

SENDING DATA FROM RASPBERRY-PI TO IBM WATSON

Date	3 NOVEMBER 2022
Team ID	PNT2022TMID39619
Project Name	GAS LEAKAGE MONITORING AND ALERTING SYSTEM FOR INDUSTRIES

AIM:

To send sensor data (or any dummy data) from Raspberry –Pi to IBM Watson .In our case it is DHT sensors Data.

REQUIREMENTS:

HARDWARE:

- RASPBERRY-PI (3B)(WITH ETHERNET CABLE OR WIFI CONNECTED)
- USB MOUSE
- USB KEYBOARD
- VGA TO HDMI CABLE
- A MONITOR
- RASPBERRY'S POWER SUPPLY
- DHT-11 Sensor
- Connecting Wires

SOFTWARE:

- IBM BLUEMIX ACCOUNT

STEPS TO BE FOLLOWED:

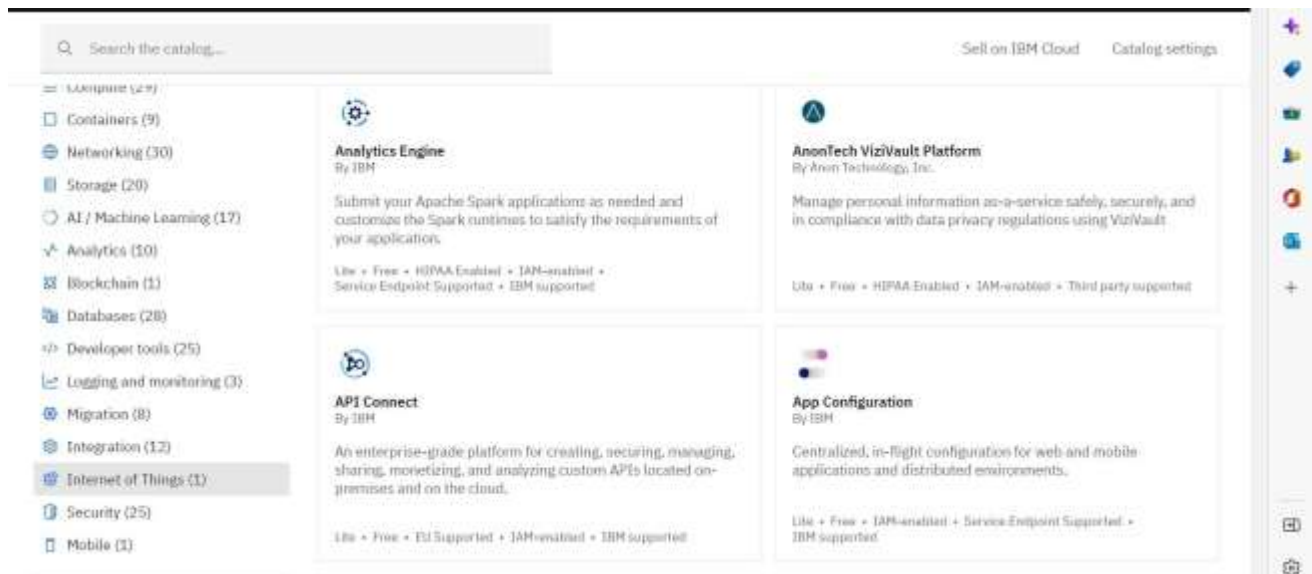
Step-1: Create a device in IBM Watson:

- Firstly, login into your IBM-Bluemix account with your e-mail ID and Password.





- Click on catalog on your dashboard screen, then under platform go IoT.



➤ Check all details and click on create.

➤ click on Launch

The screenshot shows the 'Create' page for the 'Internet of Things Platform' service in the Azure portal. The page is divided into a left sidebar, a main content area, and a right-hand summary panel.

Left Sidebar:

- Type: Service
- Provider: IBM
- Last updated: 08/15/2022
- Category: Internet of Things
- Compliance: IAM-enabled
- Location: Frankfurt

Main Content Area:

- Header: Catalog / Internet of Things Platform
- Description: This service is the hub of all things IBM IoT, it is where you can set up and manage your connected devices so that your apps can access their live and historical data.
- Tabs: Create (active), About
- Section: Select a location. Dropdown menu shows 'Frankfurt (eu-de)'.
- Section: Select a pricing plan. Text: Displayed prices do not include tax. Monthly prices shown are for country or location: [United States](#).
- Table:

Plan	Features	Pricing
Lite	Includes up to 500 registered devices, and a maximum of 200 MB of each data metric. Maximum of 500 registered devices.	Free

Right Panel (Summary):

- Section: Summary
- Internet of Things Platform **Free**
- Location: Frankfurt
- Plan: Lite
- Service name: Internet of Things Platform-0g
- Resource group: Default
- Checkbox: ☒ I have read and agree to the following license agreements: [Terms](#)
- Buttons: Create, Add to estimate

The screenshot shows the 'Launch' page for the 'Internet of Things Platform-0g' resource in the Azure portal. The page is divided into a left sidebar, a main content area, and a right-hand actions panel.

