SMART BRIDGE : PROJECT

Smart security and safety solutions based on IoT for large industrial plants

Team Members:

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Introduction:

Overview:

To create smart security and safety system for large industrial plants.

Objective:

To develop smart security and safety system which stores the date and time of employee while entry and exit using IBM cloud. Alerts the employee who exceeds the time duration in radiation room by using buzzer and by displaying message to leave the room in OLED screen.

Survey:

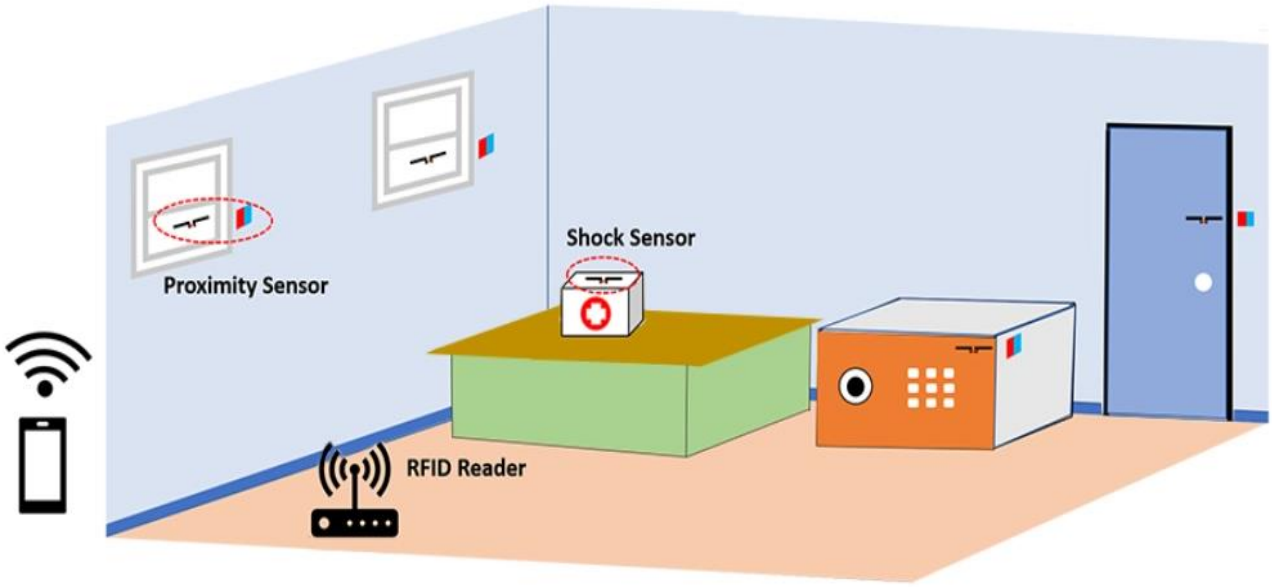
Existing model:

General model which can store date and time for entry and exit.

Solution:

We can calculate the total time spent in company using IBM cloud, we can send alert to employee in radiation room who exceeds the time limit. This can save the employee from radiation effect.

Block Diagram:



Requirements:

Python IDLE

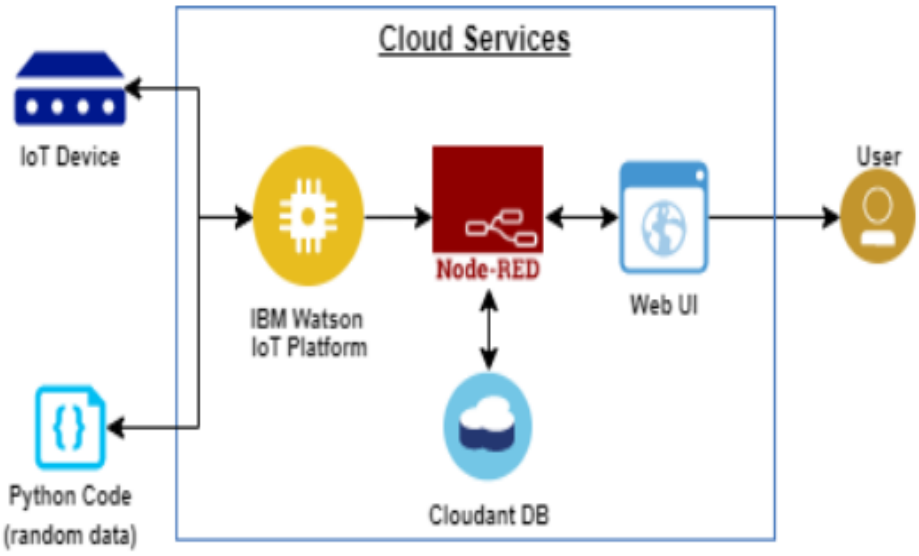
IBM account:

