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AppNexus Open AdStream Mobile SDK Client-side Mediation User Guide August 14, 2015

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Contents

Overview 3
Pre-requisites for Mediation 3
Steps: Integrate OAS Mobile SDK for iOS using Cocoapods 4
Steps: Integrate OAS Mobile SDK for iOS 6
Steps: Integrate AppNexus Mobile SDK for iOS using cocoapods 10
Steps: Integrate AppNexus Mobile SDK for iOS 11
Settings Required in XCode 13
Enabling Mediation 15
Setting Targeting parameters for Mediated Ads (Optional) 17
Setting Location Targeting parameter for Mediated Ads (Optional) 17
Enabling Mediation Dynamically 19
Mediation Libraries with Adapters 20
Debugging Mediation 21

Overview

Client-side mediation allows publishers to fill remnant ad spots with ads served from AppNexus, as well as multiple 3rd party ad networks. It is initiated by OAS Mobile SDK, which calls AppNexus Mobile SDK to either fetch an ad from AppNexus inventory, or to call out one or more mediated networks/SDKs in a "waterfall"-like process. If OAS Mobile SDK can't retrieve an ad from or through OAS, it will attempt fetching the ad through AppNexus Mobile SDK and iterate over the list of mediated SDKs in the appropriate order. This is repeated until the ad spot is either filled, or none of the mediated network yields an ad.

Reasons to mediate to another SDK include the following:

- To provide better monetization for remnant ad spots.
- To provide access to information such as a unique user ID or the device's operating system, location, or ID.
- Some networks only accept requests from their own SDKs, forcing the app developer to use the network's SDK to access their demand. Mediation through such network's SDK helps overcoming this limitation.

Pre-requisites for Mediation

1. Publisher application – must compile without any errors.
2. OAS Mobile SDK version 2.0.0 or above for iOS.
3. Supported AppNexus Mobile SDK version 2.1 or above for iOS.
4. Supported Mediation libraries and adapters, including Amazon, Mopub, Facebook, iAd, Millennial Media, and Google Play and their corresponding adapters.

Please Note: Millennial Media SDK can be downloaded separately after setting up account with Millennial Media.

Steps: Integrate OAS Mobile SDK for iOS using Cocoapods

This section provides step-by-step guide to integrate iOS SDK with the publisher's iOS application using cocoapods.

To demonstrate the integration of the AppNexusOASSDK, we will assume that the target iOS application into which AppNexusOASSDK needs to be integrated is named AppNexusOASMobileSDKSampleApp.

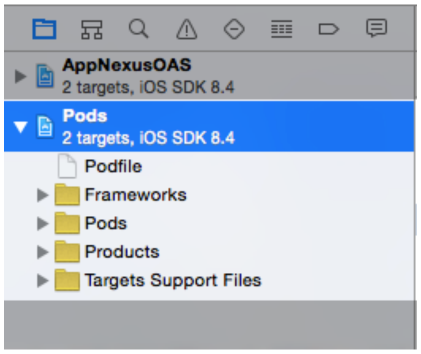
Pod contains SDK Library in Binary Format, Objective C headers, additional supported resource files.

Following are the steps to integrate AppNexusOASSDK into user's application.

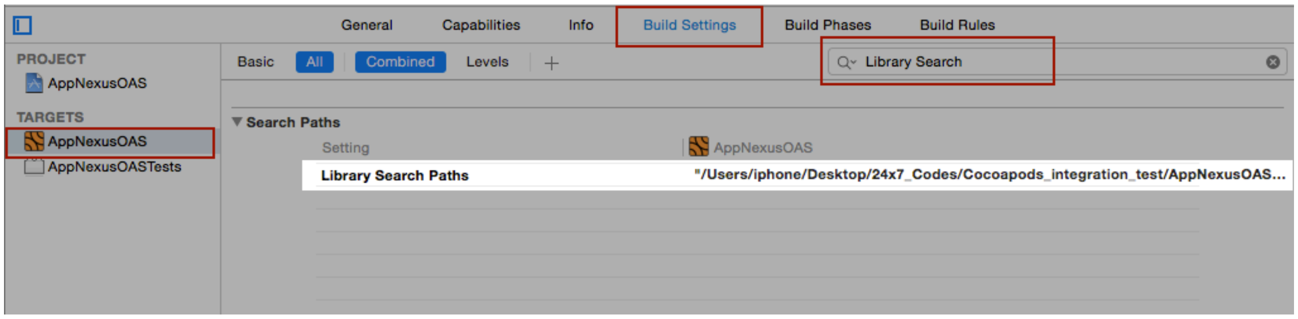
1. Navigate to Application Root Folder (folder where the xcodeproj file resides for the application)
2. Create a PodFile using the following command in Terminal –
    a. pod init (This will create the podfile to be used)
    b. open –a xcode podfile (Opens the podfile in xcode for editing)
3. Add the following lines to the pod file –

```
platform :'ios', '6.0'

target 'AppNexusOAS' do
  pod "AppNexusOASSDK", "~>2.2"

end
```

4. Replace "AppNexusOAS" with "your custom name" – Pod will be integrated with this identity.
5. Save and close the podfile
6. Open Terminal and navigate to the folder containing the recently created podfile
    - Type the following command – "pod install". To update the existing pod, type in "pod update"
7. Close the application if already open in XCode
8. Open the application using xcworkspace instead of xcodeproj
9. An additional project is added to the workspace other than the application project.

