

## PUBLISH DATA TO THE IBM CLOUD

Date	07 November 2022
Team ID	PNT2022TMID03066
Project Name	Smart Waste Management System For Metropolitan cities

### 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

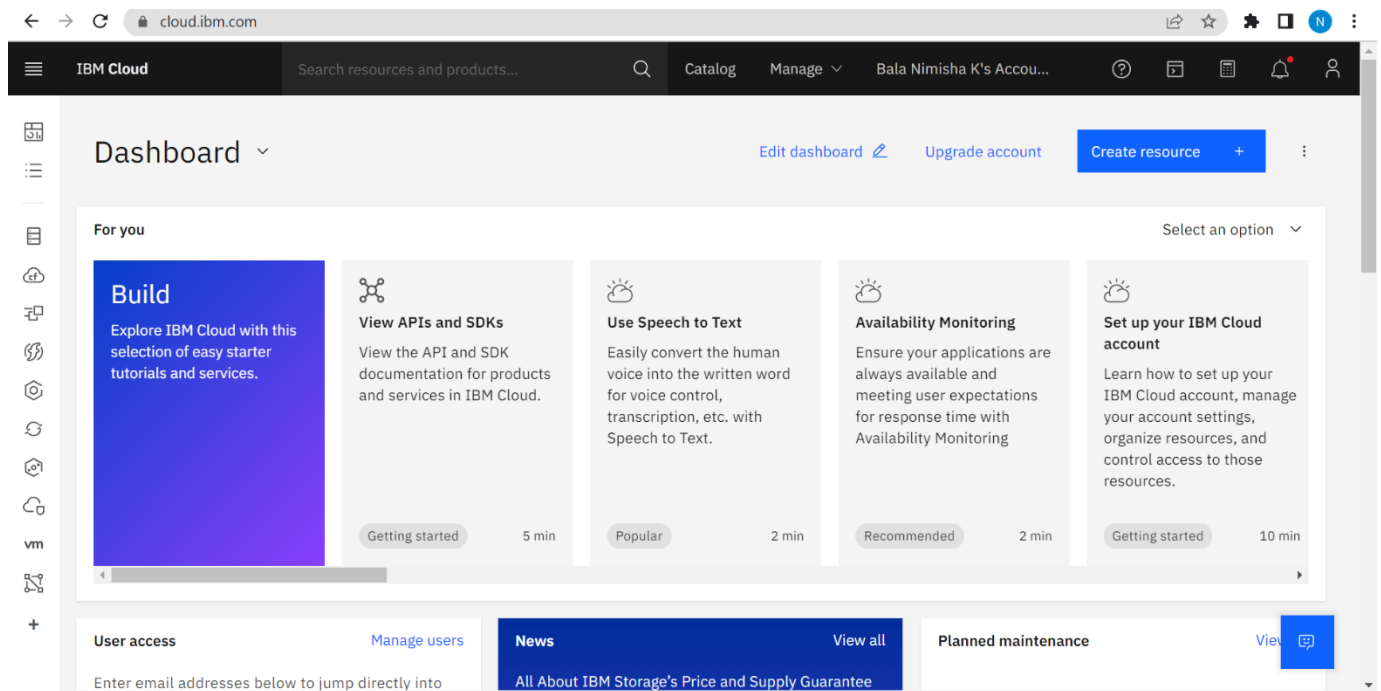
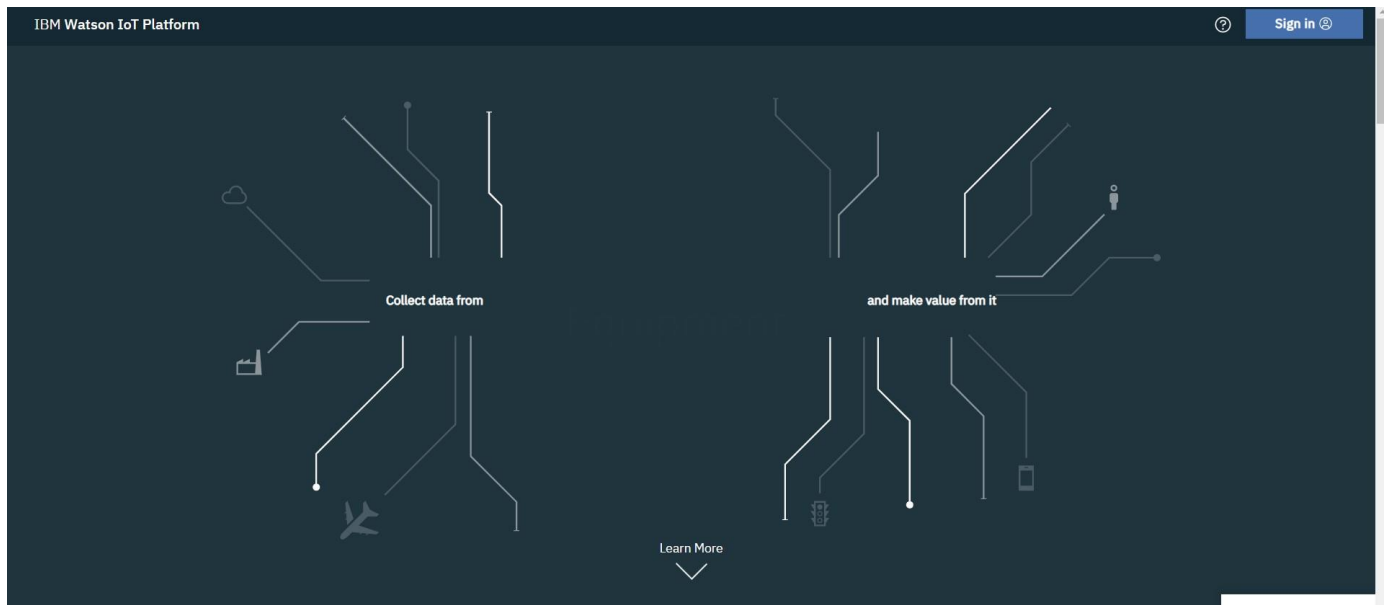
#### SOFTWARE:

- 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.



Check all details and click create

cloud.ibm.com/services/iotf-service/cm%3Av1%3Abluemix%3Apublic%3Aiotf-service%3Aeu-gb%3Aa%2F773fc4cd053f4772ad1ba54328b8...

IBM Cloud

Search resources and products...

Catalog

Manage

Bala Nimisha K's Accou...

?

Resource list /

Internet of Things Platform-jo

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

ub9jcp.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

nimivgk@gmail.com

ID: ub9jcp

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

- After click on Add device this page will open

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

- 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

Cancel Next

- Click on Finish

Browse Action Device Types Interfaces

## Register Devices, Define Interfaces

Now that you added a device type, you can register and connect devices for this type.

Cancel Next

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

The screenshot shows a web application interface with a dark sidebar on the left containing various icons. The main content area has a top navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. Below this, a light blue box contains the text 'Select a device type for the device that you are adding and give the device a unique ID.' There are two input fields: 'Device Type' with the value 'Fantastic-4' and 'Device ID' with the value '12345'. At the bottom right of this box are 'Cancel' and 'Next' buttons. Below the light blue box, the heading 'Browse Devices' is followed by two buttons: 'All Devices' (highlighted) and 'Diagnose'.

- Click on Next

The screenshot shows a web application interface with a dark sidebar on the left. The main content area has a top navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. Below this, a light blue box contains the text 'You can modify the default device information and enter more information about the device for identification purposes.' There are several input fields arranged in two columns: 'Serial Number', 'Model', 'Description', 'Hardware Version' on the left, and 'Manufacturer', 'Device Class', 'Firmware Version', 'Descriptive Location' on the right. Each field has a placeholder text 'Enter [field name]'. Below the left column of fields is a button labeled 'Add Metadata' with a plus icon. At the bottom right of the light blue box are 'Back' and 'Next' buttons.

The screenshot shows a web application interface with a dark sidebar on the left. The main content area has a top navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. Below this, the text 'There are two options for selecting a device authentication token.' is followed by two columns. The left column is titled 'Auto-generated authentication token (default)' and contains the text '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.' The right column is titled 'Self-provided authentication token' and contains the text 'Provide your own authentication token for this device. The token must be between 8 and 36 characters and contain a mix of 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.' Below these columns is an input field labeled 'Authentication Token' with the placeholder 'Enter an optional token' and an information icon. Below the input field, the text 'Make a note of the generated token. Lost authentication tokens cannot be recovered. Tokens are encrypted before being stored.' is followed by the text 'Authentication token are encrypted before we store them.'

Browse

Action

Device Types

Interfaces

Verify that the following information is correct then select Finish

Device Type

Fantastic-4

Device ID

12345

View Metadata

Security Token

To be generated

Back

Finish

Browse

Action

Device Types

Interfaces

Add Device

12345

Disconnected

Fantastic-4

Device

Nov 7, 2022 10:15 AM

→ ...

