Advanced iOS Development

Session 201

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Somewhat Qualified

Advanced Development

Overview

- Developer Tools
  - Interface Builder
  - Instruments
- Debugging
- Other Frameworks
- Publishing to the App Store

Developer Tools

Xcode and so much more

Interface Builder

Overview

- WYSIWYG GUI construction
- Not code generation
- Object serialization and deserialization
- Stored as .xib files
- Concept of `IBAction` and `IBOutlet`

Interface Builder

Things to note

- Top level objects are `alloc/init` then `autorelease`
- When view is loaded, nib is loaded and objects deserialized
- Outlets are setup before `viewDidLoad` is called

Demo

Interface Builder

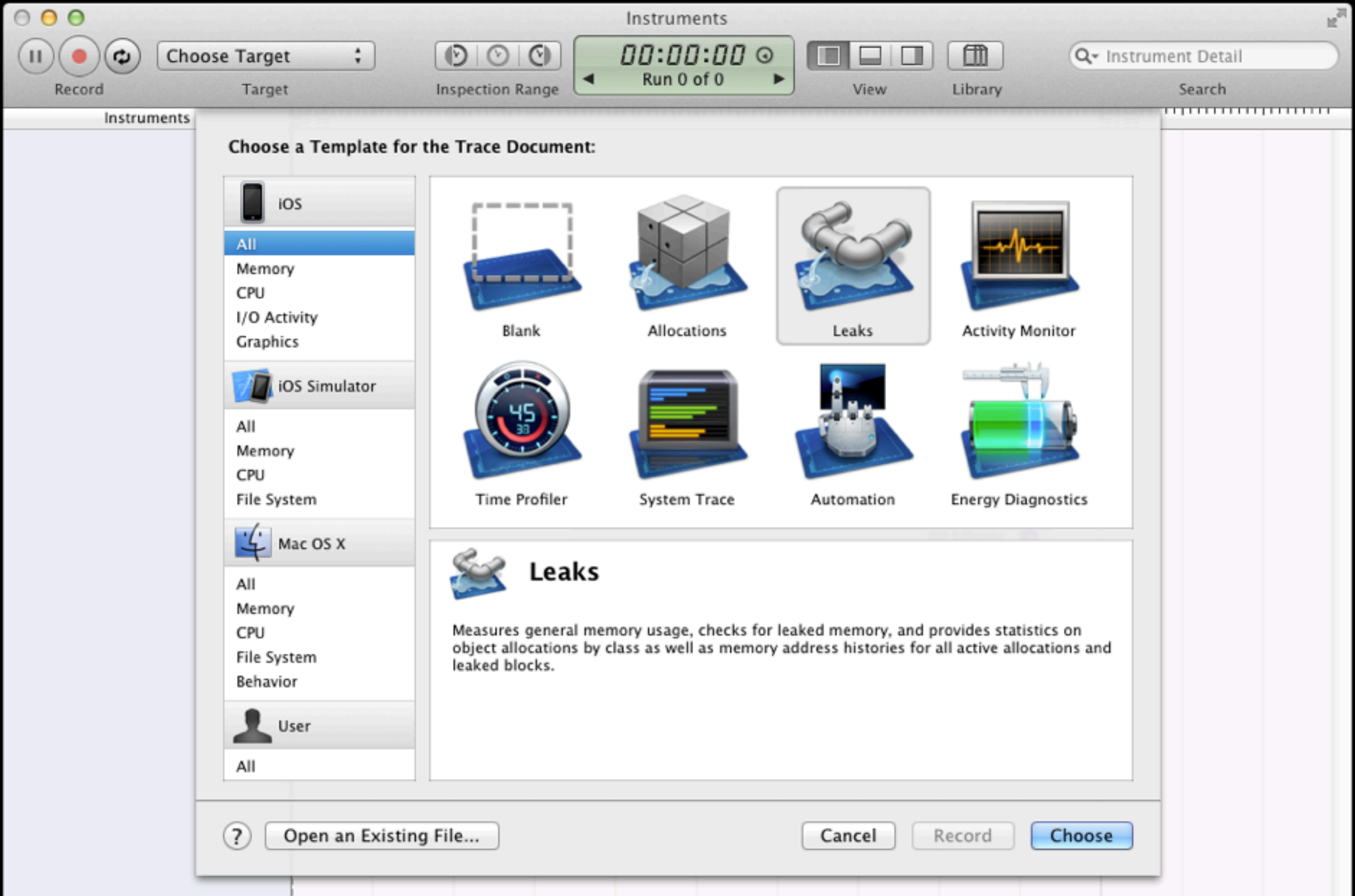
Instruments

Overview

- Analysis of various aspects of the application
- Mostly used for performance analysis
- Also useful to debug memory issues
- Time based

Instruments

Overview



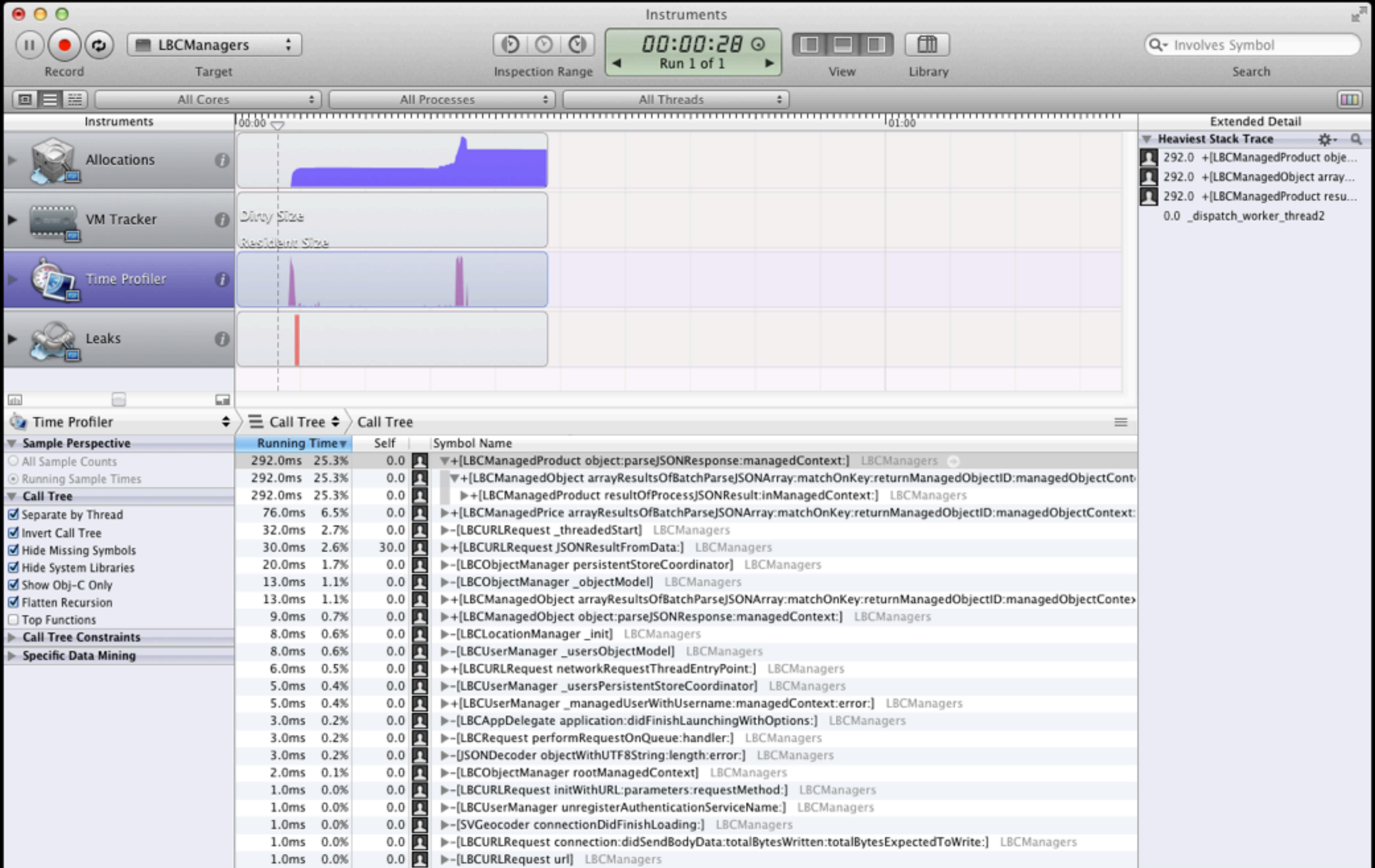
Choose a Template for the Trace Document:

Leaks

Measures general memory usage, checks for leaked memory, and provides statistics on object allocations by class as well as memory address histories for all active allocations and leaked blocks.

