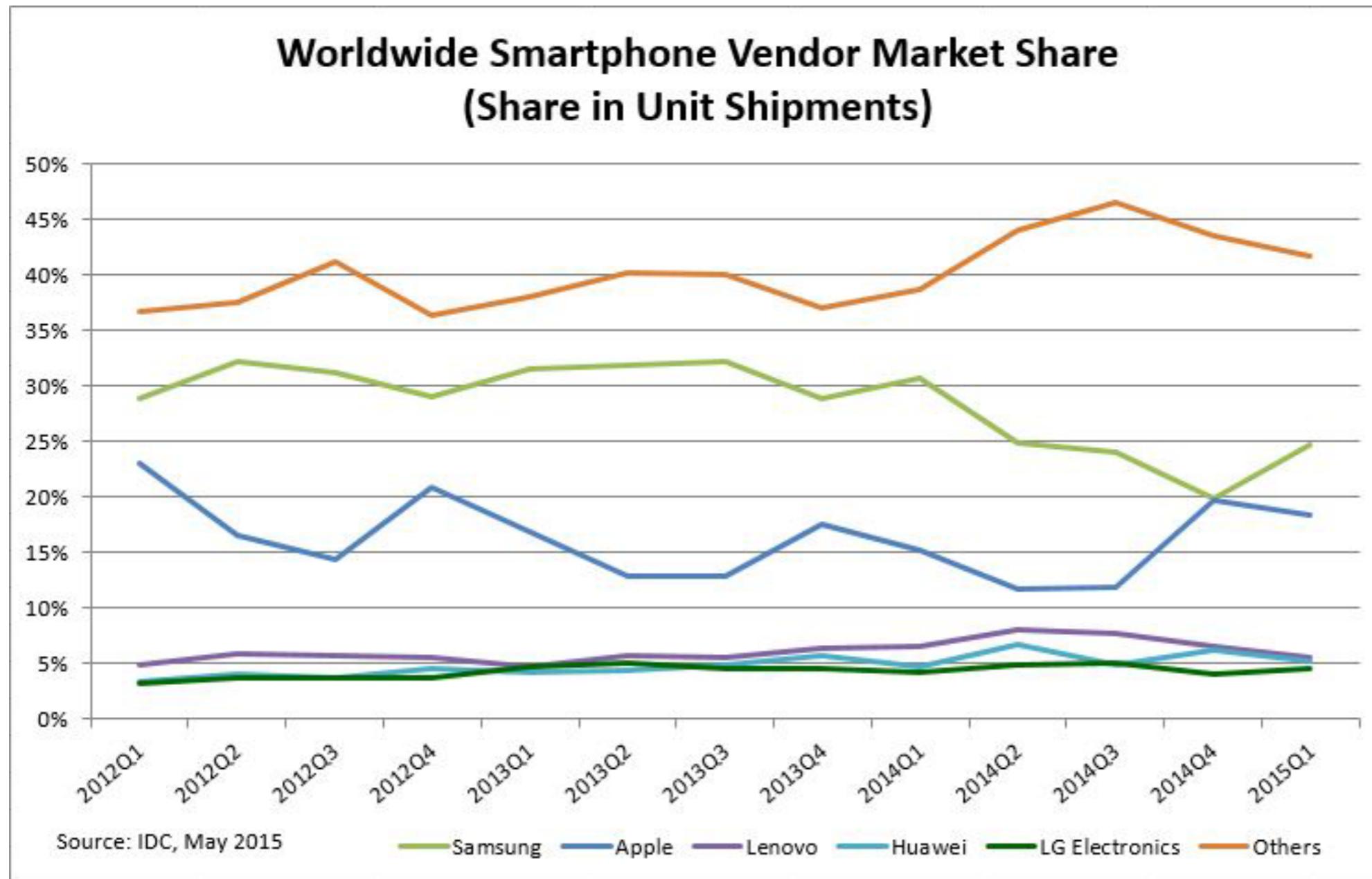
# Context

# Mobile Market

The size of the mobile market is huge, and growing exponentially



# Top smartphone vendors

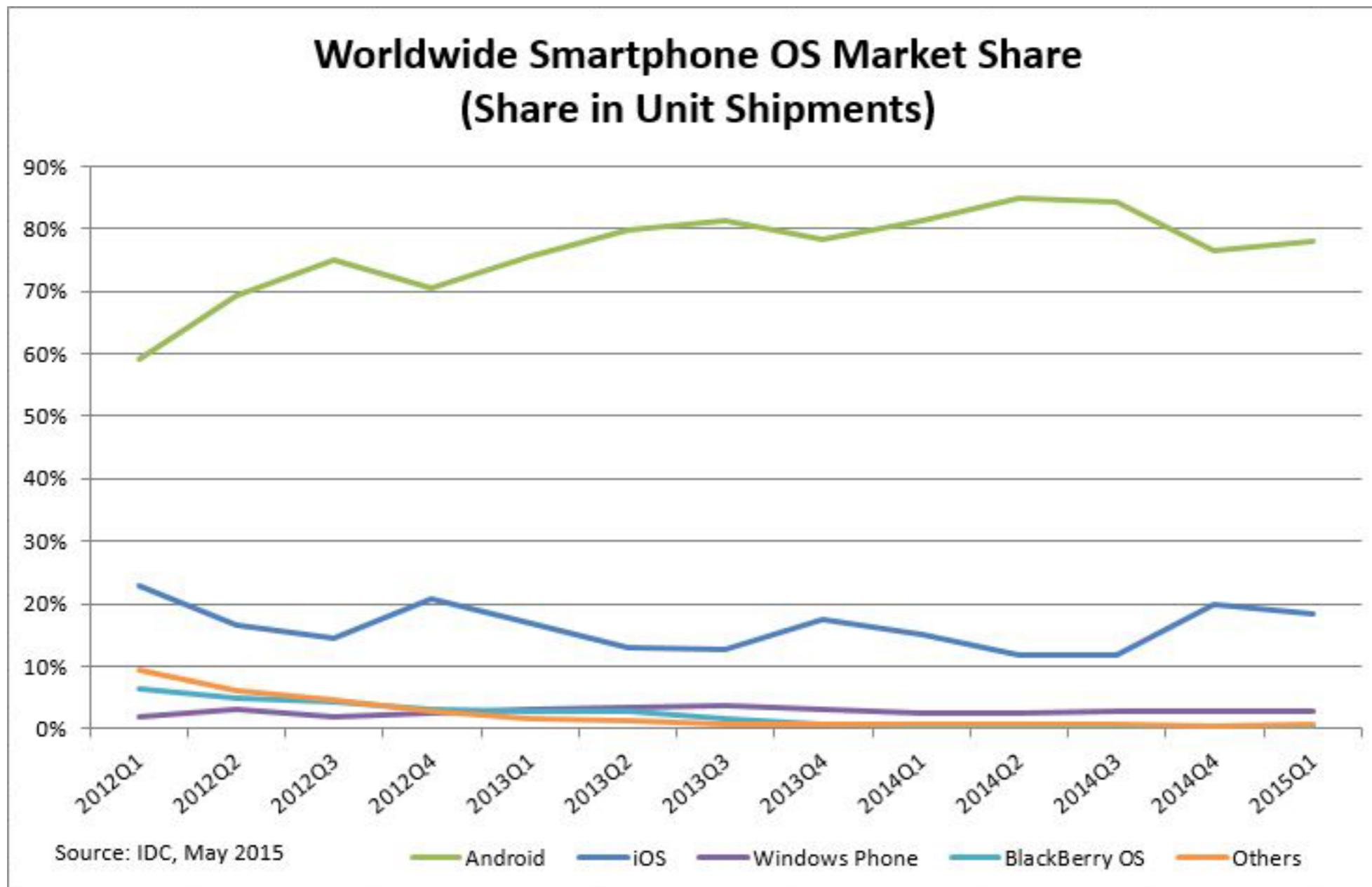


Source: IDC Worldwide Mobile Phone Tracker

**700 Million  
iPhones sold**

**225 Million  
iPads sold**

# Smartphone OS Market Share



Source: [idc.com](http://idc.com)

# Smartphone OS Market Share

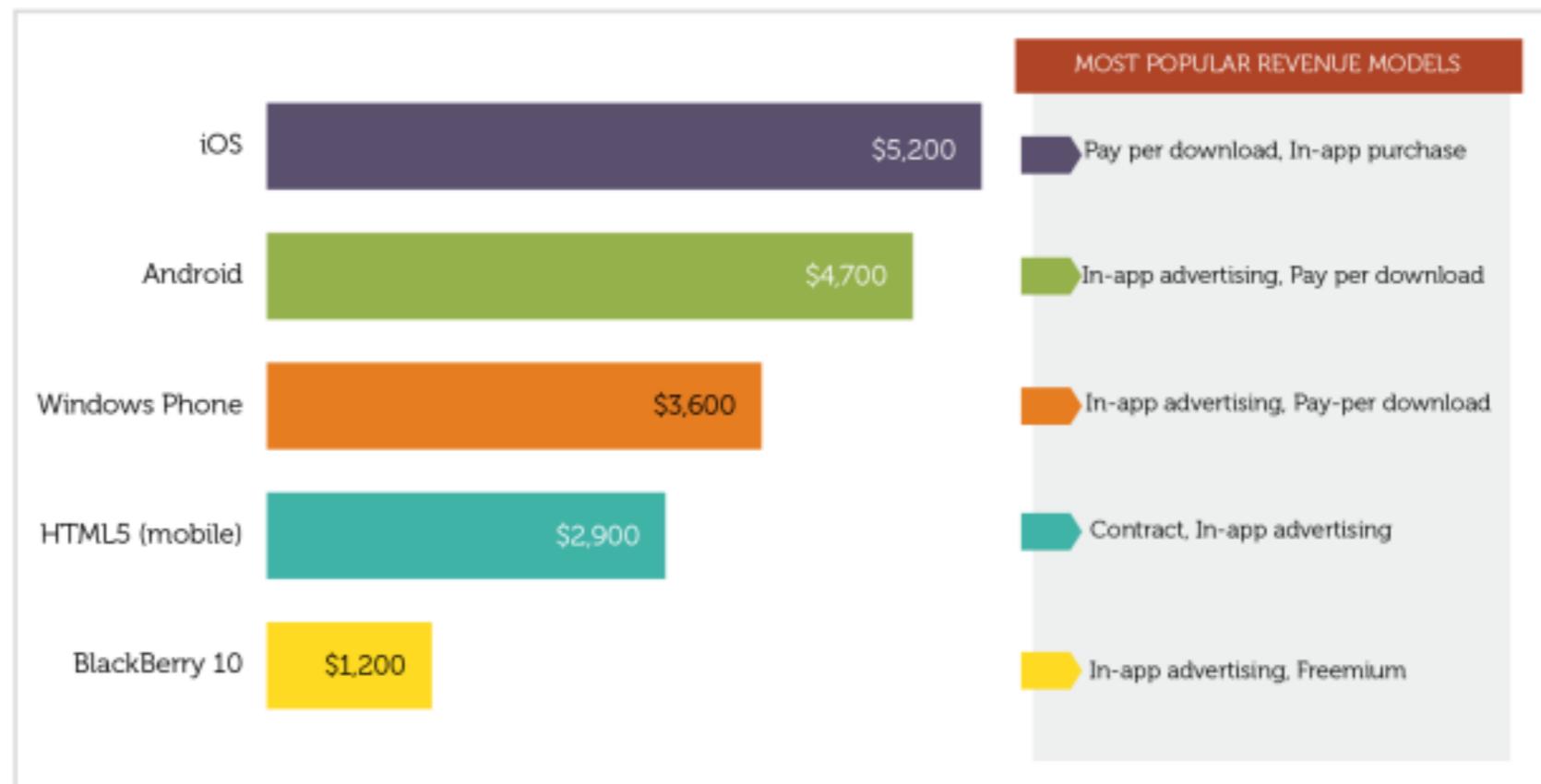
Period	Android	iOS	Others
Q1 2015	78.0%	18.3%	3.7%
Q1 2014	81.2%	15.2%	3.6%
Q1 2013	75.5%	16.9%	7.6%

Source: [idc.com](http://idc.com)

