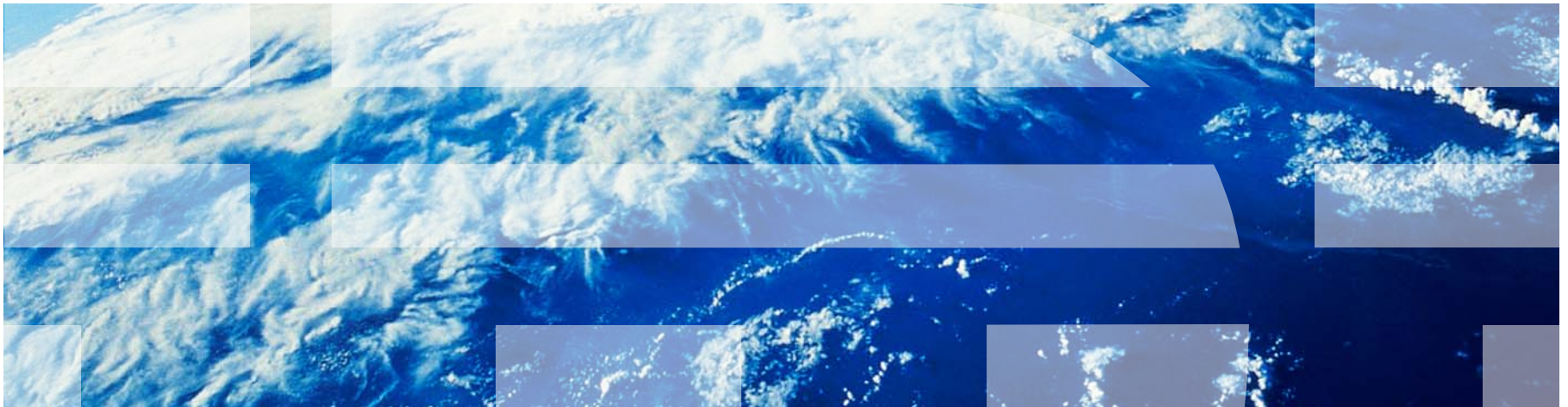


IBM Worklight V6.1.0 Getting Started

Using Worklight API for push notifications in native iOS applications



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Agenda

- What are push notifications?
- Creating a Worklight native API for push notifications
- Create and configure an iOS native application
- Initializing WLClient and WLPush
- Subscription management
- Notification API

What are push notifications?

- Push notification is the ability of a mobile device to receive messages that are *pushed* from a server.
- Notifications are received regardless of whether the application is running.
- Notifications can take several forms:
 - **Alert:** a pop-up text message
 - **Badge:** a small badge mark that appears next to the application icon
 - **Sound alert**



Agenda

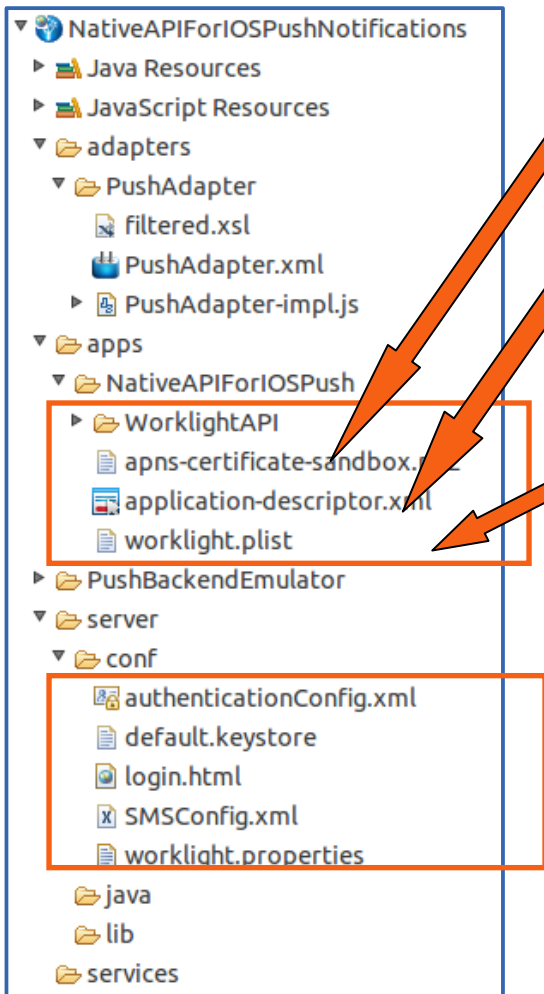
- What are push notifications?
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Creating a Worklight native API for Push Notifications

