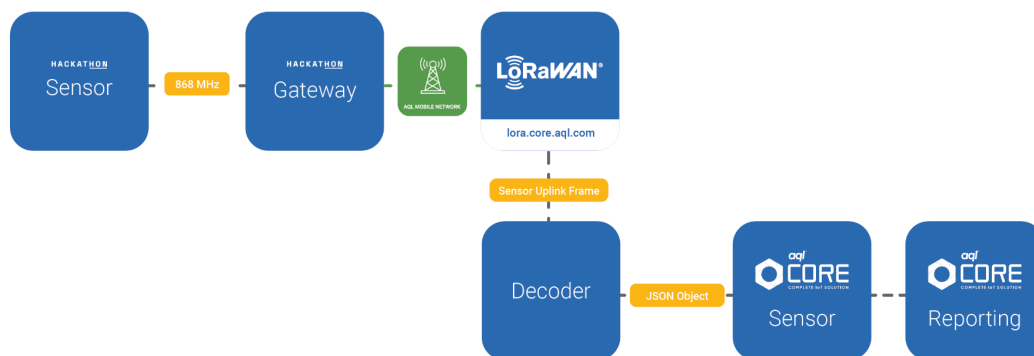




Smart Cities Hackathon Tier 1 Challenge 5

Challenge 5: Configure a Live Sensor

In this challenge, select a device from the samples provided by Alliot or aqi. You will be creating a decoder, adding the device to our Core IoT platform, and connecting it to the IoT event LoRaWAN network. The aqi Core IoT platform can handle all LoRa-compatible sensors, as well as Bluetooth and serial sensors using the aqi Edge IoT board. The platform can also ingest readings over MQTT and HTTP from third-party platforms and systems. Below is the hackathon data flow:



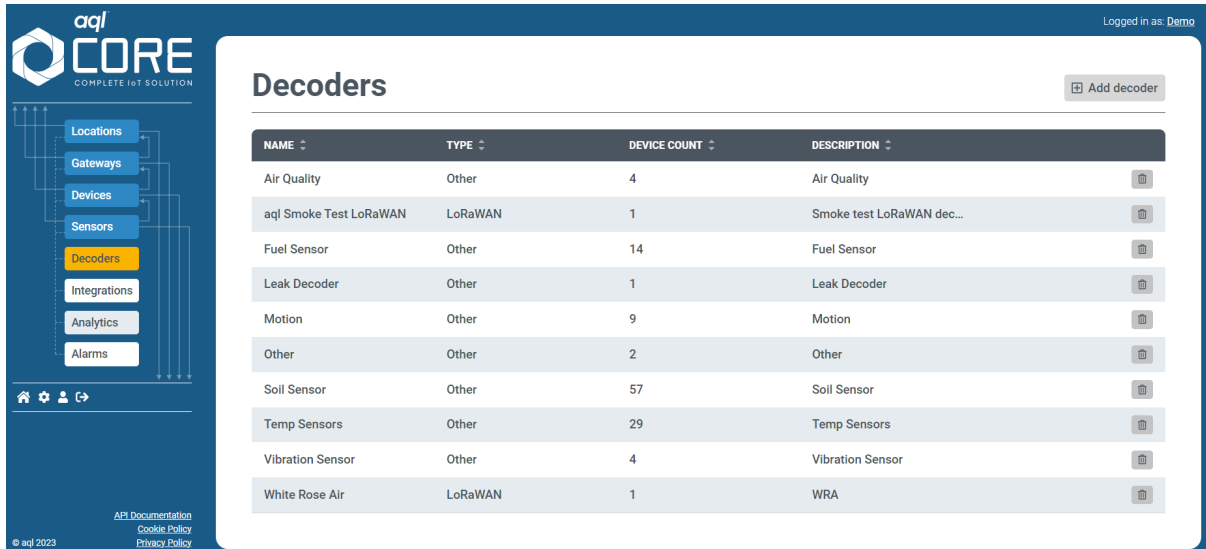
You can ask the event AI to describe LoRaWAN and how LoRaWAN security works.

Step 1

Log into the aqi Core IoT platform (<https://core.aqi.com/login>) with your provided event credentials.

