

Notification Hub

Good docs to read first:

<https://stackoverflow.com/questions/31006411/multiple-push-registrations-for-one-channel>

(just for the description of UUID vs Device Token —the channel is not relevant for our tool) <https://support.urbanairship.com/hc/en-us/articles/213492363-UDID-and-other-device-identifiers-for-iOS>

Documentation for running application in iOS:

Download the application from the repo:

<https://github.com/andrewchungxam/XamarinFormsPushNotificationSample>

This doesn't work in simulator, so you will need the appropriate provisioning profile (push notifications require specific permissions). The [iOS simulator does not support push notifications](#).

Try to run this application on your phone (device only) - it will likely fail and the error message will complain that you don't have the original author's provisioning profile (this is because the original author did not list your iPhone as one of the acceptable iPhones that his provisioning profile could work with).

So you're going to need to set up your provisioning profile.

PROVISIONING PROFILE:

For iOS, you will need an [Apple Developer Program membership](#) and a physical iOS device.

Here are the steps that are needed to created the appropriate Provisioning profile ** (NOTE: there is one step at the end requires some extra work. See note below the following url)

<https://docs.microsoft.com/en-us/azure/app-service-mobile/app-service-mobile-xamarine-forms-get-started-push#generate-the-certificate-signing-request-file>

Follow the above directions only up to this line: *This ensures that the project uses the new profile for code signing. For the official Xamarin device provisioning documentation, see [Xamarin Device Provisioning](#).*

**The above steps and directions are clear and good - HOWEVER, sometimes at the final steps when you have to upload the SSL certificate up to Azure there could be a small issue in how the keychain on your Mac will show the certificate. You will know you hit an error because you will either not be able to export the certificate in the .p12 format — or if you are able to upload it, Azure will say that it is not in the correct format. Use the solutions here to solve the issue: <https://stackoverflow.com/questions/15662377/unable-to-export-apple->

<https://apple.stackexchange.com/questions/21060610/production-push-ssl-certificate-in-p12-format/21060610#21060610> (** I had to use BOTH the first and the second answer before it worked properly).

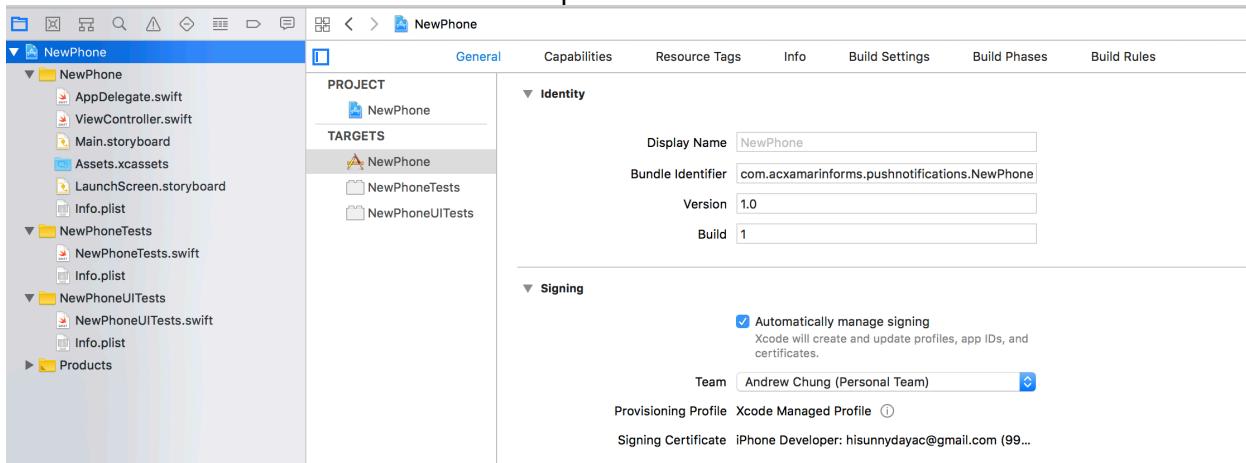
RUNNING YOUR APP ON DEVICE:

Here are the official docs: [Xamarin Device Provisioning](#)

If you have never run an app on an iPhone - I do the following:

If my summarized version doesn't work please check out the official doc:

1. Close down Xcode / Visual Studio for Mac / Any Simulators.
2. Plug your iPhone (device) to your Mac.
3. You'll be prompted to Trust your computer (If you don't trust it, you won't be able to interact with your device from your computer.) (if you don't see that prompt - try opening iTunes)
4. Open Xcode - create a new project - run this project on your iPhone. My signing options looks like this: Once it works move to step 5



5. Open up Visual Studio for Mac - create a new project. Xamarin.Forms or iOS and then deploy to your device.

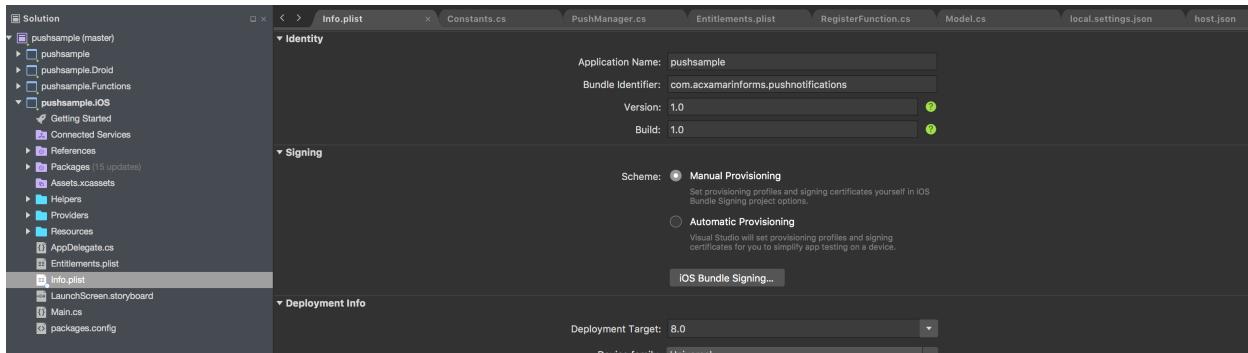
USING THE PUSH NOTIFICATIONS PROVISIONING PROFILE:

Now you've got your IDE/Iphone/Provisioning profiles working...as a next step, deploy this app, Xamarin Forms Push Notification Sample

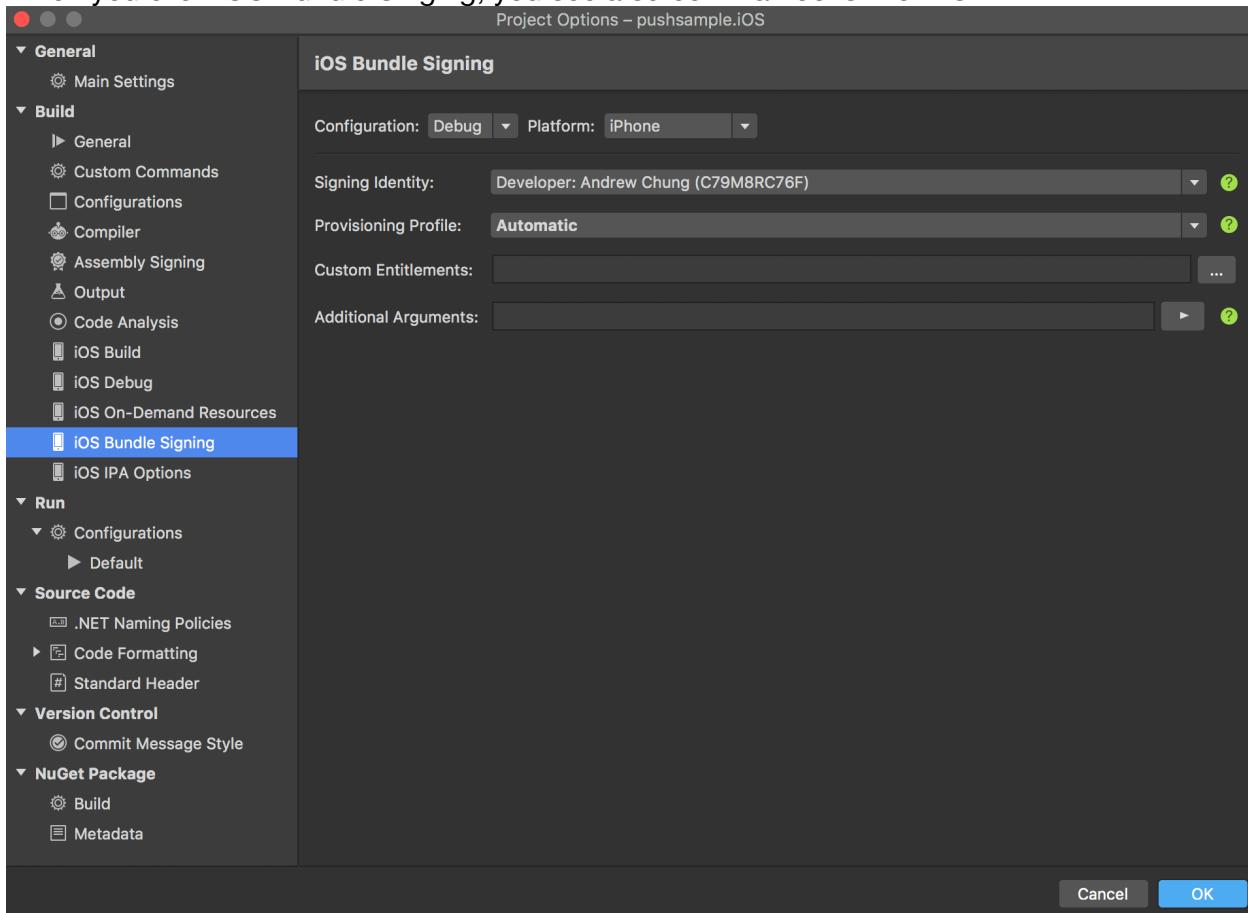
(<https://github.com/andrewchungxam/Xamarin-Forms-Push-Notifications-Sample>), to your device.

This time you want to use the provisioning profile you step up earlier.

In your solution tree > go to the pushSample.iOS - you want to set it up like this - using the Bundle Identifier you used when you set up your provisioning profile. I set mine up like this:



When you click iOS Bundle Singing, you see a screen that looks like this:



CREATING THE NOTIFICATION HUB:

I created a new Resource group in Portal.Azure.com



Create an empty resource group

* Resource group name

NotificationHubExample



* Subscription

Microsoft Azure Internal Consumption (4e... ▾)

* Resource group location

South Central US



Create

Once in that Resource group - I'm going to add a Notification Hub:

NAME	PUBLISHER	CATEGORY
Notification Hub	Microsoft	Web + Mobile

I've created the notification hub and namespace:

The screenshot shows the 'New Notification Hub' creation dialog. The form fields are as follows:

- * Notification Hub:** MySampleNotificationHub (highlighted with a green border)
- * Create a new namespace:** MySampleNotificationHubNamespace (highlighted with a red border)
- Select existing:** (disabled or grayed out)
- * Location:** South Central US
- * Resource Group:** Use existing
NotificationHubExample (highlighted with a red border)
- * Subscription:** Microsoft Azure Internal Consumption (4e2) (highlighted with a red border)

Pricing tier

Free >



Pin to dashboard

Create

Automation options

Your group should now look like this:

Subscription (change) Microsoft Azure Internal Consum... Subscription ID 4e234d59-b8fc-4ffd-bd01-54591f... Deployments 1 Succeeded

Tags (change) Click here to add tags

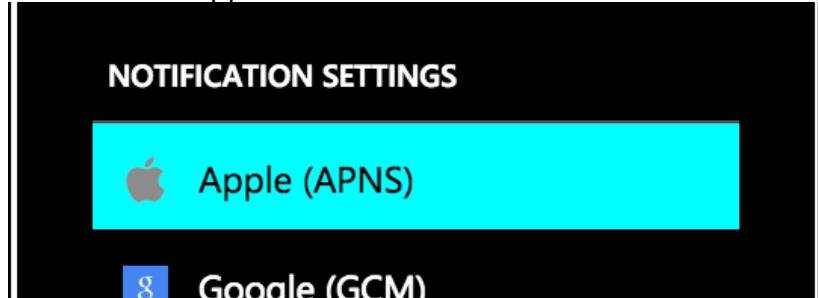
Filter by name... All types All locations

2 items Show hidden types ⓘ

	NAME ↑	TYPE ↑↓
<input type="checkbox"/>	MySampleNotificationHubNamespace	Notification Hub Namespace
<input type="checkbox"/>	MySampleNotificationHub (MySampleNotificationHubNa...)	Notification Hub

Click on your Notification Hub (not the Notification Hub Namespace)

Click here on Apple:



I clicked the Certificate under AUTHENTICATION MODE

*** MAKE SURE YOU DO SANDBOX FOR THIS RUNTHROUGH:

<https://stackoverflow.com/questions/38847071/azure-ios-push-notification-not-receiving-on-production-mode>

You must maintain two different hubs: one hub for production, and another hub for testing. This means that you must upload the certificate that you use in a sandbox environment to a separate hub than the certificate and hub that you are going to use in production. Don't try to upload different types of certificates to the same hub. This might cause notification failures.