Identity

Device Information

Recent Events

State

Logs

×

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event_1	{"type":"Buffer","data":[]}	json	a few seconds ago
event_1	{"#IBM Watson IOT Platform":"#pip install wiot...	json	5 minutes ago
event_1	{"randomNumber":24}	json	5 minutes ago

1 Simulation running

## 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 06:55:22-- http://ftp.nl.debian.org/debian/pool/main/o/openssl/lib
ssl1.0.0_1.0.1t-1-deb8u6_armhf.deb
Resolving ftp.nl.debian.org (ftp.nl.debian.org)... 130.89.149.21, 2001:67c:2564:
a120::21
Connecting to ftp.nl.debian.org (ftp.nl.debian.org)[130.89.149.21]:80... connect
ed.
HTTP request sent, awaiting response... 200 OK
Length: 867950 (848K) [application/x-debian-package]
Saving to: 'libssl1.0.0_1.0.1t-1-deb8u6_armhf.deb'

libssl1.0.0_1.0.1t- 100%[=====] 847.61K  358KB/s   in 2.4s

2017-10-23 06:55:25 (358 KB/s) - 'libssl1.0.0_1.0.1t-1-deb8u6_armhf.deb' saved [
867950/867950]

pi@raspberrypi:~$ sudo dpkg -i libssl1.0.0_1.0.1t-1-deb8u6_armhf.deb
Selecting previously unselected package libssl1.0.0:armhf.
(Reading database ... 115066 files and directories currently installed.)
Preparing to unpack libssl1.0.0_1.0.1t-1-deb8u6_armhf.deb ...
Unpacking libssl1.0.0:armhf (1.0.1t-1-deb8u6) ...
Setting up libssl1.0.0:armhf (1.0.1t-1-deb8u6) ...
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
100 164    0 164    0    0   157    0 --:--:--  0:00:01 --:--:--  157
100 609    0 609    0    0   457    0 --:--:--  0:00:01 --:--:--  457
100 110k 100 110k    0    0 20117    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 - LSB: IoT service
   Loaded: 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-sysv-generator(8)
    Group: /system.slice/iot.service
          └─2562 /opt/iot/iot /dev/null

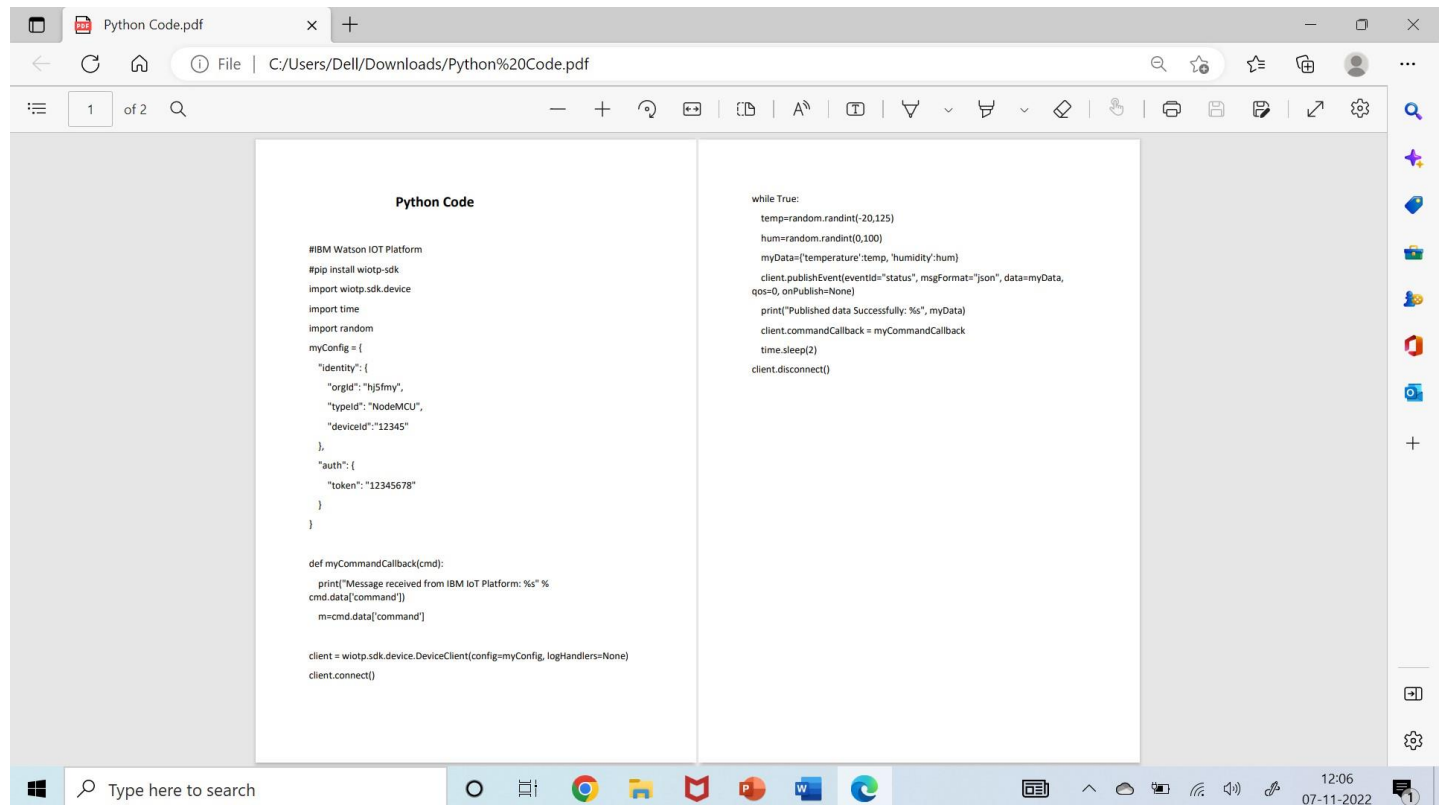
Oct 23 06:56:24 raspberrypi systemd[1]: Starting LSB: IoT service...
Oct 23 06:56:24 raspberrypi iot[2557]: Starting the iot program
Oct 23 06:56:25 raspberrypi iot[2562]: **** IoT Raspberry Pi Sample has started ****
Oct 23 06:56:25 raspberrypi iot[2562]: Config file not found. Going to Quickstart mode
Oct 23 06:56:25 raspberrypi iot[2562]: Running in Quickstart mode
Oct 23 06:56:25 raspberrypi systemd[1]: Started LSB: IoT service.
```

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

```
File Edit Tabs Help
pi@raspberrypi:~$ pip install ibmiotf
Collecting ibmiotf
  Downloading ibmiotf-0.3.0.tar.gz (58kB)
    100% |#####| 61kB 510kB/s
Collecting dicttoxml<=1.7.4 (from ibmiotf)
  Downloading dicttoxml-1.7.4.tar.gz
Collecting iso8601<=0.1.10 (from ibmiotf)
  Downloading iso8601-0.1.12-py2.py3-none-any.whl
Collecting paho-mqtt<=1.2 (from ibmiotf)
  Downloading paho-mqtt-1.3.1.tar.gz (80kB)
    100% |#####| 81kB 916kB/s
Collecting pytz>=2014.7 (from ibmiotf)
  Using cached pytz-2017.2-py2.py3-none-any.whl
Collecting requests<=2.5.0 (from ibmiotf)
  Downloading requests-2.18.4-py2.py3-none-any.whl (88kB)
    100% |#####| 92kB 1.6MB/s
Collecting requests-toolbelt<=0.7.0 (from ibmiotf)
  Downloading requests-toolbelt-0.8.0-py2.py3-none-any.whl (54kB)
    100% |#####| 61kB 1.6MB/s
Collecting xmldict<=0.10.2 (from ibmiotf)
  Downloading xmldict-0.11.0-py2.py3-none-any.whl
Collecting urllib3<1.23,>=1.21.1 (from requests==2.5.0->ibmiotf)
  Downloading urllib3-1.22-py2.py3-none-any.whl (122kB)
    100% |#####| 133kB 1.4MB/s
Collecting idna<2.7,>=2.5 (from requests==2.5.0->ibmiotf)
  Downloading idna-2.6-py2.py3-none-any.whl (56kB)
    100% |#####| 61kB 1.7MB/s
Collecting chardet<3.1.0,>=3.0.2 (from requests==2.5.0->ibmiotf)
  Downloading chardet-3.0.4-py2.py3-none-any.whl (133kB)
    100% |#####| 143kB 1.6MB/s
Collecting certifi>=2017.4.17 (from requests==2.5.0->ibmiotf)
  Using cached certifi-2017.7.27.1-py2.py3-none-any.whl
Building wheels for collected packages: ibmiotf, dicttoxml, paho-mqtt
Running setup.py bdist_wheel for ibmiotf ... done
Stored in directory: /home/pi/.cache/pip/wheels/7e/fa/45/bbc33ad957e82f7b71ba80e31d665a83d9d735a0d12e0c9418
Running setup.py bdist_wheel for dicttoxml ... done
Stored in directory: /home/pi/.cache/pip/wheels/20/d8/0d/acdc8f289011b7be7de71deebe6e42fb83be0313dfff0493
Successfully built ibmiotf dicttoxml paho-mqtt
Installing collected packages: dicttoxml, iso8601, paho-mqtt, pytz, urllib3, idna, chardet, certifi, requests, requests-toolbelt, xmldict, ibmiotf
Successfully installed certifi-2017.7.27.1 chardet-3.0.4 dicttoxml-1.7.4 ibmiotf-0.3.0 idna-2.6 iso8601-0.1.12 paho-mqtt-1.3.1 pytz-2017.2 requests-2.18.4 requests-toolbelt-0.8.0 urllib3-1.22 xmldict-0.11.0
pi@raspberrypi:~$
```

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:



### 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 dta is being received.



(11) WhatsApp x IBM-Project-40308 x IBM x IBM-Project-1042-1 x Service Details - IBM x IBM Watson IoT Platform x

qqu4hk.internetofthings.ibmcloud.com/dashboard/devices/browse

balabalajee2016@gmail.com ID: qqu4hk

IBM Watson IoT Platform

Browse Action Device Types Interfaces

Add Device +

12345 Disconnected Fantastic-4 Device Nov 7, 2022 10:15 AM

Identity Device Information Recent Events State Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event_1	{"type":"Buffer","data":{}}	json	a few seconds ago
event_1	{"#IBM Watson IOT Platform":"#pip install wiot..."}	json	5 minutes ago
event_1	{"randomNumber":24}	json	5 minutes ago

1 Simulation running

ibm.csv

Show all

Type here to search

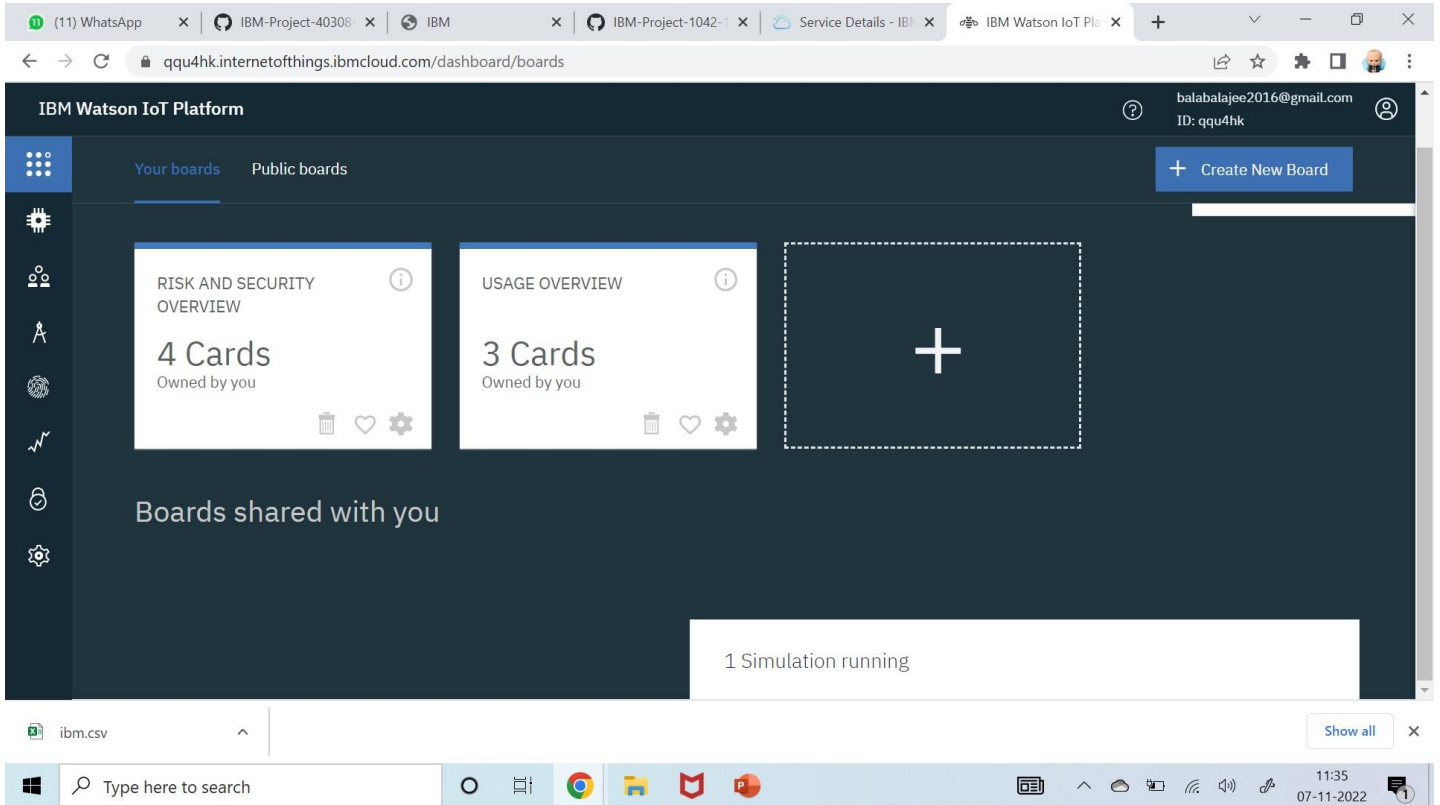
Google File Explorer Mail PowerPoint

11:34 07-11-2022

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 dashboard. The top navigation bar includes the platform name and user information (balabalajee2016@gmail.com, ID: qqu4hk). The main area displays three boards: 'AABG' with 'No cards', 'RISK AND SECURITY OVERVIEW' with '4 Cards', and 'USAGE OVERVIEW' with '3 Cards'. Below these is a section 'Boards shared with you' indicating '1 Simulation running'. A file named 'ibm.csv' is visible in the top left corner. The bottom of the screen shows a Windows taskbar with various application icons and a search bar.

○ Then click on Next you get the below window then again click on Sub

This screenshot is identical to the one above, showing the IBM Watson IoT Platform dashboard with the same three boards (AABG, RISK AND SECURITY OVERVIEW, USAGE OVERVIEW) and the 'Boards shared with you' section indicating '1 Simulation running'. The file 'ibm.csv' is also present in the top left corner. The Windows taskbar at the bottom remains the same.

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

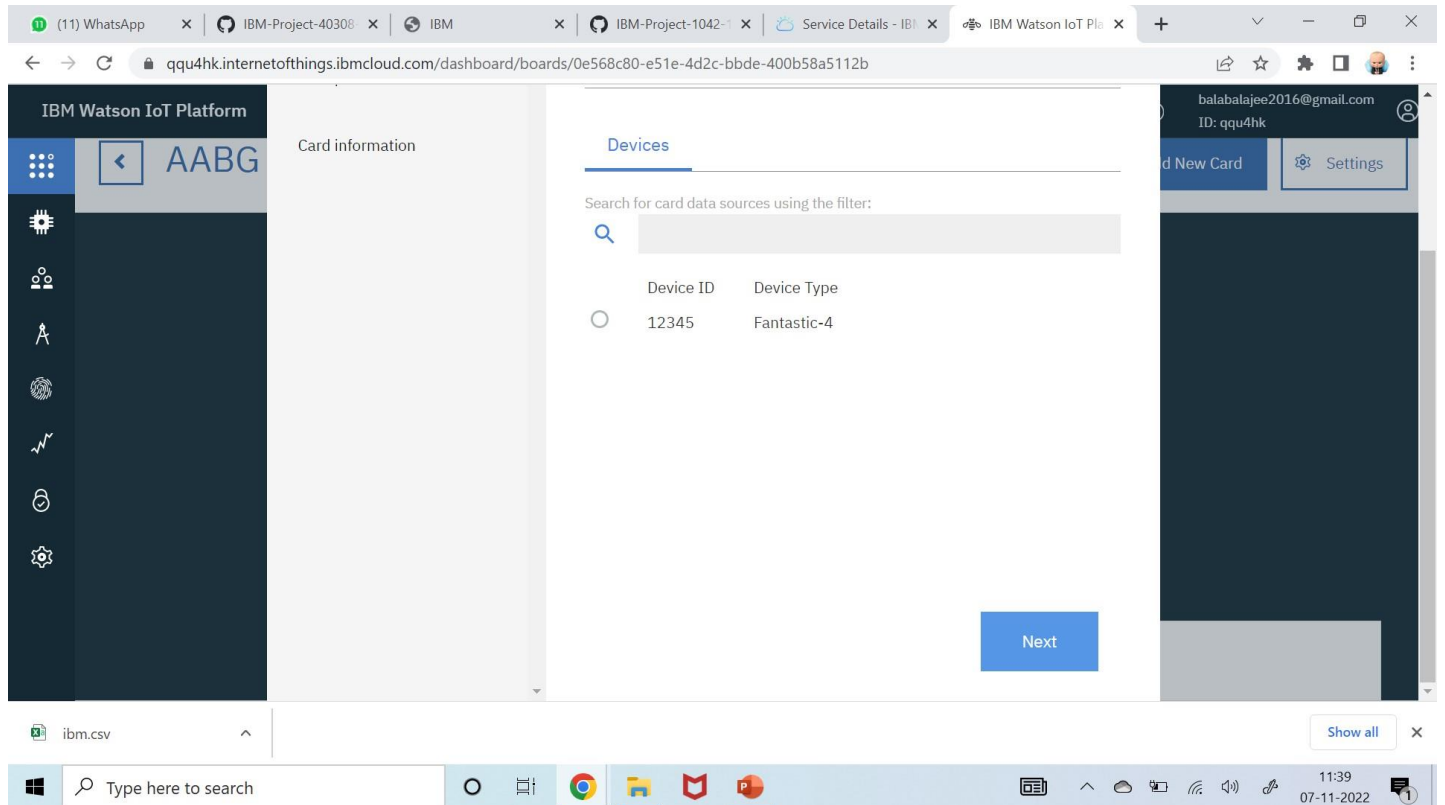
### ○ Click on Add New Card

The screenshot shows the IBM Watson IoT Platform dashboard. The browser's address bar displays the URL: `qqu4hk.internetofthings.ibmcloud.com/dashboard/boards/0e568c80-e51e-4d2c-bbde-400b58a5112b`. The dashboard header includes the user's email `balabalajee2016@gmail.com` and ID `qqu4hk`. A sidebar on the left contains various icons for navigation. The main area shows a board named "AABG" with a message: "You currently have an empty board" and a button labeled "+ Add New Card". Below this, a status bar indicates "1 Simulation running". At the bottom, a file explorer shows a file named `ibm.csv`.

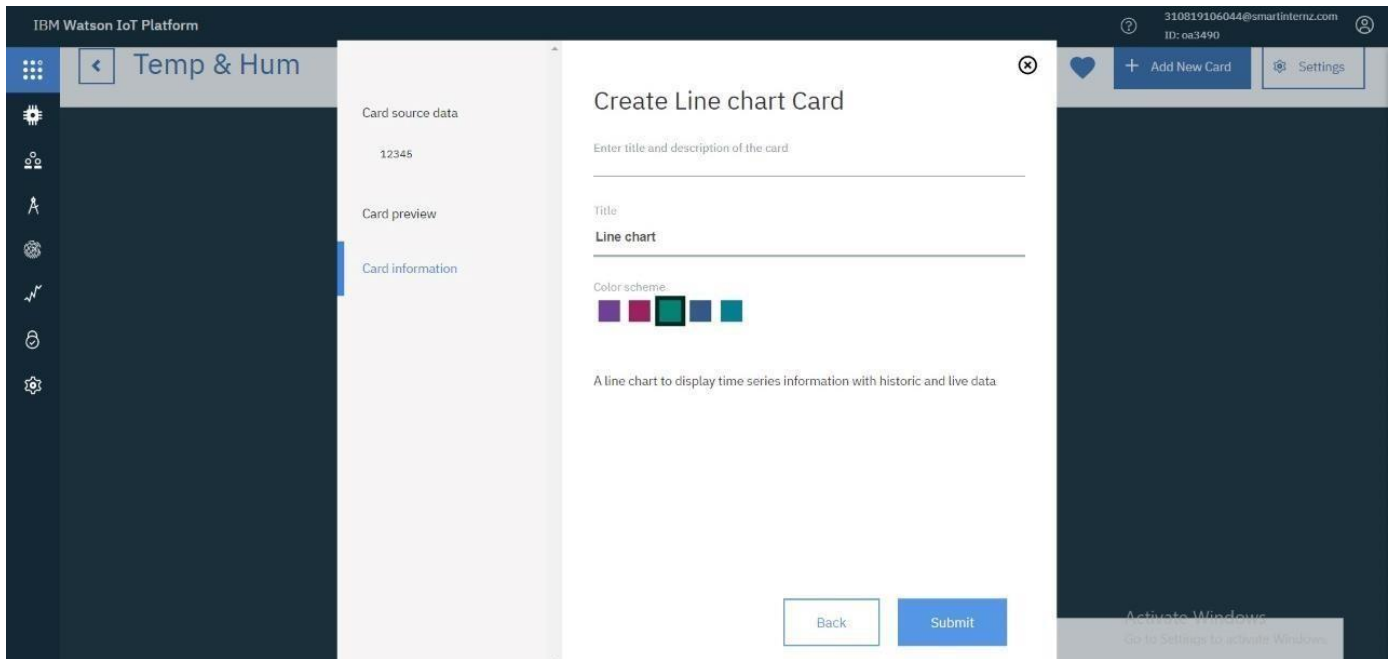
### ○ Select the type of Graph u want accordingly and click next

The screenshot shows the same IBM Watson IoT Platform dashboard, but with the "Create Card" dialog box open. The dialog has a title "Create Card" and a section "Card type" with the instruction "Select card type". Below this, there is a "Devices" section displaying a grid of card templates. The templates include: "Generic visualisation", "Line chart", "Bar chart", "Donut chart", "Value", "Gauge", "Semaphore", "Device Properties", and several other icons. The background dashboard shows the same "AABG" board and "1 Simulation running" status.

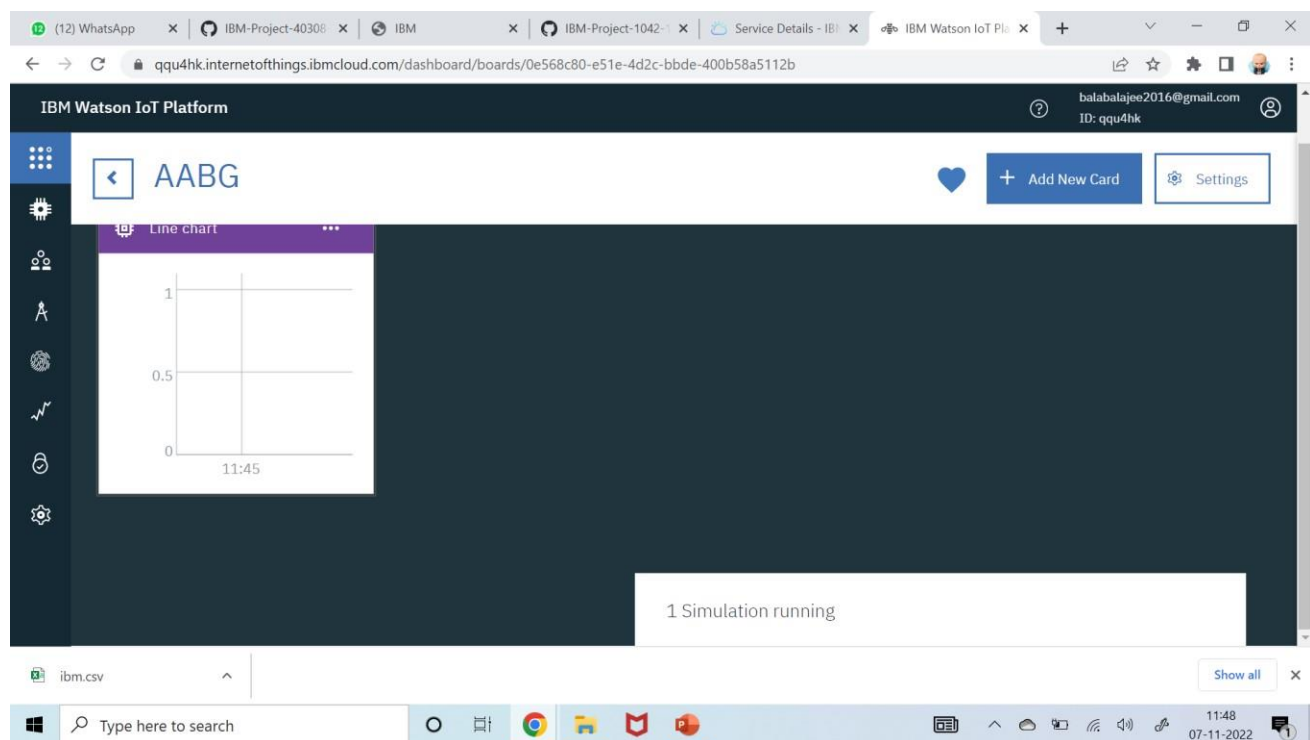
- You get the below window, choose the Device and click on Next.



- Select the event, properly to be visualized on your graph and click next. In my case it is humidity
- Then select the size of the graph and color of the graph board you want and click next



○ 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.