INTERNSHIP PROJECT REPORT
ON
INTERNET OF THINGS

Completed
at

Project Name

SPS-5884: Intelligent Water Distribution & Monitoring System

Submitted By

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Institute Name

Vidyalankar Institute of technolgy, Wadala

Mumbai.

Table of contents

CHAPTER-01

INTRODUCTION

1.1 OVERVIEW

Water is essential to our way of life and international water related issues include its short supply and uneven distribution. How to use water in a way that is in harmony with nature and the water cycle and how to reduce the usage of water by single user is still a matter of concern. To resolve these issues and establish infrastructure for water that is safe and gives users easy access to water and equal distribution this project has been proposed the “intelligent water distribution and monitoring system” concept. This concept aims to perform comprehensive management of the water cycle at a regional or city level based on the ideas of sustainability, and selfreliance by adopting more intelligent individual technologies including water recycling and other water treatment technologies, information technology, and monitoring and control technology, and by implementing water cycle traceability in a way that treats the water cycle as a “flow of both water and distribution.”

Now a days where water scarcity is increasing drastically and many villages, places do not get sufficient water for the daily use of the user. It has become very important that we manage a flow and usage of water in every single area.

1.2 PURPOSE

- A smart system is required to monitor the flow of water in a single area, if not onnly one place may get a sufficient water and some other area may completely remain dry
- therefore, we need a method to calculate the amount of water flow
- Once the water flow is monitored it is important to monitor the water level used by every user, therefore a system to minotor the water level is requied
- Finally, based on the amount of water used, a bill must be calculated and dessiminated to user.

CHAPTER- 02

LITERATURE SURVEY

2.1 Smart Water Distribution System

G. M. Tamilselvan, V. Ashishkumar, S. Jothi Prasath, S. Mohammed Yusuff, International Journal of Recent Technology and Engineering (IJRTE) November 2018, authors has proposed a water supply framework the Arduino controller is associated with the flow meter and solenoid valve, and afterward to the relay circuit. The solenoid valves are likewise controlled by relay circuit to control flow of water as needs be for a settled span of time.
This framework is proposed to utilize an Ethernet for wireless correspondence with the goal that the data can be exchanged to the individual who is checking the framework.
The proposed automated framework is completely programmed thus human work and time is diminished. The water leakages and identifying the leakages and operating error can be avoided.

AN IOT BASED WATER SUPPLY MONITORING SYSTEM, Pranita Vijaykumar Kulkarni and Mrs.M.S.Joshi, International Journal of Innovation in Engineering, Research and Technology [IJIERT], authors have mentioned that water has become a big problem because of less rain fall the water resources are not able to supply sufficient water therefore, saving water is everyone's responsibility. To save the waterwe have to concentrate on the issues such as proper water supply, over consumption, analysis of available water, water flow rate, pressure of water flow in pipeline, quality of water. To overcome these problems we need a better technology for monitoring the supply system.

In there design they are going to use a new model of raspberry pi B+ model. Specialized IOT module can be used for accessing the sensor data from controller to cloud; different sensors such as flow sensor, water level sensor, pressure sensor can be used. Data can be viewed on the cloud using special IP address. It also provide a Wi-Fi for viewing data on mobile.

Smart Water Management and Usage Systems for Society and Environment

Hideyuki Tadokoro, PE-Jp Makoto Onishi Koji Kageyama Hiromitsu Kurisu, Dr. Info. Shinsuke Takahashi, Dr. Eng. Water has a fundamental role in our way of life, and problems with both the quantity and quality of water are coming to a head due to factors such as population growth and increasing water pollution around the world. It also forecasts that the trend toward more frequent water shortages would intensify due to global warming.

Hitachi has been contributing to water and the environment in a variety of ways including both services and mechanical, electrical, IT (information technology), monitoring and control, and other equipment. Seeking to solve the problems described above, Hitachi has proposed the “intelligent water system” concept. The concept seeks to make smart use of water in a way that takes account of both people and the natural environment, both by making individual technologies smarter in fields such as water treatment, IT, and monitoring and control and also by combining these in systems to optimize the overall operation at a city or regional level.

2.2 EXISTING PROBLEM

- Centralizedsystem to monitor the flow of water
- centralized system to monitor the usage of water
- No centralized way of generating the biils as per the usage

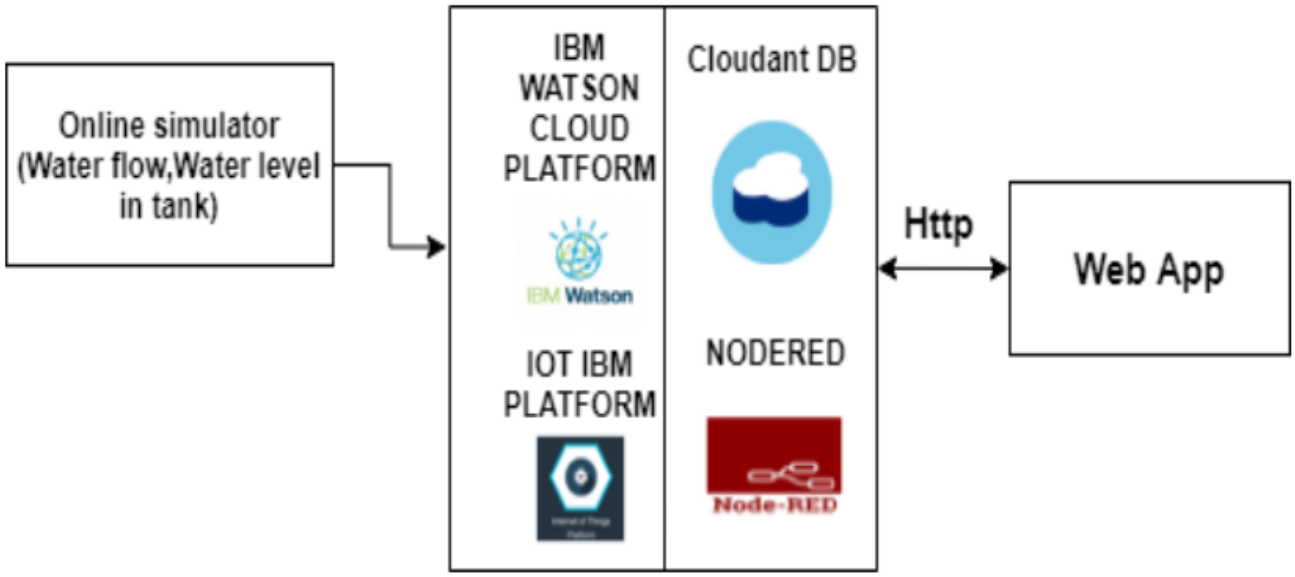
2.3 PROPOSED SOLUTION

- To monitor and control flow of water
- To monitor the water level (usage) by each user
- To make a single point for generating the bills as per the water used
- Display all data i.e. water flow, water level and bill amount on the User Interface