Instruments

Overview



Heaviest Stack Trace

292.0 +[LBCManagedProduct obje...
292.0 +[LBCManagedObject array...
292.0 +[LBCManagedProduct resu...
0.0 _dispatch_worker_thread2

Time Profiler

- Sample Perspective
  - ○ All Sample Counts
  - ● Running Sample Times
- Call Tree
  - ☑ Separate by Thread
  - ☑ Invert Call Tree
  - ☑ Hide Missing Symbols
  - ☑ Hide System Libraries
  - ☑ Show Obj-C Only
  - ☑ Flatten Recursion
  - □ Top Functions
- Call Tree Constraints
- Specific Data Mining

Call Tree > Call Tree

Running Time▾		Self	Symbol Name	
292.0ms	25.3%	0.0	▼+[LBCManagedProduct object:parseJSONResponse:managedContext:]	LBCManagers
292.0ms	25.3%	0.0	▼+[LBCManagedObject arrayResultsOfBatchParseJSONArray:matchOnKey:returnManagedObjectID:managedObjectCont	
292.0ms	25.3%	0.0	▶+[LBCManagedProduct resultOfProcessJSONResult:inManagedContext:]	LBCManagers
76.0ms	6.5%	0.0	▶+[LBCManagedPrice arrayResultsOfBatchParseJSONArray:matchOnKey:returnManagedObjectID:managedObjectContext:	
32.0ms	2.7%	0.0	▶-[LBCURLRequest _threadedStart]	LBCManagers
30.0ms	2.6%	30.0	▶+[LBCURLRequest JSONResultFromData:]	LBCManagers
20.0ms	1.7%	0.0	▶-[LBCObjectManager persistentStoreCoordinator]	LBCManagers
13.0ms	1.1%	0.0	▶-[LBCObjectManager _objectModel]	LBCManagers
13.0ms	1.1%	0.0	▶+[LBCManagedObject arrayResultsOfBatchParseJSONArray:matchOnKey:returnManagedObjectID:managedObjectConte›	
9.0ms	0.7%	0.0	▶+[LBCManagedObject object:parseJSONResponse:managedContext:]	LBCManagers
8.0ms	0.6%	0.0	▶-[LBCLocationManager _init]	LBCManagers
8.0ms	0.6%	0.0	▶-[LBCUserManager _usersObjectModel]	LBCManagers
6.0ms	0.5%	0.0	▶+[LBCURLRequest networkRequestThreadEntryPoint:]	LBCManagers
5.0ms	0.4%	0.0	▶-[LBCUserManager _usersPersistentStoreCoordinator]	LBCManagers
5.0ms	0.4%	0.0	▶+[LBCUserManager _managedUserWithUsername:managedContext:error:]	LBCManagers
3.0ms	0.2%	0.0	▶-[LBCAppDelegate application:didFinishLaunchingWithOptions:]	LBCManagers
3.0ms	0.2%	0.0	▶-[LBCRequest performRequestOnQueue:handler:]	LBCManagers
3.0ms	0.2%	0.0	▶-[JSONDecoder objectWithUTF8String:length:error:]	LBCManagers
2.0ms	0.1%	0.0	▶-[LBCObjectManager rootManagedContext]	LBCManagers
1.0ms	0.0%	0.0	▶-[LBCURLRequest initWithURL:parameters:requestMethod:]	LBCManagers
1.0ms	0.0%	0.0	▶-[LBCUserManager unregisterAuthenticationServiceName:]	LBCManagers
1.0ms	0.0%	0.0	▶-[SVGeocoder connectionDidFinishLoading:]	LBCManagers
1.0ms	0.0%	0.0	▶-[LBCURLRequest connection:didSendBodyData:totalBytesWritten:totalBytesExpectedToWrite:]	LBCManagers
1.0ms	0.0%	0.0	▶-[LBCURLRequest url]	LBCManagers

Instruments

Tasks

- Find leaks
- Profile memory allocation
- Time execution of various code blocks
- Profile OpenGL ES rendering
- Check for CALayer transparency
- Measure IO Activity
- Profile hardware power consumption

Demo

Instruments

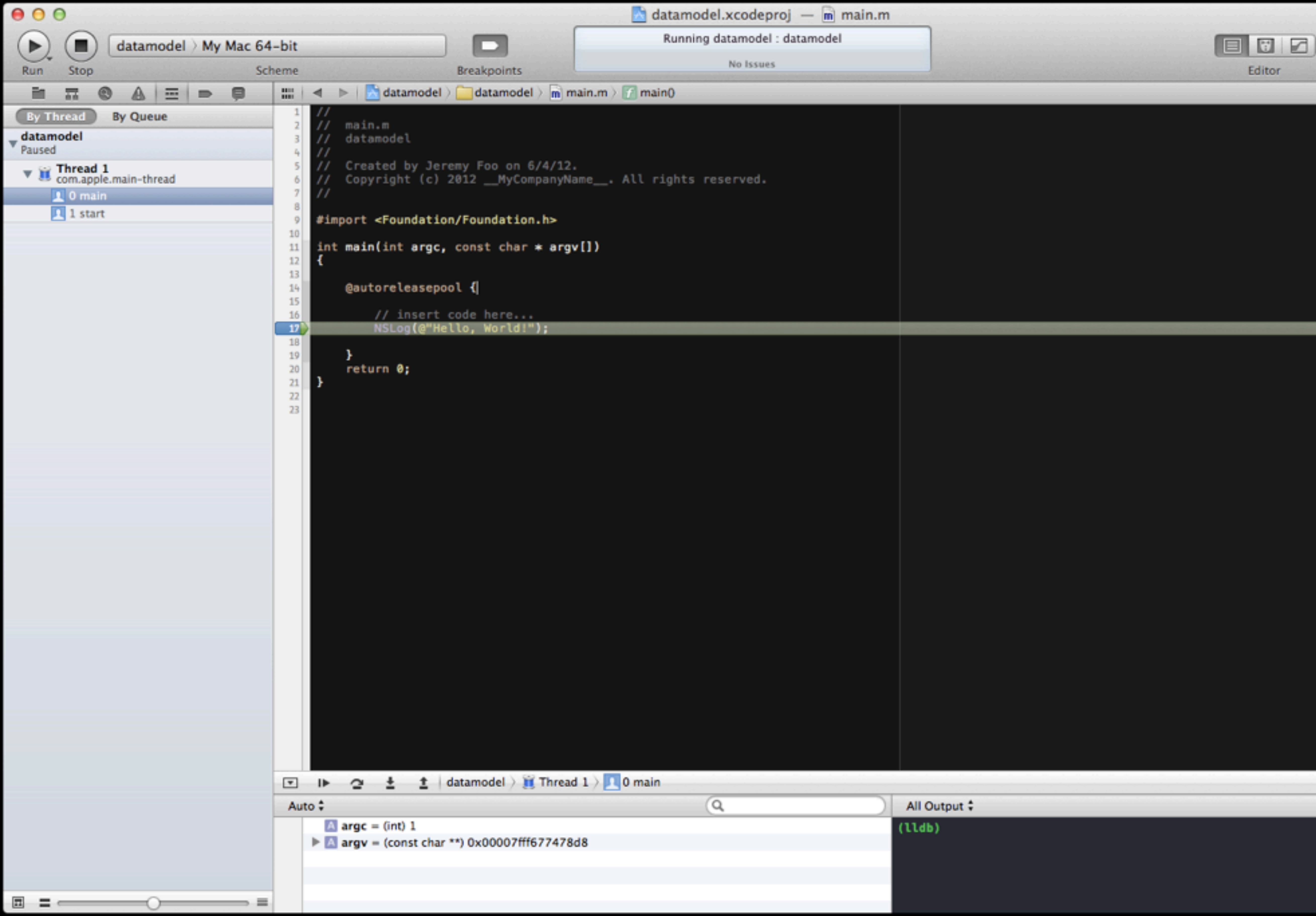
Debugging

Figure out problems

Xcode

Tools

- Set break points on line numbers
- Set break points on exceptions
- Use gdb commands to inspect objects