Left Sidebar:

- Manage (active)
- Plan
- Connections

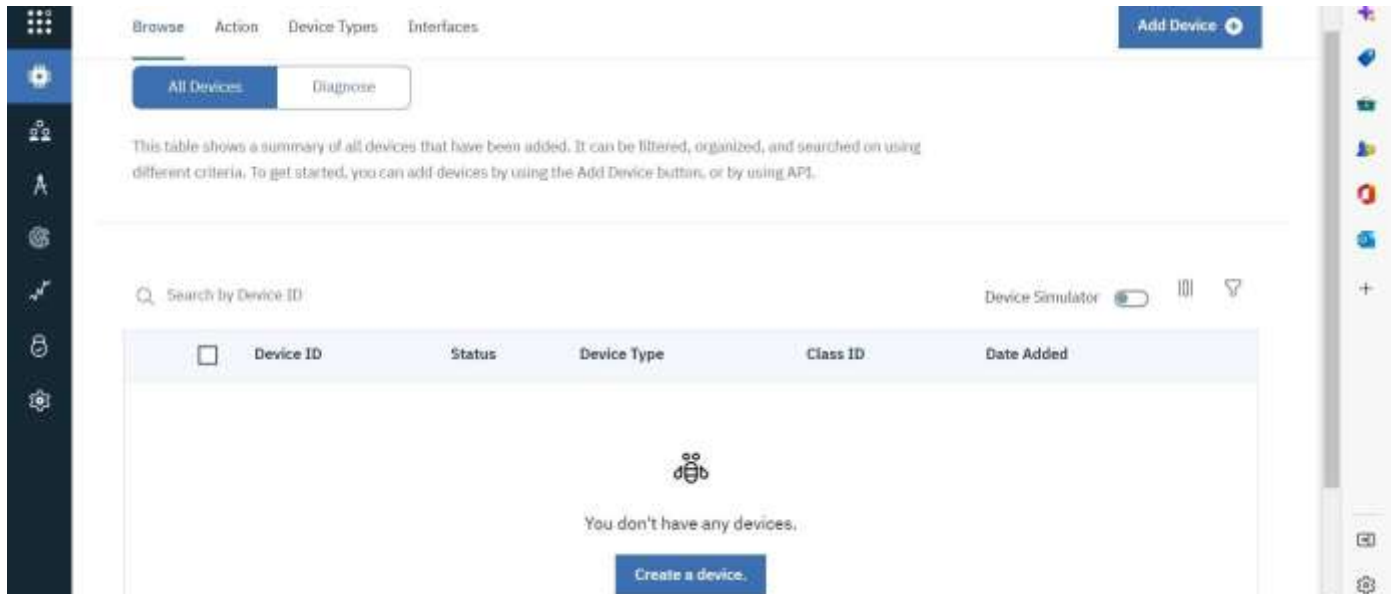
Main Content Area:

- Header: Resource IoT / Internet of Things Platform-0g Active [Add tags](#)
- Buttons: Details, Actions...
- Diagram: A central square icon with a circle inside, surrounded by various symbols representing IoT devices and data flow.
- Section: Let's get started with IBM Watson IoT Platform
- Text: Securely connect, control, and manage devices. Quickly build IoT applications that analyze data from the physical world.
- Buttons: Launch, Docs
- Section: Ready for the next level?
- Section: IBM Watson IoT Platform Journey
- Progress bar with two steps: Lite (checked) and Non-Production (unchecked).

Right Panel:

- Buttons: Add, Settings

- Dashboard of IBM Watson IoT platform,
- Click on Add device



- After click on Add device this page will open



- Go to device type and fill the details.

Browse Action Device Types Interfaces

Add type

Identity Device Information

Device types group devices that have similar characteristics, such as model number, firmware version, or location. Give the device type a unique name and a description that identifies characteristics that are shared by devices of this type.

Type Or

Name

The device type name is used to identify the device type uniquely and uses a restricted set of characters to make it suitable for API use.

