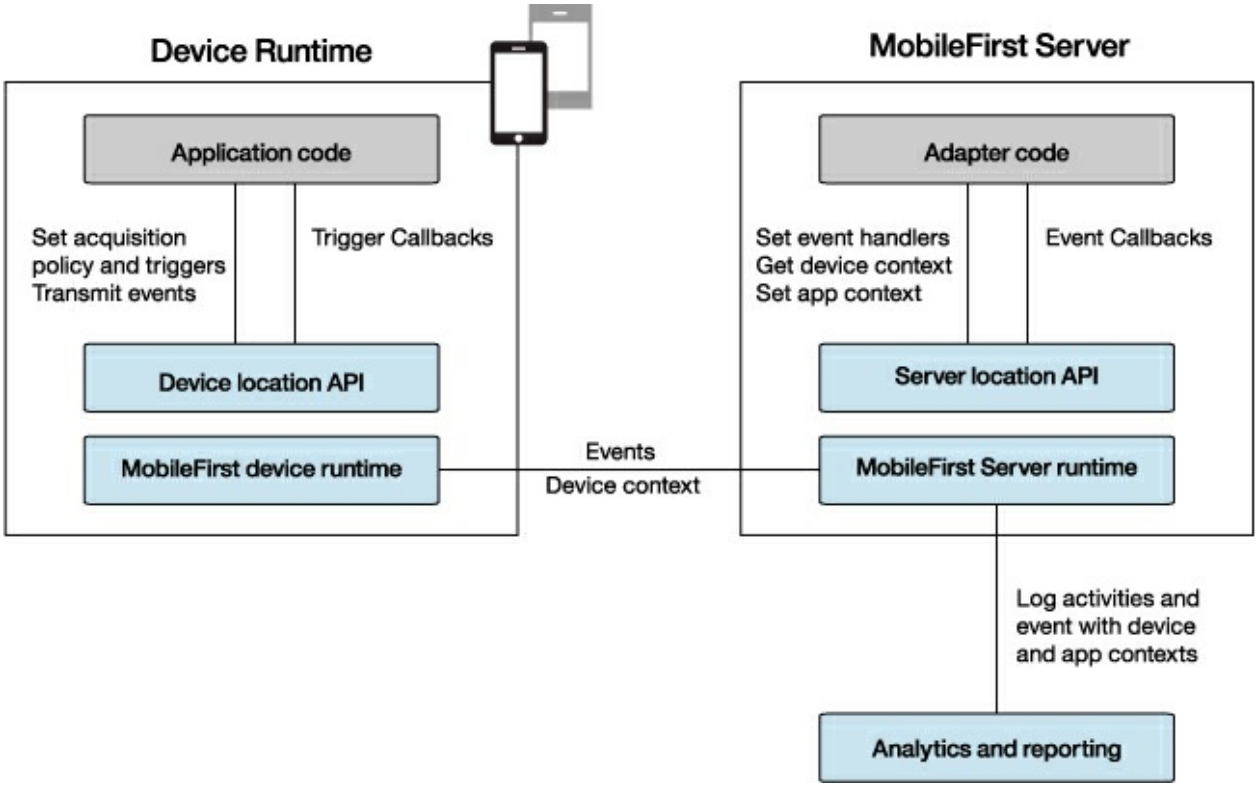
Location services in native iOS applications

Architecture



The application code on the mobile device, in the form of an acquisition policy, controls the collection of data from device sensors.

The collected data is referred to as the device context.

When a change occurs in the device context, such as a change in the geolocation of the device or the fact that it entered a WiFi zone, triggers can be activated.

The triggers specify that an action occurs: either a callback function is called, or an event is sent to the server, based on the device context.

Events are created by triggers and application code, and include a snapshot of the device context at the time of their creation.

Events are buffered on the client and are transmitted to the server periodically.

The server might process the event later.

During the event transmission process, the device context is synchronized transparently to the server.

To handle the events, the server uses adapter application code.

This code sets up event handlers on the server. These handlers filter event data and pass matching events to a callback function.

The code also accesses the client device context (its location and WiFi network information), and sets an application context.

Server activities and received events are logged, together with the device and application contexts, for future reporting and analytics.

Acquisition policy

An acquisition policy defines how acquisition takes place.

```
WLAcquisitionPolicy* policy = [[WLAcquisitionPolicy alloc] init];
```

Geo Acquisition policy

Add a `UIRequiredDeviceCapabilities` node in **yourAppName-info.plist** with items:

- **location-services**
- **gps** (when enableHighAccuracy=true)

Then in your code you can use:

```
WLGeoAcquisitionPolicy* geoPolicy = [WLGeoAcquisitionPolicy getLiveTrackingProfile];
[policy setGeoPolicy:geoPolicy];
```

If using iOS 8

Add the following nodes to **yourAppName-info.plist:**

- **NSLocationWhenInUseUsageDescription**
- **NSLocationAlwaysUsageDescription**

LiveTracking is a preset profile that uses the most accurate settings to track the device.
Additional configuration options include:

- `RoughTracking`
- `PowerSaving`
- Custom settings

> For more information, see the topic about setting an acquisition policy in the user documentation.