datamodel.xcodeproj — main.m
Run
Stop
datamodel 〉 My Mac 64-bit
Scheme
Breakpoints
Running datamodel : datamodel
No Issues
Editor
datamodel 〉 datamodel 〉 main.m 〉 main()
By Thread
By Queue
datamodel
Paused
Thread 1
com.apple.main-thread
0 main
1 start
17
datamodel 〉 Thread 1 〉 0 main
Auto
All Output

```
//
//  main.m
//  datamodel
//
//  Created by Jeremy Foo on 6/4/12.
//  Copyright (c) 2012 __MyCompanyName__. All rights reserved.
//

#import <Foundation/Foundation.h>

int main(int argc, const char * argv[])
{

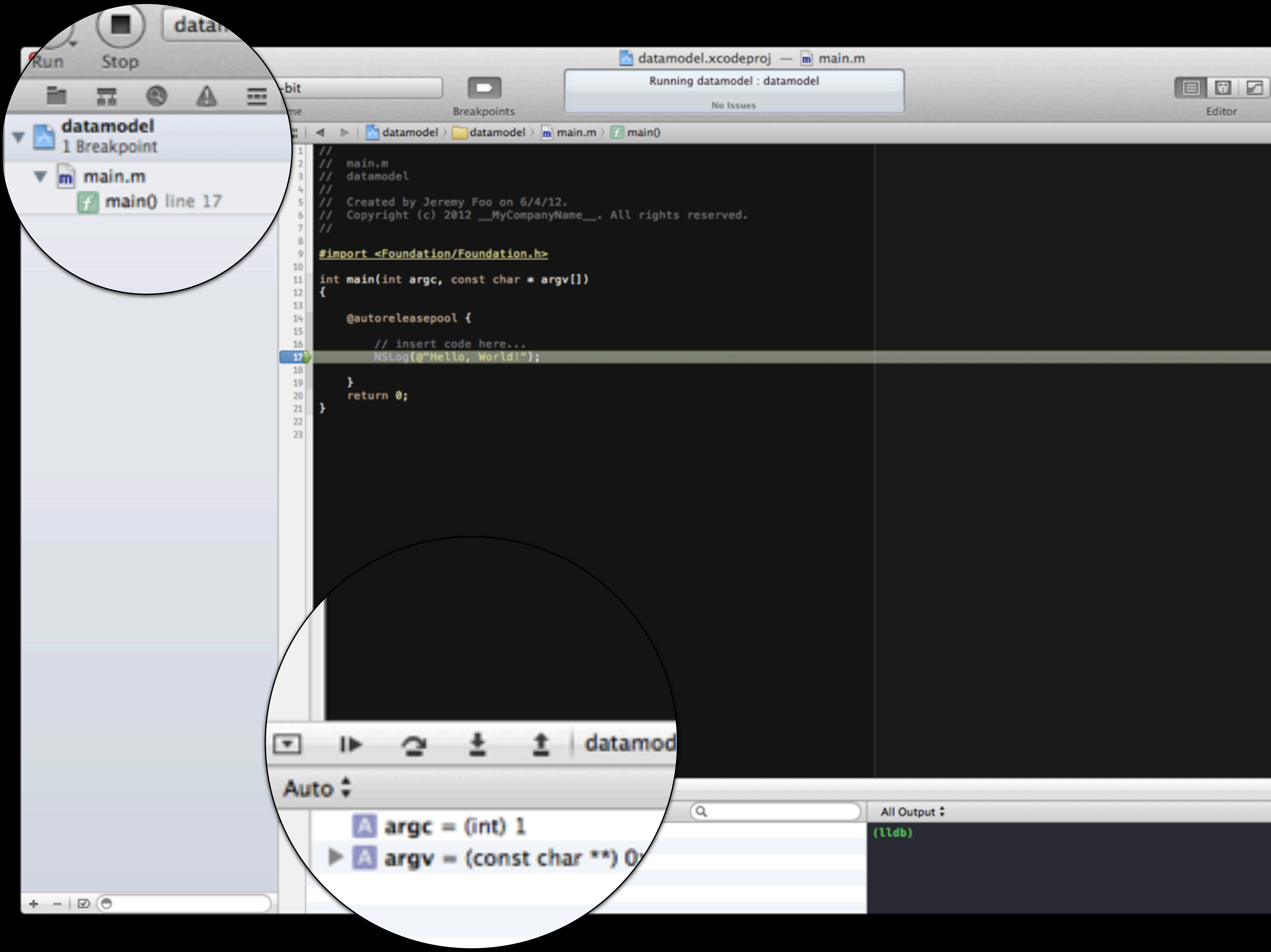
    @autoreleasepool {

        // insert code here...
        NSLog(@"Hello, World!");

    }
    return 0;
}
```

```
argc = (int) 1
argv = (const char **) 0x00007fff677478d8
```

```
(lldb)
```



Run
Stop
datamodel.xcodeproj — main.m
Running datamodel : datamodel
No Issues
Breakpoints
Editor
datamodel
1 Breakpoint
main.m
main() line 17
datamodel › datamodel › main.m › main()
datamod
Auto
All Output

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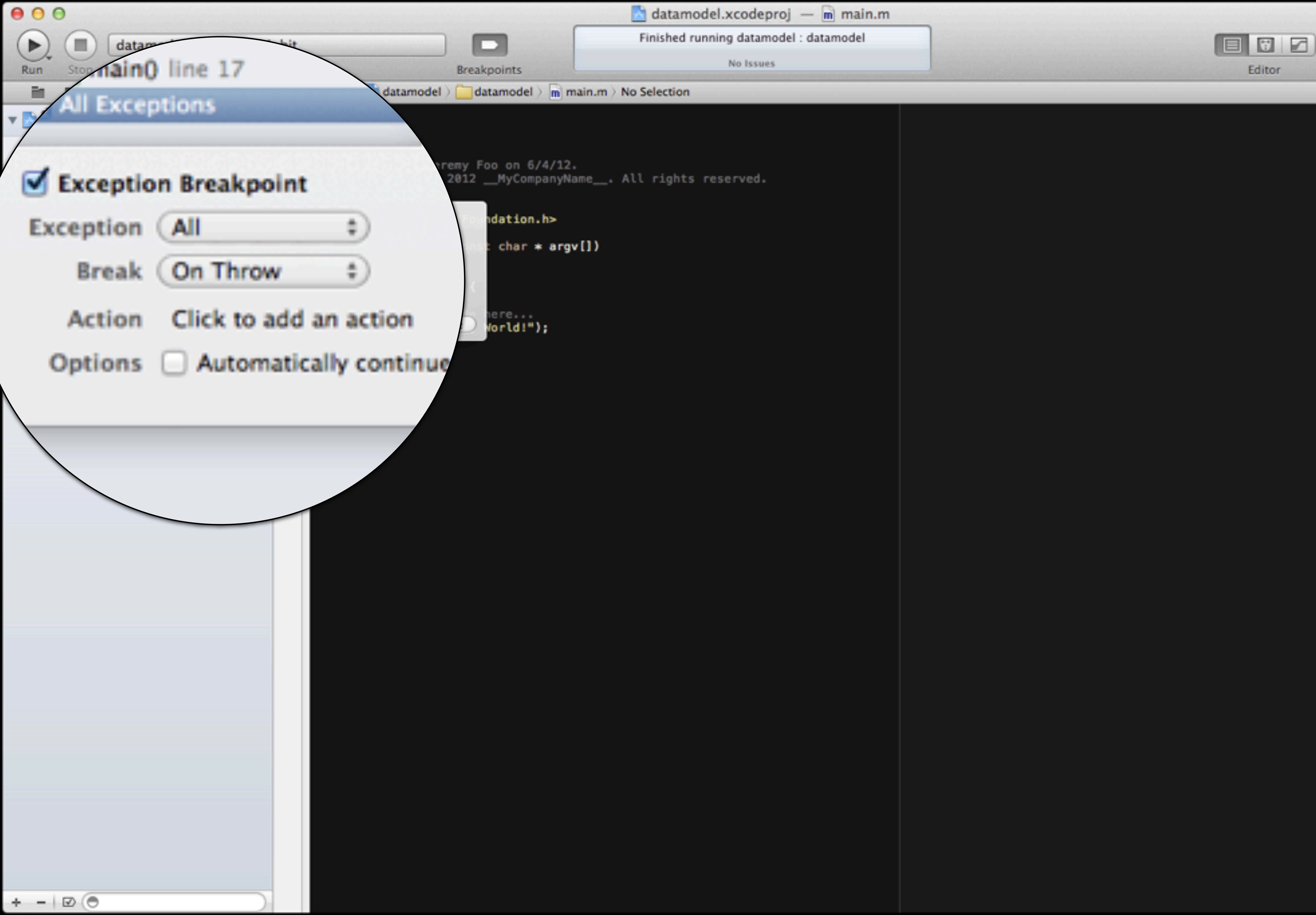
argc = (int) 1
argv = (const char **) 0
```

