

Purpose

This procedure describes how to connect a Tap (TapNLink, Tapioca, TapNPass or TapBus product) with Wi-Fi to a WAN network, and how to send data using MQTT protocol to your AWS account.

This example uses the **AWS Cloud** (<https://signin.aws.amazon.com/>). Using the IoTize tools to configure a Tap as we are showing here, uses your AWS account, AWS certificates and preset parameters that you can access using the **Tap Manager Starter Guide** (our in-app wizard for Tap configuration). This is a rapid and easy approach to get started with MQTT for data logging to AWS. It is only intended for exploration and testing.

Note: This data logging functionality uses our Tap's embedded Java Virtual Machine (JVM) and java code that will be added to the Tap's configuration. When working with java code in IoTize Studio, you can fully configure the code to use any MQTT broker and to log data to any cloud platform. When you are ready to try a more advanced implementation of data logging, an [MQTT java code example](#) is provided in the examples in the [IoTize Studio software installation](#).

This same procedure works for any Tap that has Wi-Fi and the **Duetware firmware version 2.20 or later**.

*Note: Firmware can be updated from your IoTize Cloud workspace (<https://iotize-cloud.web.app>). **Connect** to the device via Bluetooth. **Login** to the device (admin : admin). Select **Administration > Firmware update**.*

Requirements

In this procedure, you will reconfigure your module to connect to a WAN and send data via MQTT to your AWS account. To do this you need:

- **A Tap** (TapNLink, Tapioca, TapNPass, TapBus) with Wi-Fi
- **An IoTize Cloud account** (<https://iotize-cloud.web.app>)
- **An AWS account** (<https://portal.aws.amazon.com/billing/signup#/start/email>)
- **SSID and Key of the Wi-Fi network** that you will connect to
- **A target hardware system / component** and information about at least **one variable or register that you will configure to read data from**. This information can be imported into our software using either:
 - o **ELF** format file if you are connecting to a microcontroller
 - o **CSV** format [Modbus Register Dictionary](#) if you are connecting to a system/component with a Modbus port.

Note: [Here you will find CSV template and instructions](#) for creating your Modbus Register Dictionary. After you have completed this, you can do the procedure.

*Note: Creating an AWS account requires that you provide AWS a credit card for eventual payments that could be necessary if you use their service extensively. For testing under this procedure, a 1.00 USD transaction is made if you are creating an account for the first time. No other specific charges are incurred by following this procedure as it is described here. **By following this procedure and creating your AWS account, you accept that you alone are responsible for any charges that may be incurred for your use of the AWS services whether for server use, data or other storage, number of connected devices, for any other service or feature for which AWS might apply charges to your account.***

Hardware Connections

Connect your IoTize wireless device to (TapNLink, Tapioca, etc.) to a target hardware. Instructions are provided for:

- TapNLink in the [TapNLink Primer Quick Start](#)
- Tapioca for Modbus in the [Tapioca Getting Started](#)

Power the hardware. Make sure your TapNLink or Tapioca is powered.

Your AWS Account

- Create your account and login:
<https://portal.aws.amazon.com/billing/signup#/start/email>

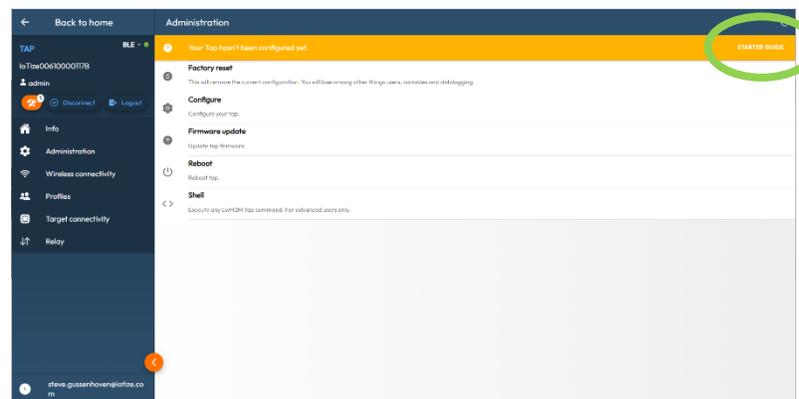
*Note: Creating and AWS account requires that you provide AWS a credit card for eventual payments that could be necessary if you use their service extensively. For testing under this procedure a 1.00 USD transaction is made if you are creating an account for the first time. No other specific charges are incurred by following this procedure as it is described here. **By following this procedure and creating your AWS account, you accept that you alone are responsible for any charges that may be incurred for your use of the AWS services whether for server use, data or other storage, number of connected devices, for any other service or feature for which AWS might apply charges to your account.***