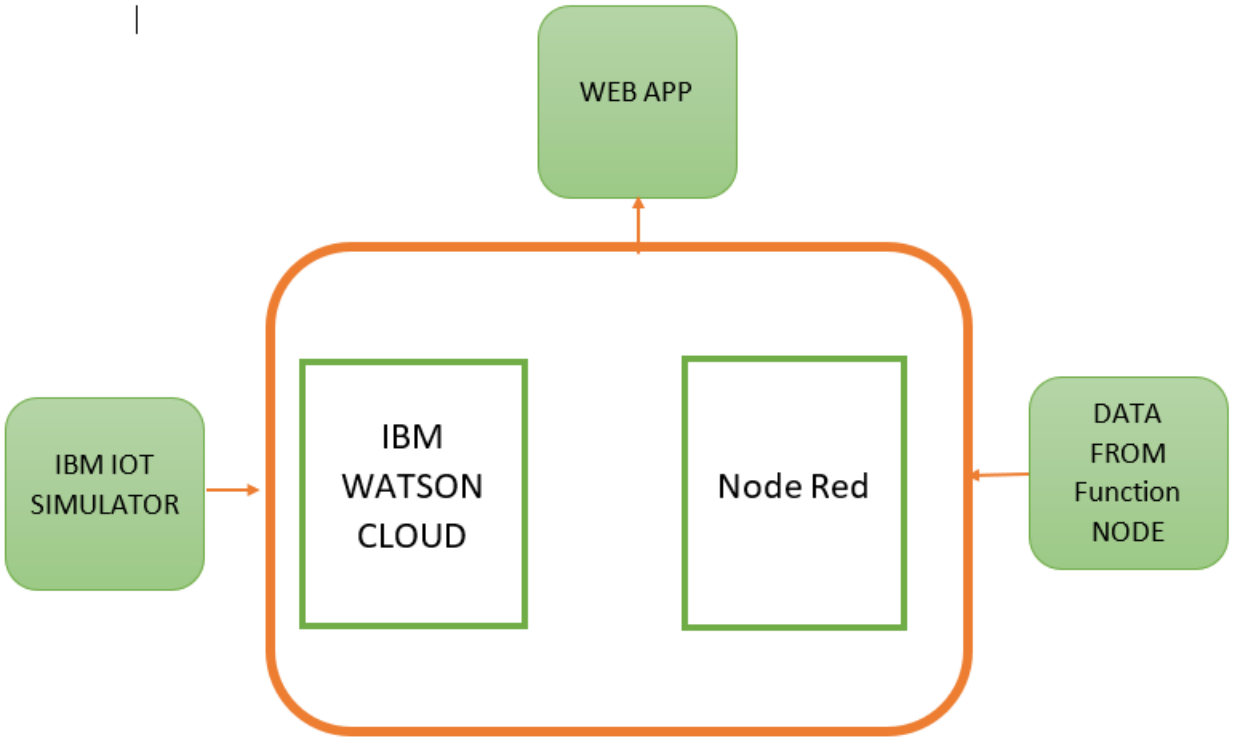
CHAPTER-03

THEORITICAL ANALYSIS

3.1 BLOCK DIAGRAM



3.2 SOFTWARE DESIGNING

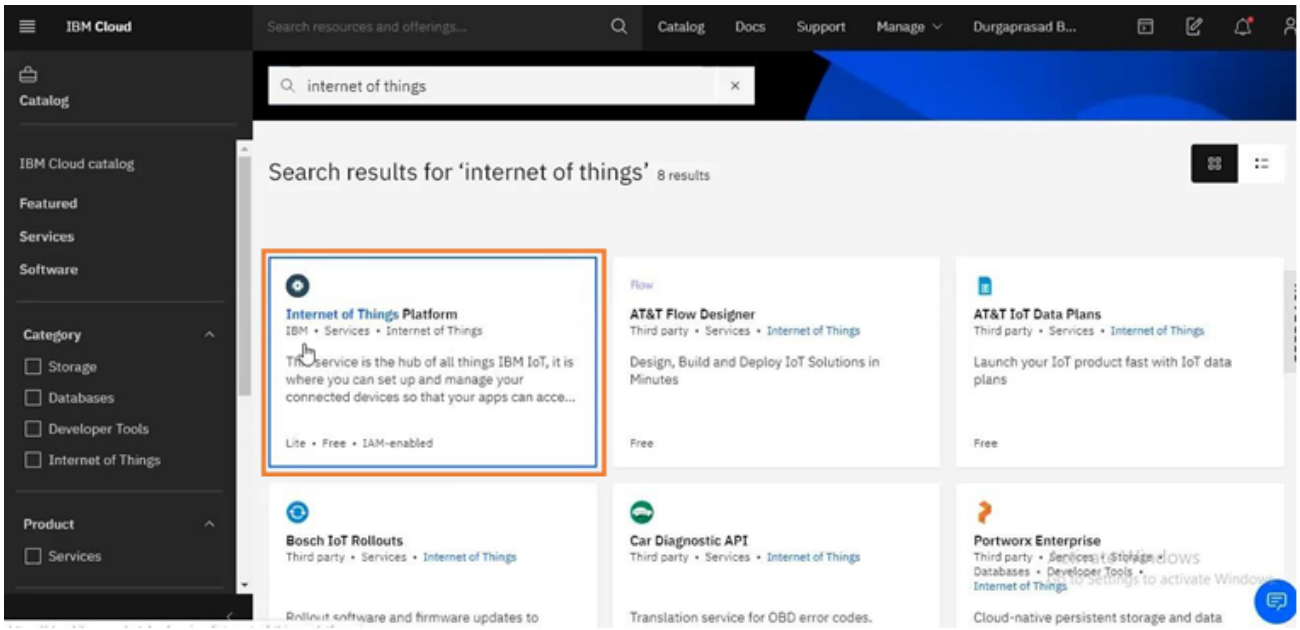


CHAPTER-04

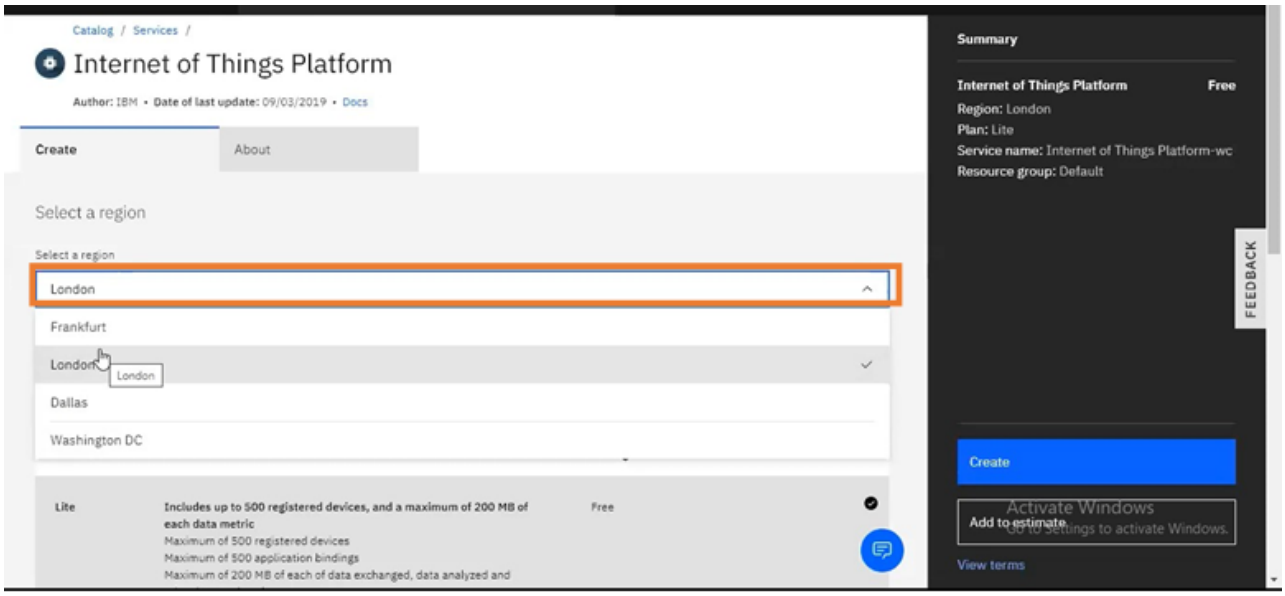
EXPERIMENTAL INVESTIGATION

4.1 SETTING THE DEVICE IN IOT PLATFORM IN IBM CLOUD

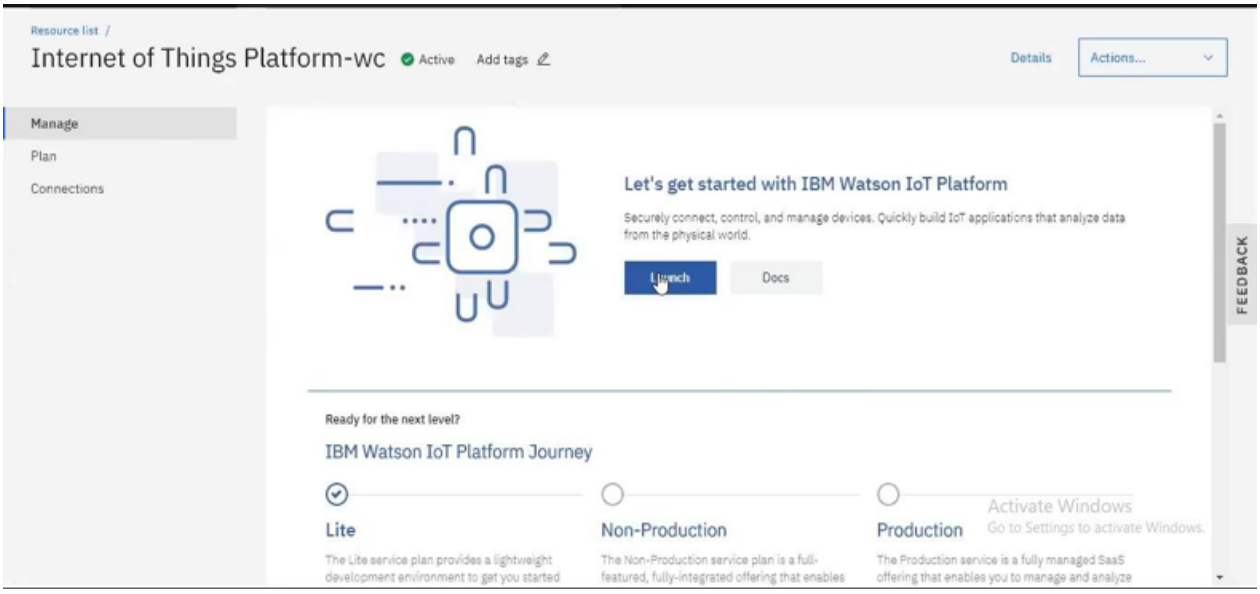
Step1: After logging into the system a dash board will appear and in the search pane type IBM IoT platform.



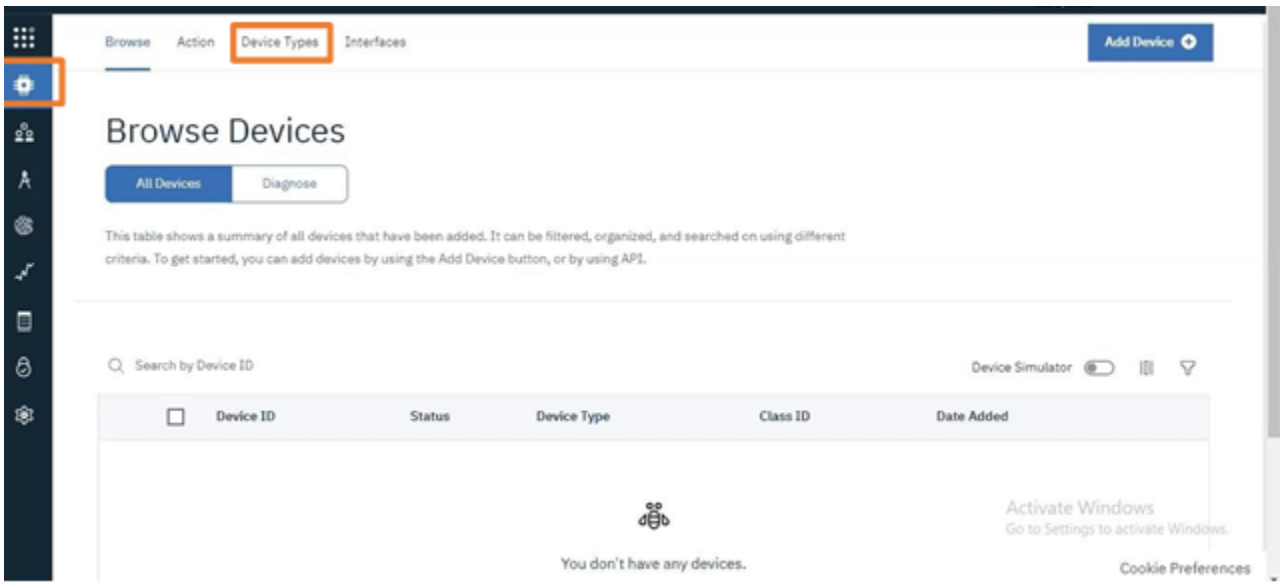
Step2: Select the London option from drop down list and click create.



