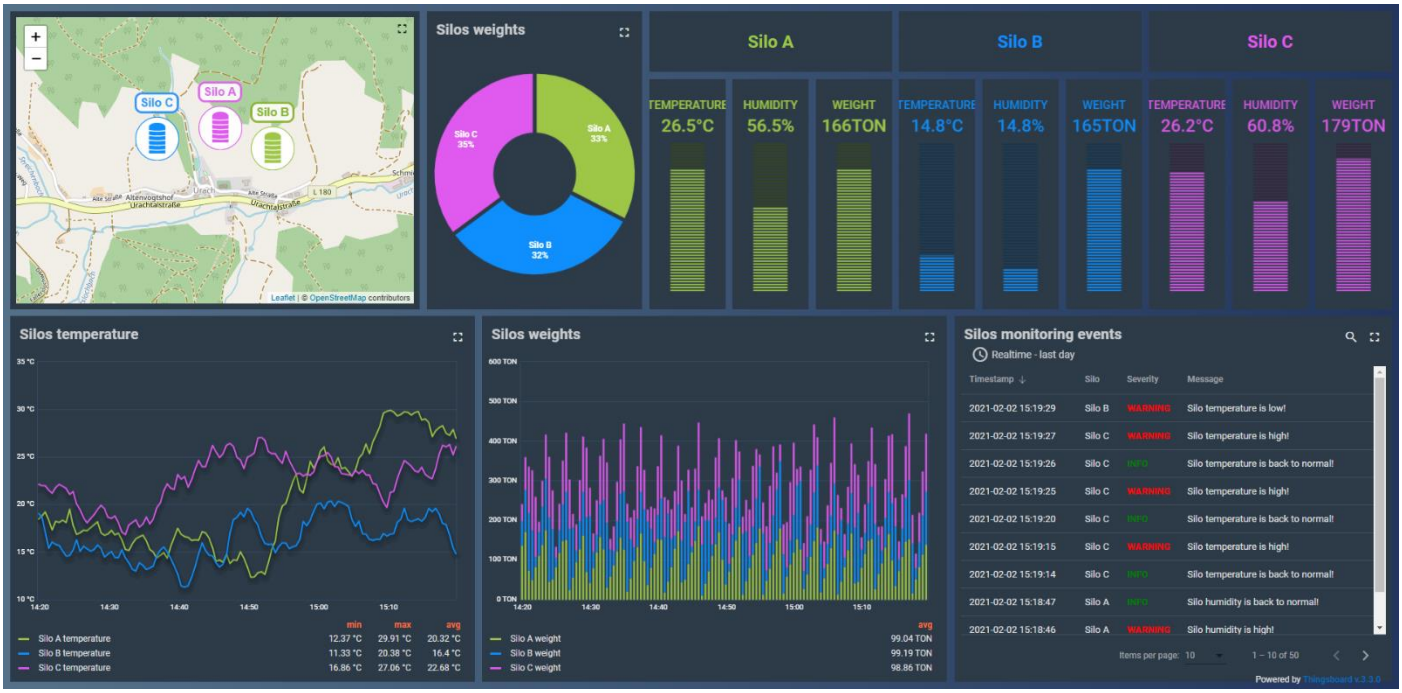
CONNECTING SENQUIP DEVICES TO THE THINGSBOARD

1. Introduction

This Application Note details how to integrate Senquip telemetry devices with the ThingsBoard using MQTT. Senquip devices and the ThingsBoard also support HTTP, but this will not be considered in this application note.

ThingsBoard is an open-source IoT platform for data collection, processing, visualisation, and device management. It enables device connectivity via industry standard IoT protocols MQTT and HTTP and supports both cloud and on-premises deployments. ThingsBoard combines scalability, fault-tolerance, and performance so you will never lose your data.

MQTT stands for Message Queuing Telemetry Transport and is a lightweight, publish-subscribe network protocol that transports messages between devices. Data will be transmitted in JSON format from the Senquip device to the ThingsBoard. JSON (JavaScript Object Notation) is an open data interchange format that uses human-readable text to store and transmit data objects consisting of key value pairs.



2. Device and ThingsBoard Configuration

This section outlines how to configure a Senquip device to communicate with ThingsBoard over MQTT. It is assumed that the user has created an account on the Senquip Portal to allow device configuration, and has an account on the ThingsBoard. ThingsBoard can be accessed at https://thingsboard.cloud/.