- IBM Worklight® provides the ability for native iOS applications to communicate with a Worklight Server by using the IBM Worklight native API library.
- To serve a native iOS application, the Worklight Server must be aware of it.
- You can find the IBM Worklight native API folder in the application folder of your IBM Worklight project.
- The IBM Worklight native API folder contains a native API library and configuration file that you must copy to your native iOS project.
- The native application contains the `application-descriptor.xml` file, where you can configure the application metadata. The native application is deployed to the server.
- In this module, you learn how to create an IBM Worklight native API and how to use its components in your native iOS application.

Creating a Worklight native API (1 of 3)

- The Worklight native API contains several components:



The **WorklightAPI** folder is a Worklight API library that must be copied to your native iOS project.

The **application-descriptor.xml** file is used to define application metadata and to configure security settings to be enforced by Worklight Server.

The **Worklight.plist** file contains connectivity settings to be used by a native iOS application. This file must be copied to your native iOS project.

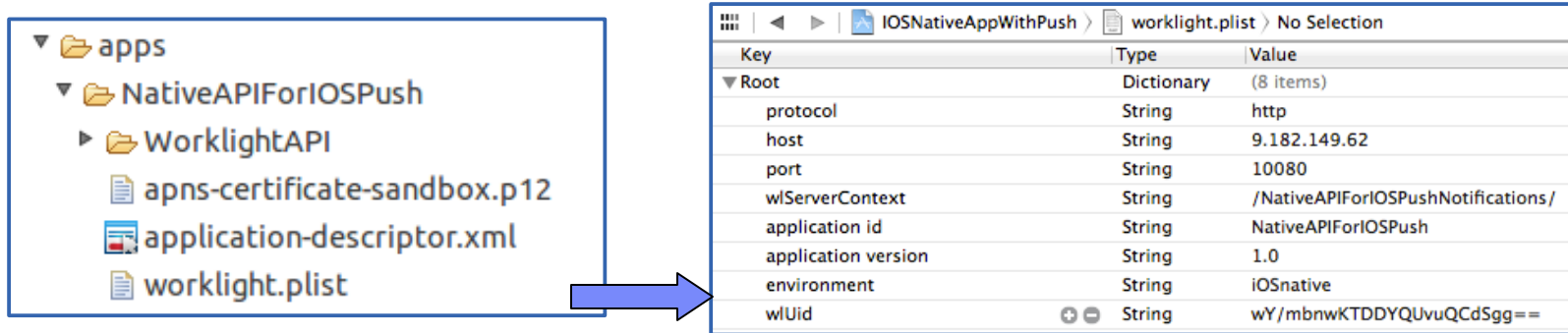
As with any Worklight project, you create the server configuration by modifying files under the **server\conf** folder.

Creating a Worklight native API (2 of 3)

1. In Worklight Studio, create a Worklight project, and add a Worklight Native API.
2. In the New Worklight Native API dialog, enter your application name, and in the **Environment** field, select **iOS**.
3. Add the Apple Push Notification Service (APNS) p12 keys (either **apns-certificate-sandbox.p12** or **apns-certificate-production.p12**) to the root folder of the application.
4. Right-click the Worklight native API folder and click **Run As > Deploy Native API**.

Creating a Worklight native API (3 of 3)

- Edit the `worklight.plist` file that holds the server configuration:



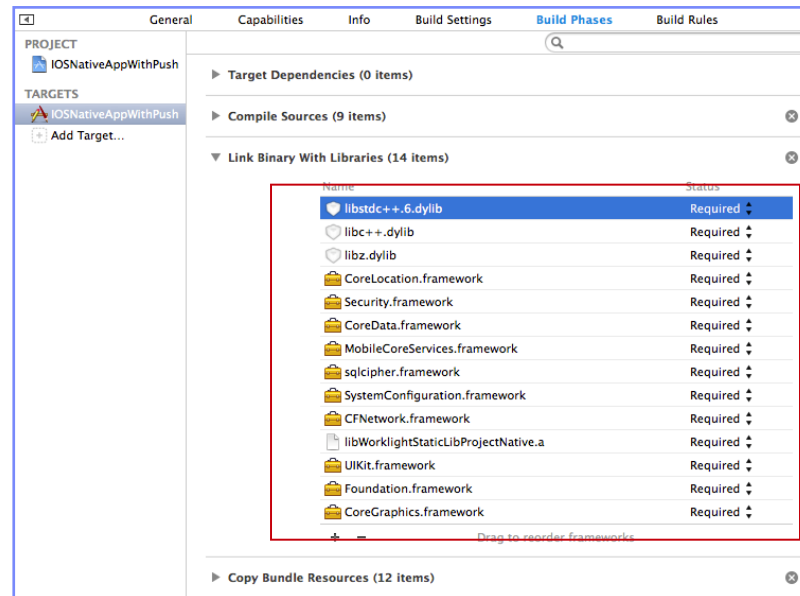
- **protocol** – The communication protocol to the Worklight server can be either *http* or *https*.
- **host** – The host name of the Worklight server.
- **port** – The port of the Worklight server.
- **wlServerContext** – The context root path of the application on the Worklight server.
- **application id** – The application ID as defined in the `application-descriptor.xml` file.
- **application version** – The application version.
- **environment** – The target environment of the native application (Android or iOS).

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Create and configure an iOS native application

- Create an Xcode project or use an existing one.
- Copy the `WorklightAPI` folder and the `worklight.plist` file from the Eclipse Worklight native API to the root of your native project.
- Link the following libraries in your native iOS application: `CFNetwork.framework`, `SystemConfiguration.framework`, `MobileCoreServices.framework`, `CoreData.framework`, `Security.framework`, `libz.dylib`, `sqlcipher.framework`, `libc++.dylib`, `libstdc++.6.dylib`, and `CoreLocation.framework`.



Create and configure an iOS native application – continued

- In the Build Settings:
 - Add the following entry: `$(SRCROOT)/WorklightSDK/include` for `HEADER_SEARCH_PATH`
 - In the **Other Linker Flags** field, enter the following value: `-ObjC`
 - In the Deployment section, select a value for the **iOS Deployment Target** field that is greater than or equal to 5.0.

Agenda

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Initializing WLClient and WLPush (1 of 4)

- Access the `WLClient` functionality by using `[WLClient sharedInstance]` anywhere in your application.
- Initiate the connection to the server by using the `wlConnectWithDelegate` method.
- For most actions, you must specify a delegate object, such as a `MyConnectListener` instance in the following example:

```
MyConnectListener *connectListener = [[MyConnectListener alloc] initWithController:self];  
[[WLClient sharedInstance] wlConnectWithDelegate:connectListener];  
[connectListener release];
```

- You learn how to create it in subsequent slides.
- Remember to import `WLClient.h` and `WLDelegate.h` in your header file.

Initializing WLClient and WLPush (2 of 4)

- As described on a previous slide, you must supply a connection delegate (listener) to the Worklight Server invocation methods.
- Create a delegate to be used in the `wlConnectWithDelegate` method and receive the response from the Worklight server. Name the class ***MyConnectListener***.
- The header file must specify that it implements the `WLDelegate` protocol.

```
#import <Foundation/Foundation.h>
#import "WLClient.h"
#import "WLDelegate.h"
#import "ViewController.h"

@interface MyConnectListener : NSObject <WLDelegate> {
    @private
    ViewController *vc;
}

- (id)initWithController: (ViewController *)mainView;
@end
```

- The `WLDelegate` protocol specifies that the class implements the following methods:
 - `onSuccess (WLResponse *) response`
 - `onFailure (WLFailResponse *) response`

Initializing WLClient and WLPush (3 of 4)

- After `wlConnectWithDelegate` finishes, either the `onSuccess` method or the `onFailure` method of the supplied `MyConnectListener` instance is invoked.
- In both cases, the response object is sent as an argument.
- Use this object to operate data that is retrieved from the server.

```
-(void)onSuccess:(WLResponse *)response{
    NSLog(@"\nConnection Success: %@", response);
    NSString *resultText = @"Connection success. ";

    if ([response responseText] != nil){
        resultText = [resultText stringByAppendingString:[response responseText]];
    }
    [vc updateView:resultText];
}

-(void)onFailure:(WLFailResponse *)response{
    NSString *resultText = @"Connection failure. ";

    if ([response responseText] != nil){
        resultText = [resultText stringByAppendingString:[response responseText]];
    }
    [vc updateView:resultText];
}
```