Configure Tap Using Tap Manager from IoTizeCloud

- In your browser, go to <https://iotize-cloud.web.app/>
- Login
- Click **Connect to device** in the left menu.
- Select **Bluetooth > Scan**. Then select your Tap device and click **Pair**.

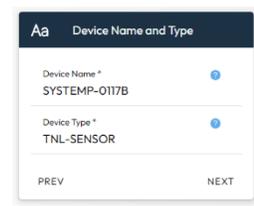
*Note: If the Tap is already configured, do a factory reset. Login on the device (admin : admin). Select **Administration > Factory Reset > Reset**. This will reset your Tap. The message **"Your Tap hasn't been configured yet"** is displayed. You can now use the Starter Guide.*

- Click on **Starter Guide**.
This wizard will guide you through the configuration to set up the MQTT broker for AWS and provision this device on AWS.



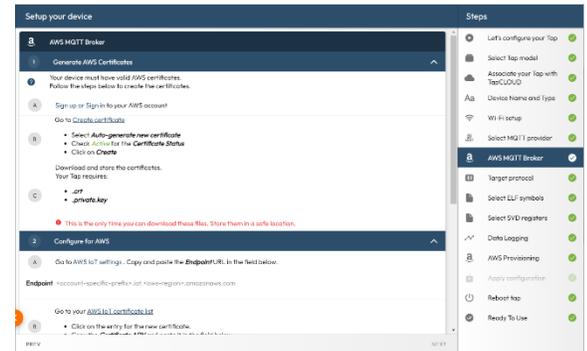
- Confirm the **Tap serial number > Next**
- Select the correct **Tap model > Next**
- Confirm the **workspace association > Next**
- Give the device a **Name and Device Type > Next**

Note: Device Type is used later in AWS to simplify configuration of devices of a same



type.

- Enter the **SSID and Key for the Wi-Fi network** the Tap will connect to > **Next**
- Select **AWS MQTT Broker** > **Next**
- Click on **Create Certificate** (for your Tap), then on the AWS site:
 - o Select **Auto-generate new certificate**
 - o Check **Active**
 - o Click **Create**
- **Download** all the key files and certificates.

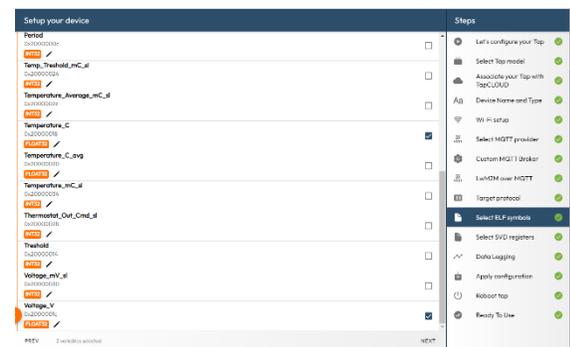


Note: For certain certificates and key files, this is the only opportunity you will have to download them. We recommend that you download all and store them securely on your PC.