Wifi Acquisition policy

Add **wifi** to your `UIRequiredDeviceCapabilities` node in **yourAppName-info.plist**.

Required device capabilities	Array	(3 items)
Item 0	String	location-services
Item 1	String	gps
Item 2	String	wifi

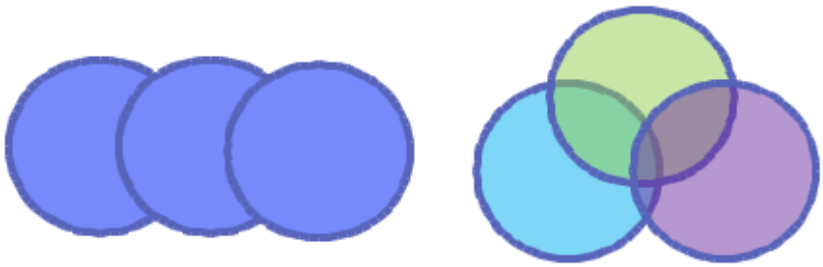
Then in your code you can use:

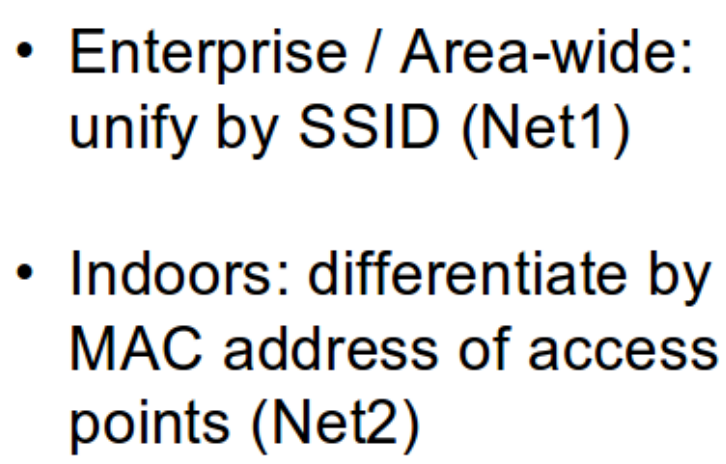
```
WLWifiAcquisitionPolicy* wifiPolicy = [[WLWifiAcquisitionPolicy alloc] init];
WLWifiAccessPointFilter* filter1 = [[WLWifiAccessPointFilter alloc] init:@"Net1"];
WLWifiAccessPointFilter* filter2 = [[WLWifiAccessPointFilter alloc] initWithSSID:@"Net2" MAC:@"*"];
[wifiPolicy setInterval:10000];
[wifiPolicy setAccessPointFilters:[NSMutableArray arrayWithObjects:filter1, filter2, nil]];
[policy setWifiPolicy:wifiPolicy];
```

`interval` is the polling interval, in milliseconds. WiFi polling is performed at each interval.

`accessPointFilters` are access points of interest.
In the above example, the acquisition policy:

- Ignores everything except "Net1" and "Net2" – This policy assists in dynamic environments, such as mobile hotspots.
- Considers all "Net1" access points as if they were one access point.
- Differentiates "Net2" access points by MAC address.





> For more information, see the topic about setting an acquisition policy in the user documentation.

Triggers

You can setup triggers for

- Geo/Wifi fences (`Enter`, `Exit`, `Dwell Inside`, `Dwell Outside`)
- Movement (Geo: `PositionChange`, WiFi: `VisibleAccessPointsChange`)
- WiFi `Connect` / `Disconnect`

```
//Init
WLTriggersConfiguration* triggers = [[WLTriggersConfiguration alloc] init];
//Center of circle
WLCoordinate* center = [[WLCoordinate alloc] initWithLatitude:40.689167 longitude:-74.044444];
//Circle
WLCircle* circle = [[WLCircle alloc] initWithCenter:center radius:100];
//Event
NSMutableDictionary* event = [NSMutableDictionary dictionaryWithObjectsAndKeys:@"me", @"bring", @"hu
ddledMasses", @"your", nil];
//Geo Trigger
WLGeoEnterTrigger* enterTrigger = [[WLGeoEnterTrigger alloc] init];
[enterTrigger setArea:circle];
[enterTrigger setCallback:nil]; //out of scope, see documentation
[enterTrigger setEvent:event];
[[triggers getGeoTriggers] setObject:enterTrigger forKey:@"trigger1"];
```

In the above example, `trigger1` is an **Enter** trigger which is activated when the device enters the defined circle (longitude, latitude and radius).

When a trigger activates, it can call a callback function and/or create an event to be sent to the server.