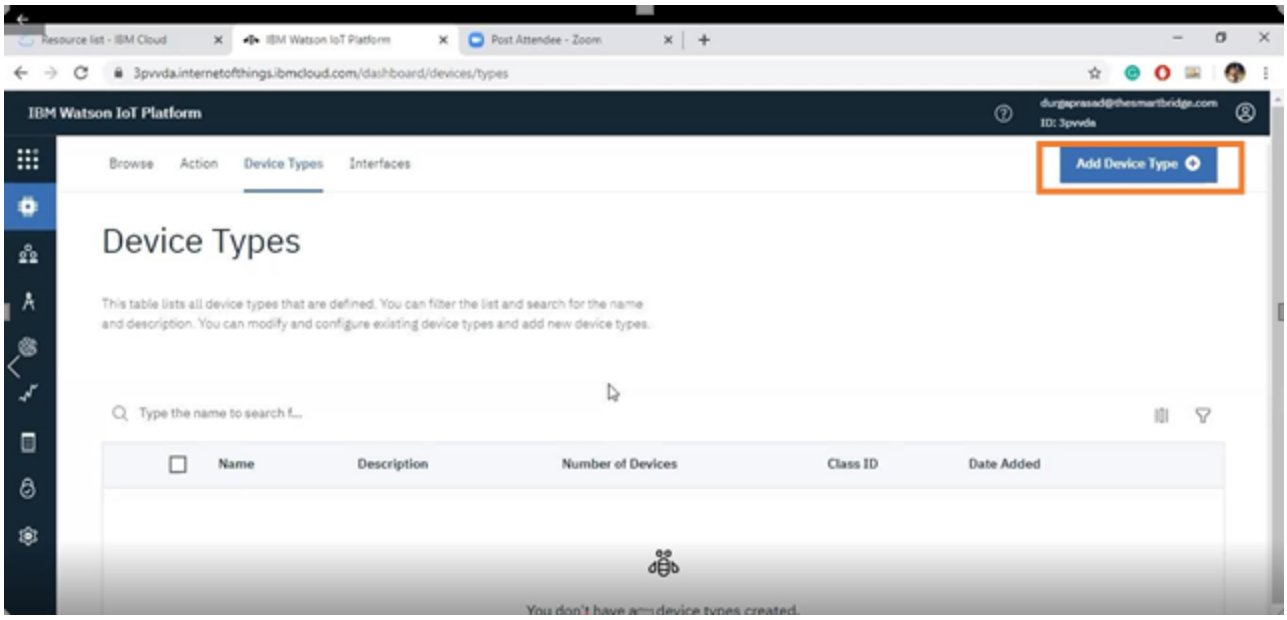
Step3: Click on the Launch button.



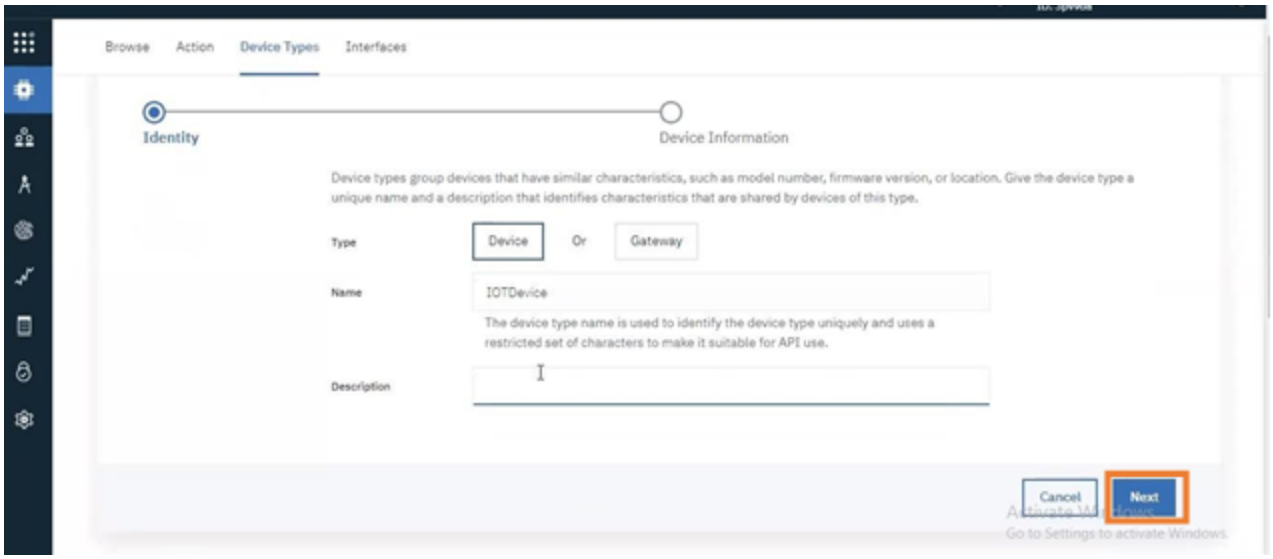
Step4: Click on the Device type.



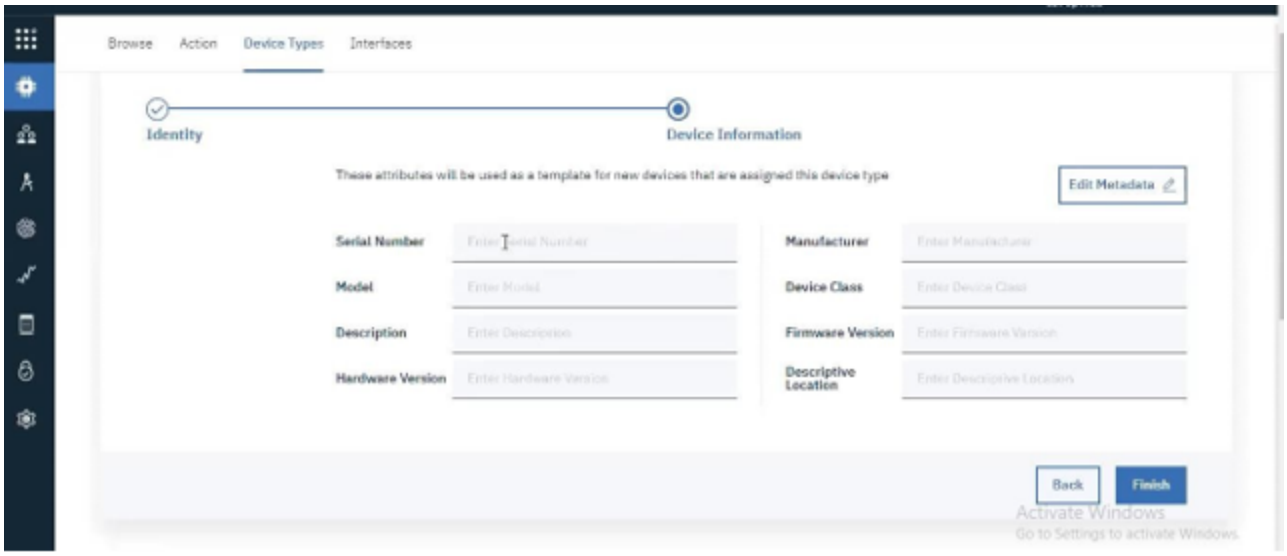
Step5: Click on the add device button



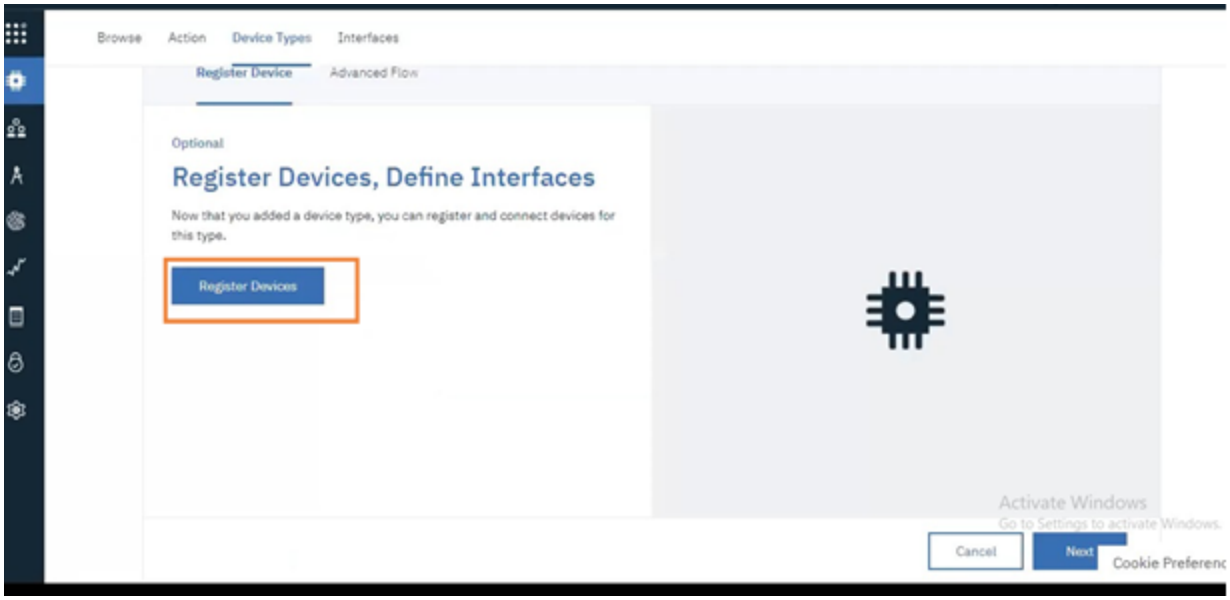
Step6: Enter the Device name and Description and click Next.