```
(lldb)
```



☑ Exception Breakpoint

Exception: All

Break: On Throw

Action: Click to add an action

Options: □ Automatically continu

```
remy Foo on 6/4/12.
 2012 __MyCompanyName__. All rights reserved.

ndation.h>

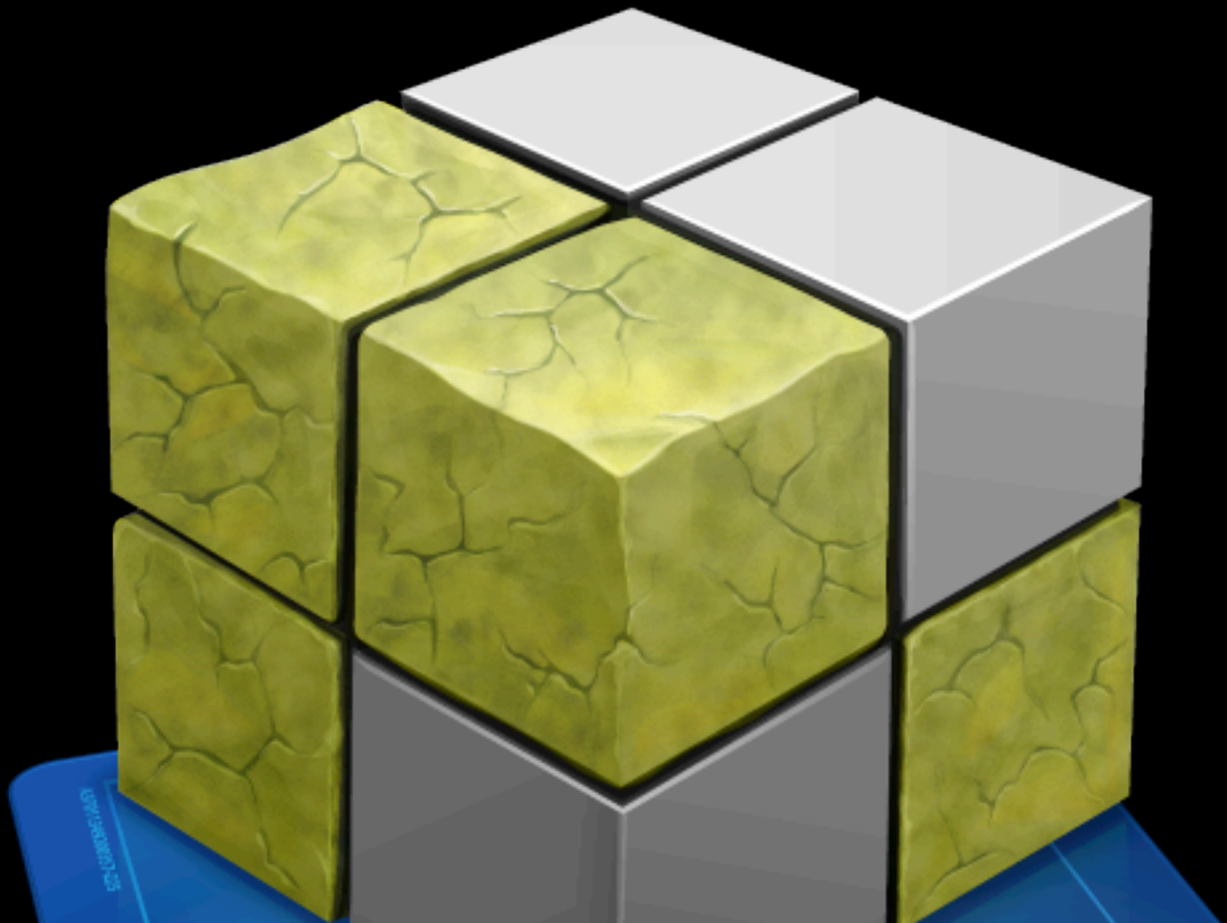
 char * argv[])

here...
World!");
```

NSZombie

Accessing deallocated object

- Used to detect when you are messaging a deallocated object
- OS sets deallocated object as NSZombie
- NSZombie throws exception when you try to access it



Instruments

Understanding problems against time

- Has leak detection using NSZombie
- More in-depth memory analysis
- Time profiling

Practice, Practice, Practice

Other frameworks

Add for awesome

Core Animation

Overview

- Animation framework built on OpenGL ES
- Strict time based animation of CALayer
- UIViews are all CALayer backed
- UIViews have connivence methods

```
[UIView animateWithDuration:0.33
                 animations:^{
                    // final state here

                 }
                 completion:^(BOOL finished) {
                     // what to do when animations are done