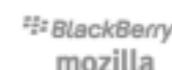
# Developer Revenue

## iOS leads the revenue chart

Average monthly developer revenue for each platform (n = 2,085)



Source: Developer Economics Q3 2013 - State of the Developer Nation  
[www.DeveloperEconomics.com/go](http://www.DeveloperEconomics.com/go) | Licensed under Creative Commons Attribution 3.0 License



# App Store



- 1.200.000 Applications (June 2014)
- 75.000.000.000+ downloads
- 800 million iTunes accounts, with credit card
- the iOS customer is much more willing to pay than other platforms customer

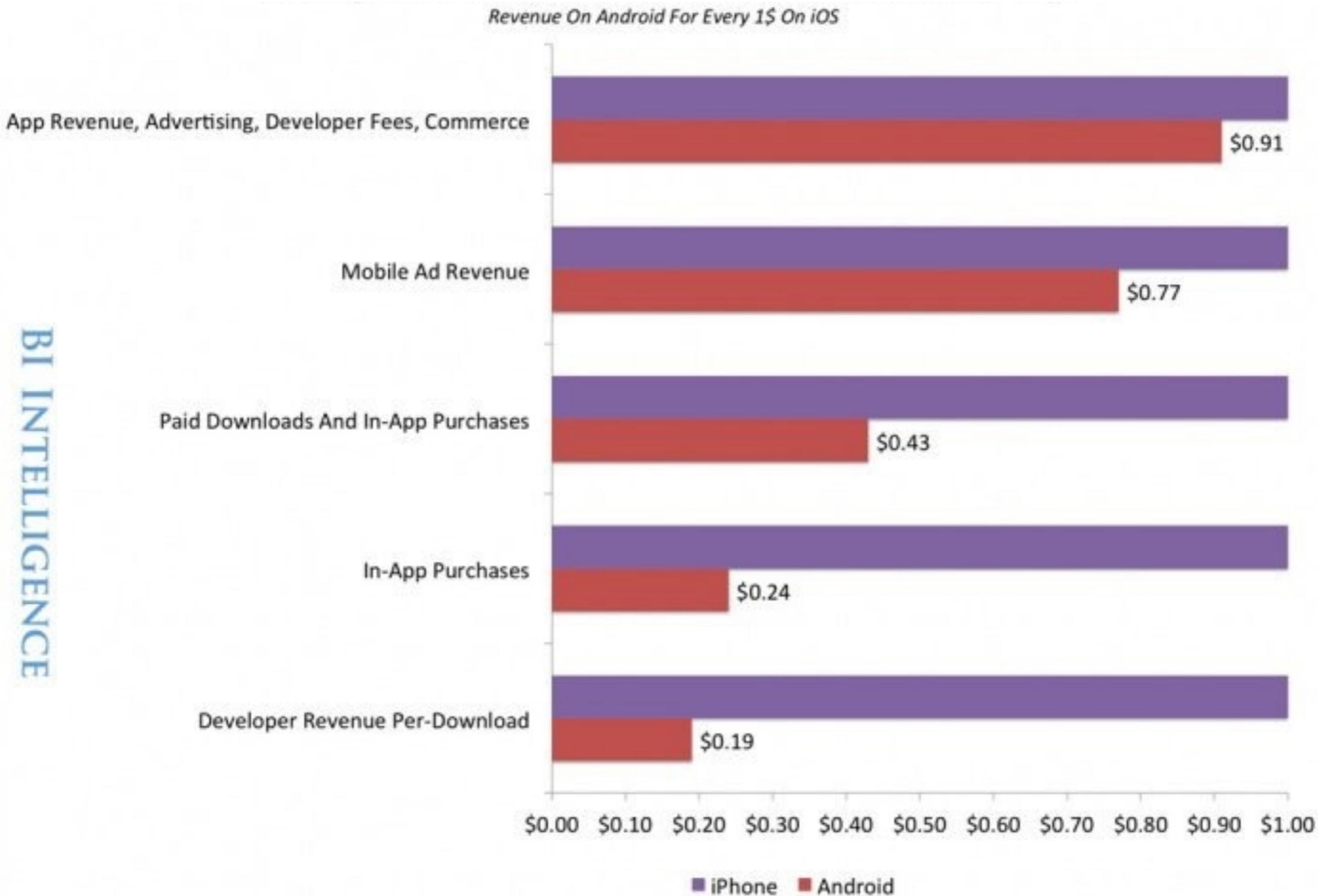
# App Store



- 1.200.000 Applications (June 2014)
  - 75.000.000.000+ downloads
  - 800 million iTunes accounts, with credit card
  - the iOS customer is much more willing to pay than other platforms customer
- World largest credit card database

# App Store Revenue

BI INTELLIGENCE



Sources: Tristan Louis, Flurry, App Annie, Opera Mobile, And Vision Mobile

# App Store Consistency

---

- Apple's highly-controlled environment limits unwanted phenomena
  - piracy
  - fraudulent apps
  - crappy apps

# App Review

---

- Every App must pass an approval process
- Good for environment, not so good for developers (and clients)

# App Review

iOS App Store



## 8 days

Based on [497 reviews](#) in the last 14 days.

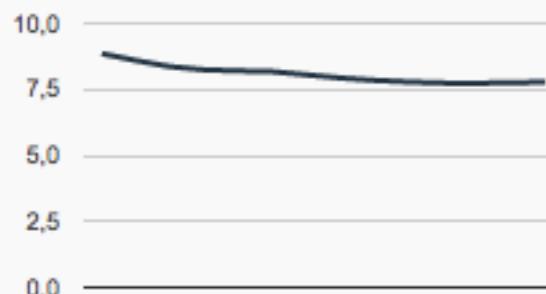
[More Data](#)

★ [Distribution Chart](#)

★ [Raw Data](#)

★ [Annual Trend Graph](#)

[Rolling 14 Day Trend](#)



Mac App Store



## 6 days

Based on [58 reviews](#) in the last 30 days.

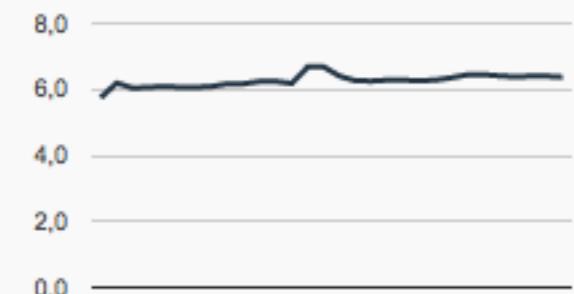
[More Data](#)

★ [Distribution Chart](#)

★ [Raw Data](#)

★ [Annual Trend Graph](#)

[Rolling 30 Day Trend](#)



This site is only made possible by people like **you** contributing review durations. [Please contribute your latest review.](#)

<http://appreviewtimes.com/>

# Requirements

# iOS development is easy!



# iOS development is easy!



# Prerequisites

---



A Mac computer  
running OS X 10.9.4 or later



Xcode  
(latest version)

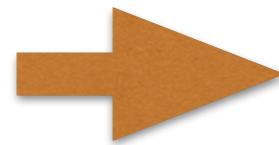
# Membership requirements

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- Apple ID (free)
- Apple Developer Program (ADP) subscription

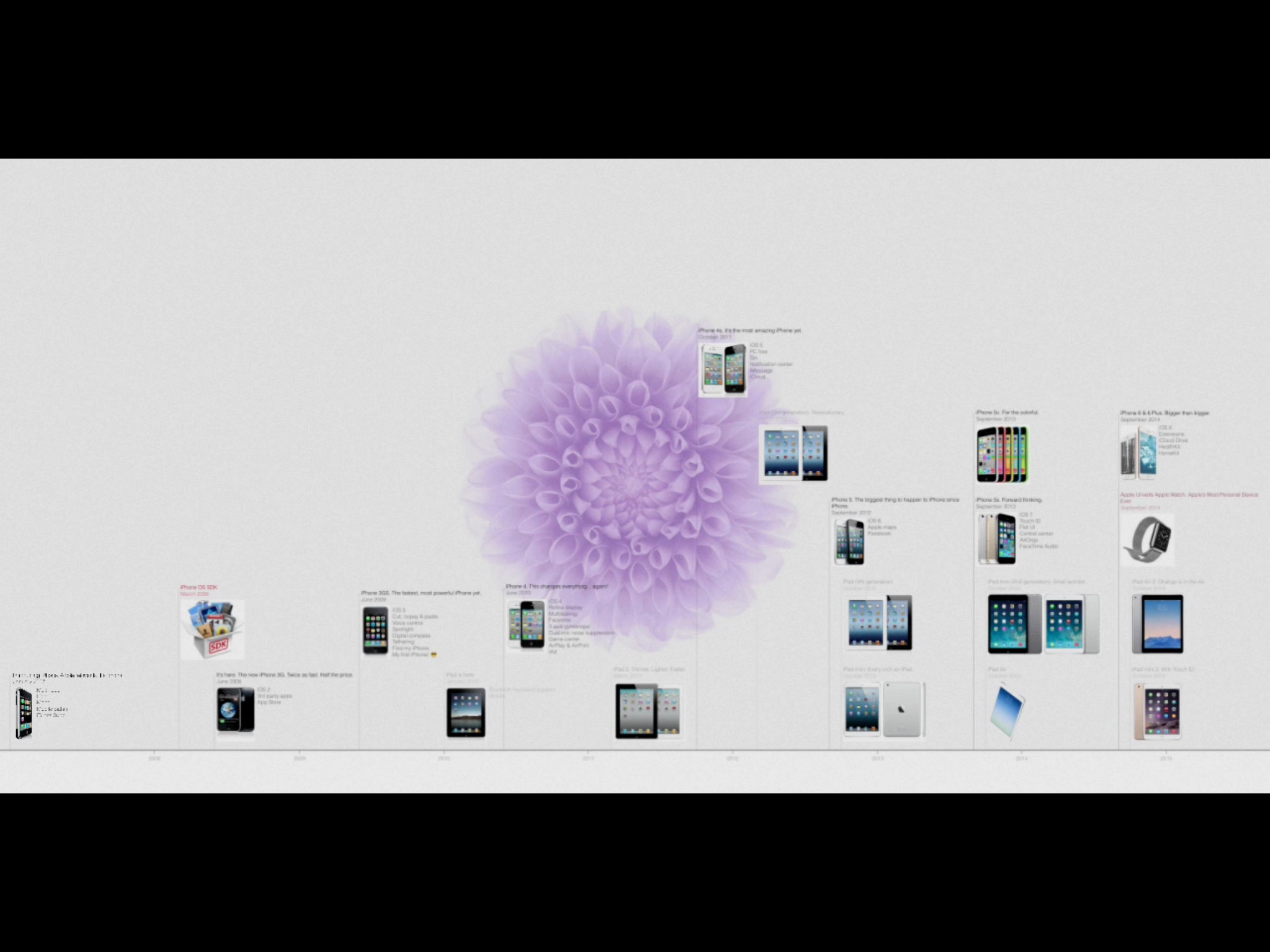
# Skill requirements

- Object Oriented Programming
- C language (optional)
- Objective-C language
- iOS SDK
- Apple guidelines
- Provisioning procedures



June 2014

# Environment



Introducing iPhone. Apple reinvents the phone.

January 2007

- Multi-touch
- iPod
- Maps
- Mobile Safari
- iTunes Sync

## iPhone OS SDK March 2008



It's here. The new iPhone 3G. Twice as fast. Half the price.  
June 2008



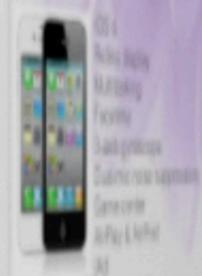
iOS 2  
3rd party apps  
App Store

iPhone 3GS. The fastest, most powerful iPhone yet.  
June 2009



iOS 3  
Cut, copy & paste  
Voice control  
Spotlight  
Digital compass  
Tethering  
Find my Phone  
My first iPhone! 🎉

Phone 4 has arrived early. April  
June 2010



Pad is here.  
January 2010



iPhone 4S is here.  
October 2010



iPhone 5 is here.  
September 2012



iPhone 6 is here.  
September 2013



iPhone 7 is here.  
September 2014



iPhone 8 is here.  
September 2015





It's here. The new iPhone 3G. Twice as fast. Half the price.  
June 2008

iOS 2  
3rd party apps  
App Store

iPhone 3GS. The fastest, most powerful iPhone yet.  
June 2009



iOS 3

Cut, copy & paste  
Voice control  
Spotlight  
Digital compass  
Tethering  
Find my iPhone  
My first iPhone! 😎



If the price.



iPad is here.  
January 2010



2010

Bluetooth keyboard support  
iBooks



FaceTime  
3-axis gyroscope  
Dual-mic noise suppression  
Game center  
AirPlay

yet.

