

# Gas Leakage monitoring & Alerting system for Industries

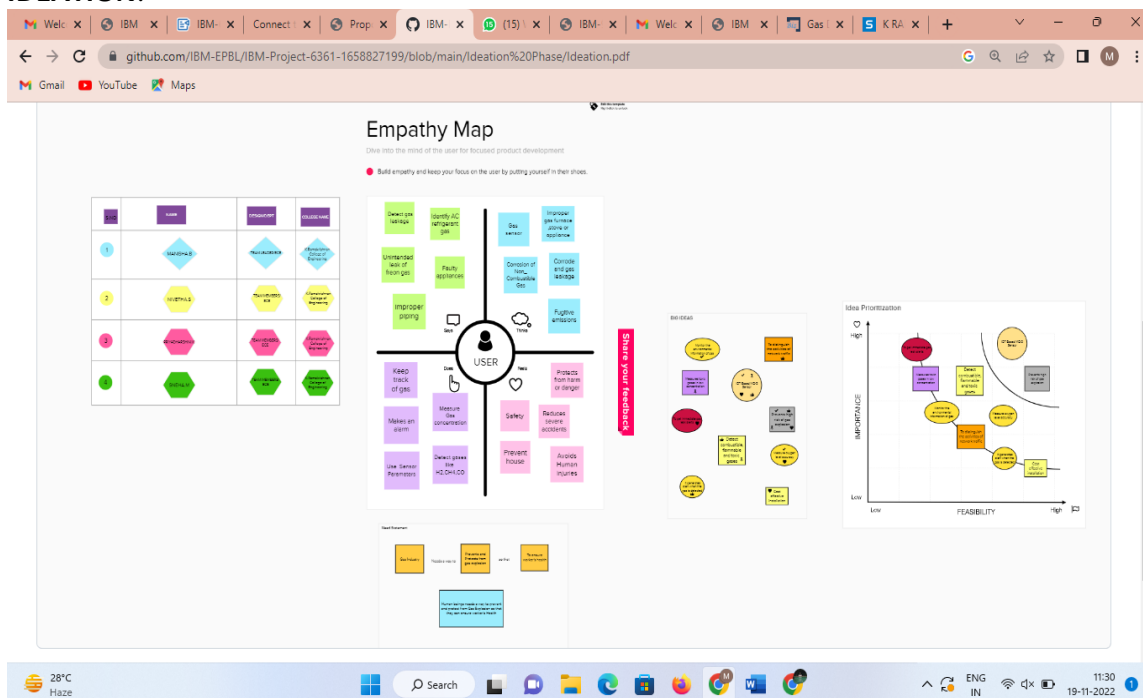
Team ID	PNT2022TMID11027
Team Leader	B.Manisha
Team Member	S.Nivetha
Team Member	K. Priyadharshini
Team Member	M.Sneha

## PROJECT OBJECTIVE:

A gas leakage system makes use of an MQ6 sensor for detection of LPG leakage. The primary objective of the Gas leakage detection system is to detect the malfunctioning of the pressurized gas system in order to prevent the accumulation of the gases so that the explosion does not happen.

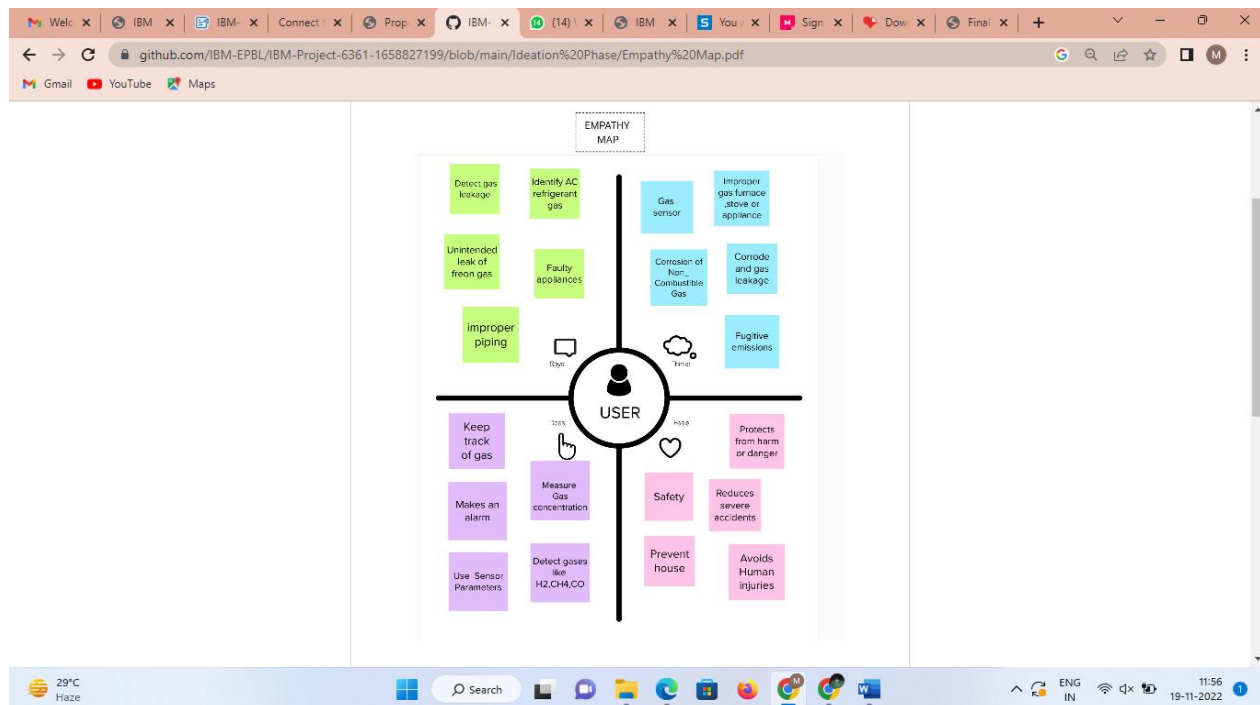
The sensor can detect any level of concentration of gas like from 200-10,000ppm operating at a temperature range from -10 to 50-degree Celsius. Once the gas level increases above a predefined level then the device sends an alert notification to the user and accordingly the user can control the devices with the help of relay for closing the gas valve.

