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## Connecting to the Azure Cloud Using the RSL10 Sense and Control Application



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### APPLICATION NOTE

#### INTRODUCTION

RSL10 Sense and Control, the Bluetooth Low Energy (BLE) based mobile application from ON Semiconductor, enables users to publish and subscribe data from sensors and actuators connected to platforms that feature [RSL10](#), industry's lowest power Bluetooth 5 certified SoC. These platforms include the [IDK](#) (IoT Development Kit) and the [B-IDK](#) (Bluetooth Low Energy IoT Development Kit).

This document provides step-by-step instructions on setting up the MQTT broker on the IBM Watson cloud and configuring the mobile app to connect to the IBM cloud.

#### PREREQUISITIES

Users need to download the appropriate platform-specific firmware to enable communication with the mobile app.

##### *IoT Development Kit (IDK)*

- Ensure that the [BLE-IOT-GEVB](#) board is connected to the IDK baseboard, [BB-GEVK](#)
- Download firmware found on [BLE-IOT-GEVB](#) web page to the [BLE-IOT-GEVB](#) board
- Download the "BLE Custom Service Firmware" example to the IDK baseboard, [BB-GEVK](#)

- Detailed instructions on compiling example code and downloading to the IDK baseboard, [BB-GEVK](#), can be found [here](#)

##### *Bluetooth Low Energy IoT Development Kit (B-IDK)*

- Download the custom service firmware to the B-IDK baseboard, [BDK-GEVK](#)
  - ♦ Detailed instructions on compiling and downloading the custom service firmware to the B-IDK baseboard, [BDK-GEVK](#), can be found [here](#)

Once the firmware is loaded, the mobile application can be used to read sensor values and set actuator values, publish sensor values to an MQTT broker and subscribe actuator settings from the MQTT broker.

#### Configuring Azure IoT Cloud Instance

1. Create a free Azure Cloud account:

<https://docs.microsoft.com/en-us/azure/cost-management/activate-subs-accounts>

In Windows Browser execute the URL: <https://portal.azure.com/> and login to the portal using UserID and password.

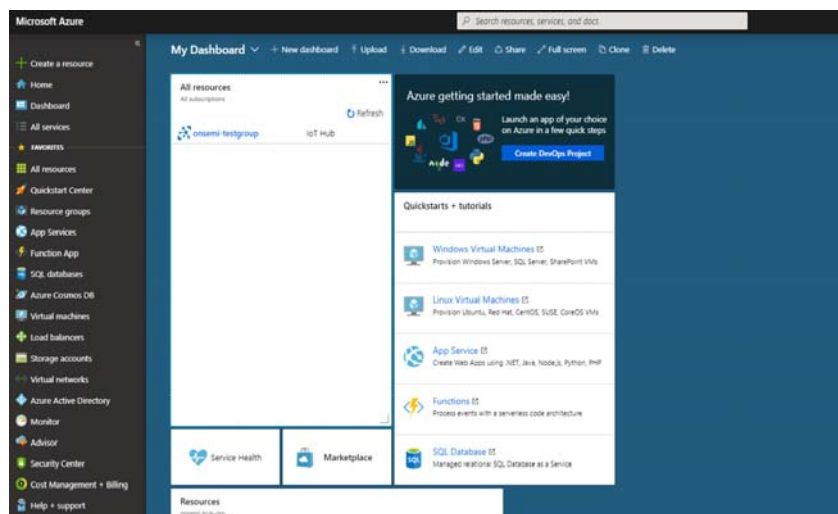


Figure 1. Microsoft Azure Portal Dashboard

2. Download *Device Explorer* from Microsoft or <https://github.com/Azure/azure-iot-sdks/releases>.  
Install and run the application; it is used for

observation and settings of MQTT communication and SaS keys

## Documentation:

- Device specific instructions for:
  - PikeL device
  - RP1600 device
  - WISE-5231 device
  - EK9160 device
  - UK70 device
  - HG700 device

### Assets 3




 SetupDeviceExplorer.msi	2.66 MB
 Source code (zip)	
 Source code (tar.gz)	

Figure 2.