Step 2

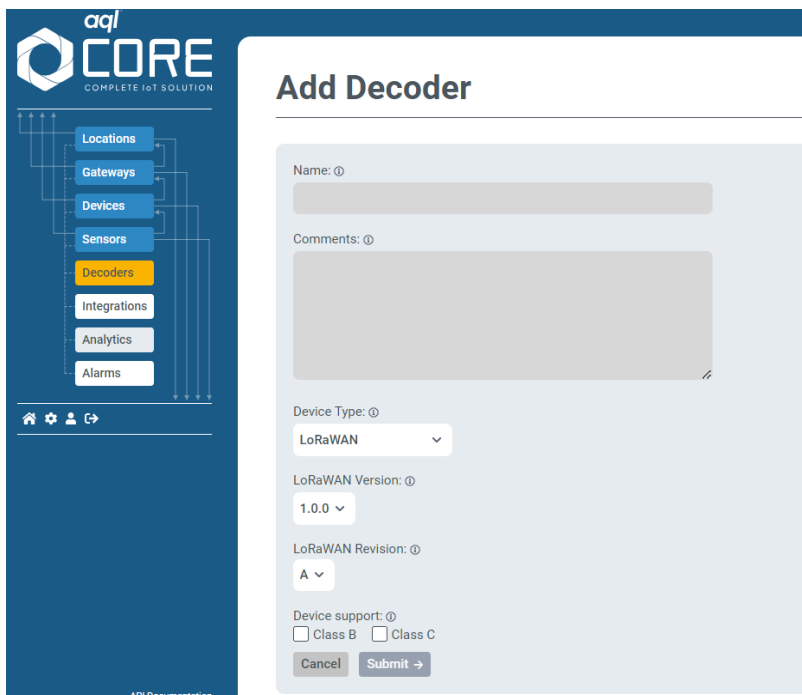
Create a LoRaWAN decoder. Once logged into your user account, select “decoders” from the menu on the left of the page, and then select the “add decoder” button from the right of the decoders index page. You should then be loaded onto a new page with a form to fill in for creating a new decoder:



The screenshot shows the 'Decoders' page in the aql CORE interface. The left sidebar contains a navigation menu with options: Locations, Gateways, Devices, Sensors, Decoders (highlighted), Integrations, Analytics, and Alarms. The main content area displays a table of decoders with columns: NAME, TYPE, DEVICE COUNT, and DESCRIPTION. A table icon in the top right corner allows for adding a new decoder.

NAME	TYPE	DEVICE COUNT	DESCRIPTION
Air Quality	Other	4	Air Quality
aql Smoke Test LoRaWAN	LoRaWAN	1	Smoke test LoRaWAN dec...
Fuel Sensor	Other	14	Fuel Sensor
Leak Decoder	Other	1	Leak Decoder
Motion	Other	9	Motion
Other	Other	2	Other
Soil Sensor	Other	57	Soil Sensor
Temp Sensors	Other	29	Temp Sensors
Vibration Sensor	Other	4	Vibration Sensor
White Rose Air	LoRaWAN	1	WRA

Once on the page with the create decoder form, complete the necessary fields to create a new LoRaWAN decoder. Please note that the name must be unique to that decoder and that the comments field must be populated. For the LoRaWAN details, you will need to either Google or confirm with Alliot as to what your LoRaWAN config should be. However, these fields can be edited later if necessary. Device type, LoRaWAN version, LoRaWAN revision & device support require no amendments. Now select “Submit”, and you will be redirected to the page of your new device:



The screenshot shows the 'Add Decoder' form in the aql CORE interface. The left sidebar is identical to the previous screenshot. The main content area contains a form with the following fields:

- Name:
- Comments:
- Device Type:
- LoRaWAN Version:
- LoRaWAN Revision:
- Device support: ☐ Class B ☐ Class C