Initializing WLCClient and WLPush (4 of 4)

- Access the WLPush functionality by using `[WLPush sharedInstance]` anywhere in your application.
- Create a `onReadyToSubscribeListener`.

```
ReadyToSubscribeListener *readyToSubscribeListener = [[ReadyToSubscribeListener alloc]
                                                       initWithController:self];
readyToSubscribeListener.alias = self.alias;
readyToSubscribeListener.adapterName = self.adapterName;
readyToSubscribeListener.eventSourceName = self.eventSourceName;
```

- Set the `onReadyToSubscribeListener` on WLPush.

```
[[WLPush sharedInstance] setOnReadyToSubscribeListener:readyToSubscribeListener];
```

- Pass the token to WLPush.

```
[[WLPush sharedInstance] setTokenFromClient:self.myToken];
```

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- Notification API

Subscription management – user subscription

- **User subscription**

- An entity that contains a user ID, device ID, and event source ID. It represents the intent of the user to receive notification from a specific event source.

- **Creation**

- The user subscription for an event source is created when the user subscribes to that event source for the first time from any device.

- **Deletion**

- A user subscription is deleted when the user unsubscribes from that event source from all owned devices.

- **Notification**

- While the user subscription exists, the Worklight Server can produce push notifications for the subscribed user. These notifications can be delivered by the adapter code to all or some of the devices the user subscribed from.

Subscription management – device subscription

- A device subscription belongs to a user subscription, and exists in the scope of a specific user and event source. A user subscription can have several device subscriptions.
- The device subscription is created when the application on a device calls the `[[W1Push sharedInstance] subscribe]` API.
- The device subscription is deleted either by an application that is calling `[[W1Push sharedInstance] unsubscribe]` or when the push mediator informs Worklight Server that the device is permanently not accessible.

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Notification API: Server side (1 of 9)

- Start by creating an event source.
 - Declare a notification event source in the adapter JavaScript™ code at a global level (outside any JavaScript function).

Notifications are pushed by the back end

```
WL.Server.createEventSource({  
  name: 'PushEventSource',  
  onDeviceSubscribe: 'deviceSubscribeFunc',  
  onDeviceUnsubscribe: 'deviceUnsubscribeFunc',  
  securityTest: 'PushApplication-strong-mobile-se  
});
```

Notifications are polled from the back end

```
WL.Server.createEventSource({  
  name: 'PushEventSource',  
  onDeviceSubscribe: 'deviceSubscribeFunc',  
  onDeviceUnsubscribe: 'deviceUnsubscribeFunc',  
  securityTest: 'PushApplication-strong-mobile-securityTest',  
  poll: {  
    interval: 3,  
    onPoll: getNotificationsFromBackend  
  }  
});
```

- `name` – A name by which the Event Source is referenced.
- `onDeviceSubscribe` – An adapter function that is invoked when user subscription request is received.
- `onDeviceUnsubscribe` – An adapter function that is invoked when user unsubscribe request is received.
- `securityTest` – A security test from the `authenticationConfig.xml` file that is used to protect the event source.

Notification API: Server side (2 of 9)

- Start by creating an event source. (continued)
 - Declare a notification event source in the adapter JavaScript code at a global level (outside any JavaScript function).

Notifications are pushed by the back end

```
WL.Server.createEventSource({
  name: 'PushEventSource',
  onDeviceSubscribe: 'deviceSubscribeFunc',
  onDeviceUnsubscribe: 'deviceUnsubscribeFunc',
  securityTest: 'PushApplication-strong-mobile-se
});
```

Notifications are polled from the back end

```
WL.Server.createEventSource({
  name: 'PushEventSource',
  onDeviceSubscribe: 'deviceSubscribeFunc',
  onDeviceUnsubscribe: 'deviceUnsubscribeFunc',
  securityTest: 'PushApplication-strong-mobile-securityTest',
  poll: {
    interval: 3,
    onPoll: getNotificationsFromBackend
  }
});
```

- `poll` – a method for notification retrieval. The following parameters are required:
 - **interval** – Polling interval in seconds.
 - **onPoll** – Polling implementation – an adapter function to be invoked at specified intervals.