3. Creating a Resource Group
- Click *Resource groups* from the left pane. You will see all the resource groups in your subscription listed

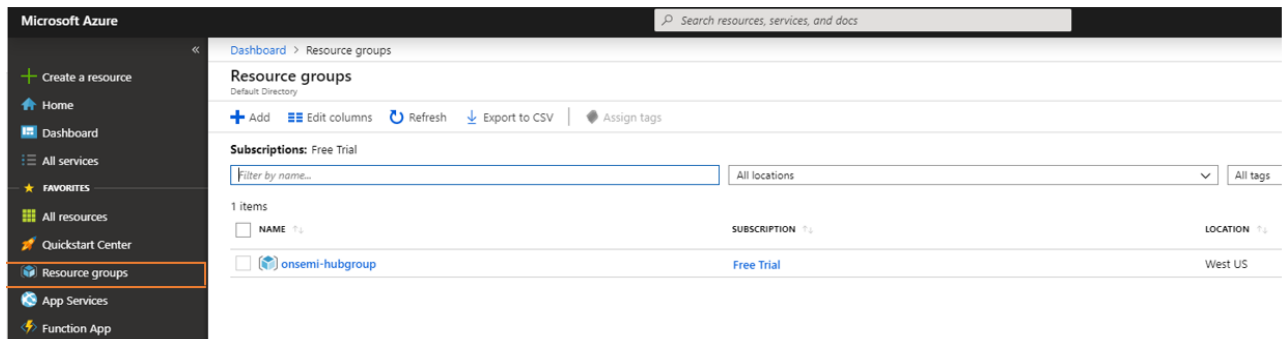


Figure 3.

- Click *Add (+)* to create a new resource group. The create Resource Group window appears

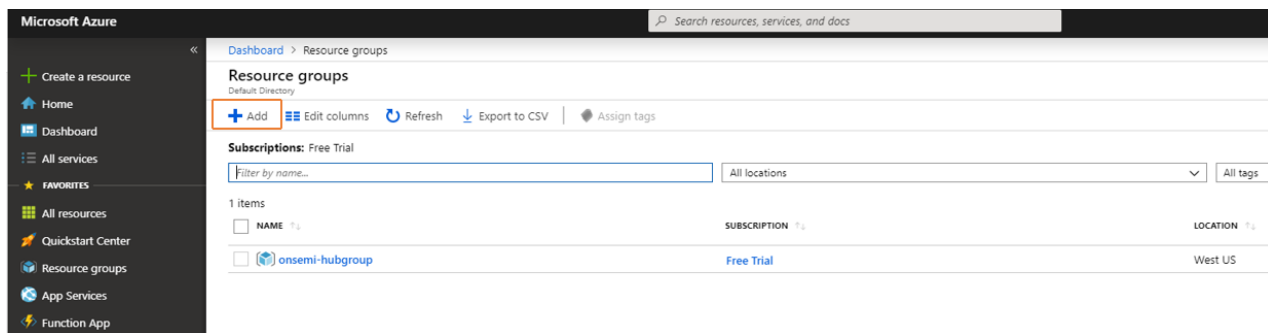


Figure 4.

- c. Provide the following information for the new resource group

Table 1.

Parameter	Description
Resource Group Name	Enter a unique name for your new resource group. A resource group name can include alphanumeric characters, periods (.), underscores (_), hyphens(-), and parenthesis (), but the name cannot end with a period
Subscription	Select your Microsoft Azure subscription
Resource Group Location	Select the location of the Microsoft Azure data center. Specify a location where the majority of your resources will reside. Typically, select the location that is closest to your physical location.