## iPhone 4. This changes everything... again!

June 2010

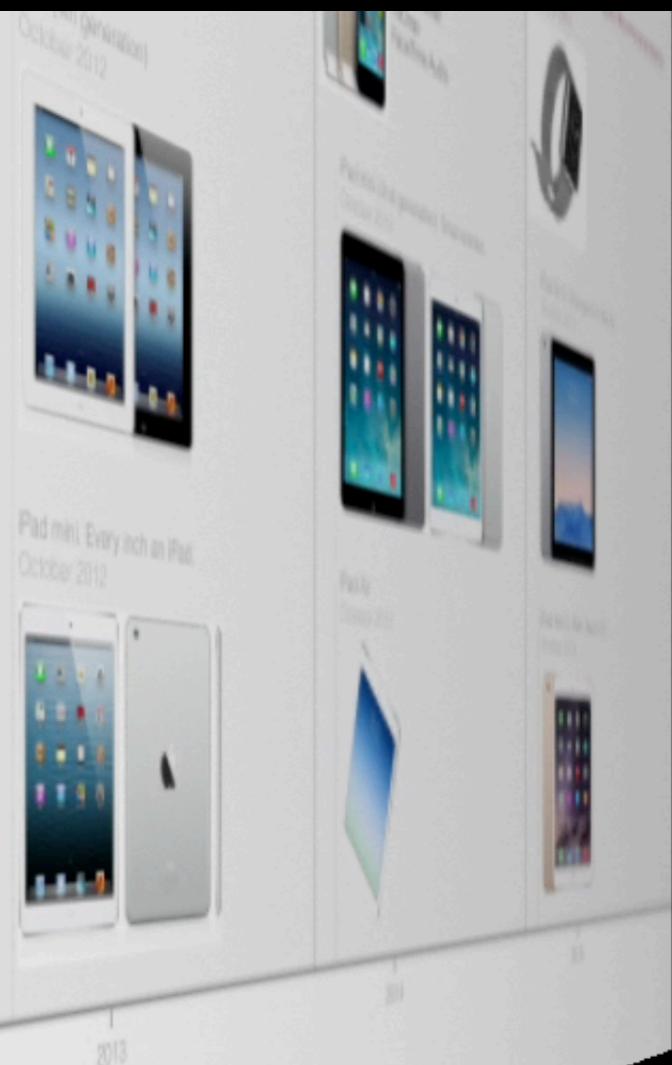


iOS 4  
Retina display  
Multitasking  
Facetime  
3-axis gyroscope  
Dual-mic noise suppression  
Game center  
AirPlay & AirPrint  
iAd



Bluetooth keyboard support  
March 2010

iPad 2. Thinner. Lighter. Faster.  
March 2011



2011

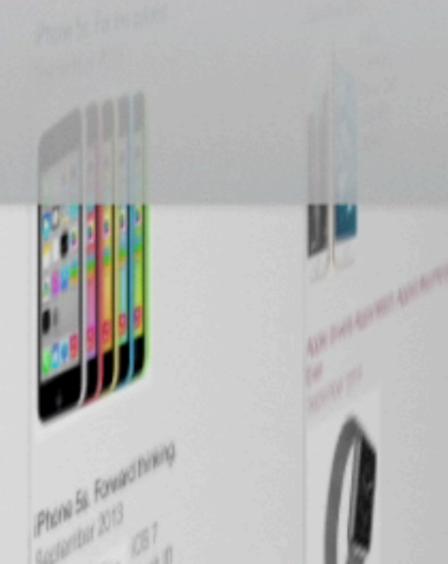
iPhone 4s. It's the most amazing iPhone yet.  
October 2011



iOS 5  
PC free  
Siri  
Notification center  
iMessage  
iCloud



iPad (3rd generation) Retina Display  
March 2012



iPhone 5s. Faster thinking.  
September 2013  
iOS 7

iPad (3rd generation). Revolutionary.  
March 2012



...nothing to happen to iPhone since  
iPhone 5. 11:00pm

iPhone.  
September 2012



iOS 6  
Apple maps  
Passbook

iPhone 5c. For the colorful.  
September 2013



iPhone 5s. Forward thinking.  
September 2013



iOS 7  
Touch ID  
Flat UI  
Control center  
AirDrop  
FaceTime Audio

iPhone 6s. For the bright.  
September 2014



iPhone 6s Plus. For the big.  
September 2014



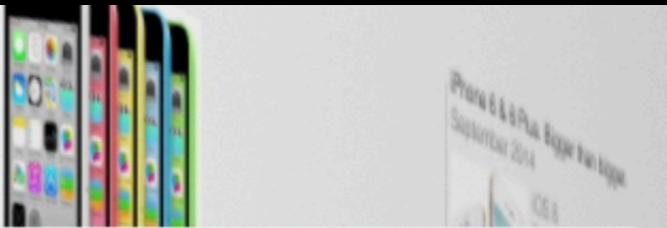
iPhone 5. The biggest thing to happen to iPhone since iPhone.

September 2012



iOS 6  
Apple maps  
Passbook

iPad (4th generation)  
October 2012



iPhone 6 & 6 Plus. Bigger than bigger.  
September 2014

iPhone 6s. Forward thinking.  
September 2015



iPad Air 2. WiFi + Cellular.  
October 2014

iPad (4th generation)  
October 2012



iPad mini. Every inch an iPad  
October 2012



iOS 7  
Touch ID  
Flat UI  
Control center  
AirDrop  
FaceTime Audio

iPad mini (2nd generation). Small wonder.  
October 2013



iPad Air  
October 2013



Apple Unveils Apple Watch. Apple Watch Will Ever  
September 2014

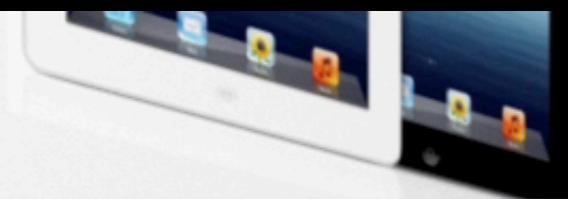


iPad Air 2. Lighter & Thinner  
October 2014



iPad mini 3. New Touch ID  
October 2014





iPad mini. Every inch an iPad.  
October 2012



iPad mini  
October 2013



iPad mini  
October 2013



iPad mini  
October 2014

2013

2014

iPhone 5c. For the colorful.  
September 2013



iPhone 5s. Forward thinking.  
September 2013



iOS 7  
Touch ID  
Flat UI  
Control center

iPhone 6 & 6 Plus. Bigger than bigger.  
September 2014



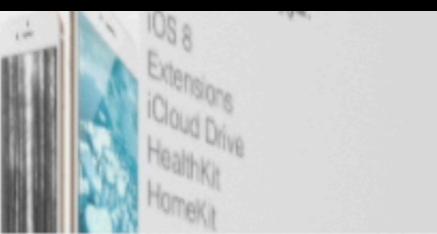
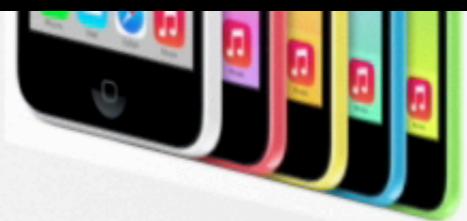
iOS 8  
Extensions  
iCloud Drive  
HealthKit  
HomeKit

Apple Unveils Apple Watch. Apple's Most Personal Device Ever  
September 2014



e since

e since



## iPhone 5s. Forward thinking. September 2013



iOS 7  
Touch ID  
Flat UI  
Control center  
AirDrop  
FaceTime Audio

iPad mini (2nd generation). Small wonder.  
October 2013





iPad mini (2nd generation). Small wonder.  
October 2013

iPad Air  
October 2013



iPad Air  
October 2013



2014

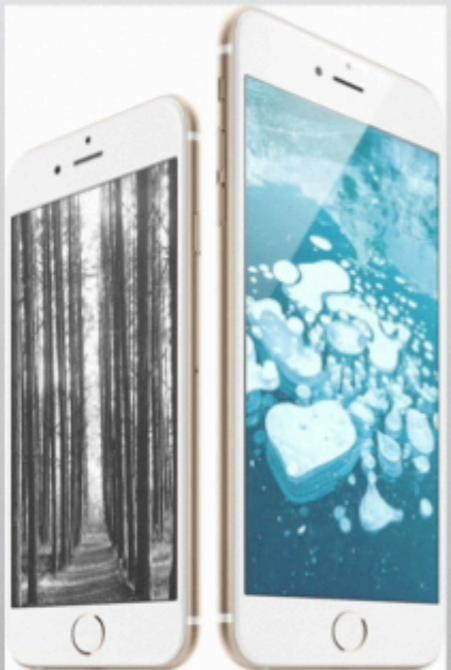


iPad mini 3. With Touch ID.  
October 2014



2015

iPhone 6 & 6 Plus. Bigger than bigger.  
September 2014



iOS 8  
Extensions  
iCloud Drive  
HealthKit  
HomeKit

Apple Unveils Apple Watch. Apple's Most Personal Device  
Ever  
September 2014



## Apple Unveils Apple Watch. Apple's Most Personal Device Ever

September 2014



iPad Air 2. Change is in the Air  
October 2014



iPad Air 2. Change is in the Air.  
October 2014



iPad mini 3. With Touch ID.  
October 2014



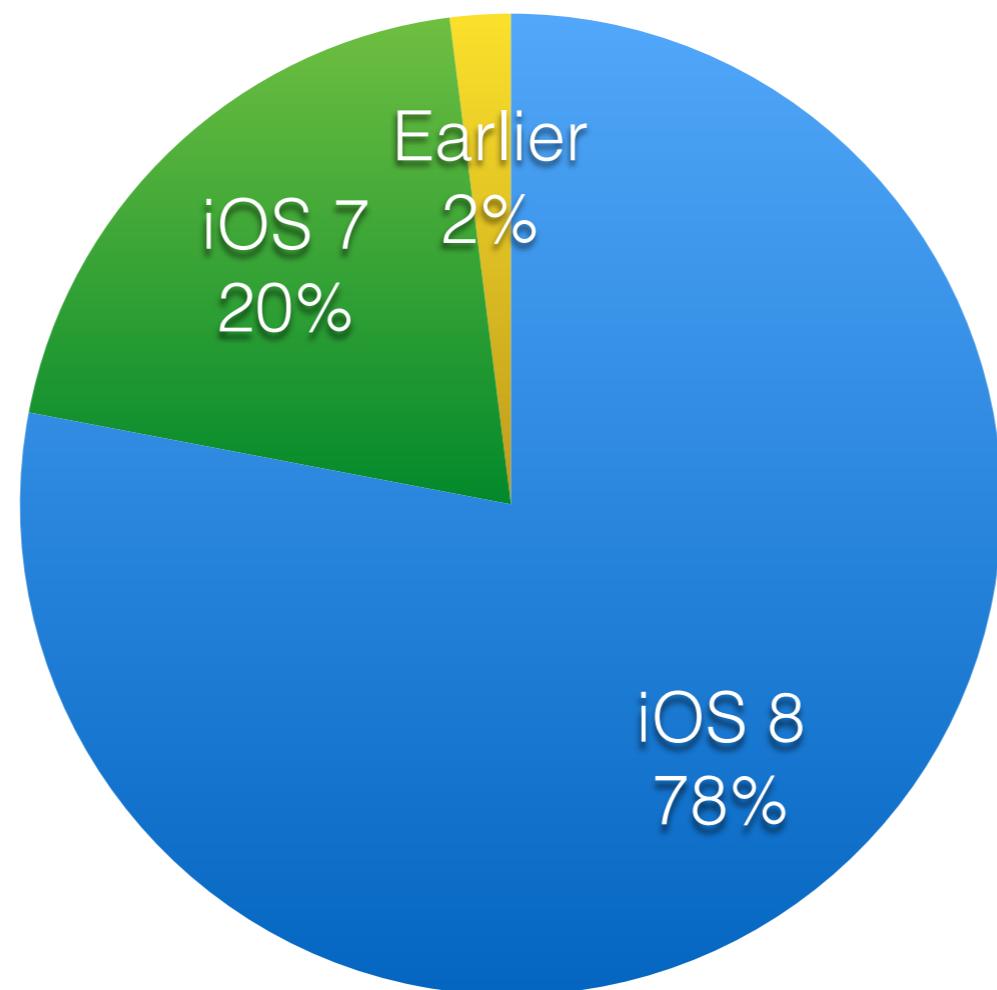


iPad mini 3. With Touch ID:  
October 2014



2015

# iOS version stats



As measured by the App Store on March 30, 2015.