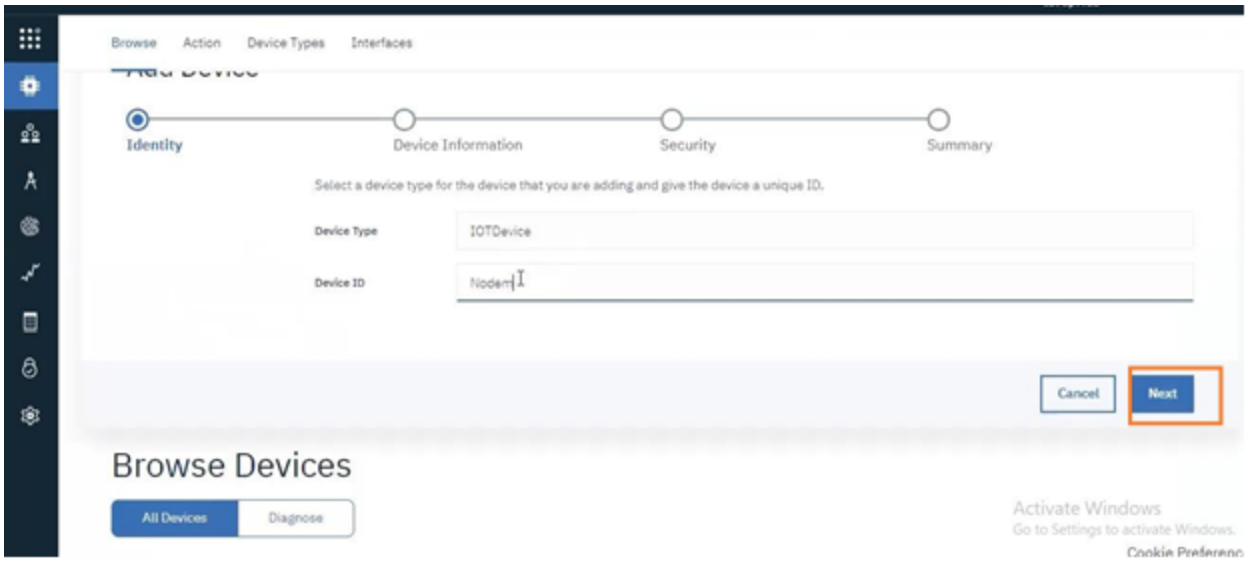
Step7: No need to fill the field of the Device Information and click Finish.



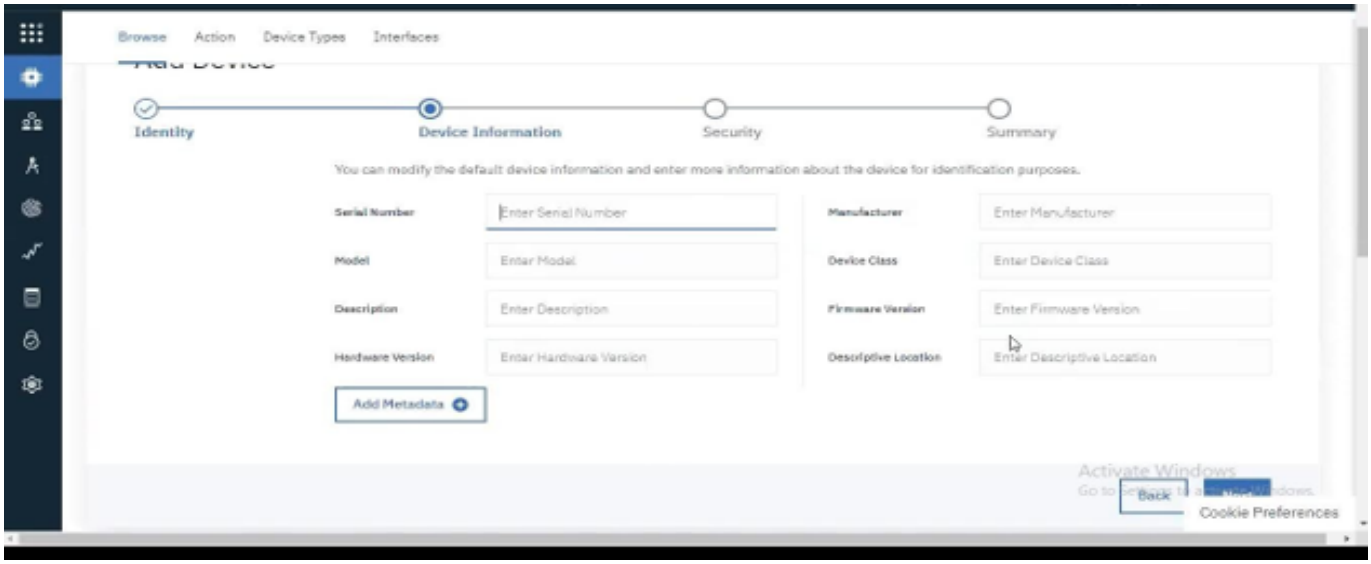
Step8: Click on the Register Device.



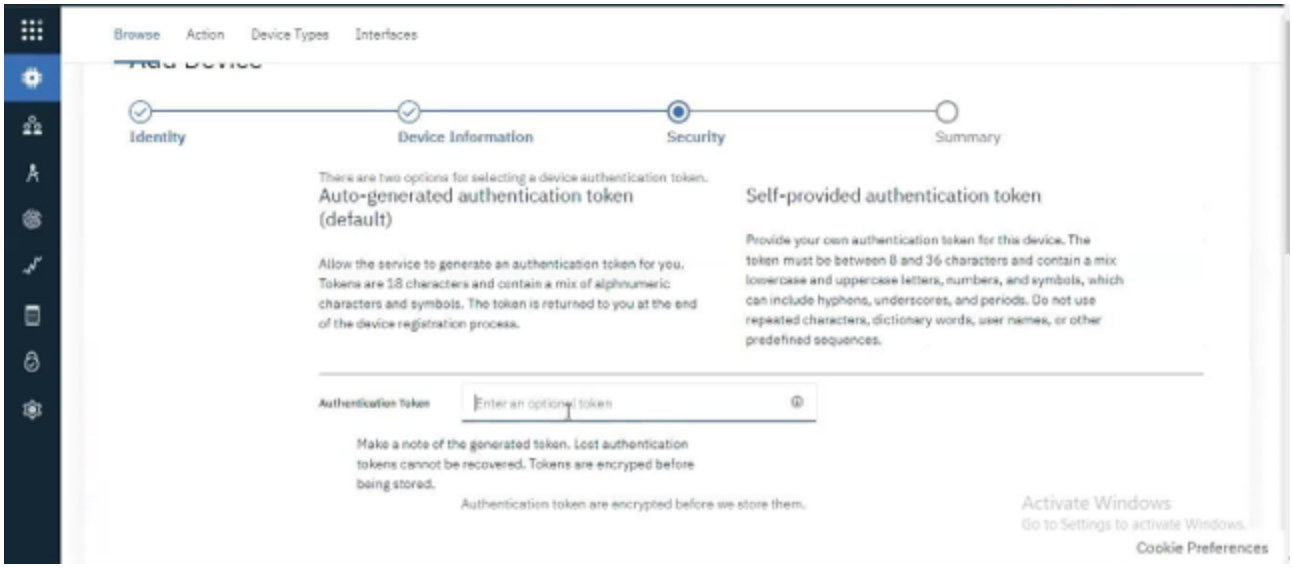
Step9: Enter the device name and click Next



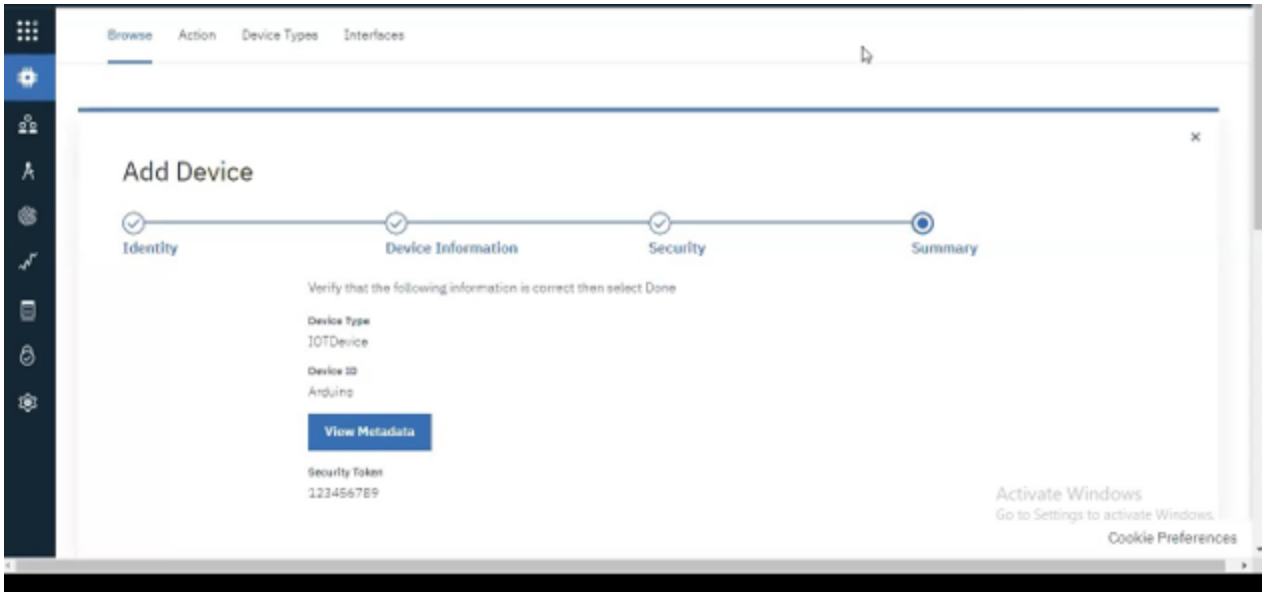
Step10: No need to fill the field and click Next button



Step11: Filling the Authentication token and click Next button.