                 }
 ];
```

Core Data

Overview

- Object graph persistence framework
- NOT AN ORM
- Persist to SQLite, XML, or roll your own
- Setup your object graph
- Use native objects

Core Location

Overview

- Uses various sensors
  - Wi-Fi
  - Cell Tower Triangulation
  - GPS
  - Magnetometer
- Various ways to track location and location changes
- Require user permissions to use location data

MapKit

Overview

- Geographic framework
- UI for mapping
- Classes and methods for geographic manipulation
- Deals in latitude and longitude

EventKit

Overview

- Access to the iPhone's calendar system
- Create and schedule events
- Modify existing events
- Create new calendars
- Schedule tasks and alarms

StoreKit

Overview

- Deals with everything about in-app purchases
    - Retrieving listings
    - Buying
    - Downloading purchase packs
- Receipt verification

AddressBook

Overview

- Deal with the Address Book

AV Foundation

Overview

- Objective-C interface to raw video, audio hardware
- Collection of classes for powerful media handling capability
- Flexible system of inputs and outputs
- Record and play back audio, video
- Mix and Mux audio, video

Publishing to the App Store

Getting it out to everyone

App Store

Overview

- Sign your apps
  - Product
  - Testing
- Upload for review
- Profit

App Store

Requirements

- USD$99
- Private Key generated using Apple's Keychain

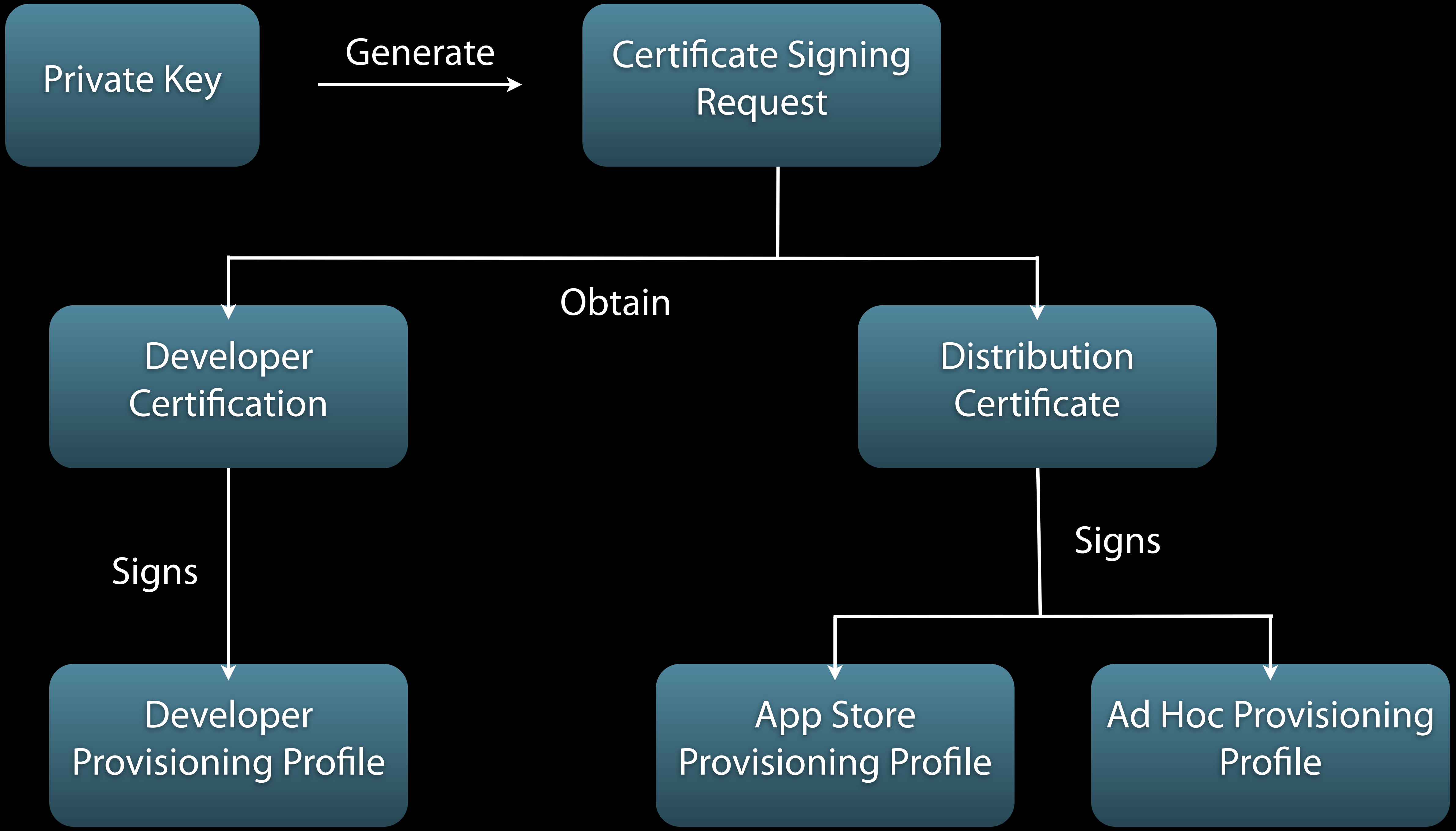
App Store

Steps to get ready

1. Sign up for iOS Developer Program
2. Upload Private Key for Certificate Signing Request
3. Receive Distribution & Developer Certificate