1. In ThingsBoard, navigate to *Device Groups* and expand the group as shown in Figure 1.

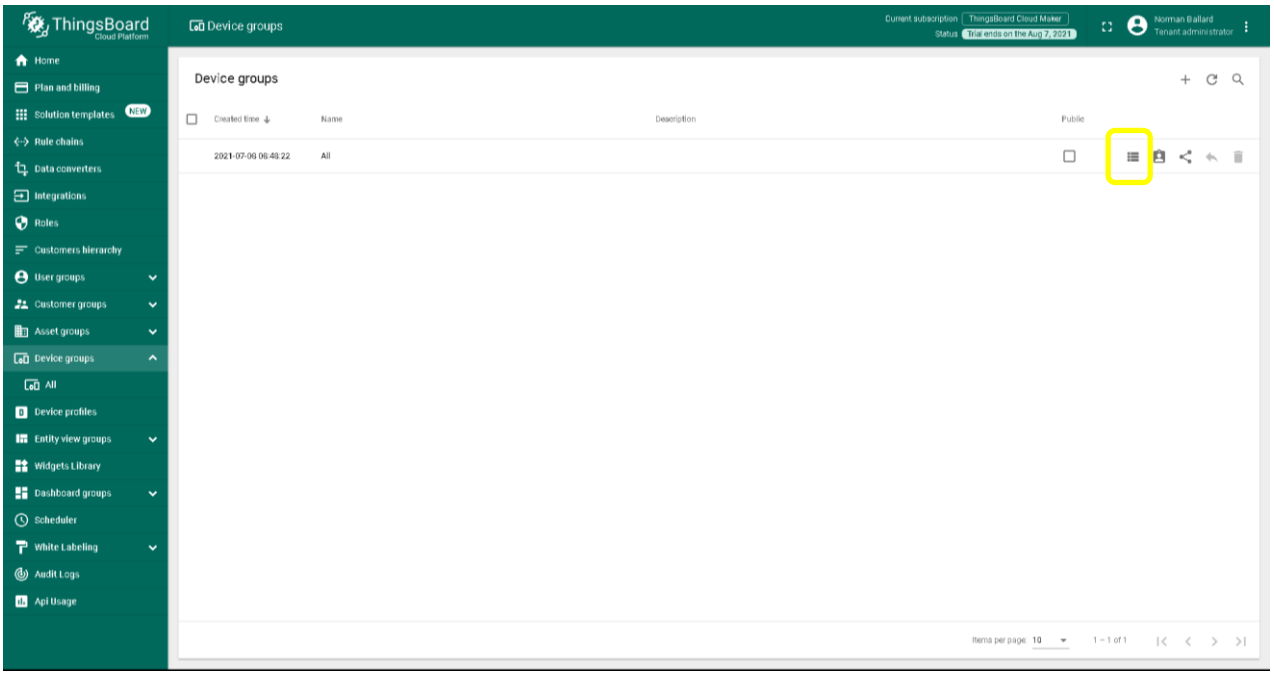


Figure 1 - Device Groups

2. If this is the first device being added to the *Device Group*, there will be no entries shown. Press the "+" button as shown in Figure 2 to add a device to the selected group.

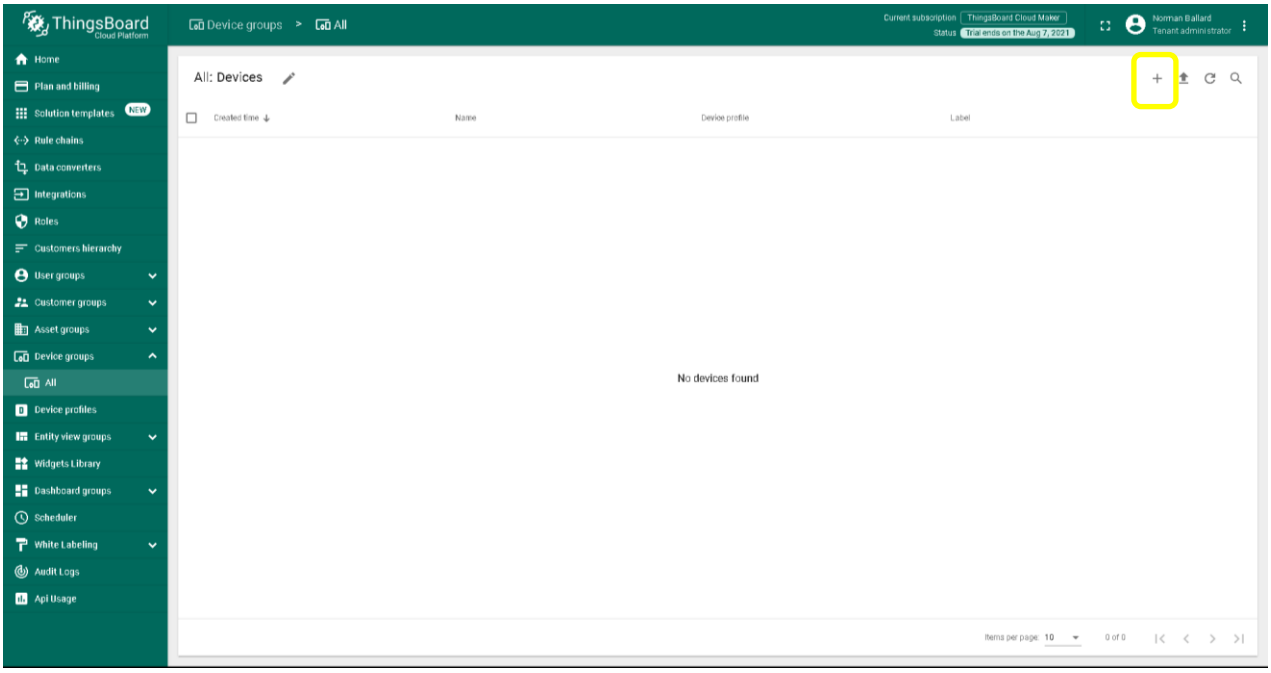


Figure 2 - Create a Device

3. Give the device a name, a label that will appear on maps widgets, and select MQTT as the transport type. Press "Next Credentials" to continue.