# Programming languages

# Objective- C

```
#import "BootViewController.h"
#import "AppDelegate.h"
#import "SSKeychain.h"
#import "Const.h"

@interface BootViewController : UIViewController

@end

@implementation BootViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    // Do any additional setup after loading the view.

    // Download user info
    [self getUserInfo];
}

- (void)getUserInfo
{
    NSString *username = @"test";
    NSString *password = @"test";

    // User is already logged in?
    if ([username length] != 0 || [password length] != 0) {

        // Set url to get data from
        NSString *URLString = [[NSString alloc] initWithFormat:@"username=%@&password=%@&token=%@", username, password, kToken];
        NSURL *url = [NSURL URLWithString:URLString];

        [AppDelegate downloadDataFromURL:url completionHandler:^(NSData *data) {

            if (data != nil) {

                // Data has been returned
                //NSLog(@"%@", [[NSJSONSerialization JSONObjectWithData:data options:kNilOptions error:&error] class]);
            } else {

                // No data returned, login again
                [self performSegueWithIdentifier:@"login" sender:self];
            }
        }];
    } else {

        // User needs to login
        [self performSegueWithIdentifier:@"login" sender:self];
    }
}
```

# Objective- C

- Created by Brad Cox in 1983
- Superset of C
- Tailored for Cocoa development

```
#import "BootViewController.h"
#import "AppDelegate.h"
#import "SSKeychain.h"
#import "Const.h"

@interface BootViewController : NSObject
@end

@implementation BootViewController
- (void)viewDidLoad
{
    [super viewDidLoad];
    // Do any additional setup after loading the view.

    // Download user info
    [self getUserInfo];
}

- (void)getUserInfo
{
    NSString *username = @"test";
    NSString *password = @"test";

    // User is already logged in?
    if ([username length] != 0 || [password length] != 0) {
        // Set url to get data from
        NSString *URLString = [NSString alloc] initWithFormat:@"username=%@&password=%@&token=%@", username, password, kToken];
        NSURL *url = [NSURL URLWithString:URLString];

        [AppDelegate downloadDataFromURL:url withCompletionHandler:^(NSData *data) {
            if (data != nil) {
                // Data has been returned
                //NSLog(@"%@", [NSJSONSerialization JSONObjectWithData:data options:kNilOptions error:&error] class);
            } else {
                // No data returned, login again
                [self performSegueWithIdentifier:@"login" sender:self];
            }
        }];
    } else {
        // User needs to login
        [self performSegueWithIdentifier:@"login" sender:self];
    }
}

- (void)didReceiveMemoryWarning
{
    [super didReceiveMemoryWarning];
    // Dispose of any resources that can be recreated.
}
}
```

# Objective- C

## TIOBE Index

May 2015	May 2014	Change	Programming Language	Ratings	Change
1	2	▲	Java	16.869%	-0.04%
2	1	▼	C	16.847%	-0.08%
3	4	▲	C++	7.875%	+1.89%
4	3	▼	Objective-C	5.393%	-6.40%
5	6	▲	C#	5.264%	+1.52%
6	8	▲	Python	3.725%	+0.67%
7	9	▲	JavaScript	3.127%	+1.34%
8	11	▲	Visual Basic .NET	2.968%	+1.70%
9	7	▼	PHP	2.720%	-0.67%
10	-	▲	Visual Basic	1.893%	+1.89%

# Objective- C

## VI. COMPENSATION BY TECHNOLOGY





Swift



# Swift

- Modern
- Designed for safety
- Fast and powerful
- Interactive playgrounds

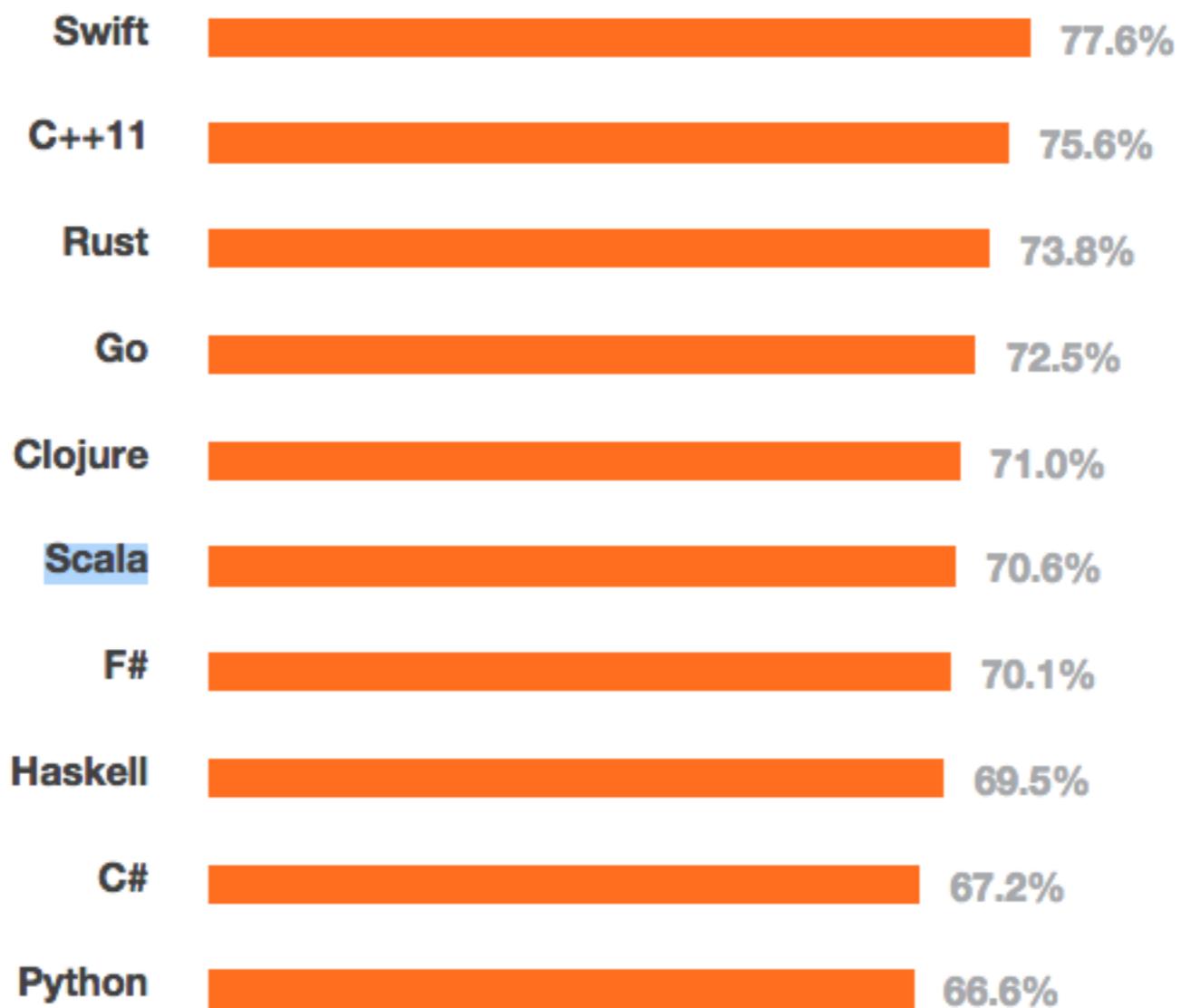


# Swift

Most Loved

Most Dreaded

Most Wanted



# SDK

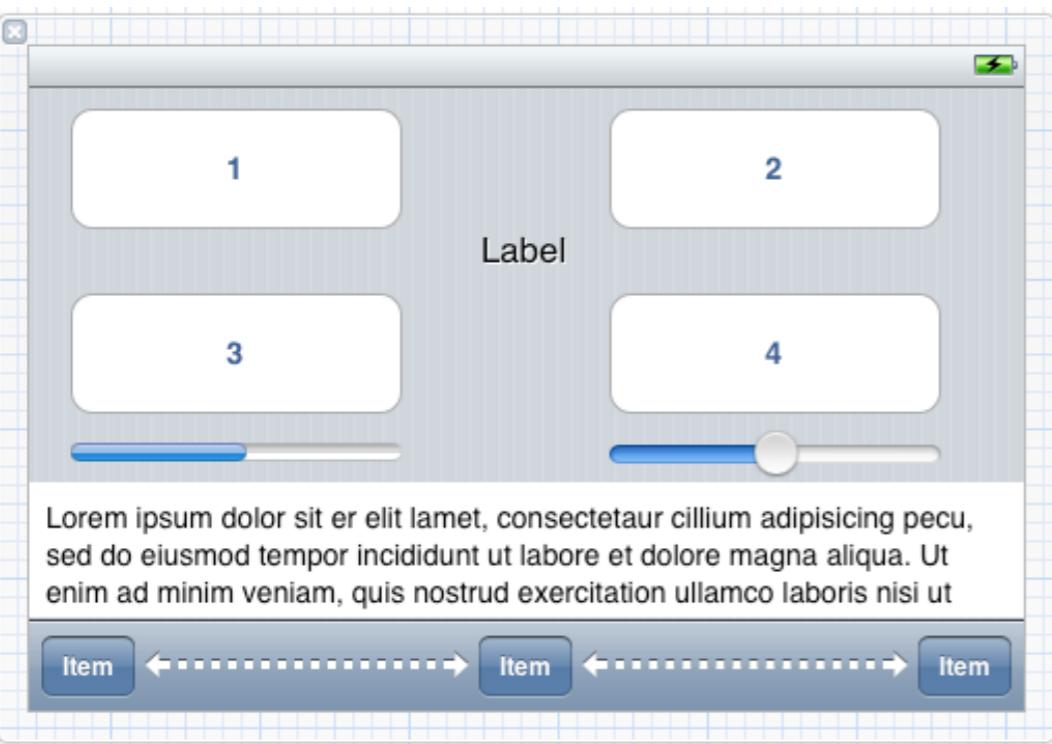
# iOS

---

- **Mobile operating system**  
ARM architecture, multitasking, Cocoa Touch, multi-touch GUI
- **Kernel XNU (like MAC OS X)**  
Originally developed by NeXT for the NeXTSTEP OS, it is a hybrid kernel combining Mach and BSD components, and an object-oriented API for drivers
- **Initially known as iPhone OS**

# Cocoa Touch frameworks

## UIKit



1  
2  
Label  
3  
4

Item Item Item

Core Animation

Use Core Animation to create rich user experiences from an easy programming model based on compositing independent layers of graphics. [Learn more ▶](#)

Core Audio

Core Audio is the professional-grade technology for playing, processing and recording audio, making it easy to add powerful audio features to your application. [Learn more ▶](#)

Core Data

Core Data provides an object-oriented data management solution that is easy to use and understand, yet is built to handle the data model needs of any application, large or small. [Learn more ▶](#)