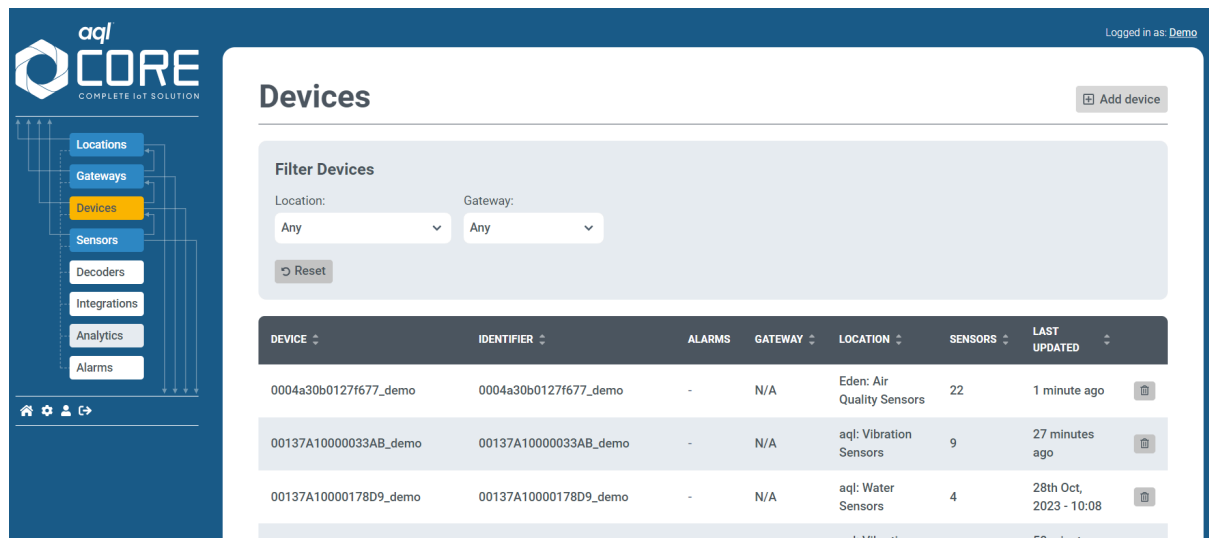
At the bottom of the form are two buttons: 'Cancel' and 'Submit'.

This will then load the decoder page, the decoder is a Javascript method that allows a sensor reading to be converted into a JSON object which is then mapped to the sensor

types supported by Core.aqi.com. For now, we are going to leave this blank we will capture a reading from the sensor and come back to this page in a later step.

Step 3

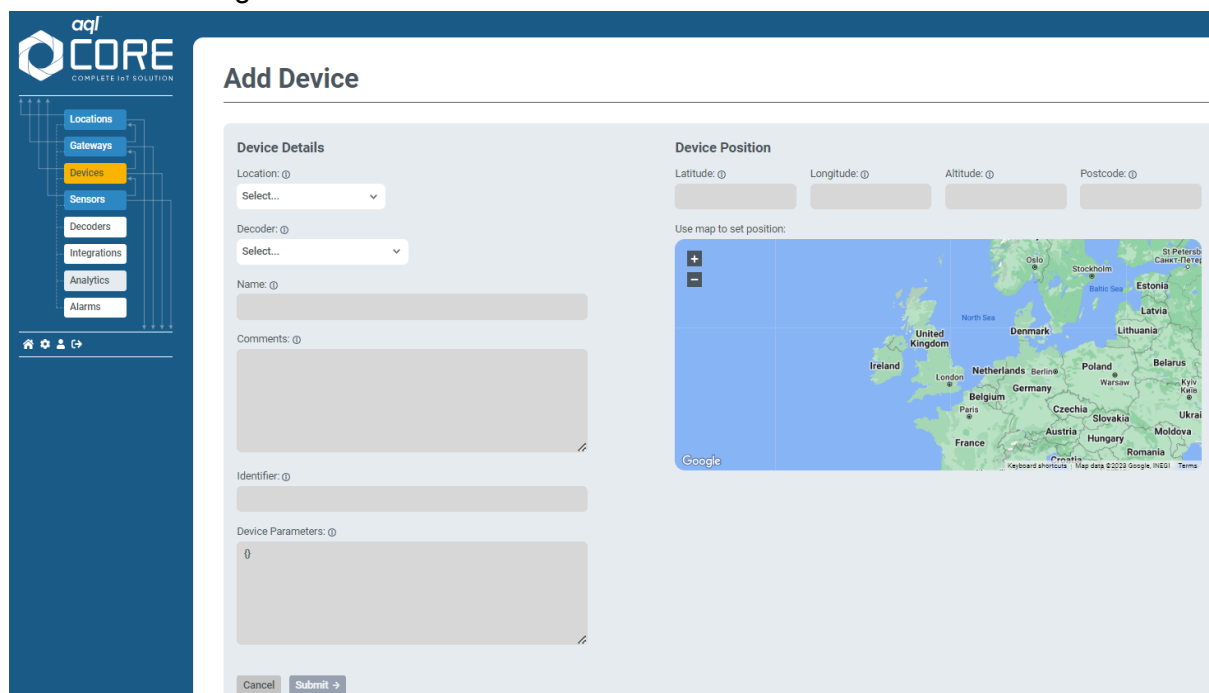
Create a device - Before continuing with setting up your decoder, you will require a device frame payload, so you will first need to create a device. To do this, select “Devices” from the left-hand menu, and it will redirect you to the devices index page:



The screenshot shows the 'Devices' page in the aqi CORE interface. On the left is a sidebar with a menu: Locations, Gateways, Devices (highlighted), Sensors, Decoders, Integrations, Analytics, and Alarms. The main content area is titled 'Devices' and includes a 'Filter Devices' section with dropdowns for 'Location' (Any) and 'Gateway' (Any), and a 'Reset' button. Below the filter is a table with columns: DEVICE, IDENTIFIER, ALARMS, GATEWAY, LOCATION, SENSORS, and LAST UPDATED. The table contains three rows of device data.

DEVICE	IDENTIFIER	ALARMS	GATEWAY	LOCATION	SENSORS	LAST UPDATED
0004a30b0127f677_demo	0004a30b0127f677_demo	-	N/A	Eden: Air Quality Sensors	22	1 minute ago
00137A10000033AB_demo	00137A10000033AB_demo	-	N/A	aqi: Vibration Sensors	9	27 minutes ago
00137A10000178D9_demo	00137A10000178D9_demo	-	N/A	aqi: Water Sensors	4	28th Oct, 2023 - 10:08

Select the “add device” button, and you should then be loaded onto a new page with a form to fill in for creating a new device:



The screenshot shows the 'Add Device' page in the aqi CORE interface. The left sidebar is the same as in the previous screenshot. The main content area is titled 'Add Device' and contains a 'Device Details' form and a 'Device Position' section. The 'Device Details' form has fields for Location (dropdown), Decoder (dropdown), Name, Comments, Identifier, and Device Parameters. The 'Device Position' section has fields for Latitude, Longitude, Altitude, and Postcode, and a map to set the position.

Device Details

Location:

Decoder:

Name:

Comments:

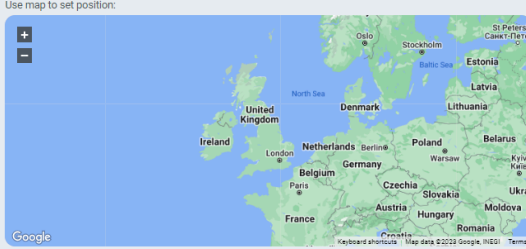
Identifier:

Device Parameters:

Device Position

Latitude: Longitude: Altitude: Postcode:

Use map to set position:




On this form, select the location of your team number, and select the decoder you created in the previous step. Based on the type of decoder you select, the required device identifier fields will change. In our use case, a LoRaWAN device, you will need a “Device EUI”, and an “App Secret Key”. These will be provided to you during the event. Please speak to any of the event organisers. They are the only required fields. Next, select “Submit” and you will be redirected to the page of your new device.

Step 4

Change the sensor to join mode. If you need help, ask the AI assistant or somebody from aql.

The “Sensor Join Request” and “Frames” will start to appear within the devices section. Once you have a payload you can copy this into your clipboard by expanding the data up frame and selecting copy data.



DATA RECEIVED

- > 22nd Apr, 2024 - 11:08:37 - Unconfirmed Data up: 868.3mhz SF12 BW125 FPort6 FCnt1
- > 22nd Apr, 2024 - 11:08:24 - Unconfirmed Data up: 867.1mhz SF12 BW125 FPort6 FCnt0 Copy Data Copy Payload
- > 22nd Apr, 2024 - 11:08:23 - Join
- ▼ 22nd Apr, 2024 - 11:07:53 - Unconfirmed Data up: 867.5mhz SF12 BW125 FPort6 FCnt0
 - devEUI : ABN6EAA8eN0=
 - txInfo (3)
 - dr : 0
 - fPort : 6
 - objectJSON : null
 - confirmedUplink : false
 - deviceProfileID : 8a8610b0-cd2e-40bc-b97a-2ebf490d35f7
 - rxInfo (2)
 - adr : true
 - fCnt : 0
 - data (11)
 - tags (1)
 - publishedAt : 2024-04-22T10:07:53.091685176Z
 - deviceProfileName : vQkPhDmk5qy
- ▼ 22nd Apr, 2024 - 11:07:53 - Join
 - devEUI : ABN6EAA8eN0=
 - txInfo (3)
 - tags :
 - rxInfo (2)
 - dr : 0
 - publishedAt : 2024-04-22T10:07:53.091372450Z