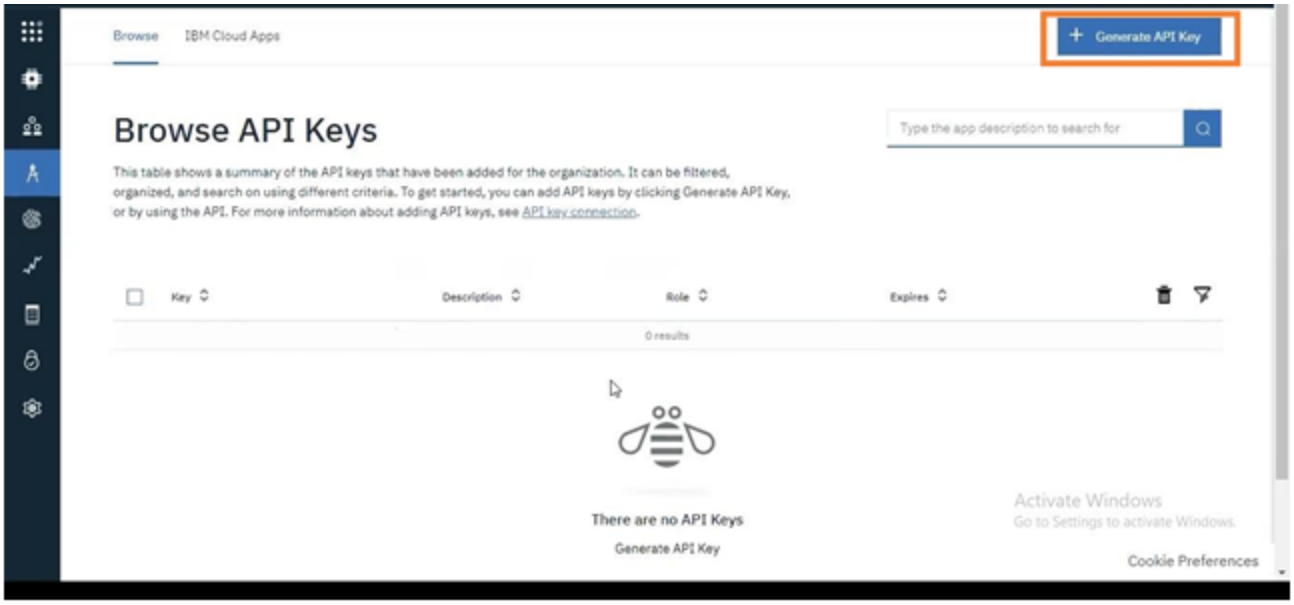


Step12: Final summary tab will show the device type and device name information.

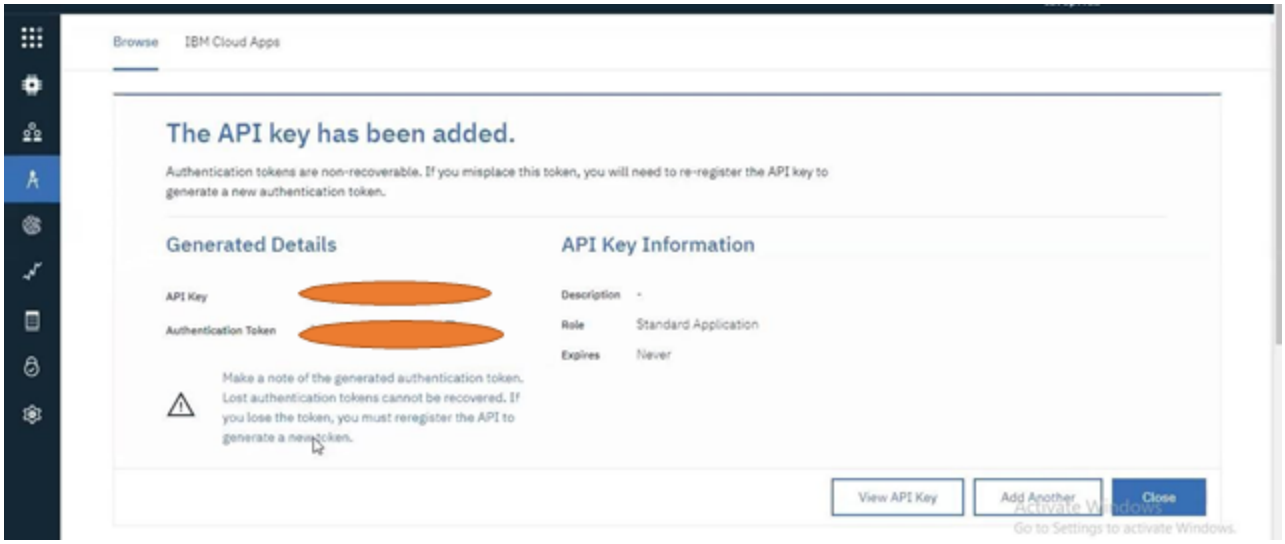


4.2 GENERATING THE DEVICE API

Step1: Click on the app icon and click on generate api key button.

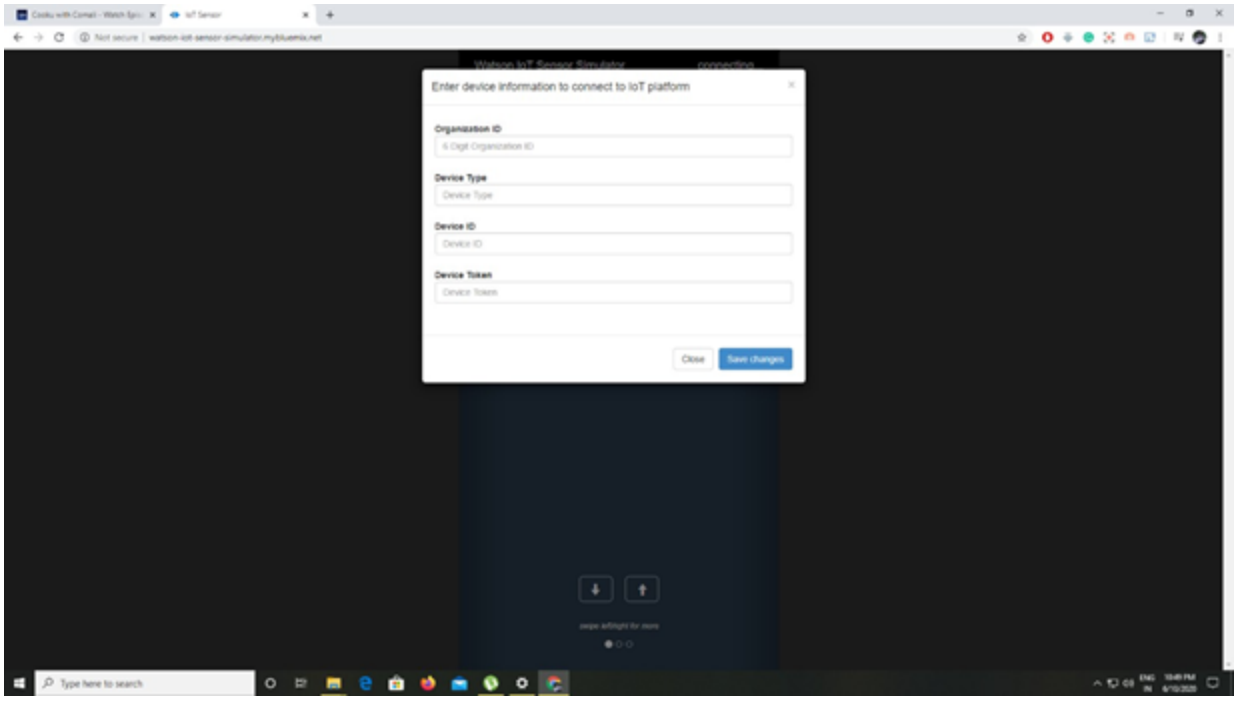


Step2: Note the Api key and authentication token for future reference



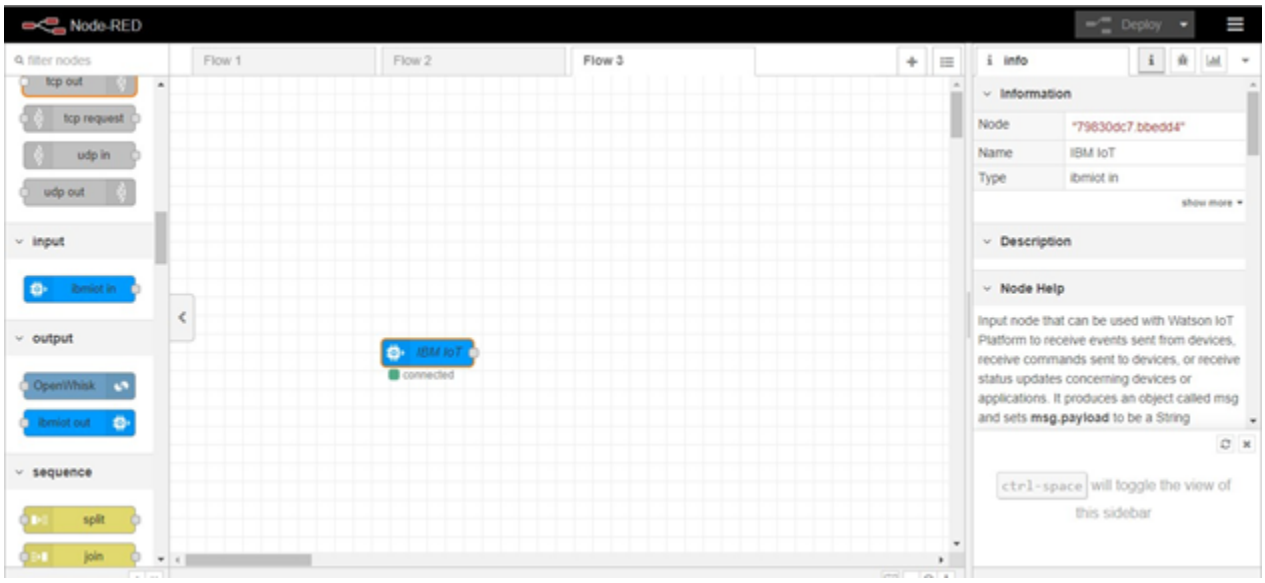
4.3 SETTING THE IOT SENSOR SIMULATOR

Step1: Enter the details like Organisation ID, Device Type, Device ID and Device token.