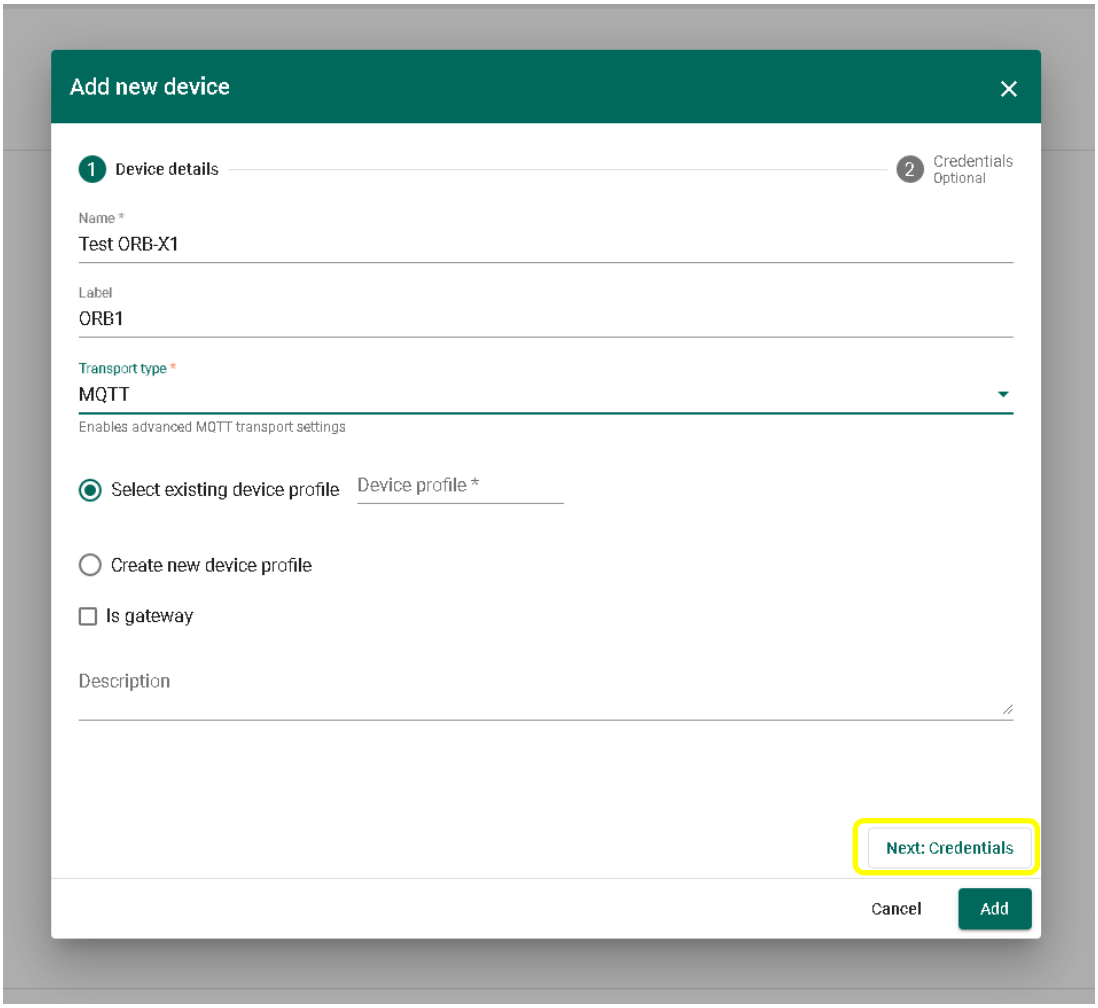


Figure 3 - Device Detail

4. Configure the Senquip telemetry device to send data to the ThingsBoard by configuring the device endpoint on the Senquip Portal. Using the Endpoint settings, as shown in Figure 4, Enable MQTT as the transport, use a *Broker Address* of thingsboard.cloud:1883 and a *Data Topic* of v1/devices/me/telemetry. Choose a *Client ID*, *Username* and *Password*. In this instance, we used the Senquip Device ID as a Client ID. Remember to save the settings before exiting the page.

   The Senquip device will now send data to the configured endpoint. It will however also continue to send data to the Senquip Portal. If you would like to stop sending data to the Senquip Portal, uncheck the *Send Data to the Senquip Portal* option. You can also disable Configuration via the Senquip Portal but this will prevent any further configuration from being performed remotely via the Senquip Portal and is not recommended.

Without access to the Senquip Portal, configuration can also be performed using the webserver on the Senquip device.