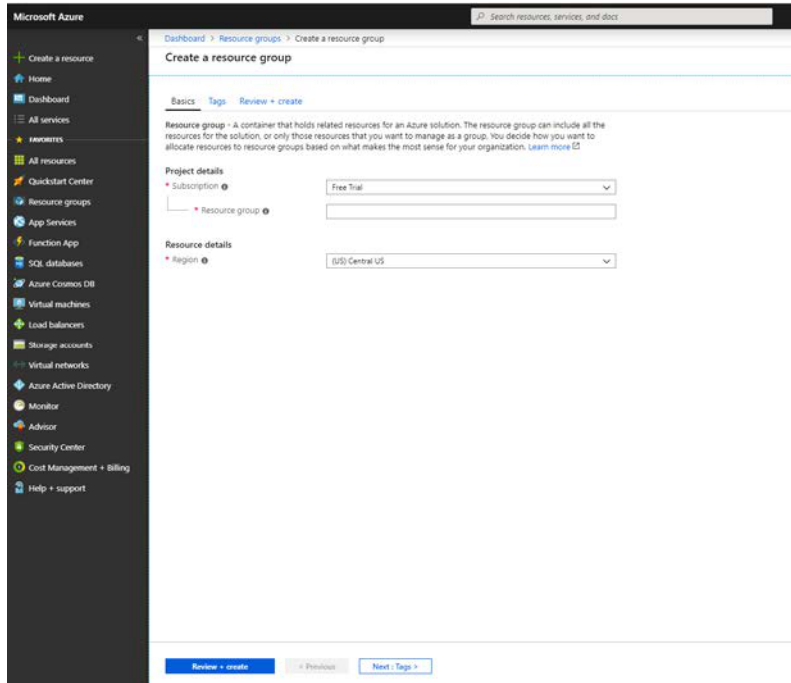


Figure 5.

- d. Click *Review + Create*. The resource group might take a few seconds to create
4. Create an IoT hub

This section describes how to create an IoT Hub after creating a resource group

- a. Click *Create a resource* from the left pane of the dashboard

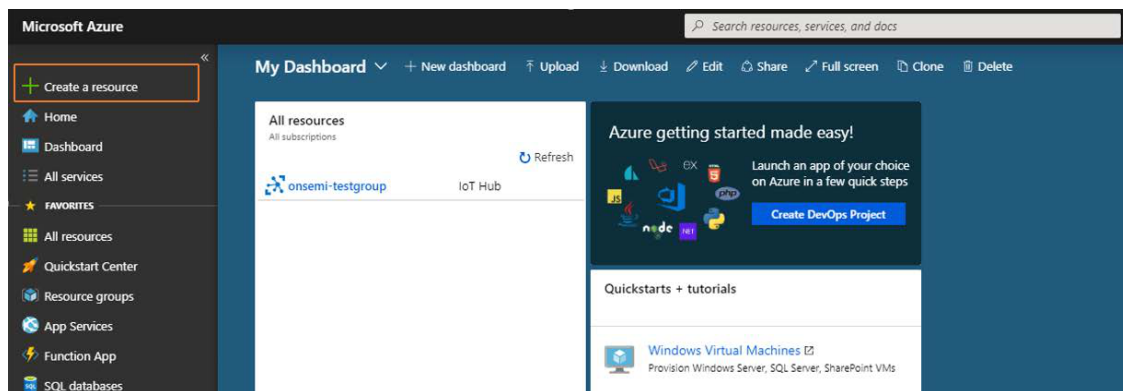


Figure 6.

b. Search the Marketplace for the IoT Hub. Select *IoT Hub* and click the *Create* button. The first screen for creating an IoT Hub will appear

c. Provide the following information to create a new resource

**Table 2.**

Parameters	Description
Subscription	Select the subscription to use for your IoT hub.
Resource Group	You can create a new resource group or use an existing one. To create a new one, click <b>Create new</b> and fill in the name you want to use. To use an existing resource group, click <b>Use existing</b> and select the resource group from the dropdown list
Region	Select the location of the Microsoft Azure data center. Specify a location where the majority of your resources will reside. Typically, select the location that is closest to your physical location.
IoT Hub Name	Select the location of the Microsoft Azure data center. Specify a location where the majority of your resources will reside. Typically, select the location that is closest to your physical location.

