Creating Great Mobile Libraries

Daniel Tull

What is a library?

- A collection of code to do a particular task
  - Better to do one thing well
- Often stand-alone, sometimes has dependencies

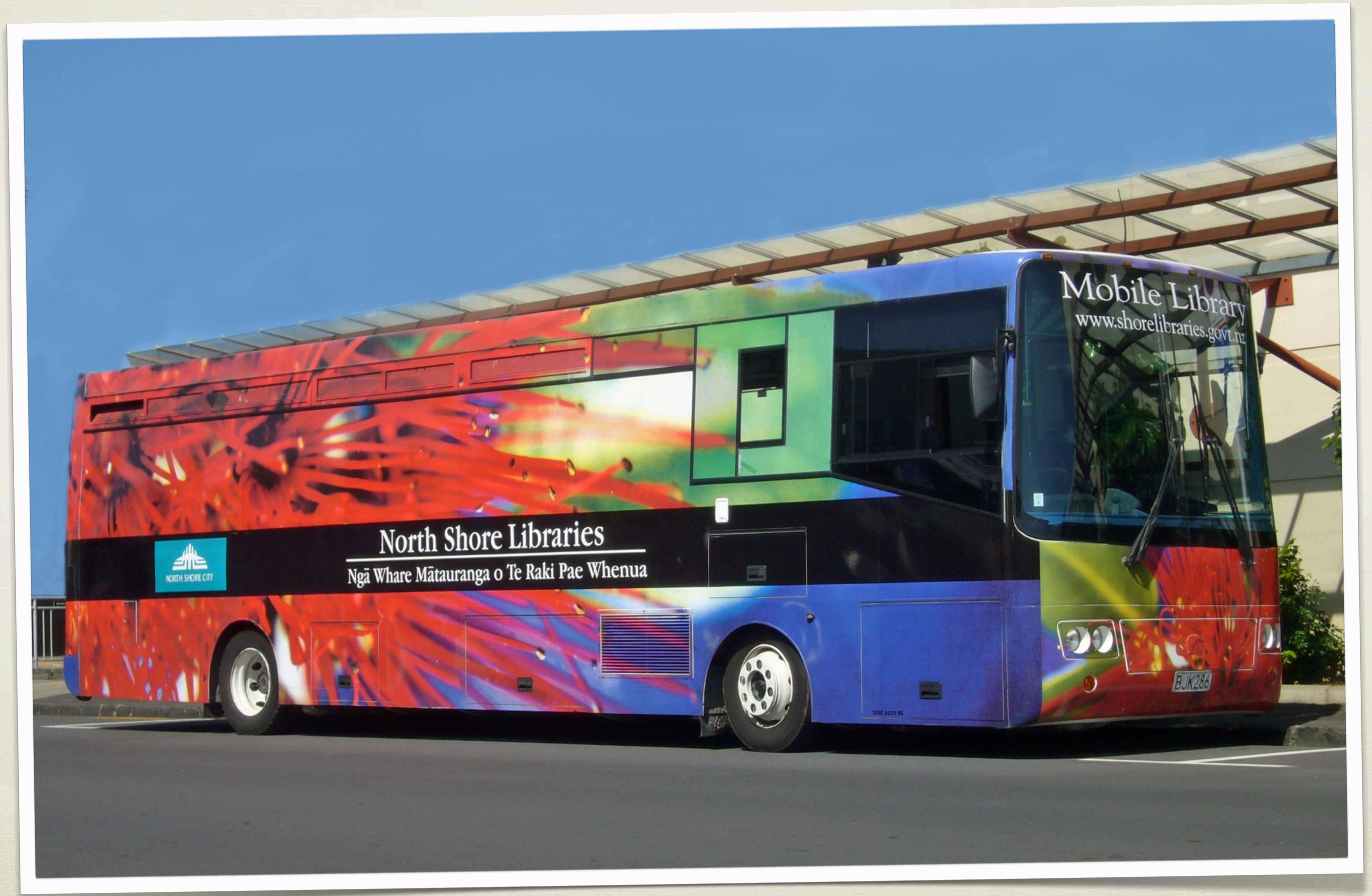
Doesn't have to be big

http://novelideasmanly.blogspot.co.uk/2007/03/library-afloat-sets-sail.html

Fit for purpose

http://www.eifl.net/ghana-library-board-mobile-library-service

Make it stand out


Mobile Library
www.shorelibraries.govt.nz
North Shore Libraries
Ngā Whare Mātauranga o Te Raki Pae Whenua
NORTH SHORE CITY
BJK286

http://en.wikipedia.org/wiki/File:NSPublicMobileLibrary.jpg

Wait for Apple to replace it

http://www.hdelectriccompany.com/latest-news/hd-electric-demo-van-becomes-bookmobile.htm

Wait for Apple to replace it

It's aerodynamic

A little bit shiny

It runs on electric!

http://www.hdelectriccompany.com/latest-news/hd-electric-demo-van-becomes-bookmobile.htm

Version Control

- For this I will assume git
- Bring in libraries with git submodules, svn externals etc