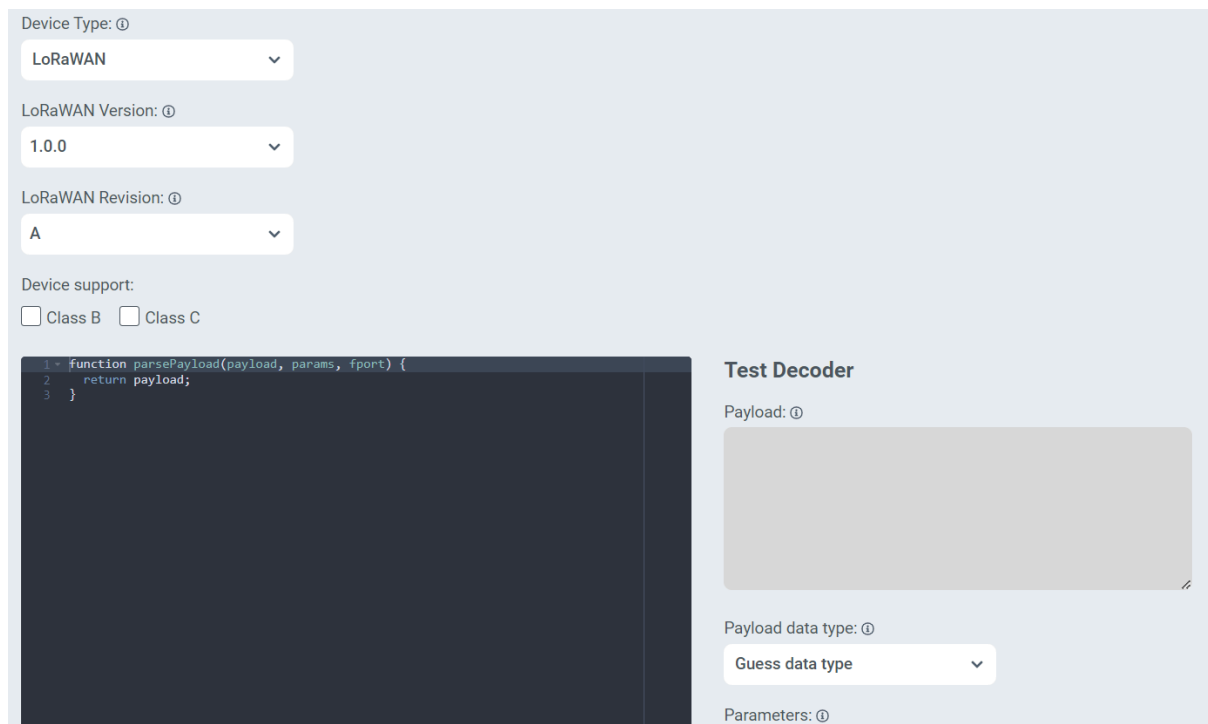
Step 5

Once you have created a decoder and device, you will need to source the device's JavaScript decoder. These will require Googling and may be available from <https://github.com/ProVuUK/Alliot-decoders> or from the aql formatted decoders https://github.com/aql-com/core_iot_decoders.

If you can't locate the relevant Netvox decoder you can source the technical documentation from [Netvox LoRaWAN Application Command V2.2 For Public_R0.pdf](#), you can use the AI to help you write a decoder from scratch

Note decoders configured for TheThingsNetwork may require some formatting. Your AI assistant can help with this if you provide the function from core.aql.com and the decoder and ask to make it compatible the AI will rework the script.

Once you have located the decoder, you will need to paste JavaScript inside the decoder function (pictured below).



The screenshot shows the AQL decoder configuration interface. On the left, there are dropdown menus for 'Device Type' (set to 'LoRaWAN'), 'LoRaWAN Version' (set to '1.0.0'), and 'LoRaWAN Revision' (set to 'A'). Below these are checkboxes for 'Device support' with 'Class B' and 'Class C' options. A code editor on the left contains a JavaScript function:

```
1 function parsePayload(payload, params, fport) {  
2   return payload;  
3 }
```