d. Click *Next Size and Scale* to continue creating your IoT Hub

**Figure 7.**

e. On this screen, take the default and click *create*

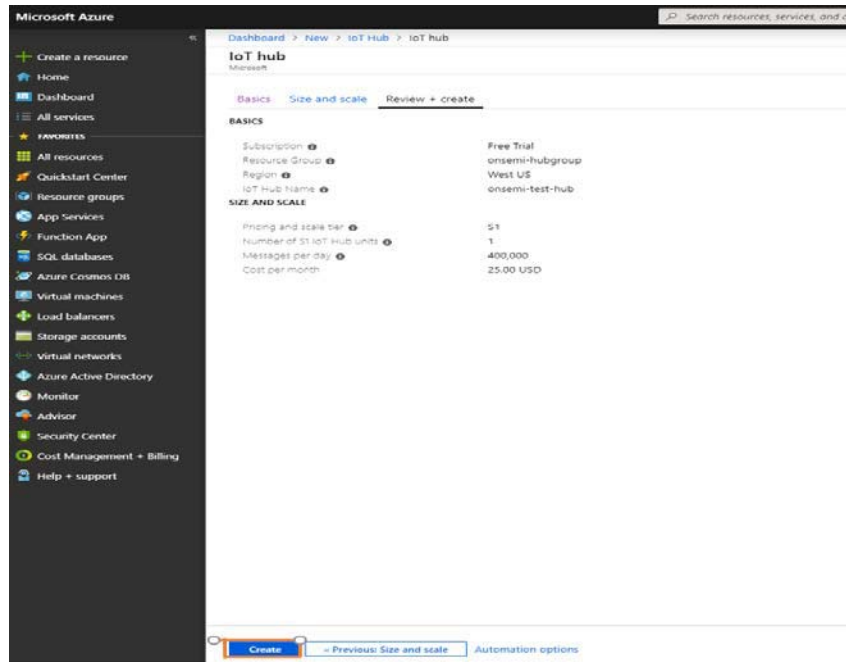


Figure 8.

5. The resource created appears to be reflecting on *My dashboard*. Click on the resource created

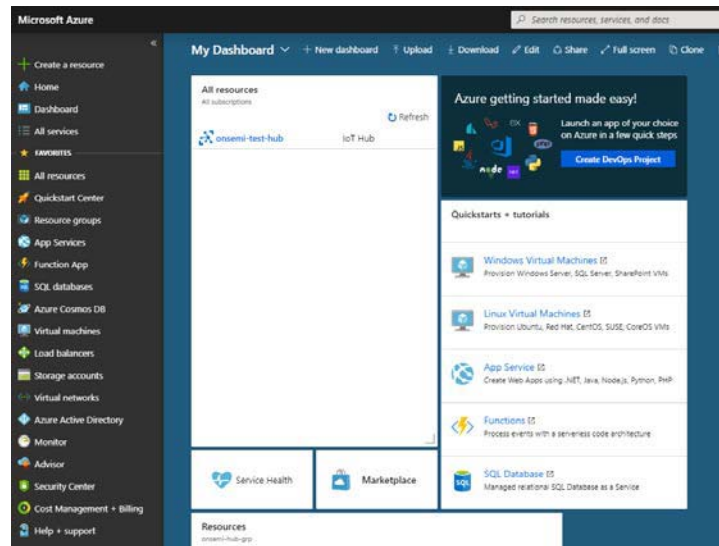


Figure 9.

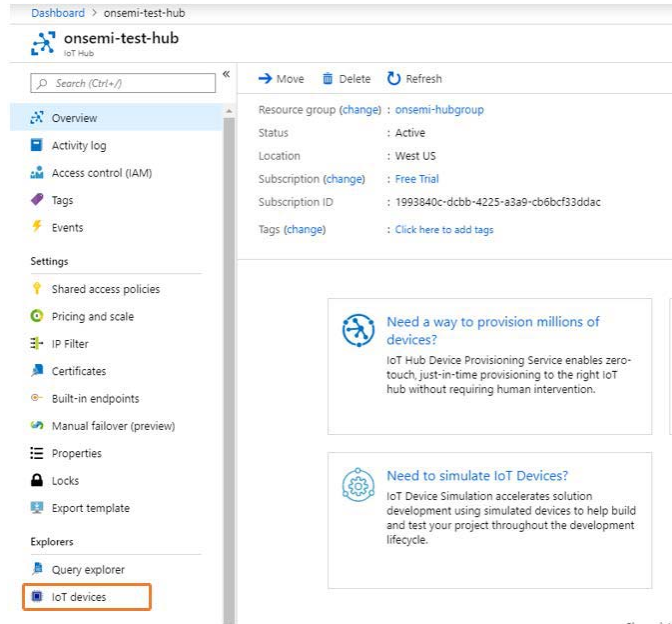
6. Select *IoT devices* from the list

Figure 10.