Drag & Drop Files

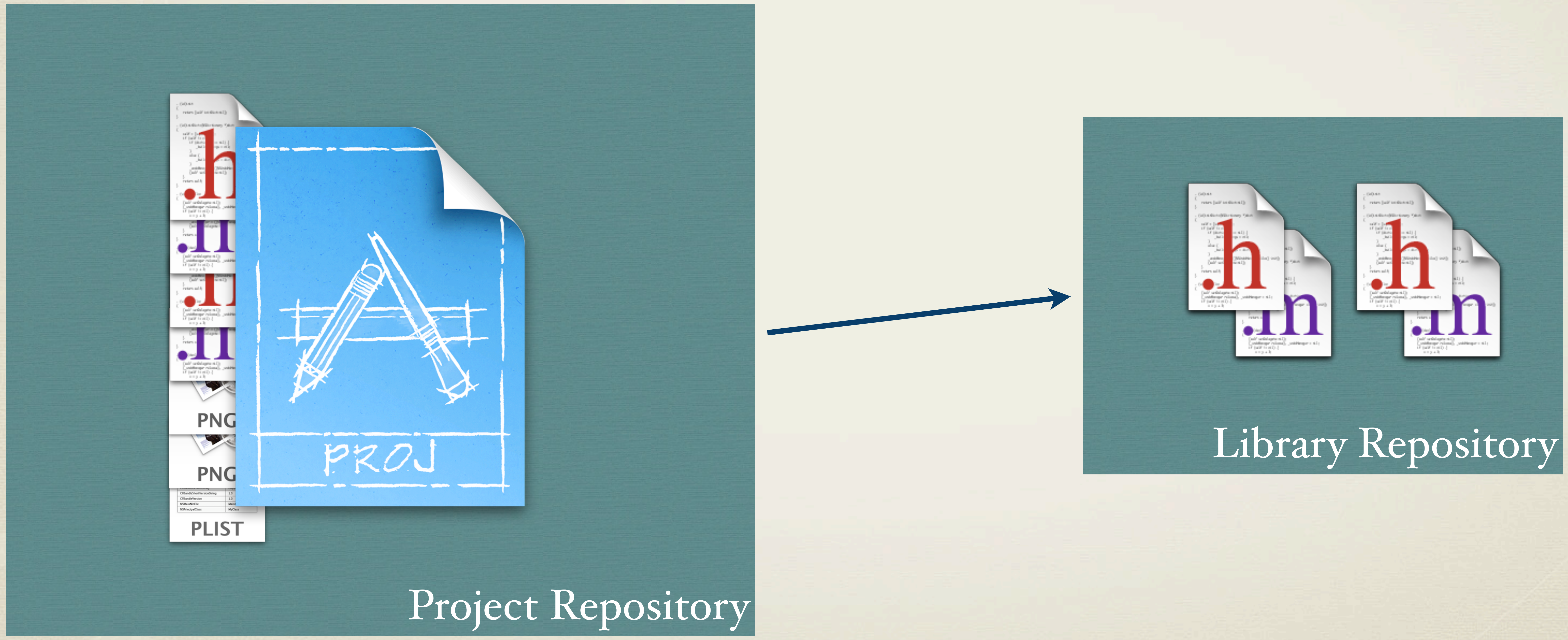
Drag & Drop Files

Create a repository and add files

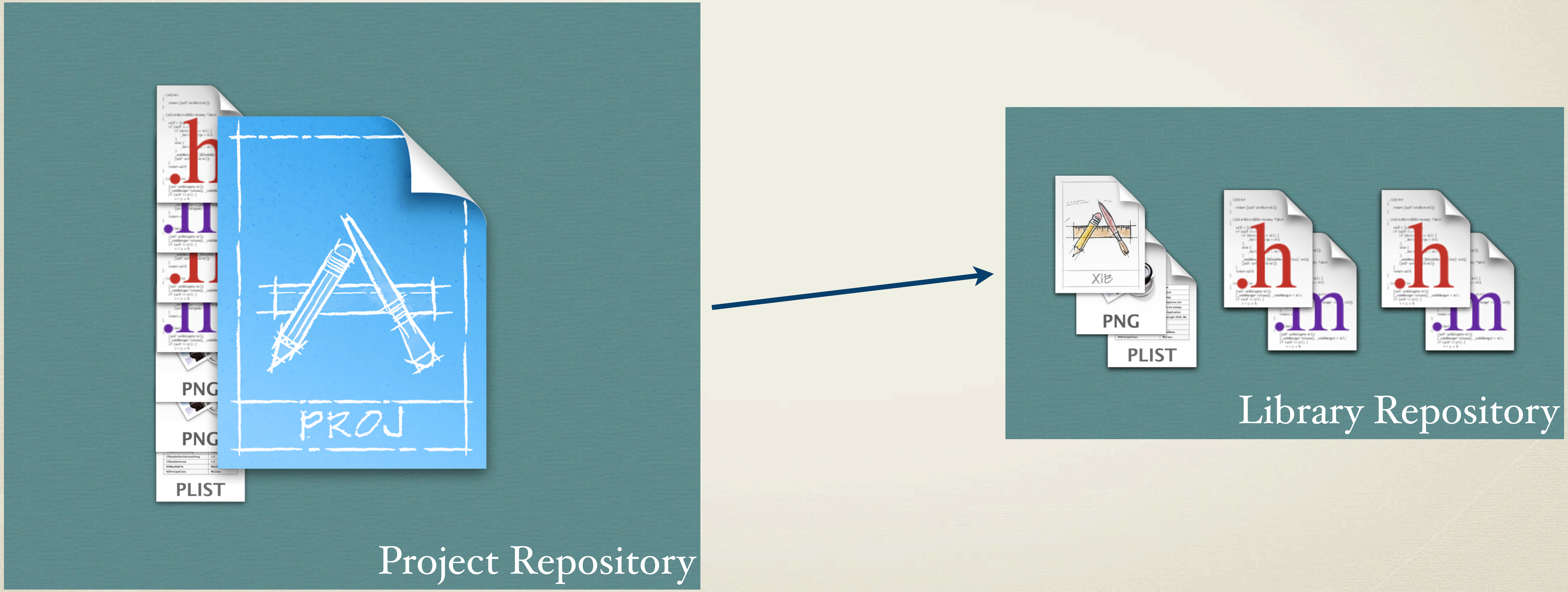
Add submodule reference to library repository

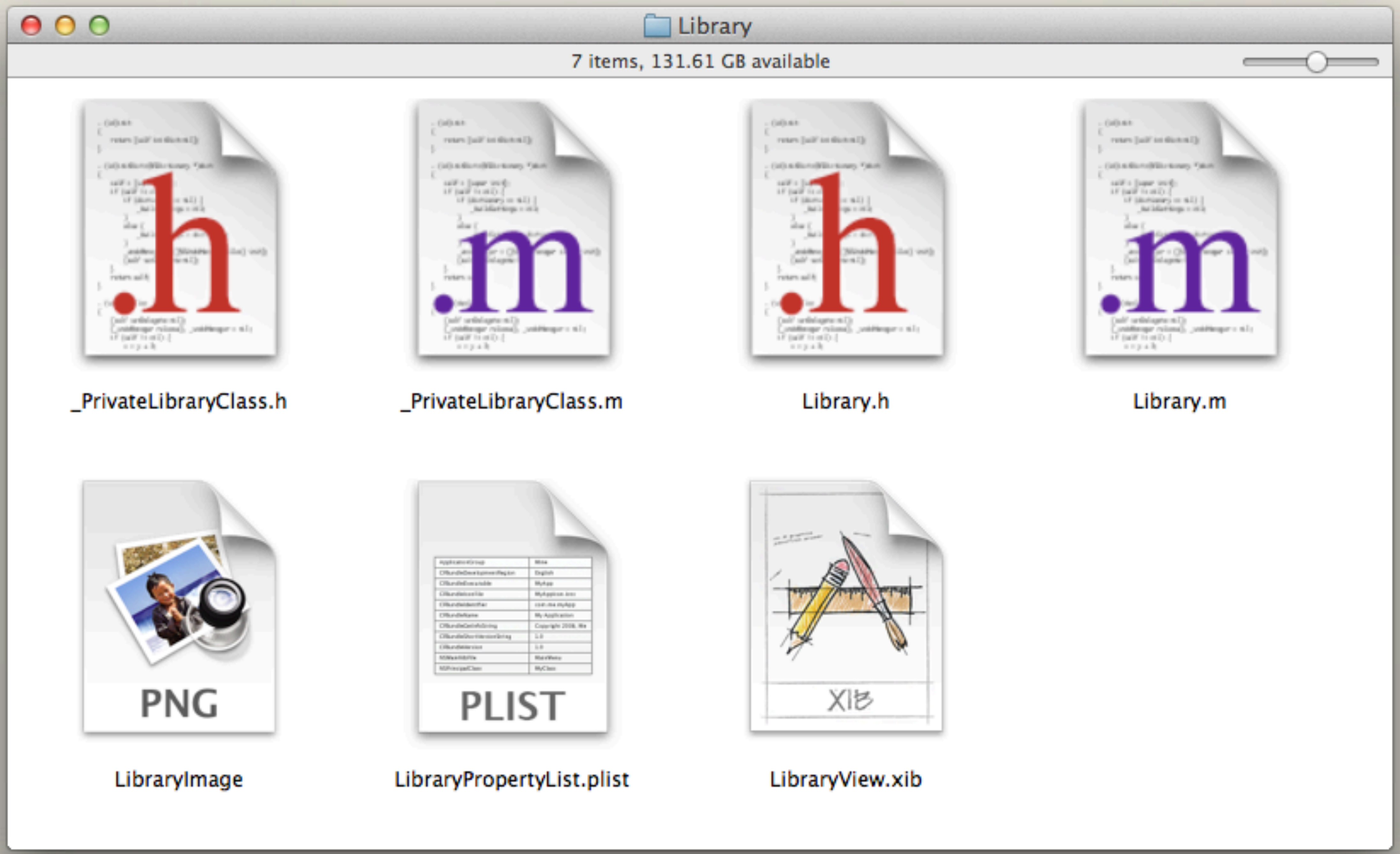
Referencing projects drag the required files in