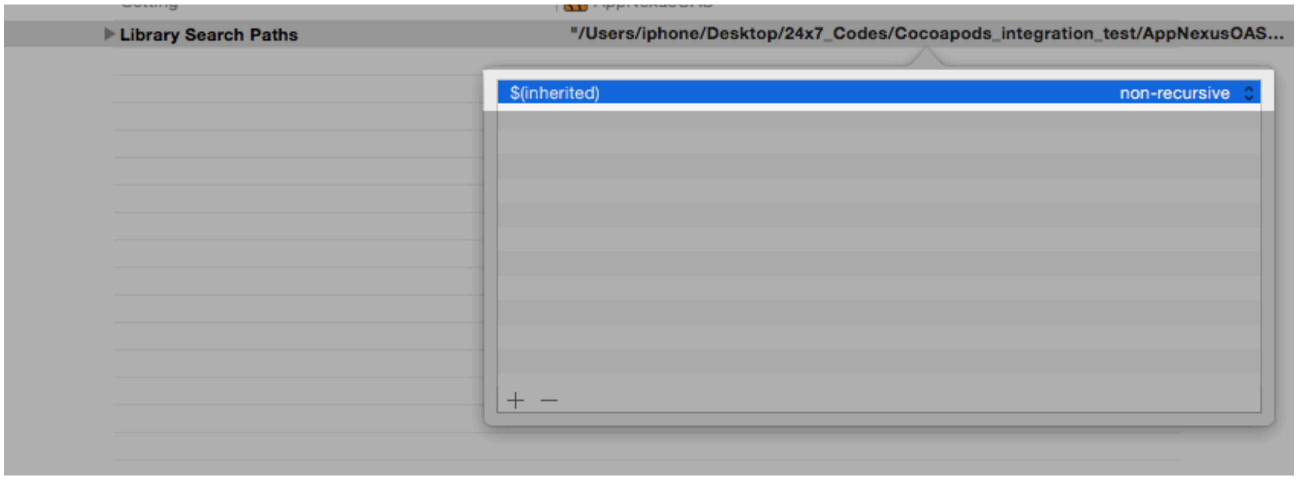


10. Select the desired target for user application and look for “Library Search Paths” under “Build Settings”



Library Search Paths "/Users/iphone/Desktop/24x7_Codes/Cocoapods_integration_test/AppNexusOAS...

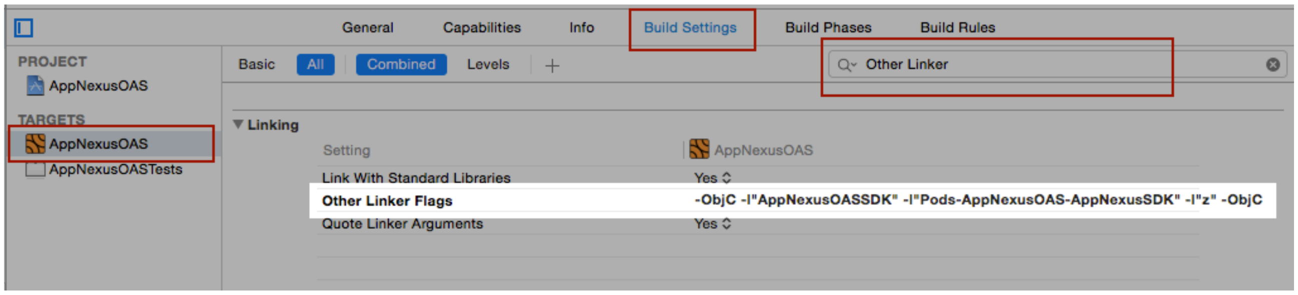
11. Add “$(inherited)” as the first entry to “Library Search Paths”



Library Search Paths "/Users/iphone/Desktop/24x7_Codes/Cocoapods_integration_test/AppNexusOAS...

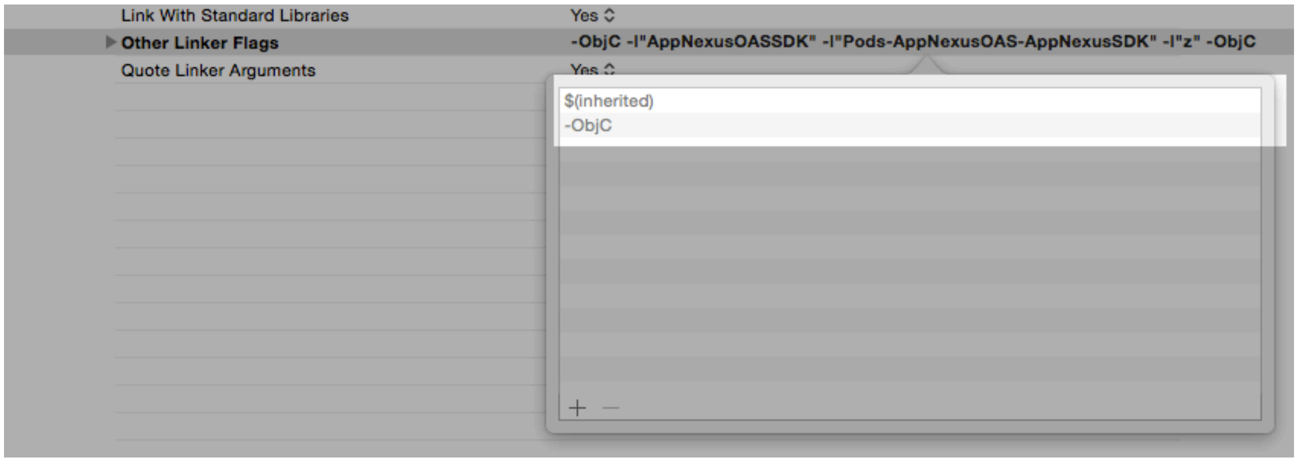
$(inherited) non-recursive

12. Now, look for “Other Linker Flags”



Link With Standard Libraries: Yes
Other Linker Flags: -ObjC -l"AppNexusOASSDK" -l"Pods-AppNexusOAS-AppNexusSDK" -l"z" -ObjC
Quote Linker Arguments: Yes

