

App Note: IoT Device Registration

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Introduction

This document describes the different methods used to register an Ayla IoT device with the Ayla Device Service (ADS) using methods provided in the mobile AylaSDK. While Setup is the act of connecting an IoT device to the ADS, Registration is the act of assigning or claiming ownership of said device. There are many Registration types with different pros and cons. This paper will explore them and provide some suggestions for implementation and debugging.

Registering an IoT Device

The Ayla SDK method for device registration is

```
AylaRegistration.registerCandidate(AylaRegistrationCandidate candidate,  
    final Response.Listener<AylaDevice> successListener,  
    final ErrorListener errorListener)
```

This method supports all of the registration types listed below.

1. Same-LAN

A registration token is generated by the ADS when a device first connects. The registration token is fetched from the IoT device over the LAN by the mobile, and sent back to the Ayla Device Service in a registration request. This registration token is used by the service to verify the mobile phone connected to the device over the same LAN.

The type field in the AylaRegistrationCandidate should be set to "Same-LAN".

Required fields in registration candidate: DSN and device registration token.

Registration token is fetched from the device by the SDK in the method

```
registerCandidate(AylaRegistrationCandidate candidate,final Response.Listener<AylaDevice>  
    successListener, final ErrorListener errorListener)
```

Optional fields: IP address of the device, and latitude and longitude of the device.

Same-LAN registration requires the mobile phone to be on the same LAN as the device.

If registration is done right after wifi setup, the setup device's LAN IP address is known and the registration token will be fetched from the IoT device by the SDK. Sample code for this flow is available in *SetupWizardFragment* in Aura app.

If registration is done at a later time for a device that is already connected to Ayla cloud, use method

```
AylaRegistration.fetchCandidate(final String dsn, final RegistrationType registrationType, final Response.Listener<AylaRegistrationCandidate> successListener, final ErrorListener errorListener)
```

to fetch the available registration candidate. The *AylaRegistrationCandidate* object returned in the *successListener* of this method should be passed to *AylaRegistration.registerCandidate()* to register the device. Sample code for this flow is available in *DeviceRegistrationFragment* in Aura app.

Notes: Registration will fail if the device is already registered to an Ayla user. Make sure that the mobile phone and device are on the same LAN. Also ensure the IoT device has connected to the ADS within the last hour. If it has been longer, power cycle the device to restart the timer.

2. AP-mode

A setup token is sent by the app to the IoT device in AP mode during Wi-Fi setup. This setup token is used by the ADS to confirm registration of the device.

The type field in the *AylaRegistrationCandidate* should be set to "AP-mode".

Required fields in registration candidate: *DSN* and *setup_token*.

Optional fields: *IP address* of the device, and *latitude* and *longitude* of the device.

AP-mode registration requires the mobile phone to be on the same LAN as the device. It also requires the *setup_token* to be set in the registration candidate that is passed to the *registerCandidate()* method. Setup-token is a random string of up to eight characters length, that is generated in the app and sent to the device during wifi setup. This is done in the method

```
AylaSetup.connectDeviceToService(final String ssid, String password, String setupToken, Double latitude, Double longitude, int timeoutInSeconds, final Listener<AylaWifiStatus> successListener, final ErrorListener errorListener)
```

The IoT device passes this *setup_token* to the Ayla Device Service. *Setup_token* can be generated in the app using the SDK method *ObjectUtils.generateRandomToken(int length)* where length should be set to eight.

Notes: The original *setup_token* used during wifi setup of the device is required for the device to be re-registered. To change ownership of the IoT device, the process must start at the beginning with Wi-Fi Setup. This is so a new *setup_token* can be generated and subsequently

associated with the new owner. AP-mode registration requires the mobile connect to the device during Setup: therefore it is not compatible with other ways of connecting a device to ADS such as WPS or wired Ethernet.

3. Button-Push

A 2 minutes registration window is started on Ayla Device Service when a registration button on the device is pushed. The device can only be registered during this registration window. Re-registration of the device to a different user is allowed while the registration window is open

The type field in the *AylaRegistrationCandidate* should be set to “Button-Push”.

Required fields in registration candidate: DSN

Optional fields: IP address of the IoT device, and latitude and longitude of that device.

Notes: Button-Push registration requires the mobile phone to be on the same LAN as the device, however, retrieving the request token is not required as with the Same-LAN mode.

4. Display

Display mode registration requires the registration token for the IoT device to be sent to the cloud. The registration token is displayed on that device, and then entered in the app by the user.

The type field in the *AylaRegistrationCandidate* should be set to “Display”.

Required fields in registration candidate: regToken.

Optional fields: IP address of the device, and latitude and longitude of the device.

Notes: Display mode registration does not require the mobile phone to be on the same LAN as the device. The device can be re-registered using its unique reg token.

5. DSN

DSN registration registers the device using the device’s unique identifier.

The type field in the *AylaRegistrationCandidate* should be set to “DSN”.

Required fields in registration candidate: DSN

Optional fields: IP address of the device.

Notes: DSN registration does not require the mobile phone to be on the same LAN as the device. Re-registration of already registered devices is not allowed for DSN registration type. DSN registration has some security concerns because anyone who knows the DSN can register the device while the registration window is open.

6. Node

Node type registration is used to register nodes to an Ayla gateway device.

To register nodes to a gateway, apps should first fetch the available registration candidates for that node using the method

```
AylaDeviceGateway.fetchRegistrationCandidates(  
    final Response.Listener<AylaRegistrationCandidate[]> successListener,  
    final ErrorListener errorListener)
```

The *registrationType* field in the registration candidates should be set to “Node”. For each node that is to be registered, use method

```
AylaRegistration.registerCandidate(AylaRegistrationCandidate candidate,  
    final Response.Listener<AylaDevice> successListener,  
    final ErrorListener errorListener)
```

Sample code for gateway node registration is available in *RegistrationFragment* in Aura app.