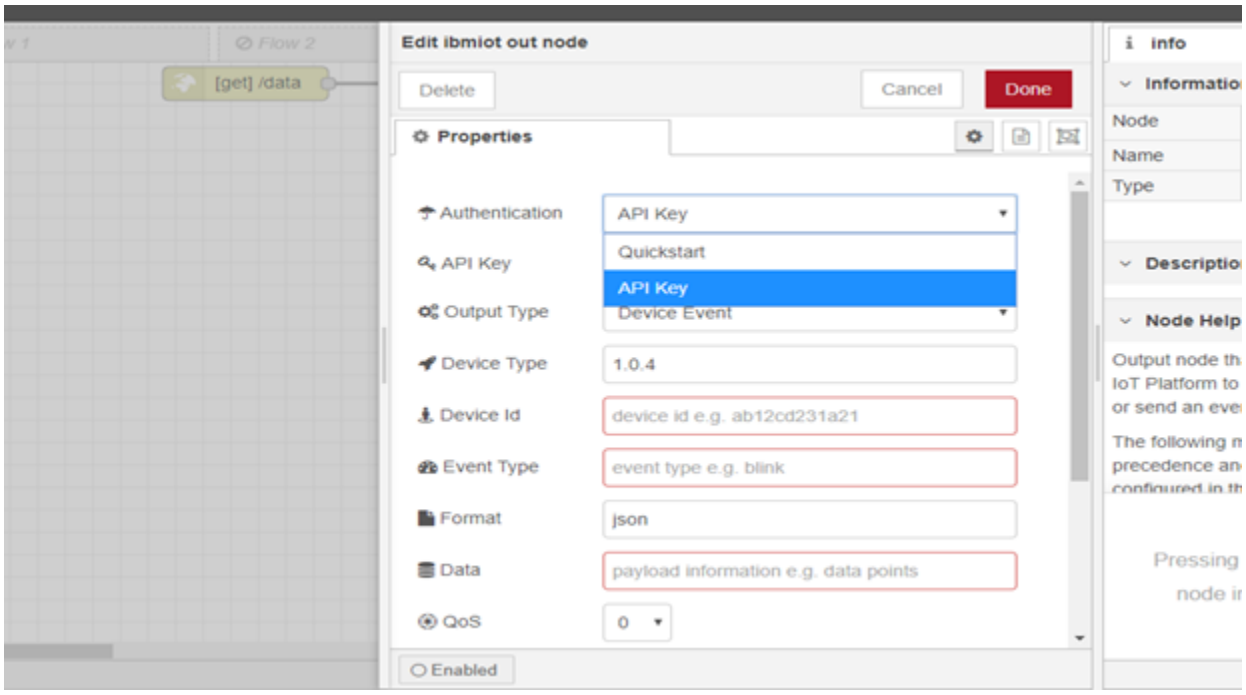
4.4 SETTING UP THE UI USING NODE-RED

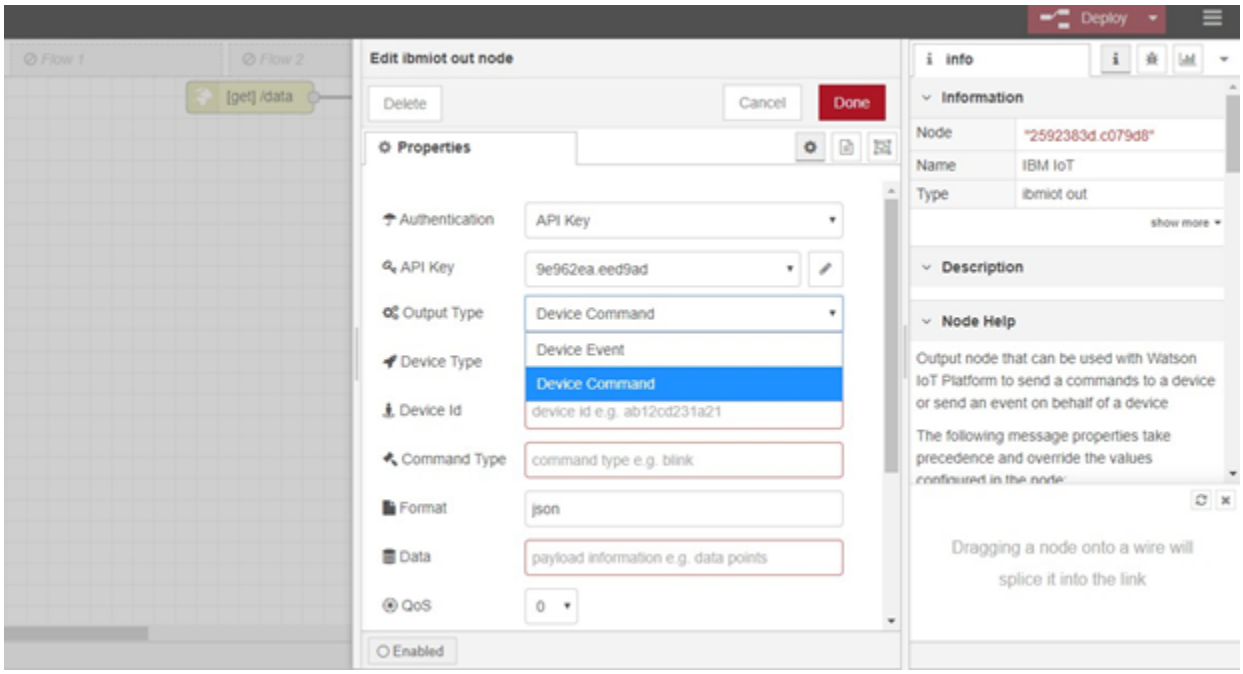
Step1: Select the IBM IoT in node from the pallet.



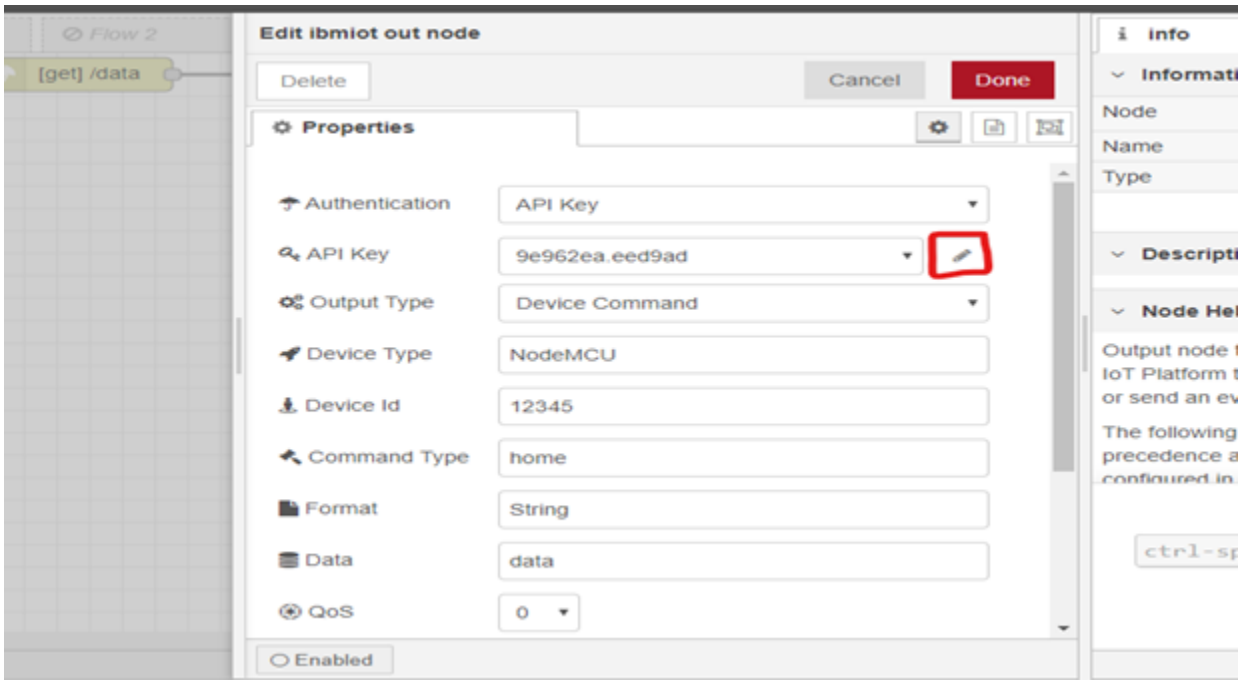
Step2: Double click the IBM IoT node, select the API,