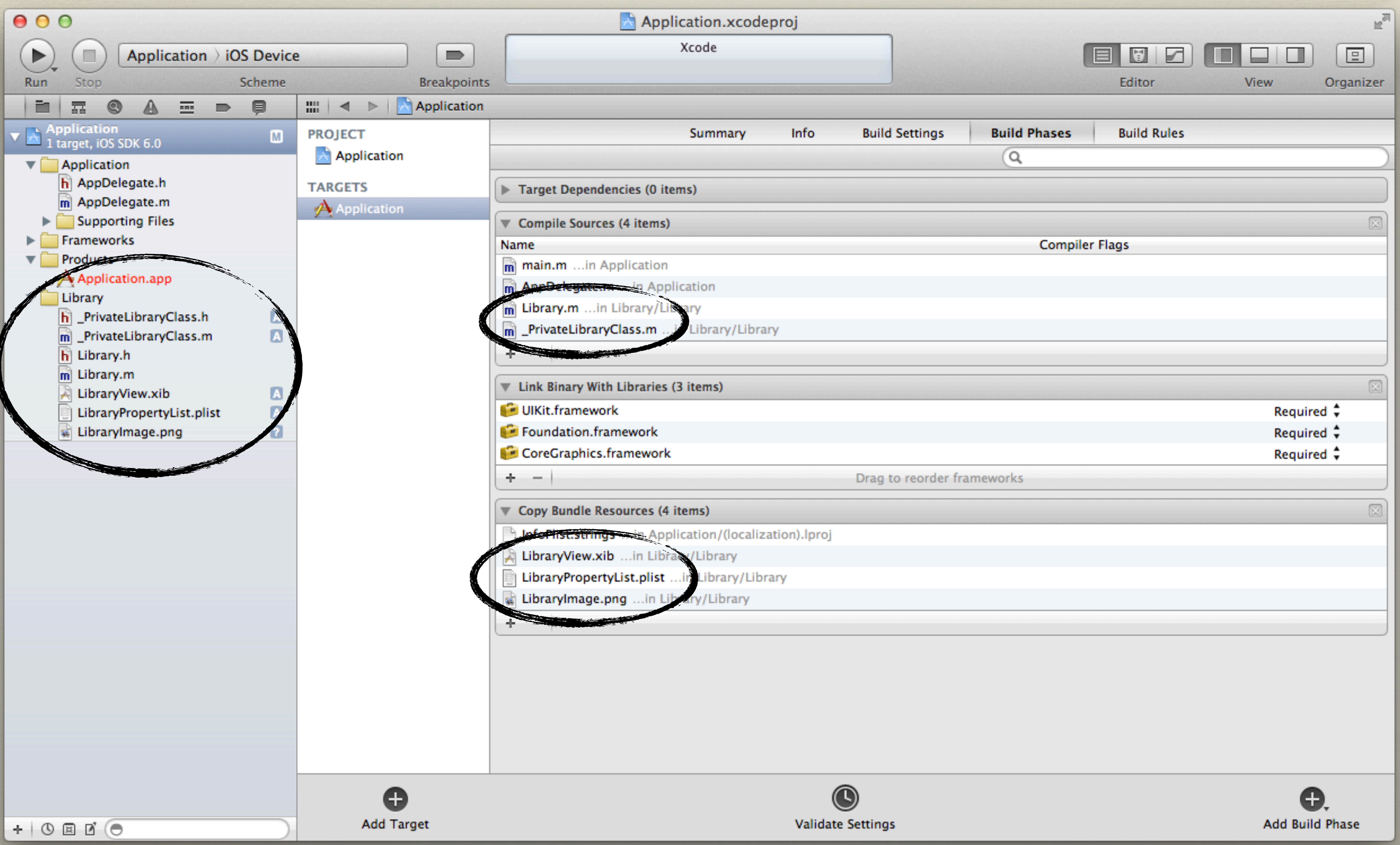
Drag & Drop Files



Drag & Drop Files




Library
7 items, 131.61 GB available
_PrivateLibraryClass.h
_PrivateLibraryClass.m
Library.h
Library.m
LibraryImage
LibraryPropertyList.plist
LibraryView.xib



Target Dependencies (0 items)

Compile Sources (4 items)

Name	Compiler Flags
main.m ...in Application	
AppDelegate.m ...in Application	
Library.m ...in Library/Library	
_PrivateLibraryClass.m ...in Library/Library	

Link Binary With Libraries (3 items)

UIKit.framework	Required
Foundation.framework	Required
CoreGraphics.framework	Required

Drag to reorder frameworks

Copy Bundle Resources (4 items)

InfoPlist.strings ...in Application/(localization).lproj
LibraryView.xib ...in Library/Library
LibraryPropertyList.plist ...in Library/Library
LibraryImage.png ...in Library/Library

Drag & Drop Files

- ✓ Really simple to create
- ✓ Easy to drop in for the user

Drag & Drop Files

- ✘ Need to know whether it’s written for ARC
- ✘ Need to know about file changes
- ✘ Library unit tests not run
- ✘ Warnings show up in app build
- ✘ Users can see and use private library classes