<input type="button" value="Save"/> <input type="button" value="Discard"/> <input type="button" value="Delete Credential"/>
Authentication Mode <small>ⓘ</small>
<input checked="" type="radio"/> Certificate <input type="radio"/> Token
 Certificate Thumbprint <div style="border: 1px solid black; padding: 2px;">2C3556C4FA76FE80E9EBBF08F77FCF8134FCAC02</div>
 Upload Certificate <div style="border: 1px solid black; padding: 2px;">"CertificatesExportedCorrectly.p12"</div> <input type="button" value=""/>
 Password <small>ⓘ</small> <div style="border: 1px solid black; padding: 2px; width: 150px;">*****</div> <input type="button" value=""/>
 Application Mode <small>ⓘ</small>
<input checked="" type="radio"/> Production <input type="radio"/> Sandbox

For this run-through - make sure you're selecting SANDBOX (not production):

<input type="button" value="Save"/> <input type="button" value="Discard"/> <input type="button" value="Delete Credential"/>
Authentication Mode <small>ⓘ</small>
<input checked="" type="radio"/> Certificate <input type="radio"/> Token
 Certificate Thumbprint <div style="border: 1px solid black; padding: 2px;">2C3556C4FA76FE80E9EBBF08F77FCF8134FCAC02</div>
 Upload Certificate <div style="border: 1px solid black; padding: 2px;">"CertificatesExportedCorrectly.p12"</div> <input type="button" value=""/>
 Password <small>ⓘ</small> <div style="border: 1px solid black; padding: 2px; width: 150px;">*****</div> <input type="button" value=""/>
 Application Mode <small>ⓘ</small>
<input checked="" type="radio"/> Production <input type="radio"/> Sandbox

It asks me to upload certificate - which is what you did in step 8 here:

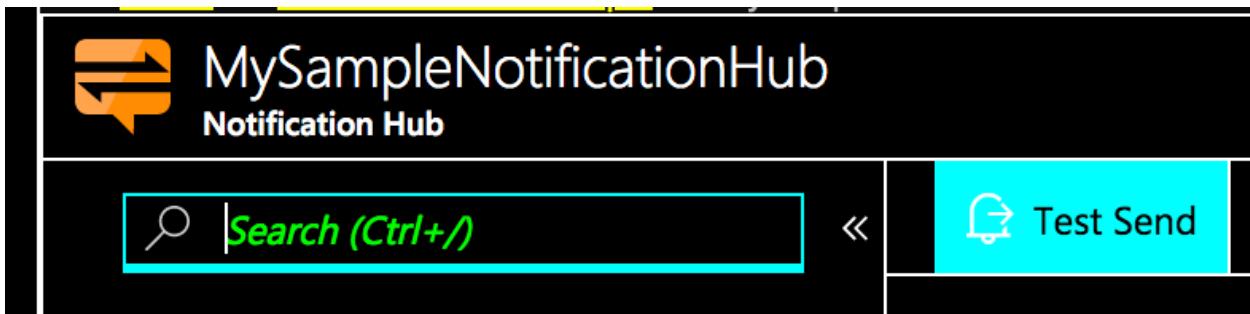
<https://docs.microsoft.com/en-us/azure/app-service-mobile/app-service-mobile-xamarin->

[forms-get-started-push#generate-the-certificate-signing-request-file](#)

It directions should look like this...In Keychain Access, right-click the new push certificate that you created in the **Certificates** category. Click **Export**, name the file, select the **.p12** format (Remember if you're having trouble reference answer 1 and 2 in above this post:

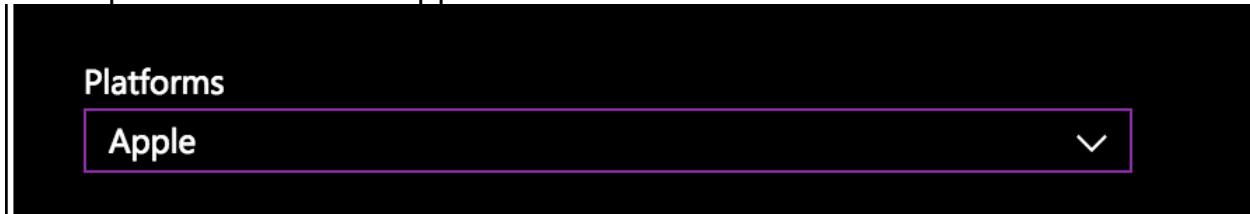
<https://stackoverflow.com/questions/15662377/unable-to-export-apple-production-push-ssl-certificate-in-p12-format/21060610#21060610>

After this is set - you can send a “test” notification. It won’t go anywhere but let’s just verify that something gets sent on the backend.



Click “Test Send”

Under platform across to Apple:



Keep everything default - and click Send.

Home > NotificationHubExample > MySampleNotificationHub > Test Send

Test Send

Send a test notification to 10 random registered devices

Settings

Platforms: Apple

Send to Tag Expression:

Payload:

```
1 [{"aps": {"alert": "Notification Hub test notification"}},  
2]
```

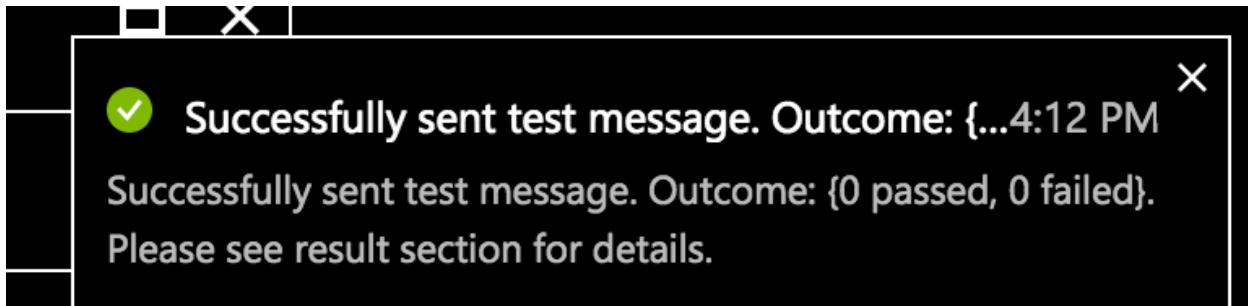
Send

Result

PLATFORM	REGISTRATION	OUTCOME
Message was successfully sent, but there were no matching targets.		

Successfully sent test message. Outcome: {0} Please see result section for details.

Hopefully - you'll this success message pop-up in the upper right.



CLIENT SIDE : XAMARIN.FORMS:

In Visual Studio for Mac, I create a new blank Xamarin.Forms application.

The options don't matter too much (I prefer UI in C# vs. XAML).

What does matter is that the Bundle Identifier in Project > Project.iOS > info.plist is set to what you defined when you were creating your provisioning profile.

So not that we've got a blank app - let's start adding code.

We're going to use Rene's code from here as a jumping off point:

<https://github.com/Krumelur/XamUAzureNotificationHub>

I'll walk line-by-line what we'll be adding and why we're doing it.

Please note - if you see errors as you are working through the code, be sure to right click / Quick Fix / and add the necessary "using" statements.

In your app delegate - you're going to need a new method - called RequestPushPermissionAsync(); This will prompt the user to accept Notifications.

(This code of course is on the Github project:

<https://github.com/andrewchungxam/XamarinFormsPushNotificationSample>

AppDelegate.cs

```
18  [Register]
19  public override void FinishedLaunching (UIApplication app, NSDictionary options)
20  {
21      //#ADD Section 1 - Step 1
22      RequestPushPermissionAsync ();
23  }
```

We'll define the method further down (note the code is for iOS 10 and above):

It basically asks for your permission — notice there is a check at the Request but also that it needs to check the settings to make sure your user didn't revoke the permission in the device's Settings since the last time the app was used.

```

23
24
25
26     async Task RequestPushPermissionAsync()
27     {
28         // iOS10 and later (https://developer.xamarin.com/guides/ios/platform\_features/user-notifications/enhanced-user-notifications/)
29         // Register for ANY type of notification (local or remote):
30         var requestResult = await UNUserNotificationCenter.Current.RequestAuthorizationAsync(
31             UNAuthorizationOptions.Alert
32             | UNAuthorizationOptions.Badge
33             | UNAuthorizationOptions.Sound);
34
35
36         // Item1 = approved boolean
37         bool approved = requestResult.Item1;
38         NSError error = requestResult.Item2;
39         if (error == null)
40         {
41             // Handle approval
42             if (!approved)
43             {
44                 Console.WriteLine("Permission to receive notifications was not granted.");
45                 return;
46             }
47
48             var currentSettings = await UNUserNotificationCenter.Current.GetNotificationSettingsAsync();
49             if (currentSettings.AuthorizationStatus != UNAuthorizationStatus.Authorized)
50             {
51                 Console.WriteLine("Permissions were requested in the past but have been revoked (-> Settings app).");
52                 return;
53             }
54
55             UIApplication.SharedApplication.RegisterForRemoteNotifications();
56         }
57         else
58         {
59             Console.WriteLine($"Error requesting permissions: {error}.");
60         }
61     }

```

Next - we need to add Register for Remote Notification:

AppDelegate.cs

```

public async override void RegisteredForRemoteNotifications(
    UIApplication application, NSData deviceToken)
{
    if (deviceToken == null)
    {
        // Can happen in rare conditions e.g. after restoring a device.
        return;
    }

    Console.WriteLine($"Token received: {deviceToken}");
    await SendRegistrationToServerAsync(deviceToken);
}

```

Send to the server the registration information (note - we'll change that client below to a Function to simplify deployment — the most updated code will be in the Github. In the sample project - you're looking at you'll likely see that "var client = new MobileServiceClient(..." code commented out or replaced with a function.)

AppDelegate.cs

```

async Task SendRegistrationToServerAsync(NSData deviceToken)
{
    // This is the template/payload used by iOS. It contains the "messageParam"
    // that will be replaced by our service.
    const string templateBodyAPNS = "{\"aps\":{\"alert\":\"$(messageParam)\"}}";

    var templates = new JObject();
    templates["genericMessage"] = new JObject
    {
        {"body", templateBodyAPNS}
    };

    var client = new MobileServiceClient(XamUNotif.App.MobileServiceUrl);
    await client.GetPush().RegisterAsync(deviceToken, templates);
}

```

Handle the situation where there was a failure to register:

AppDelegate.cs

```

public override void FailedToRegisterForRemoteNotifications(UIApplication application, NSError error)
{
    Console.WriteLine($"Failed to register for remote notifications: {error.Description}");
}

```

Finally - Receive and Present the notification:

AppDelegate.cs

```

public override void DidReceiveRemoteNotification(
    UIApplication application,
    NSDictionary userInfo,
    Action<UIBackgroundFetchResult> completionHandler)
{
    // This will be called if the app is in the background/not running and if in the foreground.
    // However, it will not display a notification visually if the app is in the foreground.

    PresentNotification(userInfo);

    completionHandler(UIBackgroundFetchResult.NoData);
}

void PresentNotification(NSDictionary dict)
{
    // Extract some data from the notification and display it using an alert view.
    NSDictionary aps = dict.ObjectForKey(new NSString("aps")) as NSDictionary;

    var msg = string.Empty;
    if (aps.ContainsKey(new NSString("alert")))
    {
        msg = (aps[new NSString("alert")] as NSString).ToString();
    }

    if (string.IsNullOrEmpty(msg))
    {
        msg = "(unable to parse)";
    }

    MessagingCenter.Send<object, string>(this, App.NotificationReceivedKey, msg);
}

```

Next - we're going to back up to the FinishedLaunching method of the AppDelegate.cs

We're going to add _launch options.

Why? This will help us for when the user received a notification but the app is not open.

This will be in options under the FinishedLaunching parameters. Upon activation, OnActivated will run and then it will call the same PresentNotifications we covered above.

Take a look at the code here:

AppDelegate.cs

```

public override bool FinishedLaunching(UIApplication app, NSDictionary options)
{
    global::Xamarin.Forms.Forms.Init();
    LoadApplication(new App());

    RequestPushPermissionAsync();

    _launchOptions = options;

    return base.FinishedLaunching(app, options);
}

NSDictionary _launchOptions;

public override void OnActivated(UIApplication uiApplication)
{
    base.OnActivated(uiApplication);
    // If app was not running and we come from a notification badge, the notification is delivered via the options.
    if (_launchOptions != null && _launchOptions.ContainsKey(UIApplication.LaunchOptionsRemoteNotificationKey))
    {
        var notification = _launchOptions[UIApplication.LaunchOptionsRemoteNotificationKey] as NSDictionary;
        PresentNotification(notification);
    }
    _launchOptions = null;
}

```

SETTINGS

Now there are a couple things in the project settings that we've got to select so that it can receive background notifications.