option from the drop down and click the **Device Event**

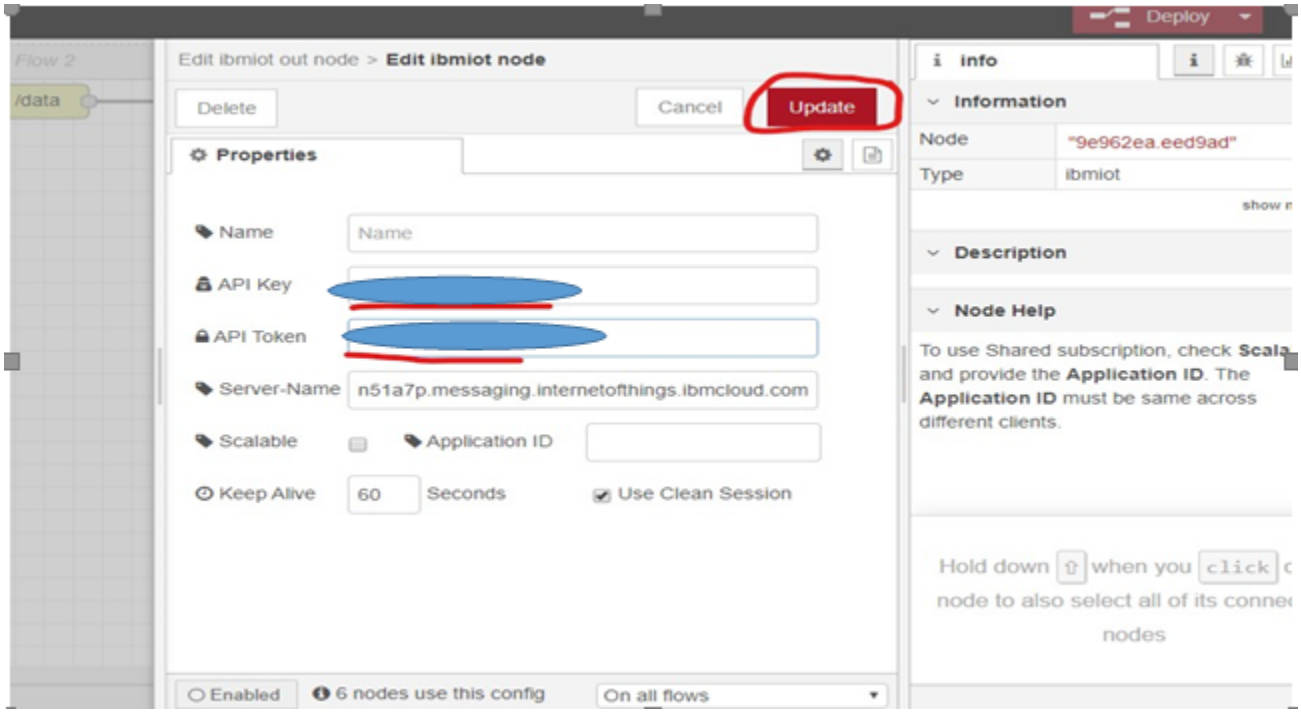




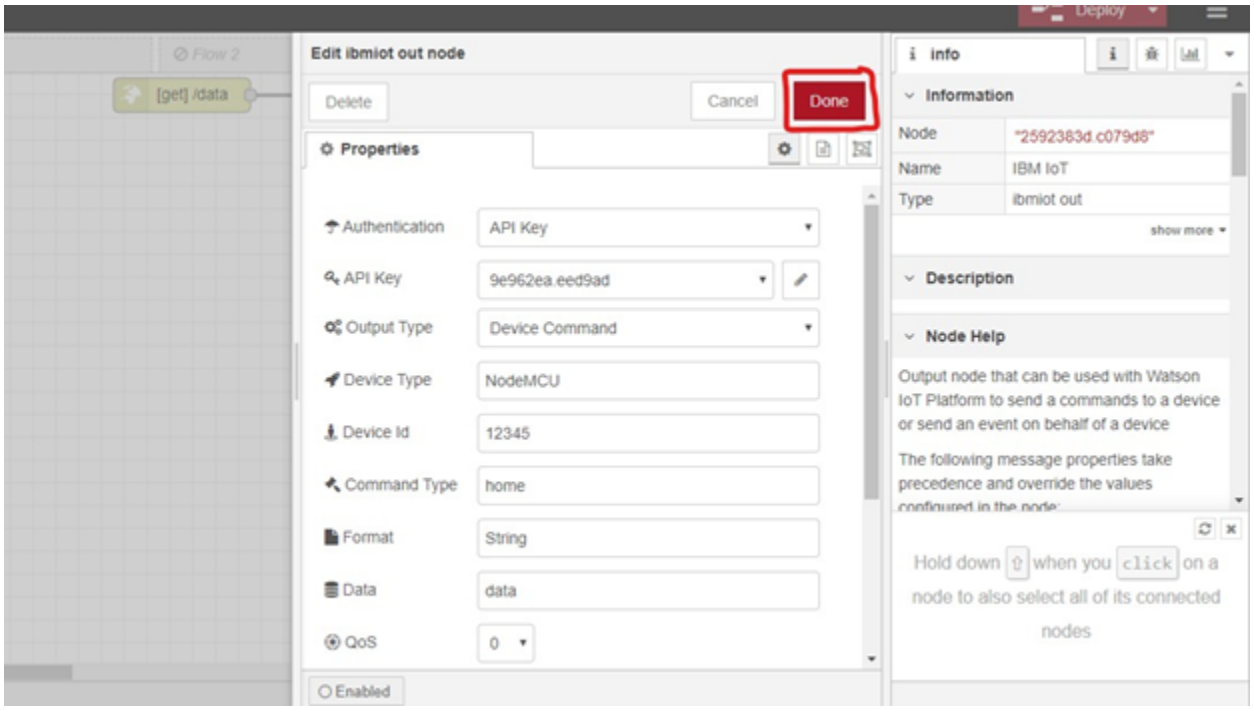
Step3: Click the pencil key icon in the API key.



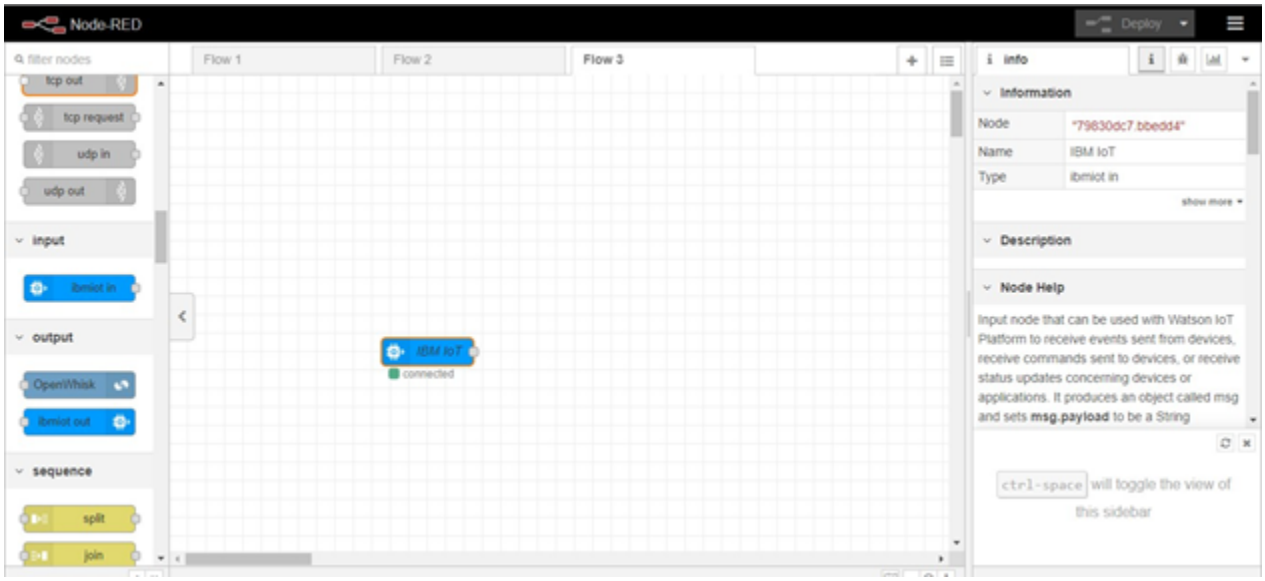
Step4: Enter the API key, API token and click update button.



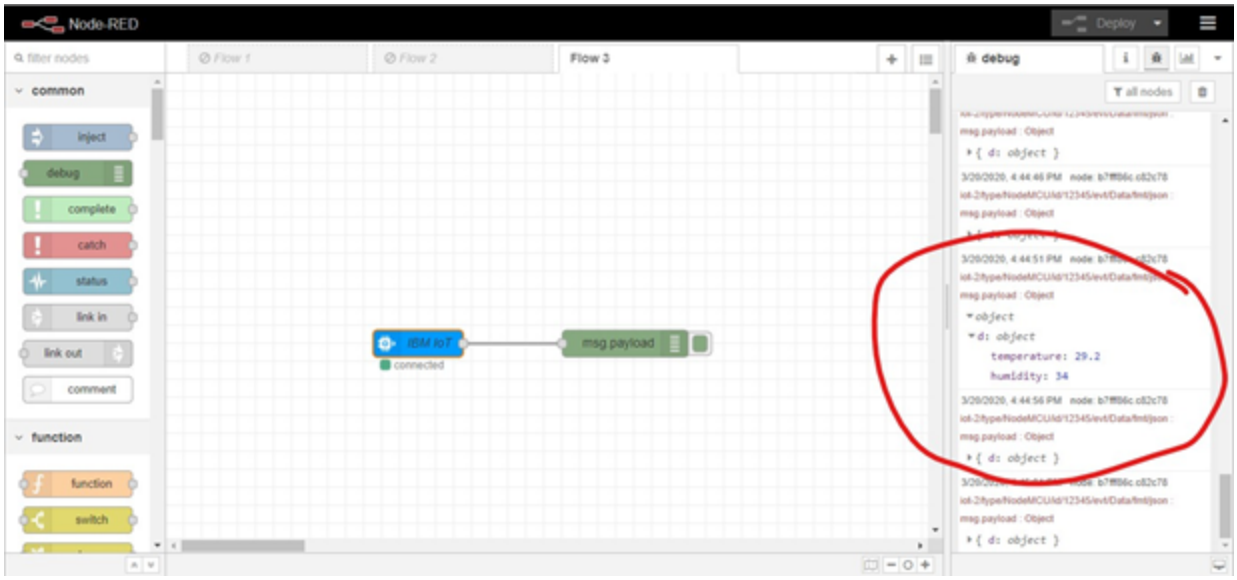
Step5: click on the Done button and click the deploy button.



Step6: After deploying Connection indication will be highlighted in the IBM IoT node.