Notification API: Server side (3 of 9)

- Sending a notification

```
function submitNotification(userId, notificationText){
    var userSubscription =
        WL.Server.getUserNotificationSubscription('PushAdapter.PushEventSource', userId);

    if (userSubscription==null){
        return { result: "No subscription found for user :: " + userId
    }

    var deviceSubscriptions =
        userSubscription.getDeviceSubscriptions();

    WL.Logger.debug("submitNotification >> userId :: " + userId + ", t

    WL.Server.notifyAllDevices(userSubscription, {
        badge: 1,
        sound: "sound.mp3",
        activateButtonLabel: "ClickMe",
        alert: notificationText,
        payload: {
            foo : 'bar'
        }
    });

    return { result: "Notification sent to user :: " + userId };
}
```

As described previously, notifications can be either polled from the back end or pushed by one. In this sample, a **submitNotification()** adapter function is invoked by a back end as an external API to send notifications.

Notification API: Server side (4 of 9)

- Sending a notification (continued)
 - Obtain notification data.

```
function submitNotification(userId, notificationText){  
    var userSubscription =  
        WL.Server.getUserNotificationSubscription('PushAdapter.PushEventSource', userId);  
  
    if (userSubscription==null){  
        return { result: "No subscription found for user :: " + userId };  
    }  
  
    var deviceSubscriptions =  
        userSubscription.getDeviceSubscriptions();  
  
    WL.Logger.debug("submitNotification >> userId :: " + userId + ", t  
  
    WL.Server.notifyAllDevices(userSubscription, {  
        badge: 1,  
        sound: "sound.mp3",  
        activateButtonLabel: "ClickMe",  
        alert: notificationText,  
        payload: {  
            foo : 'bar'  
        }  
    });  
  
    return { result: "Notification sent to user :: " + userId };  
}
```

The **submitNotification()** function receives the **userId** to send notification to and the **notificationText**. These arguments are provided by a back end, which invokes this function

Notification API: Server side (5 of 9)

- Sending a notification (continued)
 - Retrieve the active user and use it to get the user subscription data.

```
function submitNotification(userId, notificationText){  
    var userSubscription =  
        WL.Server.getUserNotificationSubscription('PushAdapter.PushEventSource', userId);  
  
    if (userSubscription==null){  
        return { result: "No subscription found for user :: " + userId };  
    }  
  
    var deviceSubscriptions =  
        userSubscription.getDeviceSubscriptions();  
  
    WL.Logger.debug("submitNotification >> userId: " + userId);  
  
    WL.Server.notifyAllDevices(userSubscription,  
        badge: 1,  
        sound: "sound.mp3",  
        activateButtonLabel: "ClickMe",  
        alert: notificationText,  
        payload: {  
            foo : 'bar'  
        }  
    );  
  
    return { result: "Notification sent to user :: " + userId };  
}
```

A user subscription object contains the information about all of the user's subscriptions. Each user subscription can have several device subscriptions. The object structure is as follows:

```
{  
    userId: 'bjones',  
    state: {  
        customField: 3  
    },  
    getDeviceSubscriptions: function(){}  
};
```

Notification API: Server side (6 of 9)

- Sending a notification (continued)
 - Retrieve the user subscription data.

```
function submitNotification(userId, notificationText){
  var userSubscription =
    WL.Server.getUserNotificationSubscription('PushAdapter.PushEventSource', userId);

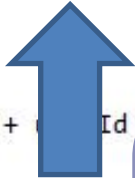
  if (userSubscription==null){
    return { result: "No subscription found for user :: " + userId };
  }

  var deviceSubscriptions =
    userSubscription.getDeviceSubscriptions();

  WL.Logger.debug("submitNotification >> userId :: " + userId);

  WL.Server.notifyAllDevices(userSubscription, {
    badge: 1,
    sound: "sound.mp3",
    activateButtonLabel: "ClickMe",
    alert: notificationText,
    payload: {
      foo : 'bar'
    }
  });

  return { result: "Notification sent to user :: " + userId };
}
```



If the user has no subscriptions for the specified event source, a **null** object is returned

Notification API: Server side (7 of 9)

- Sending a notification (continued)
 - Retrieve the user subscription data.

```
function submitNotification(userId, notificationText){
  var userSubscription =
    WL.Server.getUserNotificationSubscription('PushAdapter.PushEvent');

  if (userSubscription==null){
    return { result: "No subscription found for user :: " + userId };
  }

  var deviceSubscriptions =
    userSubscription.getDeviceSubscriptions();

  WL.Logger.debug("submitNotification >> userId :: " + userId + ", t");

  WL.Server.notifyAllDevices(userSubscription, {
    badge: 1,
    sound: "sound.mp3",
    activateButtonLabel: "ClickMe",
    alert: notificationText,
    payload: {
      foo : 'bar'
    }
  });

  return { result: "Notification sent to user :: " + userId };
}
```

