

# SENDING DATA FROM RASPBERRY-PITO IBM WATSON

<b>Date</b>	3 NOVEMBER 2022
<b>Team ID</b>	PNT2022TMID20267
<b>Project Name</b>	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 sensorsData.

## REQ

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**W**

**A**

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**E:**

- ➤ 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

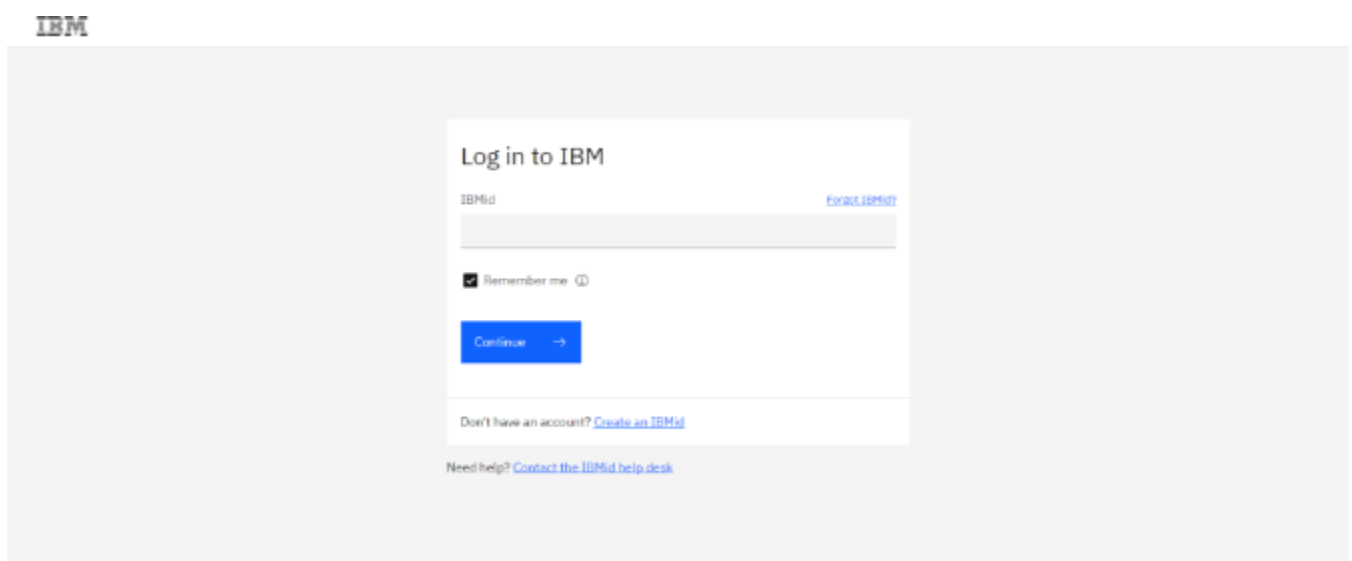
**SOFTWARE:**

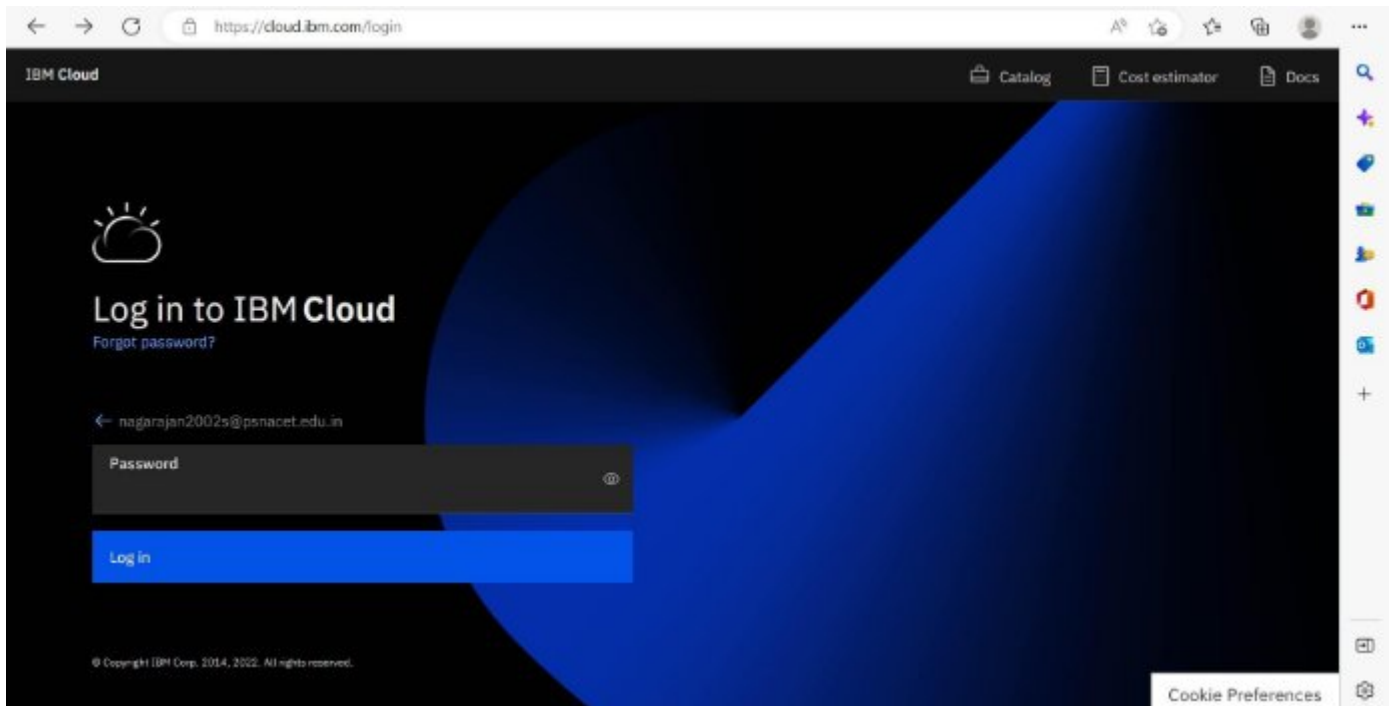
- ➤ IBM BLUEMIX ACCOUNT

## 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.

IBM Cloud

Search the catalog...

Sell on IBM CloudCatalog settings

Compute (29)

Containers (9)

Networking (30)

Storage (20)

AI / Machine Learning (17)

Analytics (10)

Blockchain (1)

Databases (28)

Developer tools (25)

Logging and monitoring (3)


Migration (8)

Integration (12)

Internet of Things (1)


Security (25)

Mobile (1)

**Analytics Engine**  
By IBM


Submit your Apache Spark applications as needed and customize the Spark runtimes to satisfy the requirements of your application.

Lite • Free • HIPAA Enabled • IAM-enabled • Service Endpoint Supported • IBM supported

**API Connect**  
By IBM


An enterprise-grade platform for creating, securing, managing, sharing, monetizing, and analyzing custom APIs located on-premises and on the cloud.

Lite • Free • EU Supported • IAM-enabled • IBM supported

**AnonTech ViziVault Platform**  
By Anon Technology, Inc.

Manage personal information as-a-service safely, securely, and in compliance with data privacy regulations using ViziVault

Lite • Free • HIPAA Enabled • IAM-enabled • Third party supported

**App Configuration**  
By IBM

Centralized, in-flight configuration for web and mobile applications and distributed environments.

Lite • Free • IAM-enabled • Service Endpoint Supported • IBM supported

Windows taskbar with icons for WhatsApp, IBM Project, and other applications. System tray shows 26°C Cloudy, ENG, and 06:42 PM.

- ➤ Check all details and click on create.

The screenshot shows the IBM Cloud 'Internet of Things Platform' creation page. The URL is <https://cloud.ibm.com/catalog/services/internet-of-things-platform>. The page has a 'Create' tab selected. On the left, there's a sidebar with details: Type: Service, Provider: IBM, Last updated: 08/15/2022, Category: Internet of Things, Compliance: IAM-enabled, and Location: Frankfurt. The main content area has a 'Select a location' dropdown set to 'Frankfurt (eu-de)'. Below that is a 'Select a pricing plan' section with a table showing the 'Lite' plan, which includes up to 500 registered devices and 200 MB of data metric, for free. A 'Create' button is prominent. On the right, a 'Summary' panel shows the service is free, located in Frankfurt, and includes a checkbox for terms and conditions. A 'Create' button is also in the summary panel.

Internet of Things Platform

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.

Create About

Type: Service

Provider: IBM

Last updated: 08/15/2022

Category: Internet of Things

Compliance: IAM-enabled

Location: Frankfurt

Select a location

Frankfurt (eu-de)

Select a pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or location: [United States](#)

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

Summary

Internet of Things Platform Free

Location: Frankfurt

Plan: Lite

Service name: Internet of Things Platform-0g

Resource group: Default

☒ I have read and agree to the following license agreements: [Terms](#)

Create

Add to estimate

- ➤ click on Launch

The screenshot shows the IBM Cloud 'Internet of Things Platform-0g' 'Launch' page. The URL is <https://cloud.ibm.com/services/iotf-service/cm%3Av1%3Abluemix%3Apublic%3Aiotf-service%3Aeu-de%3Aa%2Fa8810efb63084268995a6...>. The page has a 'Launch' button. Below the button, there's a section titled 'Let's get started with IBM Watson IoT Platform' with a description: 'Securely connect, control, and manage devices. Quickly build IoT applications that analyze data from the physical world.' There's also a 'Launch' button and a 'Docs' button. At the bottom, there's a 'Ready for the next level?' section with a progress bar showing 'Lite' (checked) and 'Non-Production' (unchecked).

Internet of Things Platform-0g Active Add tags

Details Actions...

Manage

Plan

Connections

Let's get started with IBM Watson IoT Platform

Securely connect, control, and manage devices. Quickly build IoT applications that analyze data from the physical world.

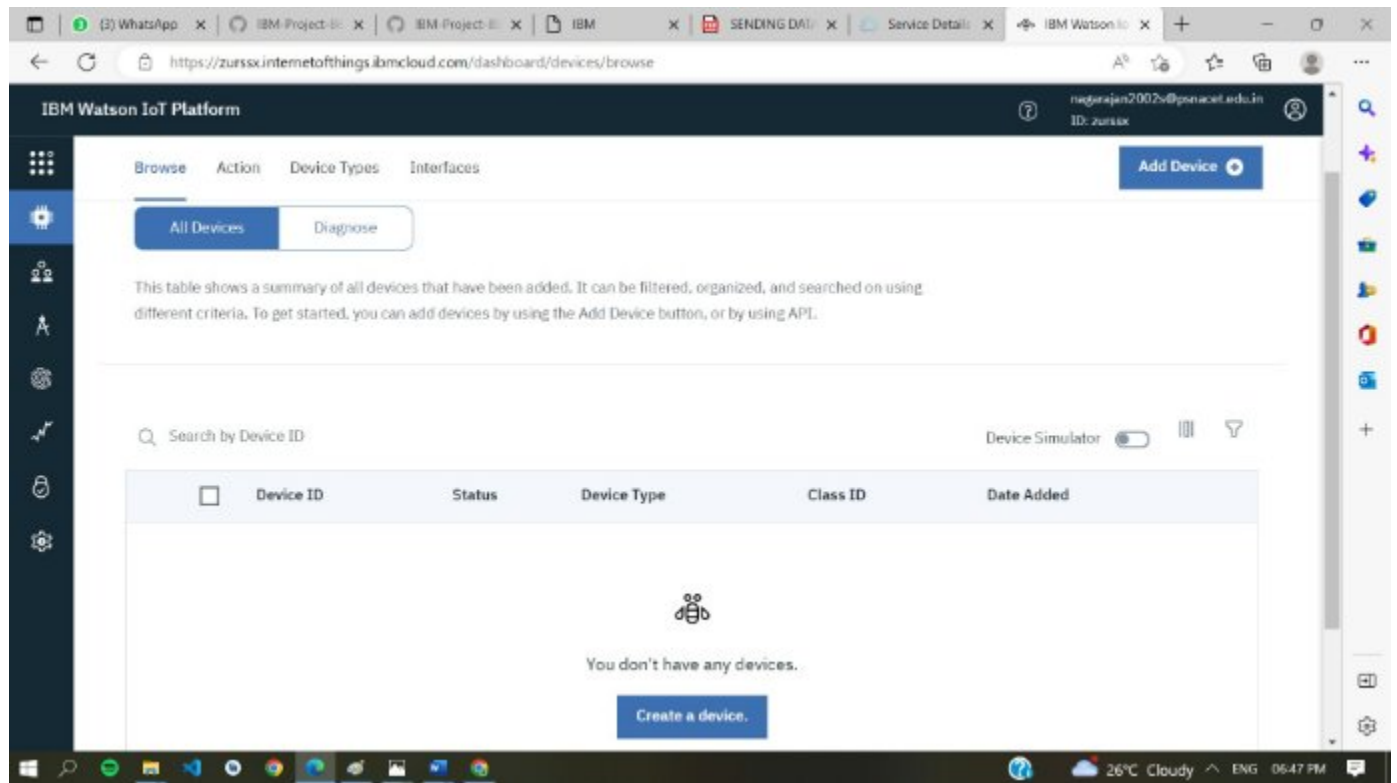
Launch Docs

Ready for the next level?

IBM Watson IoT Platform Journey

Lite Non-Production

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



- ➤ After click on Add device this page will open

Browser tabs: (3) WhatsApp, IBM-Project-6, IBM-Project-6, IBM, Service Details, SENDING DATA, IBM Watson IoT Platform

URL: <https://zurssx.internetofthings.ibmcloud.com/dashboard/devices/browse/add>

IBM Watson IoT Platform

neerajan2002v@psnacet.edu.in  
ID: zurssx

Browse Action Device Types Interfaces

### Add Device

Identity Device Information Security Summary

Select a device type for the device that you are adding and give the device a unique ID.

Device Type

Device ID

Cancel Next

### Browse Devices

Windows taskbar: 26°C Cloudy, ENG, 06:47 PM



- ➤ Go to device type and fill the details.

The screenshot shows the 'Add type' form in the IBM Watson IoT Platform. The form is titled 'Add type' and has a progress bar with two steps: 'Identity' (selected) and 'Device Information'. Below the progress bar, there is a text box for 'Name' containing the text 'Nagarajan'. To the right of the 'Name' field, there are two buttons: 'Device' (selected) and 'Gateway'. Below the 'Name' field, there is a text box for 'Description'. At the bottom right of the form, there are two buttons: 'Cancel' and 'Next'. The form is part of a dashboard with a sidebar on the left containing various icons. The top of the dashboard shows the user's name 'nagarajan2002v@psnacet.edu.in' and ID 'zurssx'.

IBM Watson IoT Platform

Browser 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

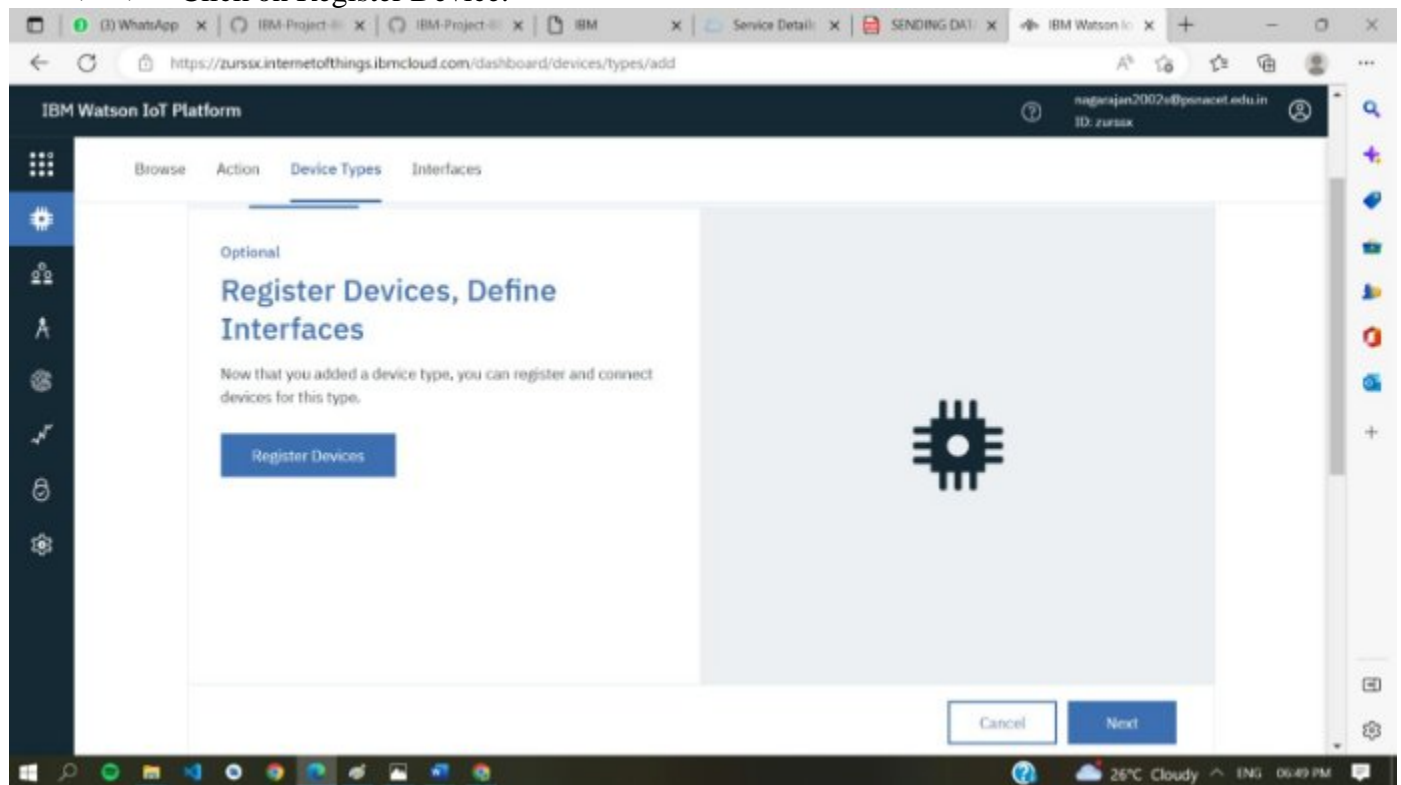
The device type name is used to identify the device type uniquely and uses a restricted set of characters to make it suitable for API use.

Description

- ➤ Click on Finish



➤ ➤ Click on Register Device.



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

IBM Watson IoT Platform

nagarajan2002@gmail.com  
ID: zurade

Browse

Action

Device Types

Interfaces

Add Device

Identity

Device Information

Security

Summary

Select a device type for the device that you are adding and give the device a unique ID.

Device Type

Nagarajan

Device ID

12345

Cancel

Next

Browse Devices

All Devices

Diagnose

26°C Cloudy

ENG

06:50 PM

➤ ➤ Click on Next

IBM Watson IoT Platform

Browser 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	<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 Next

Browser tabs: (3) WhatsApp, IBM-Project-0, IBM-Project-0, IBM, Service Detail, SENDING DATA, IBM Watson IoT

Address bar: <https://zurssx.internetofthings.ibmcloud.com/dashboard/devices/browse/add?type=Nagarajan>

IBM Watson IoT Platform

User: nagarajan2002@psnacet.edu.in  
ID: zurssx

Navigation: Browse, Action, Device Types, Interfaces

Progress: Identity (checked), Device Information (checked), Security (active), 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.

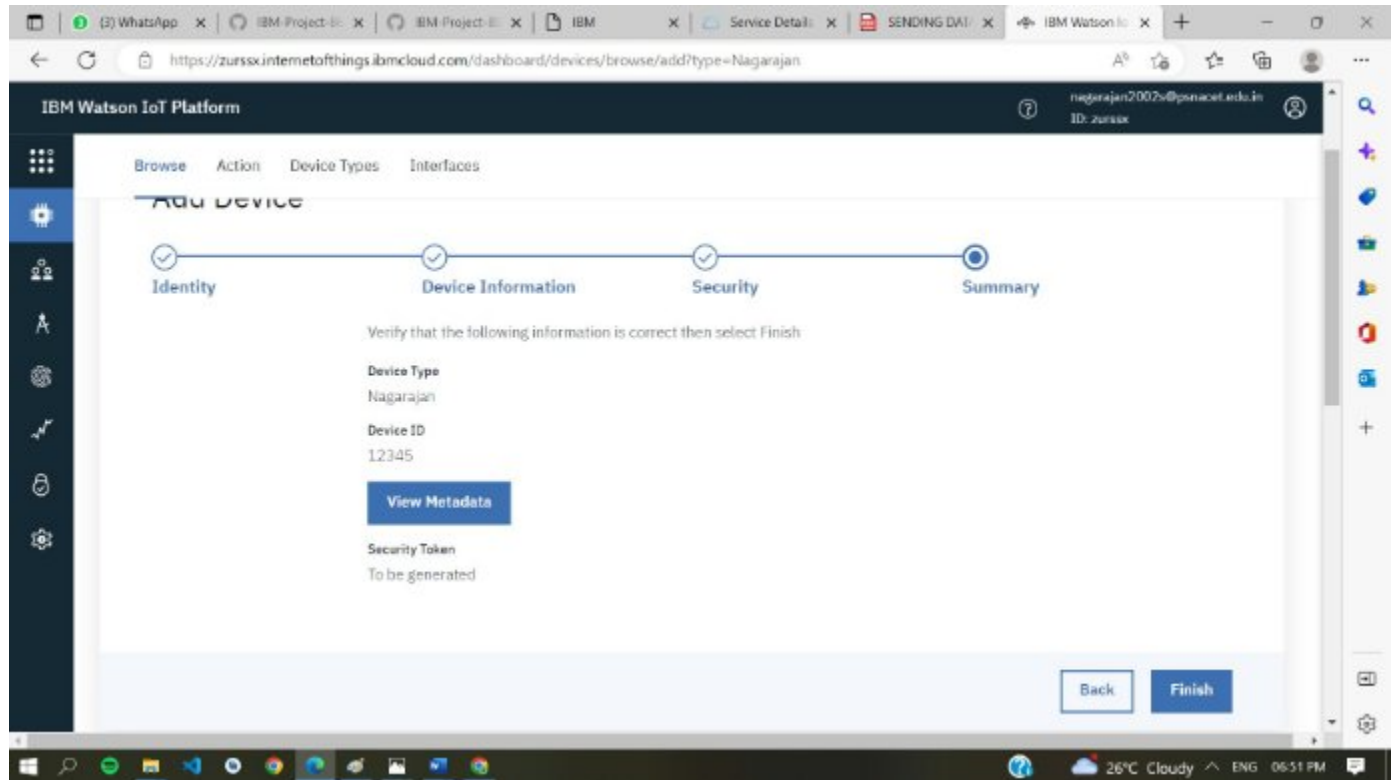
Authentication Token:

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

Authentication token are encrypted before we store them.

Windows taskbar: 26°C Cloudy, ENG, 08:51 PM

➤ ➤ Click on Finish



➤ ➤ Device is created

IBM

IBM Watson IoT Platform

IBM Project 686-165612848910

SENDING DATA FROM RASPBERRY

WhatsApp

yl0dy.internetofthings.bmccloud.com/dashboard/devices/browse

IBM Watson IoT Platform

nagaran2002s@psacet.edu.in  
ID: jurnaa

BrowseActionDevice TypesInterfaces

Add Device

Browse Devices

All DevicesDiagnose

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.

Search by Device ID

Device Simulator

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

Items per page: 50 | 1-1 of 1 item

1 of 1 page

1 Simulation running

Activate Windows  
Go to Settings to activate Windows.

Type here to search

26°C Cloudy

2025  
11-10-2022



## 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

```
File Edit Tabs Help
2017-10-23 06:50:22 - http://ftp.nl.debian.org/debian/pool/main/s/openssh/lib
ssh1.0.0-1.0-1-1-debian_armhf.deb
Resolving ftp.nl.debian.org [ftp.nl.debian.org]... 130.09.149.21, 2002:670:2304:
a126::21
Connecting to ftp.nl.debian.org [ftp.nl.debian.org]:130.09.149.21:80... connect
ed.
HTTP request sent, awaiting response... 200 OK
Length: 86750 (840K) [application/x-debian-package]
Saving to: 'libssh1.0.0-1.0-1-1-debian_armhf.deb'

libssh1.0.0-1.0-1-1- [100%] (=====) 847.83K  3500K/s  1s 2.4s

2017-10-23 06:50:28 (200 KB/s) - 'libssh1.0.0-1.0-1-1-debian_armhf.deb' saved [
86750/86750]

pi@raspberrypi:~$ sudo dpkg -i libssh1.0.0-1.0-1-1-debian_armhf.deb
Selecting previously unselected package libssh1.0.0-armhf.
(Reading database ... 115686 files and directories currently installed.)
Preparing to unpack libssh1.0.0-1.0-1-1-debian_armhf.deb ...
Unpacking libssh1.0.0-armhf (1.0.0-1-1-debian) ...
Setting up libssh1.0.0-armhf (1.0.0-1-1-debian) ...

pi@raspberrypi:~$ curl -LO https://github.com/ibm-messaging/iot-raspberrypi/rel
eases/download/1.0.2.1/iot_1.0-2_armhf.deb
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 104    0 104    0  0  127    0 --:--:--  0:00:01 --:--:-- 127
100 600    0 600    0  0  457    0 --:--:--  0:00:01 --:--:--  457
100 1194 100 1194    0  0 29117    0 0:00:03 0:00:03 --:--:-- 48190

pi@raspberrypi:~$ sudo dpkg -i iot_1.0-2_armhf.deb
(Reading database ... 115626 files and directories currently installed.)
Preparing to unpack iot_1.0-2_armhf.deb ...
Unpacking iot (1.0-1) over (1.0-1) ...
Setting up iot (1.0-1) ...
Processing triggers for systemd (232-25+deb9u1) ...

pi@raspberrypi:~$ service iot status
● iot.service - IBM IoT service
   Loaded: /etc/init.d/iot; generated; vendor preset; enabled
   Active: active (running) since Mon 2017-10-23 06:56:25 UTC; 17s ago
     Docs: man:systemd-sys-generator(8)
    CGroup: /system.slice/iot.service
           └─2502 /opt/iot/iot /dev/null

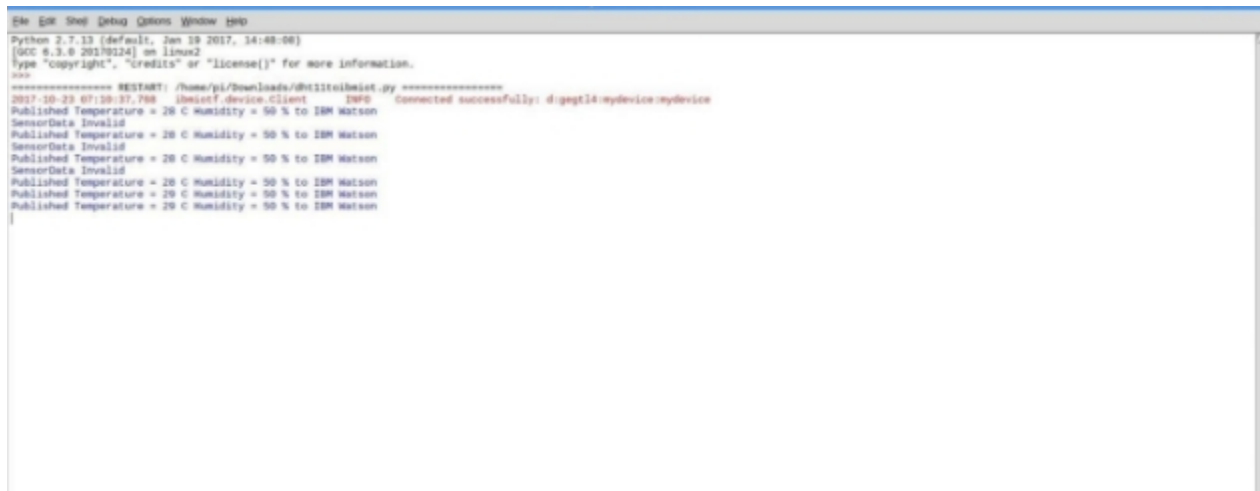
Oct 23 06:56:24 raspberrypi systemd[1]: Starting IBM IoT service...
Oct 23 06:56:24 raspberrypi iot[2567]: Starting the iot program
Oct 23 06:56:25 raspberrypi iot[2562]: "" IBM Raspberry Pi Sample has started ""
Oct 23 06:56:25 raspberrypi iot[2562]: Config file not found. Going to Quickstart mode
Oct 23 06:56:25 raspberrypi iot[2562]: Running in Quickstart mode
Oct 23 06:56:25 raspberrypi systemd[1]: Started IBM IoT service.
```

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

File Edit Tabs Help

```
polrasphersys:~$ pip install ibmiotf
Collecting ibmiotf
  Downloading ibmiotf-0.3.0.tar.gz (6040)
    100% |#####| 81KB 518KB/s
Collecting dicttool==1.7.4 (from ibmiotf)
  Downloading dicttool-1.7.4.tar.gz
Collecting lsof==0.1.18 (from ibmiotf)
  Downloading lsof-0.1.12-py2-py3-none-any.whl
Collecting paho-mqtt==1.2 (from ibmiotf)
  Downloading paho-mqtt-1.2.1.tar.gz (6040)
    100% |#####| 81KB 518KB/s
Collecting pytz==2017.2 (from ibmiotf)
  Using cached pytz-2017.2-py2.py3-none-any.whl
Collecting requests==2.9.0 (from ibmiotf)
  Downloading requests-2.9.4-py2.py3-none-any.whl (44KB)
    100% |#####| 80KB 1.49KB/s
Collecting requests-toolbelt==0.3.0 (from ibmiotf)
  Downloading requests-toolbelt-0.3.0-py2.py3-none-any.whl (6040)
    100% |#####| 81KB 1.49KB/s
Collecting saltstack==0.10.0 (from ibmiotf)
  Downloading saltstack-0.10.0-py2.py3-none-any.whl
Collecting urllib3==2.0.2 (from requests==2.9.0->ibmiotf)
  Downloading urllib3-1.22-py2.py3-none-any.whl (132KB)
    100% |#####| 139KB 1.49KB/s
Collecting idna==2.0 (from requests==2.9.0->ibmiotf)
  Downloading idna-2.0-py2.py3-none-any.whl (58KB)
    100% |#####| 81KB 1.79KB/s
Collecting chardet==3.0.4 (from requests==2.9.0->ibmiotf)
  Downloading chardet-3.0.4-py2.py3-none-any.whl (133KB)
    100% |#####| 142KB 1.89KB/s
Collecting certifi==2017.4.0 (from requests==2.9.0->ibmiotf)
  Using cached certifi-2017.7.27.1-py2.py3-none-any.whl
Building wheels for collected packages: ibmiotf, dicttool, paho-mqtt
Running setup.py bdist_wheel for ibmiotf ... done
Stored in directory: /home/pi/.cache/pip/wheels/7a/7f/48/14c33a00570d279753a88a316a6a800d78a9d12a8e418
Running setup.py bdist_wheel for dicttool ... done
Stored in directory: /home/pi/.cache/pip/wheels/45/92/58/940101336c0a702a89a13785401150b075400324879a12cc
Running setup.py bdist_wheel for paho-mqtt ... done
Stored in directory: /home/pi/.cache/pip/wheels/28/48/46/acc0f200011a79a74e71de4ef0640f02b0a313d7ff8482
Successfully built ibmiotf dicttool paho-mqtt
Installing collected packages: dicttool, lsof, paho-mqtt, pytz, urllib3, idna, chardet, certifi, requests, requests-toolbelt, saltstack, ibmiotf
Successfully installed certifi-2017.7.27.1 chardet-3.0.4 dicttool-1.7.4 ibmiotf-0.3.0 idna-2.0 lsof-0.1 lsof-0.1.12 paho-mqtt-1.3.1 pytz-2017.2 requests-2.9.4 requests-toolbelt-0.3.0 saltstack-0.10.0
polrasphersys:~$
```

- ➤ 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:



```

File Edit Shell Debug Options Window Help
Python 2.7.13 (default, Jan 19 2017, 14:48:08)
[GCC 6.3.0 20170124] on linux2
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /home/pi/Downloads/dht11toibmiot.py =====
2017-10-25 07:58:37.768 ibmiot.device.Client INFO Connected successfully: d1eggt1d-mydevice-mydevice
Published Temperature = 28 C Humidity = 50 % to IBM Watson
SensorData Invalid
Published Temperature = 28 C Humidity = 50 % to IBM Watson
SensorData Invalid
Published Temperature = 28 C Humidity = 50 % to IBM Watson
SensorData Invalid
Published Temperature = 28 C Humidity = 50 % to IBM Watson
Published Temperature = 28 C Humidity = 50 % 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.

IBM

IBM Watson IoT Platform

IBM Project 006-165028489

SENDING DATA FROM RASPBERRY

WhatsApp

ytidyinternetofthingsibmdoud.com/taahboard/devices/browse

IBM Watson IoT Platform

naganagan2002@psnucet.edu.in

ID: xurux

Browse

Action

Device Types

Interfaces

Add Device

Browse Devices

All Devices

Diagnose

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.

Search by Device ID

Device Simulator

	Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
>	<input type="checkbox"/>	12345	Disconnected	Naganagan	Device	Oct 31, 2022 11:38 AM

Items per page: 50 | 1-1 of 1 item

1 of 1 page

1

1 Simulation running

Activate Windows

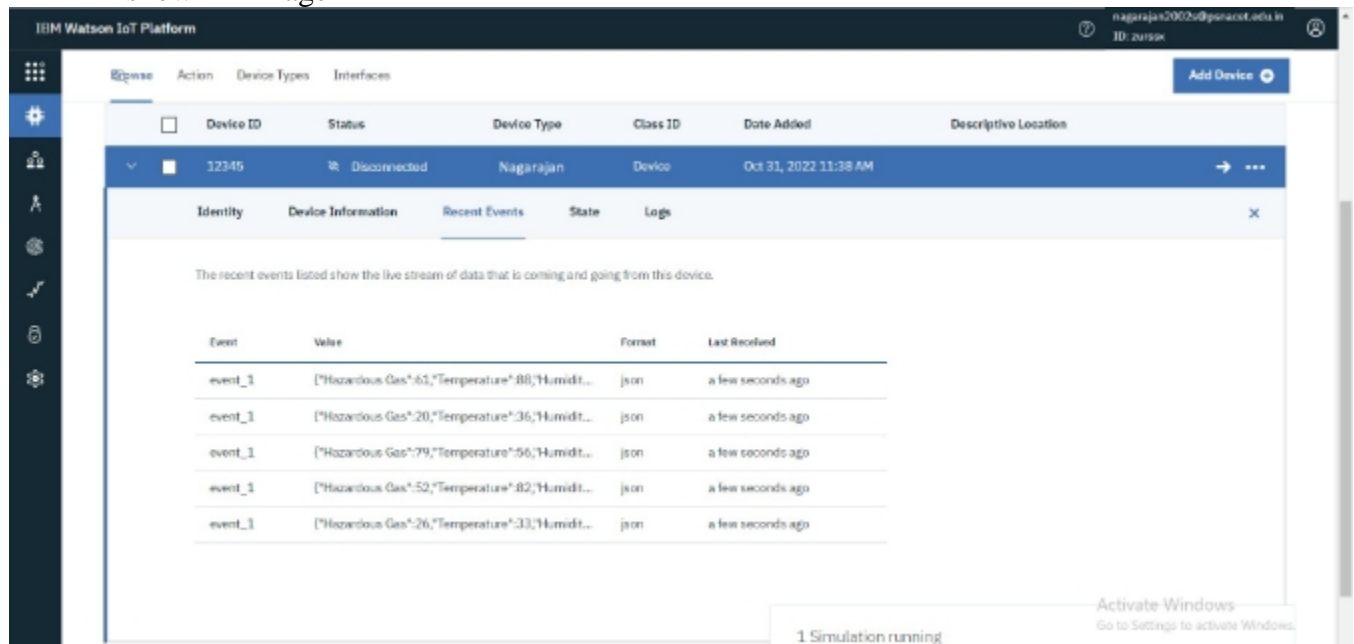
Go to Settings to activate Windows.

Type here to search

26°C Cloudy

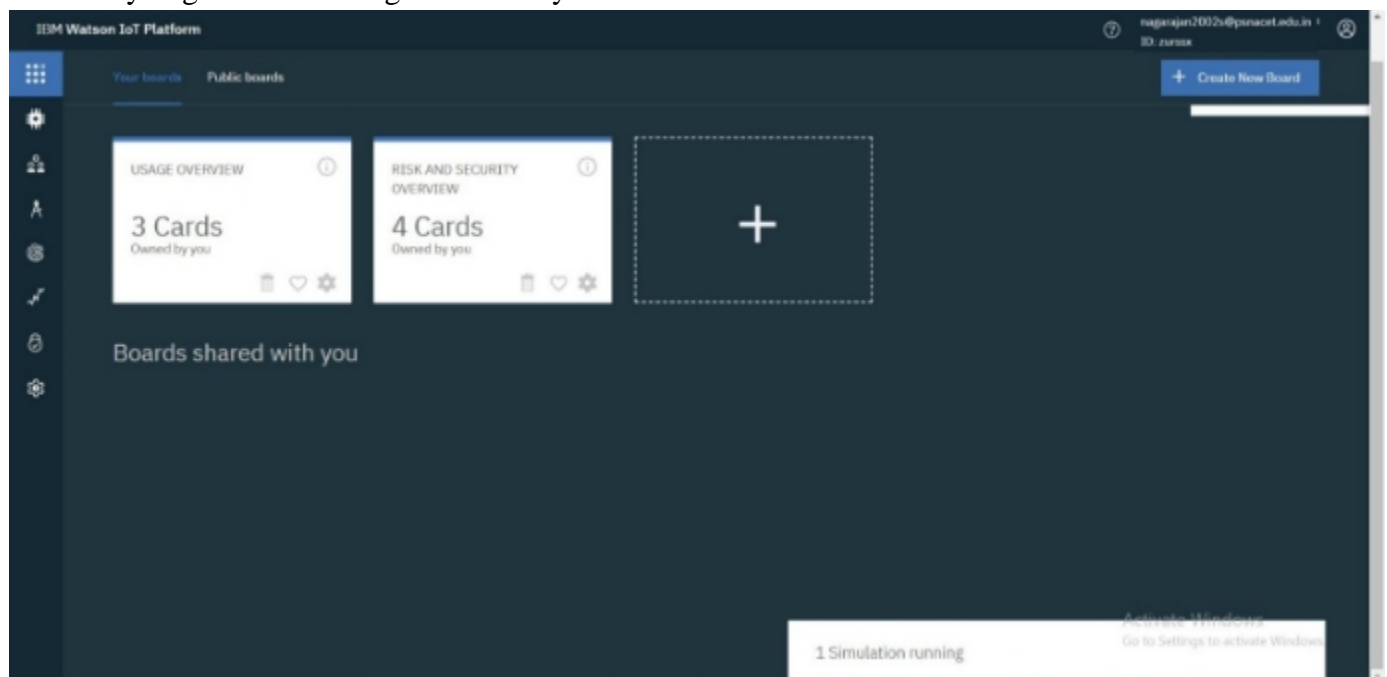
31-10-2022

- ➤ 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 .

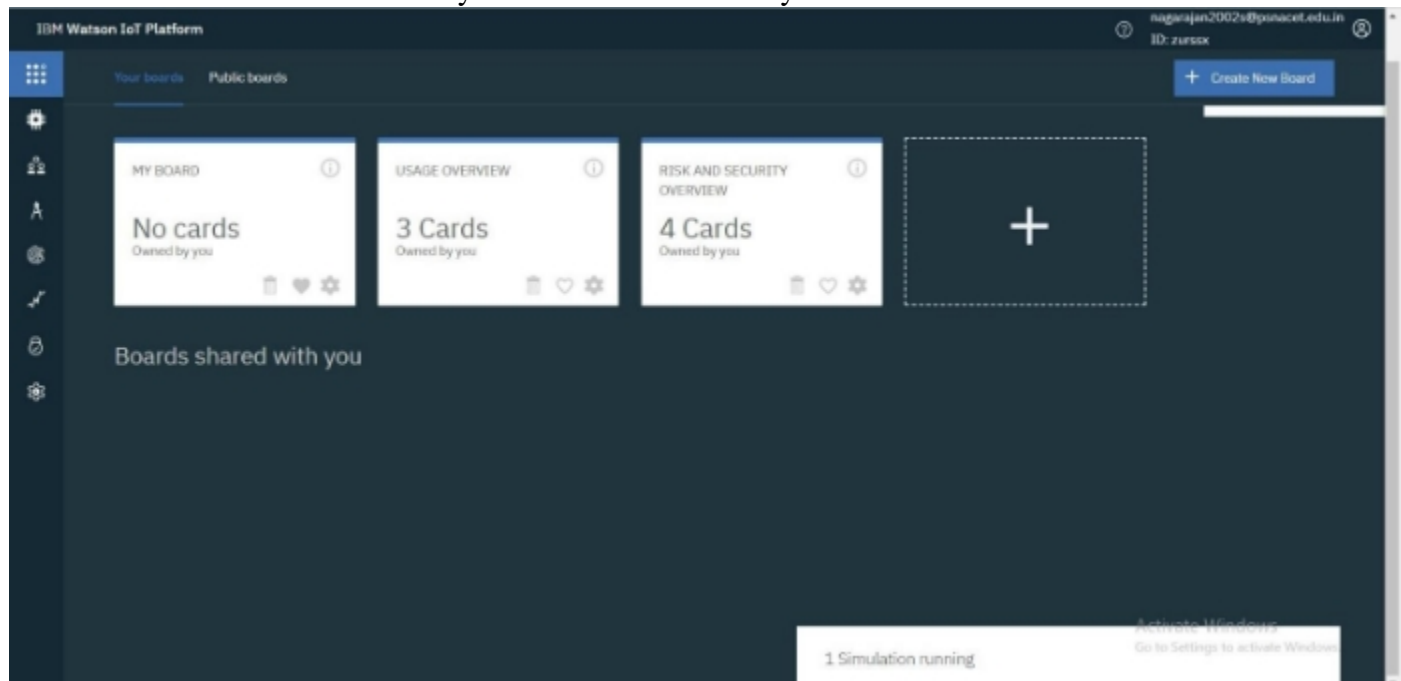
The given below window appears give a name and description to your board as shown in the window below.

The screenshot shows the IBM Watson IoT Platform interface. On the left, a sidebar contains navigation icons. The main area displays a 'Create a new board' dialog box. The dialog has a title bar with a close button. Below the title, it says 'Provide a name and description for your new board.' There are two input fields: 'Board name' and 'Description'. Below these fields, there are two radio button options: 'Make this board my landing page.' (which is selected) and 'Favorite (this also adds this board to your navbar)'. At the bottom right of the dialog is a 'Next' button. The background shows a 'Usage Overview' card with '3 Cards Owned by you' and a 'Boards shared with you' section.

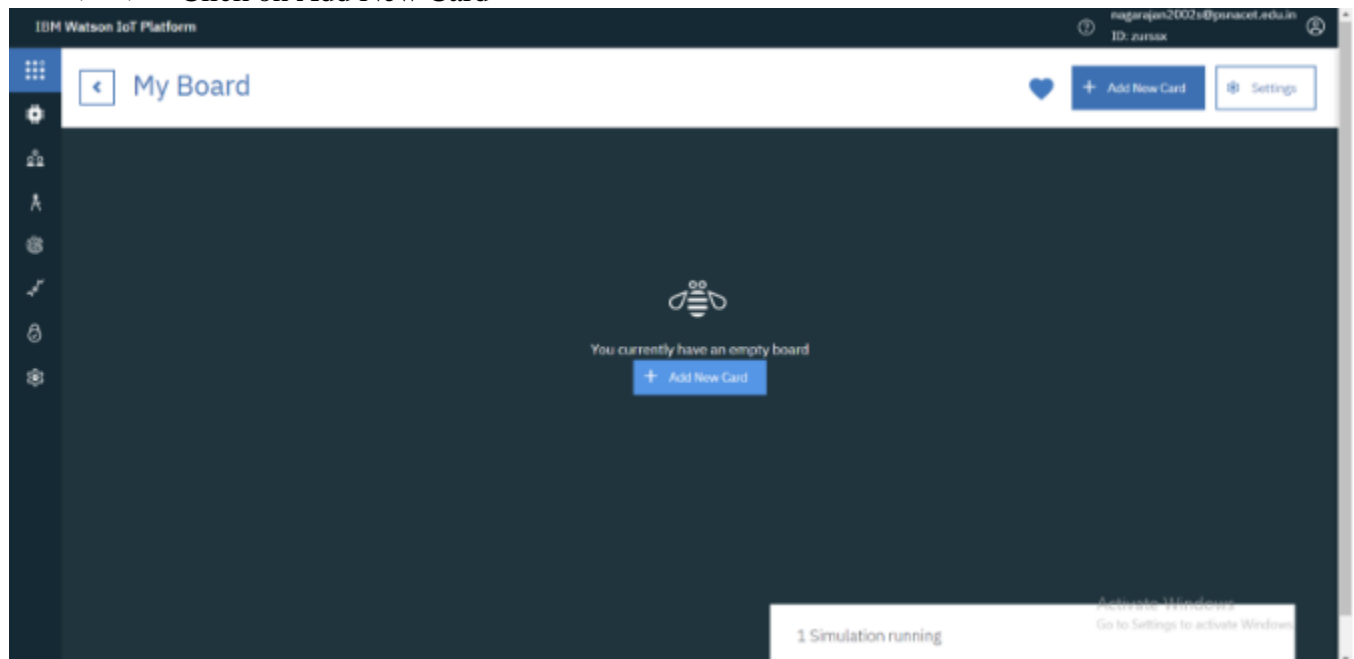
- ➤ Then click on Next you get the below window then again click on Submit

The screenshot shows the same IBM Watson IoT Platform interface, but the 'Create a new board' dialog box has advanced to the next step. It now displays 'Adding viewers allows them to see your dashboard.' Below this, the 'Owner' field is populated with 'nagarajan2002s@psnacet.edu.in(you)'. There is a 'Members' section with a radio button option 'Share as read-only with everyone?'. Below this is a section titled '+ add user ID' with a table that has two columns: 'name' and 'Editor?'. At the bottom of the dialog are 'Back' and 'Submit' buttons. The background remains the same as the previous screenshot.

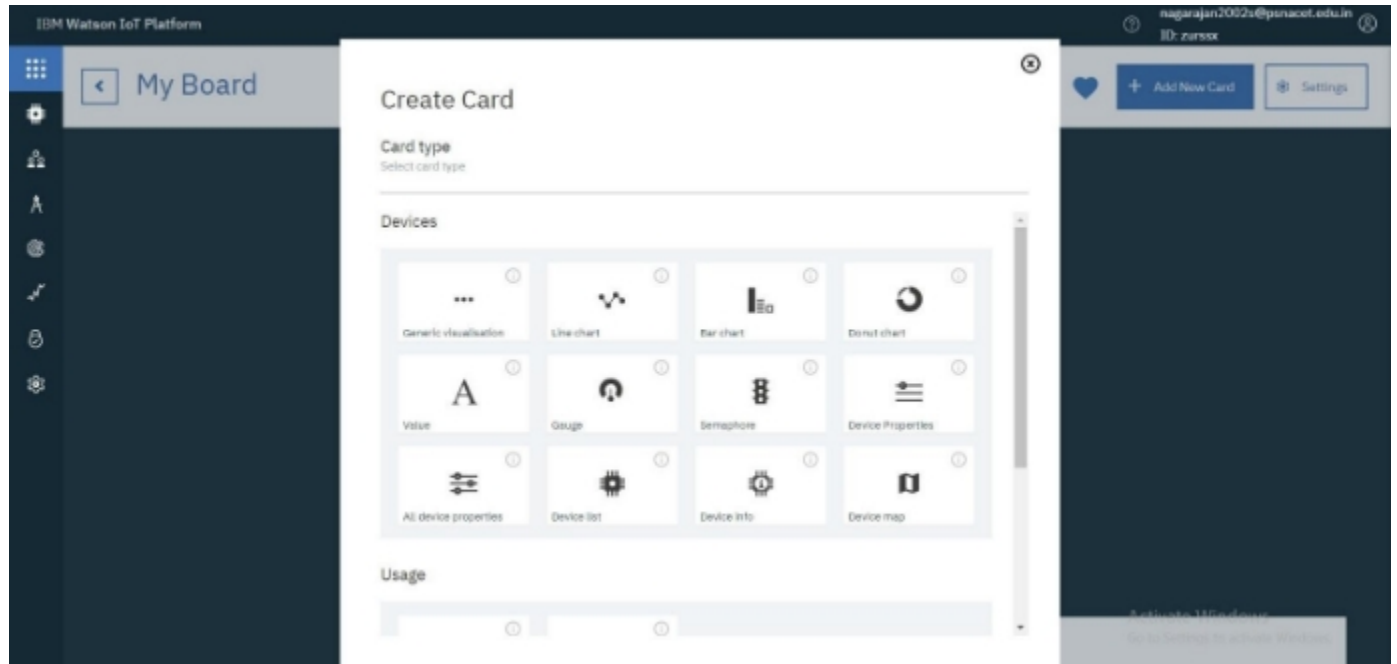
- ➤ Then double click on your boards name which you have created.



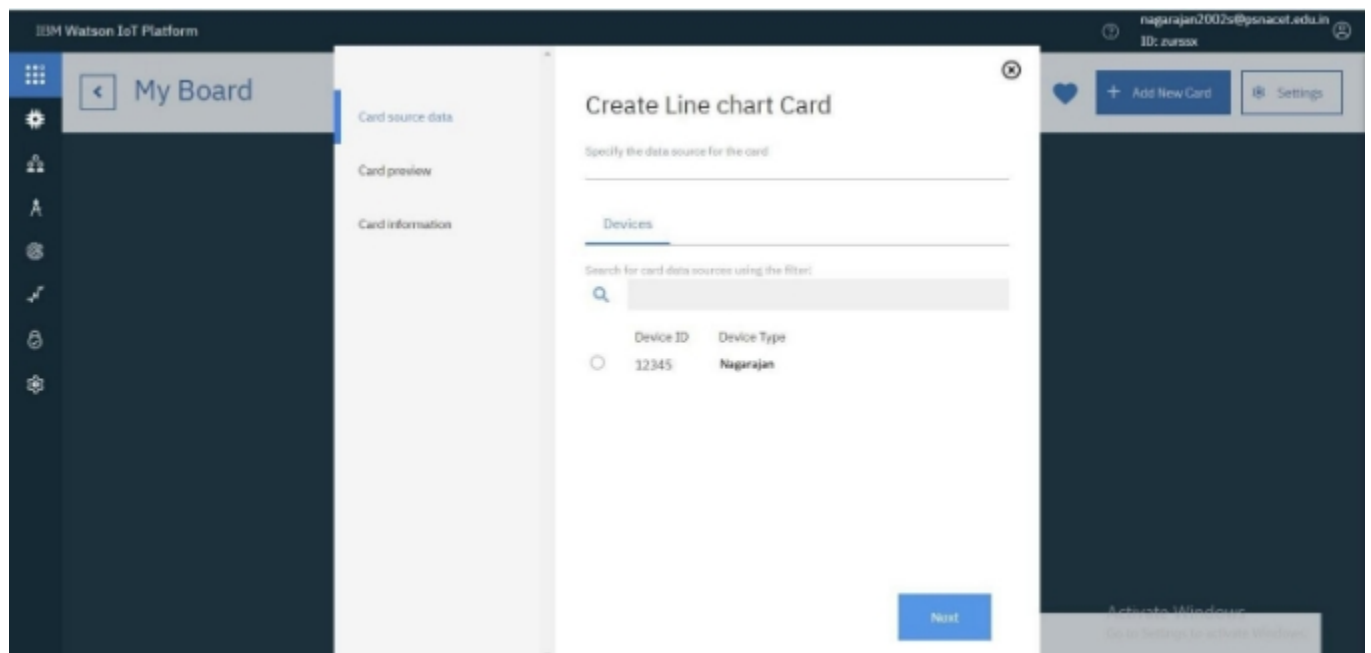
- ➤ Click on Add New Card



- ➤ 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

IBM Watson IoT Platform

Temp & Hum

Card source data  
12345

Card preview

Card information

### Create Line chart Card

Connect data set

Temperature

Event: event\_1

Property: Temperature

Name: Temperature

Type: Number (selected)

Unit:

Max: 100

Back Next

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

IBM Watson IoT Platform

Temp & Hum

Card source data  
12345

Card preview

Card information

### Create Line chart Card

Enter title and description of the card

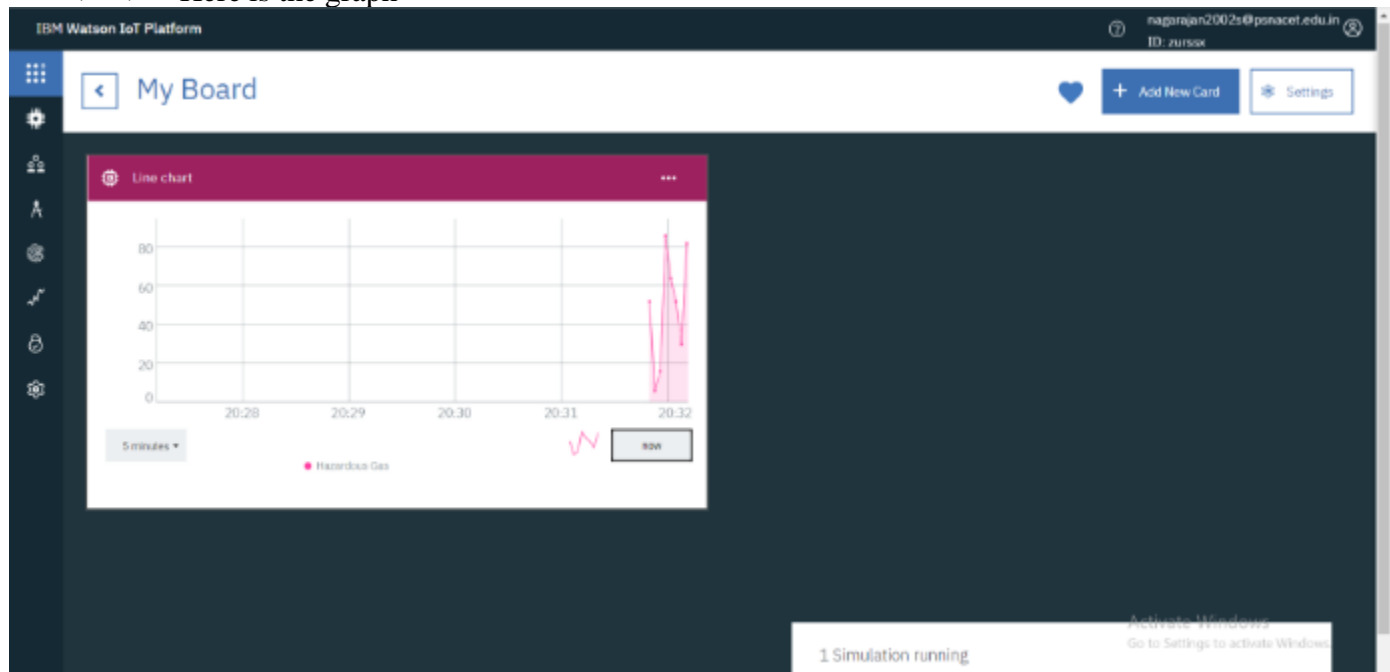
Title: Line chart

Color scheme:

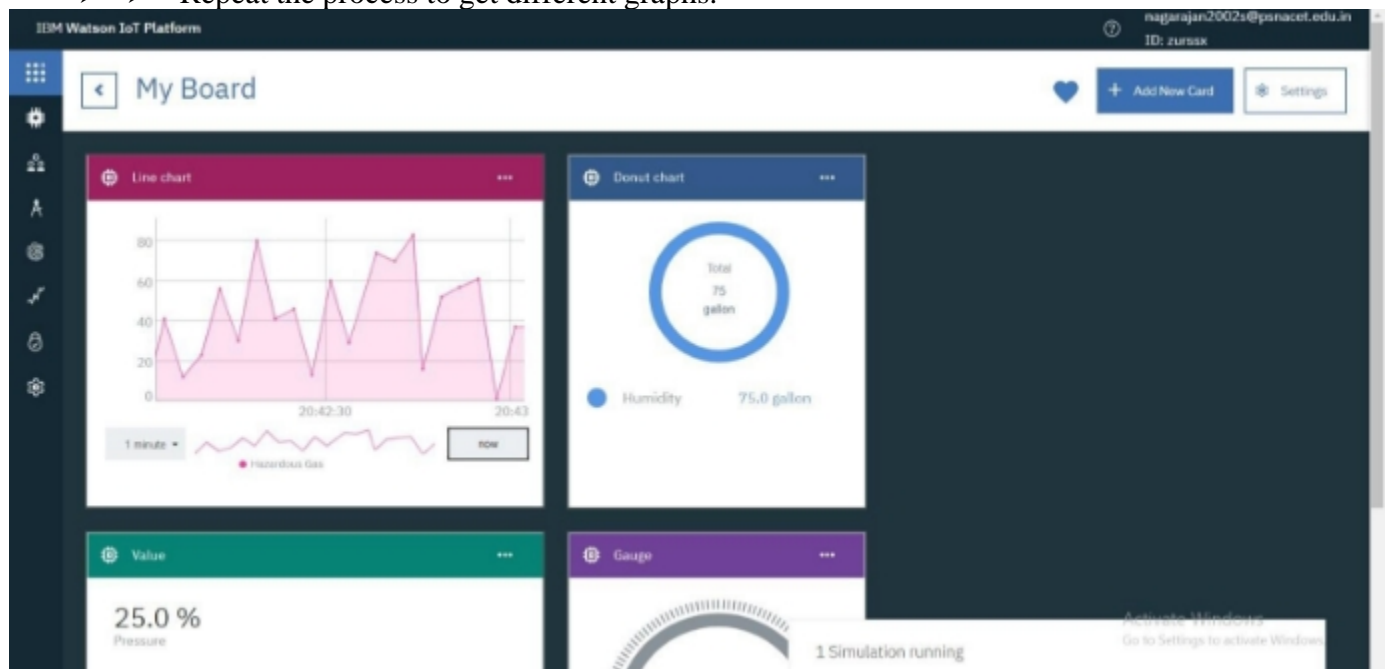
A line chart to display time series information with historic and live data

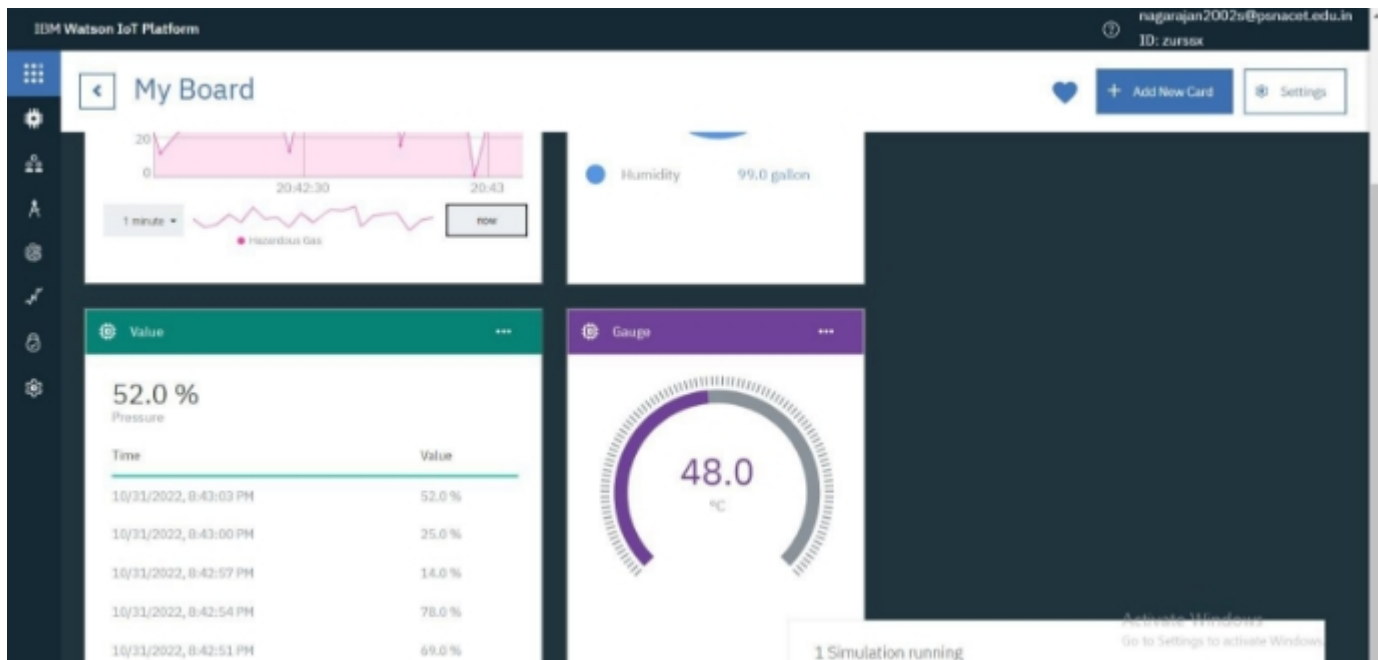
Back Submit

➤ ➤ 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.