4. Add certificates to Keychain
5. Create provisioning profiles for signing iOS Applications
6. Download and add it to Xcode

App Store

A graphical representation



Private Key

Generate

Certificate Signing Request

Obtain

Developer Certification

Distribution Certificate

Signs

Signs

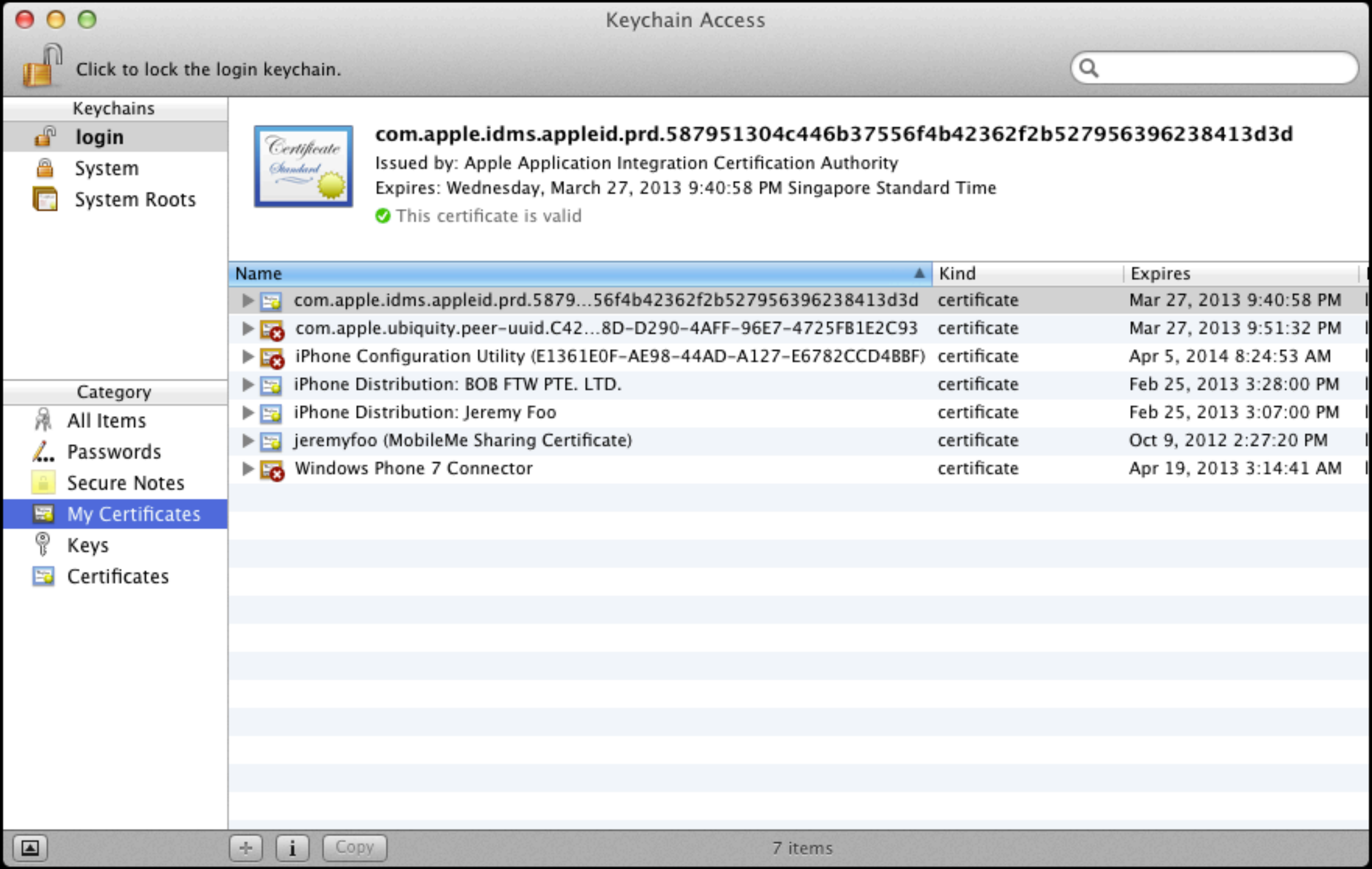
Developer Provisioning Profile

App Store Provisioning Profile

Ad Hoc Provisioning Profile

App Store

Keychain



com.apple.idms.appleid.prd.587951304c446b37556f4b42362f2b527956396238413d3d

Issued by: Apple Application Integration Certification Authority

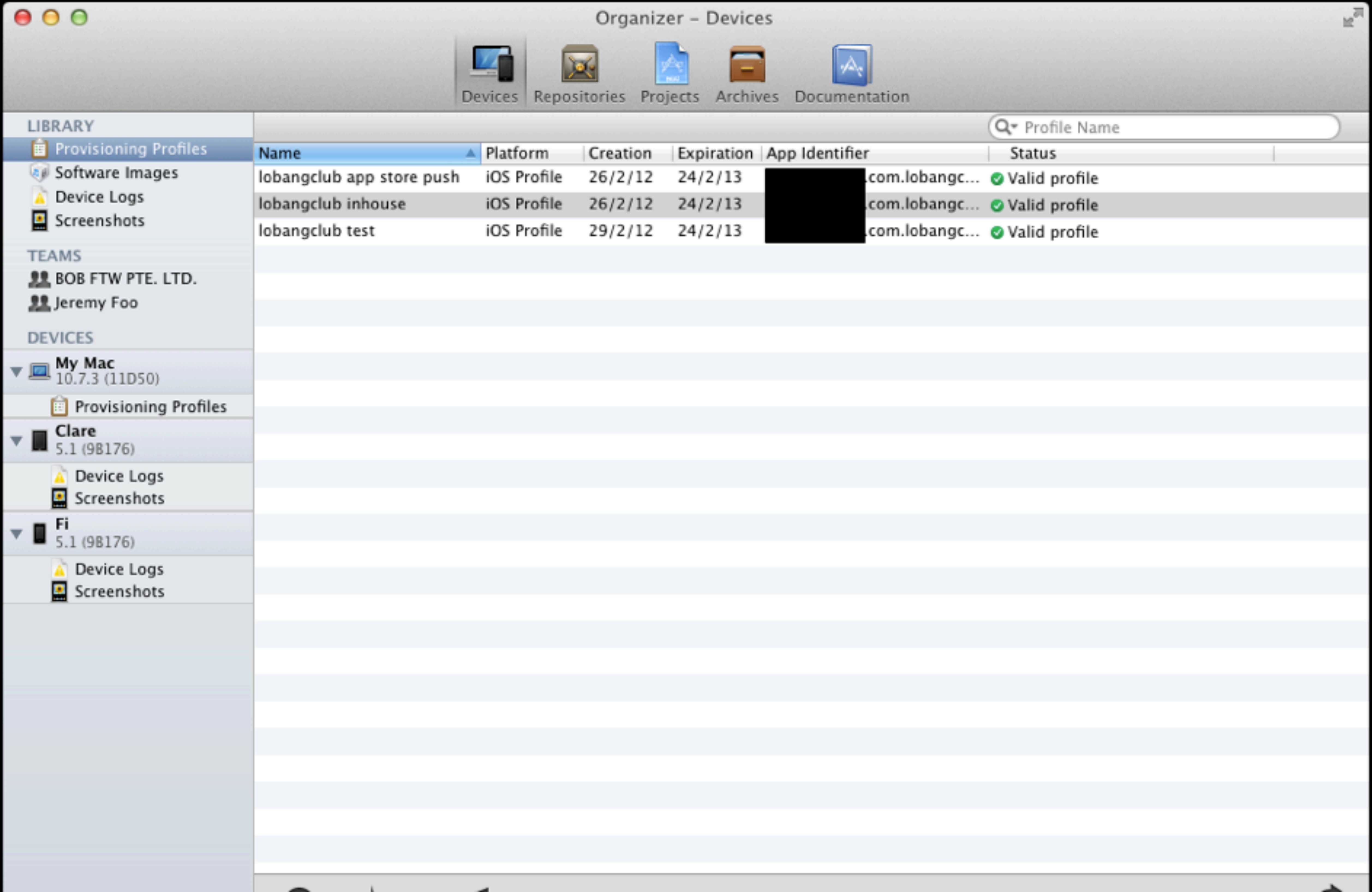
Expires: Wednesday, March 27, 2013 9:40:58 PM Singapore Standard Time

✓ This certificate is valid

Name	Kind	Expires
com.apple.idms.appleid.prd.5879...56f4b42362f2b527956396238413d3d	certificate	Mar 27, 2013 9:40:58 PM
com.apple.ubiquity.peer-uuid.C42...8D-D290-4AFF-96E7-4725FB1E2C93	certificate	Mar 27, 2013 9:51:32 PM
iPhone Configuration Utility (E1361E0F-AE98-44AD-A127-E6782CCD4BBF)	certificate	Apr 5, 2014 8:24:53 AM
iPhone Distribution: BOB FTW PTE. LTD.	certificate	Feb 25, 2013 3:28:00 PM
iPhone Distribution: Jeremy Foo	certificate	Feb 25, 2013 3:07:00 PM
jeremyfoo (MobileMe Sharing Certificate)	certificate	Oct 9, 2012 2:27:20 PM
Windows Phone 7 Connector	certificate	Apr 19, 2013 3:14:41 AM

App Store

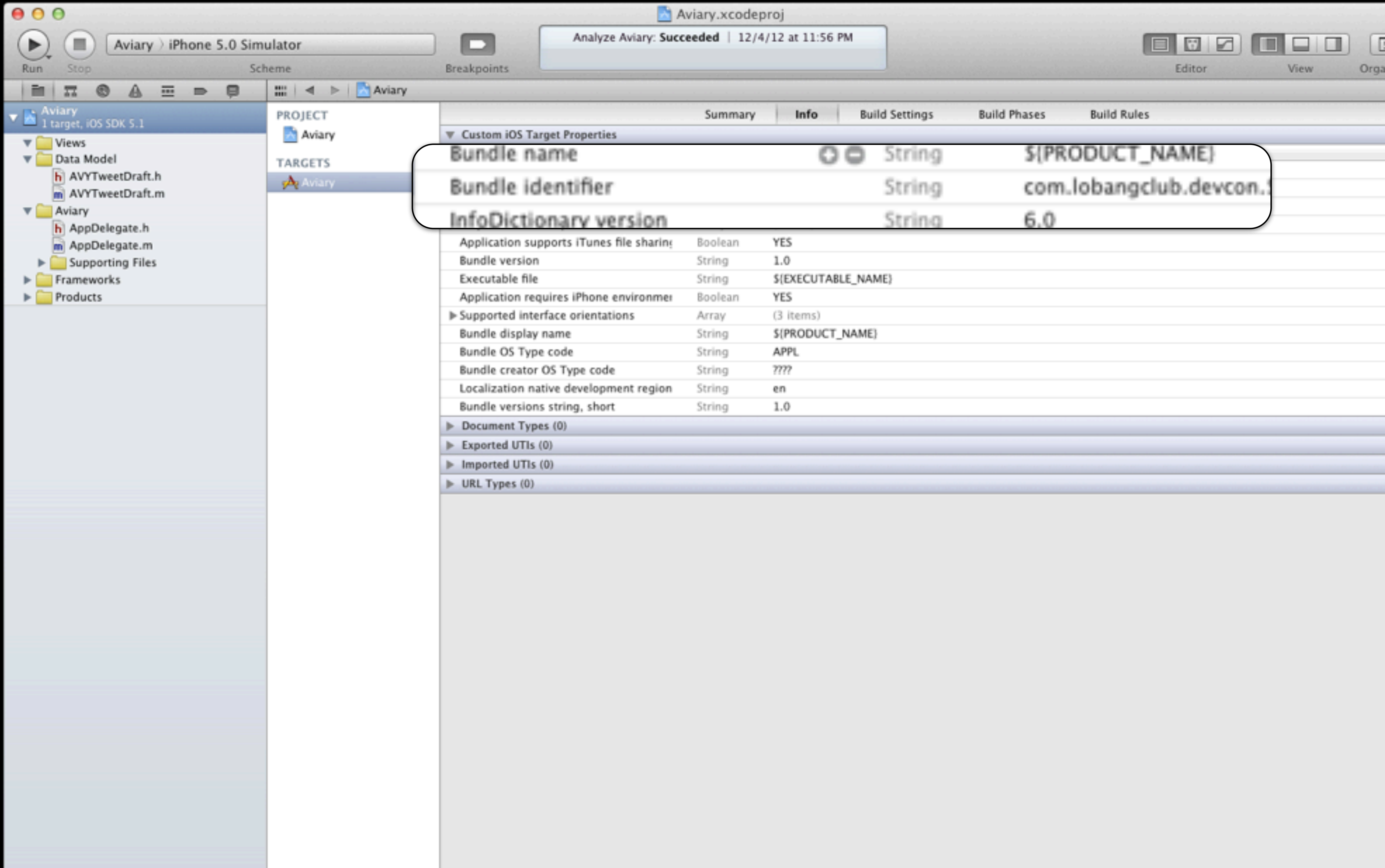
Xcode Organizer



Name	Platform	Creation	Expiration	App Identifier	Status
lobangclub app store push	iOS Profile	26/2/12	24/2/13	[redacted].com.lobangc...	✓ Valid profile
