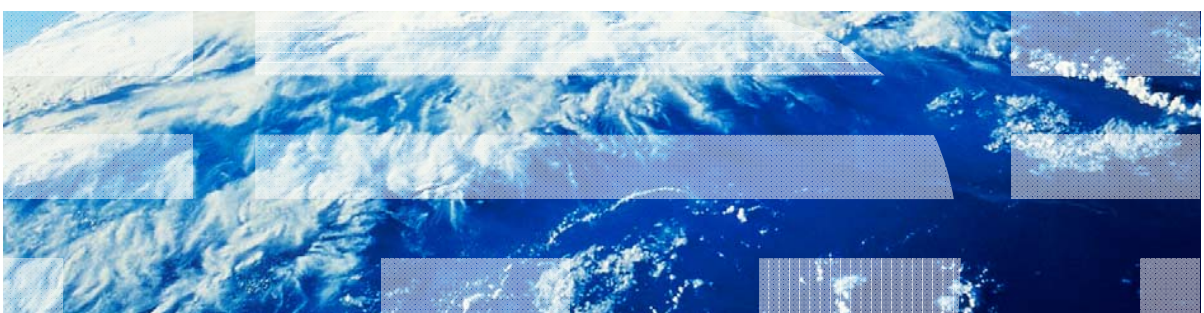
IBM Worklight V5.0.6
Getting Started

Using Worklight API for Push Notifications in native iOS applications



15 March 2013

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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 the WLCLient and WLPush
- Subscription Management
- Notification API

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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 is appearing next to the application icon
  - **Sound alert**

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Creating a Worklight native API for Push Notifications

- IBM Worklight® provides ability for native iOS applications to communicate with a Worklight Server and use Push Notification platform by using the IBM Worklight native API library.
- To serve a native iOS application, the Worklight server must be aware of it.
- The Worklight native API is located under the `apps` folder of your Worklight project.
- The Worklight native API folder serves two purposes:
  - It contains a native API library and configuration file that must be copied to your native iOS project.
  - It contains the **application-descriptor.xml** file, which must be deployed to a Worklight server as an entry point, similar to a Worklight application.
- In this module, you learn how to create a Worklight native API and how to use its components in your native iOS application for working with Push Notifications.

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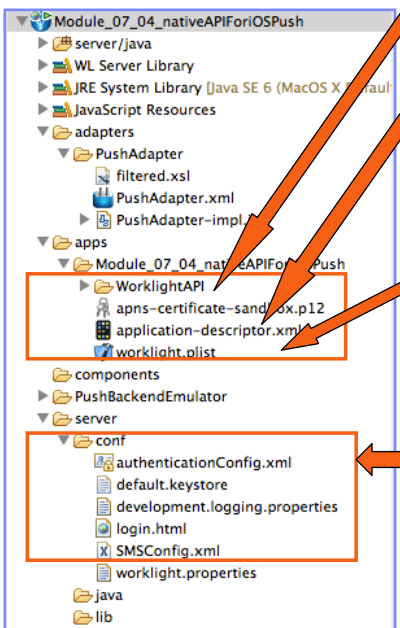
Creating a Worklight native API

- 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 a 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.

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

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Creating a Worklight native API

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 select **iOS** for the **Environment** field.
3. Add the 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 select **Run As ➔ Deploy Native API**.

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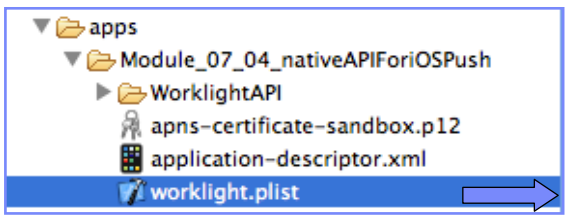
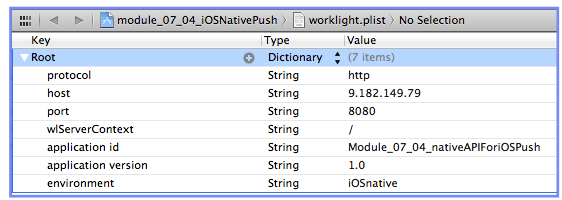
Creating a Worklight native API

- 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 hostname 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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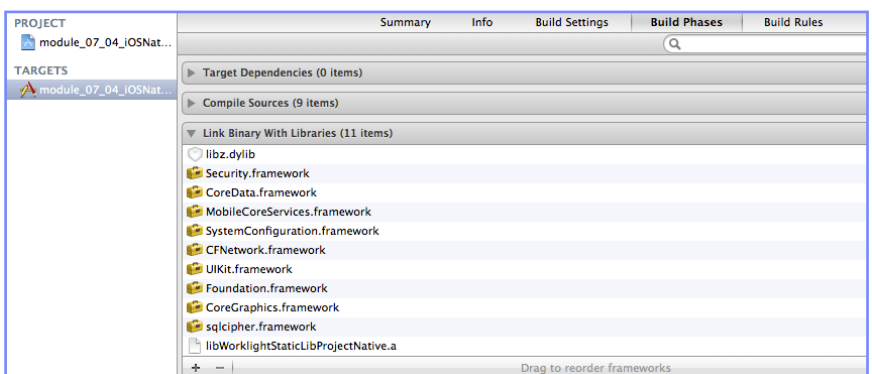
Create and configure an iOS native application

- 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, SystemConfiguration, MobileCoreServices, CoreData, Security, libz.dylib.