Static Libraries

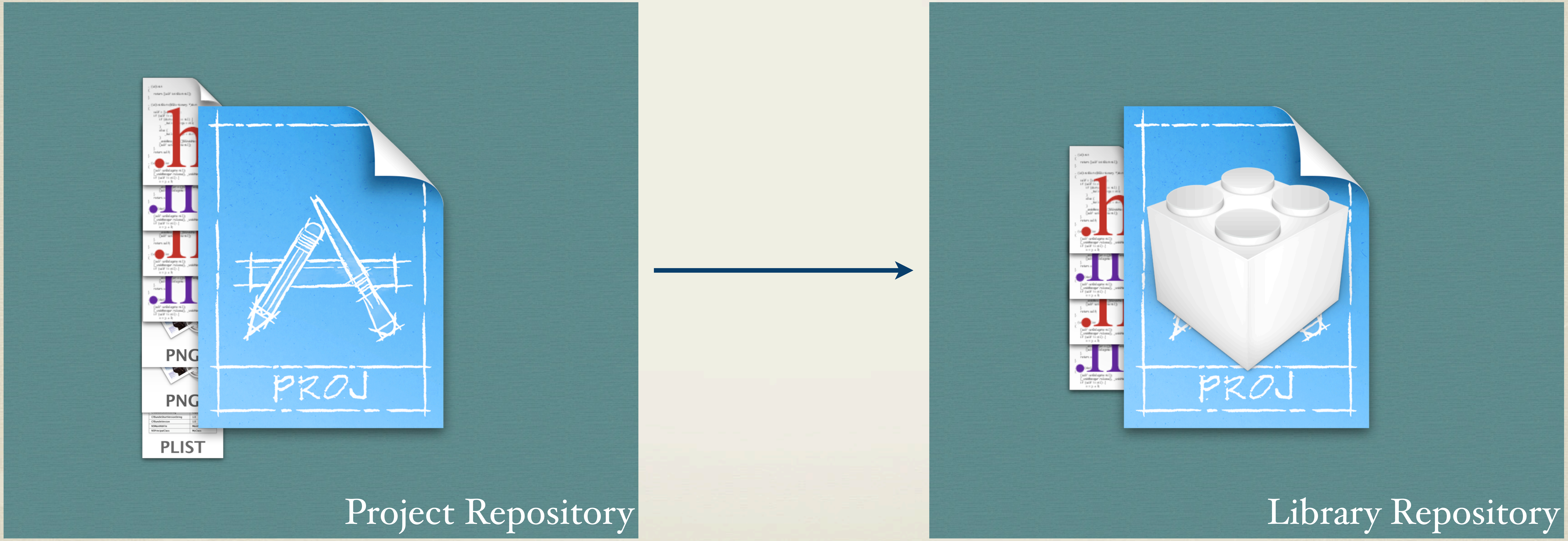
Static Libraries

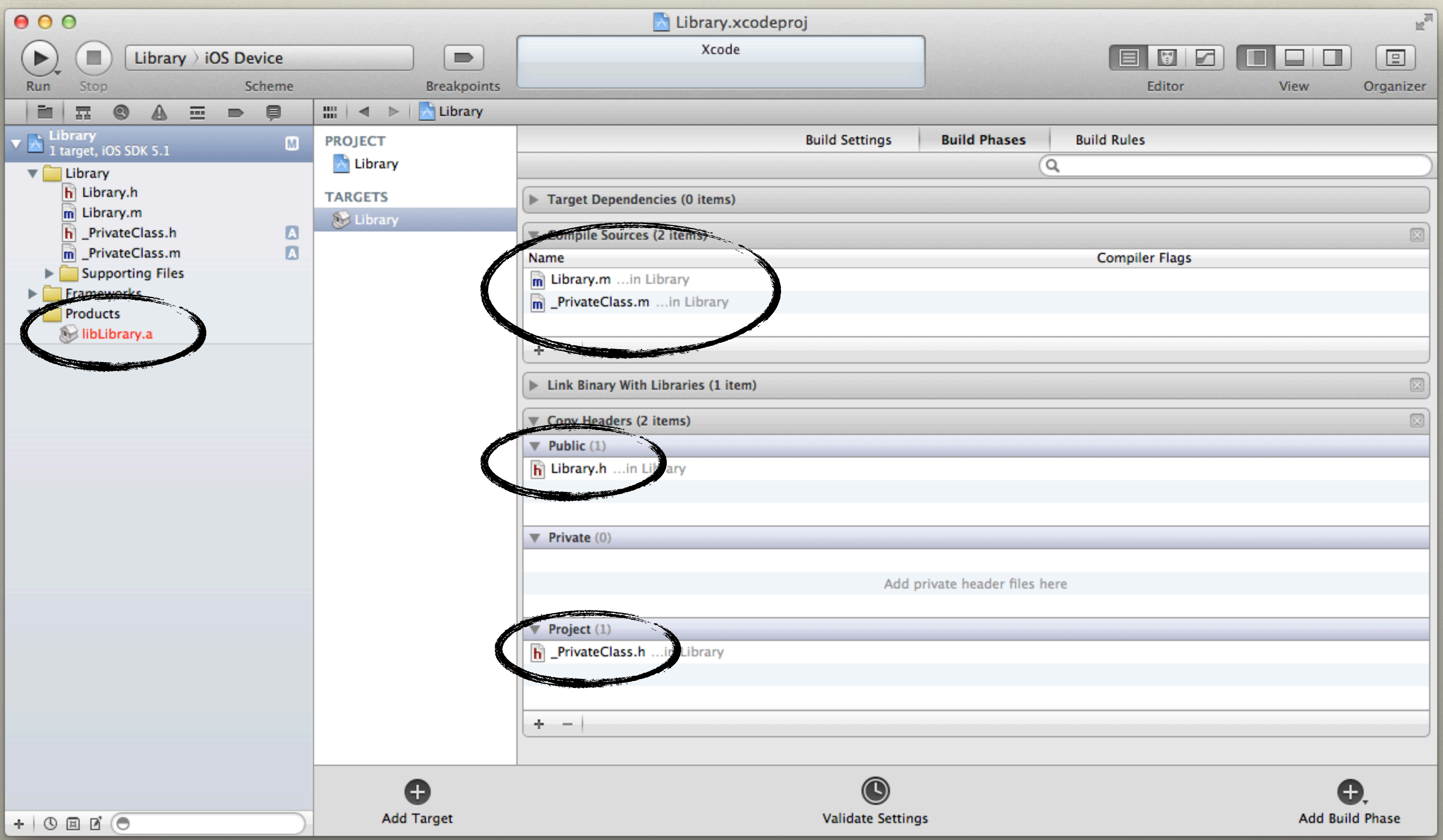
Create a new static library project

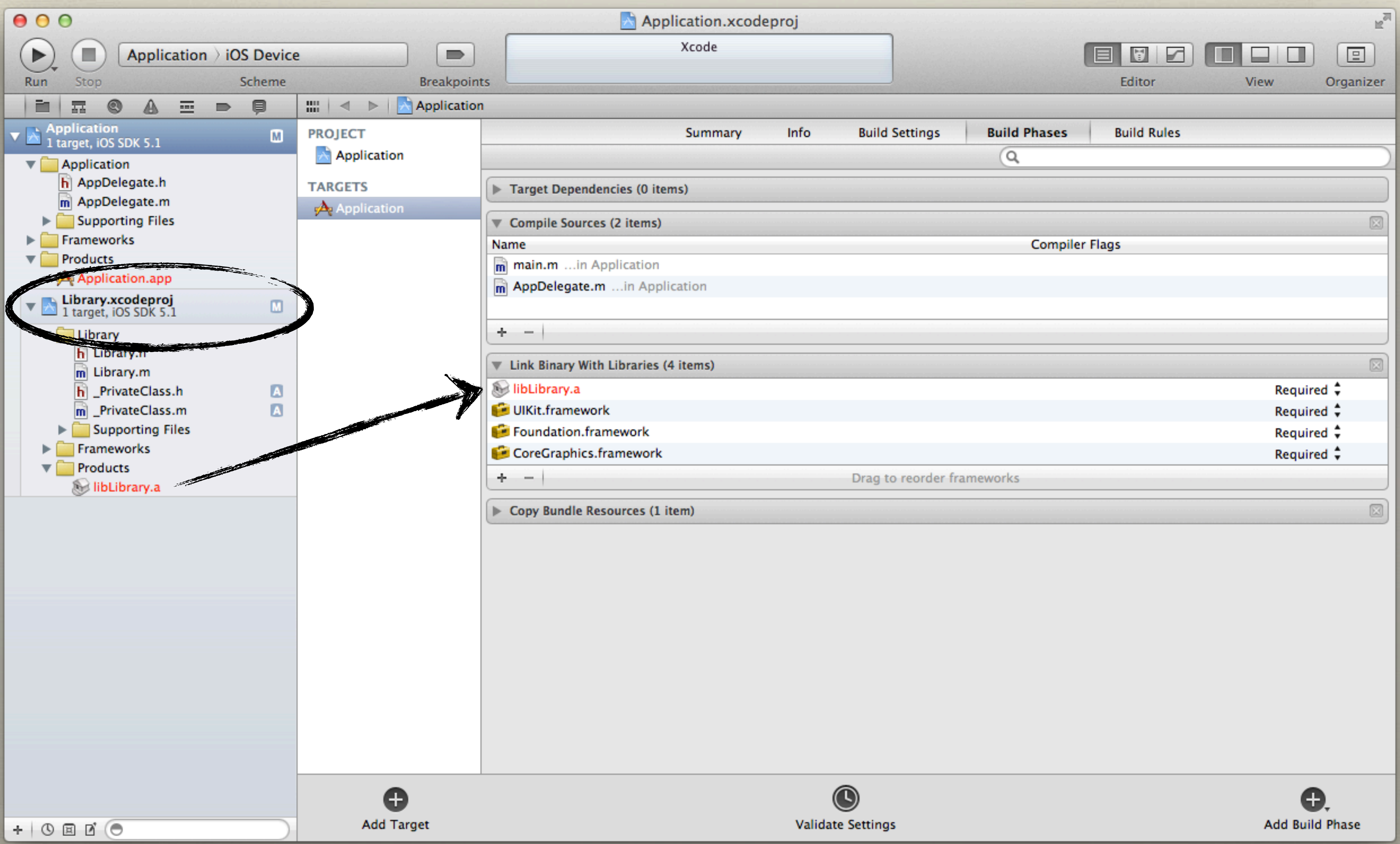
Add classes to the static library target

Link the library into the app project

Static Libraries




Library.xcodeproj
Run
Stop
Library 〉 iOS Device
Scheme
Breakpoints
Xcode
Editor
View
Organizer
Library
1 target, iOS SDK 5.1
Library
Library.h
Library.m
_PrivateClass.h
_PrivateClass.m
Supporting Files
Frameworks
Products
libLibrary.a
PROJECT
Library
TARGETS
Library
Build Settings
Build Phases
Build Rules
Target Dependencies (0 items)
Compile Sources (2 items)
Name
Compiler Flags
Library.m ...in Library
_PrivateClass.m ...in Library
Link Binary With Libraries (1 item)
Copy Headers (2 items)
Public (1)
Library.h ...in Library
Private (0)
Add private header files here
Project (1)
_PrivateClass.h ...in Library
Add Target
Validate Settings
Add Build Phase



Application
1 target, iOS SDK 5.1
- Application
  - AppDelegate.h
  - AppDelegate.m
  - Supporting Files
- Frameworks
- Products
  - Application.app
- Library.xcodeproj
  1 target, iOS SDK 5.1
  - Library
    - Library.h
    - Library.m
    - _PrivateClass.h
    - _PrivateClass.m
    - Supporting Files
  - Frameworks
  - Products
    - libLibrary.a

PROJECT
Application

TARGETS
Application

Target Dependencies (0 items)

Compile Sources (2 items)

Name	Compiler Flags
main.m ...in Application	
AppDelegate.m ...in Application	

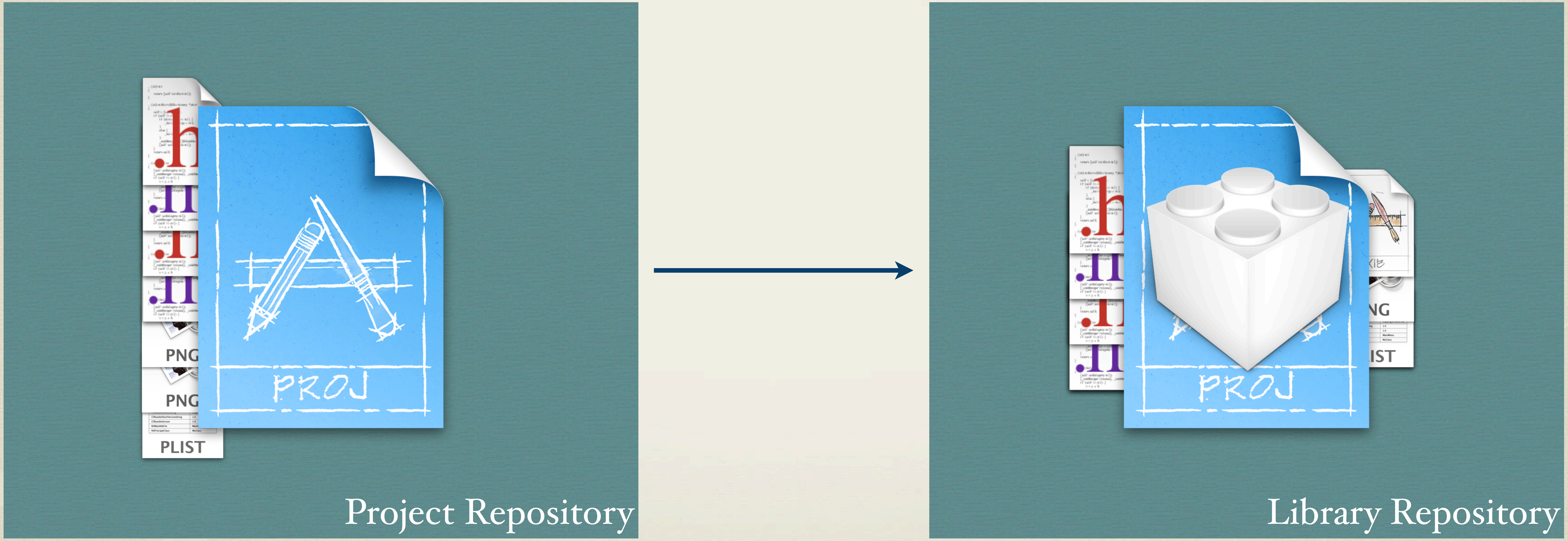
Link Binary With Libraries (4 items)

