

Team id:PNT2022TMID49101

**PROJECT NAME:SMART WASTE MANAGEMENT SYSTEM FOR
METROPOLITAN CITIES**

SPRINT 2

DEVELOP A PYHTON SCRIPT

```
from opencage.geocoder import OpenCageGeocode
```

```
key = YOUR_API_KEY
```

```
geocoder = OpenCageGeocode(key)
```

```
query = 'Bijuesca, Spain'
```

```
results = geocoder.geocode(query)
```

```
print (results)
```

```
lat = results[0]['geometry']['lat']
```

```
lng = results[0]['geometry']['lng']
```

```
print (lat, lng)
```

```
list_lat = []
```

```
list_long = []
```

```
for index, row in df_crime_more_cities.iterrows():
```

```
    City = row['City']
```

```
    State = row['State']
```

```
    query = str(City)+','+str(State)
```

```
    results = geocoder.geocode(query)
```

```
    lat = results[0]['geometry']['lat']
```

```
    long = results[0]['geometry']['lng']
```

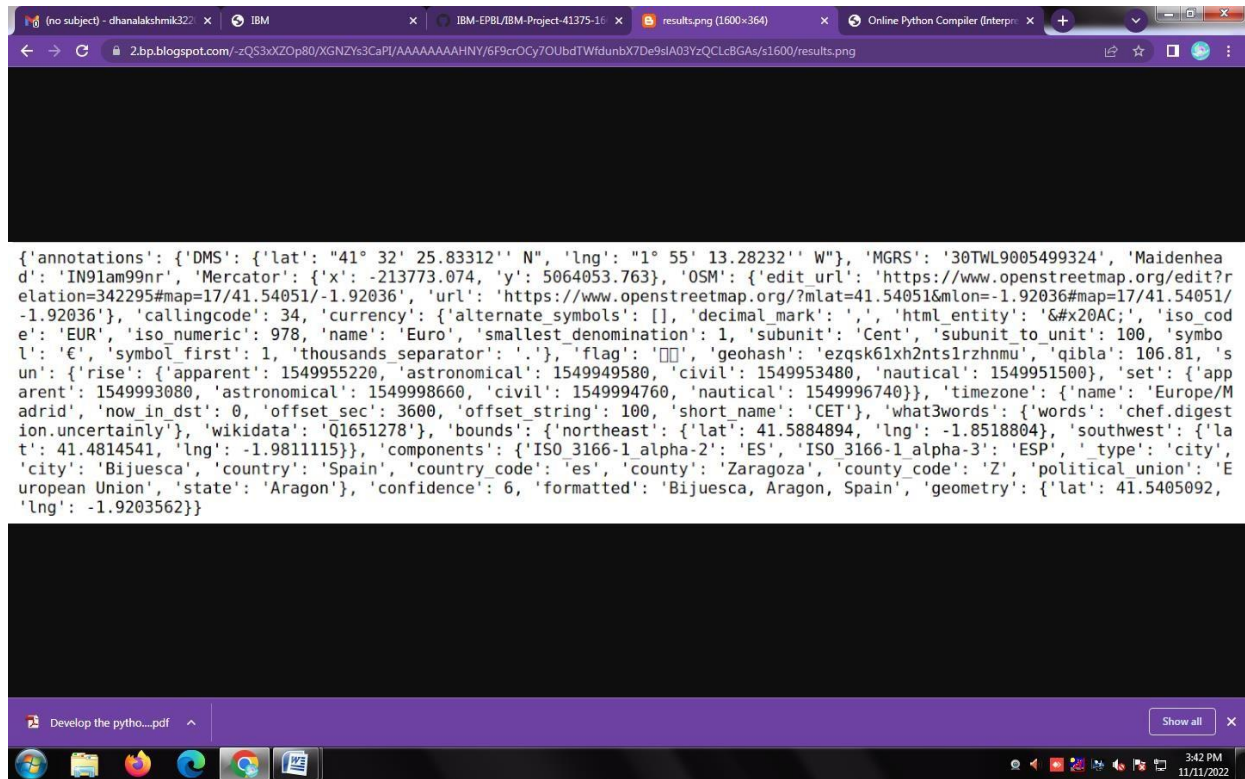
```
    list_lat.append(lat)
```

```
    list_long.append(long)
```

```
df_crime_more_cities['lat'] = list_lat
df_crime_more_cities['lon'] = list_long
```

OUTPUT:-

41.5405092 -1.9203562



City	State	1985	1986	1987	1988	1989	1990	1991	...	2007	2008	2009	2010	2011	2012	2013	2014	lat	lon
Birmingham	AL	34.4	30.7	29.8	32.5	36.0	47.0	51.6	...	37.8	35.9	28.6	NaN	25.3	31.4	29.7	24.5	33.520682	-86.802433
Huntsville	AL	7.3	12.5	9.7	9.2	7.5	11.3	NaN	...	12.4	10.4	7.3	6.7	7.2	7.6	13.0	8.0	34.729847	-86.585901
Jefferson County Sheriff Department	AL	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	31.294218	-86.381475
Madison County Sheriff Department	AL	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	34.714507	-86.738861
Mobile County Sheriff Department	AL	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	30.690208	-88.104363
Mobile	AL	12.6	22.6	15.6	15.6	19.1	20.9	20.1	...	15.0	16.7	9.7	10.0	11.9	12.7	11.6	12.4	30.694357	-88.043054
Montgomery	AL	11.8	11.2	11.2	12.9	17.0	18.2	19.0	...	22.8	11.3	15.3	12.1	15.0	21.1	1.5	17.5	32.366966	-86.300648
Anchorage	AK	6.1	7.1	6.5	6.0	4.9	4.4	10.7	...	7.7	3.6	4.9	4.5	4.0	5.0	4.7	4.0	61.216313	-149.894852
Chandler	AZ	0.0	5.6	1.4	2.8	1.2	1.1	7.6	...	3.6	2.4	2.0	2.5	0.8	1.6	0.8	0.4	33.306713	-111.840849
Gilbert	AZ	13.9	11.8	7.4	0.0	0.0	3.4	0.0	...	0.5	0.0	1.7	2.4	0.9	2.3	0.4	0.0	33.352826	-111.789024
Glendale	AZ	7.6	5.7	9.9	9.0	4.2	10.1	5.3	...	6.0	6.6	7.1	5.3	9.6	5.2	5.6	8.4	33.558997	-112.404683

SENDING DATA FROM RASPBERRY-PI TO IBM WATSON

AIM:

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

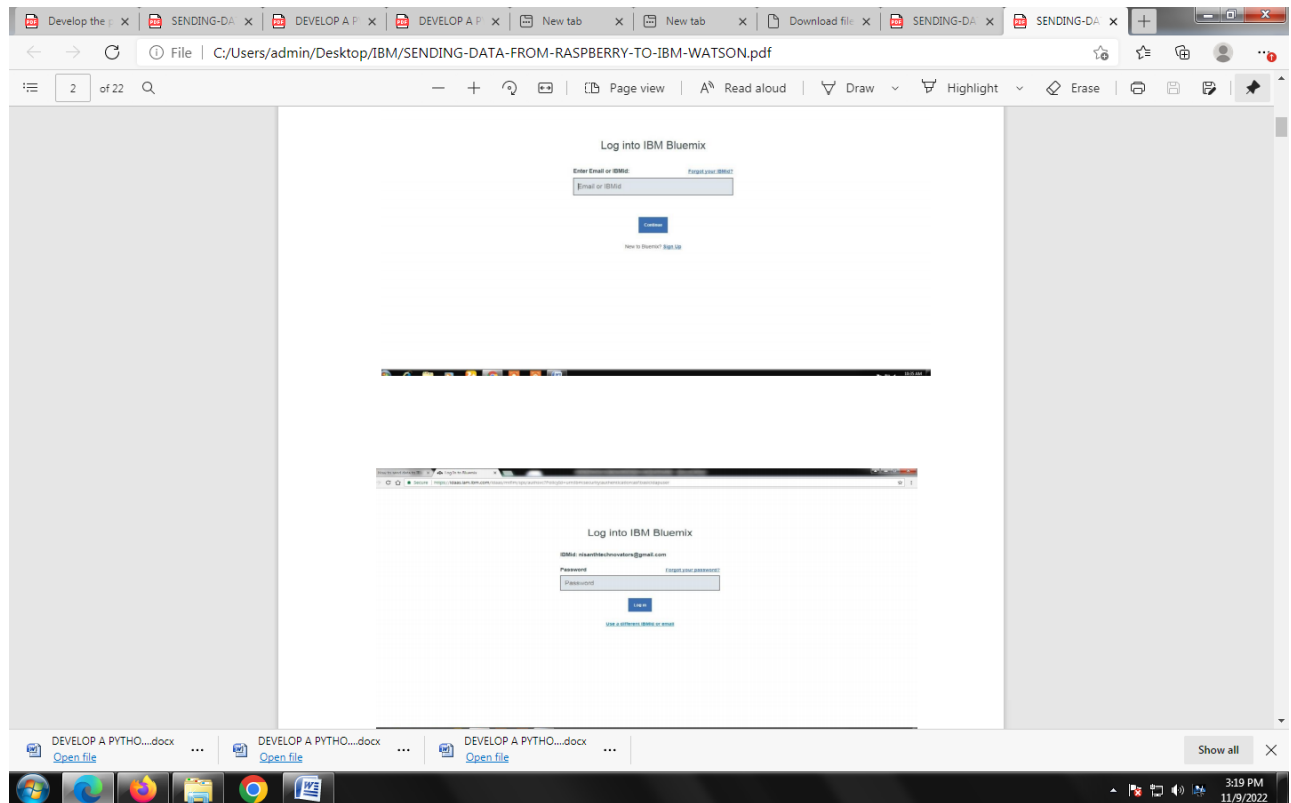
REQUIREMENTS: HARDWARE:

- 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

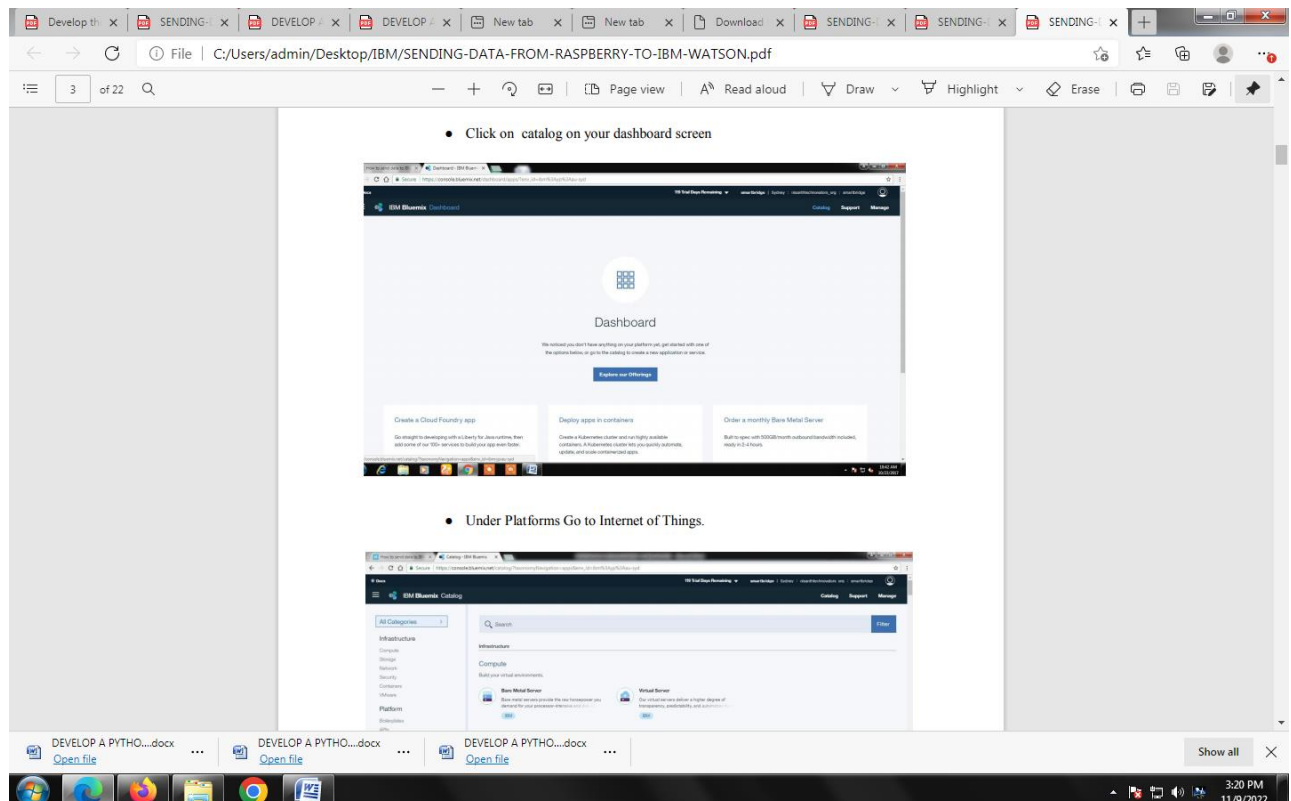
SOFTWARE: ● IBM BLUEMIX ACCOUNT

STEPS INVOLVED:

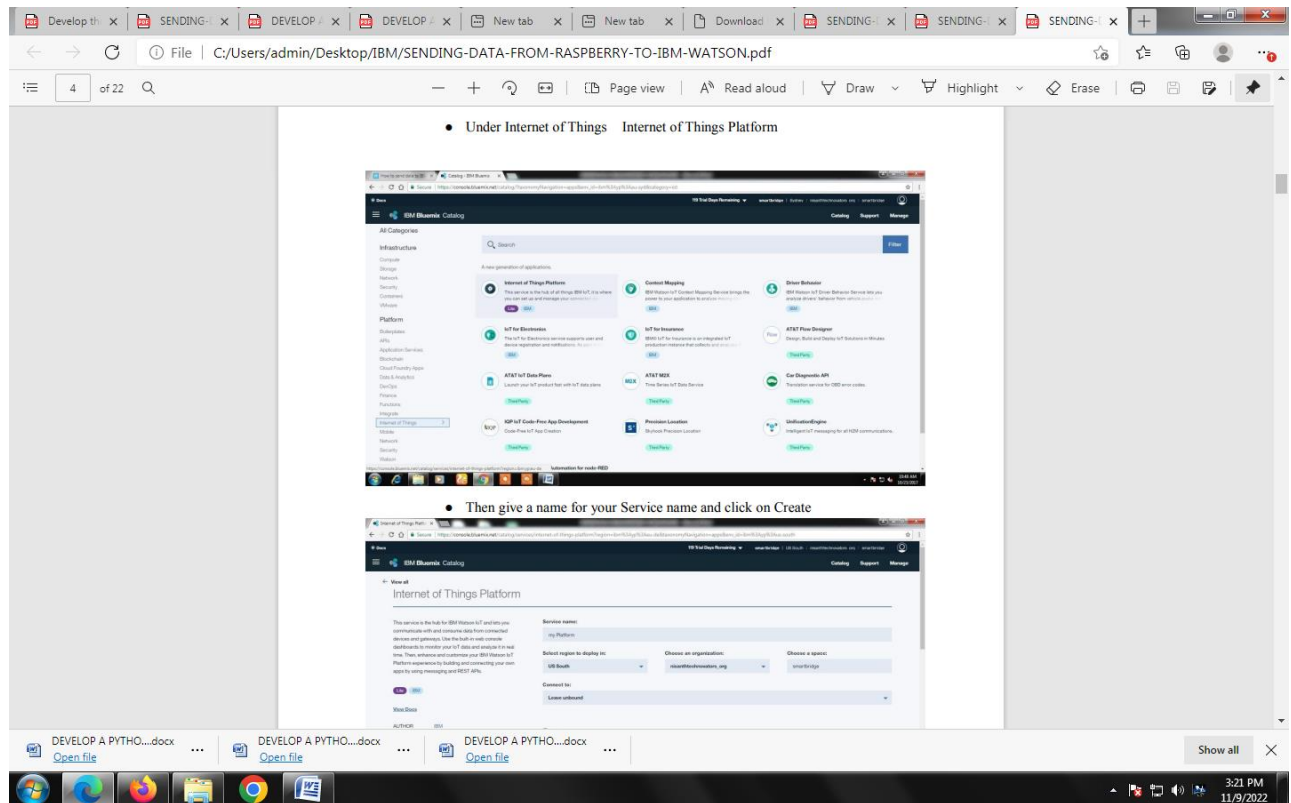
Step-1: Create a device in IBM Watson: ● Firstly, login into your IBM-Bluemix account with your e-mail ID and Password.



- Click on catalog on your dashboard screen

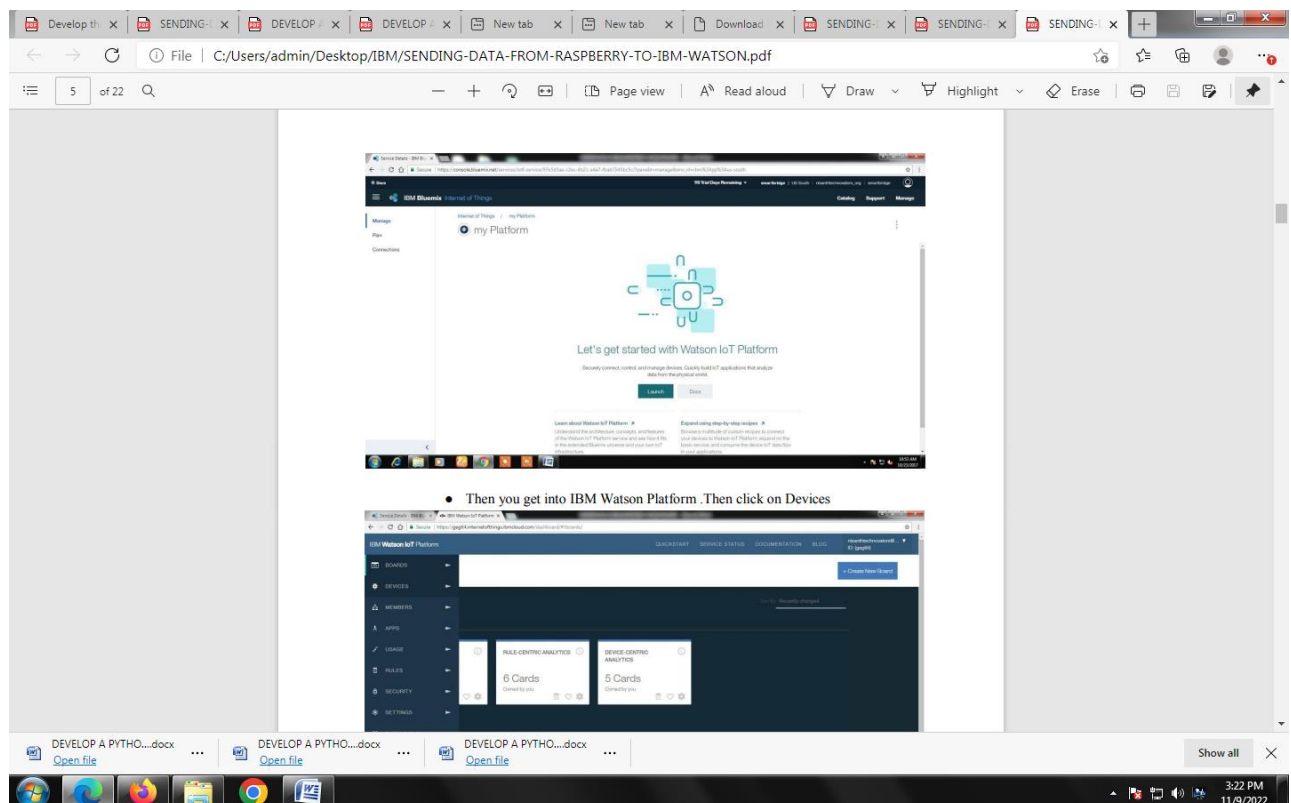


- Under Platforms Go to Internet of Things.
- Under Internet of Things Internet of Things Platform



• Then give a name for your Service name and click on Create

• After getting into your service click on Launch



- Then you get into IBM Watson Platform .Then click on Devices
- When you get into Devices you find a button called +Add Device click on it.
- Then you get a window where you should click on Create Device Type.

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Page view | Read aloud | Draw | Highlight | Erase

IBM Watson IoT Platform

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 ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Disconnected	NodeMCU	Device	Nov 3, 2022 2:44 PM	
123456	Disconnected	NodeMCU	Device	Nov 3, 2022 3:39 PM	

Items per page: 50 | 1-2 of 2 items | 1 of 1 page

- Then you get a window where you should click on Create Device Type.
- Then you will get an another window asking whether to create a device type or gateway type. Click on "Create a Device Type"

DEVELOP A PYTHON...docx ... DEVELOP A PYTHON...docx ... DEVELOP A PYTHON...docx ...

Show all

3:22 PM 11/9/2022

• Then you will get an another window asking whether to create a device type or gateway type. Click on "Create a Device Type"

Develop th x SENDING- x DEVELOP x DEVELOP x New tab x New tab x Download x SENDING- x SENDING- x SENDING- x

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Page view | Read aloud | Draw | Highlight | Erase

IBM Watson IoT Platform

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: Select or create a device type...

Device ID: Enter Device ID

Cancel Next

Browse Devices

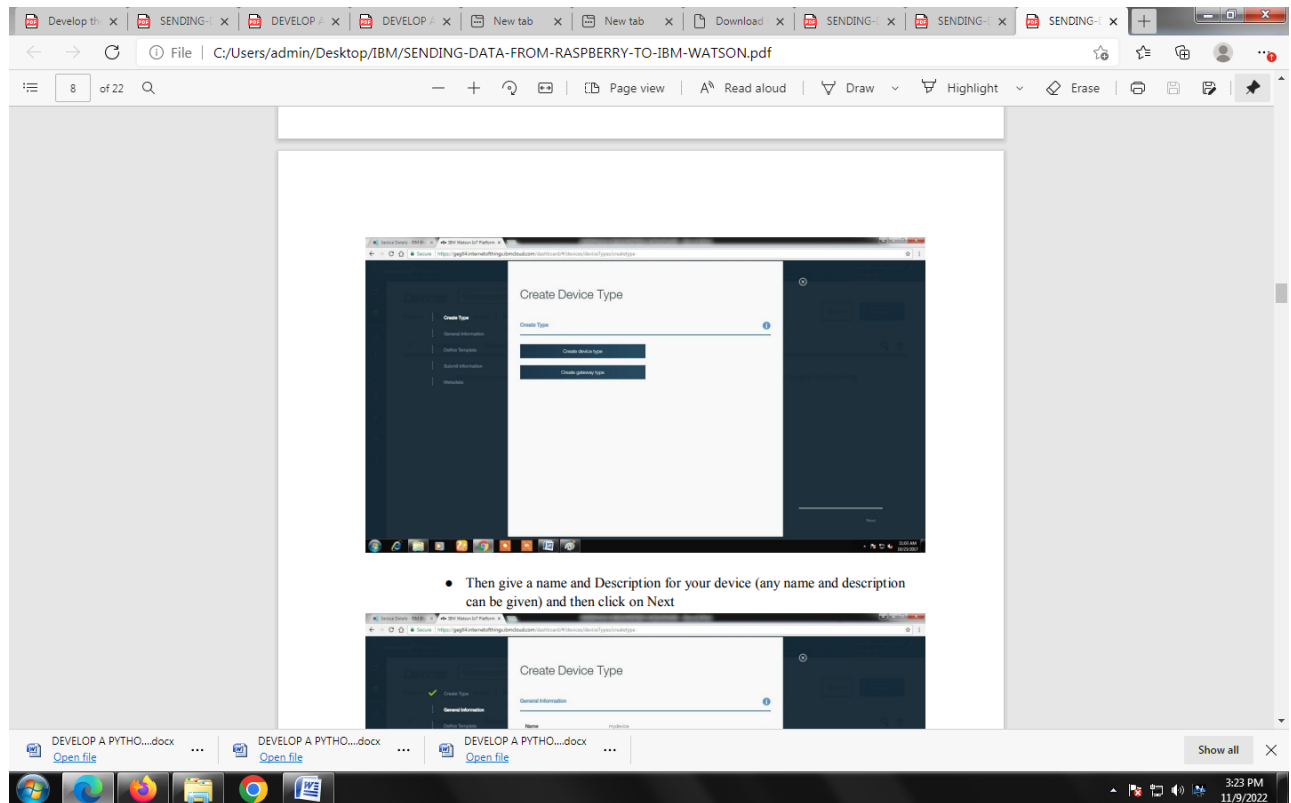
All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria.

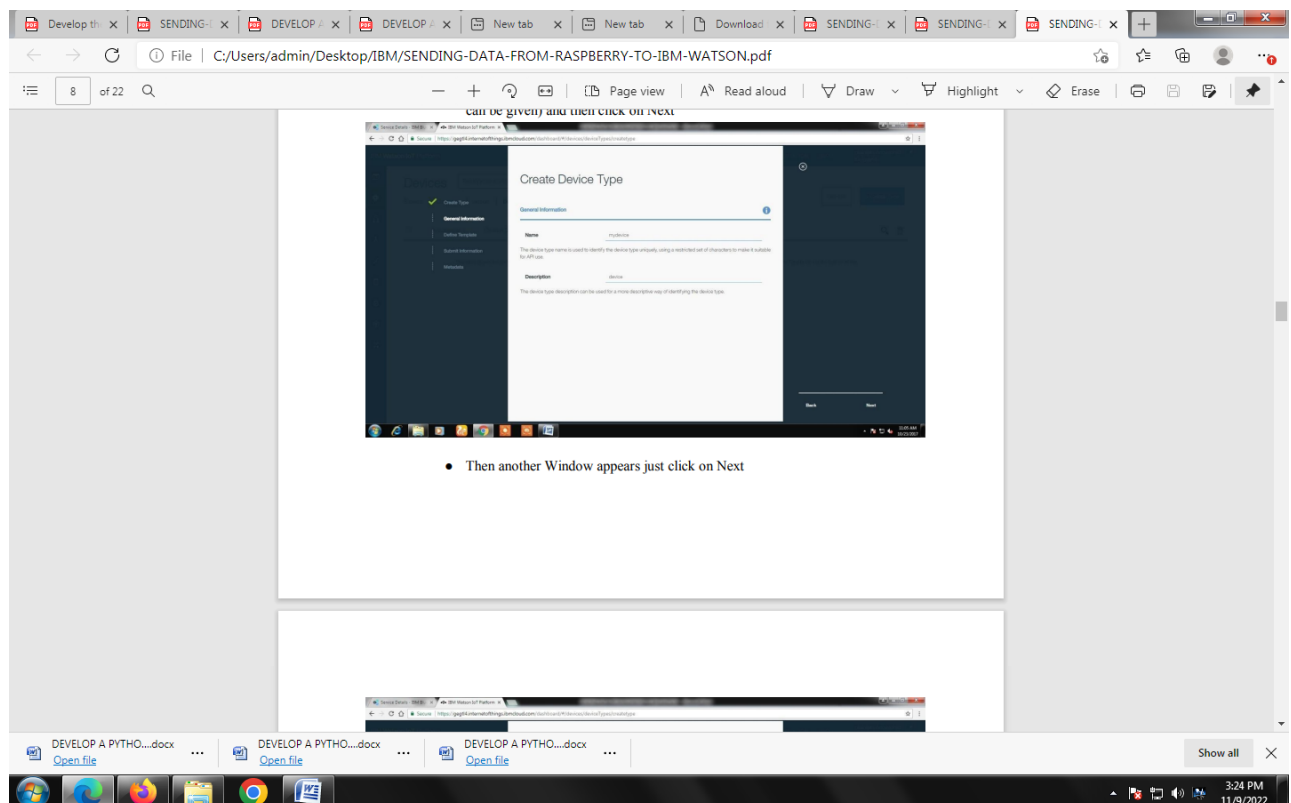
DEVELOP A PYTHON...docx ... DEVELOP A PYTHON...docx ... DEVELOP A PYTHON...docx ...

Show all

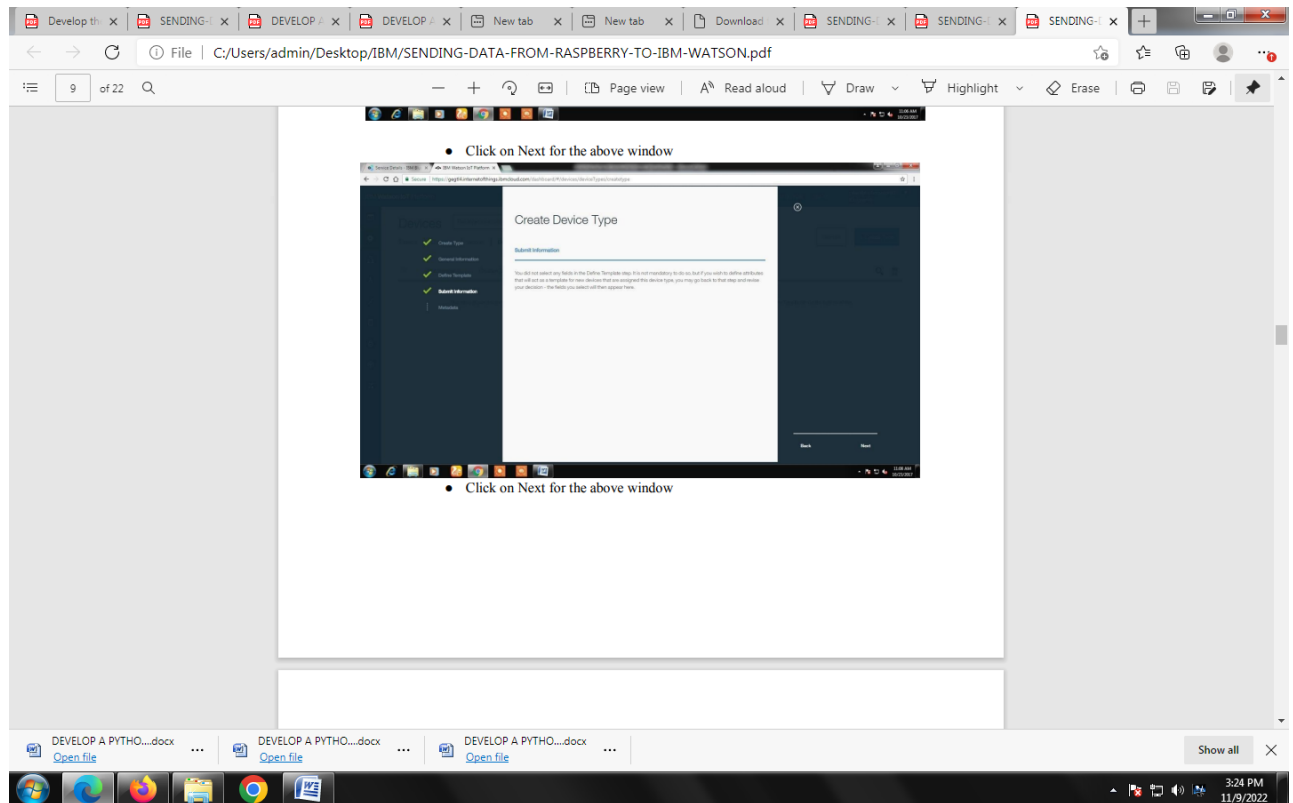
3:23 PM 11/9/2022



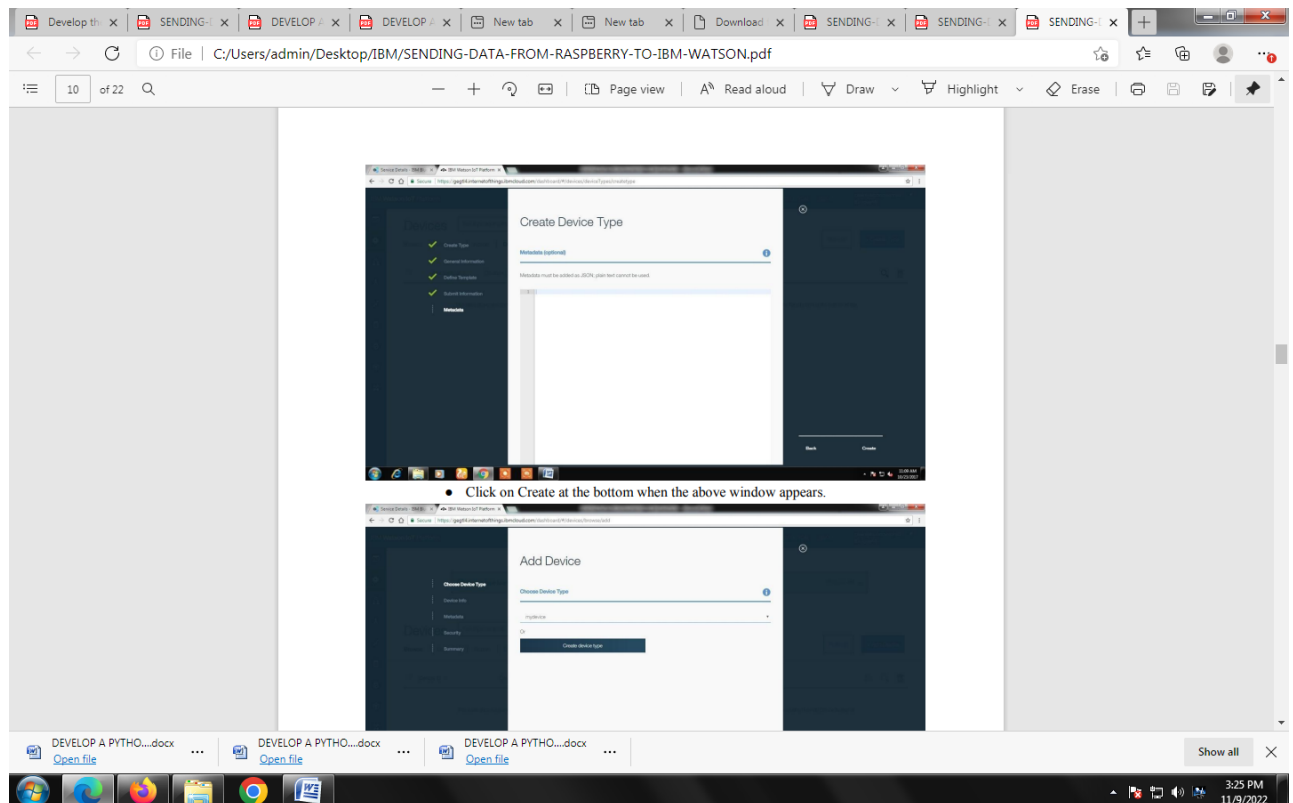
- Then give a name and Description for your device (any name and description can be given) and then click on Next



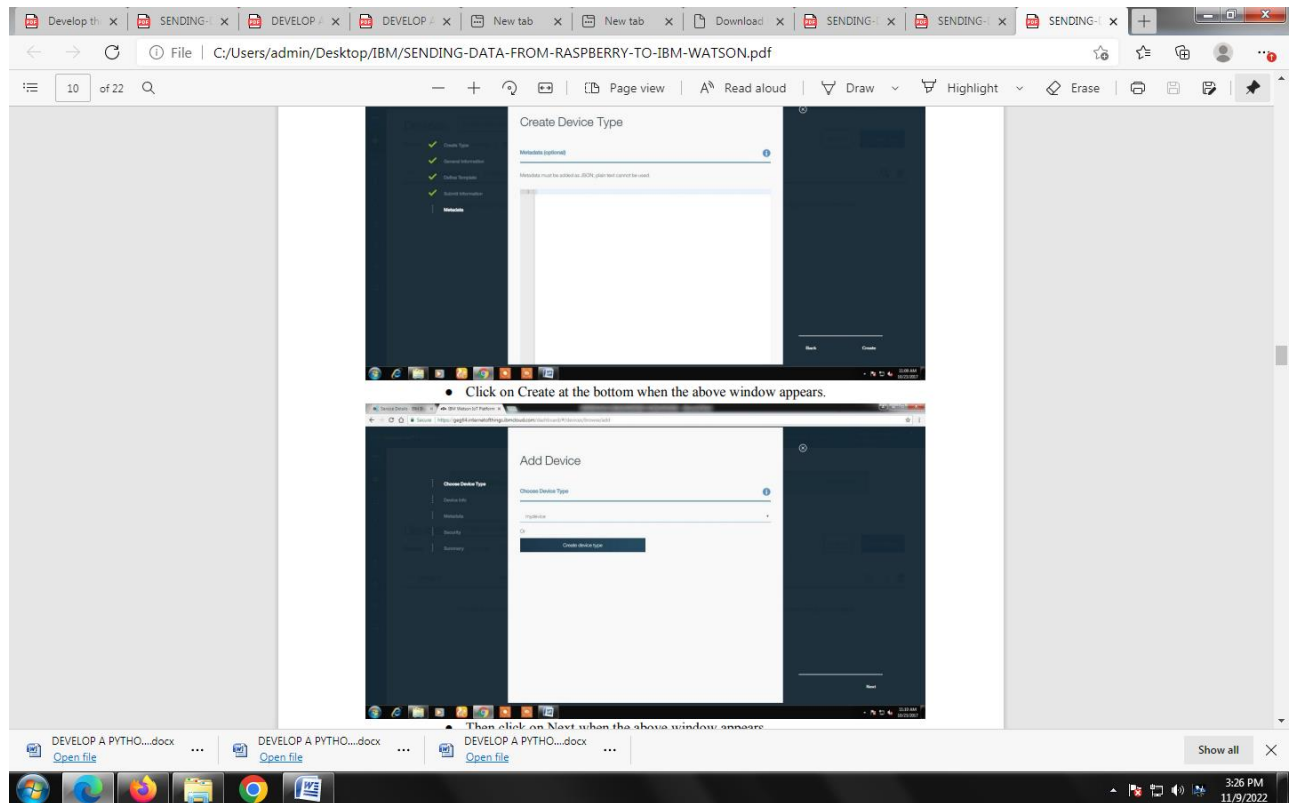
- Then another Window appears just click on Next



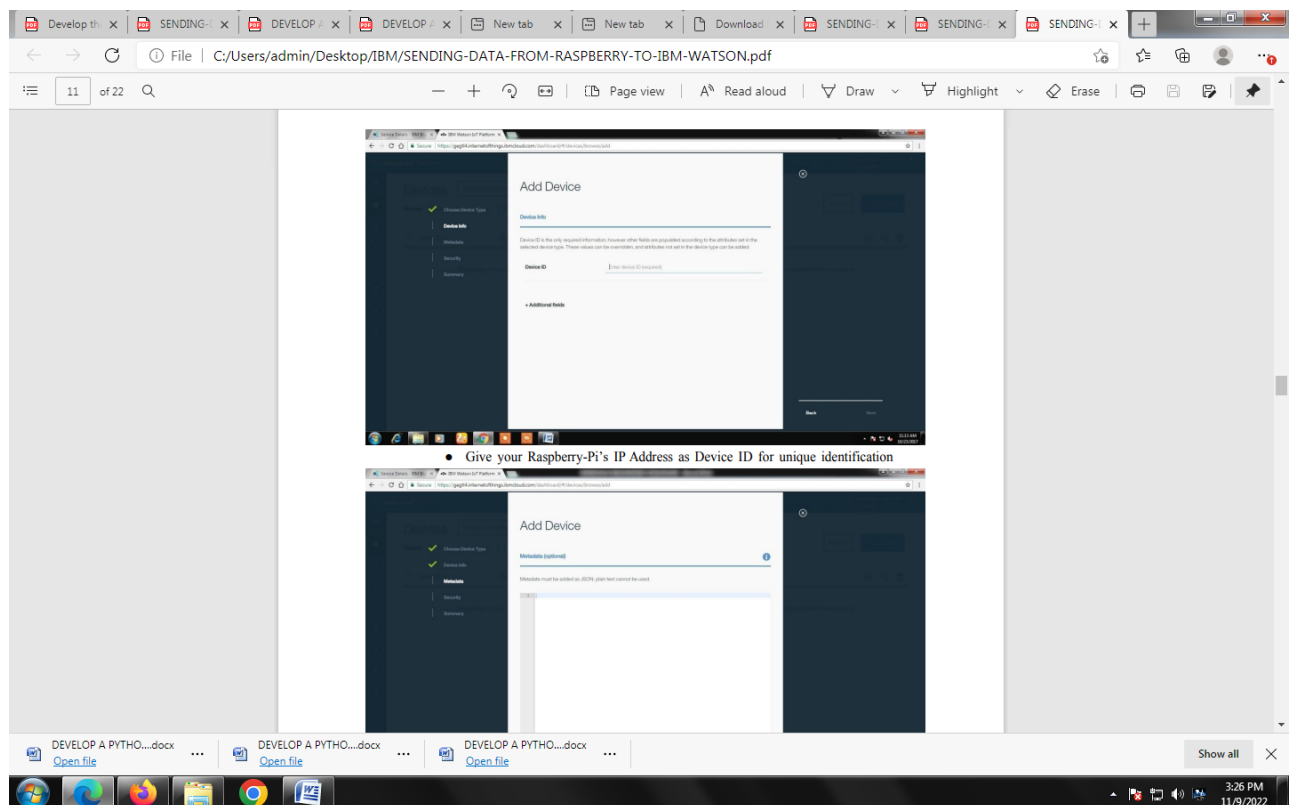
- Click on Next for the above window



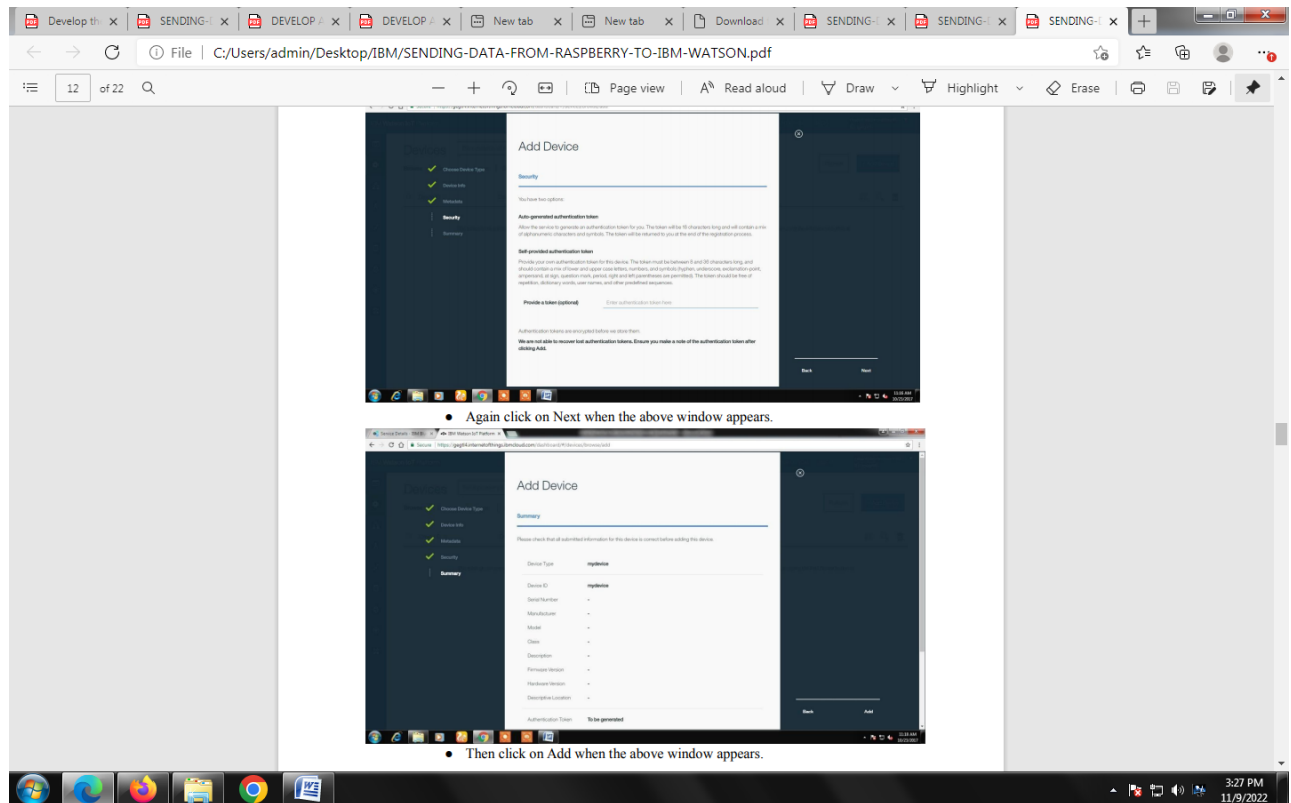
- Click on Next for the above window



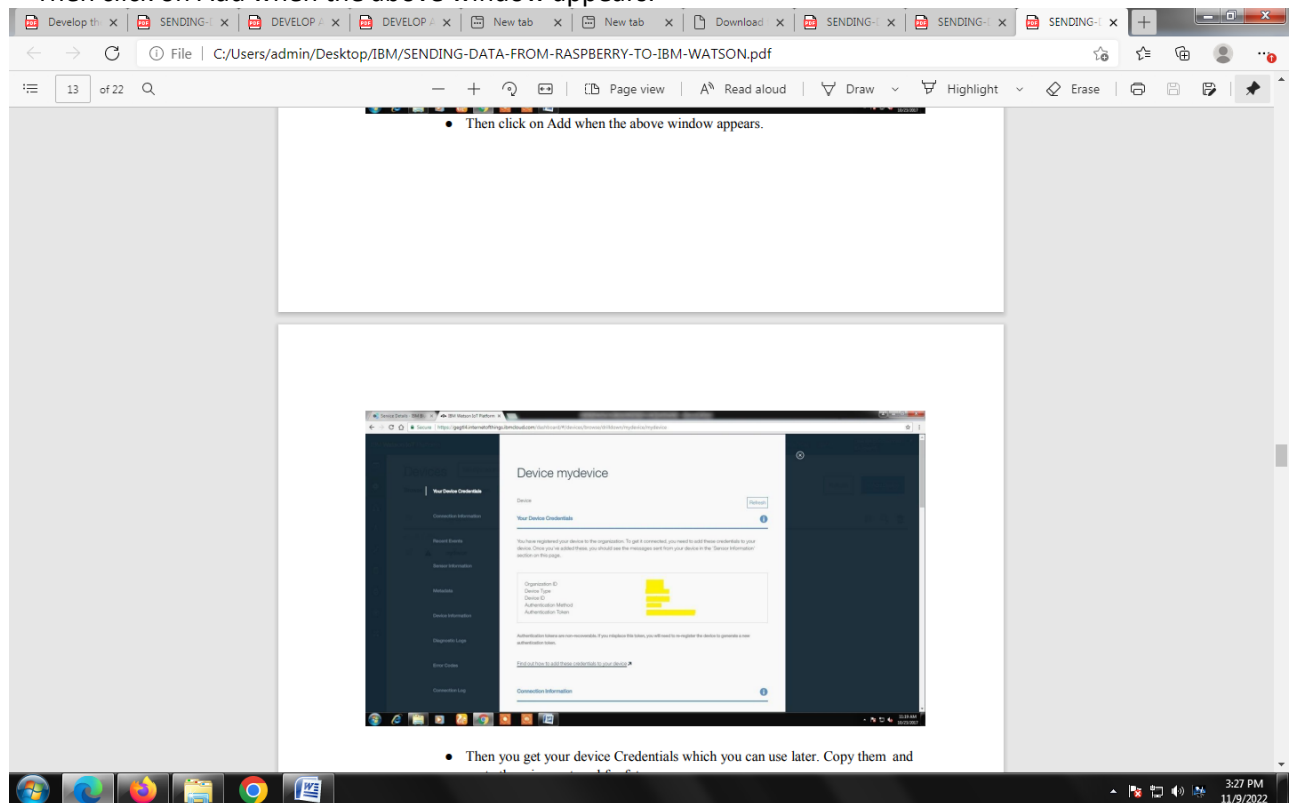
- Click on Create at the bottom when the above window appears.



- Then click on Next when the above window appears.



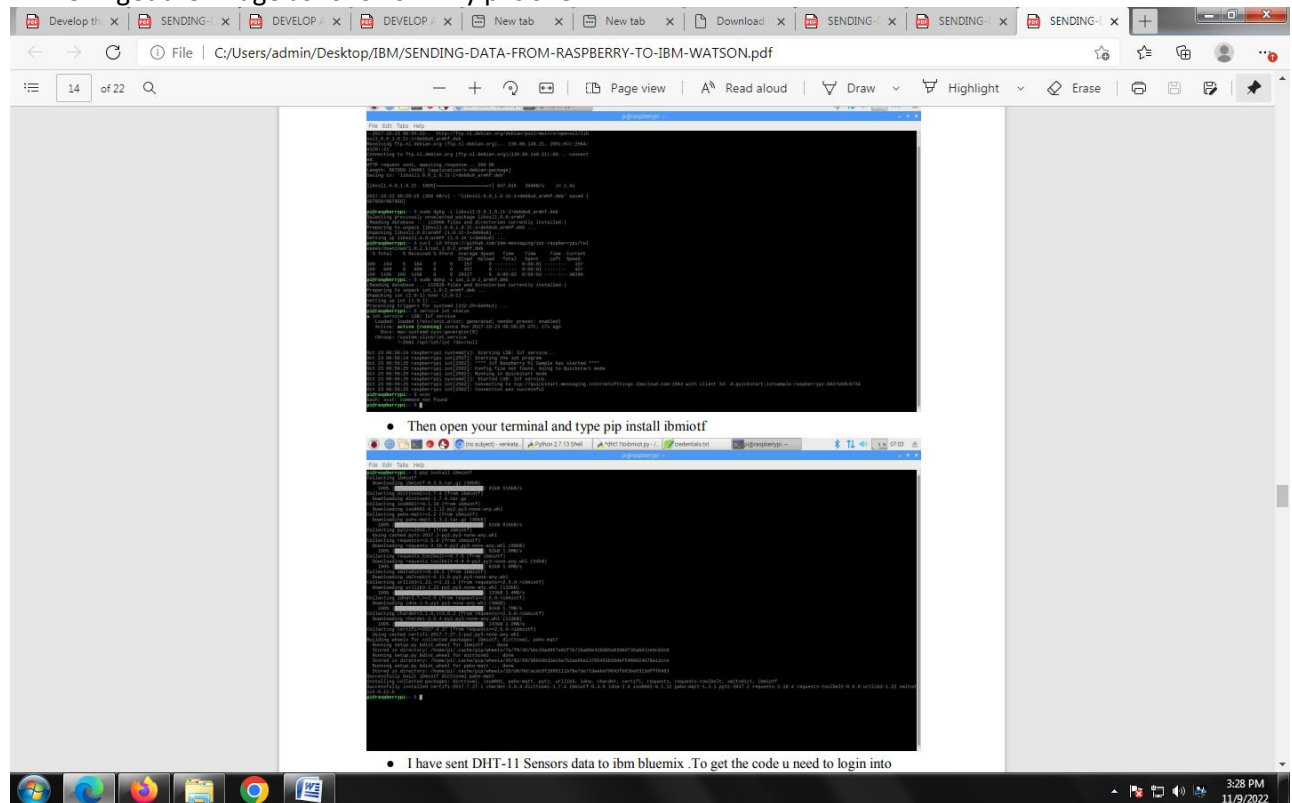
- Give your Raspberry-Pi's IP Address as Device ID for unique identification
- Click next when the above window appears.
- Again click on Next when the above window appears.
- Then click on Add when the above window appears.



- Then you get your device Credentials which you can use later. Copy them and paste them in a notepad for future uses.

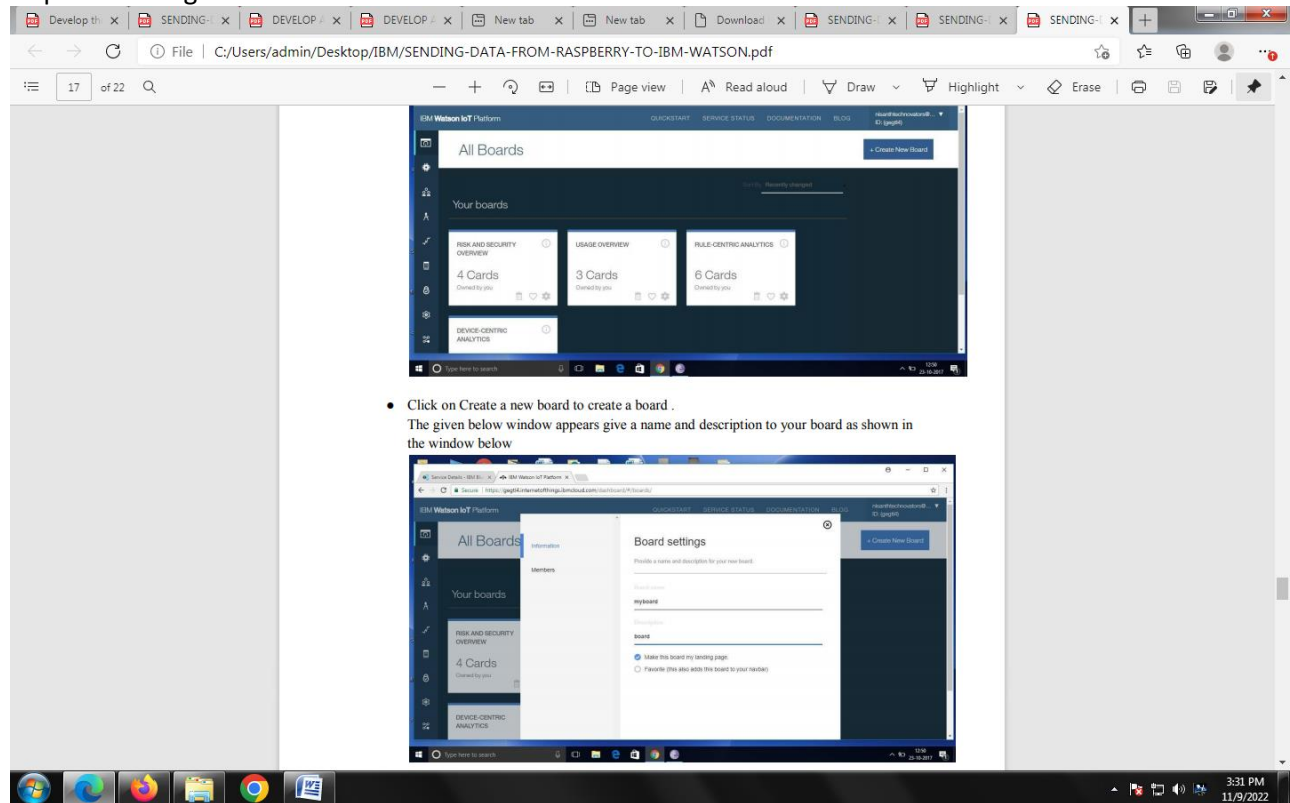
STEP-2: INSTALLING NECESSARY PACKAGES ON YOUR PI:

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

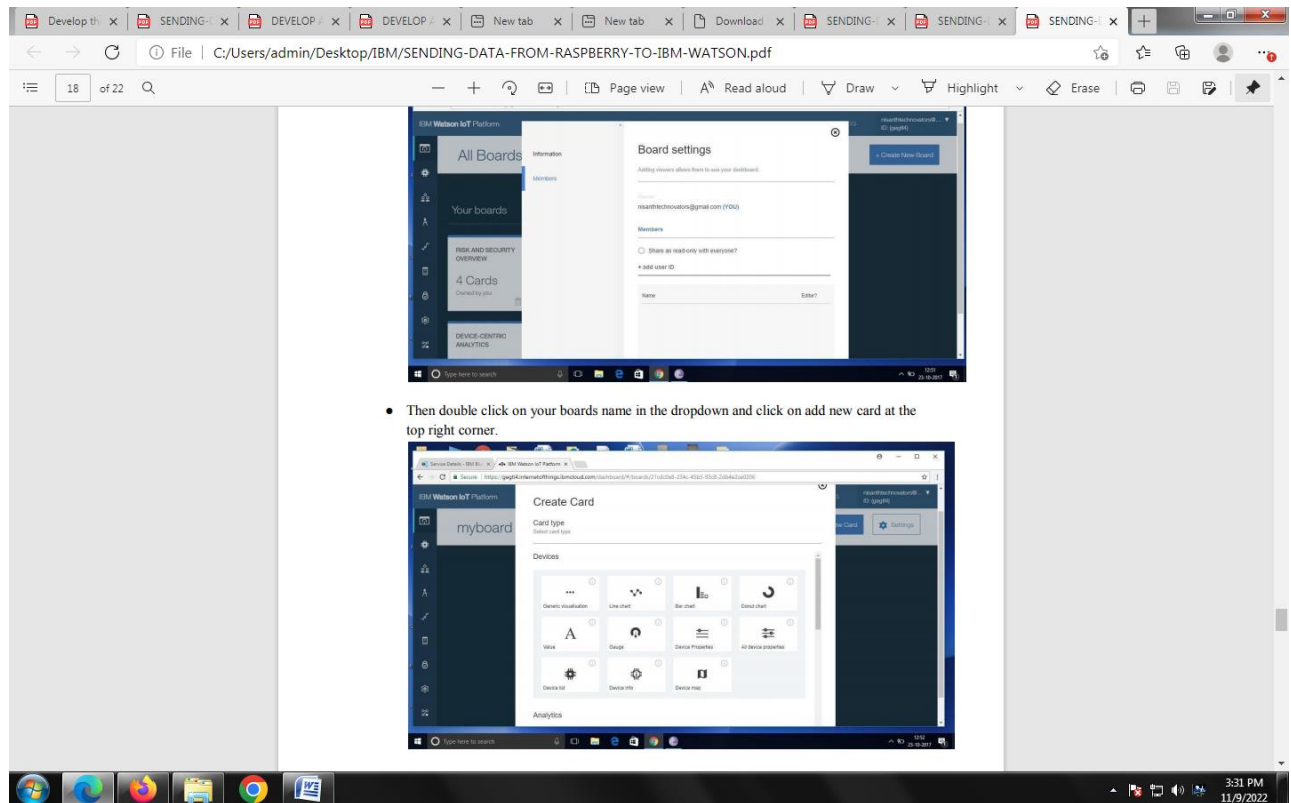


- After double clicking on your created device you can see the received data as shown in image

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

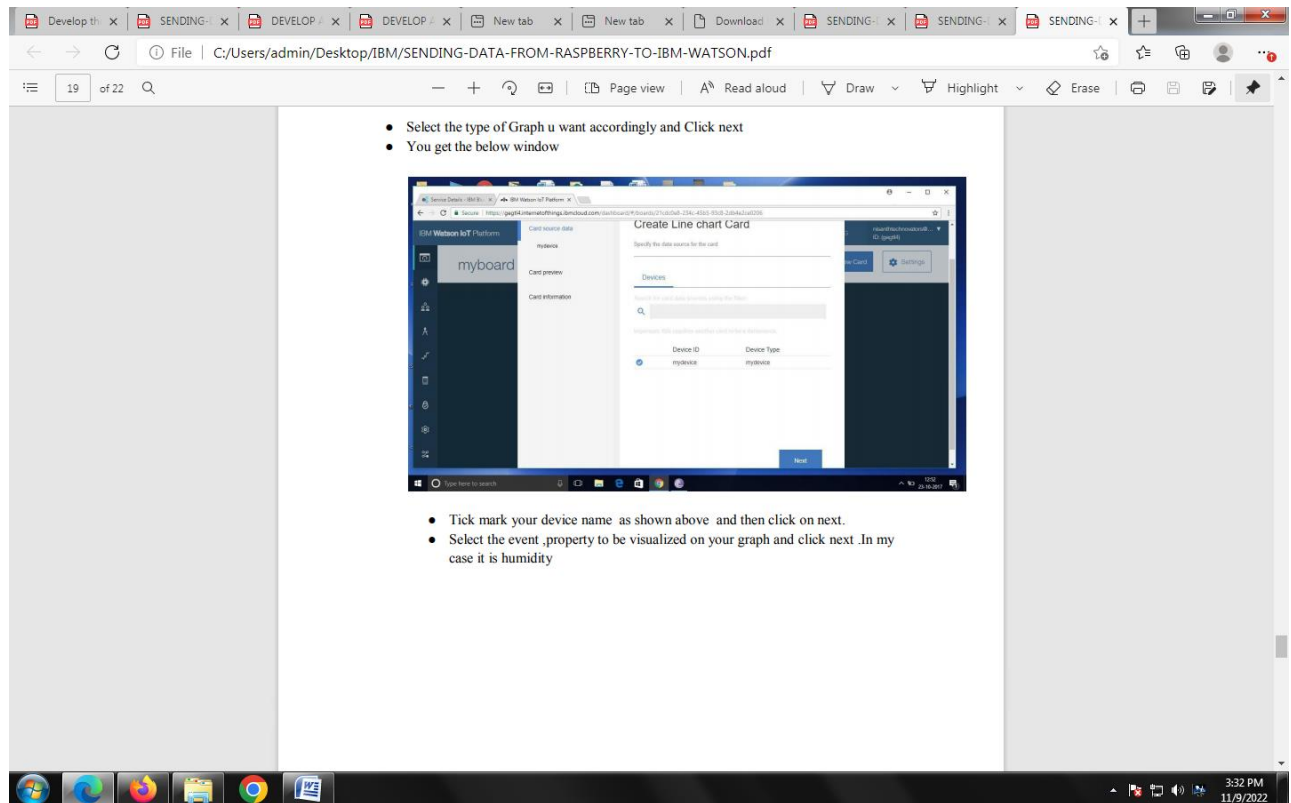


- In your Watson platform you have an option called board .Click on it and you get the following window on your screen

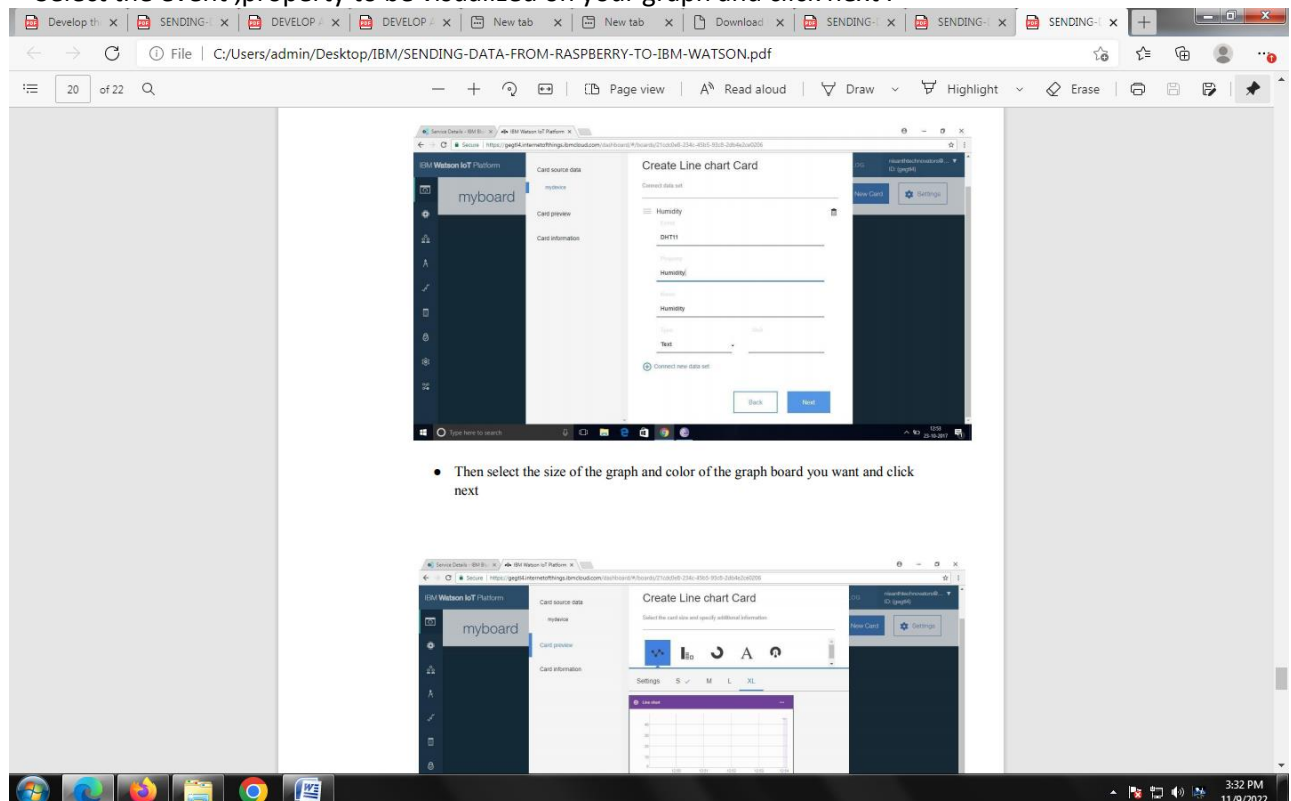


- Then double click on your boards name in the dropdown and click on add new card at the top right corner.

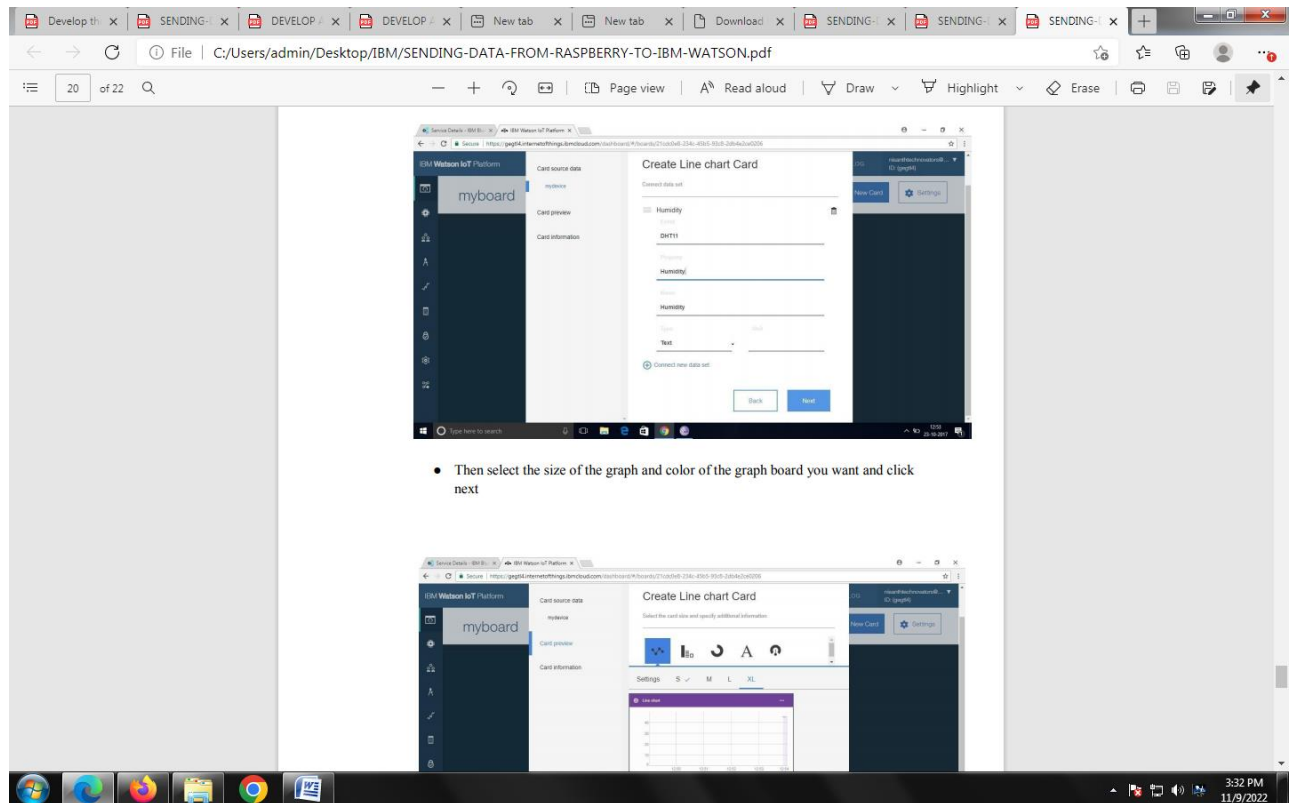
- Click on Create a new board to create a board . The given below window appears give a name and description to your board as shown in the window below
- Then click on Next you get the below window then again click on ADD
- Then double click on your boards name in the dropdown and click on add new card at the top right corner.
- Select the type of Graph u want accordingly and Click next
- You get the below window



- Tick mark your device name as shown above and then click on next.
- Select the event ,property to be visualized on your graph and click next .

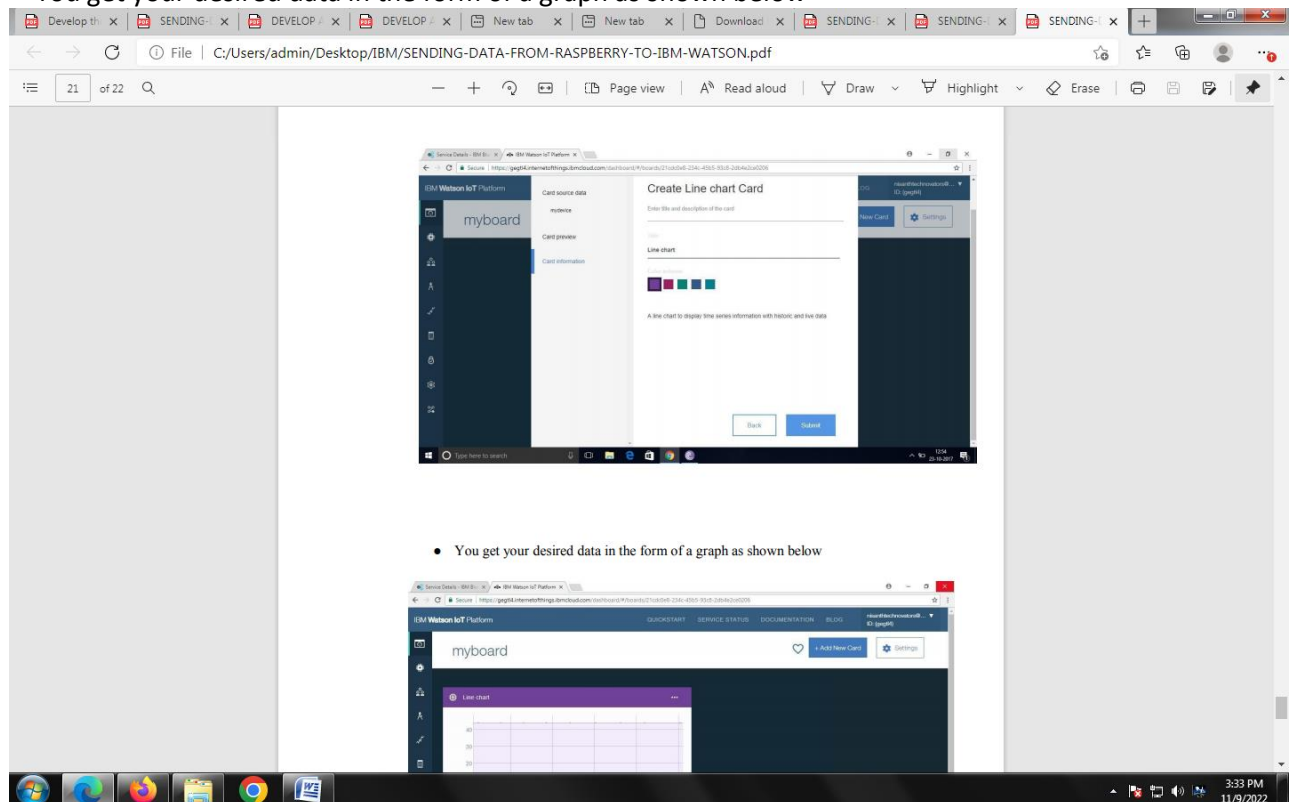


- Then select the size of the graph and color of the graph board you want and click next



In my case it is humidity

- Then select the size of the graph and color of the graph board you want and click next
- You get your desired data in the form of a graph as shown below



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