Go to Info.plist and then scroll down all the way to Background Modes - click the box and more options will appear.

Enable Background Modes

Background modes is a way to tell iOS which services must be allowed to continue running while your app is running in the background.

Modes: Audio, AirPlay and Picture in Picture

Location updates

Voice over IP

Newsstand downloads

External accessory communication

Uses Bluetooth LE accessories

Acts as Bluetooth LE accessory

Background fetch

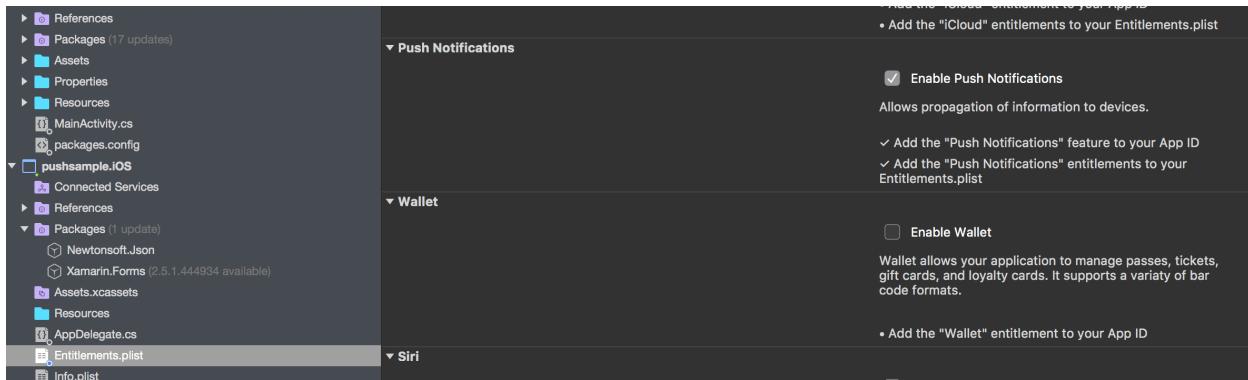
Remote notifications

Network Authentication

✓ Add the "Required Background Modes" key to your Info.plist

^ If that isn't set - it will not receive the notification.

Also set Enable Push Notifications in the Entitlements:



NEXT STEPS:

Now let's re-work the UI of the application.

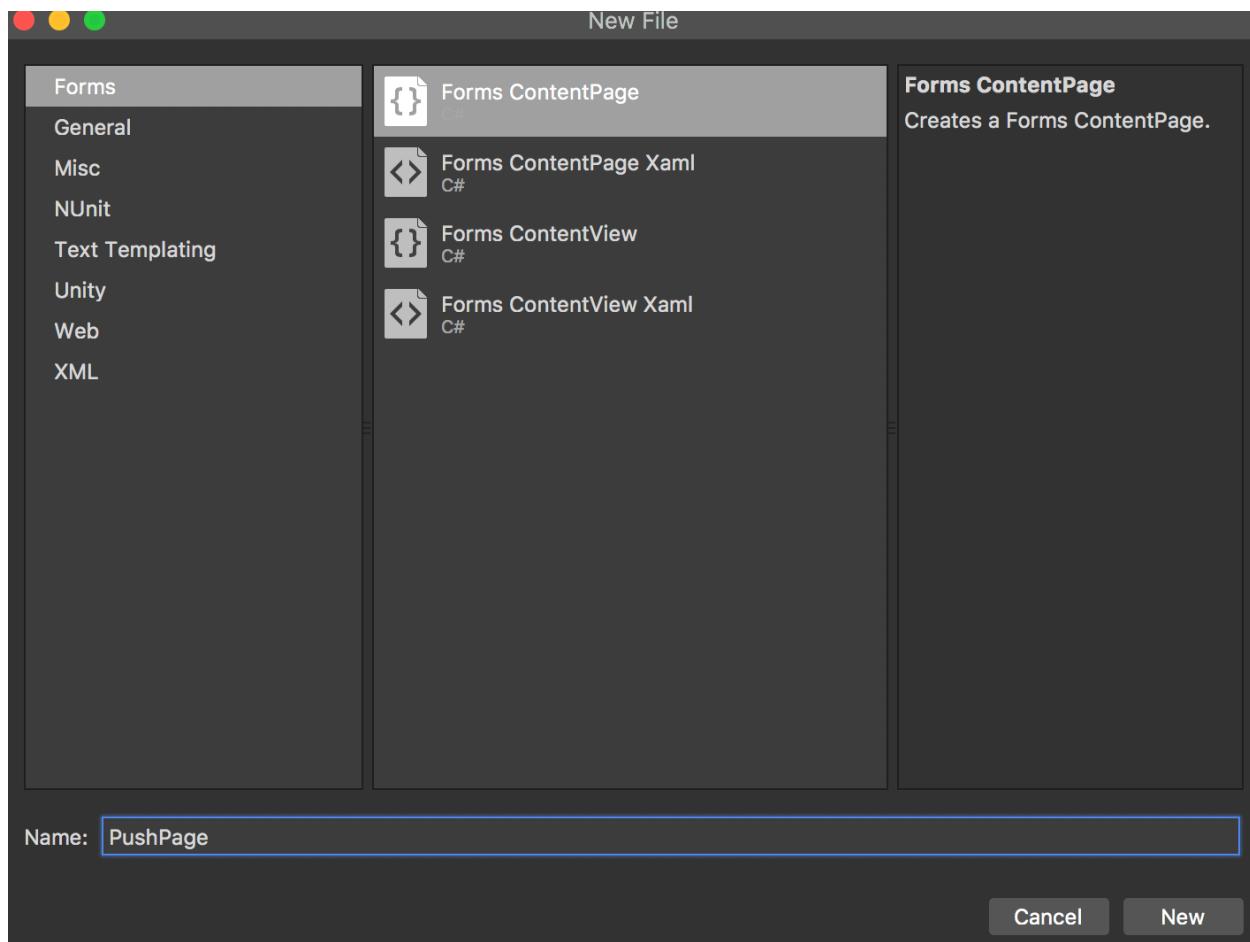
Also - let's use a couple programs to test out how far we've actually gotten. We're going to use something akin "Postman" to send a test notification to make sure the app is correctly setup. This app is called Pusher.

After that we'll use an Azure Function to Interact with the Notification Hub.

Re-work the UI of the Application:

I've used a Blank app.

Create a new Forms > ContentPage



Then let's have that page be our first page.

pushsample.cs

```

5  namespace pushsample
6  {
7      public class App : Application
8      {
9          public App()
10         {
11             // The root page of your application
12             //var content = new ContentPage
13             //{
14                 //    Title = "pushsample",
15                 //    Content = new StackLayout
16                 //{
17                     //        VerticalOptions = LayoutOptions.Center;
18                     //        Children = {
19                         //            new Label {
20                             //                HorizontalTextAlignment = TextAlignment.Center;
21                             //                Text = "Welcome to Xamarin!";
22                         //}
23                     }
24                 //}
25             };
26         }
27     }
28
29     var pushPage = new PushPage();
30     MainPage = new NavigationPage(pushPage);

```

Testing the application:

Let's use this application called Pusher which is the iOS push notifications equivalent of "postman":

<https://github.com/noodlewerk/NWPusher>

I downloaded the binary (I did this at my own risk — but the tool was recommended by a colleague in our development education group so I figured it was worth the risk.)

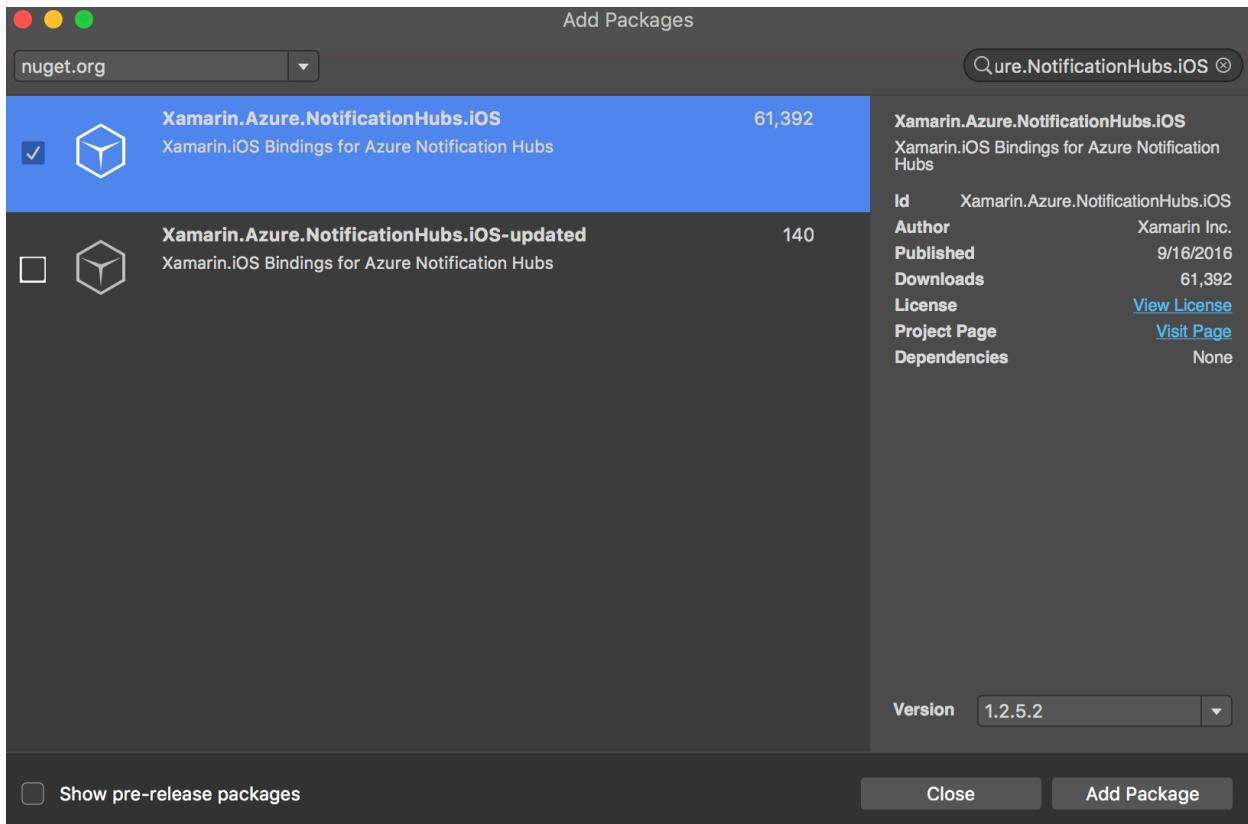
- It will ask you to upload your SSL certificate which is the same as the one you uploaded to Azure Notification Hub.
- In Finder on the Mac - open up console. Command + Space :: Console.
 - Run the app on your phone and then find it in the left bar

Devices	Type	Time	Process	Message
MacBook Pro (2)	rappor..	19:21:42.992365		Found CUBonjourDevice 99:E9:5B:40:D9:32, 'Kent's New MacBook Pro'
iPhone X	rappor..	19:21:42.992461		Bonjour unauth peer found <99:E9:5B:40:D9:32>: CUBonjourDevice 99:E9:5B:40:D9:32, 'Kent's New MacBook Pro'
Happy Happy I...	sympto..	19:21:45.163584		L2 Metrics on ifname en0: rssi: -68 (txFrames/txReTx/txFail) 0/0/0 -> (was/is) 0/0
	CommCe..	19:21:45.619582		QMI: Svc=0x03(NAS) Ind MsgId=0x0051 Bin=['01 2A 00 00 03 05 04 6F 4E 51 00 1E 00 11 08 00 83 05 00 00 96 F
	UserEv..	19:21:47.011634		POSIM disabled...
	nsurls..	19:21:50.174226		Triggering periodic update to powerlog for client <private>
	sympto..	19:21:50.174278		L2 Metrics on ifname en0: rssi: -67 (txFrames/txReTx/txFail) 1/0/0 -> (was/is) 0/0
	CommCe..	19:21:50.741788		QMI: Svc=0x03(NAS) Ind MsgId=0x0051 Bin=['01 2A 00 00 03 05 04 70 4E 51 00 1E 00 11 08 00 83 05 00 00 96 F
	locati..	19:21:51.518376		{"msg": "adapter details", "adapterDescription": "usb host", "batteryChargerType": "kChargerTypeUsb"}
	coredu..	19:21:51.557933		CDDBatteryMonitor: received batterycallback, currentPercentage:100.000000!
	nsurls..	19:21:54.153271		Triggering periodic update to powerlog for client <private>
	sympto..	19:21:55.180533		L2 Metrics on ifname en0: rssi: -66 (txFrames/txReTx/txFail) 0/0/0 -> (was/is) 0/0
	CommCe..	19:21:55.855696		QMI: Svc=0x03(NAS) Ind MsgId=0x0051 Bin=['01 2A 00 00 03 05 04 71 4E 51 00 1E 00 11 08 00 83 05 00 00 96 F
	nsurls..	19:21:56.518142		Triggering periodic update to powerlog for client com.apple.tipsd
	atc	19:21:57.262280		<ATLegacyMessageLink: 0x1004df980, wifi=0> ---> [Ping Request. id=1073, Session=0, params=(null)]

- o Search for: token received
 - If you don't see it - rebuild your app and make sure your console is running from when your app is open
- o 1) Try with the app in the background (ie. press the Home button) - you should be to press the notification and see the app open up.
- o 2) Try with the app in the foreground - the text should change if successful! (The text will change to "Success"
 - NOTE - the button will not work yet.
- o **Quick gotcha - if you delete the app, you have recheck for the token. Also if you recheck the token you might see old logs so make sure you're looking at the latest ones (ie check the time stamp).

Registering Notification through the iOS Client

Add the necessary package to the iOS project:
 Xamarin.Azure.NotificationHubs.iOS:



pushsample.iOS > AppDelegate.cs

```
15
16 namespace pushsample.iOS
17 {
18     [Register("AppDelegate")]
19     public partial class AppDelegate : global::Xamarin.Forms.Platform.iOS.FormsApplicationDelegate
20     {
21
22         private SBNotificationHub Hub { get; set; }
23     }
```

(Right click to add the appropriate using statements.)

Go to the shared project to your main app project.

pushsample > pushsample.cs

*Ensure that you use the correct shared access signature configuration strings on the client and on the application back end. Generally, you must use **DefaultListenSharedAccessSignature** on the client and **DefaultFullSharedAccessSignature** on the application back end (grants permissions to send notifications to Notification Hubs).*

```
// Azure app-specific connection string and hub path  
public const string ConnectionString = "ConnectionString - Microsoft documentation recommends to use the Listen on client ";  
public const string NotificationHubName = "<Azure hub name - ie. just the name of the hub>";
```

Get the above from your Notification Hub:

A screenshot of the Azure portal showing a notification hub. The hub name is 'XamarinFormsNotificationHub' (with ellipses), and it is located in the 'Central US' region. The status bar at the bottom shows 'Notification Hub'.

Go to AccessPolicies:

A screenshot of the 'Access Policies' section in the Azure portal. It features a large blue button with a key icon and the text 'Access Policies'.

- Go to Listen, Manage, Send and get the Connection String.
- For the Notification Hub Name go here:

A screenshot of the 'Properties' section in the Azure portal. It features a large blue button with a vertical bars icon and the text 'Properties'.

and get this:

A screenshot of the 'NAMESPACE' section in the Azure portal. It shows the hub name 'XamarinFormsNotificationHub' highlighted with a yellow underline.

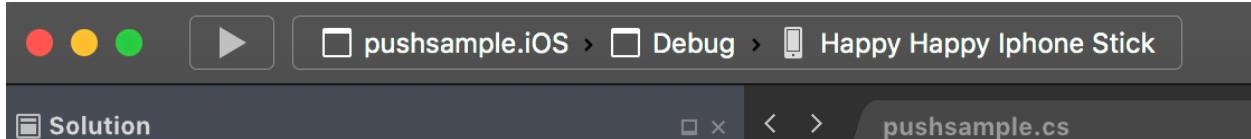
```

103
104    async Task SendRegistrationToServerAsync(NSDate deviceToken)
105    {
106        // This is the template/payload used by iOS. It contains the "messageParam"
107        const string templateBodyAPNS = "{\"aps\":{\"alert\":\"$(messageParam)\"}}";
108
109        var templates = new JObject();
110        templates["genericMessage"] = new JObject
111        {
112            {"body", templateBodyAPNS}
113        };
114
115
116        Hub = new SBNotificationHub(App.ConnectionString, App.NotificationHubName);
117
118        Hub.UnregisterAllAsync(deviceToken, (error) => {
119            if (error != null)
120            {
121                Console.WriteLine("Error calling Unregister: {0}", error.ToString());
122                return;
123            }
124
125            NSSet tags = null; // create tags if you want
126            Hub.RegisterNativeAsync(deviceToken, tags, (errorCallback) => {
127                if (errorCallback != null)
128                    Console.WriteLine("RegisterNativeAsync error: " + errorCallback.ToString());
129            });
130        });
131
132    }
133
134    //This will be replaced with a Function calling into a NotificationHub
135    //var client = new MobileServiceClient(XamUNotif.App.MobileServiceUrl);
136    //await client.GetPush().RegisterAsync(deviceToken, templates);
137 }

```

Delete previous versions of your app from your device. (This will cause a re-registration of your app and get a new device token for registration with your Notification Hub).

Re-run on device:



Also - added the extra line of Error Handling to make sure the notification's has the string "api" and is not null:

To see what the APS keys

are: <https://developer.apple.com/library/content/documentation/NetworkingInternet/Conceptual/RemoteNotificationsPG/PayloadKeyReference.html>

```

    void PresentNotification(NSDictionary dict)
    {
        // Check to see if the dictionary has the aps key. This is the notification payload you would have sent
        if (null != dict && dict.ContainsKey(new NSString("aps")))
        {
            // Extract some data from the notification and display it using an alert view.
            NSDictionary aps = dict.ObjectForKey(new NSString("aps")) as NSDictionary;

            var msg = string.Empty;
            if (aps.ContainsKey(new NSString("alert")))
            {
                msg = (aps[new NSString("alert")] as NSString).ToString();
            }

            if (string.IsNullOrEmpty(msg))
            {
                msg = "(unable to parse)";
            }

            MessagingCenter.Send<object, string>(this, App.NotificationReceivedKey, msg);
        }
    }
}

```

So now this is setup - go to the portal and send test notification to your iOS application:

The screenshot shows the PushSharp configuration interface. It includes sections for Settings, Platforms (set to Apple), Send to Tag Expression (empty), Payload (containing a JSON object), and a Send button. Below the interface is a Result section with a note about sending a test notification.

Settings

Platforms: Apple

Send to Tag Expression:

Payload

```

1 {"aps":{"alert":"Notification Hub test notification"}}
2

```

Send

Result

You must send a test notification before you can see any results.

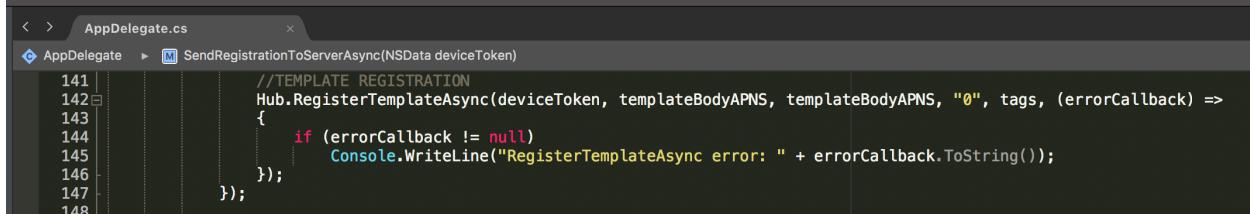
Press Send.

|||||||||||||||||||||

BRANCH 3

We've added a TEMPLATE REGISTRATION in the AppDelegate.cs of the iOS project
This can be distinguished from a NATIVE registration.

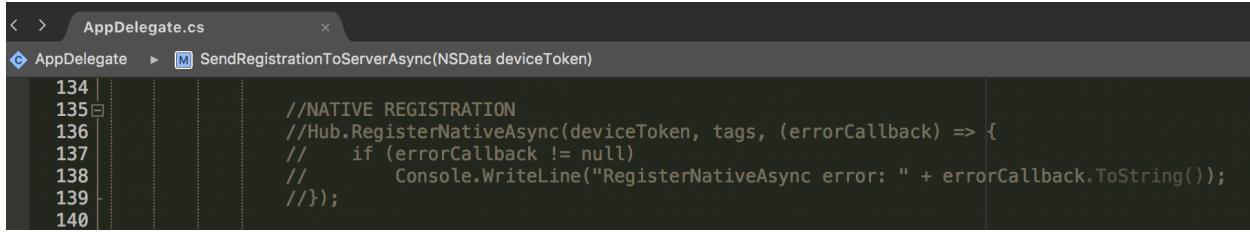
NEW:



```
< > AppDelegate.cs
AppDelegate > SendRegistrationToServerAsync(NSData deviceToken)
141 |         //TEMPLATE REGISTRATION
142 |         Hub.RegisterTemplateAsync(deviceToken, templateBodyAPNS, templateBodyAPNS, "0", tags, (errorCallback) =>
143 |             {
144 |                 if (errorCallback != null)
145 |                     Console.WriteLine("RegisterTemplateAsync error: " + errorCallback.ToString());
146 |             });
147 |
148 |     });

149 | }
```

OLD:



```
< > AppDelegate.cs
AppDelegate > SendRegistrationToServerAsync(NSData deviceToken)
134 |         //NATIVE REGISTRATION
135 |         Hub.RegisterNativeAsync(deviceToken, tags, (errorCallback) => {
136 |             if (errorCallback != null)
137 |                 Console.WriteLine("RegisterNativeAsync error: " + errorCallback.ToString());
138 |         });
139 |
140 |     });

141 | }
```

Not sure which one you've done?

(Helpful links:

<https://stackoverflow.com/questions/42980577/azure-notification-hub-what-are-registration-types-native-and-template>

<https://stackoverflow.com/questions/24543173/diagnosing-dropped-notifications-from-azure-notification-hub-to-apns>

<https://docs.microsoft.com/en-us/azure/notification-hubs/notification-hubs-push-notification-fixer#verify-registrations>

** Visually look at the registrations

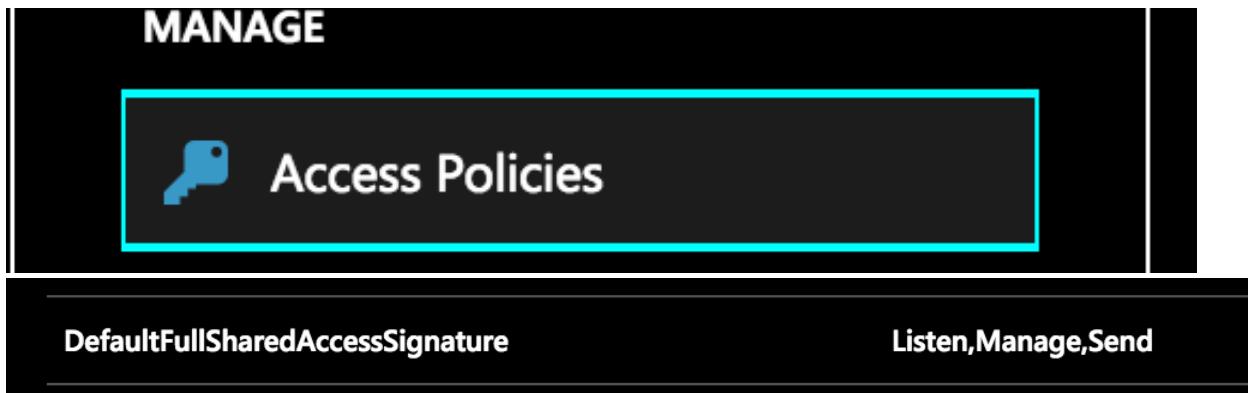
<https://msdn.microsoft.com/en-us/magazine/dn948105.aspx>

<https://docs.microsoft.com/en-us/azure/notification-hubs/notification-hubs-push-notification-fixer>

//Running the Console application

// Make sure to add in Azure Constants the necessary constants:

1) Full Access Connection String:



2) ConsoleApplicationNotificationHubName

- This is just the name of the notification hub

```
//In case you have issues running the Console application -- please set it as the Startup  
Project — I run this console application from Visual Studio 2017 - targeting .NET CORE 2.0  
//NOTE: Notice the “Thread.Sleep(30000)” — you’ll need something like this to make sure the  
program has enough time to send the notification.
```

You'll notice there are three types of Notifications that can be sent:

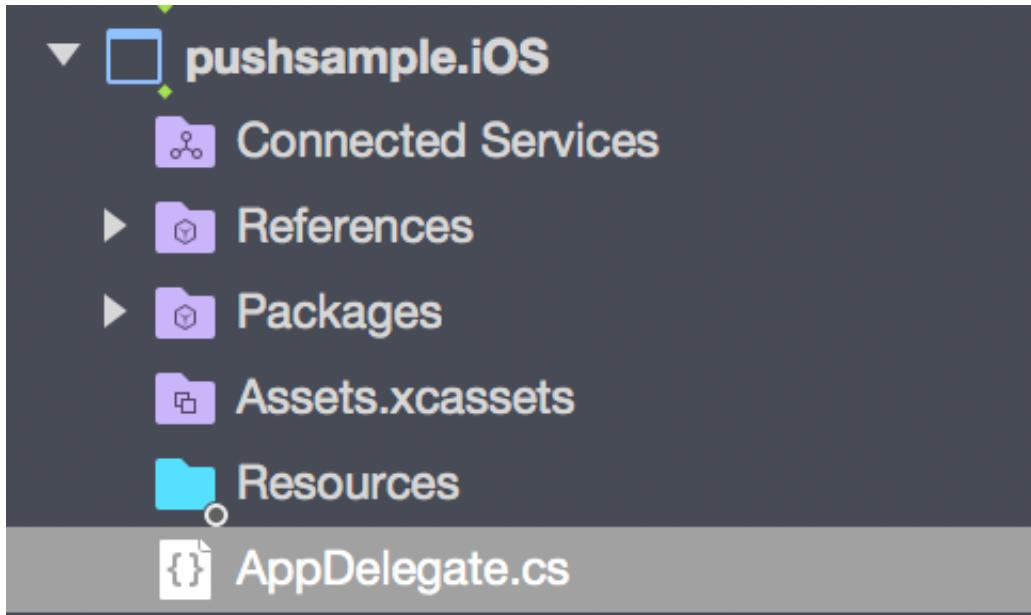
- 1) Send Template Notification Async Native Apple — this you'll need to send with the Native registration set up in the iOS App
- 2) Send Template Notification Async - this you'll need to send with the Template registration set up in the iOS App
- 3) Send Template Notification Multiple Async - this you'll need to send with the Template registration set up in the iOS App

BRANCH 4

Azure Functions to handle automatic registration with Notification Hub

Previously the registrations was done in the AppDelegate.cs

(This is from Branch 3)



```
async Task SendRegistrationToServerAsync(NSData deviceToken)
{
    // This is the template/payload used by iOS. It contains the "messageParam"
    // that will be replaced by our service.
    const string templateBodyAPNS = "{\"aps\":{\"alert\":\"$(<messageParam>)\"}}";

    var templates = new JObject();
    templates["genericMessage"] = new JObject
    {
        {"body", templateBodyAPNS}
    };

    Hub = new SBNotificationHub(App.ConnectionString, App.NotificationHubName);

    Hub.UnregisterAllAsync(deviceToken, (error) =>
    {
        if (error != null)
        {
            Console.WriteLine("Error calling Unregister: {0}", error.ToString());
            return;
        }

        //NSSet tags = null; // create tags if you want
        NSSet tags = new NSSet("World", "Politics", "Business", "Technology", "Science", "Sports");

        //NATIVE REGISTRATION
        //Hub.RegisterNativeAsync(deviceToken, tags, (errorCallback) =>
        //{
        //    if (errorCallback != null)
        //        Console.WriteLine("RegisterNativeAsync error: " + errorCallback.ToString());
        //});

        //TEMPLATE REGISTRATION
        Hub.RegisterTemplateAsync(deviceToken, templateBodyAPNS, templateBodyAPNS, "0", tags, (errorCallback) =>
        {
            if (errorCallback != null)
                Console.WriteLine("RegisterTemplateAsync error: " + errorCallback.ToString());
        });
    });
}
```

Now we have to coordinate the registration of your application to your Function and then to Notification Hub.

We'll trigger that in the App Delegate of the iOS project via an Azure Function.

Create Azure Function:

This tutorial will at first use an anonymous function - but security should of course be a consideration in the production environment: <https://docs.microsoft.com/en-us/azure/azure-functions/>

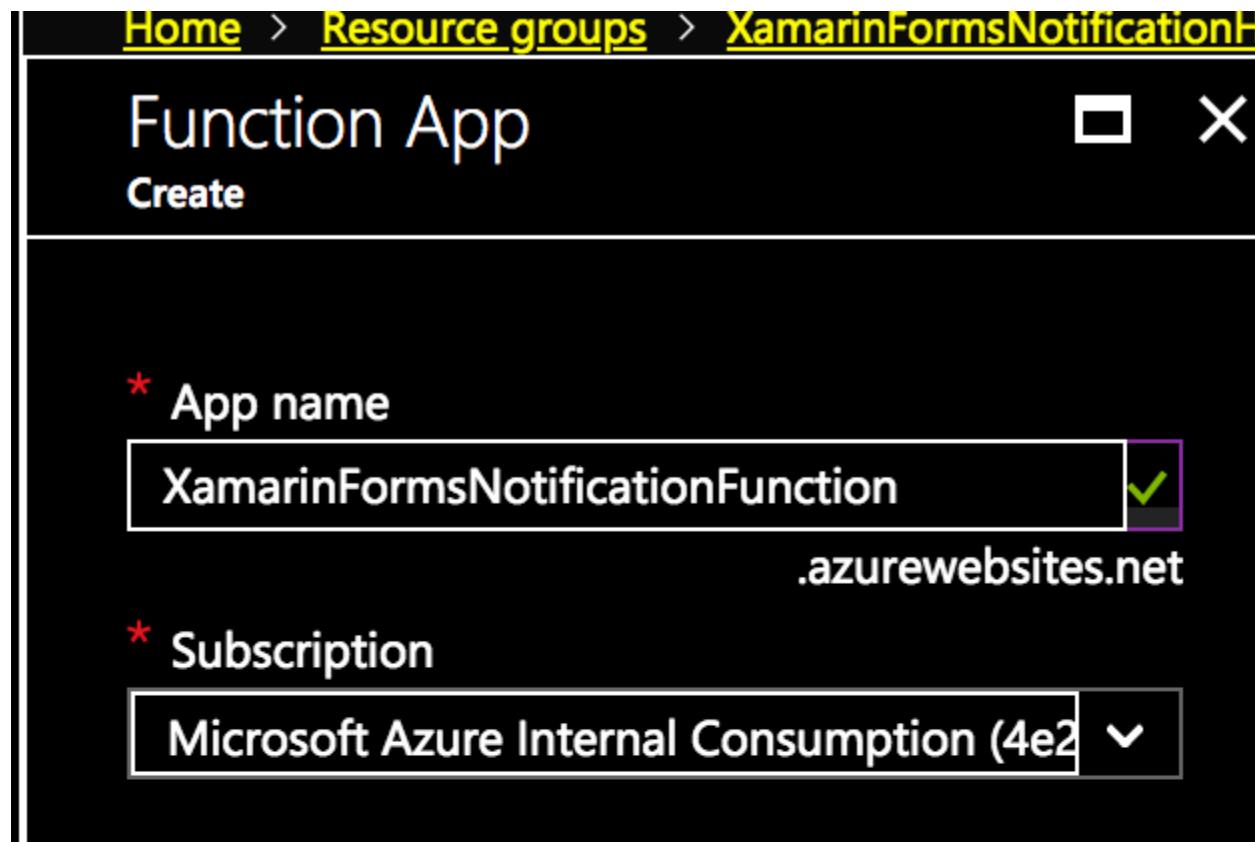
The setup of Azure Function is best described here (in terms of what is required in Visual Studio and a quick setup):

If you've never used an Azure Function - I would start with the following two tutorials.
<https://docs.microsoft.com/en-us/azure/azure-functions/functions-create-first-azure-function>
<https://docs.microsoft.com/en-us/azure/azure-functions/functions-create-your-first-function-visual-studio>

NAME	PUBLISHER	CATEGORY
 Function App	Microsoft	Web + Mobile 

You can use these setting generally - the Hosting Plan can either be consumption (pay as you go) or App Service plan:

The Consumption plan lets you pay-per-execution and dynamically allocates resources based on your app's load. App Service Plans let you use a predefined capacity allocation with predictable costs and scale.



The screenshot shows the 'Create Function App' dialog in the Azure portal. The URL in the browser is [Home > Resource groups > XamarinFormsNotificationH](#). The title bar says 'Function App' and has 'Create' and close ('X') buttons. The main form contains two fields: 'App name' with the value 'XamarinFormsNotificationFunction.azurewebsites.net' and a checked checkbox, and 'Subscription' with the value 'Microsoft Azure Internal Consumption (4e2)' and a dropdown arrow.

Home > [Resource groups](#) > [XamarinFormsNotificationH](#)

Function App X

Create

* App name

XamarinFormsNotificationFunction

.azurewebsites.net

* Subscription

Microsoft Azure Internal Consumption (4e2) ▼

* Resource Group 



Create new



Use existing

XamarinFormsNotificationHubSample



* OS

Windows

Linux (Preview)