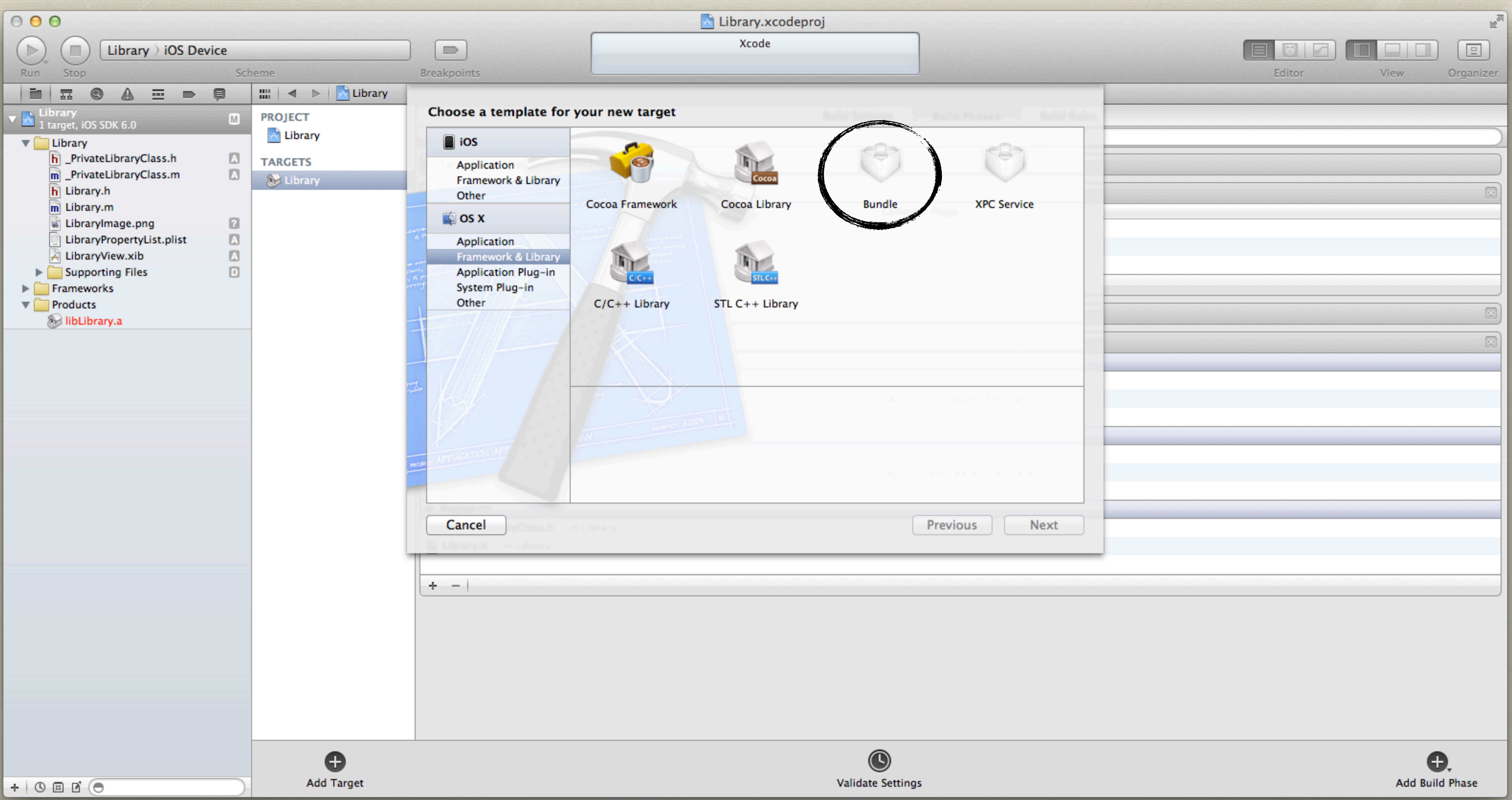
libLibrary.a	Required
UIKit.framework	Required
Foundation.framework	Required
CoreGraphics.framework	Required

Drag to reorder frameworks

Copy Bundle Resources (1 item)

Static Libraries

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Library
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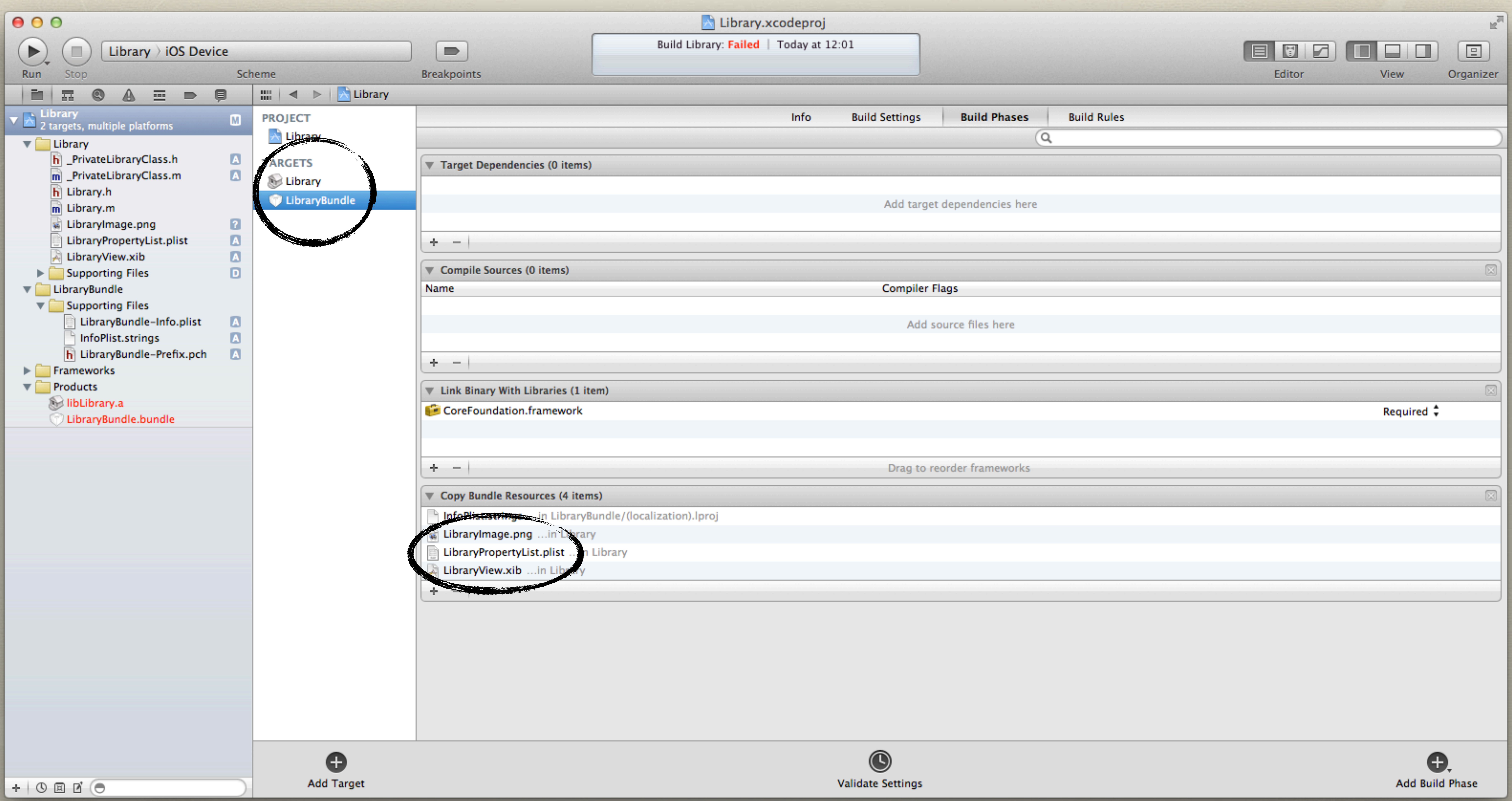
_PrivateLibraryClass.m
Library.h
Library.m
LibraryImage.png
LibraryPropertyList.plist
LibraryView.xib
Supporting Files
Frameworks
Products
libLibrary.a
PROJECT
Library
TARGETS
Library
Choose a template for your new target
iOS
Application
Framework & Library
Other
OS X
Application
Framework & Library
Application Plug-in
System Plug-in
Other
Cocoa Framework
Cocoa Library
Bundle
XPC Service
C/C++ Library
STL C++ Library
Cancel
Previous
Next
Add Target
Validate Settings
Add Build Phase



Build Library: Failed | Today at 12:01

Library
2 targets, multiple platforms

- Library
  - _PrivateLibraryClass.h
  - _PrivateLibraryClass.m
  - Library.h
  - Library.m
  - LibraryImage.png
  - LibraryPropertyList.plist
  - LibraryView.xib
  - Supporting Files
- LibraryBundle
  - Supporting Files
    - LibraryBundle-Info.plist
    - InfoPlist.strings
    - LibraryBundle-Prefix.pch
- Frameworks
- Products
  - libLibrary.a
  - LibraryBundle.bundle

Target Dependencies (0 items)