NSObject

UIResponder ← This class is responsible for receiving events

UIApplication

UIView

UIWindow

UILabel

UIPickerView

UIProgressBar

Audio and Video

Core Audio

OpenAL

Media Library

AV Foundation

Graphics and Animation

Core Animation

OpenGL ES

Quartz 2D

User Applications

Address Book

Core Location

Map Kit

Store Kit

Networking and Internet

Bonjour

WebKit

BSD Sockets

Data Management

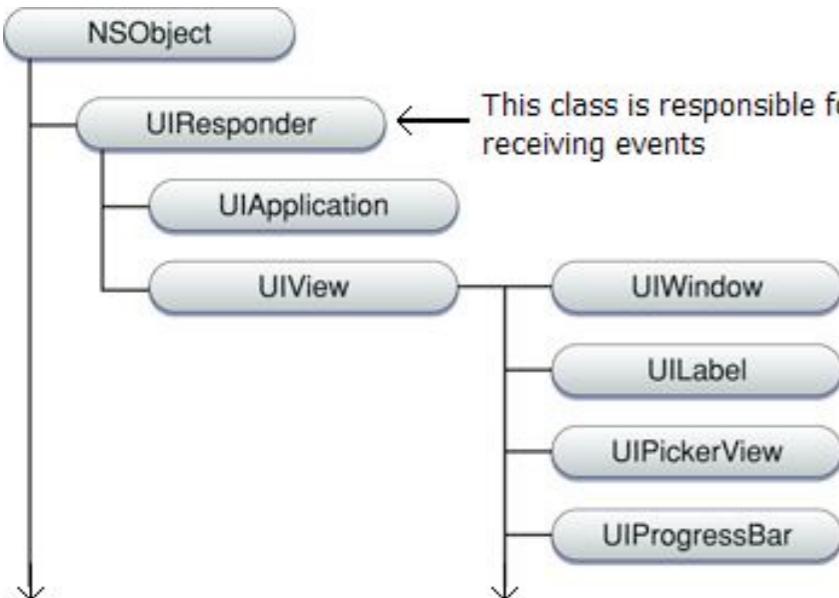
Core Data

SQLite

Features List: Frameworks by Category

Below is a small sampling of the available frameworks included in Cocoa Touch:

```
graph TD; NSObject --> UIResponder["UIResponder<br/>← This class is responsible for receiving events"]; UIResponder --- UIApplication["UIApplication"]; UIResponder --- UIView["UIView"]; UIView --- UIWindow["UIWindow"]; UIView --- UILabel["UILabel"]; UIView --- UIPickerView["UIPickerView"]; UIView --- UIProgressBar["UIProgressBar"];
```



# New frameworks



# New frameworks



WatchKit



Metal



PhotoKit



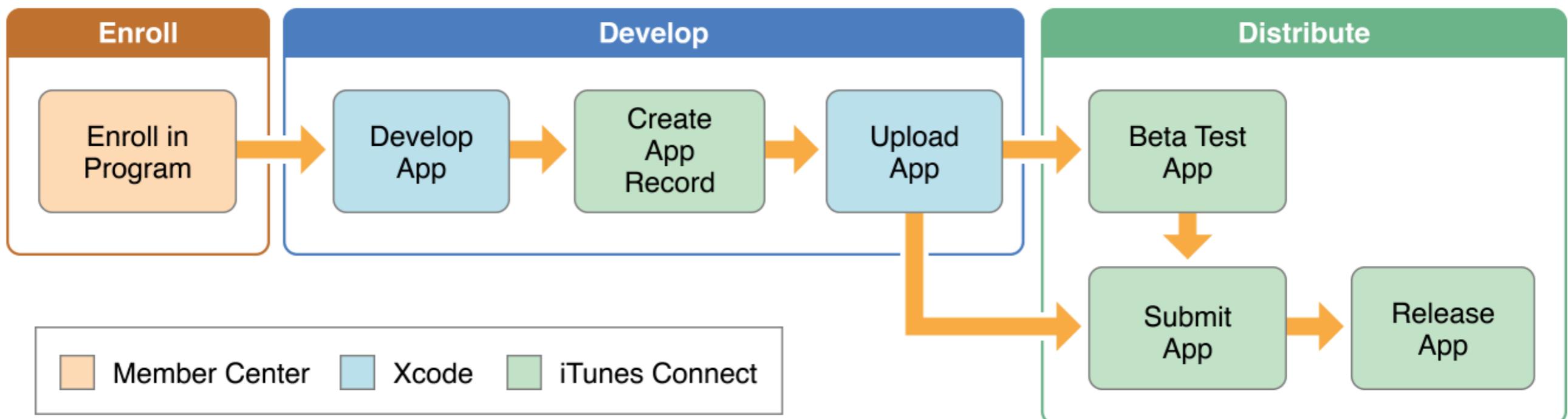
HomeKit



HealthKit

# Distribution

# Distribution



# Apple developer program



iOS Developer  
Enterprise Program

299\$/year

NO App Store

∞ devices



iOS Developer  
Program

99\$/year

App Store

100 devices



iOS Developer  
University Program

free

NO App Store

200 devices

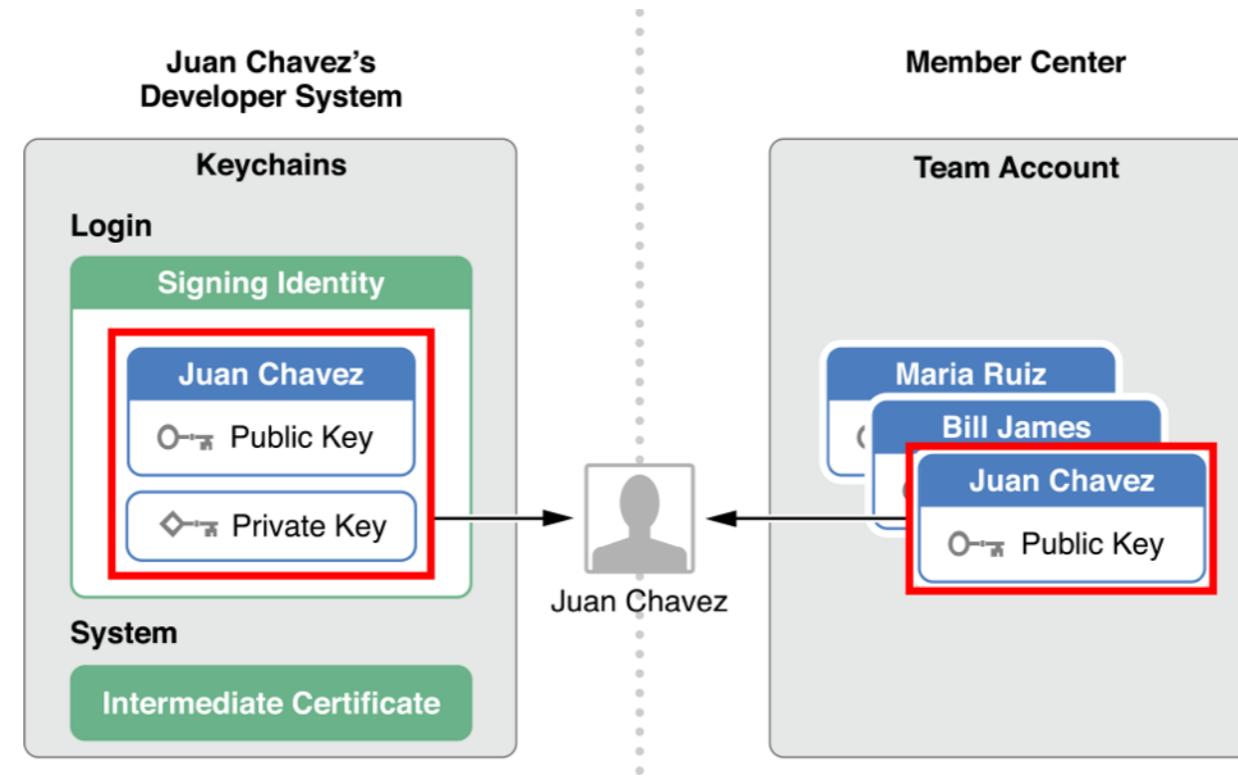
# Concepts

---

- **Certificate**  
univocally identifies an actor
- **Device**  
Devices must be enabled for testing
- **App ID**  
Unique identifier for the app
- **Provisioning profile**  
Asset which encloses the three concepts above

# Certificates

- **Development Certificate**  
Each person in the team has his own



- **Distribution Certificate**  
There's one for the whole company (or single developer)

# Devices

---

- **Purpose**  
devices are used during development and testing
- **Name + UDID**  
Unique Device IDentifier, 40 char-long string  
e.g. 67a43b0925c7a8050ad78859lace81d1bda81bed
- **Limits**
  - 1.The ADP allows for a maximum of 100 devices
  - 2.A device can't be removed from the list until the next renewal of the subscription (only disabled)

# App IDs

---

- **Bundle Identifier**  
unique identifier for the app
- **Reverse domain name**  
e.g. com.mycompany.BestAppEver
- **Wildcard character**  
e.g. com.mycompany>\*

iOS App IDs – Apple Developer  
Apple Inc. developer.apple.com/account/ios/identifiers/bundle/bundleList.action

Technologies Resources Programs Support Member Center Search Developer

## Certificates, Identifiers & Profiles

iOS Apps

**Certificates**

- All
- Pending
- Development
- Production

**Identifiers**

**App IDs** (selected)

- Pass Type IDs
- Website Push IDs

**Devices**

**Provisioning Profiles**

- All
- Development
- Distribution

### iOS App IDs

110 App IDs Total

Name	ID
PushAppID	com.areollo-mobile.MyPushApp

**ID**

Name: PushAppID  
Prefix: 6L [REDACTED] 45  
ID: com.areollo-mobile.MyPushApp

**Application Services:**

Service	Development	Distribution
Data Protection	<input type="radio"/> Disabled	<input type="radio"/> Disabled
Game Center	<input checked="" type="radio"/> Enabled	<input checked="" type="radio"/> Enabled
iCloud	<input type="radio"/> Disabled	<input type="radio"/> Disabled
In-App Purchase	<input checked="" type="radio"/> Enabled	<input checked="" type="radio"/> Enabled
Inter-App Audio	<input type="radio"/> Disabled	<input type="radio"/> Disabled
Passbook	<input type="radio"/> Disabled	<input type="radio"/> Disabled
Push Notifications	<input type="radio"/> Configurable	<input type="radio"/> Configurable

**Edit**

# Provisioning Profile

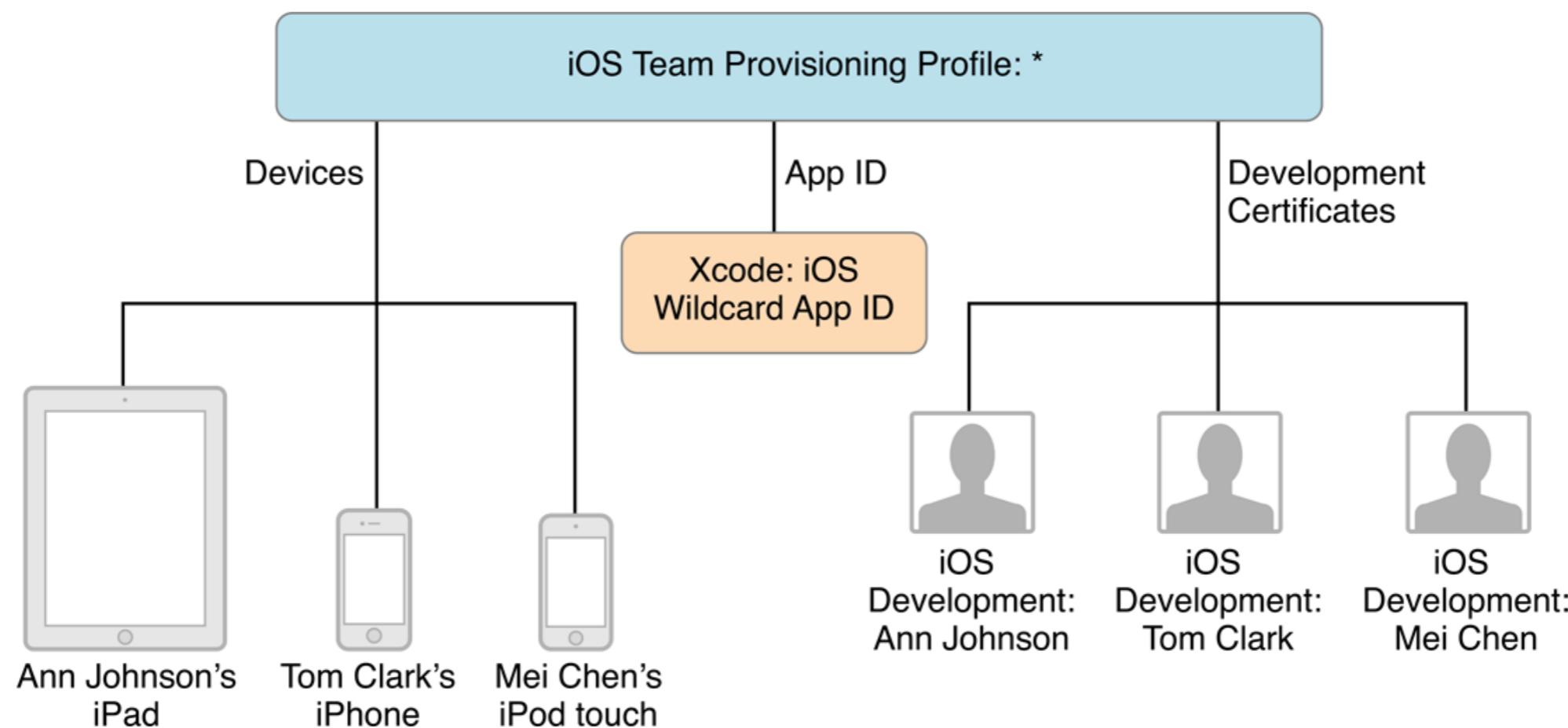
---

- **What is it?**  
it's a resource (a file) which bundles the App ID, the device list and the certificates of the developers of the team
- **What does it provide?**  
it is bundled with the app and is used to authorize the execution of the app on the devices and its deployment and distribution
- **How long does it last?**  
It is valid for one year, after which it must be renewed