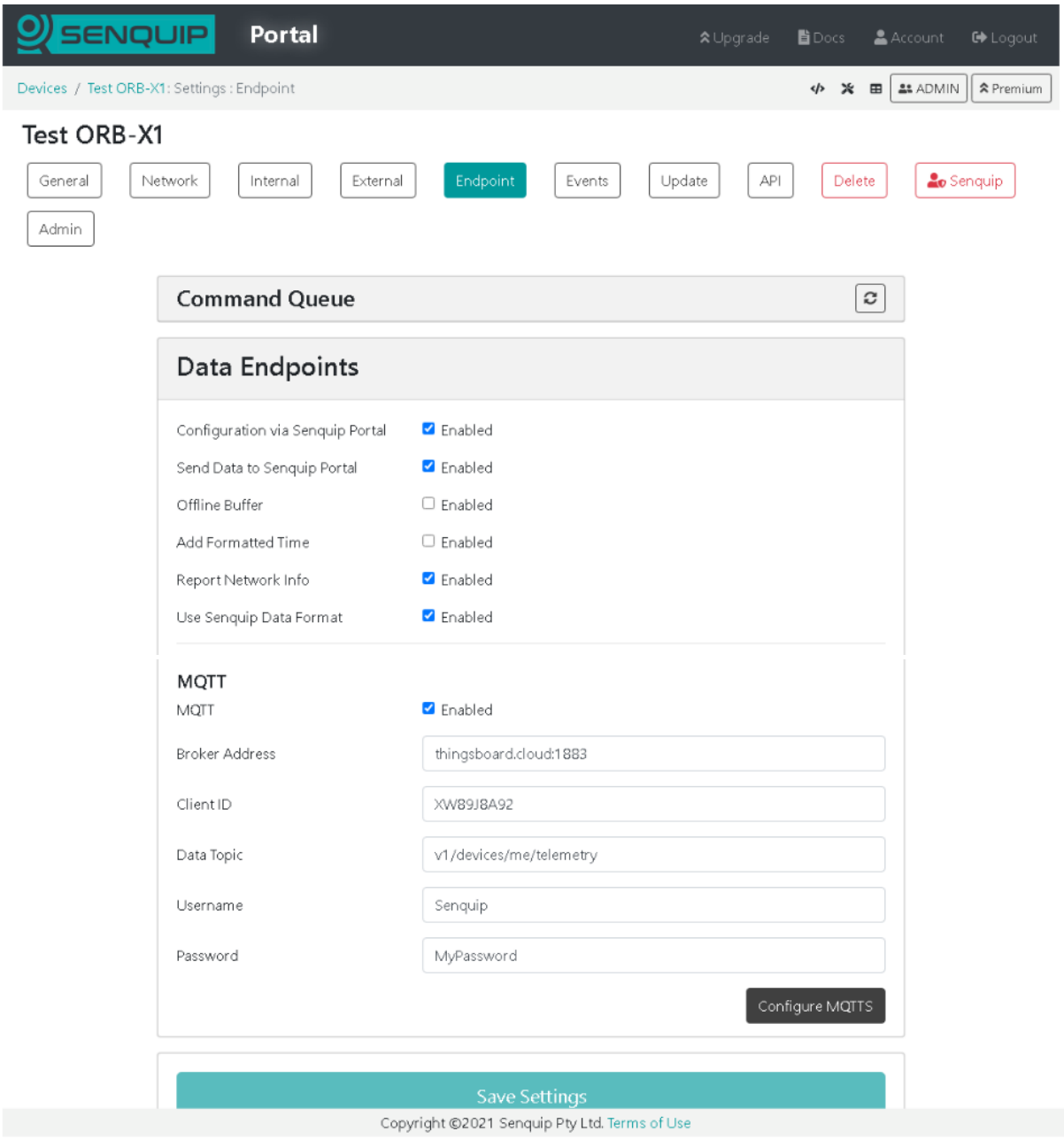


Figure 4 - Setting up the Senquip Endpoint

5. On the ThingsBoard, tick *Add Credentials*, choose a credential type of "MQTT Basic" and fill in the *Client ID*, *User Name*, and *Password* that were entered in the previous step on the Senquip device Endpoint page. Press *Add*.