Add target dependencies here

Compile Sources (0 items)

Name	Compiler Flags

Add source files here

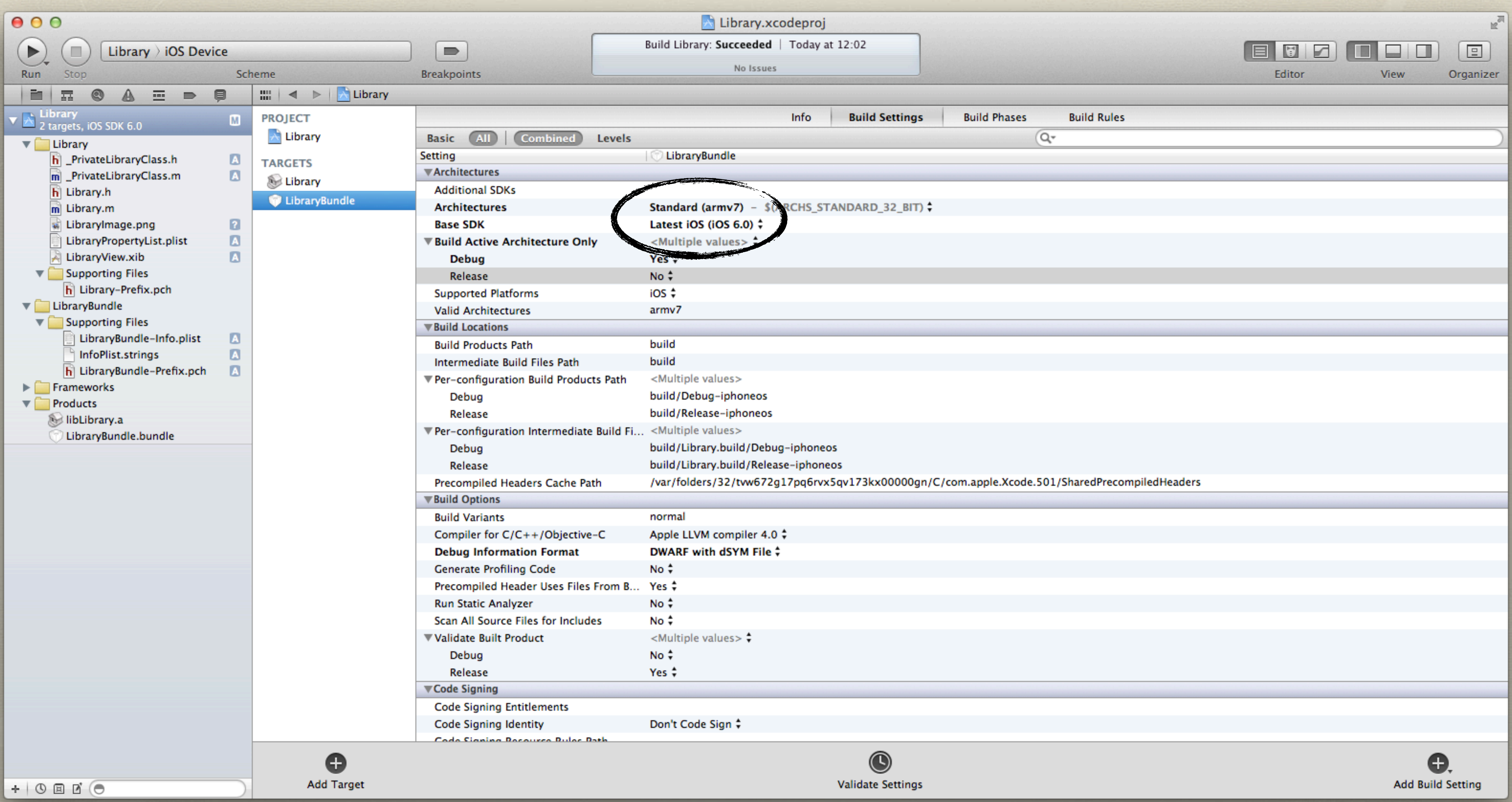
Link Binary With Libraries (1 item)

CoreFoundation.framework — Required

Drag to reorder frameworks

Copy Bundle Resources (4 items)

- InfoPlist.strings ...in LibraryBundle/(localization).lproj
- LibraryImage.png ...in Library
- LibraryPropertyList.plist ...in Library
- LibraryView.xib ...in Library



```
Library
2 targets, iOS SDK 6.0
▼ Library
    _PrivateLibraryClass.h
    _PrivateLibraryClass.m
    Library.h
    Library.m
    LibraryImage.png
    LibraryPropertyList.plist
    LibraryView.xib
  ▼ Supporting Files
      Library-Prefix.pch
▼ LibraryBundle
  ▼ Supporting Files
      LibraryBundle-Info.plist
      InfoPlist.strings
      LibraryBundle-Prefix.pch
▶ Frameworks
▼ Products
    libLibrary.a
    LibraryBundle.bundle
```

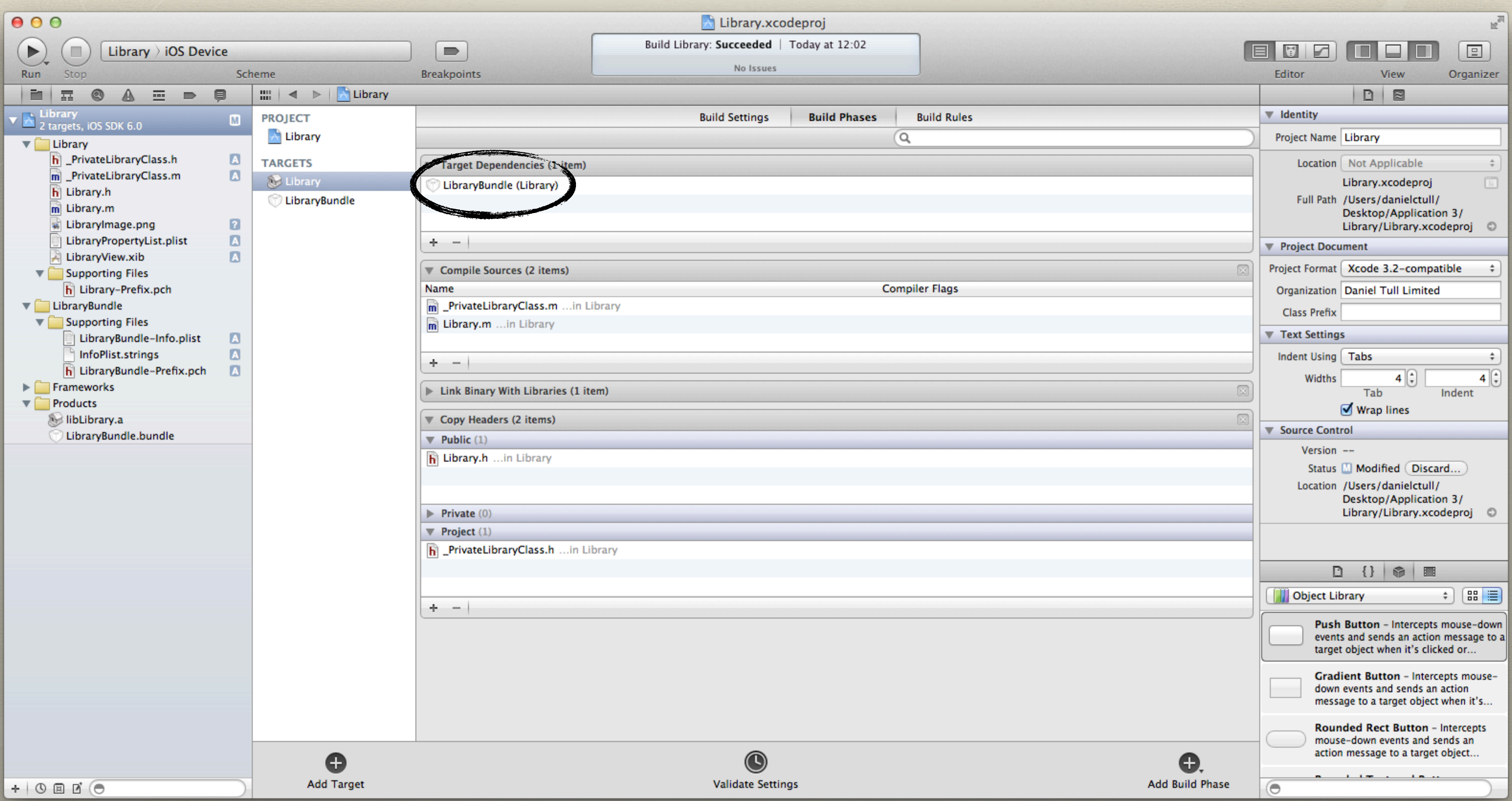
PROJECT
- Library

TARGETS
- Library
- LibraryBundle

Info | Build Settings | Build Phases | Build Rules

Basic | All | Combined | Levels

Setting	LibraryBundle
▼Architectures	
Additional SDKs	
Architectures	**Standard (armv7)** – $(ARCHS_STANDARD_32_BIT)
Base SDK	**Latest iOS (iOS 6.0)**
▼Build Active Architecture Only	<Multiple values>
Debug	Yes
Release	No
Supported Platforms	iOS
Valid Architectures	armv7
▼Build Locations	
Build Products Path	build
Intermediate Build Files Path	build
▼Per-configuration Build Products Path	<Multiple values>
Debug	build/Debug-iphoneos
Release	build/Release-iphoneos
▼Per-configuration Intermediate Build Fi...	<Multiple values>
Debug	build/Library.build/Debug-iphoneos
Release	build/Library.build/Release-iphoneos
Precompiled Headers Cache Path	/var/folders/32/tww672g17pq6rvx5qv173kx00000gn/C/com.apple.Xcode.501/SharedPrecompiledHeaders
▼Build Options	
Build Variants	normal
Compiler for C/C++/Objective-C	Apple LLVM compiler 4.0
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>
Debug	No
Release	Yes
▼Code Signing	
Code Signing Entitlements	
Code Signing Identity	Don't Code Sign