13. Add “$(inherited)” as the first entry to the values for “Other Linker Flags”



Link With Standard Libraries: Yes
Other Linker Flags: -ObjC -l"AppNexusOASSDK" -l"Pods-AppNexusOAS-AppNexusSDK" -l"z" -ObjC
Quote Linker Arguments: Yes

```
$(inherited)
-ObjC
```

14. Make sure the following frameworks and library files are added:

- MediaPlayer.framework
- AVFoundation.framework
- EventKit.framework
- CoreTelephony.framework
- CoreData.framework
- SystemConfiguration.framework
- libz.dylib
- CoreGraphics.framework
- UIKit.framework
- Foundation.framework
- MessageUI.framework

15. Done! The project should build just fine with these settings.

Steps: Integrate OAS Mobile SDK for iOS

This section provides step-by-step guide to integrate iOS SDK with the publisher's iOS application.

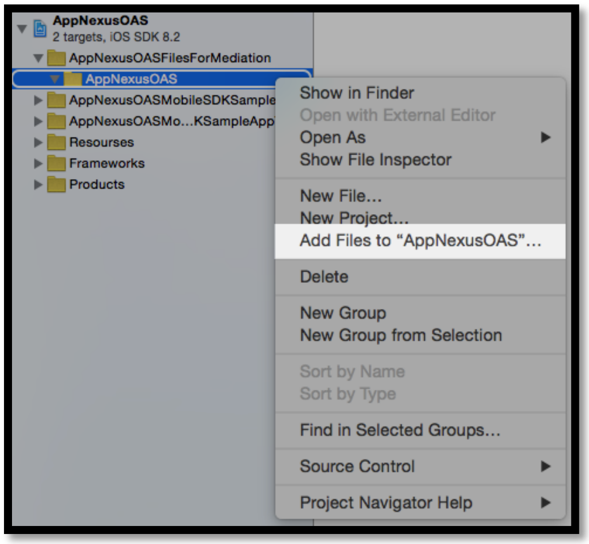
Please note:

- All the mediation libraries and adapters including AppNexusSDK are optional and should be integrated only when publisher wants to enable mediation.
- Each SDK is linked with the main SDK through its adapter. If publisher is including any particular SDK (for e.g. libMoPubSDK.a) then he/she must include its corresponding adapter (libANSDKMoPubAdapter.a).