## IDEATION:



## EMPATHY MAP:

# Gas Leakage monitoring & Alerting system for Industries



## Literature survey:

LIU zhen-ya, WANG Zhen-dong, and CHEN Rong published on "Intelligent Residential Security Alarm and Remote Control System Based On Single Chip Computer" 2008 .This covers intelligent residential burglar alarm, emergency alarm, fire alarm, toxic gas leakage remote automatic sound alarm, and remote control system.The technology has the ability to activate an automatic alarm that calls the police hotline on its own. It can also be a voice alarm and shows the location where the alarm was received. Remote power management is possible with this smart security system. LIU zhen-ya, WANG Zhen-dong, and CHEN Rong published on "Intelligent Residential Security Alarm," 2008 are intelligent residential burglar alarm, emergency alarm, fire alarm, hazardous gas leakage remote automatic sound alarm, and remote control system.The project put out the issue of a GAS container running out of gas, which is the most prevalent one we encounter on a daily basis. This document is being presented to raise awareness of the decliningto order gas using IOT and to determine the volume of the gas in the container. The booking or order for gas is being the continuous weight measurement is carried out with the aid of IOT and a load cell, which is with a

microcontroller interfaced (to compare with an ideal value). It has even been added for convenience with RF TX and RX devices that provide the same data. In terms of the safety of We have a MQ-2 (gas sensor), an LM 35 (temperature sensor), and a gas container in the kit. In this research, we suggested a wireless sensor network (WSN) prototype to track and in a complex interior environment, find gas leaks. In particular, a mobile node is travelling across a structure to track any carbon dioxide (CO<sub>2</sub>) leaks, supporting and showing the level and the leak's exact location. The benefits of cognitive technology were demonstrated all through the demonstration. Multichip routing and networking are investigated. Many reviews of gas leakage detection methods have been published in the past, either as part of research articles or technical reports on specific leak detection techniques and other gas-related topics.

