

# App Note: Android Wi-Fi Setup

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This document provides details on how to implement Wi-Fi setup in applications using methods provided in the Ayla Android SDK, and outlines common issues seen during the Wi-Fi setup process. `AylaSetup` class in Ayla SDK provides methods to connect an Ayla device to the Ayla cloud. Sample code for using `AylaSetup` is provided in `SetupWizardFragment`, and `WifiSetupFragment` in the Aura application.

## 1. Start Setup

Create an `AylaSetup` object using the constructor provided in the SDK.

```
AylaSetup(Context context, AylaSessionManager sessionManager)
```

## 2. Scan For Ayla Device Access Points

The first step in connecting a device to the Ayla Device Service (ADS) is to scan for Wi-Fi access points as broadcasted by an Ayla device. Ayla devices are designed to broadcast an SSID that can be recognized by the mobile application. The SDK method used to scan for Ayla devices is:

```
scanForAccessPoints( int timeoutInSeconds, final Predicate<ScanResult>
filter,
final Listener<ScanResult[]> successListener, final ErrorListener
errorListener)
```

By default, all Ayla apps use a regular expression to filter for Ayla specific device SSIDs in this method. The app developer must change this expression to filter for their device's SSID, which is OEM specific.

## 3. Connect To the Ayla Device

The device to be setup is selected from the list returned to the `successListener` of the method in Step 2. Use method

```
connectToNewDevice(final String ssid, final int timeoutInSeconds,
```

```
final Listener<AylaSetupDevice> successListener, final ErrorListener
errorListener)
```

to connect the mobile device to the Ayla device requiring setup. The timeout value defaults to 10 seconds and should be changed if the device is not able to respond within this time.

If successful, `connectToNewDevice()` returns an `AylaSetupDevice` object in its `successListener`, which includes details about the device such as DSN, feature list, etc. The mobile device will be connected to the Ayla device's AP when this API call completes.

## 4. Request the Device To Scan For APs

Request the device to scan for a list of access points visible to it using the SDK method

```
startDeviceScanForAccessPoints(final Listener<EmptyResponse>
successListener, final ErrorListener errorListener)
```

This method call will initiate a Wi-Fi scan on the device. This will take several seconds for the device to complete.

## 5. Get the AP List From the Device

Fetch the results of the access points scan done on the device in Step 4 using the method

```
fetchDeviceAccessPoints(final Predicate<AylaWifiScanResults.Result>
filter, final Listener<AylaWifiScanResults> successListener, final
ErrorListener errorListener)
```

It is recommended that the app add a delay between Steps 4 and 5 so the device is uninterrupted while scanning. This helps to ensure the application receives the most recent Wi-Fi scan results. Aura (the sample SDK application) uses a 5 second delay between Steps 4 and 5.

## 6. Connect the Device To the Ayla Device Service (ADS)

This step connects the Ayla device to one of the Wi-Fi APs returned in Step 5. Before connecting to the access point (AP) and Ayla Device Service, the application must prompt the user to choose the desired AP SSID and provide the correct password, to connect to the Wi-Fi network. Use the method

```
connectDeviceToService(final String ssid, String password, String
setupToken, Double latitude,
```

```
Double longitude, int timeoutInSeconds, final Listener<AylaWifiStatus>
successListener, final ErrorListener errorListener)
```

to connect the Ayla device to the selected AP. If the device supports AP-STA mode, (can be both a Wi-Fi AP and a Station/Client), the mobile remains connected to the device's AP even after this method finishes.

If the app receives a `NetworkError` from this method, it does not necessarily mean that Wi-Fi setup has failed. A `NetworkError` is returned if the device drops its AP, or the mobile phone gets disconnected from the Ayla device during this step. The mobile phone disconnecting from the Ayla device does not affect the device connecting to ADS. Therefore, the app should proceed to Step 8 and confirm whether the device connected to ADS even if a network error is received.

## 7. Request Ayla Device To Stop AP Mode

If Step 6 returned success, the mobile is still connected to the device's AP. So the next step is to request the device to stop AP mode using method

```
disconnectAPMode(final Listener<EmptyResponse> successListener, final
ErrorListener errorListener)
```

## 8. Reconnect Mobile Phone To Original Wi-Fi Network

The mobile app has now either completed setup (if Step 6 returned success, and Step 7 was executed), or returned a `NetworkError` in Step 6. For both scenarios, the mobile phone has to be reconnected to the original Wi-Fi network using the method

```
reconnectToOriginalNetwork(int timeoutInSeconds, final
Listener<EmptyResponse> successListener, final ErrorListener
errorListener)
```

## 9. Confirm if the device connected to Ayla Device Service

Use method

```
confirmDeviceConnected(final int timeoutInSeconds, String dsn,
String setupToken, final Listener<AylaSetupDevice> successListener,
final ErrorListener errorListener)
```

to check whether the device successfully connected to the Ayla Device Service. Some devices may take a longer time than Ayla EVBs for template association. This largely depends on the

number of properties, schedules, etc. Refer to the section *Troubleshooting Wi-Fi Setup* on how to handle this case.

## 10. Exit setup

Call the method

```
exitSetup(Listener<EmptyResponse>      successListener,      ErrorListener  
errorListener)
```

to clean up all the resources created for Wi-Fi Setup. *This method must be called before returning to normal SDK operation*, regardless of the success or failure of the setup operations. This method ensures the mobile device returns to the original Wi-Fi network and that any networking operations that may have been suspended are resumed.

### Flow Diagram

<https://drive.google.com/open?id=0B1SnkNsi0uu4OURzbEozWi1LdkU>

## Troubleshooting Wi-Fi Setup

These are the common failure areas for Wi-Fi setup.

### **Step 3 returns `InternalError`("Could not bind process to device's network ")**

This error means the Android API binding the current process to the device's network failed. In this case it is recommended the app exit Wi-Fi Setup and retry.

### **Step 9 returns 404 error from ADS**

Getting a 404 in Step 9 could mean the device takes longer than an Ayla EVB to complete template association. In this case, adding a delay before Step 9, or polling this method for a longer time, will solve this issue.

## Glossary of Terms

ADS - Ayla Device Service

AP Mode - The device acts as an access point, and allows mobile phone to connect to it.

STA Mode - The device is connected to a Wi-Fi access point.

AP-STA Mode - The device supports simultaneous AP and station mode. The mobile phone can remain connected to the device's AP even after it has connected to another Wi-Fi access point.

DSN - Device Serial Number is a unique identifier assigned during device manufacturing or during discovery for virtual devices