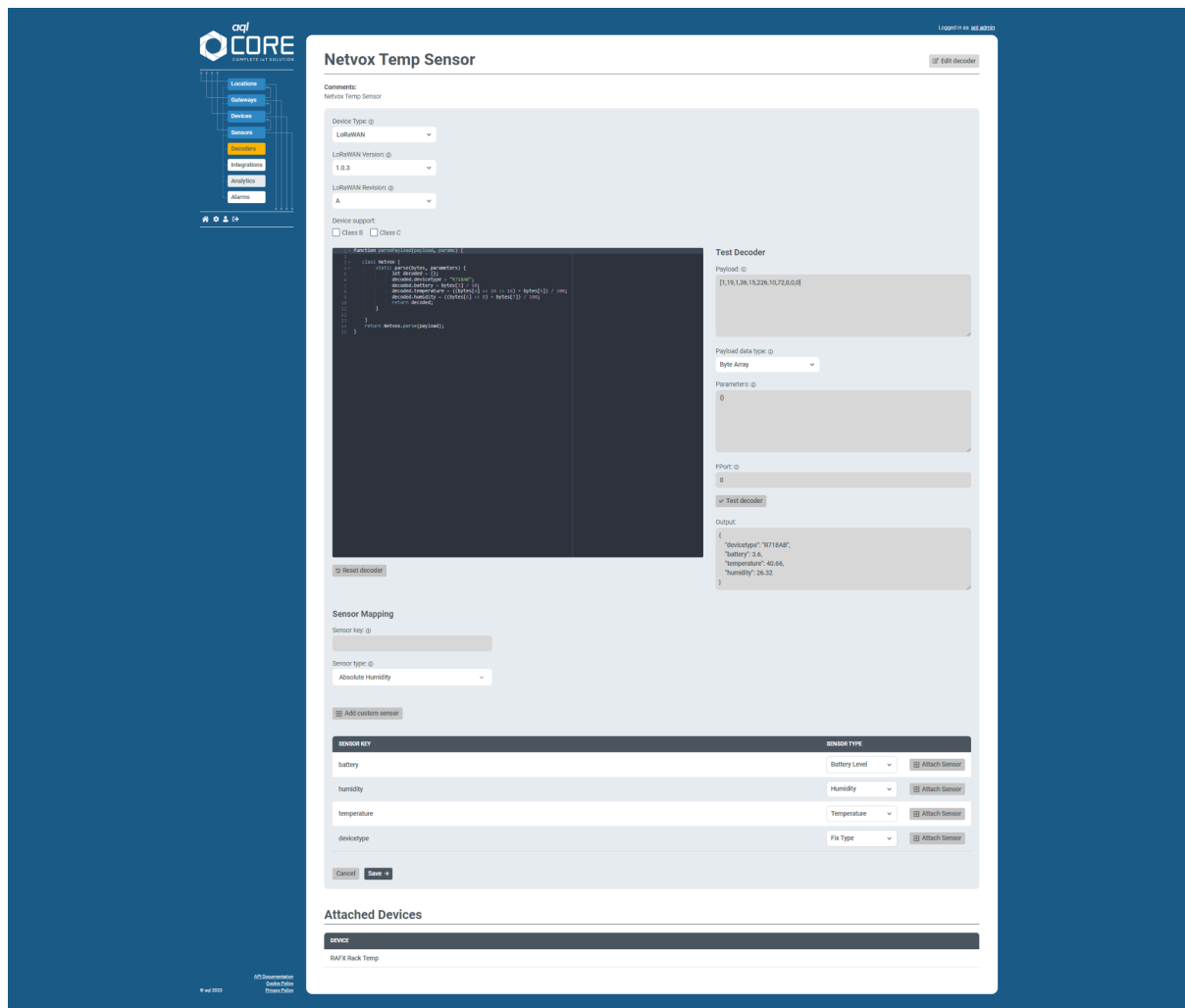
 On the right, the 'Test Decoder' section includes a 'Payload' input field, a 'Payload data type' dropdown set to 'Guess data type', and a 'Parameters' input field.

Step 6

The next step is to test the decoder using a payload from a device frame already received previously. Each decoder will return a JSON object with key-value pairs, you will need to map each key by either entering the key and picking the sensor type, or you can select “Test Decoder”. When selecting “Test Decoder”, ensure you have an fport value of 1-223 entered.

You can use the payload you copied earlier.

When you test a payload the code will attempt to match the JSON array key to our sensor mapping. You can change the sensor type in the dropdown.