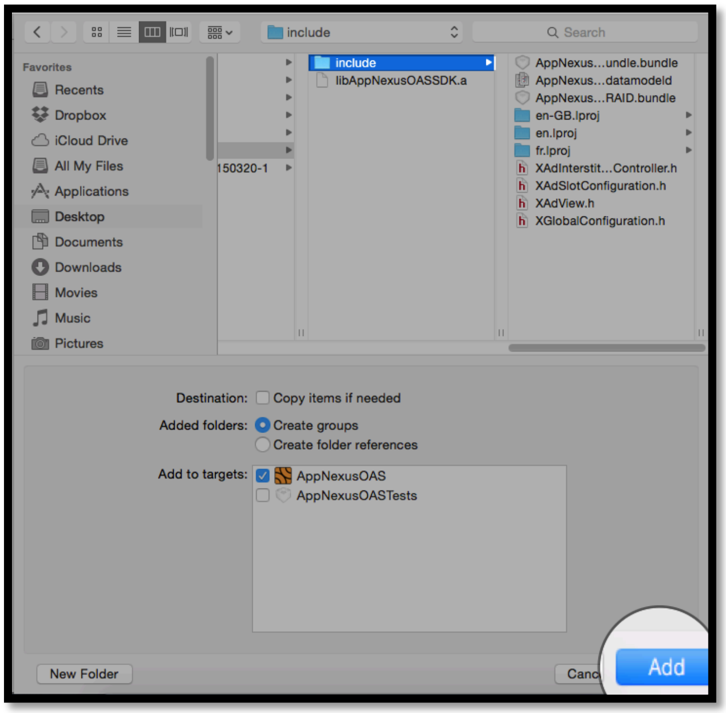
Step 1: Unzip OAS Mobile SDK

Step 2: Add include folder to the XCode project

1. Right Click on the folder group inside XCode to which you wish to add the SDK. Click on "Add Files to…"



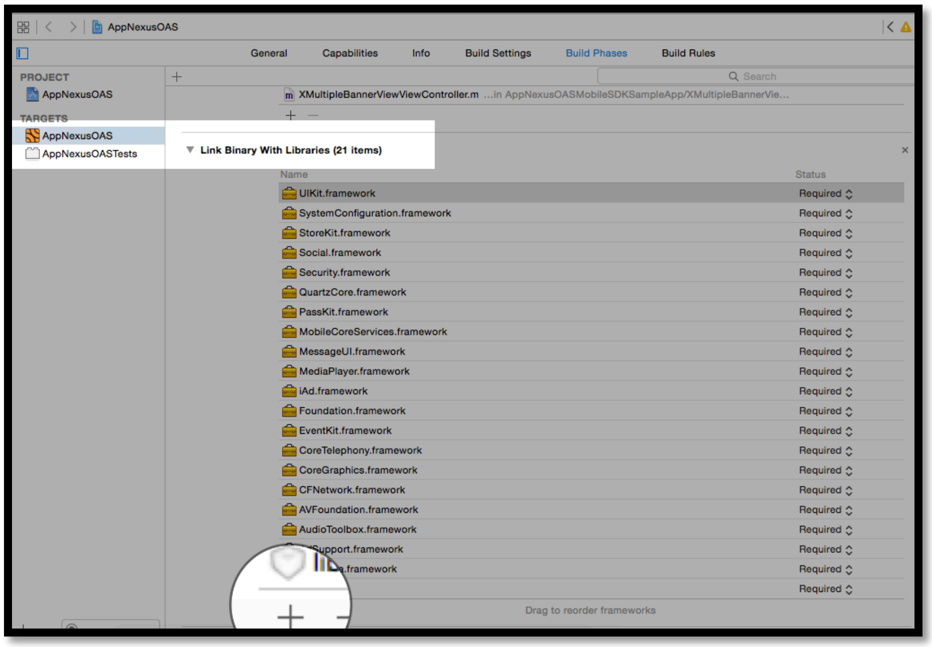
2. Browse to the folder containing the unzipped AppNexusOAS SDK files. And select "include" folder to add to the project.



Destination: ☐ Copy items if needed
Added folders: [● Create groups] ○ Create folder references
Add to targets: ☑ AppNexusOAS ☐ AppNexusOASTests

Step 3: Add the OAS Mobile SDK library – libAppNexusOASSDK.a to the XCode project

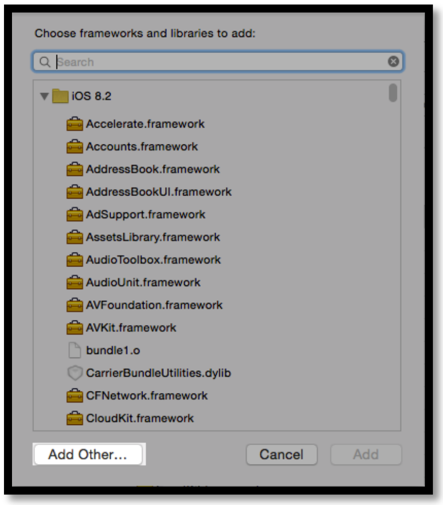
1. Select the required target, go to build settings and expand "Link Binary with Libraries" section. Click on "+" sign.



▼ Link Binary With Libraries (21 items)

Name	Status
UIKit.framework	Required
SystemConfiguration.framework	Required
StoreKit.framework	Required
Social.framework	Required
Security.framework	Required
QuartzCore.framework	Required
PassKit.framework	Required
MobileCoreServices.framework	Required
MessageUI.framework	Required
MediaPlayer.framework	Required
iAd.framework	Required
Foundation.framework	Required
EventKit.framework	Required
CoreTelephony.framework	Required
CoreGraphics.framework	Required
CFNetwork.framework	Required
AVFoundation.framework	Required
AudioToolbox.framework	Required
pport.framework	Required
a.framework	Required
	Required

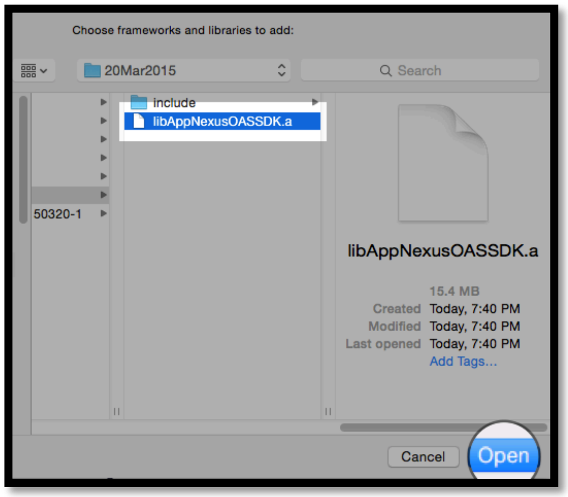
2. Click on "Add Other" and Browse to the unzipped AppNexusOAS SDK folder. Select "libAppNexusOASSDK.a" file



Choose frameworks and libraries to add:

Search

- iOS 8.2
  - Accelerate.framework
  - Accounts.framework
  - AddressBook.framework
  - AddressBookUI.framework
  - AdSupport.framework
  - AssetsLibrary.framework
  - AudioToolbox.framework
  - AudioUnit.framework
  - AVFoundation.framework
  - AVKit.framework
  - bundle1.o
  - CarrierBundleUtilities.dylib
  - CFNetwork.framework
  - CloudKit.framework



Choose frameworks and libraries to add:

libAppNexusOASSDK.a

15.4 MB

Created	Today, 7:40 PM
Modified	Today, 7:40 PM
Last opened	Today, 7:40 PM

Add Tags...

Step 4: Compile the project. Ideally, it should compile without any errors. If any errors are found, please resolve it before going to next steps.

Steps: Integrate AppNexus Mobile SDK for iOS using cocoapods

This section provides step-by-step guide to install AppNexus Mobile SDK for mediation purpose.