Separate subscription data for each of the user's devices can be obtained by using the **getDeviceSubscriptions** API. The result is an array of objects with the following structure:

```
[
  {
    alias: "myPush",
    device: "4AooAq83gUSoas.....",
    token: 'KQz0srTUXsOqh.....',
    applicationId: 'PushApp',
    platform: 'Android',
    options: {
      customOption: 'aaa',
      alert: true,
      badge: true,
      sound: true
    }
  }
]
```

Notification API: Server side (8 of 9)

- Sending a notification (continued)
 - Send notification to the user device or devices.

```
function submitNotification(userId, notificationText){
    var userSubscription =
        WL.Server.getUserNotificationSubscription('PushAdapter.PushEventSource', userId);

    if (userSubscription==null){
        return { result: "No subscription found for user :: " + userId };
    }

    var deviceSubscriptions =
        userSubscription.getDeviceSubscriptions();

    WL.Logger.debug("submitNotification >> userId :: " + userId);

    WL.Server.notifyAllDevices(userSubscription, {
        badge: 1,
        sound: "sound.mp3",
        activateButtonLabel: "ClickMe",
        alert: notificationText,
        payload: {
            foo : 'bar'
        }
    });

    return { result: "Notification sent to user :: " + userId };
}
```

WL.Server.notifyAllDevices API sends notification to all the devices that are subscribed to the user. Custom properties can be sent in the **payload** object.

Notification API: Server side (9 of 9)

- Several APIs exist for notification.
- `WL.Server.notifyAllDevices (userSubscription, options)` is used to send the notification to all user devices (see previous slide).
- `WL.Server.notifyDevice (userSubscription, device, options)` is used to send the notification to a specific device that belongs to a specific `userSubscription`.
- `WL.Server.notifyDeviceSubscription (deviceSubscription, options)` is used to send the notification to a specific device.

Notification API: Client side (1 of 5)

Sending token to client and WLPush initialization

The user must initialize the `WLPush sharedInstance` in the app's `ViewController` load method.

```
AppDelegate *appDelegate = [[UIApplication sharedApplication]delegate];
appDelegate.appDelegateVC = self;

[[WLPush sharedInstance]init];
```

The user must add this method to the app delegate to get the token.

```
- (void)application:(UIApplication*)application
  didRegisterForRemoteNotificationsWithDeviceToken:(NSData*)deviceToken
{
    NSLog(@"My token from APNS : %@", deviceToken);
    _appDelegateVC.myToken = deviceToken.description;
}
```

- The token that is received by this method must be passed to the `WLPush` method. `[[WLPush sharedInstance] setTokenFromClient]:`

```
[[WLPush sharedInstance] setTokenFromClient:self.myToken];
```

Notification API: Client side (2 of 5)

Event Source – registration

The first task is to register an event source within the application.

IBM Worklight provides the customizable `onReadyToSubscribe` function that is used to register an event source.

Set up your `onReadyToSubscribe` function in `Listener`, which implements `WLReadyToSubscribeListener`. It is invoked when the authentication finishes.

```
#import "ReadyToSubscribeListener.h"
#import "MyEventListener.h"

@implementation ReadyToSubscribeListener

- (id)initWithController: (ViewController *) mainView{
    if ( self = [super init] )
    {
        vc = mainView;
    }
    return self;
}

-(void)onReadyToSubscribe{
    [vc updateMessage:@"\nPreparing to subscribe"];
    MyEventListener *eventSourceListener=[[MyEventListener alloc]init];
    [[WLPush sharedInstance] registerEventSourceCallback:self.alias :self.adapterName
                                                         :self.eventSourceName :eventSourceListener];
    [vc updateMessage:@"Ready to subscribe..."];
}

@end
```


Notification API: Client side (3 of 5)

Event Source – subscribing and unsubscribing

A user must be authenticated to subscribe.