Return to the Tap Manager Startup interface and:

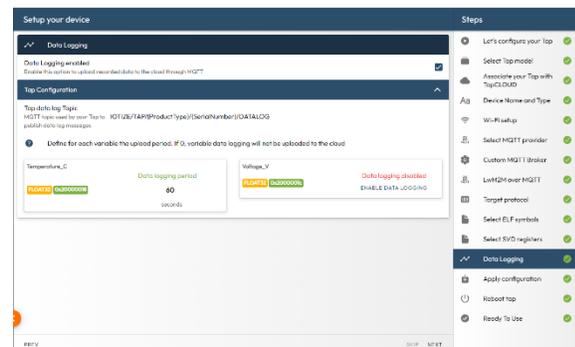
- Click the link to get the AWS Endpoint URL
- Paste the **Endpoint URL** in the provided field in Tap Manager
- Click the **link to get the AWS Certificate ARN**
- In AWS, click on the active Certificate that you have created
- Copy the **Certificate ARN**, paste it in the provided field in Tap Manager
- For **PEM Certificate (crt)**, click on **Import from File**, and select the Certificate for the AWS files that you have downloaded.
- For **Private Key (private.pem.key)**, click on **Import from File**, and select the Private PEM Key for the AWS files that you have downloaded.
- Click **Next**

- Select the **Target Protocol (SWD or MODBUS)** depending on the hardware connection that you are using.
- Click **Select File**, to import your ELF (SWD connection) or your CSV format library of Modbus registers from your PC or phone.
- Click to **select the variables or registers** that you want to read data from > **Next**



Note: for SWD you are invited to import an SVD file for registers. You can do this or skip. Just be sure you have at least one variable or register that the Tap will read data from.

- Click on **Enable Data Logging** for the variables / registers that you want to log data for. Set the data logging interval > **Next**



In AWS Provisioning:

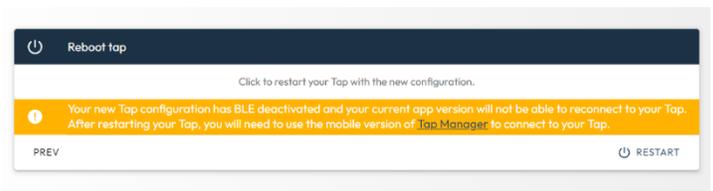
- If you are provisioning a 2nd device of the same **Device Type**, check the box **I've Already Provisioned a Device of type <your type>**. If not, leave this unchecked.
- For **AWS Cloud Formation template**, click on **Download**.
- Click the **Cloud Formation > Stacks > Create Stack** link
- STEP 1**
 - o Select **Choose and Existing Template**
 - o Select **Upload a template file**
 - o Use **Choose file** to select the downloaded template
 - o Click **Next**, then return to Tap Manager for more instructions.
- **STEP 2**
 - o Copy the provided stack name, and paste it in the **AWS Specify stack details > Enter a Stack Name** field
 - o Click **Next**.
- **STEP 3**
 - o Keep the defaults. Scroll to the bottom and click **Next**
- **STEP 4**
 - o Scroll to the bottom.
 - o Acknowledge any conditions that are shown.
 - o Click **Submit**.

This opens the **CloudFormation > Stacks view**. Your AWS Cloud will be ready when the status has changed to **CREATE_COMPLETE**. This may take up to several minutes. You may want to refresh the AWS Cloud Formation > Stack view periodically to verify the status.

- For the Apply configuration popup, click on **Apply**

The configuration is sent to the Tap.

The Reboot Tap pop up appears. Click on **Restart** to reboot your Tap and start datalogging to AWS.



Important Note:

The message in the orange block about the AWS configuration explains that when you click on restart, the Tap's Wi-Fi is configured to connect to the Wi-Fi network you have set. It will start logging data to AWS via that connection.

Bluetooth is deactivated to free up module memory for the management of AWS certificates and the security mechanisms. After restarting, you cannot connect to the Tap from Tap Manager running on your PC because Bluetooth is required to do this.

You can, however, connect by Wi-Fi or NFC using the Tap Manager app on your mobile phone. [Click here for more instructions.](#)

At this point, you can exit Tap Manager configuration on your PC. Click on **Back to home > Quit**.