IBM Cloud

IBM Watson IoT platform

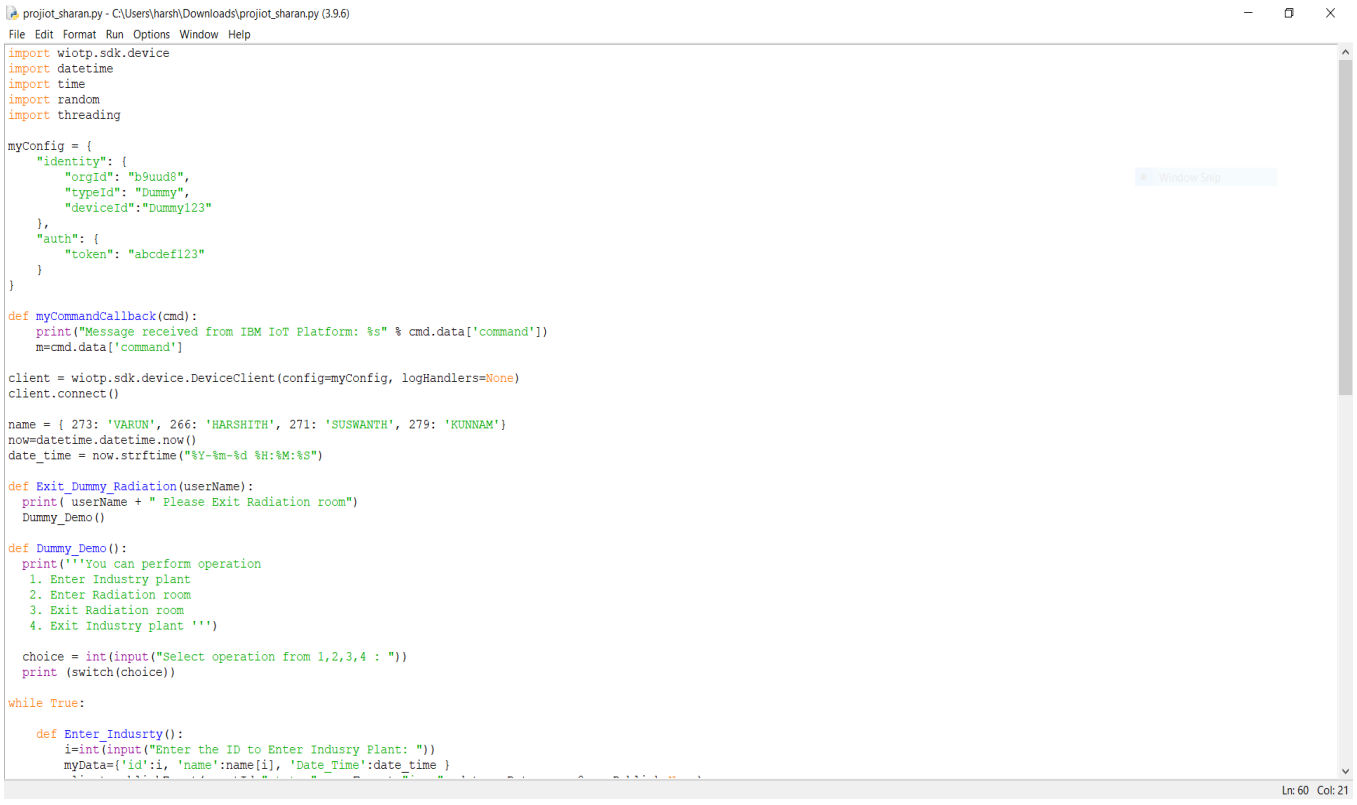
Node-red

Flow Chart:



Procedure:

Develop the code:



```
projiot_sharan.py - C:\Users\harsh\Downloads\projiot_sharan.py (3.9.6)
File  Edit  Format  Run  Options  Window  Help
import wiotp.sdk.device
import datetime
import time
import random
import threading

myConfig = {
    "identity": {
        "orgId": "b9uud8",
        "typeId": "Dummy",
        "deviceId":"Dummy123"
    },
    "auth": {
        "token": "abcdef123"
    }
}

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()

name = { 273: 'VARUN', 266: 'HARSHITH', 271: 'SUSWANTH', 279: 'KUNNAM'}
now=datetime.datetime.now()
date_time = now.strftime("%Y-%m-%d %H:%M:%S")

def Exit_Dummy_Radiation(userName):
  print( userName + " Please Exit Radiation room")
  Dummy_Demo()

def Dummy_Demo():
  print('''You can perform operation
   1. Enter Industry plant
   2. Enter Radiation room
   3. Exit Radiation room
   4. Exit Industry plant ''')

  choice = int(input("Select operation from 1,2,3,4 : "))
  print (switch(choice))

while True:

    def Enter_Indusrty():
        i=int(input("Enter the ID to Enter Indusry Plant: "))
        myData={'id':i, 'name':name[i], 'Date_Time':date_time }
Ln: 60  Col: 21
```

projiot_sharan.py - C:\Users\harsh\Downloads\projiot_sharan.py (3.9.6)

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```
while True:

    def Enter_Indusrty():
        i=int(input("Enter the ID to Enter Indusry Plant: "))
        myData={'id':i, 'name':name[i], 'Date_Time':date_time }
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Published data Succesfully: %s",myData)
        print( name[i]+" Entered Industry Plant")

    def Enter_Radiation():
        j=int(input("Enter the ID to Enter Radiation room: "))
        myData={'id':j, 'name':name[j], 'Date_Time':date_time }
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Published data Succesfully: %s",myData)
        print( name[j]+" Entered Radiation room")
        Dummy_Demo()
        threading.Timer(5.0, Exit_Dummy_Radiation(name[j])).start()
        time.sleep(15)

    def Exit_Radiation():
        k=int(input("Enter the ID to Exit Radiation room: "))
        myData={'id':k, 'name':name[k], 'Date_Time':date_time }
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Published data Succesfully: %s",myData)
        print( name[k]+" Exited Radiation room")

    def Exit_Industy():
        l=int(input("Enter the ID to Exited Indusry Plant: "))
        myData={'id':l, 'name':name[l], 'Date_Time':date_time }
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Published data Succesfully: %s",myData)
        print( name[l]+" Exited Industry Plant")
    def default():
        print("Selected Choice is not correct")

    switcher = {
        1: Enter_Indusrty,
        2: Enter_Radiation,
        3: Exit_Radiation,
        4: Exit_Industy,
        }

    def switch(operation):
        return switcher.get(operation, default)()