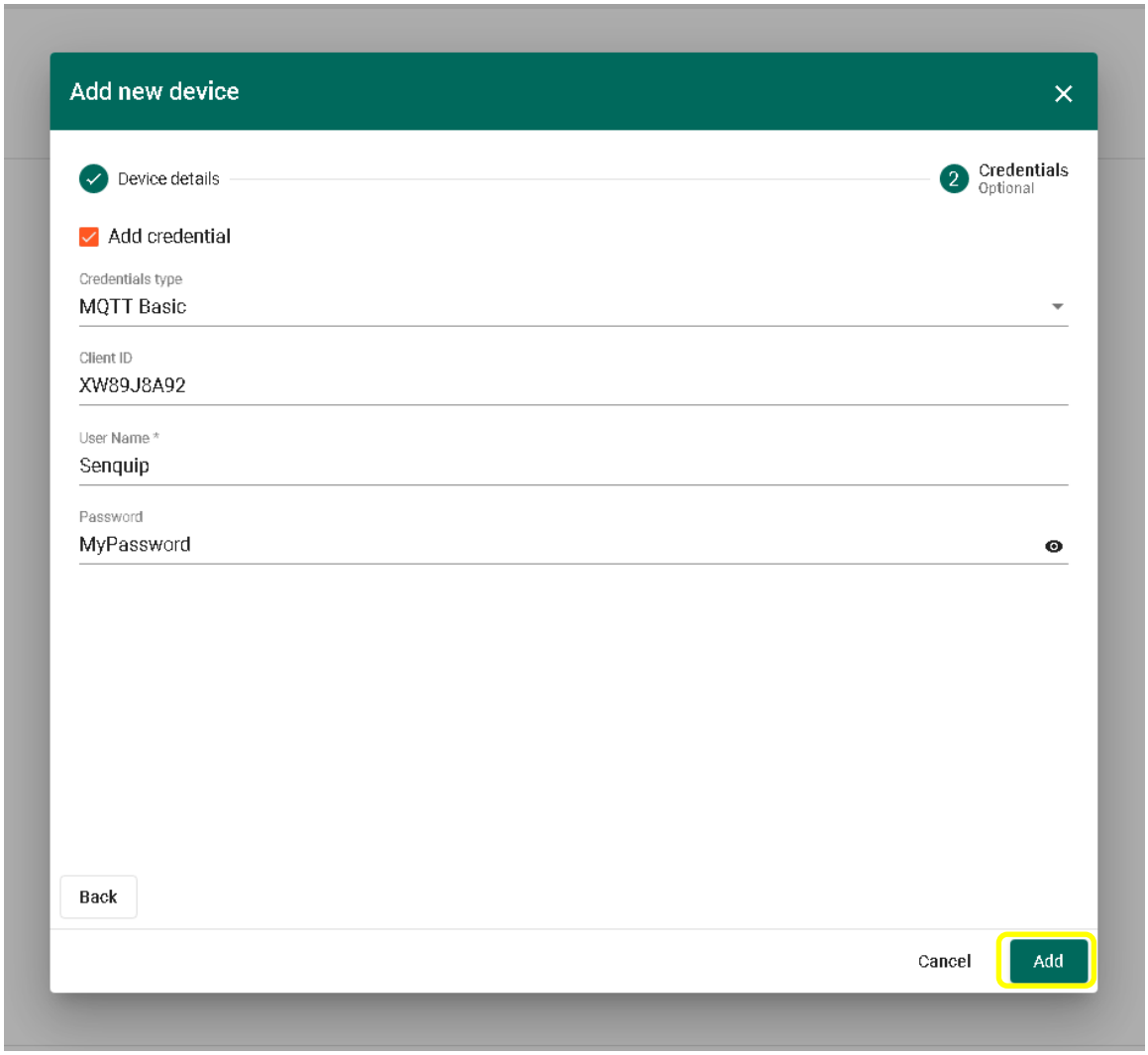


Figure 5 - MQTT Details

6. The newly added device will now appear in the the selected group. Select the device and choose *Latest Telemetry* to see the data arriving. Each key value pair in the Senquip raw data packet will be received by the ThingsBoard and is displayed. If additional peripherals are turned on on the Sequip device, more key value pairs will be added to the JSON raw data packet and will be received by the ThingsBoard.