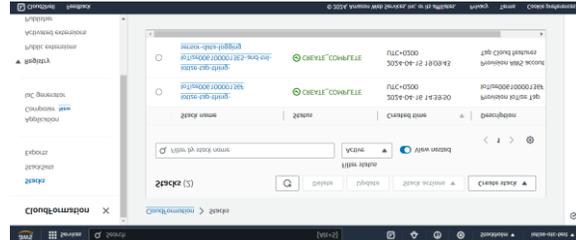
Test Connections and View Data Logs

You can confirm your data logging set up and view data on AWS. The following service sections are of particular interest:

AWS Cloud Formation:

<https://eu-north-1.console.aws.amazon.com/cloudformation/>

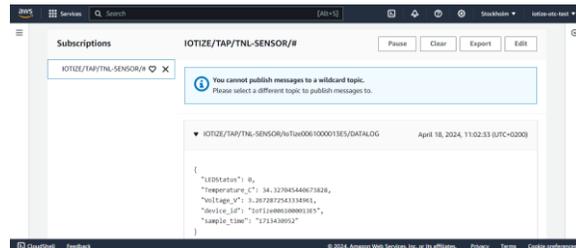
Here you have access to any stacks that you have created, and associated resources and certificates.



AWS IoT > MQTT Test Client

<https://eu-north-1.console.aws.amazon.com/iot/>

Here you can monitor MQTT messages between your account and your devices.



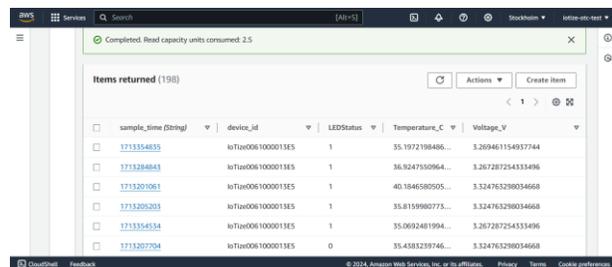
Just Subscribe to a topic filter, and messages appear in the provided panel (Topic example for my configuration “IOTIZE/TAP/TNL-SENSOR/#”).

It is also possible to publish messages to specific devices.

DynamoDB > Tables

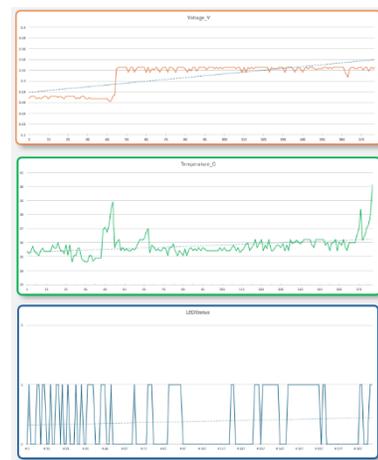
<https://eu-north-1.console.aws.amazon.com/dynamodbv2/>

Click on **Tables > Explore Table Items**, and you can view the history of logged data records here.



Data can be used across other AWS services for creating dashboards and your own services for managing devices analyzing their data and managing your own services.

The data can also be exported for use in other systems and apps like in this simple chart view from our example.



Reconnecting Tap Manager Mobile App to Your Tap

With the Tap configured for data logging to AWS, you can no longer connect to the Tap by Bluetooth (See [Important Note](#)). However, you can use the Tap Manager on your mobile phone to connect to your Tap and do things like:

- Set up and view a local data monitoring interface
- Update its firmware
- Change its configuration
- Etc.

Install Tap Manager from Play Store (Android) or App Store (iOS) on your mobile phone.

Connect via Wi-Fi with (NFC pairing enabled)

- Turn the phone's Wi-Fi and NFC on
- Tap the phone to the NFC point on the Tap
- Tap Manager is launched and the Wi-Fi pairing is established.

At this point you can work with your module directly from the Tap Manager app.

Troubleshooting Notes