    print('''You can perform operation
    1. Enter Industry plant
```

Ln: 60 Col: 21

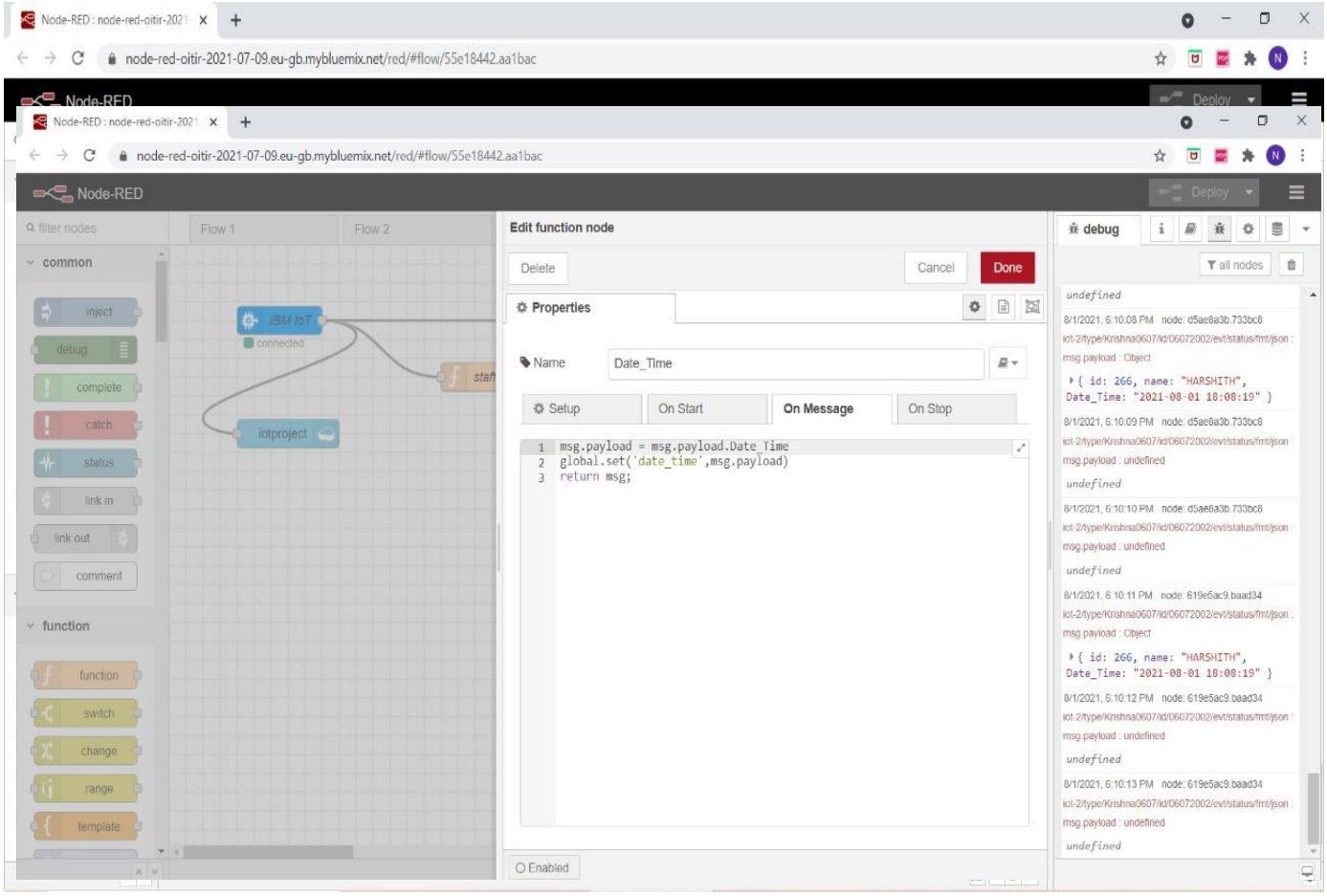
projiot_sharan.py - C:\Users\harsh\Downloads\projiot_sharan.py (3.9.6)

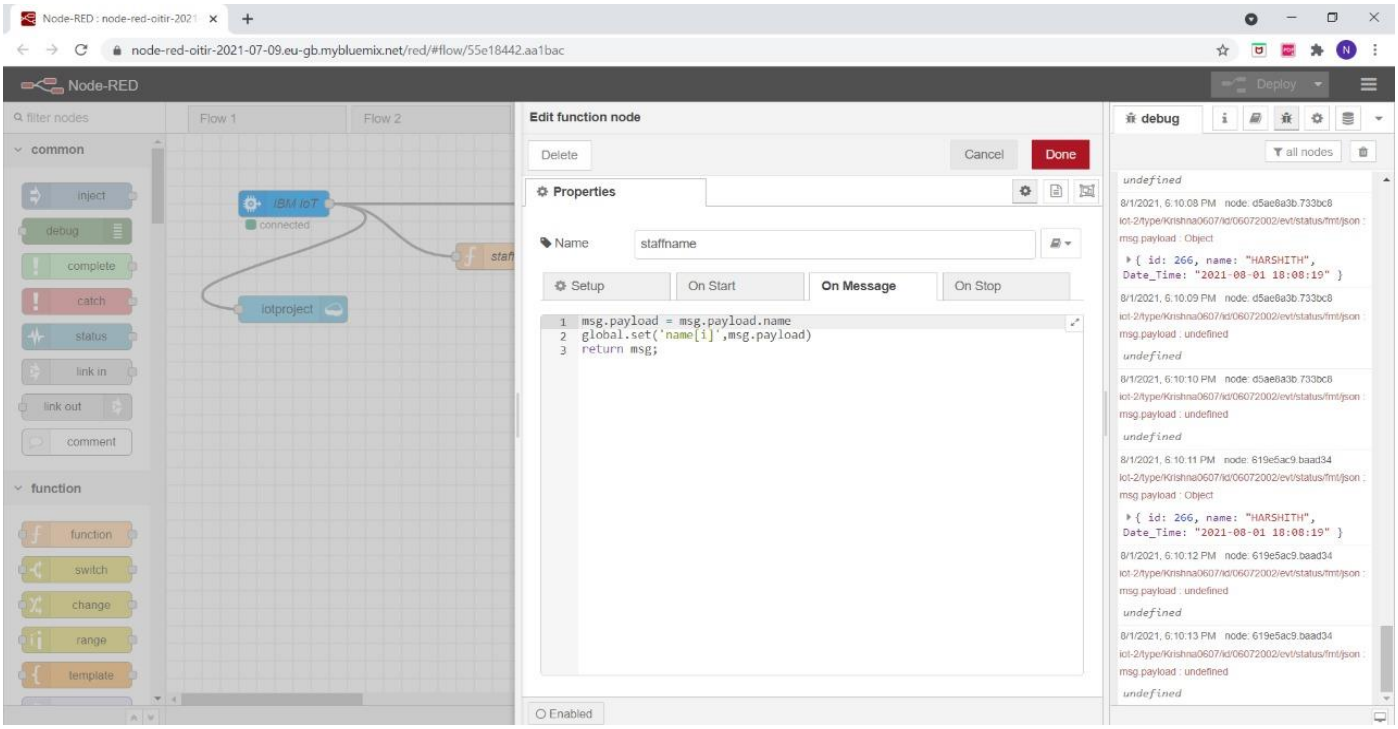
File Edit Format Run Options Window Help