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Initializing the WLClient and WLPush

- Access the WLClient functionality by using [WLClient sharedInstance] anywhere in your application.
- Initiate the connection to the server by using wlConnectWithDelegate method
- For most actions, you need to 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.

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Initializing the WLClient and WLPush

- As described on a previous slide, you must to supply a connection delegate (listener) to 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:
  - ***The onSuccess (WLResponse *)response***
  - ***The onFailure (WLFailResponse *)response***

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Initializing the WLCLient and WLPush

- After wlConnectWithDelegate finishes, 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 are retrieved from 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];
}
```


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Initializing the WLClient and WLPush

- 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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Subscription management
User subscription

- **User subscription**
  - An entity containing 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 of his or her 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 has subscribed from

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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 [[WlPush sharedInstance]subscribe] API

- The device subscription is deleted either by an application that is calling [[WlPush sharedInstance] unsubscribe] or when the push mediator informs the Worklight server that the device is permanently not accessible

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Notification API: Server side

- 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 **authenticationConfig.xml** file used to protect the event source

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Notification API: Server side

- 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
    }
});
```

  - poll – a method that will be used 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

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Notification API: Server side

- 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 **submitNotifications()** adapter function is invoked by a back end as an external API to send notifications.

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Notification API: Server side

- Sending a notification
  - 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

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Notification API: Server side

- Sending a notification
  - Retrieve the active user and use it to get user's 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

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

    return { result: "Notification sent to user
}
```

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(){}
};
```


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Notification API: Server side

- Sending a notification
  - 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

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Notification API: Server side

- Sending a notification
  - Retrieve the user subscription data

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

    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
    }
  }
]
```


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Notification API: Server side

- Sending a notification
  - Send notification to the users 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.

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Notification API: Server side

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

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Notification API: Client side

Sending token to client and WLPush initialization

The user must initialize the WLPush sharedInstance in the App's ViewController's 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 should be passed to the WLPush method. [[WLPush sharedInstance] setTokenFromClient]:

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


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Notification API: Client side

- 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 WLOnReadyToSubscribeListener. It is invoked when the authentication finishes

```
#import "ReadyToSubscribeListener.h"
#import "MyEventSourceListener.h"

@implementation ReadyToSubscribeListener

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

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

@end
```


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Notification API: Client side

Event Source – subscribing and unsubscribing

A user must be authenticated in order 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

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Notification API: Client side

- **Event Source** – subscribing and unsubscribing
  - 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

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Notification API Client side

- 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 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.

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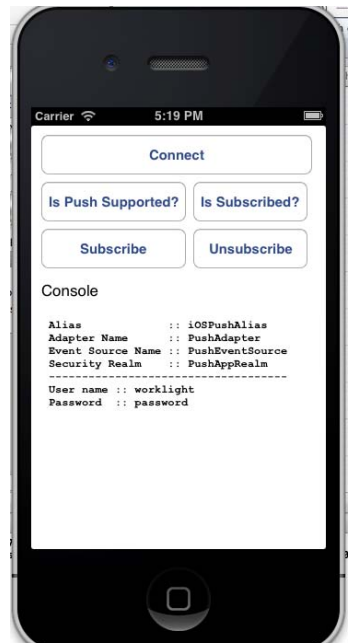
Receiving a procedure response

- 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.
- Sample contains two projects:
  - The **module_07_4_NativeAPIForIOSPush.zip** contains a Worklight native API to be deployed to your Worklight server.
  - The **module_07_4_iOSNativePush.zip** contains 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 relevant server settings.



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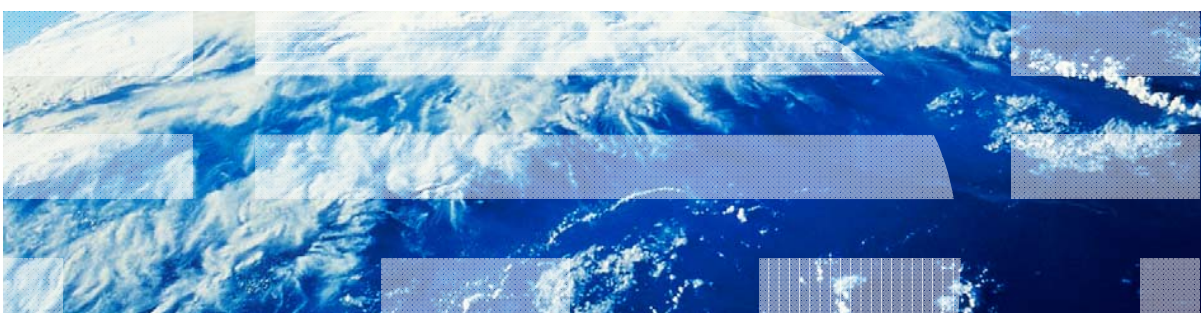

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