Build Library: **Succeeded** | Today at 12:02
No Issues

Library
2 targets, iOS SDK 6.0

- Library
  - _PrivateLibraryClass.h
  - _PrivateLibraryClass.m
  - Library.h
  - Library.m
  - LibraryImage.png
  - LibraryPropertyList.plist
  - LibraryView.xib
  - Supporting Files
    - Library-Prefix.pch
- LibraryBundle
  - Supporting Files
    - LibraryBundle-Info.plist
    - InfoPlist.strings
    - LibraryBundle-Prefix.pch
- Frameworks
- Products
  - libLibrary.a
  - LibraryBundle.bundle

PROJECT
Library

TARGETS
Library
LibraryBundle

Target Dependencies (1 item)
LibraryBundle (Library)

Compile Sources (2 items)

Name	Compiler Flags
_PrivateLibraryClass.m ...in Library	
Library.m ...in Library	

Link Binary With Libraries (1 item)

Copy Headers (2 items)
Public (1)
Library.h ...in Library
Private (0)
Project (1)
_PrivateLibraryClass.h ...in Library

Identity

Project Name	Library
Location	Not Applicable
	Library.xcodeproj
Full Path	/Users/danielctull/Desktop/Application 3/Library/Library.xcodeproj

Project Document

Project Format	Xcode 3.2-compatible
Organization	Daniel Tull Limited
Class Prefix	

Text Settings

Indent Using	Tabs
Widths	Tab 4, Indent 4
	✓ Wrap lines

Source Control

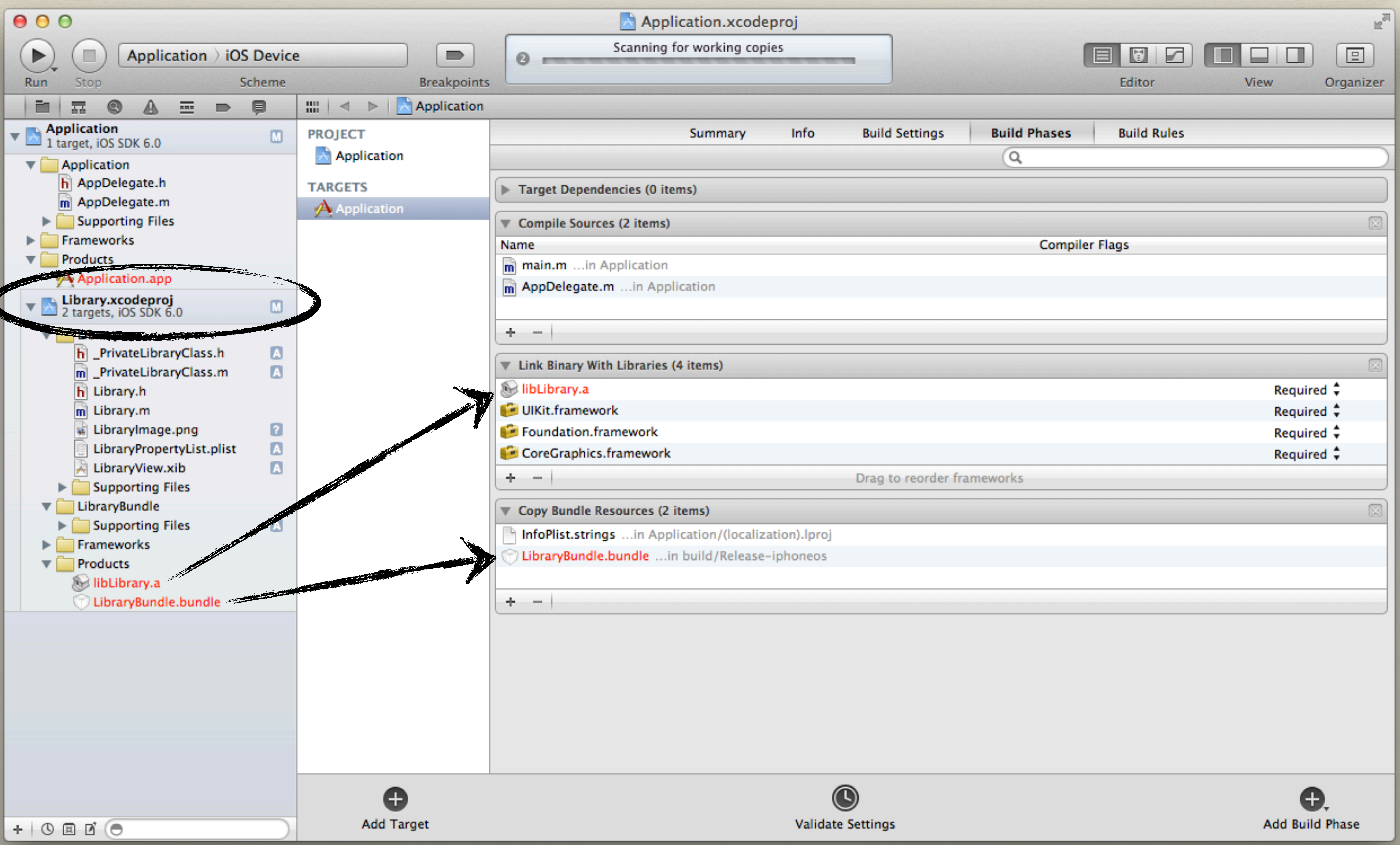
Version	--
Status	Modified Discard...
Location	/Users/danielctull/Desktop/Application 3/Library/Library.xcodeproj

Object Library

Push Button – Intercepts mouse-down events and sends an action message to a target object when it's clicked or...

Gradient Button – Intercepts mouse-down events and sends an action message to a target object when it's...

Rounded Rect Button – Intercepts mouse-down events and sends an action message to a target object...



```
Application
1 target, iOS SDK 6.0
  Application
    AppDelegate.h
    AppDelegate.m
    Supporting Files
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2 targets, iOS SDK 6.0
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    LibraryPropertyList.plist
    LibraryView.xib
    Supporting Files
  LibraryBundle
    Supporting Files
  Frameworks
  Products
    libLibrary.a
    LibraryBundle.bundle
```

PROJECT
Application
TARGETS
Application

Summary | Info | Build Settings | **Build Phases** | Build Rules

Target Dependencies (0 items)

Compile Sources (2 items)

Name	Compiler Flags
main.m ...in Application	
AppDelegate.m ...in Application	

Link Binary With Libraries (4 items)

libLibrary.a	Required
UIKit.framework	Required
Foundation.framework	Required
CoreGraphics.framework	Required

Drag to reorder frameworks

Copy Bundle Resources (2 items)

InfoPlist.strings ...in Application/(localization).lproj
LibraryBundle.bundle ...in build/Release-iphoneos

Static Libraries

```
+ (NSBundle *)bundle {

    NSFileManager *fm = [NSFileManager new];
    NSURL *mainBundleURL = [[NSBundle mainBundle] bundleURL];
    NSDirectoryEnumerator *enumerator = [fm enumeratorAtURL:mainBundleURL
                                 includingPropertiesForKeys:nil
                                                    options:NSDirectoryEnumerationSkipsHiddenFiles
                                               errorHandler:NULL];

    for (NSURL *URL in enumerator)
        if ([[URL lastPathComponent] isEqualToString:@"LibraryBundle.bundle"])
            return [NSBundle bundleWithURL:URL];

    return nil;
}
```

Static Libraries

- ✔ New files will be pulled in
- ✔ Guaranteed to work with ARC **and** MMR
- ✔ Library unit tests are run when you build the app
- ✔ Warnings are contained to library target
- ✔ Private classes are hidden