Pre-requisite: Must have completed the installation of AppNexus OpenAdStream Mobile SDK using Cocoapods as described above in this document. Ensure the application is compiling without any errors.

1. Open Terminal Window and navigate to the podfile created earlier (Check here)
2. Edit the podfile in X-Code and make the following entry below AppNexusOASSDK

```
pod "AppNexusSDK",
subspecs:['AppNexusSDK','FacebookAdapter','AmazonAdapter','MoPubAdapter','iAdAdapter','MillennialMediaAdapter','AdColonyAdapter','ChartboostAdapter','InMobiAdapter','VdopiaAdapter','VungleAdapter','YahooAdapter']
```

3. The final outcome should be something similar to the following –

```
target 'AppNexusOAS' do

pod "AppNexusOASSDK", "~>2.2"

pod "AppNexusSDK",
subspecs:['AppNexusSDK','FacebookAdapter','AmazonAdapter','MoPubAdapter','iAdAdapter','MillennialMediaAdapter','AdColonyAdapter','ChartboostAdapter','InMobiAdapter','VdopiaAdapter','VungleAdapter','YahooAdapter']
```

4. Save the podfile and close

5. Run “pod update” command
6. Make sure “$(inherited)” is the first entry in the required target -> Build Settings -> Library Search Path and target -> Build Settings -> Other Linker Flags
7. Done! The project should build just fine with the setup.

Note: *AppNexusSDK can be integrated for iOS versions 6.0 and over.*

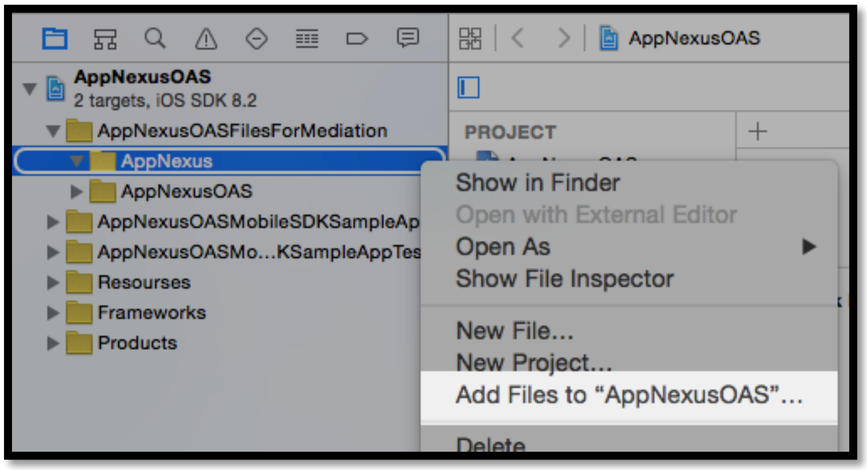
Steps: Integrate AppNexus Mobile SDK for iOS

This section provides step-by-step guide to integrate the AppNexus SDK to the publisher’s iOS application.

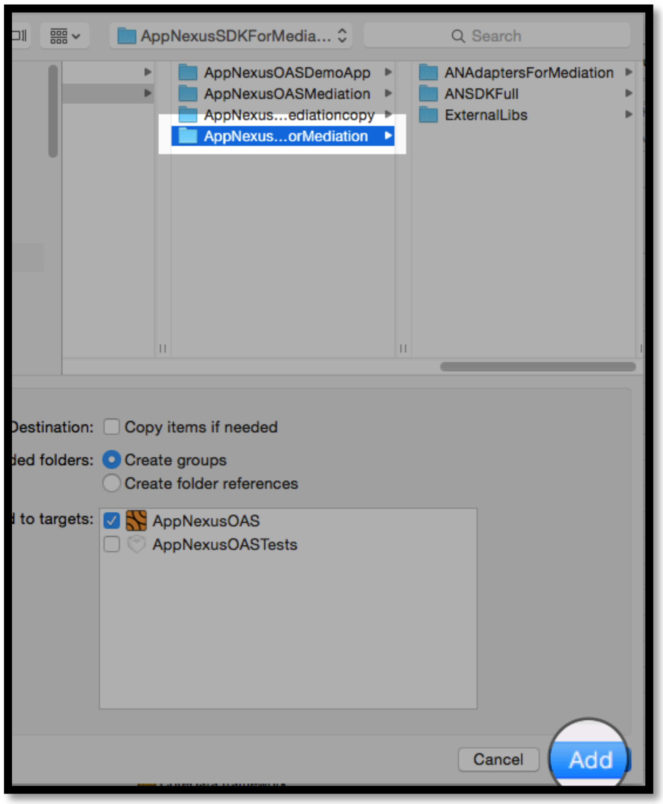
Step 1: Unzip AppNexus SDK

Step 2: Add the root folder to the XCode Project

1. Right Click on the folder you wish to add the AppNexus SDK to.



2. Browse to the unzipped folder and select the root folder



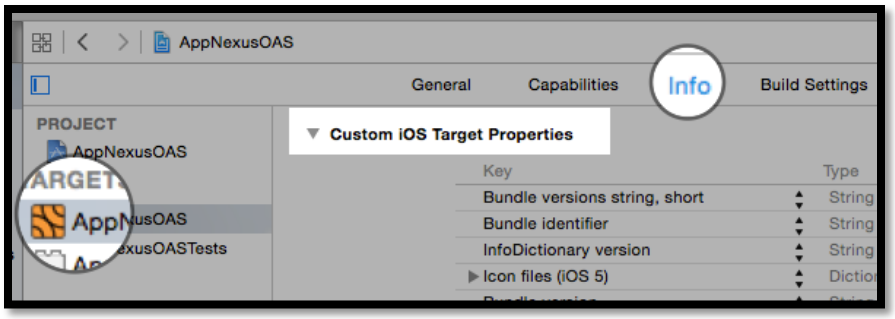
Destination: Copy items if needed
ded folders: [✓ Create groups] Create folder references
d to targets: [✓ AppNexusOAS] AppNexusOASTests