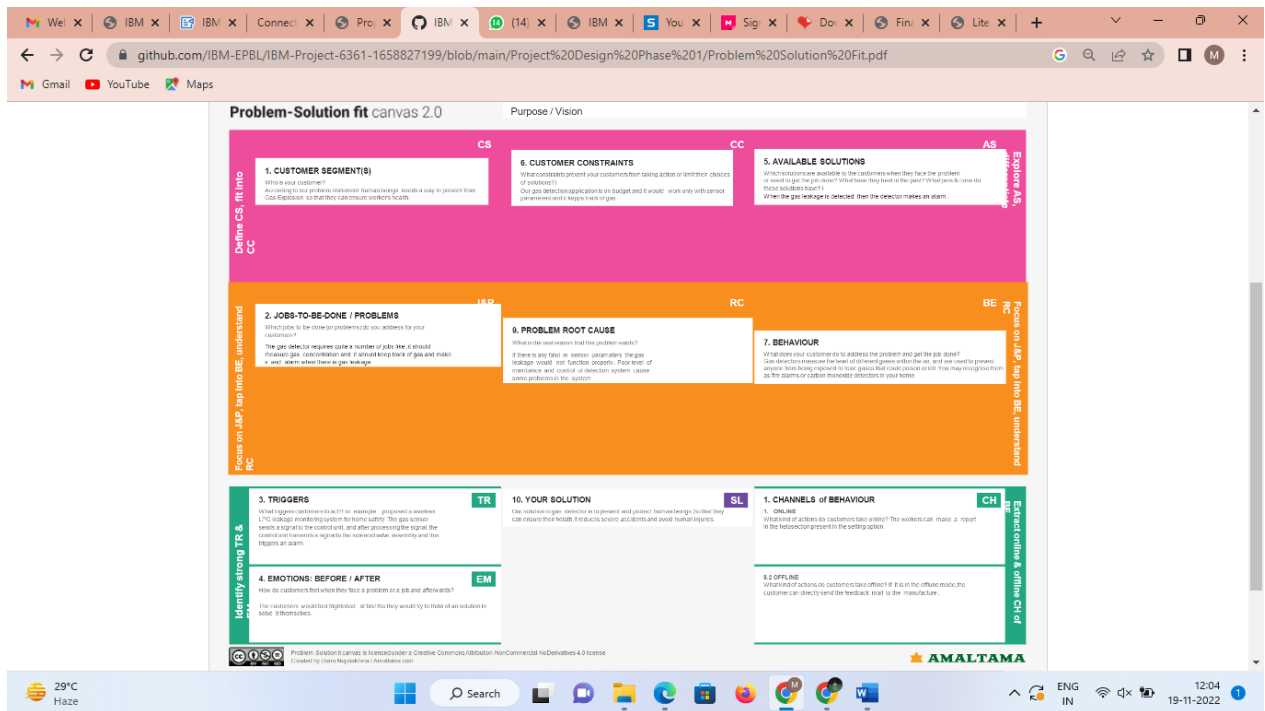
- A. Mahalingam, r. T. Naayagi, and n. E. Mastorakis published an affordable gas leakage detector's design and implementation are presented. They provided solutions to numerous issues with earlier gas leak detectors. They stated that a number of standards, including IEEE, BS5730, and IEC, have been developed for the design of a gas leakage detecting system. The recommended UK safety standards have been used for this project. The primary purpose of the suggested alarm system is to find LPG leaks, which are most frequently found in residential and commercial buildings. The technology detects the amount of leakage in addition to the presence of gas (gas leak). B. B. Did paye and Prof. S. K. Nanda, discussed their work on leakage detection and a review of the "Automated unified system for LPG employing microcontroller and GSM module." their piece offered a cutting-edge and creative method for automatic, preventative, and detection of LPG leaks scheduling a refill. In advance, the technology offers automatic LPG regulator controlling if When a leak is found, the system will automatically shut off the power supply's main switch. So it's helpful to avoid the blast and detonation.
- B. Srinivasan, Leela, Jeya bharathi, Kirthik, and Rajasree discussed the detection and control of gas leaks. In this study, gas leaks that cause fatal flames have emerged as a major issue in homes and other settings where domestic gas is utilised and handled. In addition to shutting off the gas supply valve, it also warns the subscriber via the alarm and the status display. Hitendra Rawat, Ashish Kushwah, Khyati Asthana, and Akanksha Shivhare in 2014 created a framework and provided security measures against criminals, spills, and fire mishaps. When this happens, their deliver SMS messages to the assigned crisis number. P. Meenakshi Vidya, S. Abinaya, G. Geetha Rajeswari, and N. Guna, "Automatic LPG

detection and hazard. The real-time gas monitoring and leak detection system were proposed in the article "controlling" published in April 2014. Ch. Manohar Raju and N. Sushma Rani on 2008 saw the introduction of an android-based autonomous gas detection and indication robot. The prototype they have suggested shows a small mobile robot that can find gas leaks in dangerous areas. When there is a gas leakage in a certain location, the robot promptly reads the data and sends it to an Android mobile device using Bluetooth. We create an Android application for smartphones running the Android operating system that can immediately receive data from robots over Bluetooth. Every time a gas leak occurs, the programme alerts us with an indicator, and we can use text or voice instructions to direct the robot's motions when it is connected to Bluetooth. The earlier mobile robots are built on a variety of different technologies.

- C. Pal-Stefan Murvaya and Ioan Sileaa (2008) described numerous methods for detecting gas leaks in their survey on gas leak localization approaches. They implement an old or novel method to find the gas. The non-technical, hardware-based solutions that are proposed in this study aim to consist of active, visual, and acoustic approaches. In their study, they provided a wealth of gas pipeline leak detection methods are available. Since their invention, some methods have undergone. The development of the initial proposal and some new ones was prompted by improvements in sensor fabrication and processing power. Each detection technique does, however, have benefits and drawbacks. Leak Each category of detection techniques has some benefits and drawbacks in common. For instance, all foreign methods. Falohun A.S., Oke A.O., and Abolaji B.M. (2016) proposed their method for MQ-9-based integrated circuit-based harmful gas detection. They essentially employed an embedded design in this switches, relays, solenoids, LEDs, tiny or bespoke LCDs are examples of common input and output devices. Radio frequency gadgets, displays, and sensors for information like temperature, humidity, light intensity, etc. The majority of embedded systems lack a keyboard, screen, discs, printers, or any other recognizable input/output (I/O) devices, a personal computer and possibly a device for human connection. The variety and quantity of detectors, as well as Depending on the owner's property, one will choose a particular sort of fire alarm system. protection objectives, property value, and owner's insurance requirements.