# Provisioning Profile

- **Development Provisioning Profile**

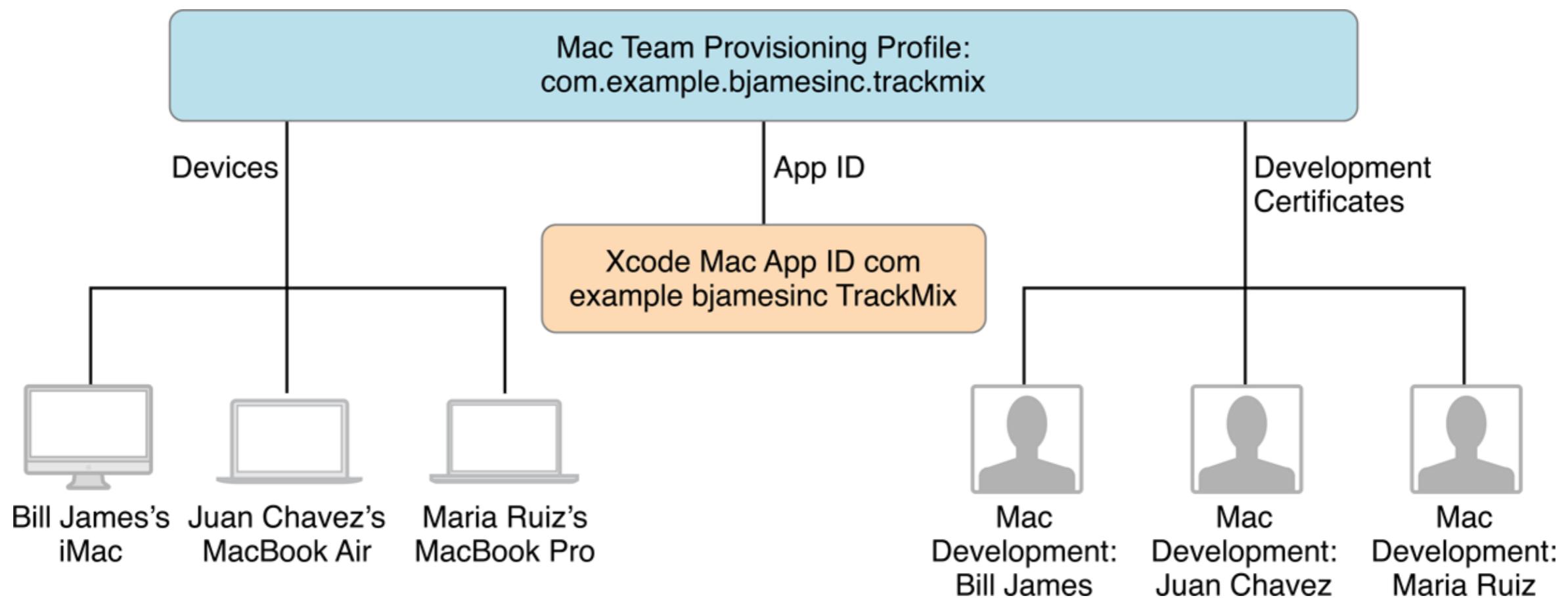
- ▶ App ID
- ▶ (Development) certificate list (1 or more)
- ▶ Device list



# Provisioning Profile

## ● Development Provisioning Profile

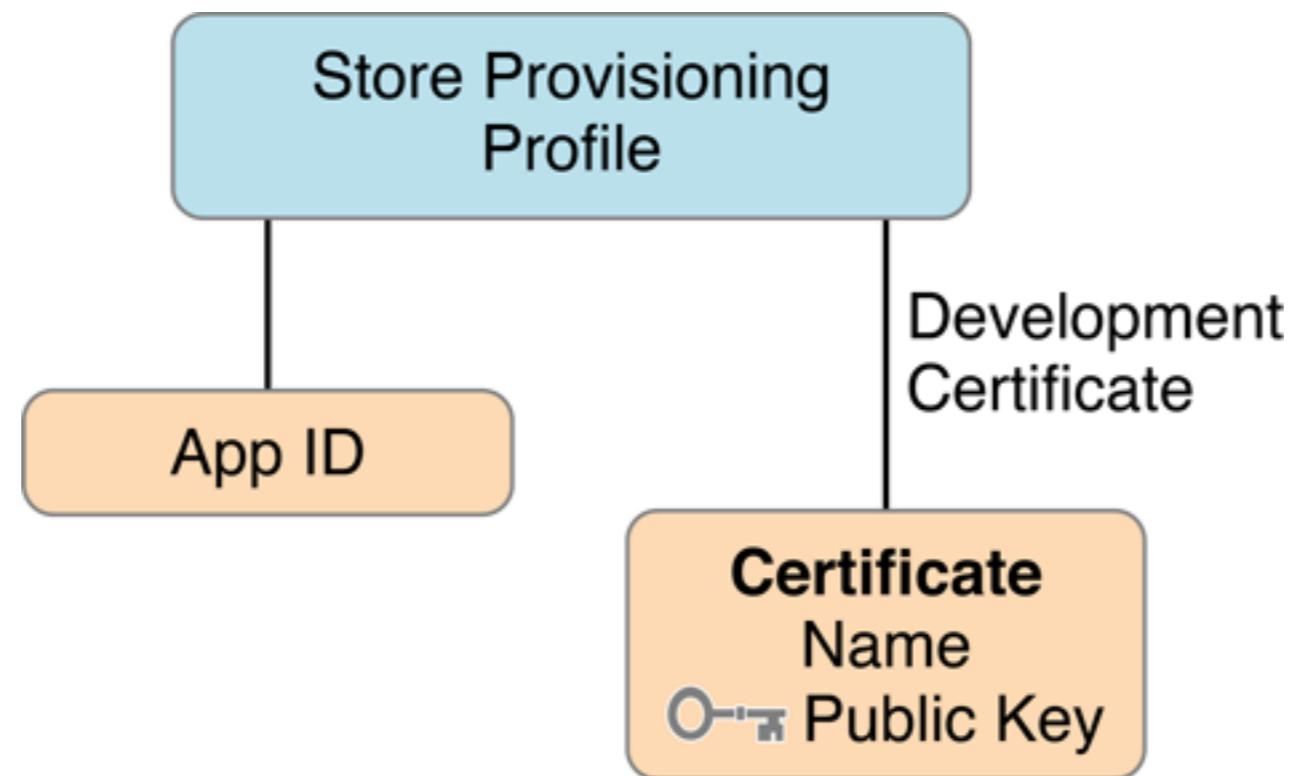
- ▶ App ID
- ▶ (Development) certificate list (1 or more)
- ▶ Device list



# Provisioning Profile

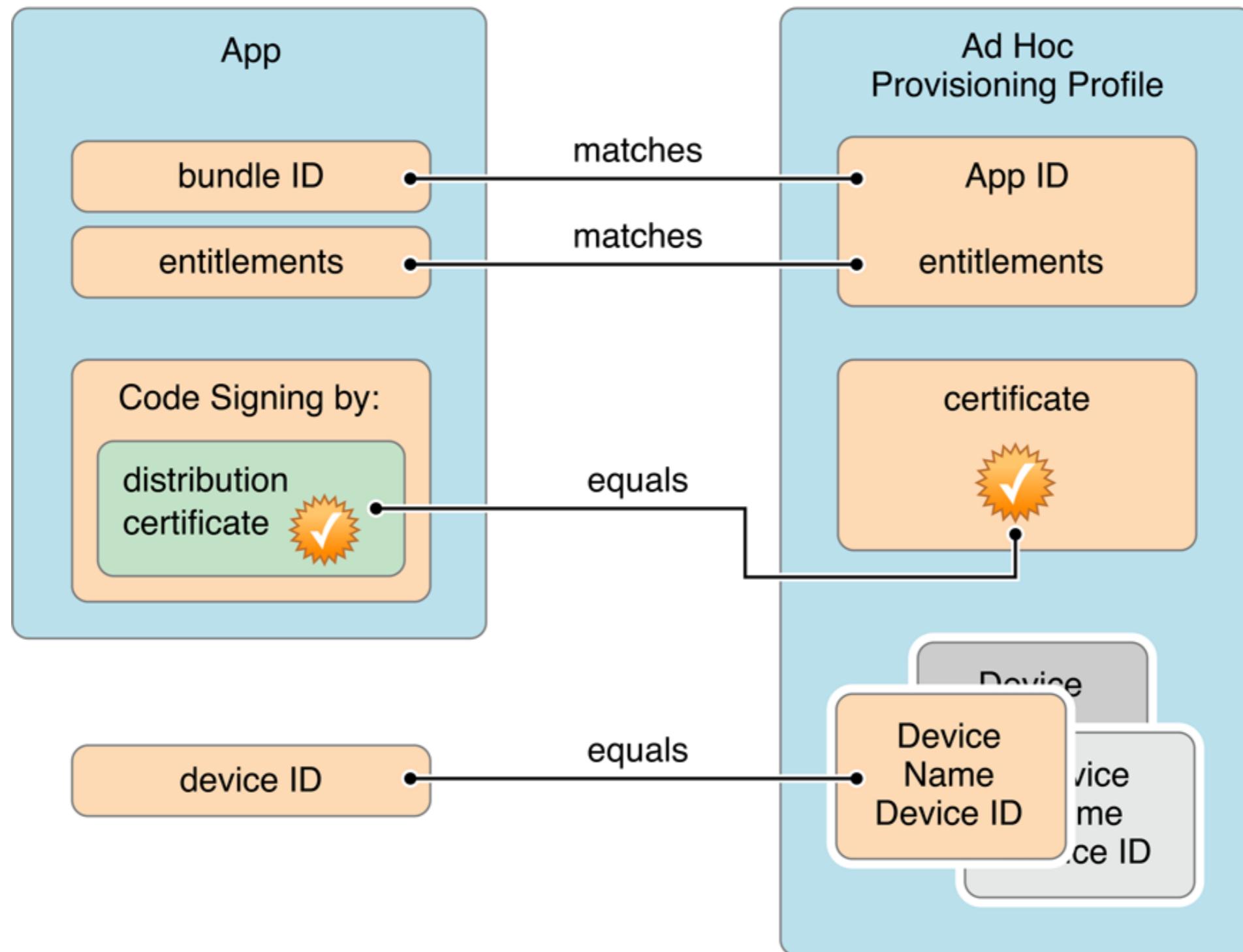
- **Distribution Provisioning Profile**

- ▶ Distribution method (App Store or AdHoc)
- ▶ App ID
- ▶ (Distribution) certificate
- ▶ Device list (only in case of AdHoc deployment)