Step 3: Compile the project. Ideally, it should compile without any errors.
Please resolve any errors before going to the next steps

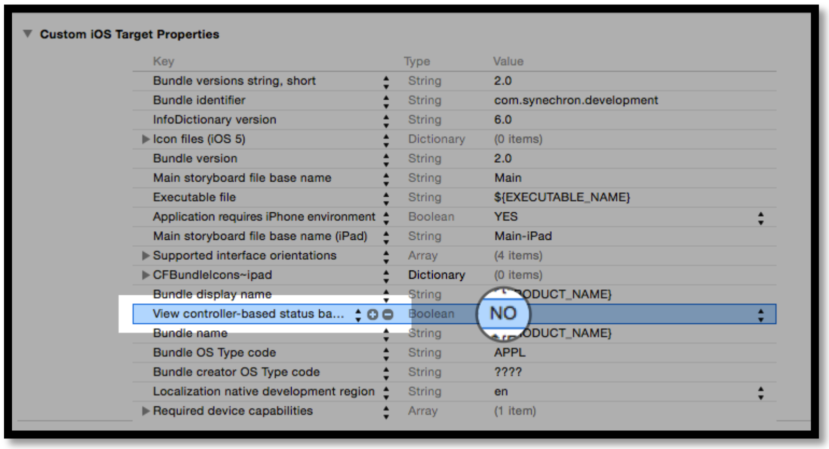
Settings Required in XCode

These settings are required to ensure optimal functioning of the OAS Mobile SDK:

Step 1: Open application plist file from info under active targets.



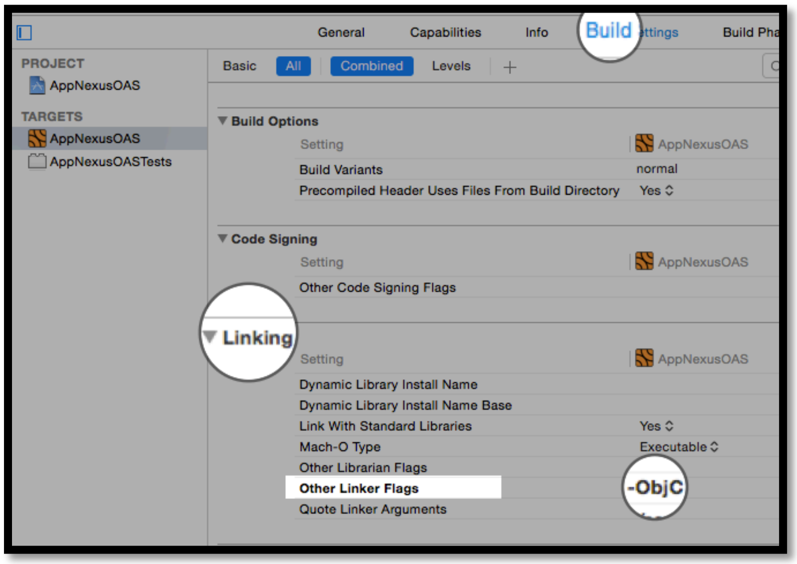
1. Add “View controller-based status bar appearance” to the application plist and set the value to NO.



▼ Custom iOS Target Properties

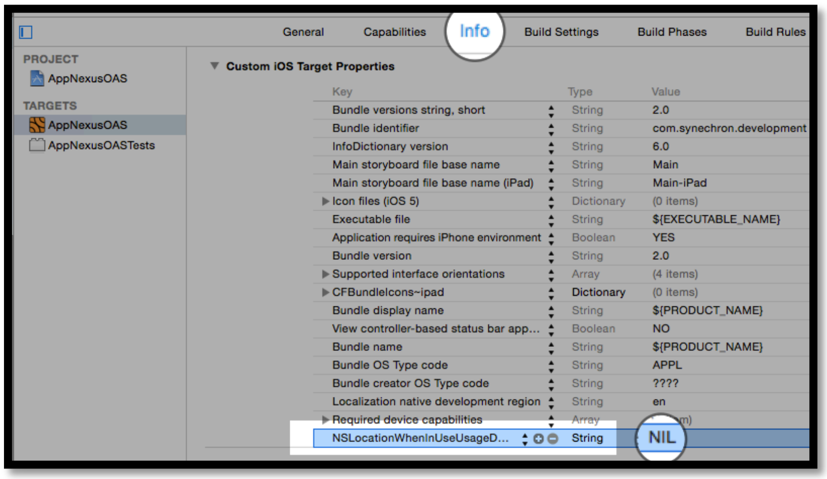
Key	Type	Value
Bundle versions string, short	String	2.0
Bundle identifier	String	com.synechron.development
InfoDictionary version	String	6.0
▶ Icon files (iOS 5)	Dictionary	(0 items)
Bundle version	String	2.0
Main storyboard file base name	String	Main
Executable file	String	${EXECUTABLE_NAME}
Application requires iPhone environment	Boolean	YES
Main storyboard file base name (iPad)	String	Main-iPad
▶ Supported interface orientations	Array	(4 items)
▶ CFBundleIcons~ipad	Dictionary	(0 items)
Bundle display name	String	ODUCT_NAME}
View controller-based status ba...	Boolean	NO
Bundle name	String	ODUCT_NAME}
Bundle OS Type code	String	APPL
Bundle creator OS Type code	String	????
Localization native development region	String	en
▶ Required device capabilities	Array	(1 item)

2. Add “-ObjC” to “Other Linker Flags” under application target build settings



Setting	AppNexusOAS
Build Options	
Build Variants	normal
Precompiled Header Uses Files From Build Directory	Yes ◇
Code Signing	
Other Code Signing Flags	
Linking	
Dynamic Library Install Name	
Dynamic Library Install Name Base	
Link With Standard Libraries	Yes ◇
Mach-O Type	Executable ◇
Other Librarian Flags	
Other Linker Flags	-ObjC
Quote Linker Arguments	

3. Add “NSLocationWhenInUseUsageDescription” to the application plist and leave the value as NIL.



Key	Type	Value
Bundle versions string, short	String	2.0
Bundle identifier	String	com.synechron.development
InfoDictionary version	String	6.0
Main storyboard file base name	String	Main
Main storyboard file base name (iPad)	String	Main-iPad
▶ Icon files (iOS 5)	Dictionary	(0 items)
Executable file	String	${EXECUTABLE_NAME}
Application requires iPhone environment	Boolean	YES
Bundle version	String	2.0
▶ Supported interface orientations	Array	(4 items)
▶ CFBundleIcons~ipad	Dictionary	(0 items)
Bundle display name	String	${PRODUCT_NAME}
View controller-based status bar app…	Boolean	NO
Bundle name	String	${PRODUCT_NAME}
Bundle OS Type code	String	APPL
Bundle creator OS Type code	String	????
Localization native development region	String	en
▶ Required device capabilities	Array	m)
NSLocationWhenInUseUsageD…	String	NIL

Enabling Mediation

With OAS Mobile SDK, mediation can be enabled at the application level or at individual slot levels.

When mediation is enabled at application level, it will be enabled throughout the application. Meaning, if any of the banners or interstitial (except Pre-roll) fails to receive ad from OAS, it would try to fill the ad slot from AppNexus, or through mediated ad networks. But it requires publishers to set the mediation placement id along width and height parameters (for mediated banner ads) in slot configuration.

On the other hand, when mediation is enabled at slot levels, the mediation is enabled only for that slot. Meaning, if mediation is enabled for a banner ad on screen 3, then OAS Mobile SDK would try and fetch ads from mediation only for that particular banner placement on screen 3 and not for any other placements through out the application. This way, OAS Mobile SDK provides flexibility to the publishers to enable or disable mediation at individual slot levels as well as at application level.

Steps to enable mediation at the application level:

Step 1: Create the object of XGlobalConfiguration and set canMediate property to YES. Or, add the below code snippet when the application start – Ideal place would be the appDelegate's didFinishLaunchingWithOptions method.

```
[XGlobalConfiguration sharedInstance].canMediate = YES;
```

Step 2: At the slot level, set the following parameters mediationPlacementId (NSString), mediationBannerHeight (float), mediationBannerWidth (float). Please refer to the code snippets given below on how to set these parameters.

```
configuration.mediationPlacementId = @"12345";
configuration.mediationBannerWidth = 320.0;
configuration.mediationBannerHeight = 50.0;
```

Please Note:

A slot level setting for mediation takes precedence over application level setting. This means that even if mediation is disabled at the application level, but enabled for a particular slot, then upon ad request failure from OAS server, SDK would still request the mediated network to fill that slot.

In case if mediation is enabled at the application level, but disabled for a particular slot, then upon a failed request from OAS server, SDK would terminate the flow and not make any further request to mediated ad networks for this slot.

Steps to enable mediation at the slot level:

Step 1: Create the object of XAdSlotConfiguration and set canMediate property to YES.

```
XAdSlotConfiguration *configuration = [XAdSlotConfiguration new];
   configuration.canMediate = YES;
```

Set the following parameters mediationPlacementId (NSString), mediationBannerHeight (float), mediationBannerWidth (float). Please refer to the code snippets given below on how to set these parameters.

Step 2: Setting PlacementId

This is a required parameter and mediation would fail to start without this parameter value set.

```
configuration.mediationPlacementId = @"12345";
```

Step 3: Setting mediationBannerWidth and mediationBannerHeight

This is a required parameter while requesting banner ads. This parameter is not required for requesting interstitial ads.

```
 configuration.mediationBannerWidth = 320.0;
 configuration.mediationBannerHeight = 50.0;
```

Setting Targeting parameters for Mediated Ads (Optional)

Setting Optional targeting parameters (Age, Gender, Custom Keywords & Location)

These parameters can be used for targeting the ad request based on age, gender, custom keywords and/or location.

Setting age

```
configuration.mediationTargetedAge = 32;
```

Setting Gender

```
configuration.mediationTargetedGender = XMediationTargetedGenderFemale;
```

XMediationTargetedGender is available inside XAdView as an enum.

Setting Custom Keywords

```
configuration.mediationTargetedKeywords = [NSDictionary dictionaryWithObjects:[NSArray
arrayWithObjects:@"mascara", @"eyeliner", nil] forKeys:[NSArray
arrayWithObjects:@"Cosmetics", @"Cosmetics", nil]];
```

Setting Location Targeting parameter for Mediated Ads (Optional)

User location must be set at global level.

```
[XGlobalConfiguration sharedInstance].mediationTargetedLocation = _userLocation;
```

where _userLocation is obtained by implementing the below code.

Step 1: Import the following framework to the application class

```
#import <CoreLocation/CoreLocation.h>
```

Step 2: Implement the CLLocationManagerDelegate

```
@interface AppNexusOASRichMediaViewController : UIViewController<XAdViewDelegate,
CLLocationManagerDelegate>
```

Step 3: declare the required properties

```
@property (nonatomic, strong) CLLocation *userLocation;
@property (nonatomic, strong) CLLocationManager *locationManager;
```

Step 4: Synthesize them

```
@synthesize userLocation = _userLocation;
@synthesize locationManager;
```

Step 5: call the method to obtain location somewhere at the beginning. In this case, we have used it inside viewDidLoad

```
 [self getUserLocation];
```

where getuserLocation method is as follows –

```
- (void) getUserLocation{

   locationManager = [[CLLocationManager alloc] init];
   CLAuthorizationStatus authStatus = [CLLocationManager authorizationStatus];

   if (authStatus == kABAuthorizationStatusRestricted || authStatus ==
kABAuthorizationStatusDenied || authStatus == kABAuthorizationStatusNotDetermined) {
      if ([locationManager respondsToSelector:@selector(requestWhenInUseAuthorization)]) {
         [locationManager requestWhenInUseAuthorization];
      }else if([locationManager respondsToSelector:@selector(requestAlwaysAuthorization)]){
         [locationManager requestAlwaysAuthorization];
      }
   }

   locationManager.delegate = self;
   locationManager.desiredAccuracy = kCLLocationAccuracyThreeKilometers;
   locationManager.distanceFilter = kCLDistanceFilterNone;
```

```
    [locationManager startUpdatingLocation];

}
```

Step 6: Implement the LocationManagerdelegate didUpdateLocation

```
- (void)locationManager:(CLLocationManager *)manager didUpdateLocations:(NSArray
*)locations{

    _userLocation = [locations lastObject];
    [locationManager stopUpdatingLocation];

}
```

Enabling Mediation Dynamically

To enable mediation dynamically through OAS, publishers can use the following XML format to traffic in OAS as the house ad. Upon receiving this response, SDK (version 2.1.0 and above) will treat it as a no ad response and enable mediation behind the scenes with the updated placement id and other parameters as mentioned in the xml. If app developer has already specified a placement id in SDK's configuration, then placement id mentioned in XML would take precedence.

This XML needs to be trafficked in OAS with the lowest priority and no frequency capping or limits, so OAS would serve this XML only when there are no other ads available.

```
<?xml version="1.0" encoding="UTF-8"?>
<MobileSDK>
   <ClientSideMediation placementId="12345" width="320" height="50" />
</MobileSDK>
```

Note:

- AdType attribute for the above XML must be set as text/xml for SDK to detect correctly.

- "width" and "height" attributes are optional, as it is required only by the banner ads. For interstitial ads width and height values are ignored. Also, since XML is case sensitive, it is important to maintain the letter cases as it is. Only the values for placementId, width and height are allowed to vary.

Mediation Libraries with Adapters

AppNexus OAS SDK supports 5 different types of mediated ad networks. Following is the list of supported ad networks with their library and corresponding AppNexus adapter.

1. **Amazon**
   - Library name: AmazonAd.framework
   - Adapter name: libANSDKAmazonAdapter.a

2. **Facebook**
   - Library name: FBAudienceNetwork.framework
   - Adapter name: libANSDKFacebookAdapter.a

3. **Mopub**
   - Library name: libMoPubSDK.a
   - Adapter name: libANSDKMoPubAdapter.a

4. **AdMob/Google Play/DFP**
   - Library name: GoogleMobileAds.framework
   - Adapter name: libANSDKGoogleAdMobAdapter.a

5. **Millennial Media**
   - Library name: MillennialMedia.framework
   - Adapter name: libANSDKMillennialMediaAdapter.a

Please Note: Millennial Media SDK can be downloaded separately after setting up account with them.

Debugging Mediation

LogMessages:

Failed to retrieve ad from OAS. Cannot mediate, as required delegate xAdInterstitialDidLoad is not implemented.
While trying to fill the slot with mediated ads, SDK realized that the required delegate implementation for showing interstitial ad is missing. To show the mediated interstitial ad, this delegate is a must to avoid any unintended behavior within the SDK.

LogMessage:

Failed to retrieve ad from OAS. Cannot mediate for Pre-roll ads.
Tried to fill the pre-roll slot with ad via mediation, however, mediation is currently not supported for pre-roll ad.

LogMessage:

Cannot mediate. Please enable mediation at slot level or application level.
To fill the slot with ad via mediation, you need to enable mediation at the application level or at the slot level.

LogMessage:

Cannot Mediate. PlacementId not set.
To fill slots via mediation, placementId needs to be set at the slot configuration.

LogMessage:

Cannot Mediate. BannerWidth or BannerHeight not set.
To fill banner slots via mediation, mediationBannerWidth and mediationBannerHeight needs to be set at the slot configuration.

LogMessage:

Missing required mediation classes.

Publisher does not integrate the mediation library. To fill the slot with mediated ads, the AppNexus library along with the supported header files are required.