## 1. PROJECT DESIGN PHASE:

## i.PROBLEM SOLUTION FIT:

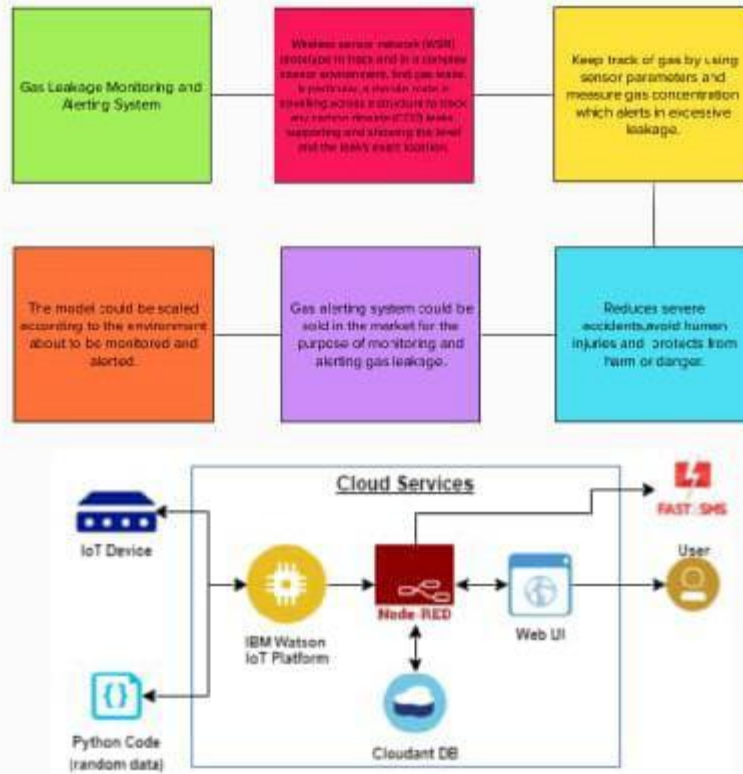


## ii .PROPOSED SOLUTION:

Proposed Solution Template:		
Project team shall fill the following information in proposed solution template.		
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Gas Leakage Monitoring and Alerting System
2.	Idea / Solution description	Wireless sensor network (WSN) prototype to track and in a complex interior environment, find gas leaks. In particular, a mobile node is travelling across a structure to track any carbon dioxide (CO <sub>2</sub> ) leaks, supporting and showing the level and the leak's exact location.
3.	Novelty / Uniqueness	Keep track of gas by using sensor parameters and measure gas concentration which alerts in excessive leakage.
4.	Social Impact / Customer Satisfaction	Reduces severe accidents, avoid human injuries and protects from harm or danger.
5.	Business Model (Revenue Model)	Gas alerting system could be sold in the market for the purpose of monitoring and alerting gas leakage.
6.	Scalability of the Solution	The model could be scaled according to the environment about to be monitored and alerted.

## iii.SOLUTION ARCHITECTURE:

## Proposed Solution



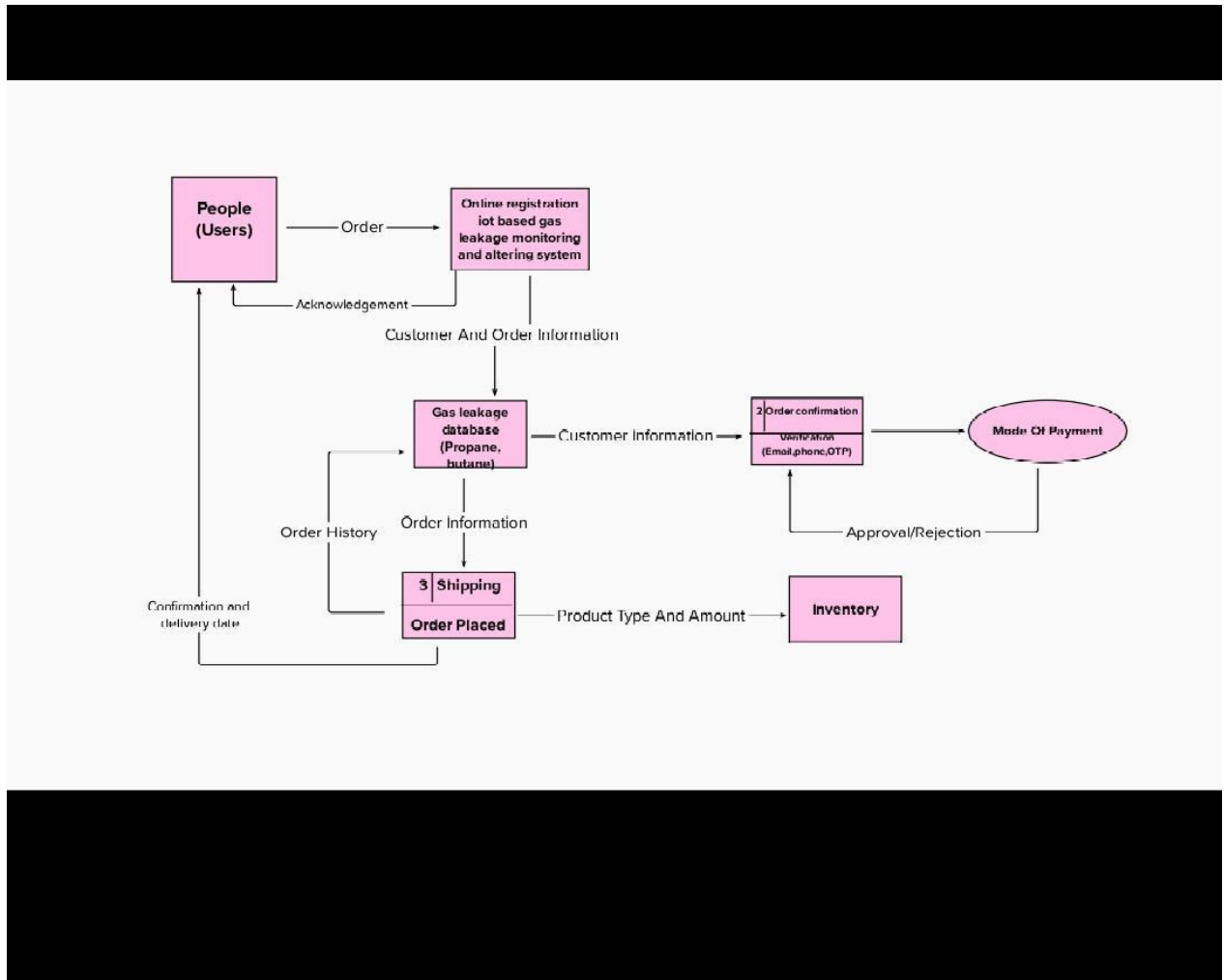
## 2.PROJECT DESIGN PHASE:

### i.CUSTOMER JOURNEY MAP:

## CUSTOMER JOURNEY MAP



## ii. DATA FLOW DIAGRAM:



iii.FUNCTIONAL REQUIREMENT:

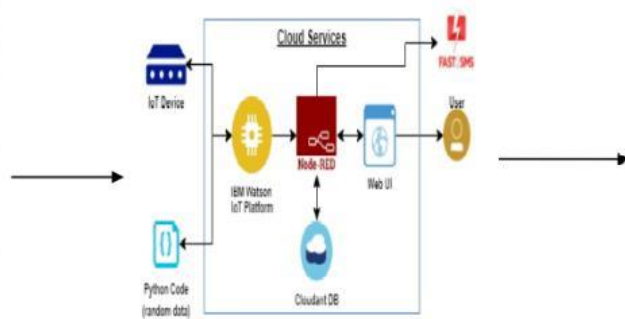


## Technology Architecture

### FIELD



### USER

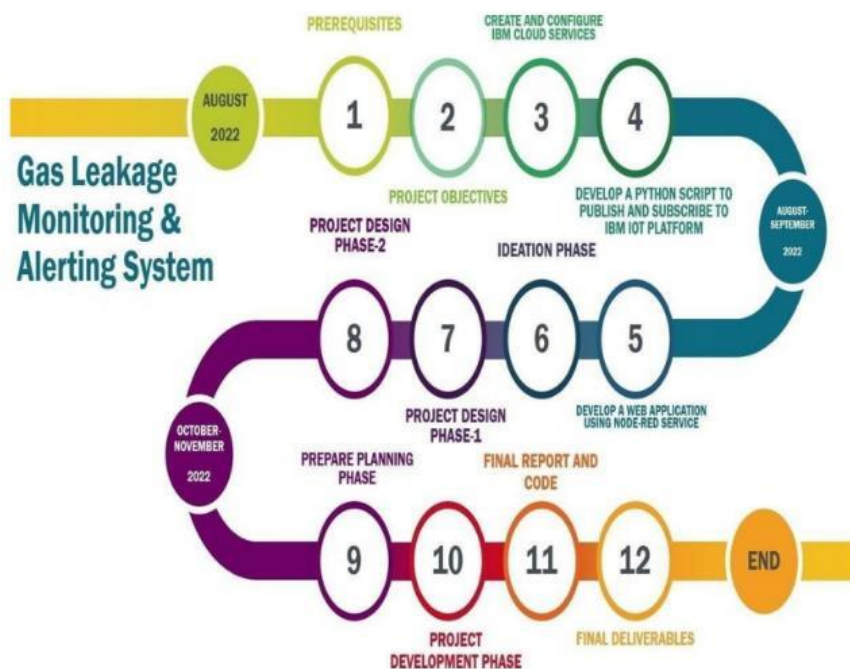


## Architecture and data flow of the IOT Based Gas Leakage Monitoring and Alerting System

# PROJECT PLANNING PHASE

Prepare Milestone And Activity List

DATE	18 NOVEMBER 2022
TEAM ID	PNT2022TMID11027
PROJECT NAME	Gas leakage monitoring and alerting system



ii.SPRINT DELIVERY PLAN:

# PROJECT PLANNING PHASE

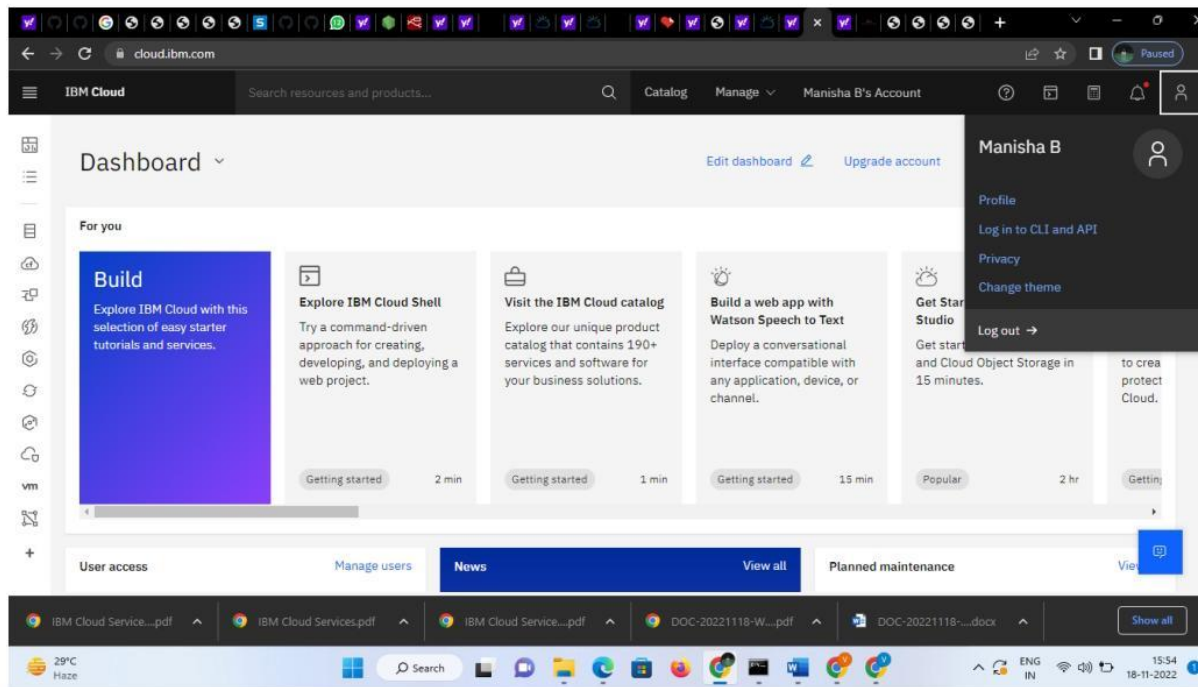
## SPRINT DELIVERY PLAN

<b>DATE</b>	18 NOVEMBER 2022
<b>TEAM ID</b>	<b>PNT2022TMID11027</b>
<b>PROJECT NAME</b>	Gas leakage monitoring and alerting system

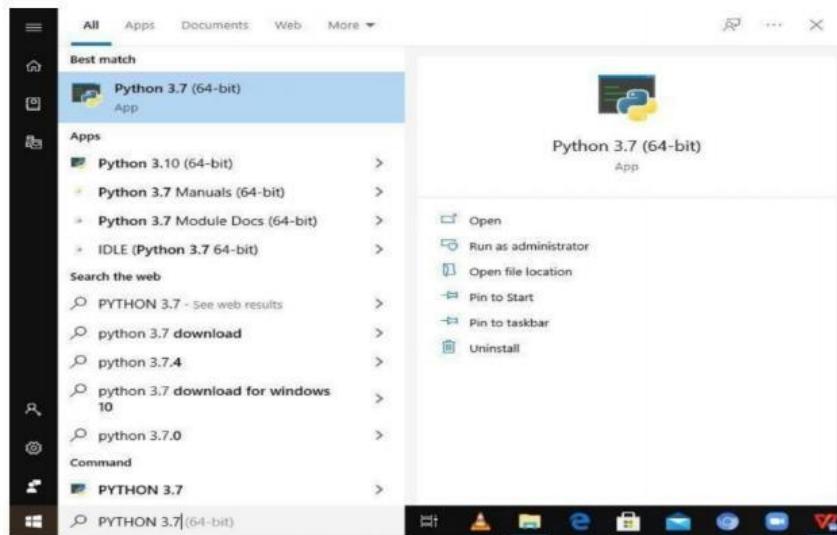


## PREREQUISITES :

### i.IBM CLOUD SERVICE:



### ii.SOFTWARE:



```
Python 3.10.7
File Edit Shell Debug Options Window Help
Python 3.10.7 (tags/v3.10.7:6cc6b13, Sep 8 2022, 14:08:36) [MSC v.1933 64 bit (AMD64)] on win32
Type "help()", "copyright()", "credits()" or "license()" for more information.
>>> print("Hello World")
Hello World
>>>
```

**Code:**

**DEVELOP A PYTHON SCRIPT TO AND  
SUBSCRIBE TO IBM IOT PLATFORM**

**DEVELOP THE PYTHON CODE**

Date	18 NOVEMBER 2022
Team ID	PNT2022TMID11027
Project Name	Gas Leakage Monitoring and Alerting System

**Program:**

```
import wiotp.sdk.device
import time
import random
myConfig = {"identity": {"orgId": "8u6vu9", "typeId":
"12345678", "deviceId": "12345678"}, "auth": {"token":
"G4VznMz04rN?RgkJr8"}
}
def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s"
%cmd.data['command'])
    m=cmd.data['command']
client =
wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
while True:
    gas=random.randint(0,100)
    temp=random.randint(0,100)
    hum=random.randint(0,100)
    pre=random.randint(0,100)
    myData={'Hazardous Gas':gas, 'Temperature':temp,
'Humidity':hum, 'Pressure':pre }
    client.publishEvent(eventId="status",
msgFormat="json", data=myData, qos=0, onPublish=None)
    print("Published data Successfully: %s", myData)
    #client.commandCallback =myCommandCallbacktime.sleep(2)
    client.disconnect()
```