Description

- Click on Finish

Browse Action Device Types Interfaces

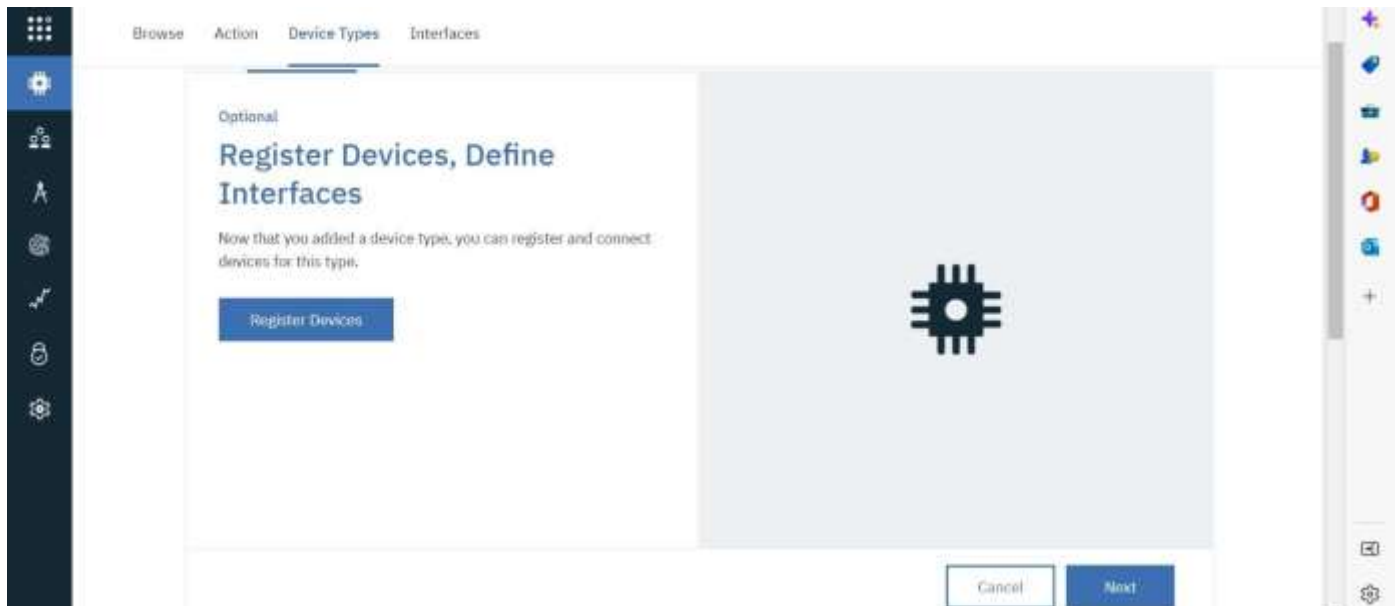
Add type

Identity Device Information

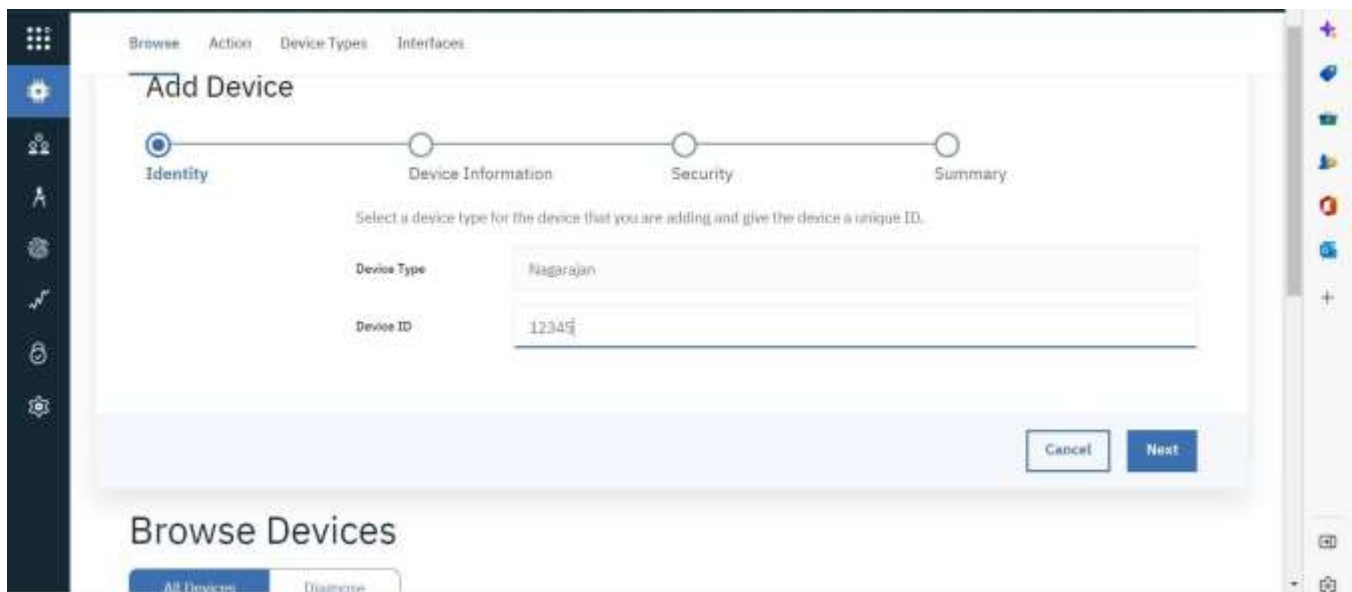
These attributes will be used as a template for new devices that are assigned this device type

Serial Number	<input type="text" value="Enter Serial Number"/>	Manufacturer	<input type="text" value="Enter Manufacturer"/>
Model	<input type="text" value="Enter Model"/>	Device Class	<input type="text" value="Enter Device Class"/>
Description	<input type="text" value="Enter Description"/>	Firmware Version	<input type="text" value="Enter Firmware Version"/>
Hardware Version	<input type="text" value="Enter Hardware Version"/>	Descriptive Location	<input type="text" value="Enter Descriptive Location"/>

- Click on Register Device.



- Choose the device and give device ID and then click on next.



- Click on Next

The screenshot shows the 'Add Device' form in a web application. The form is divided into four steps: Identity, Device Information, Security, and Summary. The 'Device Information' step is currently active. It contains several input fields for device details: Serial Number, Model, Description, Hardware Version, Manufacturer, Device Class, Firmware Version, and Descriptive Location. Each field has a placeholder text 'Enter [field name]'. There is also an 'Add Metadata' button with a plus icon. The interface includes a sidebar with various icons and a top navigation bar with tabs for Browse, Action, Device Types, and Interfaces.

Browse Action Device Types Interfaces

Add Device

Identity Device Information Security Summary

You can modify the default device information and enter more information about the device for identification purposes.

Serial Number	Enter Serial Number	Manufacturer	Enter Manufacturer
Model	Enter Model	Device Class	Enter Device Class
Description	Enter Description	Firmware Version	Enter Firmware Version
Hardware Version	Enter Hardware Version	Descriptive Location	Enter Descriptive Location

Add Metadata +

- Click on Next

The screenshot shows the 'Add Device' form in a web application, specifically the 'Security' step. The form is divided into four steps: Identity, Device Information, Security, and Summary. The 'Security' step is currently active. It presents two options for selecting a device authentication token: 'Auto-generated authentication token (default)' and 'Self-provided authentication token'. The 'Auto-generated' option explains that the service will generate an 18-character alphanumeric token. The 'Self-provided' option requires the user to provide their own token, which must be between 8 and 36 characters and contain a mix of lowercase and uppercase letters, numbers, and symbols. There is an input field for the 'Authentication Token' with a placeholder 'Enter an optional token' and a help icon. Below the input field, there is a note: 'Make a note of the generated token. Lost authentication tokens cannot be recovered. Tokens are encrypted before being stored.' and a statement: 'Authentication tokens are encrypted before we store them.'