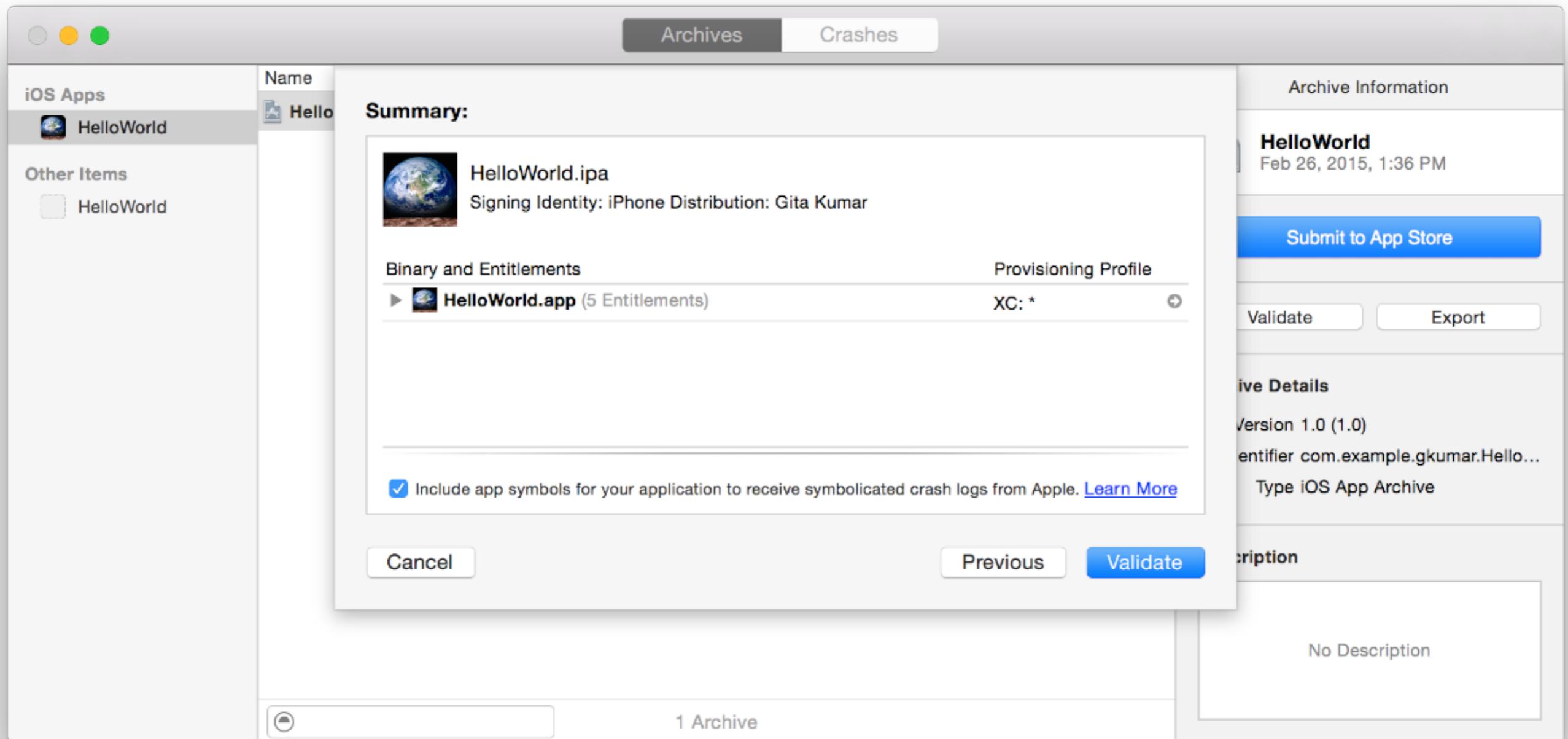


# Ad hoc distribution

Your app launches on a device if:



# App Store Distribution



**WTF?!**



# Beta distribution

---

- Can distribute to testers before going on store
- Internal testers:
  - Up to 25 testers
  - No review
- External testers:
  - Up to 1000 testers
  - Beta review

# Beta distribution

App Store > Utilities > Apple

The screenshot shows the TestFlight app page on the App Store. The top navigation bar includes "Details", "Ratings and Reviews", and "Related". Below the navigation is a "Screenshots" section with tabs for "iPhone" and "iPad". Two screenshots are displayed: one showing the TestFlight interface with "Updates" and "Testing" sections, and another showing the same interface with a detailed list of features for iMovie.

**TestFlight** 4+

Apple >

Details Ratings and Reviews Related

Screenshots iPhone iPad

**TestFlight**

Updates 1

iMovie Version 2.0 What to Test ▾ UPDATE Expires in 29 days

Testing 4

Pages Version 2.2.1 What to Test ▾ OPEN Expires in 2 days

Numbers Version 2.2.1 What to Test ▾ OPEN Expires in 4 days

Keynote Version 2.2.1 What to Test ▾ OPEN Expires in 2 days

**TestFlight**

Updates 1

iMovie Version 2.0 What to Test ▾ UPDATE Expires in 29 days

- Full-screen video browsing
- Slow motion
- Cutaway, picture-in-picture, and split screen effects
- Slow motion
- Slide, Wipe, and Fade transitions in videos
- Add audio to a video
- Remove audio from video

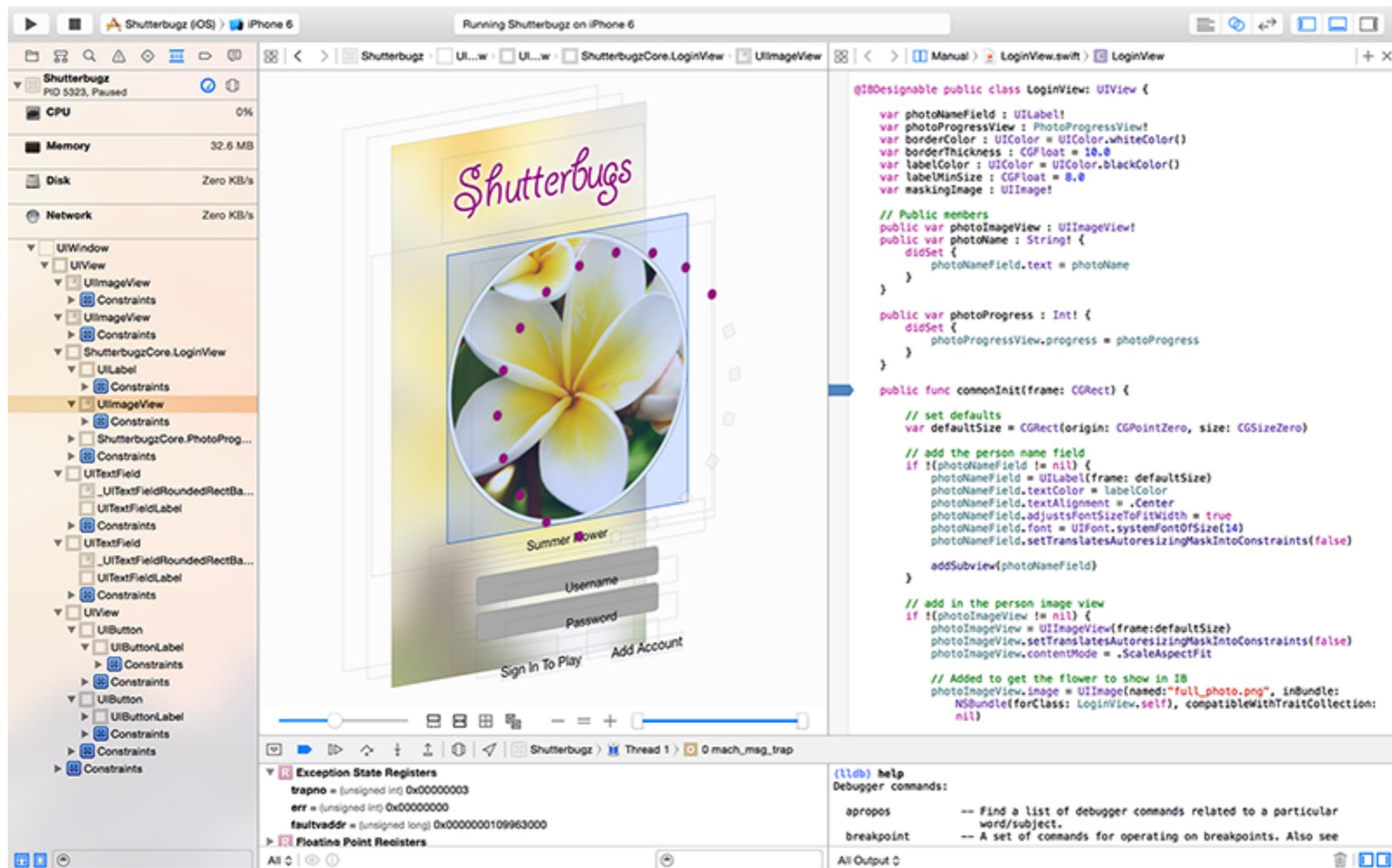
Testing 4

Pages Version 2.2.1 What to Test ▾ OPEN Expires in 2 days

Numbers Version 2.2.1 What to Test ▾ OPEN Expires in 4 days

# Tools

# Xcode



# Xcode

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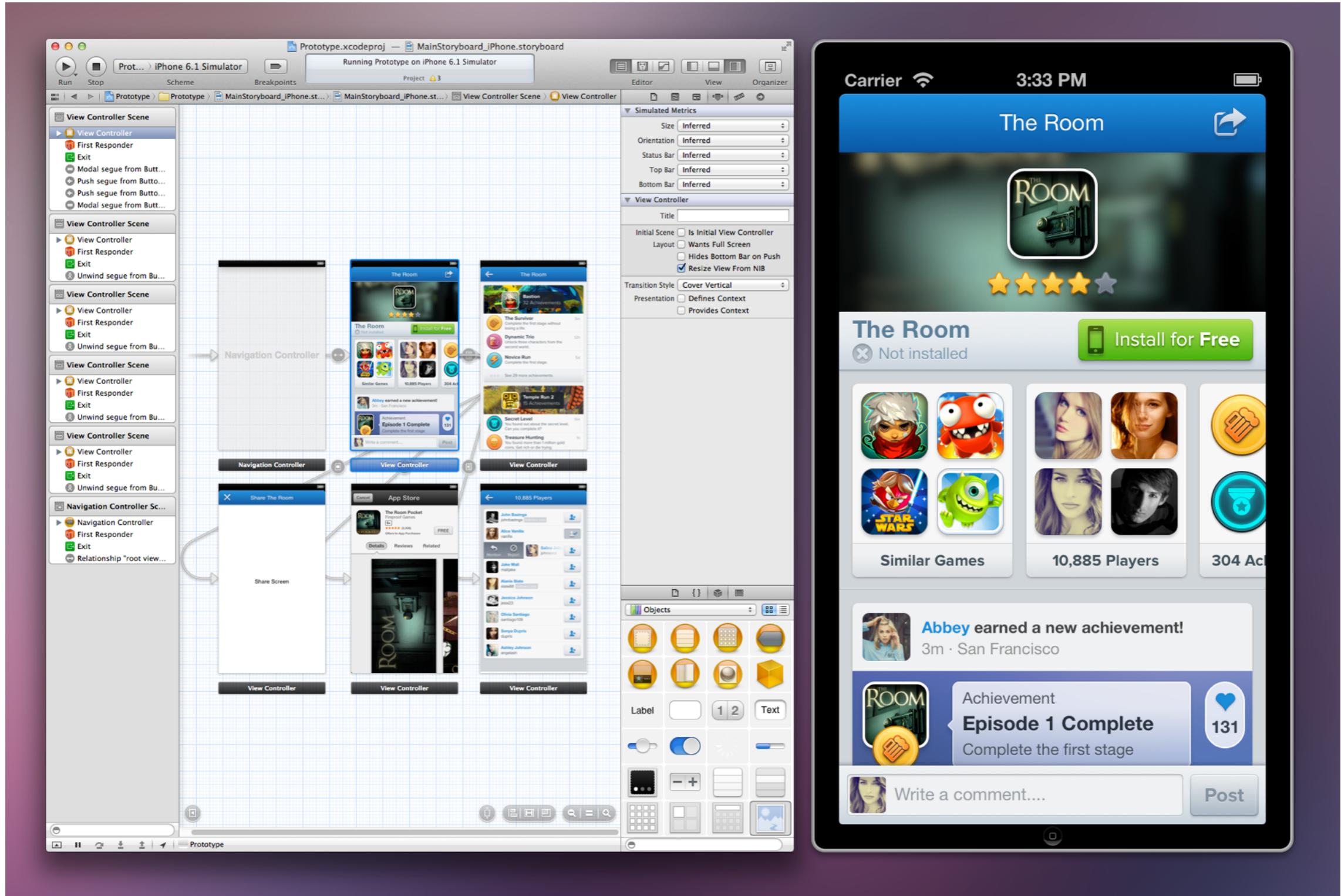
- Integrated Development Environment
- Objective-C / Objective-C++ / C++ / C
- LLVM and GCC compilers and debuggers
- Interface Builder
- Source Control (Subversion / Git)
- Apple developer documentation