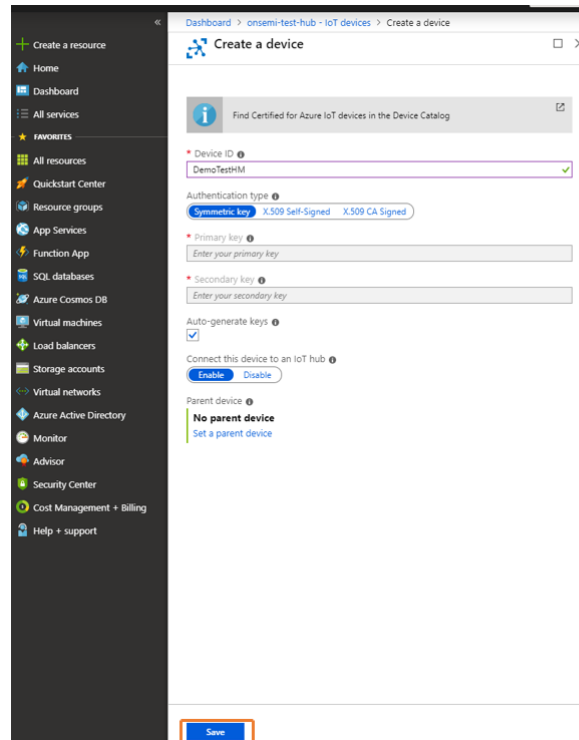
7. Click *New (+)*. Enter the Device ID and keep the existing field as it is. Click *Save*

Figure 11.

8. Once the device is created, it will be shown in the IoT Device List

View, create, delete, and update devices in your IoT Hub.

Field Operator Value

+ × select or enter a property name = specify constraint value

+ Add a new clause

Query devices </> Switch to query editor

DEVICE ID	STATUS	LAST ACTIVITY TIME (UTC)	LAST STATUS UPDATE (UTC)	AUTHENTICATION TYPE	CLOUD TO DEVICE MESSAGE COUNT
DemoTestHM	Enabled	--	--	Sas	0

Figure 12.

9. Select *Shared access policies* from the left sub-window list and click *Iothubowner*

Dashboard > onsemi-test-hub - Shared access policies

onsemi-test-hub - Shared access policies IoT Hub

Search (Ctrl+F)

+ Add

IoT Hub uses permissions to grant access to each IoT hub endpoint. Permissions limit the access to an IoT hub based on functionality.

Search to filter items...

POLICY	PERMISSIONS
iothubowner	registry write, service connect, device connect
service	service connect
device	device connect
registryRead	registry read
registryReadWrite	registry write

Settings

- Shared access policies
- Pricing and scale
- IP Filter
- Certificates
- Built-in endpoints
- Manual failover (preview)

Figure 13.

10. Copy the *Connection string—primary key*. This is a crucial step for the Device Explorer login access

iothubowner onsemi-test-hub

Save Discard More

Access policy name

iothubowner

Permissions

- ☒ Registry read
- ☒ Registry write
- ☒ Service connect
- ☒ Device connect

Shared access keys

Primary key

Secondary key

Connection string—primary key

Connection string—secondary key

Figure 14.



11. Configuring the Device Explorer

- a. Open the *Device Explorer Twin* which was installed previously

- b. Paste the *Connection string—primary key* in the field *IoT Hub Connection String* and click *Update* as shown

Figure 15.

- c. Click *Generate SAS* as shown

Figure 16.

## Android Application Configuration

### 12. Start the Android App

- On the main page of the App, tap on the Setting icon as shown below
- On the setting page tap on the Manage Brokers setting

- Tap on the “+” symbol on the bottom of the screen
- Tap on the add broker setting denoted by “+”
- Select Azure and tap Next