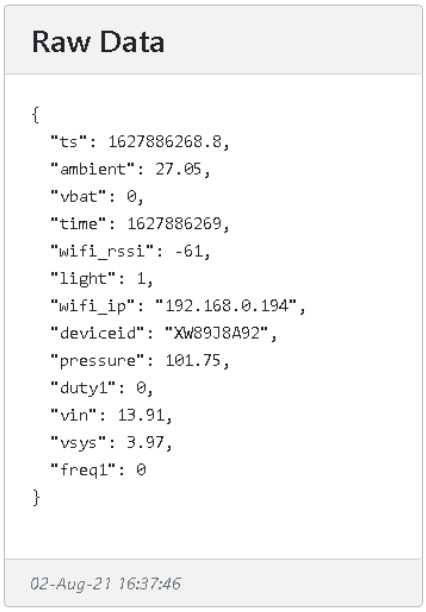


Figure 6 - Senquip Device Data in JSON Format

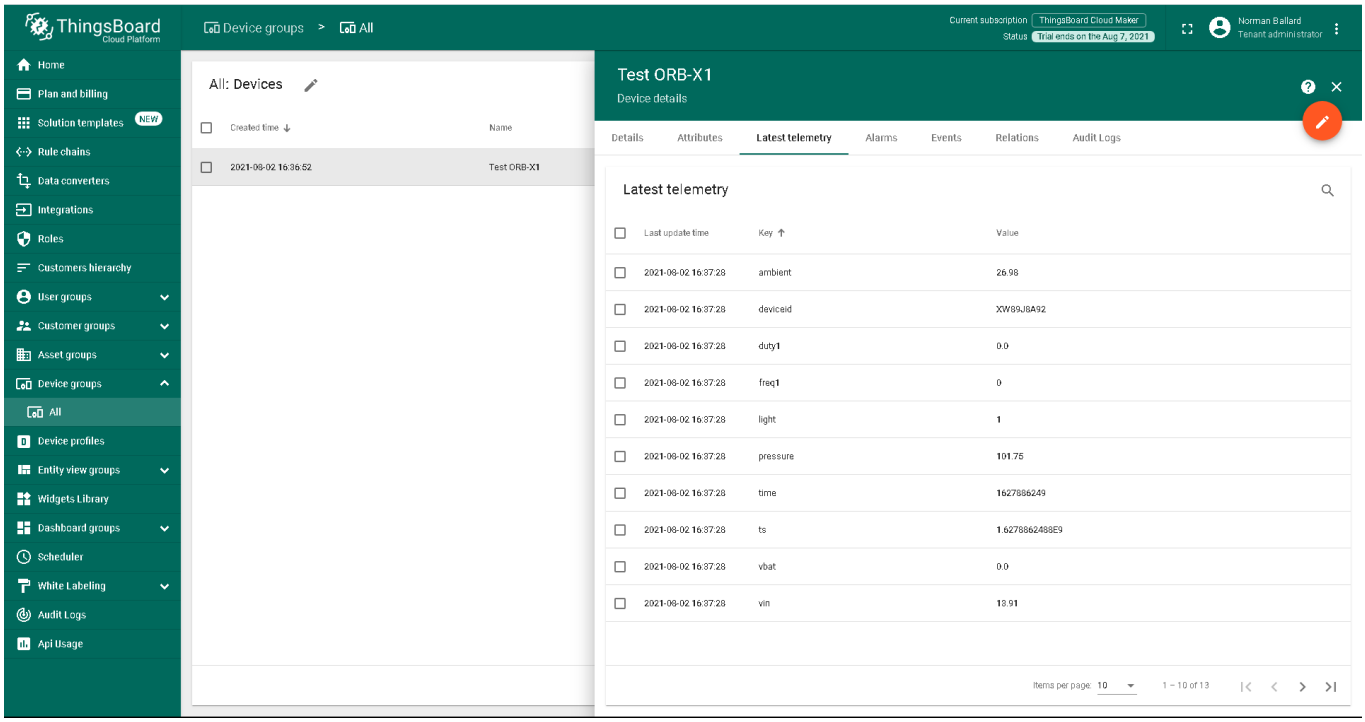


Figure 7 - Data Received on ThingsBoard

3. Visualising the Data on a Dashboard

ThingsBoard allows you to configure customisable IoT dashboards. Each IoT Dashboard can contain multiple widgets that visualise data from multiple IoT devices. Once an IoT Dashboard is created, you can assign it to multiple customers of your IoT project. In this section, we will discuss creating a very simple dashboard.

1. In the *Latest Telemetry* window, chose a key value pair using the selection box and press "Show on Widget" to associate the data with a display widget. In this example, we have chosen ambient temperature. It can be seen in Figure 8 that the current value is 27.24 degrees.