# Simulator

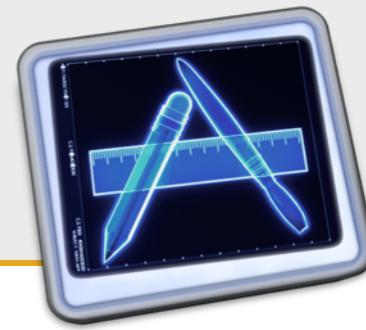
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- iPhone / iPhone Retina (3.5" / 4" / 4.7" / 5.5") / iPad / iPad Retina
- Gestures, Orientation change, Memory Warnings
- GPS
- Apps: Safari, Photos, Contacts, Settings, Game Center, News Stand
- Fast! (It's x86 and runs x86 apps, no ARM emulation)

# Simulator



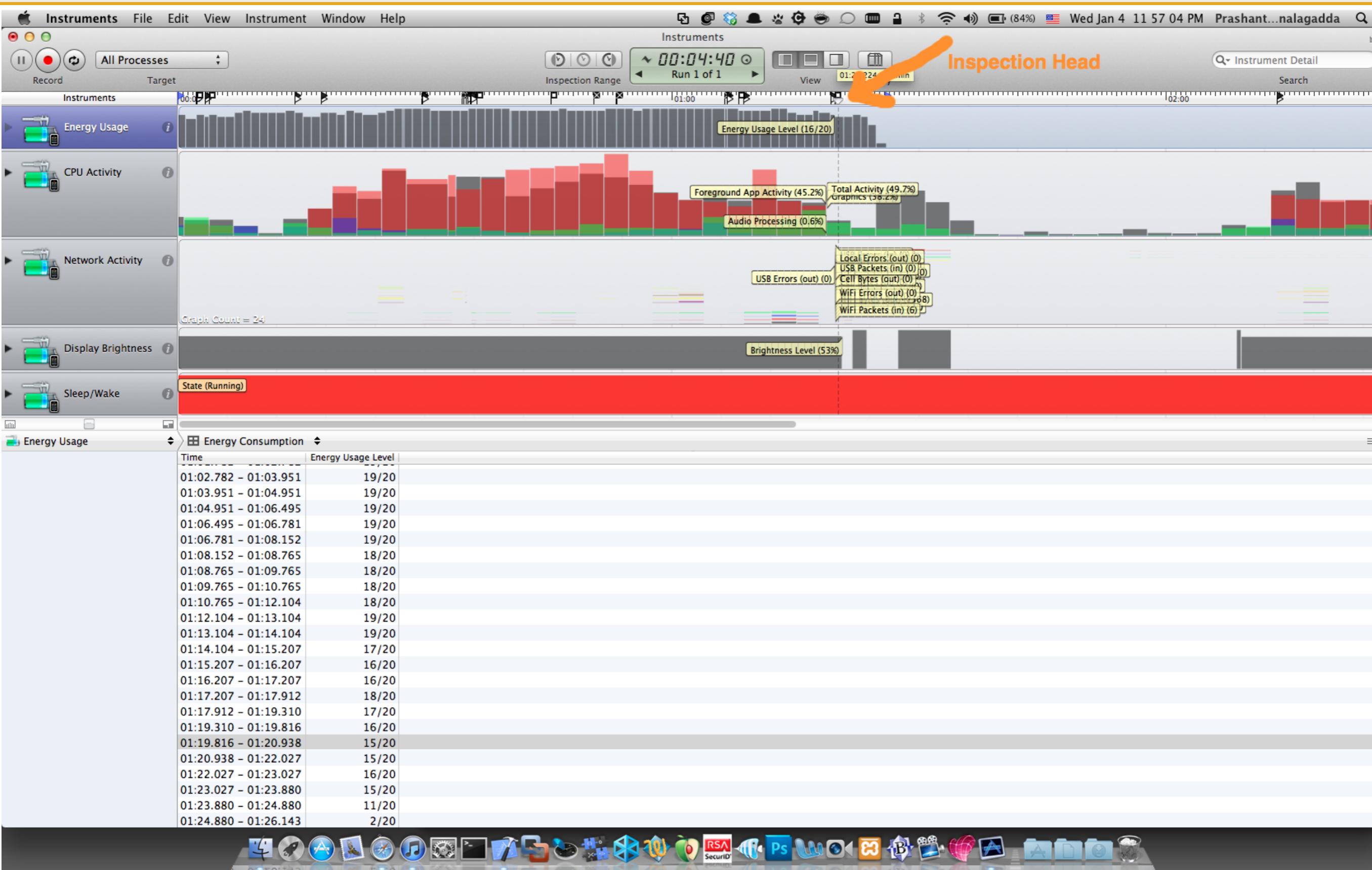
# Instruments



- Application performance analyzer and visualizer
- Integrated with Xcode
- Tracks user events, CPU activity, memory allocations, releases and leaks, file I/O, network activity, graphics and OpenGL



# Instruments



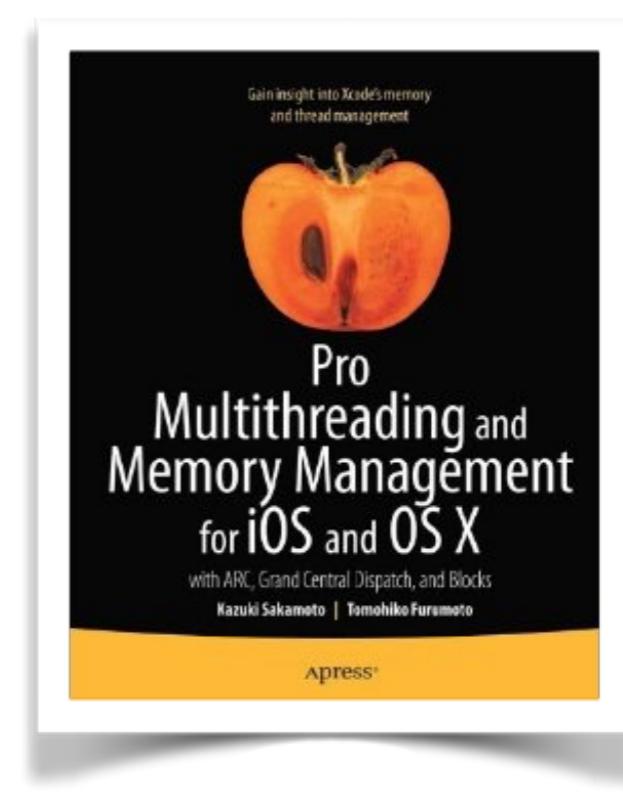
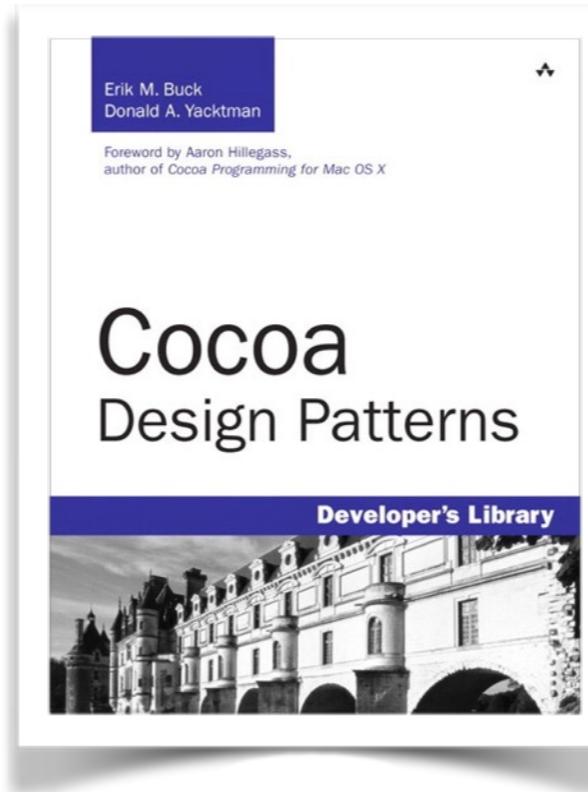
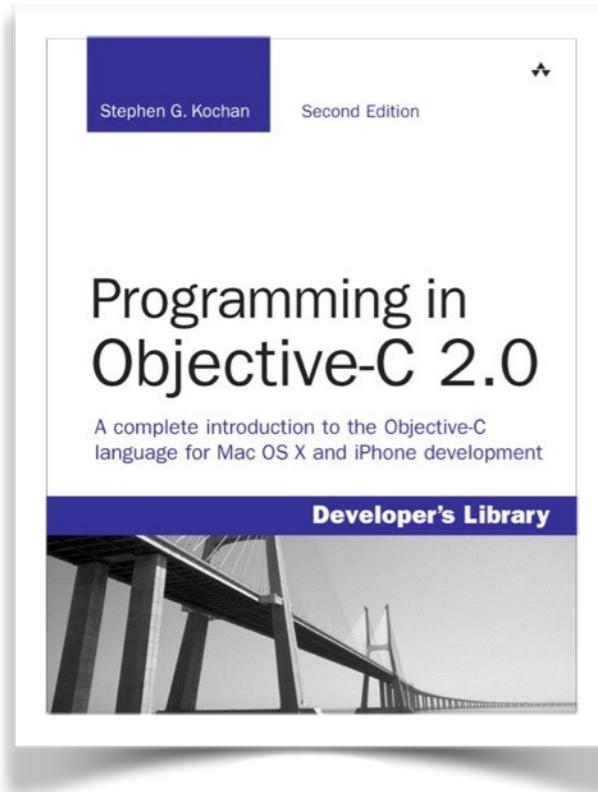
# Resources

# Apple documentation

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- iOS developer library
- Swift blog
- Apple developer forums
- WWDC videos

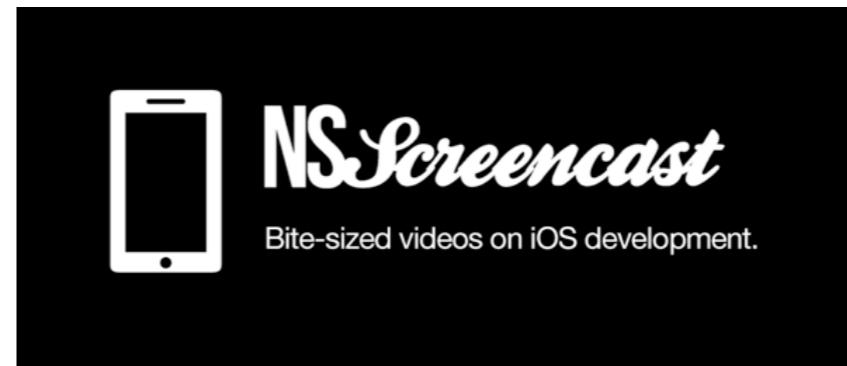
# Books



- Programming in Objective-C
- Cocoa Design Patterns
- Pro Multithreading and Memory Management for iOS and Mac OS X

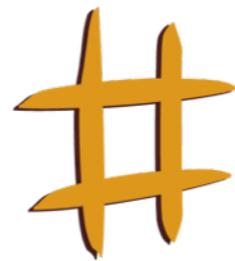
# Video

- NSScreencast
- Ray Wenderlich
- lynda.com



# Vibrant community

- #pragma mark
- Cocoapods
- StackOverflow
- Conferences



# Questions?