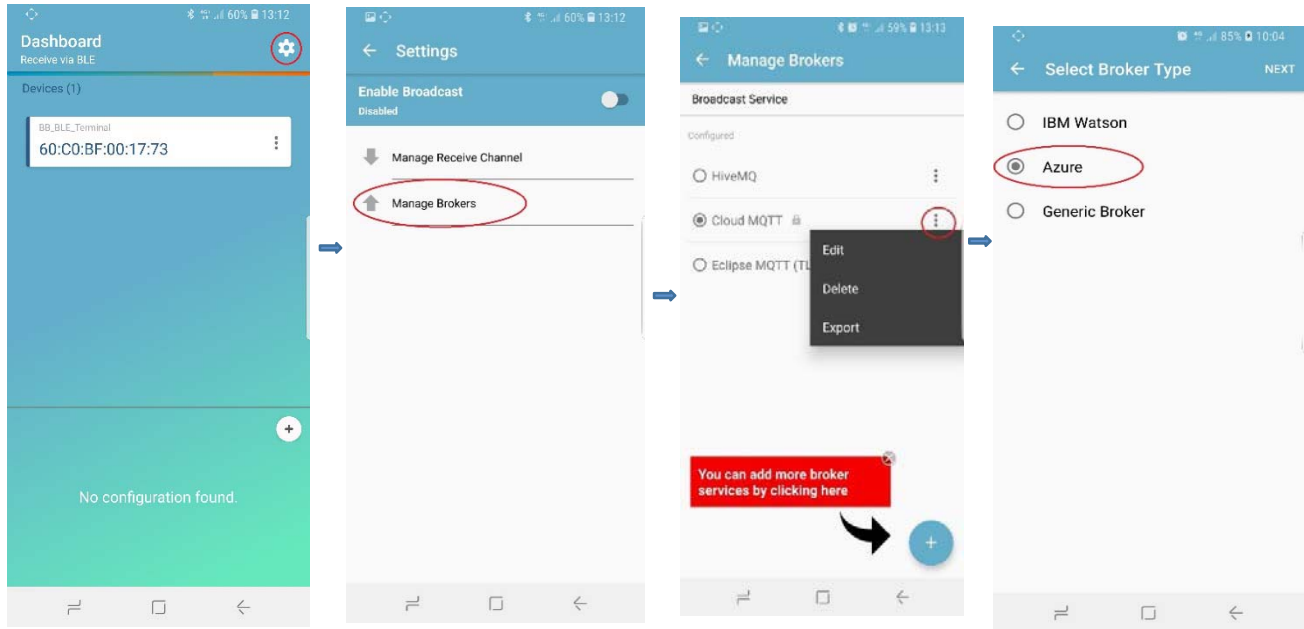


Figure 17.

### 13. Populate the Fields with the values shown below

- Client Name: *Any text string*
- Device ID: Enter the *Device ID* which was provided while creating a device
- Protocol: SSL
- URL : Enter the Hostname

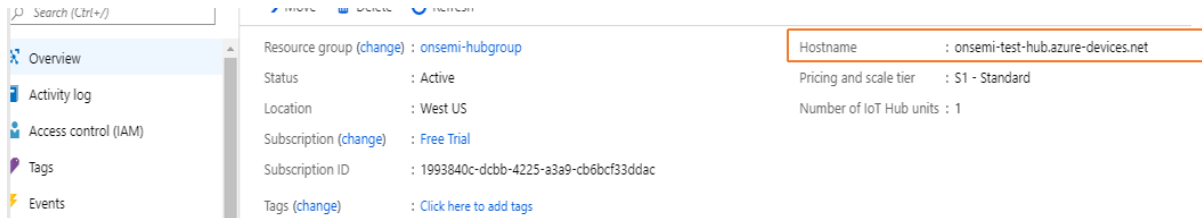


Figure 18.

- Port No: 8883
- Username: <Hostname>/<Device ID> configured in the Azure Portal>/api-version=<Current Date in YYYY-M-D>
- Password: Generated SAS key from Device Explorer
- Click Save and validate the connection

**Edit Broker**  
Azure MQTT

Client Name  
Azure

Device ID  
DemoTestHM

Protocol ☐ tcp ☒ ssl

URL  
onsemi-test-hub.azure-devices.net

Port Number  
8883

Username  
onsemi-test-hub.azure-devices.net/Demo

Password  
.....

☐ Supports MQTT v3.1.1

☐ SSL Certificate

Figure 19.