* Hosting Plan 

Consumption Plan



* Location

South Central US



* Storage 



Create new



Use existing

xamarinformsnot92da

Application Insights 

On

Off

* Application Insights Location 

South Central US



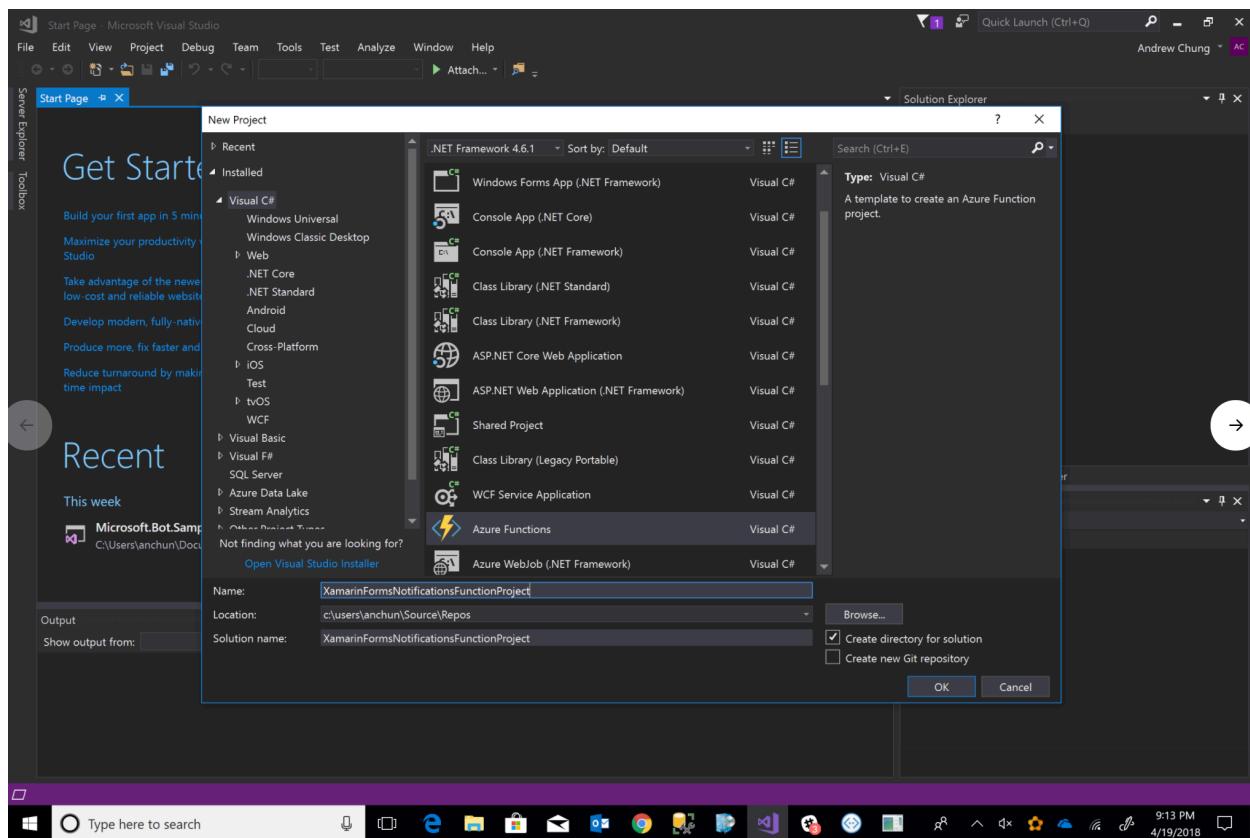


Pin to dashboard

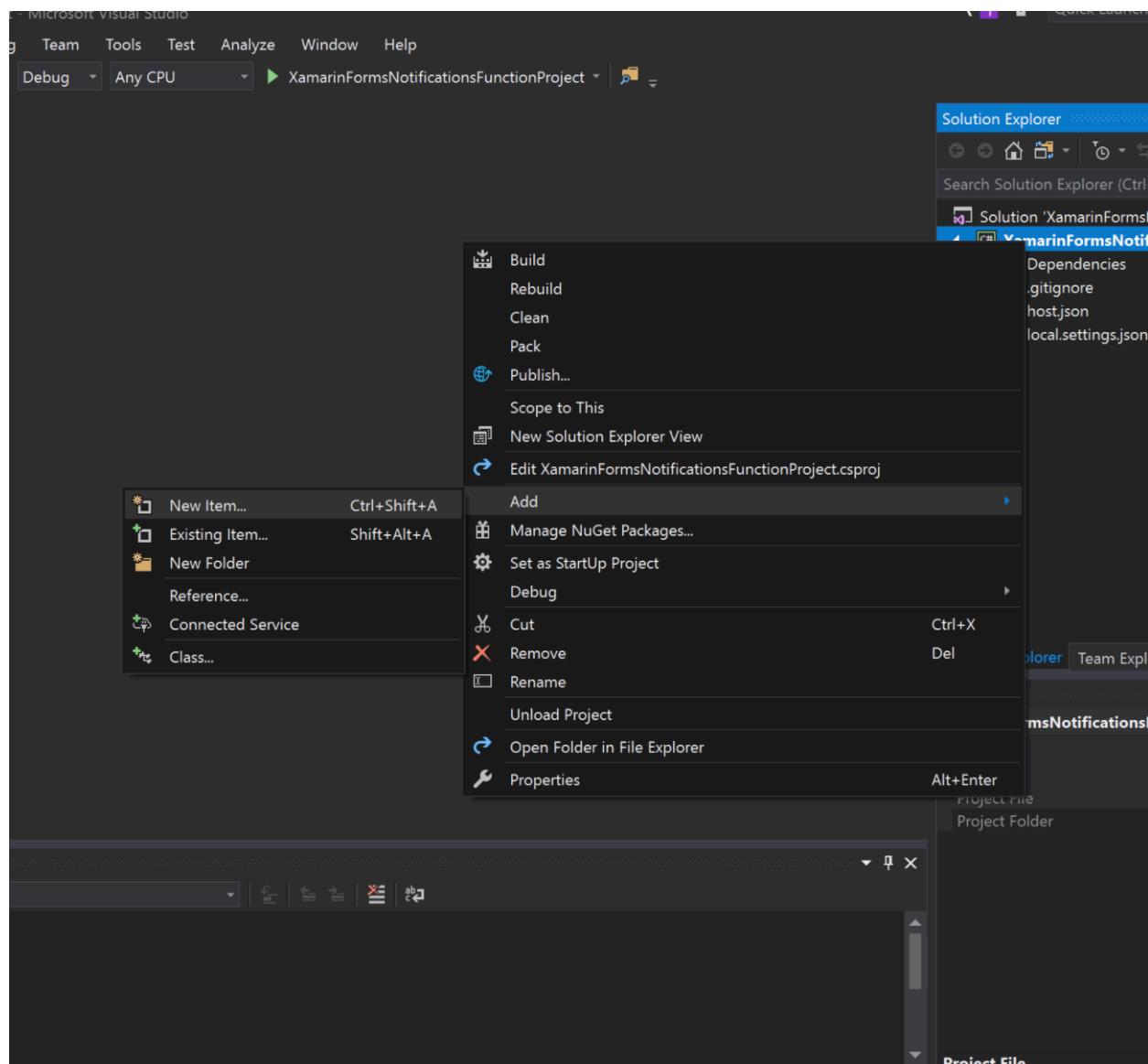
Create

Automation options

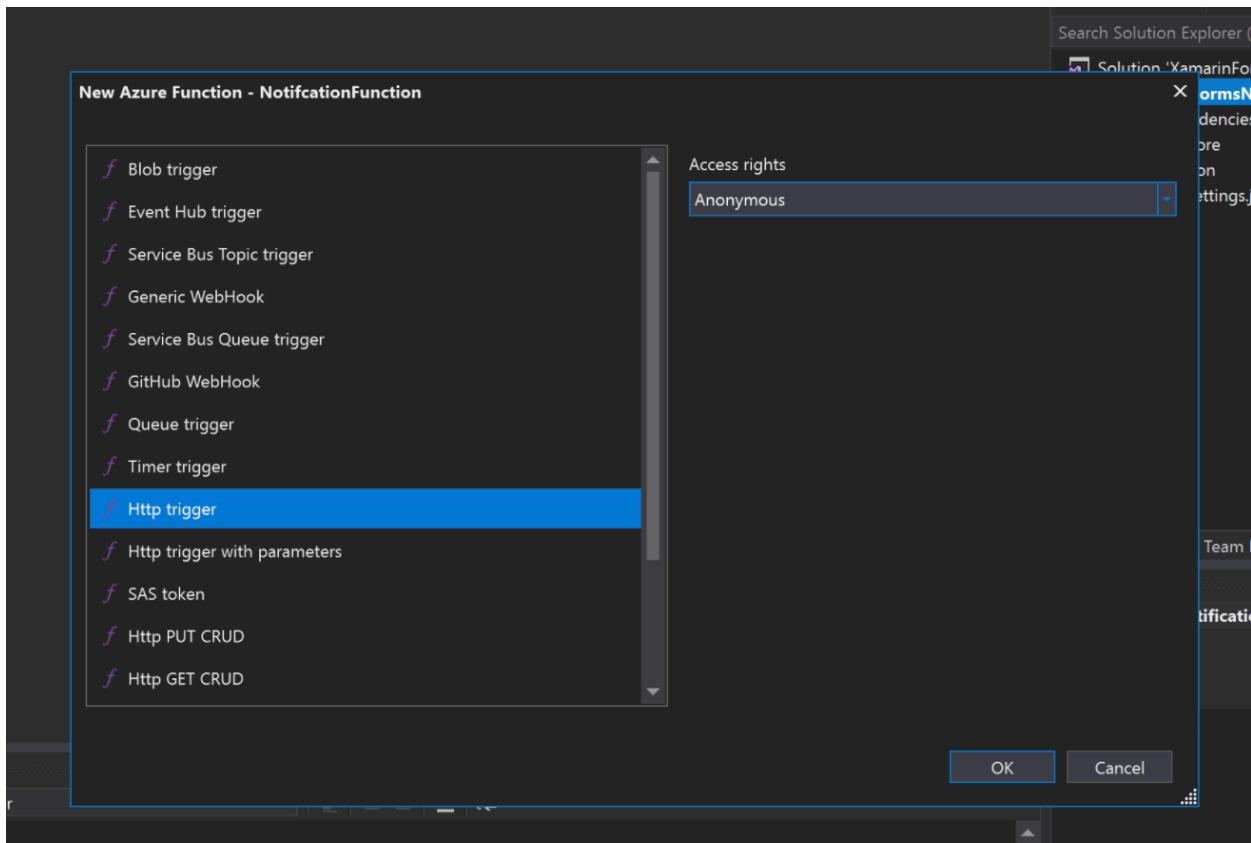
Create a new Functions Project:



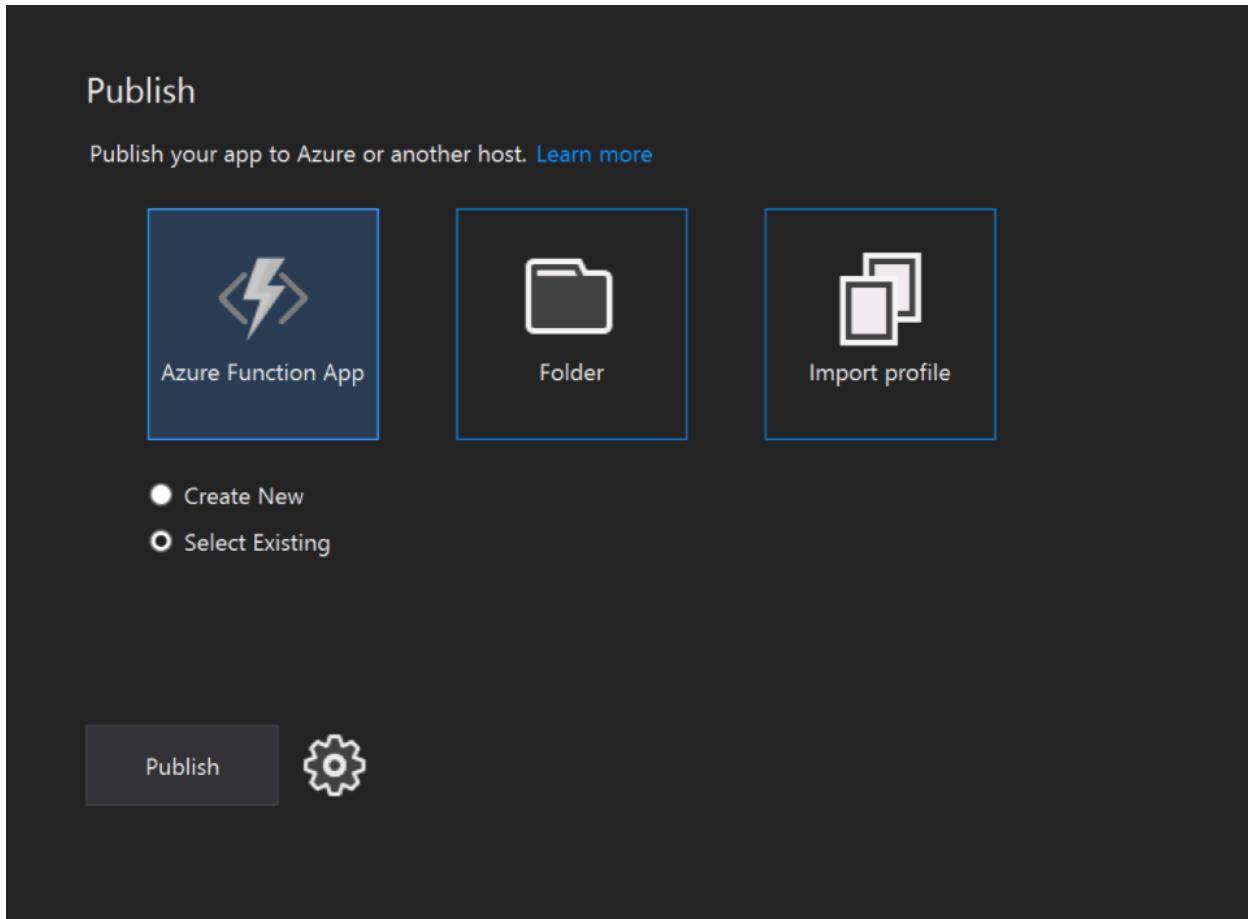
And a New Item:



This tutorial will at first use an anonymous function - but security should of course be a consideration in the production environment: <https://docs.microsoft.com/en-us/azure/azure-functions/>



Right Click your Function project to Publish.
Choose “Select Existing”
Press Publish



You'll be asked for your credentials and then once you log in - you'll be able to see your Resource Group → then Select your Functions App that you created. Then press Publish.

In Visual Studio - you should be able to see the following:

```
Output
Show output from: Build
Adding file (XamarinFormsNotificationFunction\bin\zh-Hant\Microsoft.Data.OData.resources.dll).
Adding file (XamarinFormsNotificationFunction\bin\zh-Hant\Microsoft.Data.Services.Client.resources.dll).
Adding file (XamarinFormsNotificationFunction\bin\zh-Hant\System.Spatial.resources.dll).
Adding file (XamarinFormsNotificationFunction\functionsSdk.out).
Updating file (XamarinFormsNotificationFunction\host.json).
Adding file (XamarinFormsNotificationFunction\NotificationFunction\function.json).
Publish Succeeded.

Restore completed in 29.72 ms for c:\users\anchun\source\repos\xamarinformsnotificationsfunctionproject\xamarinformsnotificationsfunctionproject\xamarinformsn...
```

Go back to the Azure portal - back into the Function app you created:

You should see something like this:

The screenshot shows the Azure Functions Overview page for a function named 'XamarinFormsNotificationFunction'. The URL is listed as <https://xamarinformsnotificationfunction.azurewebsites.net>.

Notice the Url on the upper right?

Try going to that URL on a browser - you should see the following:

The screenshot shows a browser window displaying the Microsoft Azure Function App landing page. The URL <https://xamarinformsnotificationfunction.azurewebsites.net> is visible in the address bar.