Browse Action Device Types Interfaces

Identity Device Information Security Summary

There are two options for selecting a device authentication token.

Auto-generated authentication token (default)

Allow the service to generate an authentication token for you. Tokens are 18 characters and contain a mix of alphanumeric characters and symbols. The token is returned to you at the end of the device registration process.

Self-provided authentication token

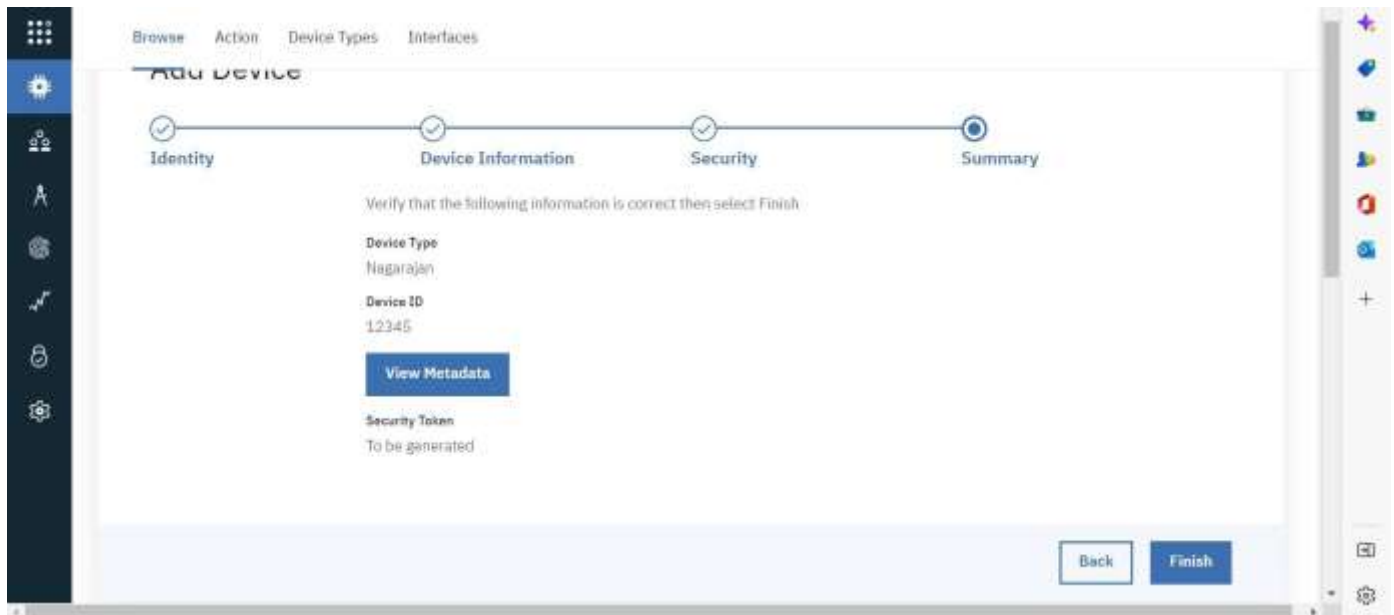
Provide your own authentication token for this device. The token must be between 8 and 36 characters and contain a mix lowercase and uppercase letters, numbers, and symbols, which can include hyphens, underscores, and periods. Do not use repeated characters, dictionary words, user names, or other predefined sequences.

Authentication Token: Enter an optional token ⓘ

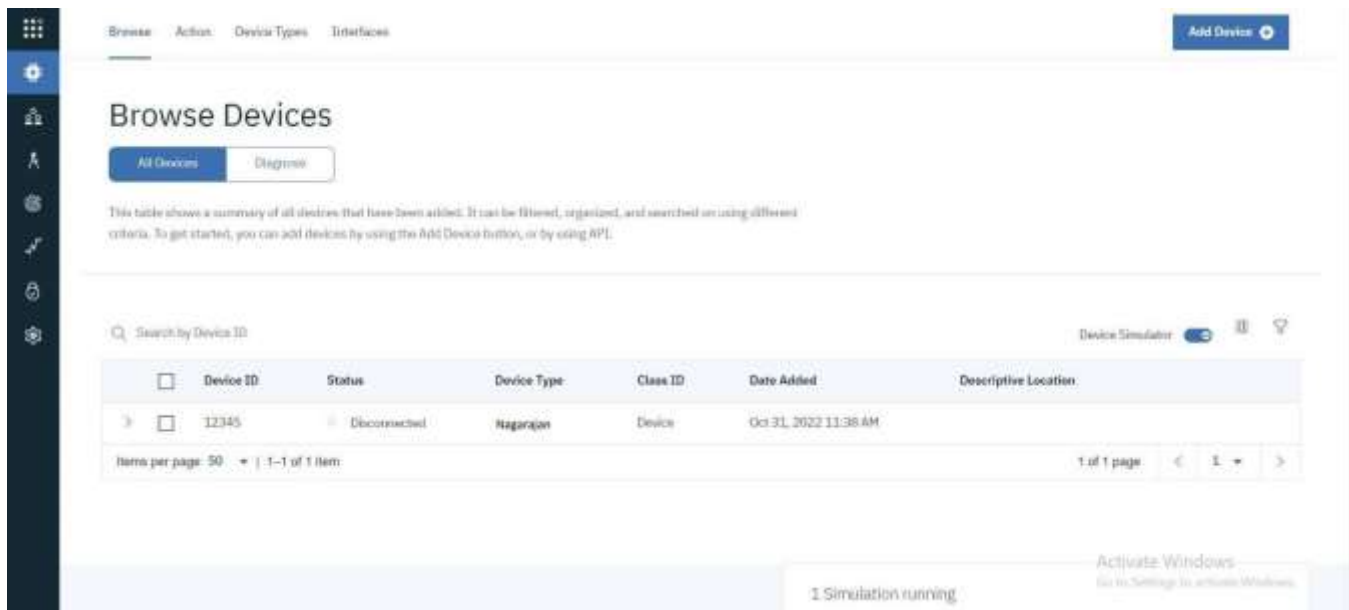
Make a note of the generated token. Lost authentication tokens cannot be recovered. Tokens are encrypted before being stored.