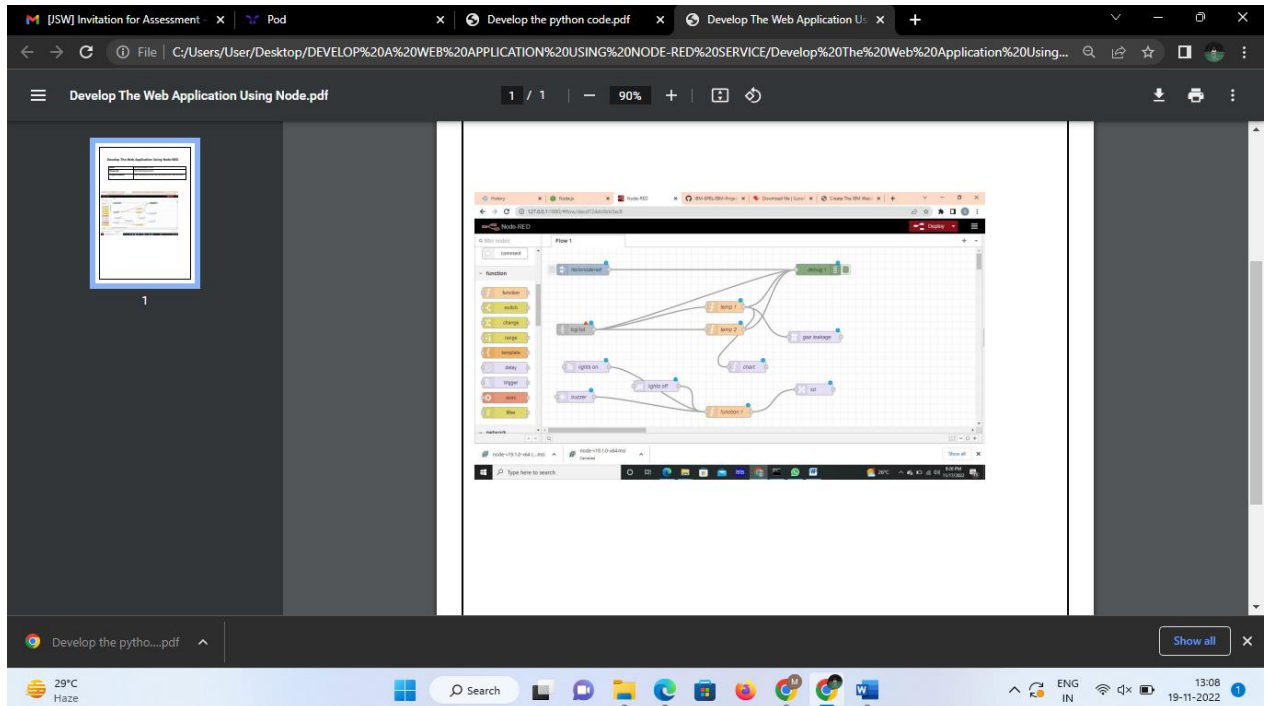
## OUTPUT:

```
1 import wiotp.sdk.device
2 import time
3 import random
4 myConfig = {"identity": {"orgId": "8u6vu9", "typeId": "12345678", "deviceId": "12345678"}, "auth": {"token": "G4VznMz04rN7RgkJr8"}}
5 }
6 def myCommandCallback(cmd):
7     print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
8     m=cmd.data['command']
9 client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
10 client.connect()
11 while True:
12     gas=random.randint(0,100)
13     temp=random.randint(0,100)
14     hum=random.randint(0,100)
15     pre=random.randint(0,100)
16     myData={'Hazardous Gas':gas, 'Temperature':temp, 'Humidity':hum, 'Pressure':pre }
17     client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
18     print("Published data Successfully: %s" % myData)
19     #client.commandCallback = myCommandCallbacktime.sleep(2)
20     client.disconnect()
```