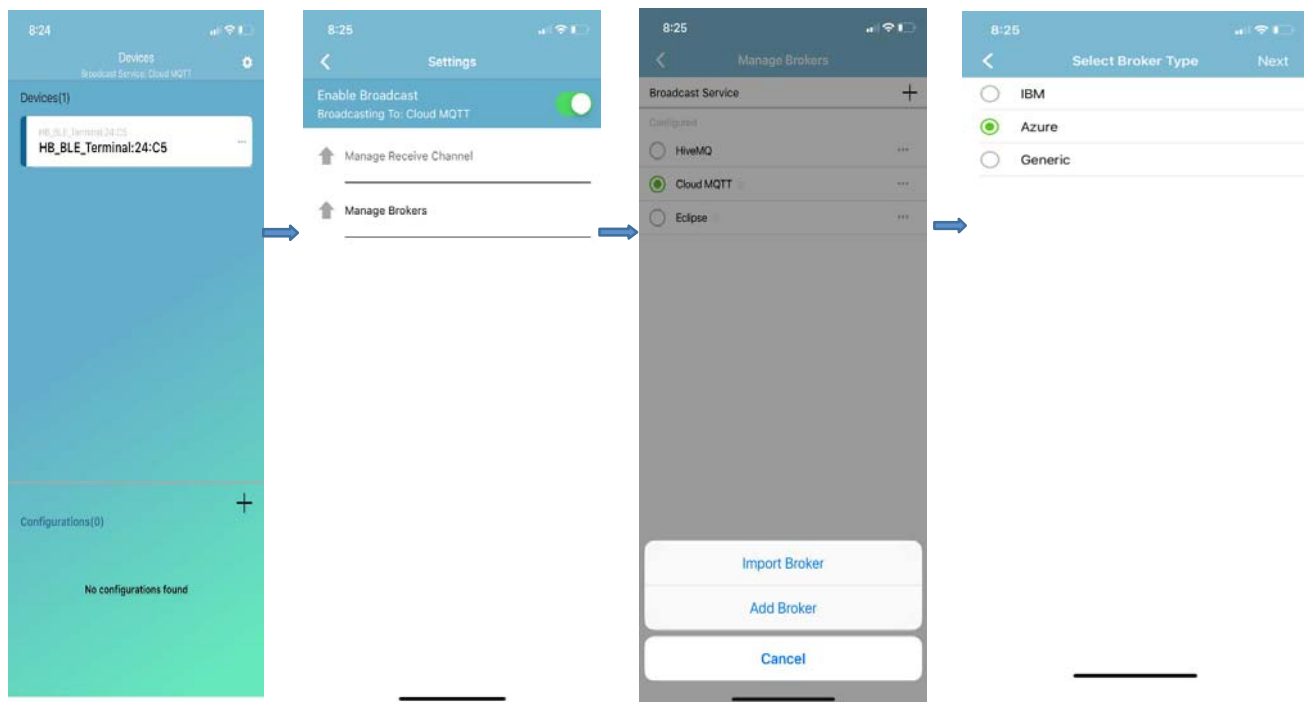


Figure 20.

## IOS Application Configuration

14.

- Start the iOS App
- On the main page of the App, tap on the Settings icon as shown below
- On the settings page tap on the Manage Brokers settings
- Tap on the “+” symbol on the bottom of the screen
- Tap on the add broker setting denoted by “+”
- Select Azure and tap Next

- Populate the Fields with the values shown below
  - Client Name: Any text string
  - Device ID: Enter the *Device ID* which was provided while creating a device

- Protocol: SSL
- URL: Enter the Hostname

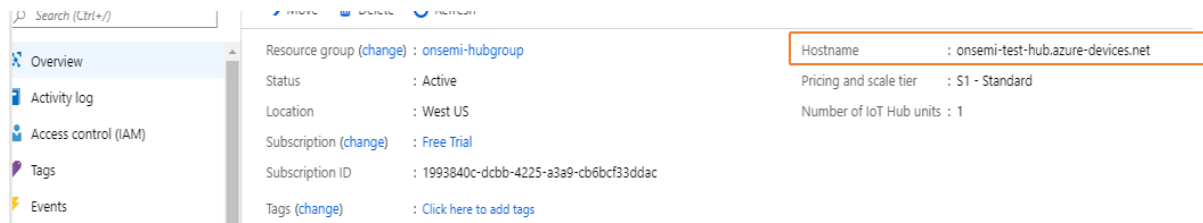



Figure 21.

- e. Port No: 8883
- f. Username: <Hostname>/<Device ID  
configured in the Azure Portal>/api-version=  
<Current Date in YYYY-M-D>
- g. Password: Generated SAS key from Device Explorer
- h. Click Save and validate the connection

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