Static Libraries

- ✘ A little overhead to set up
- ✘ Recursive dependencies can be a little tricky

CocoaPods

CocoaPods

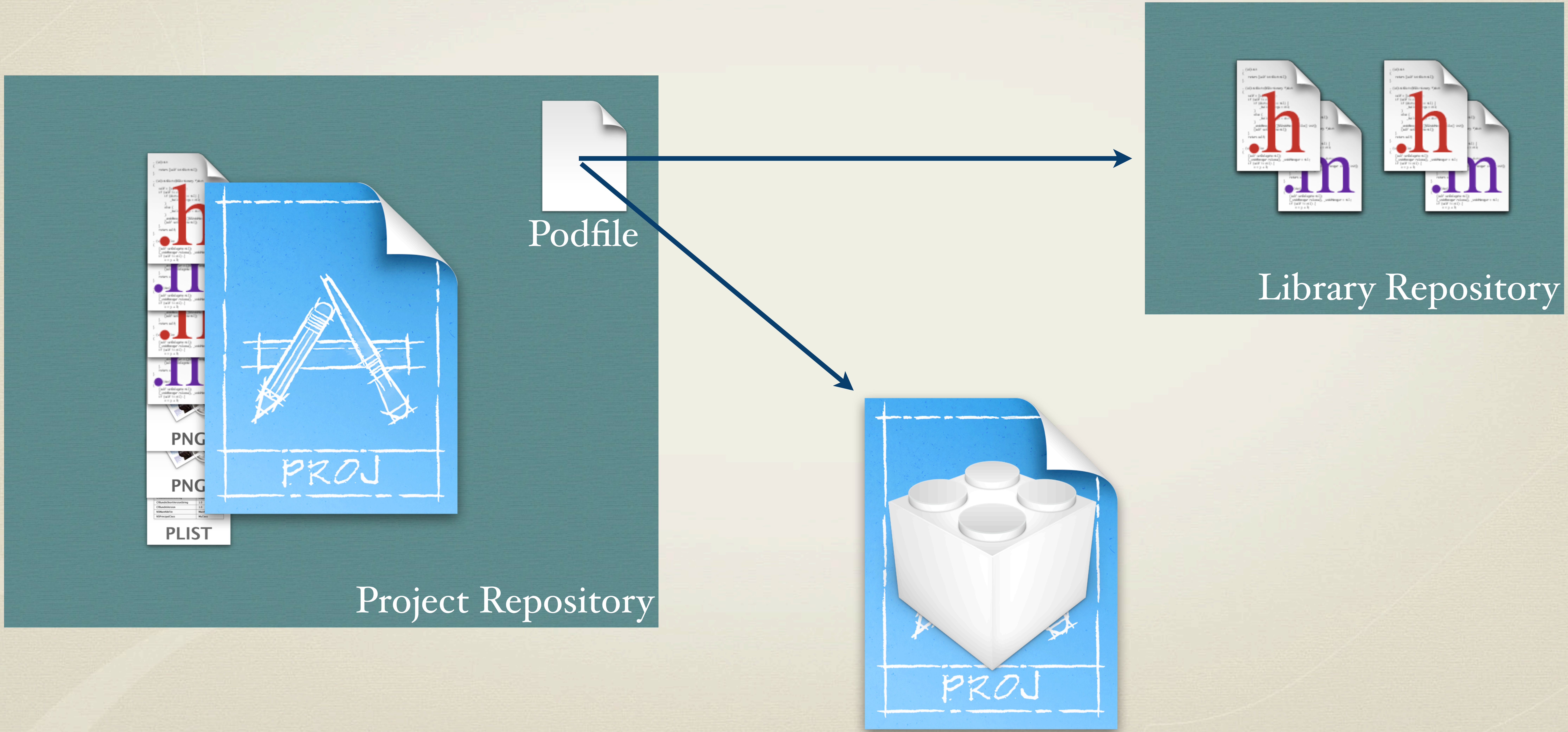
Install CocoaPods

Create a Podfile to specify the libraries

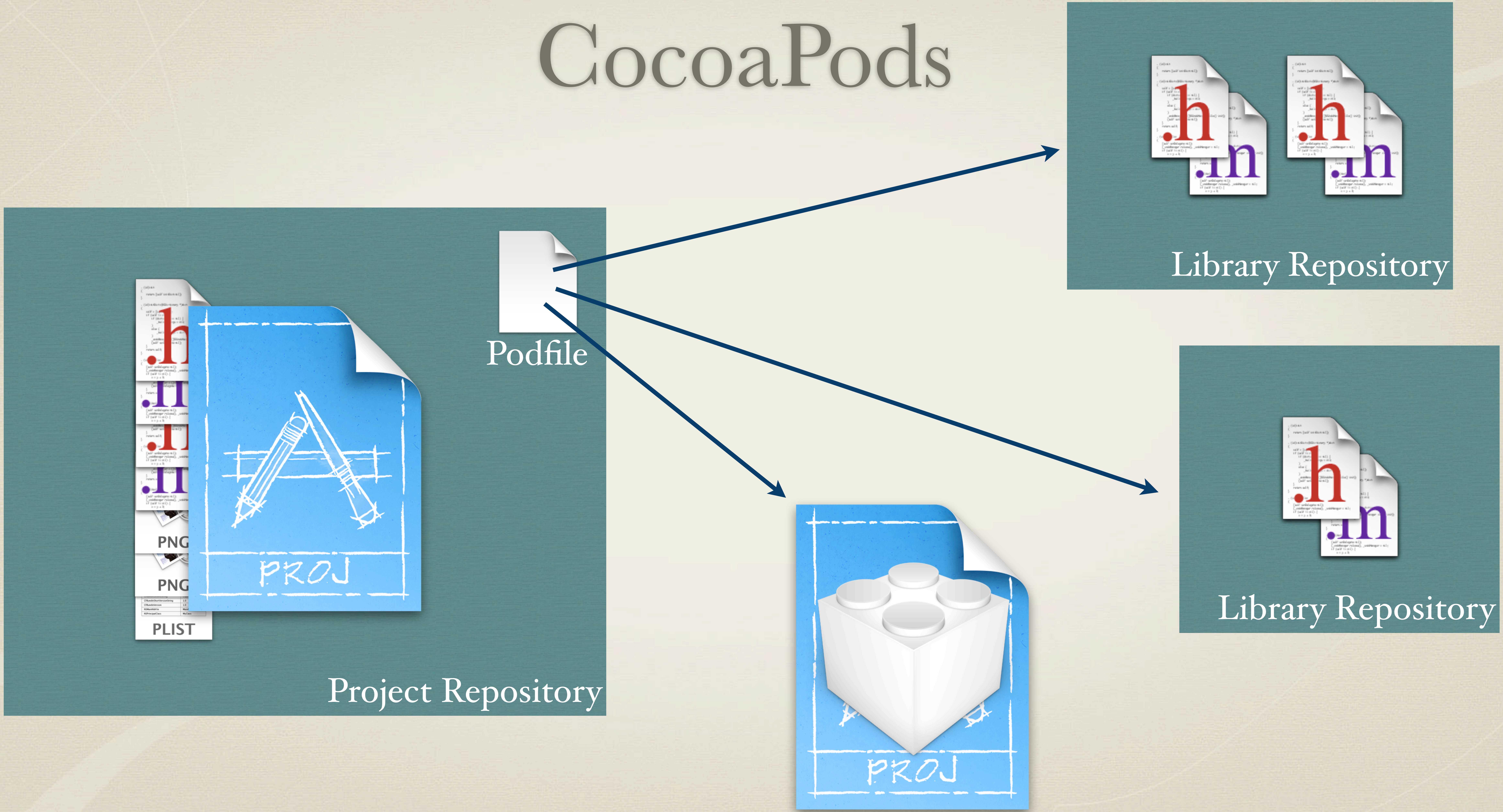
Run cocoapods

Use the created workspace instead of your app project

CocoaPods


Podfile
Project Repository
Library Repository
PNG
PNG
PLIST
PROJ
PROJ

CocoaPods


Library Repository
Podfile
PNG
PNG
PLIST
PROJ
Library Repository
Project Repository
PROJ

CocoaPods

- ✓ Independent of version control
  - ✓ Link to mercurial repositories from git
- ✓ Handles dependencies
- ✓ Warnings are contained to CocoaPods static library target

CocoaPods

- ✗ Complex to setup
- ✗ Requires knowledge of Ruby
- ✗ All members need CocoaPods to build and run app
- ✗ Unit tests likely not brought in with library code

	Drag and Drop	Static Library	CocoaPods
Contained warnings	✗	✓	✓
Build with unit tests	✗	✓	✗
Build upon clone	✓	✓	✗
VCS independent	✗	✗	✓
Dependencies	✗	✗	✓
Hidden classes	✗	✓	✗
File handling	✗	✓	✓
Resources	✓	✗ (✓)	✓

Daniel Tull

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