The screenshot displays the 'aqi CORE' interface for configuring a 'Netvox Temp Sensor'. The left sidebar contains navigation links: Locations, Databases, Sensors, Integrations, Analytics, and Alarms. The main configuration area includes fields for Device Type (LoRaWAN), LoRaWAN Version (1.0.3), and LoRaWAN Revision (A). Below these are checkboxes for Device support (Class B and Class C). A 'Test Decoder' section shows a decoded payload: '[1,78,1,36,15,226,10,72,0,0]'. The 'Sensor Mapping' section features a table with columns 'SENSOR KEY' and 'SENSOR TYPE', listing battery, humidity, temperature, and device type with corresponding sensor types and 'Attach Sensor' buttons. The 'Attached Devices' section shows a table with one device: 'RAFI's Rack Temp'.

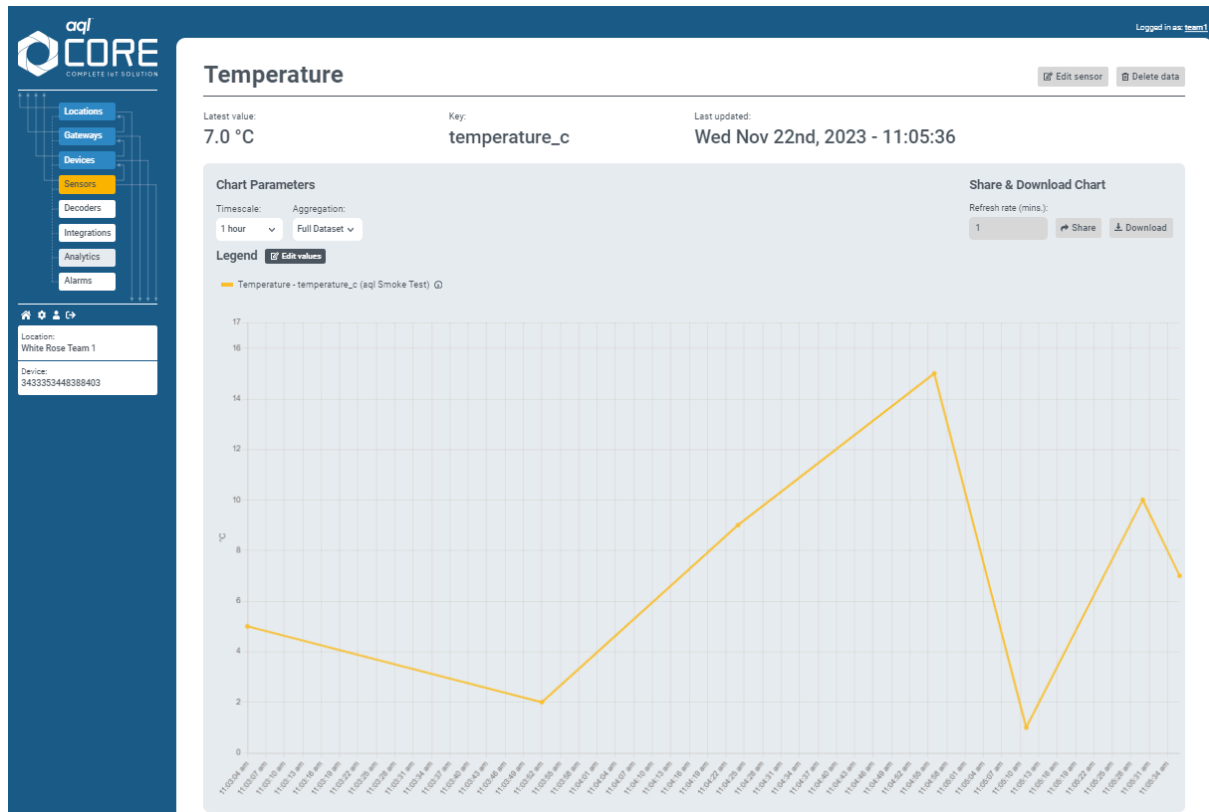
Once you are happy, attach the sensors and select update to save the code and sensor mappings.

Step 7

Once you've completed all the previous steps, you will be able to check that you are receiving sensor readings to your created device/sensors on the platform.

On your device's page, you will see a "sensors" table populated with sensors according to the sensor keys you mapped to the decoder earlier. If you do not see them, that could mean that readings are not being received. You can click on the name of each sensor to view their individual pages.

On the sensors page, there is a chart with readings that will be updated as new readings come in.



If you are seeing readings on the chart, congratulations, You've completed this challenge!