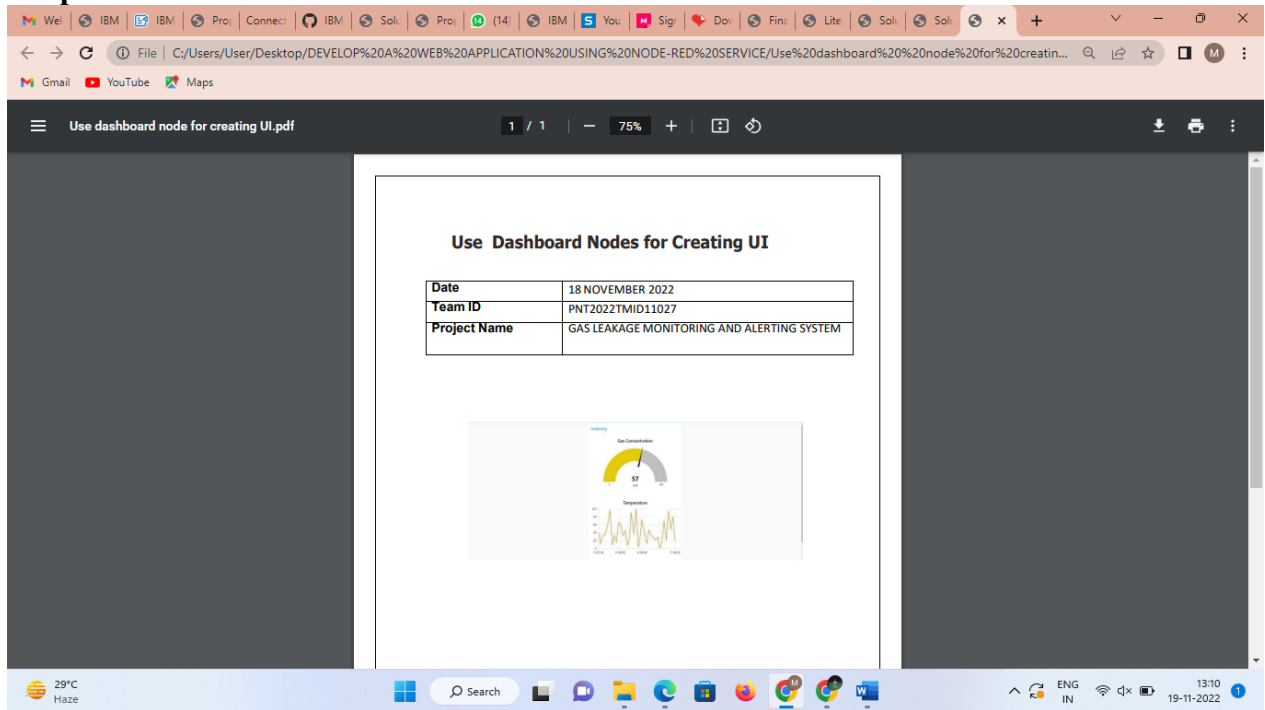
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
[user@parrot:~]$ /bin/python3 /home/user/Downloads/prasanna.py
2022-11-18 16:31:42,275 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:8u6vu9:12345678:12345678
Published data Successfully: %s {'Hazardous Gas': 77, 'Temperature': 80, 'Humidity': 57, 'Pressure': 52}
2022-11-18 16:31:42,276 wiotp.sdk.device.client.DeviceClient INFO Disconnected from the IBM Watson IoT Platform
2022-11-18 16:31:42,276 wiotp.sdk.device.client.DeviceClient INFO Closed connection to the IBM Watson IoT Platform
2022-11-18 16:31:52,277 wiotp.sdk.device.client.DeviceClient WARNING Unable to send event status because client is in disconnected state
Published data Successfully: %s {'Hazardous Gas': 24, 'Temperature': 22, 'Humidity': 80, 'Pressure': 20}
2022-11-18 16:31:52,277 wiotp.sdk.device.client.DeviceClient INFO Closed connection to the IBM Watson IoT Platform
```

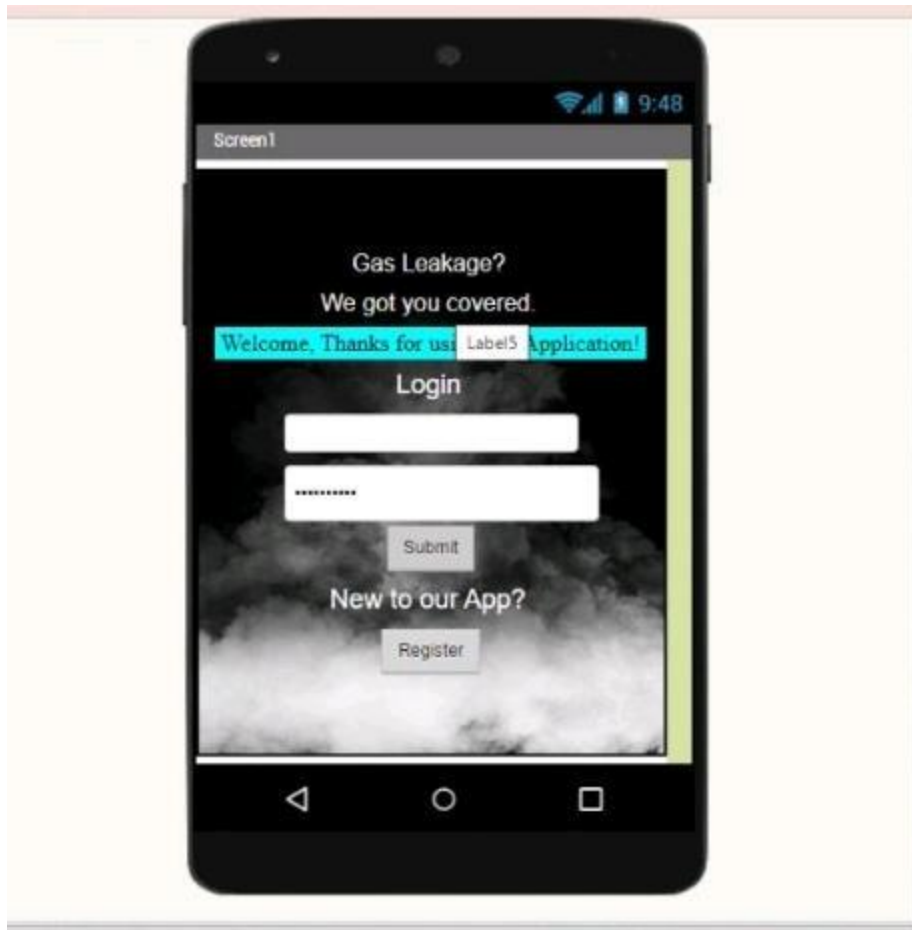
## NODE RED SERVICE:



## Output:



## Final app:



**Output:**