lobangclub inhouse	iOS Profile	26/2/12	24/2/13	[redacted].com.lobangc...	✓ Valid profile
lobangclub test	iOS Profile	29/2/12	24/2/13	[redacted].com.lobangc...	✓ Valid profile

Xcode

Bundle Identifier identifies your app



▼ Custom iOS Target Properties

Bundle name	String	${PRODUCT_NAME}
Bundle identifier	String	com.lobangclub.devcon.$
InfoDictionary version	String	6.0
Application supports iTunes file sharin	Boolean	YES
Bundle version	String	1.0
Executable file	String	${EXECUTABLE_NAME}
Application requires iPhone environmer	Boolean	YES
▶ Supported interface orientations	Array	(3 items)
Bundle display name	String	${PRODUCT_NAME}
Bundle OS Type code	String	APPL
Bundle creator OS Type code	String	????
Localization native development region	String	en
Bundle versions string, short	String	1.0

▶ Document Types (0)

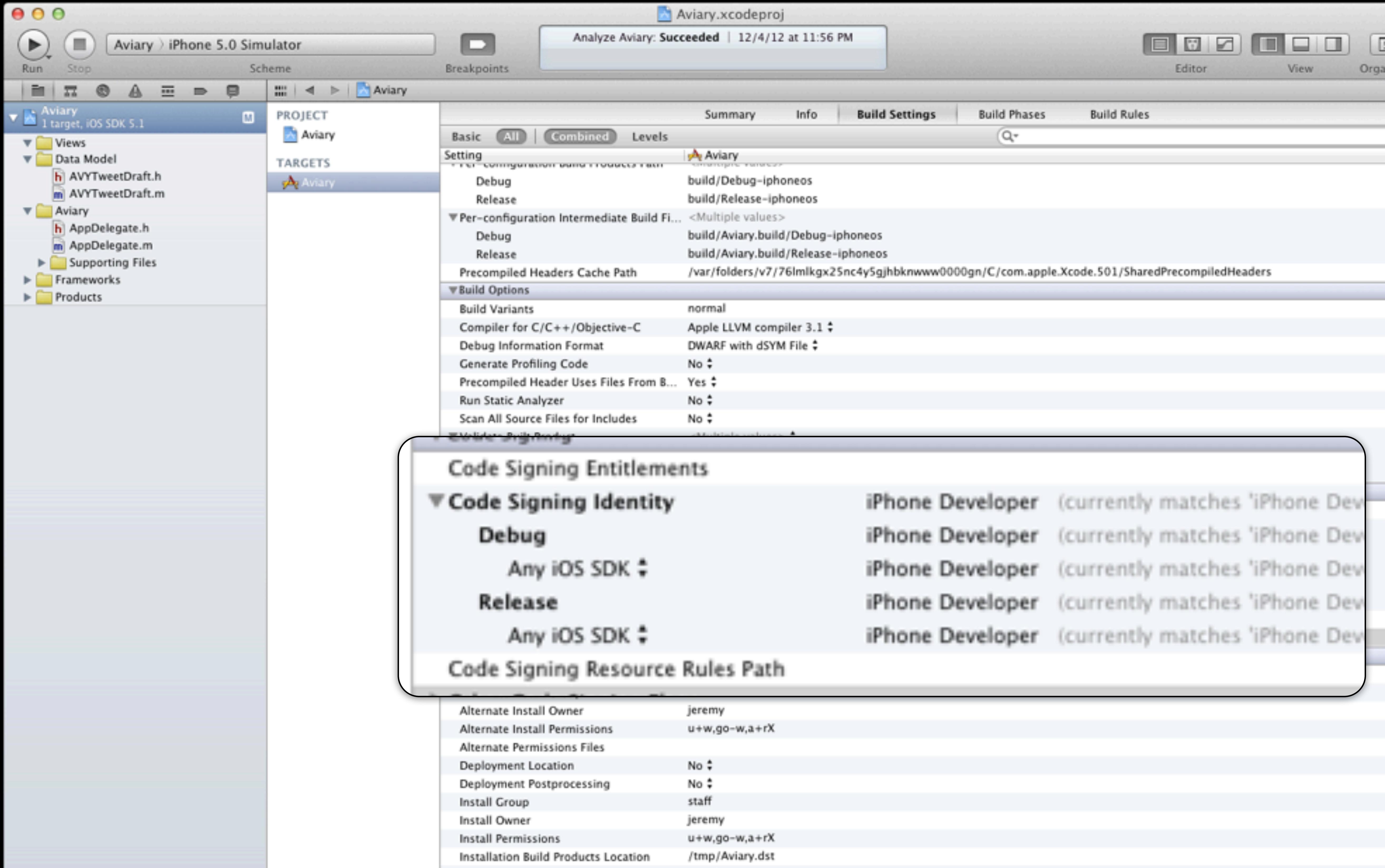
▶ Exported UTIs (0)

▶ Imported UTIs (0)

▶ URL Types (0)

Xcode

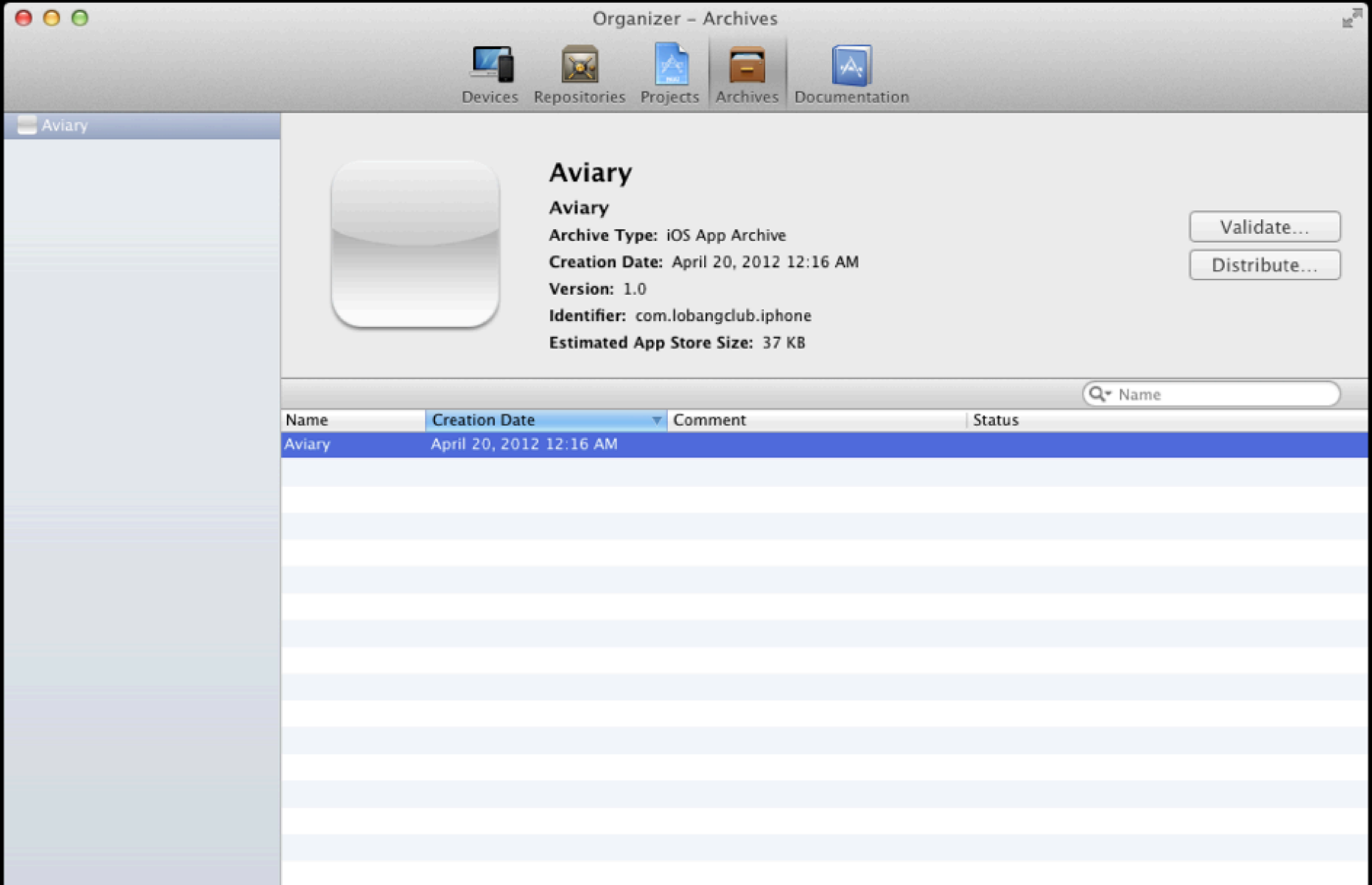
Build settings



Setting	Aviary
Per-configuration Build Products Path	<Multiple values>
Debug	build/Debug-iphoneos
Release	build/Release-iphoneos
▼Per-configuration Intermediate Build Fi...	<Multiple values>
Debug	build/Aviary.build/Debug-iphoneos
Release	build/Aviary.build/Release-iphoneos
Precompiled Headers Cache Path	/var/folders/v7/76lmlkgx25nc4y5gjhbknwww0000gn/C/com.apple.Xcode.501/SharedPrecompiledHeaders
▼Build Options	
Build Variants	normal
Compiler for C/C++/Objective-C	Apple LLVM compiler 3.1 ⬍
Debug Information Format	DWARF with dSYM File ⬍
Generate Profiling Code	No ⬍
Precompiled Header Uses Files From B...	Yes ⬍
Run Static Analyzer	No ⬍