> For more information, see the topic about triggers in the user documentation.

Start Acquisition

Use the `policy` and `triggers` defined above to start the acquisition.

```
WLLocationServicesConfiguration* config = [[WLLocationServicesConfiguration alloc] init];
[config setPolicy:policy];
[config setTriggers:triggers];
[config setFailureCallbacks:nil];//see documentation
[[[WLClient sharedInstance] getWLDevice] startAcquisition:config];
```

Events

Client Side

Events are generated by triggers (as explained above).

```
NSMutableDictionary* event = [NSMutableDictionary dictionaryWithObjectsAndKeys:@"me", @"bring", @"hu
ddledMasses", @"your", nil];
[enterTrigger setEvent:event];
```

Events can also be generated manually by calls to the API:

```
[[WLClient sharedInstance] transmitEvent:event immediately:YES];
```

Where **event** is a `NSDictionary` and **immediate** is a `boolean`.

Server-side

In the adapter code, create event handlers by using:

```
WL.Server.createEventHandler(filter, handlerFunction);
```

The events that match the filter are passed to `handlerFunction`. Filter examples:

- `{status: "platinum"}` – handle platinum members only
- `{hotel: { country: "USA" } }` – hotels in the USA
- `{}` – all events

Register the event handlers by using:

```
WL.Server.setEventHandlers([...]);
```

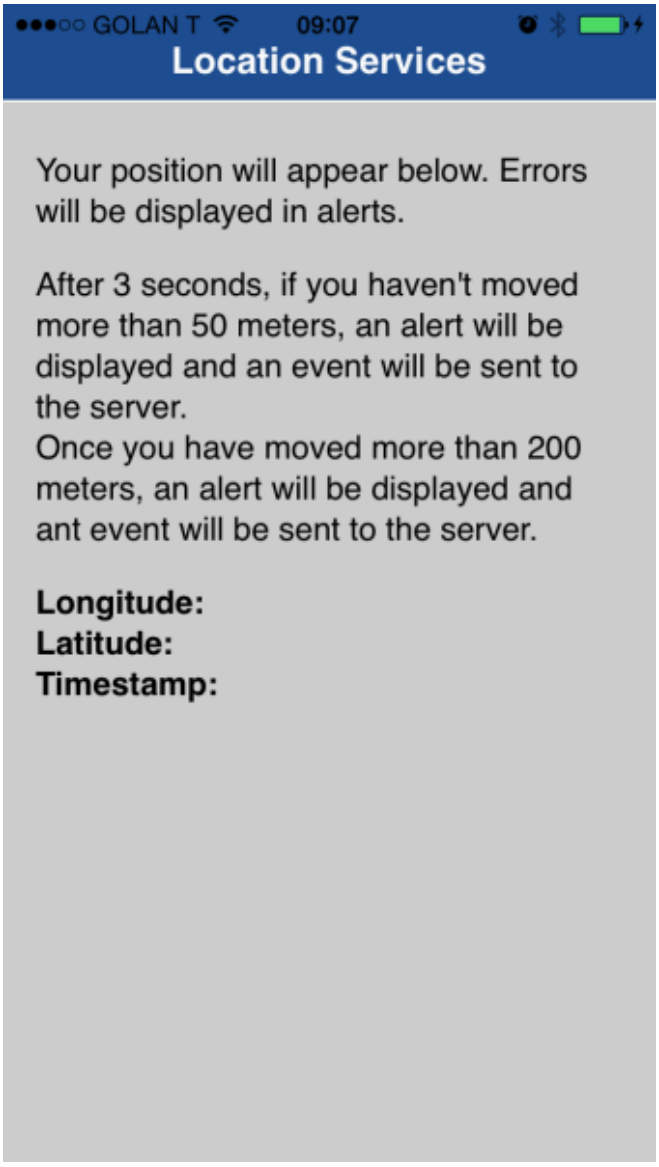
> For more information, see the topic about working with geofences and triggers in the user documentation.

Sample application

Click to download (http://public.dhe.ibm.com/software/products/en/MobileFirstPlatform/docs/v630/LocationServicesProject.zip) the Studio project.
Click to download (http://public.dhe.ibm.com/software/products/en/MobileFirstPlatform/docs/v630/LocationServicesNativeiOSProject.zip) the Native project.

The LocationServices sample demonstrates the following features:

- Acquiring an initial position
- Using a Geo profile
- Using Geo triggers for DwellInside, Exit area, and PositionChange
- Transmitting event to the server on DewllInside and Exit area
- Ongoing acquisition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Location Services
Your position will appear below. Errors will be displayed in alerts.
After 3 seconds, if you haven't moved more than 50 meters, an alert will be displayed and an event will be sent to the server.
Once you have moved more than 200 meters, an alert will be displayed and ant event will be sent to the server.
Longitude:
Latitude:
Timestamp: