

SENDING DATA FROM RASPBERRY-PI TO IBM WATSON

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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.

The screenshot displays the IBM Cloud IoT Platform console. The browser's address bar shows the URL: `cloud.ibm.com/services/iotf-service/crn%3Av1%3Abluemix%3Apublic%3Aaio%3Aeu-gb%3Aa2f1a346facfb6a4e40be660b003811019f%3A21a5...`. The page header includes the IBM Cloud logo, a search bar, and navigation links for Catalog, Manage, and the user's account (Santhosh Vaitil's Acco...). The main content area features a sidebar with 'Manage' (Plan, Connections) and a central panel titled 'Internet of Things Platform-qn' with a status of 'Active'. A large graphic of a central node connected to various devices is shown. To the right, a section titled 'Let's get started with IBM Watson IoT Platform' provides instructions on securely connecting, controlling, and managing devices, with 'Launch' and 'Docs' buttons. A 'Ready for the next level?' message is at the bottom. The taskbar at the bottom shows several open documents related to sending data and Python code, along with system icons and the date/time (11:08, 14-11-2022).

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 06:55:22-- http://ftp.nl.debian.org/debian/pool/main/o/openssl/libssl1.0.0_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 ... 115606 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 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 - 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)
   CGroup: /system.slice/iot.service
           └─602 /opt/iot/iot /dev/null

Oct 23 06:56:24 raspberrypi systemd[1]: Starting LSB: iot service...
Oct 23 06:56:24 raspberrypi iot[2567]: 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`

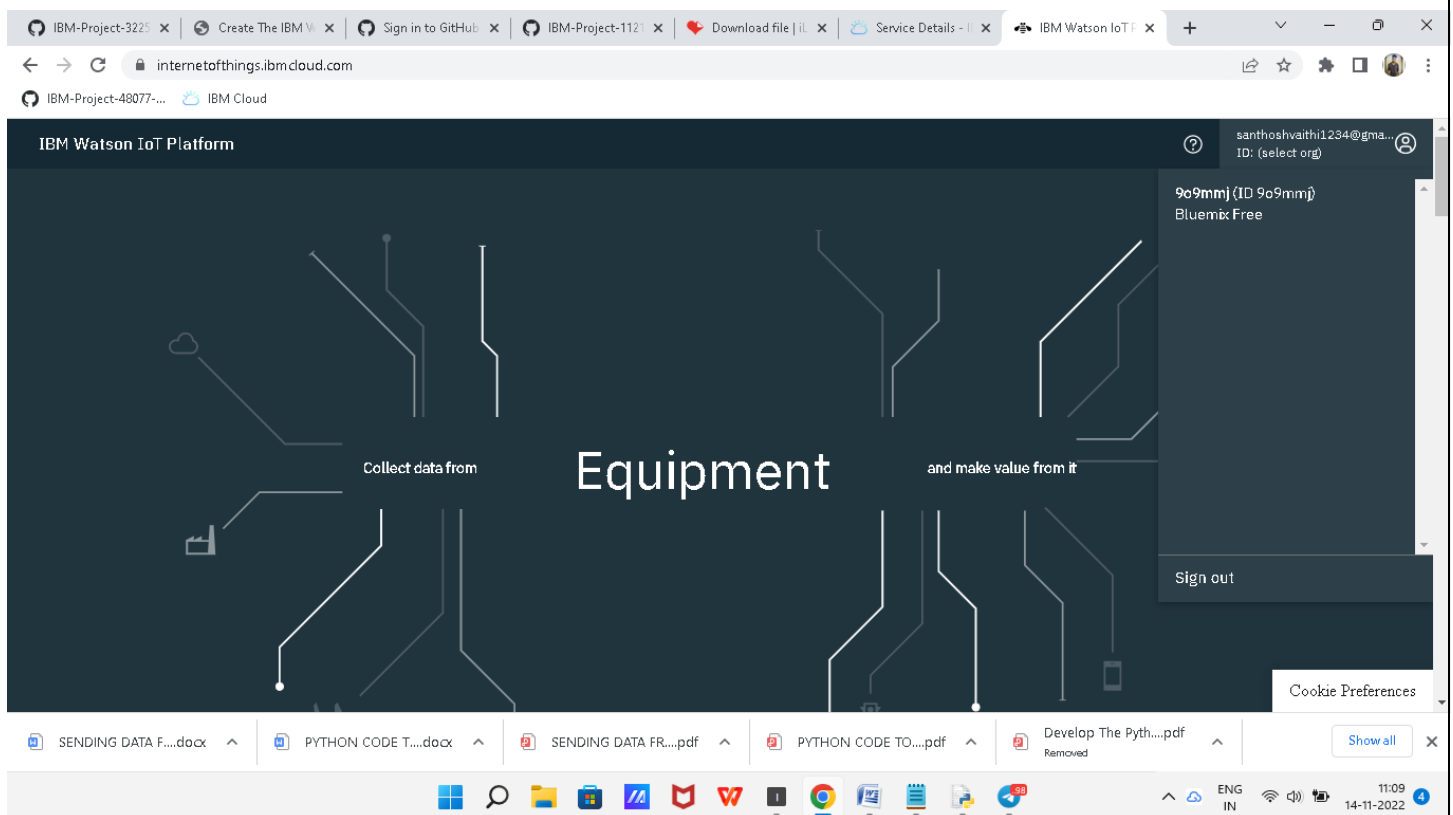
```
File Edit Tabs Help
pi@raspberrypi:~$ pip install ibmiotf
Collecting ibmiotf
  Downloading ibmiotf-0.3.0.tar.gz (59kB)
    100% |#####| 61kB 510kB/s
Collecting dicttoxml>=1.7.4 (from ibmiotf)
  Downloading dicttoxml-1.7.4.tar.gz
Collecting iso8601>=0.1.10 (from ibmiotf)
  Downloading iso8601-0.1.12-py2.py3-none-any.whl
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>=0.18.2 (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 (132kB)
    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 1.9MB/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
Stored in directory: /home/pi/.cache/pip/wheels/7e/f9/45/bbc33ad957e02f7b71ba80e316d65a83d9d735a0d12e0c0418
Running setup.py bdist_wheel for dicttoxml
Stored in directory: /home/pi/.cache/pip/wheels/45/62/59/96910b33ec6a7b2ae66a13765491b50def5468024078e12cce
Running setup.py bdist_wheel for paho-mqtt
Stored in directory: /home/pi/.cache/pip/wheels/28/d8/0d/acdc8f289011b7be7de71deebef6642fb3be9313dfff0493
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:

```
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 =====
2017-10-23 07:10:37,768 ibmiotf.device.Client INFO Connected successfully: d:gegtl4: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
SensorData Invalid
Published Temperature = 28 C Humidity = 50 % to IBM Watson
Published Temperature = 29 C Humidity = 50 % to IBM Watson
```

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 Watson IoT Platform

Browse Action Device Types Interfaces

Add Device

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	{"temperature":31,"humidity":79}	json	a few seconds ago
event_1	{"temperature":42,"humidity":81}	json	a few seconds ago
event_1	{"temperature":13,"humidity":77}	json	a few seconds ago
event_1	{"temperature":9,"humidity":72}	json	a few seconds ago
event_1	{"temperature":25,"humidity":71}	json	a few seconds ago

1 Simulation running

SENDING DATA F....docx PYTHON CODE T....docx SENDING DATA FR....pdf PYTHON CODE TO....pdf Develop The Pyth....pdf Removed Show all

ENG IN 11:12 14-11-2022

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

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

IBM Watson IoT Platform

Your boards Public boards

Create New Board

TESTDEVICES No cards Owned by you

USAGE OVERVIEW 3 Cards Owned by you

RISK AND SECURITY OVERVIEW 4 Cards Owned by you

Boards shared with you

1 Simulation running

SENDING DATA F....docx PYTHON CODE T....docx SENDING DATA FR....pdf PYTHON CODE TO....pdf Develop The Pyth....pdf Removed Show all

ENG IN 11:29 14-11-2022

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

The screenshot displays the IBM Watson IoT Platform interface. The browser address bar shows the URL: `9o9mmj.internetofthings.ibmcloud.com/dashboard/boards/64739042-8e94-48be-ba22-7c53adb545c8`. The left sidebar contains the 'testdevice' menu. The main content area is titled 'Select the card size and specify additional information'. It features a 'Card preview' section on the left and a 'Card information' section on the right. The 'Card preview' section shows a line chart titled 'Line chart' with a y-axis ranging from 0 to 100 and an x-axis showing time from 11:31 to 11:36. The chart displays a purple line representing 'humidity' data. The 'Card information' section includes a 'Settings' tab and a 'Back' button. The bottom of the screen shows a Windows taskbar with various application icons and a system tray with the date and time (11:35, 14-11-2022).

IBM Watson IoT Platform

testdevice

12345

Card preview

Card information

Select the card size and specify additional information

Settings S M L XL

Line chart

100 80 60 40 20 0

11:31 11:32 11:33 11:34 11:36

humidity

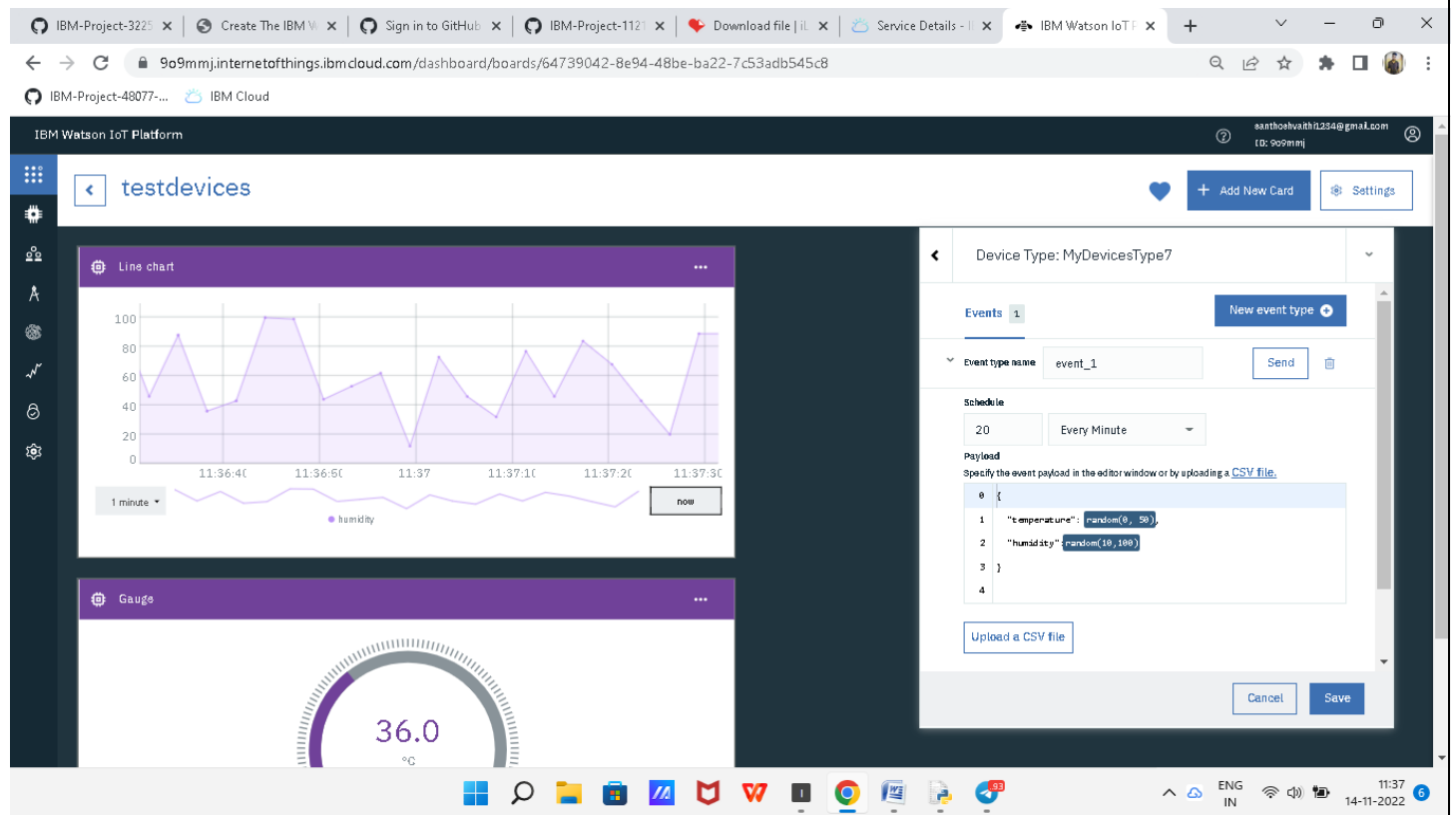
LOW

Back Next

santhoshvaithi1234@gmail.com ID: 9o9mmj

Add New Card Settings

ENG IN 11:35 14-11-2022



RESULT:

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