Scan All Source Files for Includes	No ⬍
Validate Built Product	<Multiple values> ⬍
Code Signing	
Code Signing Entitlements	
▼Code Signing Identity	iPhone Developer (currently matches 'iPhone Dev
Debug	iPhone Developer (currently matches 'iPhone Dev
Any iOS SDK ⬍	iPhone Developer (currently matches 'iPhone Dev
Release	iPhone Developer (currently matches 'iPhone Dev
Any iOS SDK ⬍	iPhone Developer (currently matches 'iPhone Dev
Code Signing Resource Rules Path	
Other Code Signing Flags	
Alternate Install Owner	jeremy
Alternate Install Permissions	u+w,go-w,a+rX
Alternate Permissions Files	
Deployment Location	No ⬍
Deployment Postprocessing	No ⬍
Install Group	staff
Install Owner	jeremy
Install Permissions	u+w,go-w,a+rX
Installation Build Products Location	/tmp/Aviary.dst

Xcode

Build and Archive



Aviary

Aviary

Archive Type: iOS App Archive

Creation Date: April 20, 2012 12:16 AM

Version: 1.0

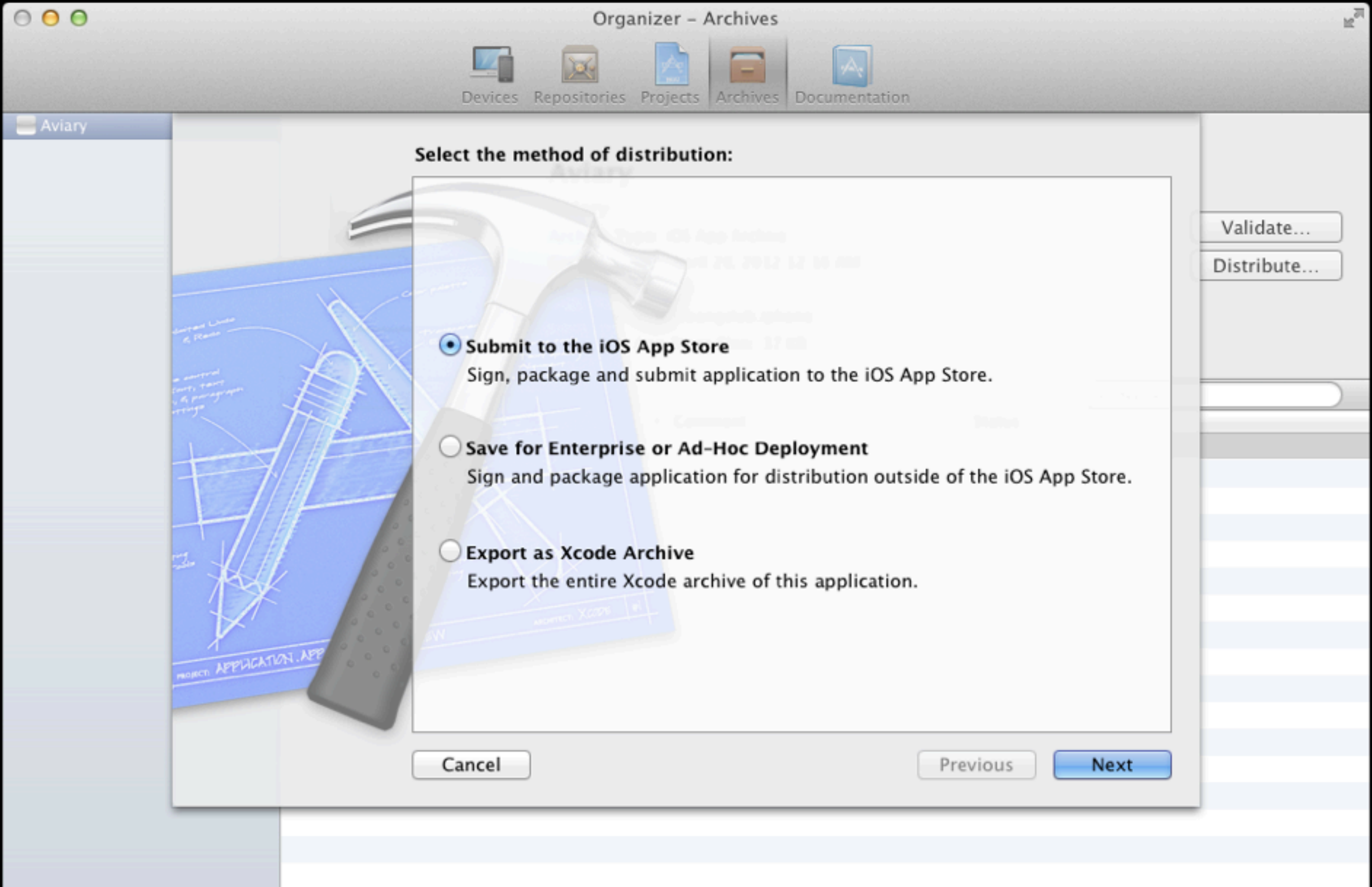
Identifier: com.lobangclub.iphone

Estimated App Store Size: 37 KB

Name	Creation Date	Comment	Status
Aviary	April 20, 2012 12:16 AM		

Xcode

Distribute



Organizer – Archives

Select the method of distribution:

● Submit to the iOS App Store
Sign, package and submit application to the iOS App Store.

○ Save for Enterprise or Ad-Hoc Deployment
Sign and package application for distribution outside of the iOS App Store.

○ Export as Xcode Archive
Export the entire Xcode archive of this application.

App Store

Review

- Average 2 weeks review time
- Longer if there is a rejection
- Static Analysis for private API usage
- Human/Automated testing

Profit