Use the following API to subscribe to the event source.

```
- (IBAction)subscribe:(id)sender {
    self.result.text=@"Trying to subscribe ...";
    MySubscribeListener *mySubscribeListener = [[MySubscribeListener alloc] initWithController:self];
    [[WLPush sharedInstance]subscribe:self.alias :nil :mySubscribeListener];
}
```

- `[[WLPush sharedInstance] subscribe]` receives the following parameters:
 - An **alias** declared in `[[WLPush sharedInstance] registerEventSourceCallback]`
 - Optional `onSuccess` delegate
 - Optional `onFailure` delegate
- Delegates receive a response object if one is required.

Notification API: Client side (4 of 5)

Event Source – subscribing and unsubscribing (continued)

- Use the following API to unsubscribe from the event source.

```
- (IBAction)unsubscribe:(id)sender {
    self.result.text = @"Trying to unsubscribe ... ";
    MyUnsubscribeListener *myUnsubscribeListener = [[MyUnsubscribeListener alloc]
                                                    initWithController:self];
    [[WLPush sharedInstance]unsubscribe:self.alias :myUnsubscribeListener];
}
```

```
-(void) onSuccess:(WLResponse *)response{
    [vc updateMessage:@"Successfully got a response for Unsubscribe"];
    [vc updateMessage:response.responseText];
}

-(void) onFailure:(WLFailResponse *)response{
    [vc updateMessage:@"Failed get a response for Unsubscribe"];
    [vc updateMessage:response.responseText];
}
```

- `[[WLPush sharedInstance] unsubscribe]` receives the following parameters:
 - An **alias** declared in `WL.Client.Push.registerEventSourceCallback`
 - Optional `onSuccess` delegate
 - Optional `onFailure` delegate
- Delegates receive a response object if one is required.

Notification API Client side (5 of 5)

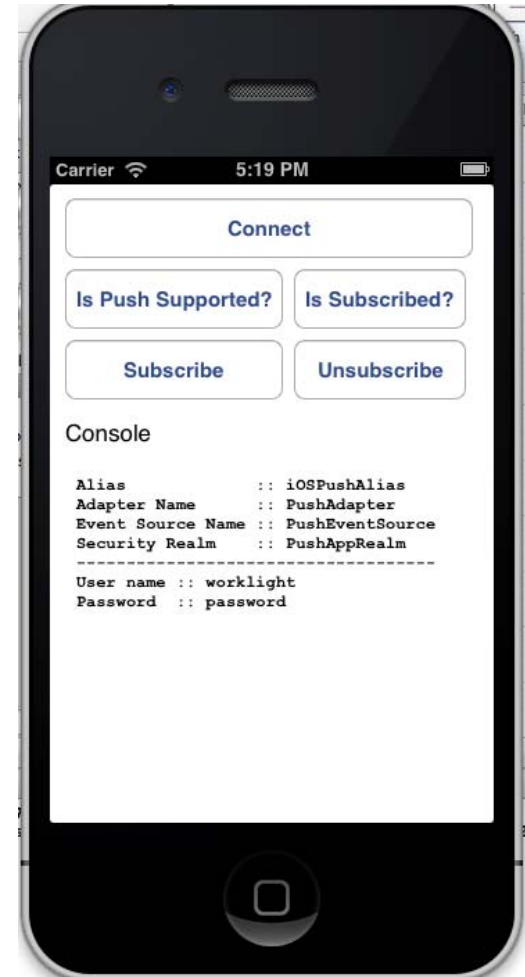
- Additional client side APIs:
 - `[[WLPush sharedInstance] isPushSupported]` – returns true if push notifications are supported by the platform, and false otherwise.
 - `[[WLPush sharedInstance] isSubscribed :alias]` – returns whether the currently logged-in user is subscribed to a specified event source alias.
- When a push notification is received by a device, the `didReceiveRemoteNotification` method in the app delegate is invoked.

```
- (void)application:(UIApplication*)application didReceiveRemoteNotification
    :(NSDictionary*)userInfo
{
    _appDelegateVC.result.text = userInfo.description;
}
```

- If the application was in background mode (or inactive) when the push notification arrived, this callback is invoked when the application returns to foreground.

Receiving a procedure response

- The sample for this training module can be found in the Getting Started page of the IBM Worklight documentation website at <http://www.ibm.com/mobile-docs>.
- The sample contains two projects:
 - **NativeAPIForIOSPush.zip** contains a Worklight native API to be deployed to your Worklight server.
 - **iOSNativeAppWithPush.zip** contains a native iOS application that uses a Worklight native API library to communicate with the Worklight server.
- Make sure to update the `wlclient.plist` file in `iOSNativeApp` with the relevant server settings.



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