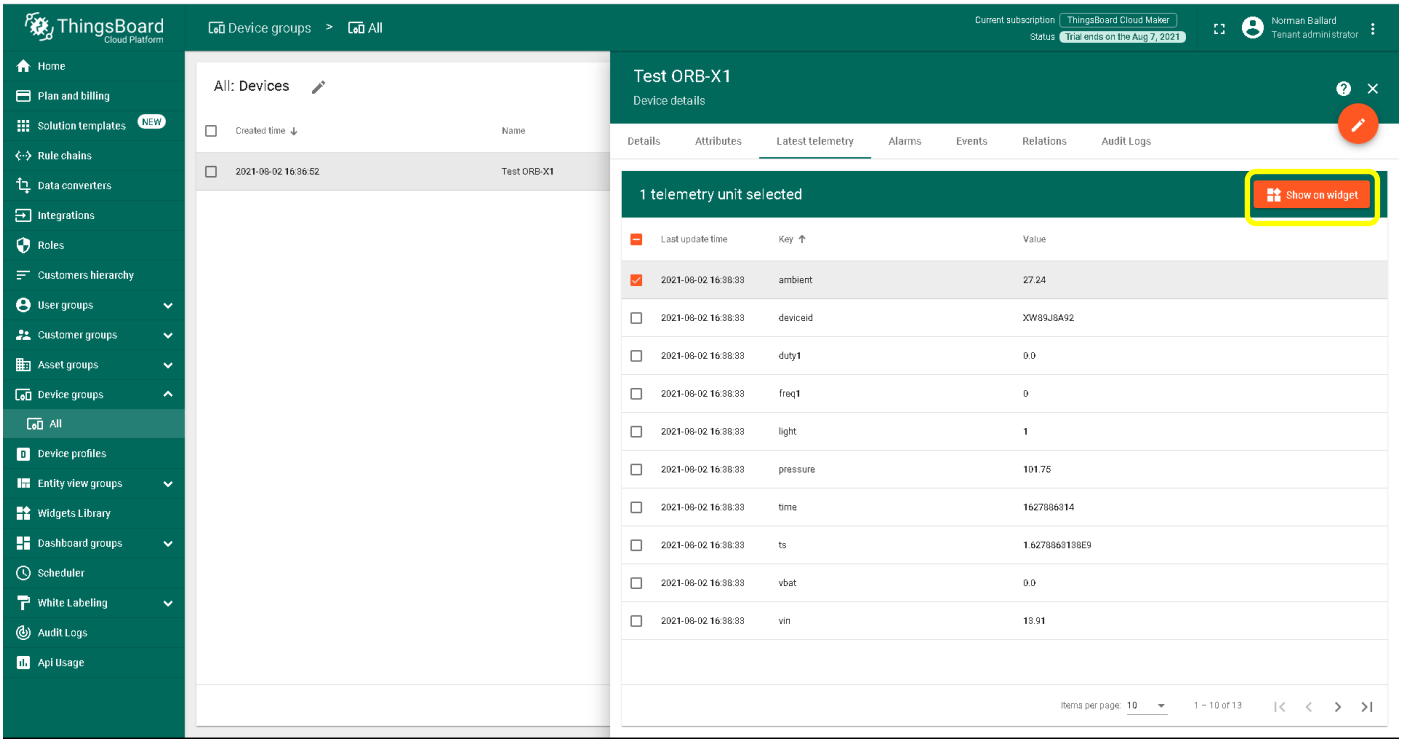


Figure 8 - Choose a Key Value Pair

2. Select the type of widget by first selecting the bundle of widgets and then the widget. Bundles of widgets include line graphs, tables, gauges and more. In this example, we have chose the *Analogue Gauges* bundle and a circular gauge. The scale, colour, font and text on the widget are completely configurable. Press "Add to Dashboard". If this is your first dashboard, you will have to give the dashboard a name.