Then try <YOUR_URL> / api / {Name of your Function that you defined in your code }

```
namespace XamarinFormsNotificationsFunctionProject
{
    public static class NotificationFunction
    {
        [FunctionName("NotificationFunction")]
        public static async Task<HttpResponseMessage>
        {
            ...
        }
    }
}
```

Mine is: <https://xamarinformsnotificationfunction.azurewebsites.net/api/NotificationFunction>

And then it will ask for a name, so try:

[https://xamarinformsnotificationfunction.azurewebsites.net/api/NotificationFunction?
name="Andrew"](https://xamarinformsnotificationfunction.azurewebsites.net/api/NotificationFunction?name=Andrew)

← → ⌂ <https://xamarinformsnotificationfunction.azurewebsites.net/api/NotificationFunction?name=Andrew>

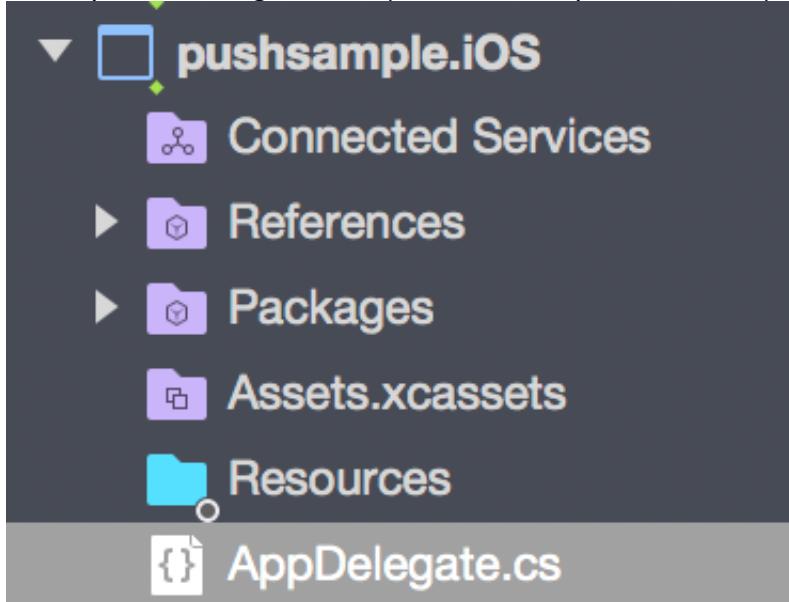
This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<string xmlns="http://schemas.microsoft.com/2003/10/Serialization/">Hello "Andrew"</string>
```

A small object lesson here!

Notice - I misspelled Notification above — since this very much has a magic string feel to it, please remember to check your spelling quite carefully and don't get caught up in small gotchas like this one! (If you're having issues and can't figure it out — consider reviewing URLs and using Postman (<https://www.getpostman.com/>) to double check your work.)

Your options for registration (Native or Template are here:)



```

97
98     public async override void RegisteredForRemoteNotifications(
99         UIApplication application, NSData deviceToken)
100    {
101        if (deviceToken == null)
102        {
103            // Can happen in rare conditions e.g. after restoring a device.
104            return;
105        }
106
107        Console.WriteLine($"Token received: {deviceToken}");
108
109        //await SendRegistrationToServerAsyncNative(deviceToken);
110        await SendRegistrationToServerAsyncTemplate(deviceToken);
111    }

```

Here are the two ways to register your notification.

```

async Task SendRegistrationToServerAsyncNative(NSData deviceToken)
{
    // This is the template/payload used by iOS. It contains the "messageParam"
    // that will be replaced by our service.

    string[] stringTags = new string[] { "Functions", "World", "Politics", "Business", "Technology", "Science", "Sports" };
    await NativeRegisterWithAzureNotificationHubRegistration(deviceToken, stringTags);

    //NSSet tags = new NSSet("World", "Politics", "Business", "Technology", "Science", "Sports");
    //await NativeRegisterWithAzureNotificationHubRegistration(deviceToken, tags);
}

async Task SendRegistrationToServerAsyncTemplate(NSData deviceToken)
{
    // This is the template/payload used by iOS. It contains the "messageParam"
    // that will be replaced by our service.
    const string templateBodyAPNS = "{\"aps\":{\"alert\":\"$(messageParam)\"}}";
    NSSet tags = new NSSet("World", "Politics", "Business", "Technology", "Science", "Sports");

    string[] stringTags = new string[] { "Functions", "World", "Politics", "Business", "Technology", "Science", "Sports" };

    var templates = new JObject();
    templates["genericMessage"] = new JObject
    {
        {"body", templateBodyAPNS}
    };

    await TemplateRegisterWithAzureNotificationHubRegistration(deviceToken, stringTags, templateBodyAPNS);
}

```

BRANCH 5

Azure Functions will be used to trigger the notification.

The Function is currently HTTP trigger and anonymous.

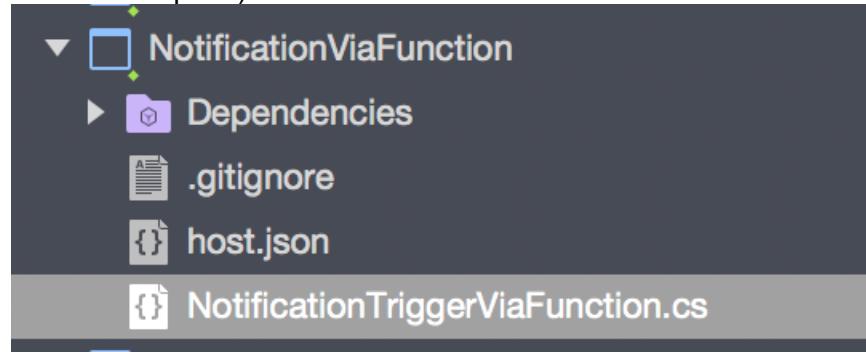
REMEMBER

PHONE (Trigger Native Registration) --> AZURE FUNCTION (Native Registrations) — Pairs With —> Azure Functions (Native Notifications)

OR

PHONE (Trigger Template Registration) --> AZURE FUNCTION (Template Registrations) — Pairs With —> Azure Functions (Template Notifications)

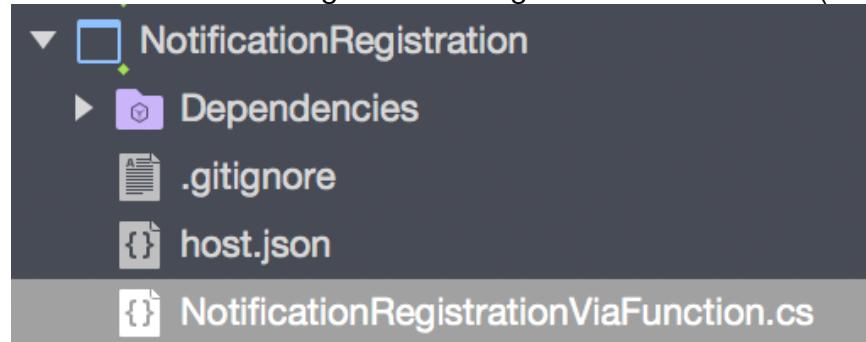
Remember there are three configurations to trigger the Notifications (one is Native the other two are Template)



[`FunctionName("NotificationFunctionNative")`]
`https://YourAzureFunction.net/api/NotificationFunctionNative`
[`FunctionName("NotificationFunctionTemplate")`] //sends only 1 notification
`https://YourAzureFunction.net/api/NotificationFunctionTemplate`
[`FunctionName("NotificationFunctionTemplateMultiple")`] //sends notifications to several Tags
`https://YourAzureFunction.net/api/NotificationFunctionTemplateMultiple`

REGISTRATIONS:

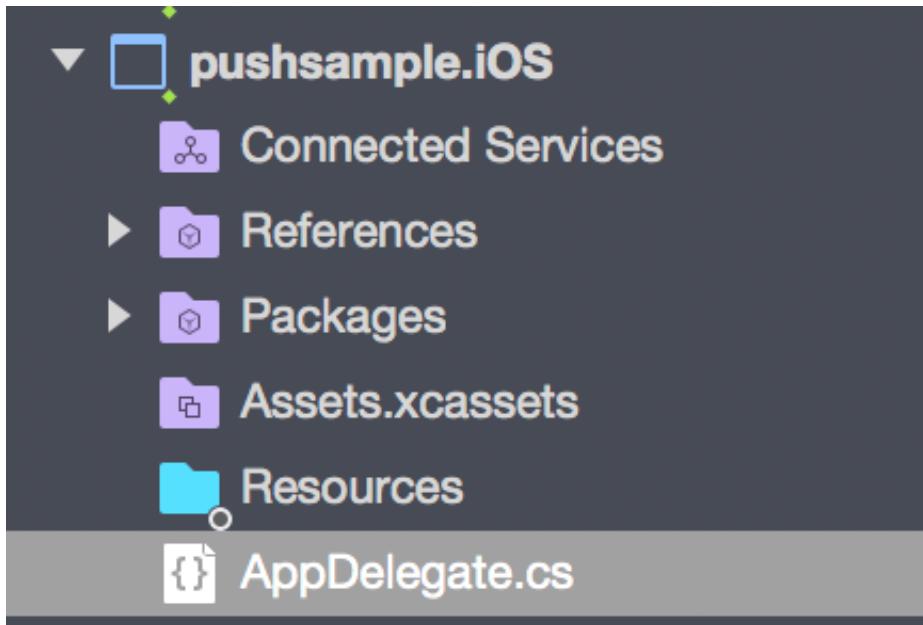
And there are two configuration to Register the Notifications (Native vs Template):



[`FunctionName("NativeRegistrationWithTags")`]
`https://YourAzureFunction.net/api/GetRegistrationIdPassingHandle/{handleString}`

[`FunctionName("TemplateRegistrationWithTags")`]
`https://YourAzureFunction.net/api/GetTemplateRegistrationWithTags/{handleString}`

TRIGGERING / TOGLLING REGISTRATION TYPE FROM THE PHONE:



TOGGLE BETWEEN THE BOTTOM TWO LINES OF CODE:

```
public async override void RegisteredForRemoteNotifications(
    UIApplication application, NSData deviceToken)
{
    if (deviceToken == null)
    {
        // Can happen in rare conditions e.g. after restoring a device.
        return;
    }

    Console.WriteLine($"Token received: {deviceToken}");

    //await SendRegistrationToServerAsyncNativeWithUsername(deviceToken);
    await SendRegistrationToServerAsyncTemplateWithUsername(deviceToken);
```

How do you trigger the Notification?

Use a program called: Postman: <https://www.getpostman.com/>
to trigger the URLs:

REMEMBER! You can save and run your Functions locally — you just need to change the first part of the URL (before /api/YourSpecificFunctionName) to the URL shown when you press the > Button for the Function:

```
NotificationFunctionNative: http://localhost:7071/api/NotificationFunctionNative
NotificationFunctionTemplate: http://localhost:7071/api/NotificationFunctionTemplate
NotificationFunctionTemplateMultiple: http://localhost:7071/api/NotificationFunctionTemplateMultiple
```

But the most important GOTCHA is that you have to PUBLISH your function each time you change it — for it to properly reflect the changes.

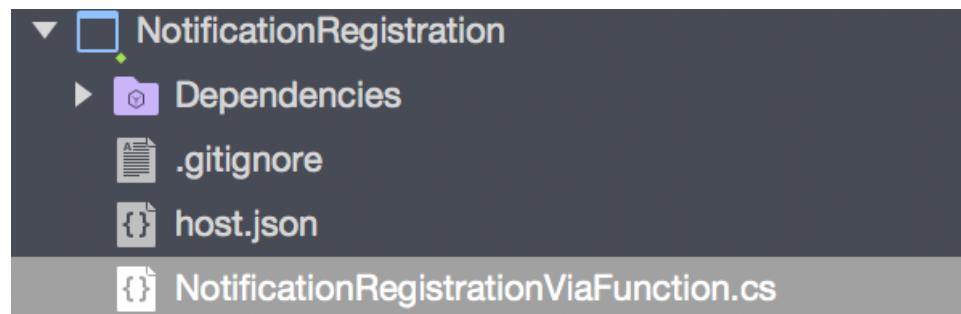
BRANCH 6

This is a continuation of Branch 5.

The only difference is that there is a tag → to distinguish it from other “tags” we’re going to follow a pattern where we create a prefix to the tag (username:). The tag will look like this “username:YourUsername”.

This example will add the tags in various various parts of the code — and adds it to the array of tags at the time of registration.

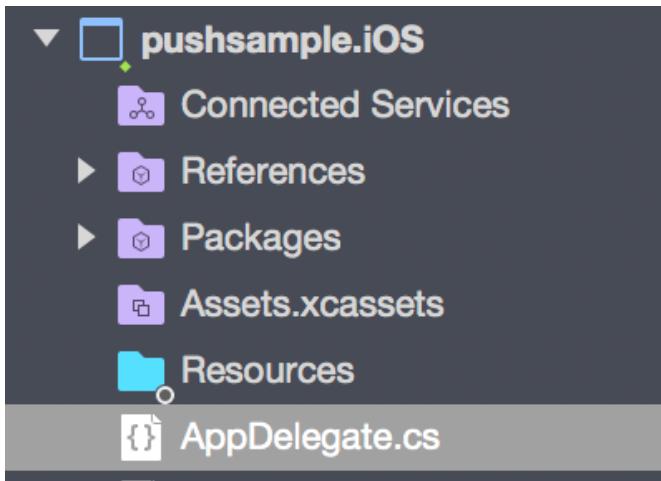
Here's an example of adding the username at the time of Registrations.