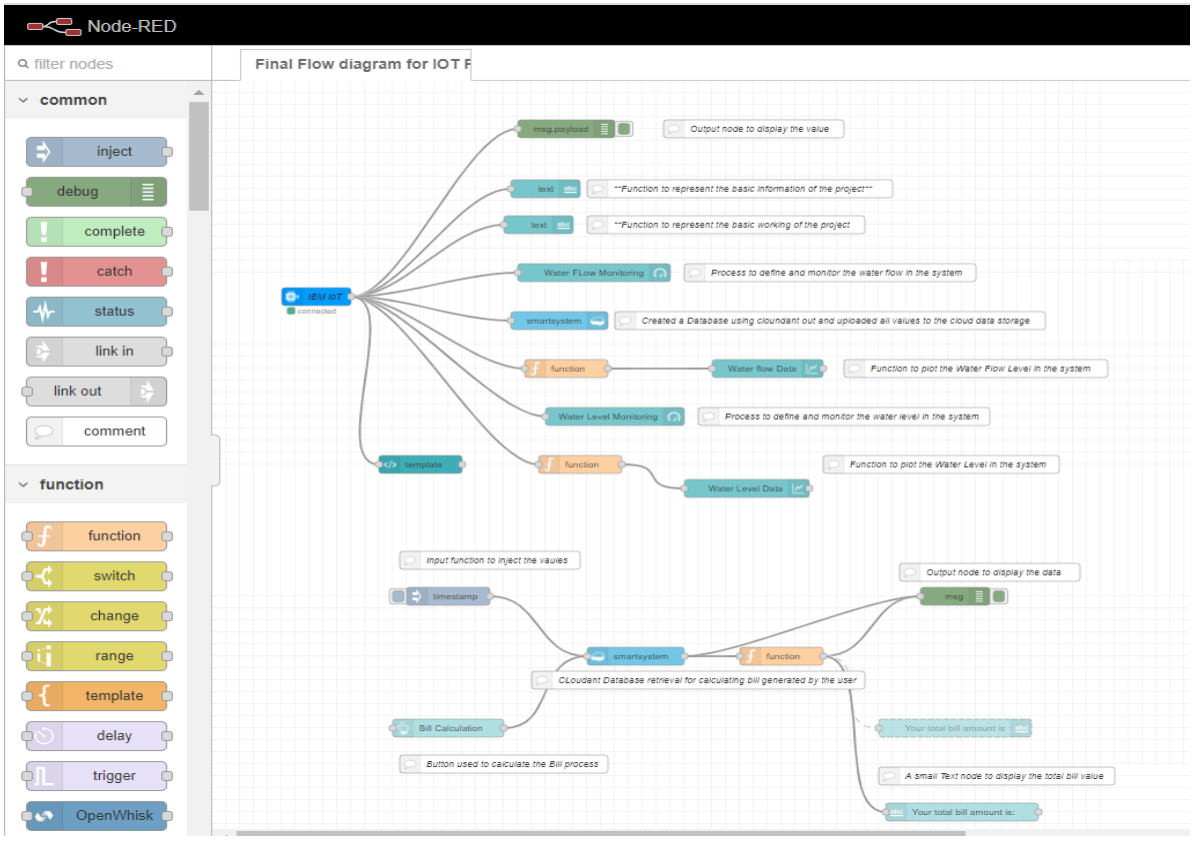


Step7: Place the debug node in the flow editor and click on deploy to see the temperature and humidity value in the debug tab.



4.5 Setting up IBM IOT OUT SIMULATOR

Step 1: Final Flow diagram of the entire project

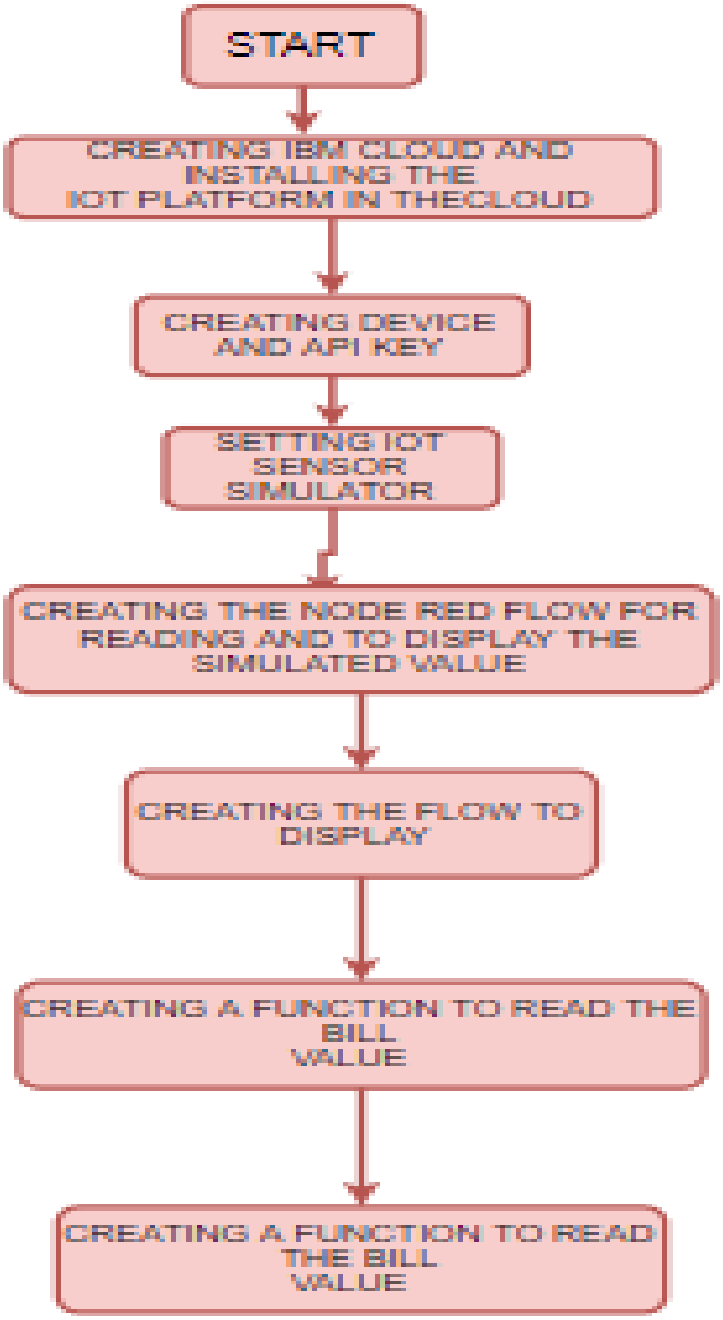


Step 2: Final UI


Intelligent Water Distribution and Water Flow system
Project Details
This is a Build-a-Thon Project designed after conducting Smart Internz Gurucool program. This project is designed by Prof Vinita Bhandiwad, Vidylanakar Institute of Technology Mumbai.
Project Information
This project is basically designed to measure and display the Water FLow and Water Level. It calculates the Water level based on the usage of water flow. I have also added the method to calculate the Bill as per the water usage. Also for the user convienience I have represented the data in the Chart method
Water Flow Monitoring
Water FLow Monitoring
6
0
Gallons per minute (gpm)
10
Water flow Data
10
7.5
5
2.5
0
17:06
17:08
17:11
Water Level Monitoring
Water Level Monitoring
6
0
Litr/gpm
10
Water Level Data
10
9
8
7
6
5
4
3
2
1
0
17:06
17:07
17:08
17:09
17:10
17:11
Bill Generation
BILL CALCULATION
Your total bill amount is:
62.425₹

CHAPTER 05

FLOW CHART



CHAPTER-06

RESULT

CHAPTER- 07

ADVANTAGES AND DISADVANTAGES

7.1 Advanatges

1. Communicating the device at larger distance through web application. It will play an important role in reducing the man power and help in reducing the paper work
2. The automatic bill calculation helps to generate the bill wihout any person physically visiting to note the water flow or water usage
3. intergrating the water flow to the bill generation part hepls the user to kow how much water he/she has used and can use water efficiently so that no wastage of water is done.

7.2 Disadvantages

1. The project would have been better if we could have worked on real sensors that would give us the best results
2. Accuracy of data from water flow and water level sensor is randomly collected due to which the exact data regarding bill is not calculated

CHAPTER-08

APPLICATIONS

1. This technique can be used in smart home automation or also in areas where wtaer scarcity is a concern of matter
2. It can also be used in industries where the company gets the details about the water that has been used
3. It can be used by single user/Industry to identify the bill at the end of every month/week/day.
4. It can used to monitor the total water usage by single/multiple user

CHAPTER-09

CONCLUSION

The various parameters like water flow, water level etc were monitored using the web UI. The data from the sensor were collected and displayed on the Browser.

The UI was designed using Node Red Application where it was customized in the way the UI was to be represented.

CHAPTER-10

FUTURE SCOPE

- ☞ Various parameters of water monitoring can be implemented to make the project work more efficiently.
- ☞ Voice input and output can be added to the system User Interface to make it more presentable.
- ☞ Alert system can be added to the UI, which will alert the user if he/she is exceeding the water usage.
- ☞ A bill limit can be added to the Application by the user, after which the user will get a message to increase the limit.
- ☞ Sending the message to the authority for reading the water used by users in specific area.

CHAPTER-11

REFERENCES

[1] AN IOT BASED WATER SUPPLY MONITORING SYSTEM, Novateur Publication's International Journal of Innovation in Engineering, Research and Technology [IJIERT] ICITDCEME'15 Conference Proceedings ISSN No - 2394-3696, Pranita Vijaykumar Kulkarni Department of Electronics and communication Engineering Marathwada institute of technology, Aurangabad, India Mrs.M.S.Joshi Assistant Professor Department of Electronics and communication Engineering Marathwada institute of technology, Aurangabad, India

[2] IoT Based Automated Water Distribution System with Water Theft Control and Water Purchasing System International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7 Issue-4S, November 2018, G. M. Tamilselvan, V. Ashishkumar, S. Jothi Prasath, S. Mohammed Yusuff

[3] An IoT based reference architecture for smart water management processes, Tomas Robles ´ 1 , Ramon Alcarria ´ 2∗ , Diego Mart´ın1 , Mariano Navarro3 , Rodrigo Calero3 , Sof´ıa Iglesias3 , and Manuel Lopez ´ 3 1Dep. de Ingenier´ıa de Sistemas Telematicos ´ 2Dep. de Ingenier´ıa Topografica y Cartograf ´ ´ıa Universidad Politecnica de Madrid, Spain ´ {tomas.robles, ramon.alcarria, diego.martin}@upm.es 3 Innovation and R&D unit Tragsa Group, Spain {mnc, rcalero, siglesias, mlopez}@tragsa.es, Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications, volume: 6, number: 1, pp. 4-23

[4] Smart Water Flow Control and Monitoring System, International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Published by, www.ijert.org NCESC - 2018 Conference Proceedings, Janhavi Sawanth V Lourd Mary J Department of ECE Department of ECE VVIET, Mysuru, Karnataka, India VVIET, Mysuru, Karnataka, India Madduleti Vidya Mounika D V Department of ECE Department of ECE VVIET, Mysuru, Karnataka, India VVIET,

Mysuru, Karnataka, India

APPEENDIX

A) Code for calculating Bill Generation:

```
valuelen=msg.payload.length
flow1=0;
for (i=0;i<valuelen;i++)
{
   flow1=msg.payload[i].waterflow+flow1;
}

bill=flow1*1/1000;
msg.payload=bill+ "₹";
return msg;
```

B) NODE RED FLOW

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