Authentication tokens are encrypted before we store them.

- Click on Finish



- Device is created



STEP-2: INSTALLING NECESSARY PACKAGES ON YOUR PI:

- Now we are going to install necessary packages on your pi.
- Open your terminal in your pi and type the following commands
- `curl -LO`
`https://github.com/ibm-messaging/iot-raspberrypi/releases/download/1.0.2.1/iot_1.0-2_armhf.deb`
- `sudo dpkg -i iot_1.0-2_armhf.deb`
- `service iot status`

Following are the images as to what appears on your pi's terminal when u type these commands

[illegible]

- Then open your terminal and type `pip install ibmiotf`

[illegible]

- I have sent DHT-11 Sensors data to ibm bluemix .To get the code u need to login into IOT GYAN.
- Then I get the image as follows in my pi's shell:

```
python x.py --connect --api-key XXXXXXXXXX
[600 0.3.0 20170124] on linux2
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /home/pi/Downloads/ibmbluemix.py =====
2022-10-25 07:28:27,788 [ibm41 device client] INFO: Connected successfully: d1g0tj4-wpbluexin-wpbluexin
SensorData Invalid
Published Temperature = 28 C Humidity = 58 % to IBM Watson
SensorData Invalid
Published Temperature = 28 C Humidity = 58 % to IBM Watson
SensorData Invalid
Published Temperature = 28 C Humidity = 58 % to IBM Watson
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```

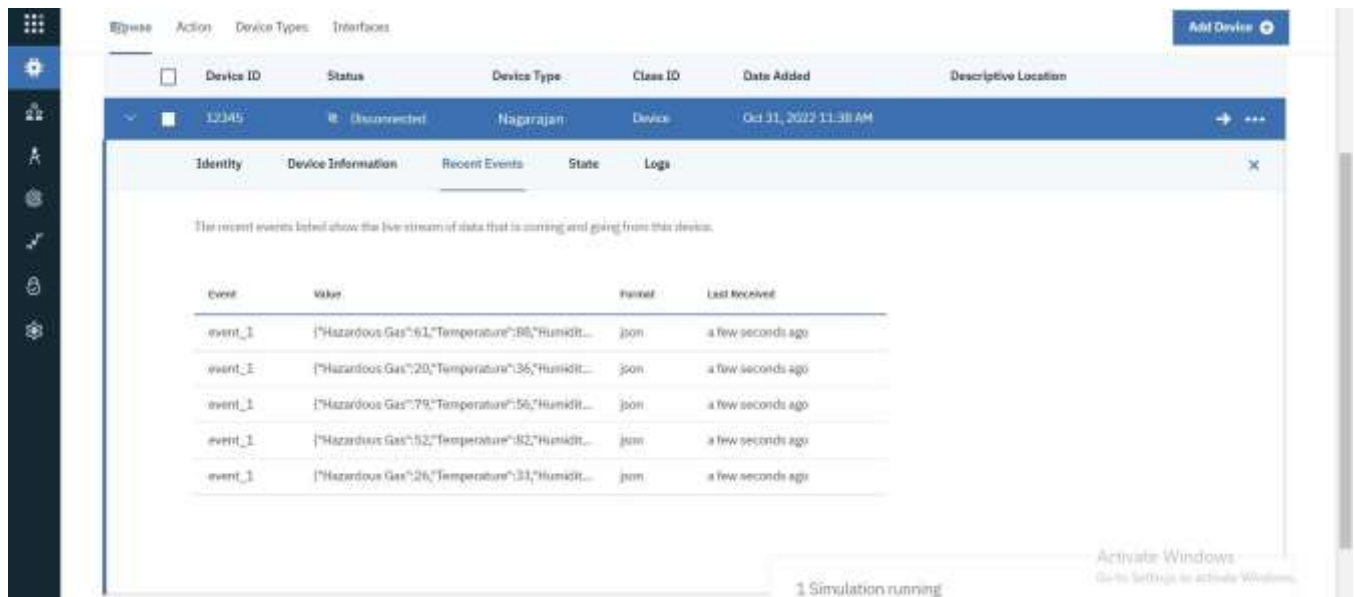
Step-3: checking your data sent on IBM Bluemix:

- After you have sent your sensors data you can check whether it is received at your iot platform Just look at the image below and if u see the same wifi kind of symbol on your created device then your data is being received.

The screenshot displays the IBM Watson IoT Platform interface. The main heading is 'Browse Devices'. Below it, there are two tabs: 'All Devices' and 'Diagnose'. A message states: 'This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.' Below this is a search bar labeled 'Search by Device ID'. To the right of the search bar is a 'Device Simulator' toggle switch, which is currently turned on. Below the search bar is a table with the following columns: Device ID, Status, Device Type, Class ID, Date Added, and Descriptive Location. The table contains one row with the following data: Device ID 12345, Status Disconnected, Device Type Nagirajan, Class ID Device, Date Added Oct 31, 2022 11:38 AM, and Descriptive Location. Below the table, there is a pagination bar showing 'Items per page: 50' and '1-1 of 1 Item'. At the bottom right of the page, there is a status bar that says '1 Simulation running'.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Disconnected	Nagirajan	Device	Oct 31, 2022 11:38 AM	

- After double clicking on your created device you can see the received data as shown in image



Step-4: Creating boards and cards for visualization of data:

- In your Watson platform you have an option called board .Click on it and you get the following window on your screen



- Click on Create a new board to create a board .

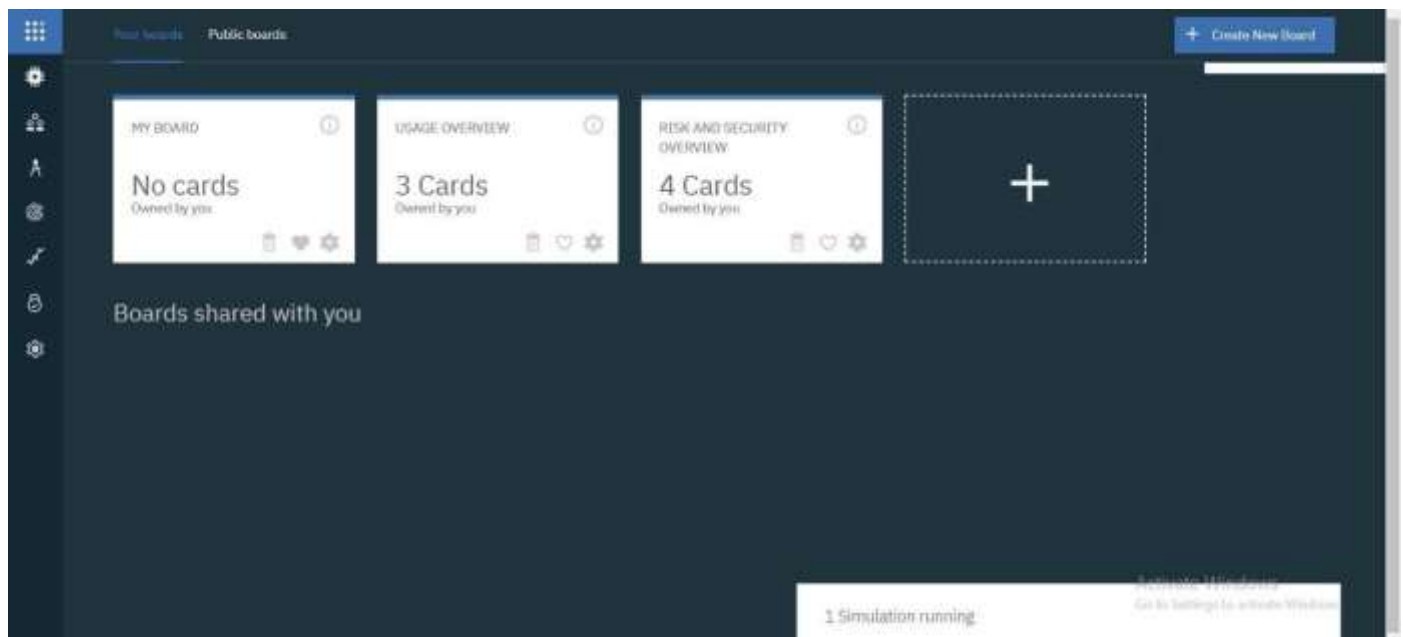
The given below window appears give a name and description to your board as shown in the window below.

This screenshot shows the 'Create a new board' form in the first step. The form is titled 'Create a new board' and includes a sub-header 'Provide a name and description for your new board.'. It features two input fields: 'Board name' and 'Description'. Below these fields are two radio button options: 'Make this board my landing page.' (which is selected) and 'Favorite (this also adds this board to your navbar)'. A 'Next' button is located at the bottom right of the form. The background shows a sidebar with a 'Public boards' tab and a 'Usage Overview' card indicating '3 Cards Owned by you'.

- Then click on Next you get the below window then again click on Submit

This screenshot shows the 'Create a new board' form in the second step. The form is titled 'Create a new board' and includes a sub-header 'Adding viewers allows them to see your new board.'. It features a 'Owner' field with the email 'nagarajan2002s@psnacet.edu.in(you)'. Below this is a 'Members' field. There is a radio button option 'Share as read-only with everyone?'. A section titled '* add user ID' contains a table with two columns: 'Name' and 'Email'. The table is currently empty. At the bottom of the form are 'Back' and 'Submit' buttons. The background shows the same sidebar as the first screenshot.

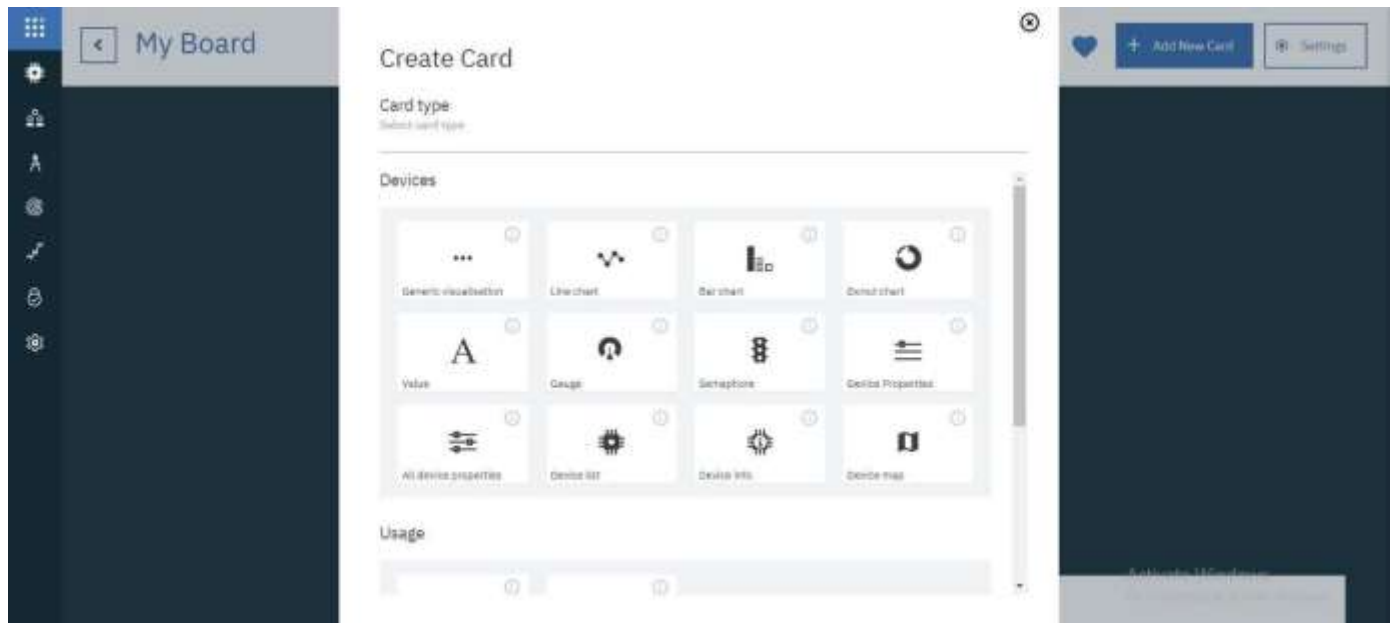
- Then double click on your boards name which you have created.



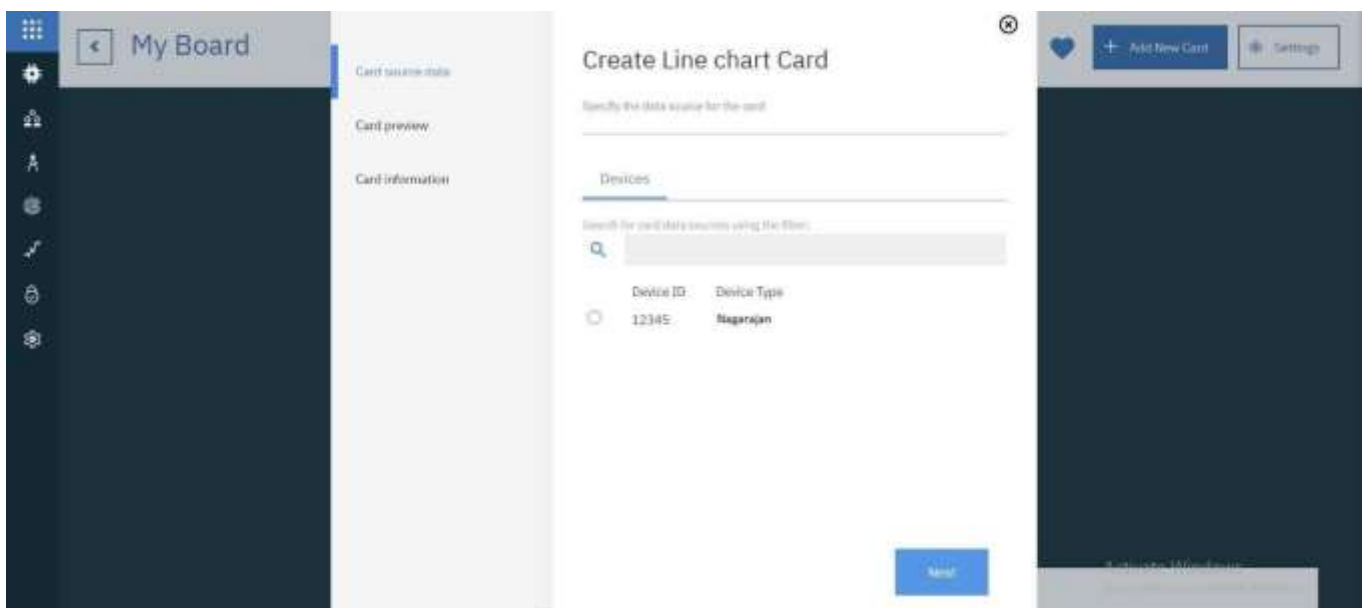
- Click on Add New Card



- Select the type of Graph u want accordingly and click next



- You get the below window, choose the Device and click on Next.



- Select the event, properly to be visualized on your graph and click next. In my case it is humidity

Temp & Hum

Card source data

12345

Card preview

Card information

Create Line chart Card

Select data set

Temperature

Event

event_1

Property

Temperature

Name

Temperature

Type

Number

Unit

100

Placeholder

100

Back Next

- Then select the size of the graph and color of the graph board you want and click next

Temp & Hum

Card source data

12345

Card preview

Card information

Create Line chart Card

Give title and description of the card

Title

Line chart

Data scheme

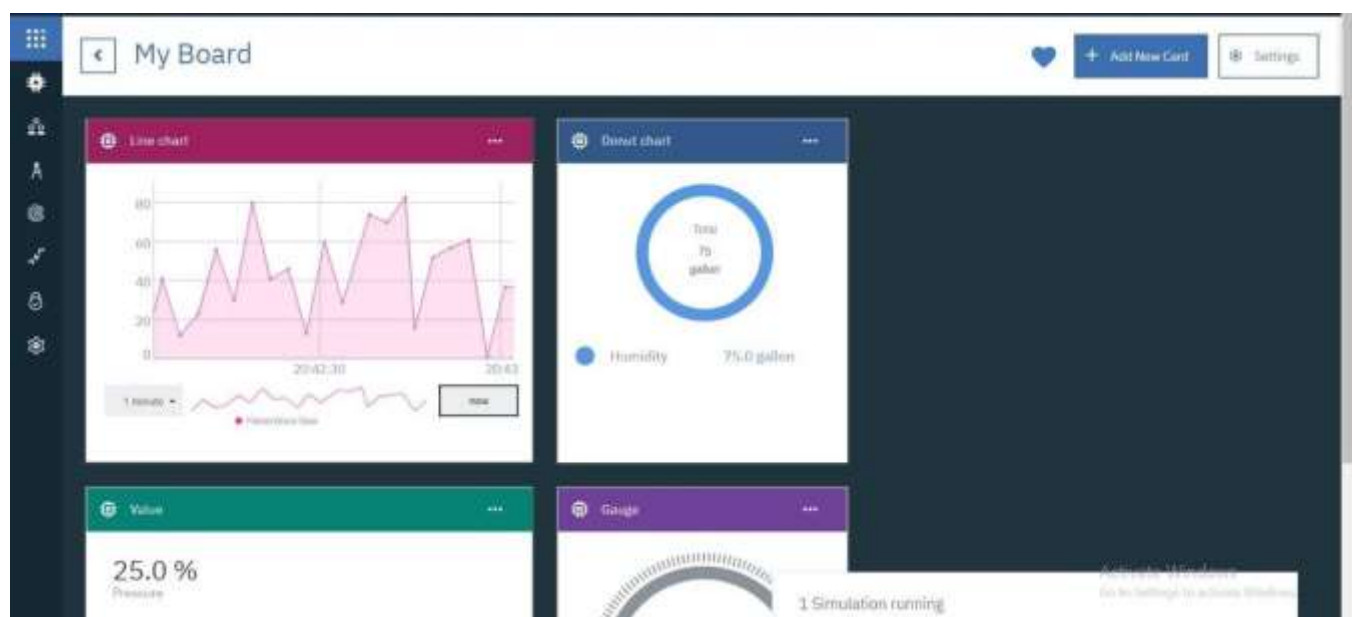
A line chart to display time series information with historic and live data

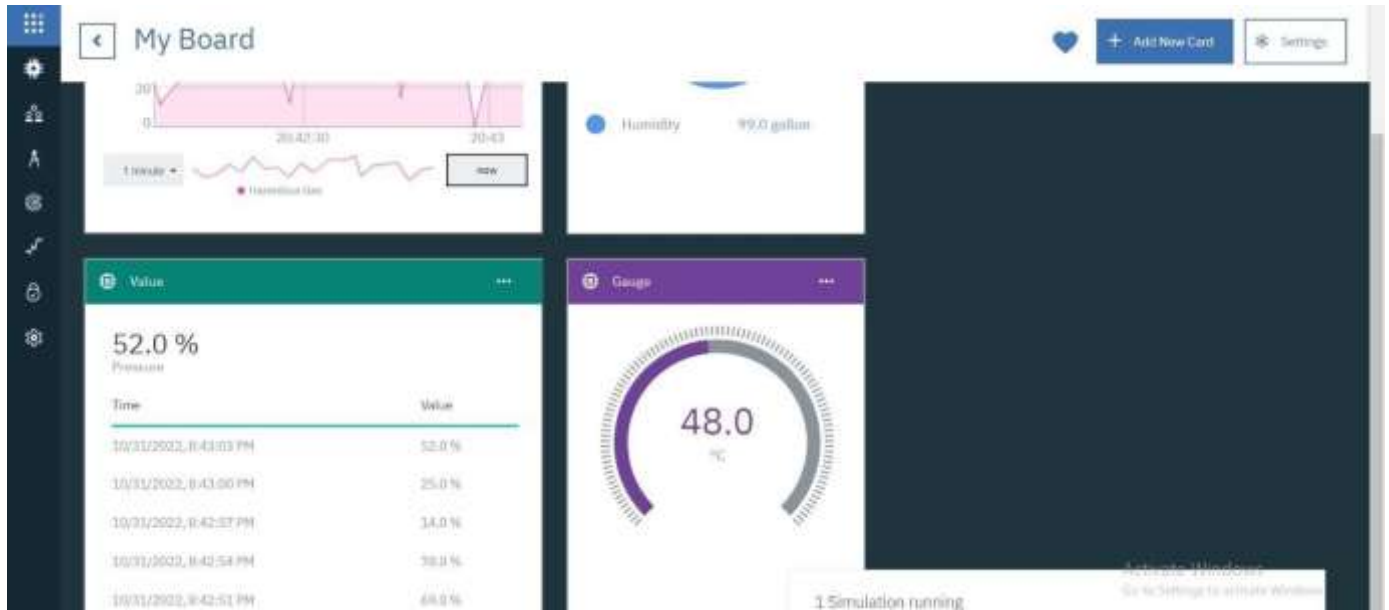
Back Submit

➤ Here is the graph



➤ Repeat the process to get different graphs.





RESULT:

Hence, we were able to send data from our pi to IBM Watson and visualize it on a graph.