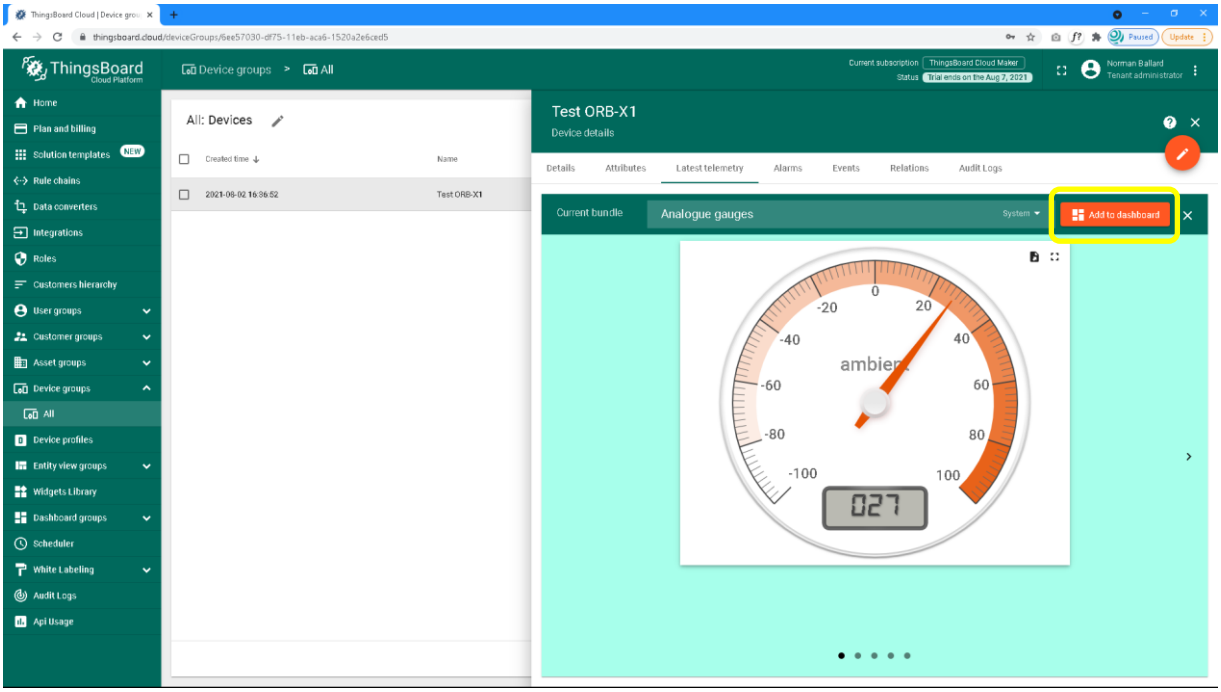


Figure 9 - Choosing a Widget

3. The widget is now visible on your dashboard. Further widgets can be added by following the same procedure.

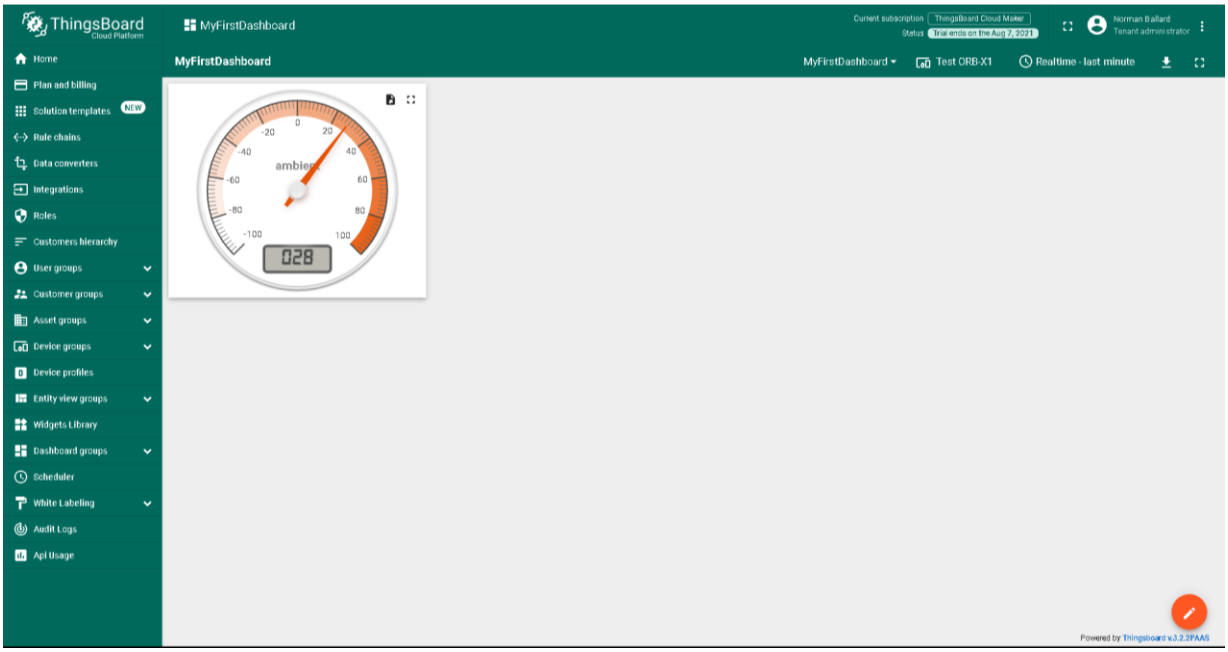


Figure 10 - Simple ThingsBoard Dashboard

4. Conclusion

Configuring a Senquip ORB to send data to ThingsBoard is simple using the ORB MQTT endpoint settings. The ThingsBoard offers a flexible dashboard that is configurable for most IoT applications.

Senquip devices can maintain connection with a third-party endpoint and the Senquip Portal at the same time. This allows for configuration changes and firmware updates from the Senquip Portal whilst sending data to a third-party server.

Senquip also offers hosting of your data, and data visualisation dashboards as shown in Figure 11. For further information on Senquip hosting and dashboards, please contact Senquip at support@senquip.com.

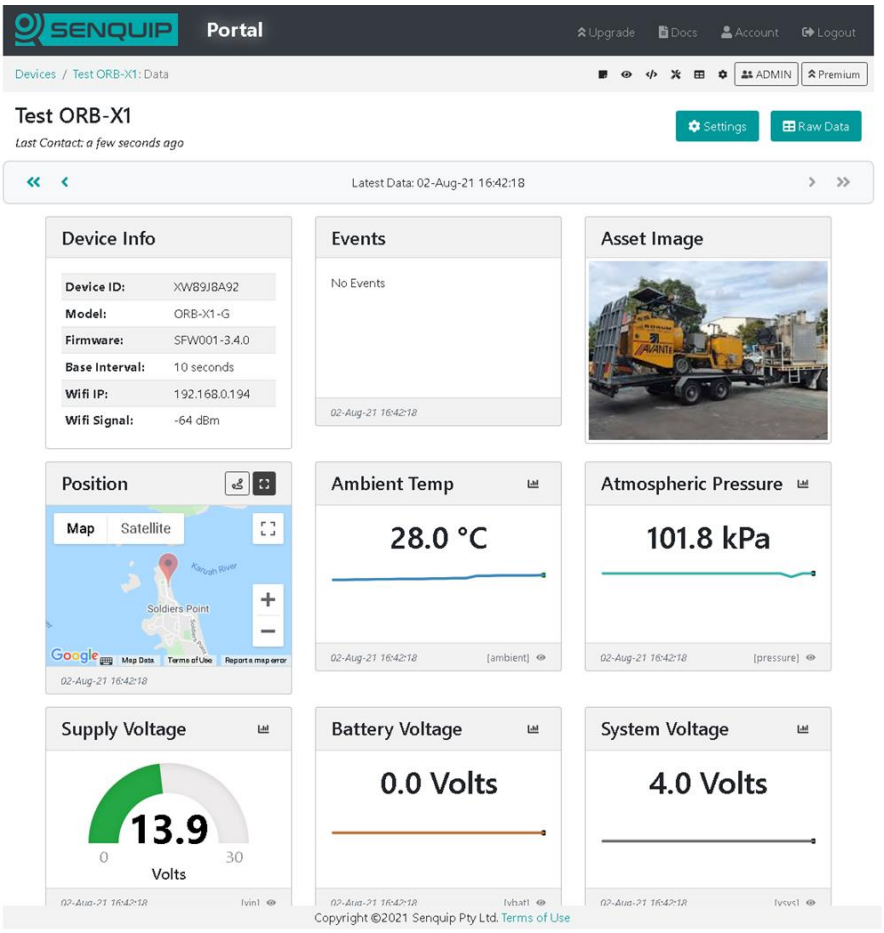


Figure 11 - Example Senquip Portal Dashboard