```
NATIVE
112     registration.Tags = new HashSet<string>(deviceUpdate.Tags);
113     var nativeUsername = "NativeUser101";
114     registration.Tags.Add("username:" + nativeUsername);

TEMPLATE
152
153     var stringTags = deviceRegistrationObjectWithTemplate.Tags;
154
155     Array.Resize(ref stringTags, stringTags.Length + 1);
156     var templateUsername = "TemplateUser101";
157     stringTags[stringTags.Length - 1] = "username:" + templateUsername;
```

Here's an example of adding the username from the client (phone):



NATIVE

```
async Task SendRegistrationToServerAsyncNativeWithUsername(NSData deviceToken)
{
    // This is the template/payload used by iOS. It contains the "messageParam"
    // that will be replaced by our service.

    string[] stringTags = new string[] { "Functions", "World", "Politics", "Business", "Technology", "Science", "Sports" };

    Array.Resize(ref stringTags, stringTags.Length + 1);
    var sampleUsername = "NewUser101";
    stringTags[stringTags.Length - 1] = "username:" + sampleUsername;

    await NativeRegisterWithAzureNotificationHubRegistration(deviceToken, stringTags);
```

TEMPLATE

```
async Task SendRegistrationToServerAsyncTemplateWithUsername(NSData deviceToken)
{
    // This is the template/payload used by iOS. It contains the "messageParam"
    // that will be replaced by our service.
    const string templateBodyAPNS = "{\"aps\":{\"alert\":\"$({messageParam})\"}}";

    //NSSet tags = new NSSet("World", "Politics", "Business", "Technology", "Science", "Sports");

    string[] stringTags = new string[] { "Functions", "World", "Politics", "Business", "Technology", "Science", "Sports" };

    Array.Resize(ref stringTags, stringTags.Length + 1);
    var sampleUsername = "NewUser101";
    stringTags[stringTags.Length - 1] = "username:" + sampleUsername;
```

Here's the Triggering of the Notifications with Username - simply add the Username with the addition of the prefix:

CONSOLE APPLICATION:

Native:

```

Array.Resize(ref categories, categories.Length + 1);
var nativeUsername = "NativeUser101";
categories[categories.Length - 1] = "username:" + nativeUsername;
var sdf = categories[1];

//this errors out - as the string type doesn't match registration string jsonString = "{\"aps\":{\"alert\":\"From your console - {0} native registration.\",\"category\":" + categories[i] + "}";
for (int i = 0; i < categories.Length; i++)
{
    //FOR FORMAT REQUIRING MODIFIED MESSAGES IN YOUR ALERT
    var _apns = new Aps()
    {
        alert = String.Format("From your console - {0} native registration.", categories[i])
    };

    var _rootObject = new RootObject
    {
        aps = _apns
    };

    string newJsonString = JsonConvert.SerializeObject(_rootObject);

    await hubClient.SendAppleNativeNotificationAsync(newJsonString, categories[i]);
}

```

Template:

```

private static async void SendTemplateNotificationAsync()
{
    // THIS WILL ONLY WORK IF IN YOUR IOS APPLICATION - YOU USE A TEMPLATE REGISTRATION
    //

    NotificationHubClient hubClient = Microsoft.Azure.NotificationHubs.NotificationHubClient.CreateClientFromConnectionString(
        (
            AzureConstants.AzureConstants.ConsoleApplicationFullAccessConnectionString,
            AzureConstants.AzureConstants.ConsoleApplicationNotificationHubName,
            true
        ));
    // Create an array of breaking news categories.
    var categories = new string[] { "World", "Politics", "Business", "Technology", "Science", "Sports" };

    Array.Resize(ref categories, categories.Length + 1);
    var templateUsername = "TemplateUser101";
    categories[categories.Length - 1] = "username:" + templateUsername;

    Dictionary<string, string> templateParams = new Dictionary<string, string>();
    //{
    //    { "messageParam", "Hello World" }
    //};
    //SINGLE NOTIFICATION
    templateParams["messageParam"] = "Breaking " + categories[0] + " News!";
    await hubClient.SendTemplateNotificationAsync(templateParams, "World");
}

```

Template Multiple:

```

private static async void SendTemplateNotificationMultipleAsync()
{
    //
    //THIS WILL ONLY WORK IF IN YOUR IOS APPLICATION - YOU USE A TEMPLATE REGISTRATION
    //

    NotificationHubClient hubClient = Microsoft.Azure.NotificationHubs.NotificationHubClient.CreateClientFromConnectionString
    (
        AzureConstants.AzureConstants.ConsoleApplicationFullAccessConnectionString,
        AzureConstants.AzureConstants.ConsoleApplicationNotificationHubName,
        true
    );
    // Create an array of breaking news categories.
    var categories = new string[] { "World", "Politics", "Business", "Technology", "Science", "Sports" };

    Array.Resize(ref categories, categories.Length + 1);
    var templateUsername = "TemplateUser101";
    categories[categories.Length - 1] = "username:" + templateUsername;

    Dictionary<string, string> templateParams = new Dictionary<string, string>();
    //{
    //    {"messageParam", "Hello World"}
    //};
    //templateParams["messageParam"] = "Breaking News!";
    foreach (var category in categories)
    {
        templateParams["messageParam"] = "Breaking " + category + " News!";
        await hubClient.SendTemplateNotificationAsync(templateParams, categories);
    }
}

```

Here's the Triggering of the Notifications with Username - simply add the Username with the addition of the prefix:

FUNCTION APPLICATION:

Native:

```

[FunctionName("NotificationFunctionNative")]
public static async Task<HttpResponseMessage> RunNotificationFunctionNative([HttpTrigger(AuthorizationLevel.Anonymous, "get", "post", Route = "native")]
{
    //
    //THIS WILL ONLY WORK IF IN YOUR IOS APPLICATION - YOU USE A NATIVE REGISTRATION
    //

    try
    {
        NotificationHubClient hubClient = Microsoft.Azure.NotificationHubs.NotificationHubClient.CreateClientFromConnectionString
        (
            AzureConstants.AzureConstants.ConsoleApplicationFullAccessConnectionString,
            AzureConstants.AzureConstants.ConsoleApplicationNotificationHubName,
            true
        );
        // Create an array of breaking news categories.
        var categories = new string[] { "World", "Politics", "Business", "Technology", "Science", "Sports" };

        Array.Resize(ref categories, categories.Length + 1);
        var nativeUsername = "NativeUser101";
        categories[categories.Length - 1] = "username:" + nativeUsername;

        for (int i = 0; i < categories.Length; i++)
        {
            //FOR FORMAT REQUIRING MODIFIED MESSAGES IN YOUR ALERT
            var _apns = new Apns()
            {
                alert = String.Format("From Azure Functions - {0} native registration.", categories[i])
            };

            var _rootObject = new RootObject
            {
                aps = _apns
            };

            string jsonString = JsonConvert.SerializeObject(_rootObject);

            await hubClient.SendAppleNativeNotificationAsync(jsonString, categories[i]);

            //FOR FORMATS NOT REQUIRING MODIFIED MESSAGES IN YOUR ALERT
            //string jsonString2 = String.Format("{\"aps\":{\"alert\":\"From your console - native registration\"}}");
            //await hubClient.SendAppleNativeNotificationAsync(jsonString2, categories[i]);
        }
    }
}

```

It was necessary to create an object that would serialize and mimic the Json string that follows the format of notification that Apple expects from your notification message. Why was this done? This was necessary to create text in the messages that would accept “variables” that could be customized to change the wording of the notification. In the above example you’ll see it as categories[i].

Template:

```
[FunctionName("NotificationFunctionTemplate")]
public static async Task<HttpResponseMessage> RunNotificationFunctionTemplate([HttpTrigger(AuthorizationLevel.Anonymous, "get", "post", Route
{
    // THIS WILL ONLY WORK IF IN YOUR IOS APPLICATION - YOU USE A TEMPLATE REGISTRATION
    //

    try
    {
        NotificationHubClient hubClient = Microsoft.Azure.NotificationHubs.NotificationHubClient.CreateClientFromConnectionString
            (
                AzureConstants.AzureConstants.ConsoleApplicationFullAccessConnectionString,
                AzureConstants.AzureConstants.ConsoleApplicationNotificationHubName,
                true
            );
        // Create an array of breaking news categories.
        var categories = new string[] { "World", "Politics", "Business", "Technology", "Science", "Sports" };

        Array.Resize(ref categories, categories.Length + 1);
        var templateUsername = "TemplateUser101";
        categories[categories.Length - 1] = "username:" + templateUsername;

        Dictionary<string, string> templateParams = new Dictionary<string, string>();
        //{
        //    { "messageParam", "Hello World" }
        //};
        //SINGLE NOTIFICATION
        templateParams["messageParam"] = "Breaking " + categories[0] + " News!";
        await hubClient.SendTemplateNotificationAsync(templateParams, "World");
    }
}
```

Template Multiple:

```
[FunctionName("NotificationFunctionTemplateMultiple")]
public static async Task<HttpResponseMessage> RunNotificationFunctionTemplateMultiple([HttpTrigger(AuthorizationLevel.Anonymous, "get",
{
    // THIS WILL ONLY WORK IF IN YOUR IOS APPLICATION - YOU USE A TEMPLATE REGISTRATION
    //
    try
    {
        NotificationHubClient hubClient = Microsoft.Azure.NotificationHubs.NotificationHubClient.CreateClientFromConnectionString
            (
                AzureConstants.AzureConstants.ConsoleApplicationFullAccessConnectionString,
                AzureConstants.AzureConstants.ConsoleApplicationNotificationHubName,
                true
            );
        // Create an array of breaking news categories.
        var categories = new string[] { "World", "Politics", "Business", "Technology", "Science", "Sports" };

        Array.Resize(ref categories, categories.Length + 1);
        var templateUsername = "TemplateUser101";
        categories[categories.Length - 1] = "username:" + templateUsername;

        Dictionary<string, string> templateParams = new Dictionary<string, string>();

        foreach (var category in categories)
        {
            templateParams["messageParam"] = "Breaking " + category + " News!";
            await hubClient.SendTemplateNotificationAsync(templateParams, categories);
        }

        return req.CreateResponse(System.Net.HttpStatusCode.OK, "Success - Notification Function triggered - Template Multiple");
    }
}
```

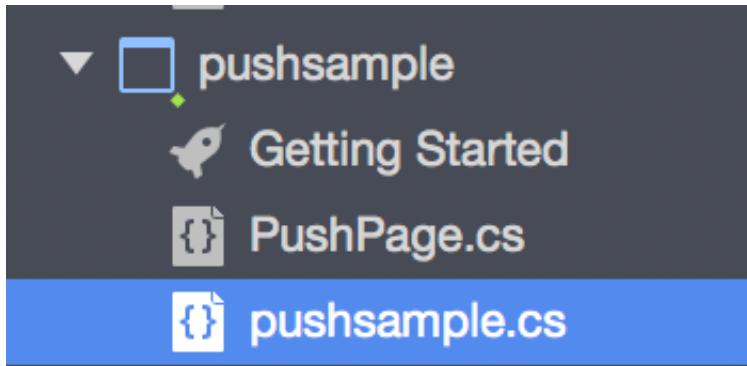
NOTE: If you need to add the tags later on (say - a week or after the registration) — you can either CreateOrUpdate the Native Registration or you can simply register the Template Registration.

BRANCH 7

This is a continuation of Branch 6.

In this example, we're simply using Buttons to trigger notifications.

You can press the button and then quickly close the app if you want to trigger notifications and see how they operate with the app closed.



The Function is currently HTTP trigger and anonymous.

So all we do, is set up a HttpClient - configure it with the current URL to trigger the function.

This is one example of the format of the buttons - there is one for each type of Notification (Native / Template / MultipleTemplate)

```
async void OnBtnSendClicked_MultipleTemplate(object sender, EventArgs e)
{
    Debug.WriteLine($"Sending message notification MultipleTemplate to URI {AzureNotificationsViaFunctionsURLS.MultipleTemplateApiURL}");

    var httpRequest = new HttpRequestMessage
    {
        Method = new HttpMethod("POST"),
        RequestUri = new Uri(AzureNotificationsViaFunctionsURLS.MultipleTemplateApiURL),
    };

    var result = await _httpClient.SendAsync(httpRequest).ConfigureAwait(false);

    Debug.WriteLine("Send result: " + result.IsSuccessStatusCode);
}
```

Remember:

REMEMBER

PHONE (Trigger Native Registration) --> AZURE FUNCTION (Native Registrations) — Pairs With —> Azure Functions (Native Notifications)

OR

PHONE (Trigger Template Registration) --> AZURE FUNCTION (Template Registrations) — Pairs With —> Azure Functions (Template Notifications)

See more at Branch 5 on how to change the registration of the application.