```
        print("Published data Succesfully: %s",myData)
        print( name[j]+" Entered Radiation room")
        Dummy_Demo()
        threading.Timer(5.0, Exit_Dummy_Radiation(name[j])).start()
        time.sleep(15)

    def Exit_Radiation():
        k=int(input("Enter the ID to Exit Radiation room: "))
        myData={'id':k, 'name':name[k], 'Date_Time':date_time }
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Published data Succesfully: %s",myData)
        print( name[k]+" Exited Radiation room")

    def Exit_Industy():
        l=int(input("Enter the ID to Exited Indusry Plant: "))
        myData={'id':l, 'name':name[l], 'Date_Time':date_time }
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Published data Succesfully: %s",myData)
        print( name[l]+" Exited Industry Plant")
    def default():
        print("Selected Choice is not correct")

    switcher = {
        1: Enter_Indusrty,
        2: Enter_Radiation,
        3: Exit_Radiation,
        4: Exit_Industy,
        }

    def switch(operation):
        return switcher.get(operation, default)()

    print('''You can perform operation
    1. Enter Industry plant
    2. Enter Radiation room
    3. Exit Radiation room
    4. Exit Industry plant ''')

    #Take input from user
    choice = int(input("Select operation from 1,2,3,4 : "))
    print (switch(choice))

    client.commandCallback = myCommandCallback
    time.sleep(15)
client.disconnect()
{"mode":"full","isActive":false}
```

Ln: 60 Col: 21

Node-red:


Node-RED : node-red-oitir-2021
node-red-oitir-2021-07-09.eu-gb.mybluemix.net/red/#flow/55e18442.aa1bac
Node-RED
Deploy
filter nodes
Flow 1
Flow 2
common
inject
debug
complete
catch
status
link in
link out
comment
function
function
switch
change
range
template
IBM IoT
connected
staff
Iotproject
Edit function node
Delete
Cancel
Done
Properties
Name
Date_Time
Setup
On Start
On Message
On Stop
1 msg.payload = msg.payload.Date_Time
2 global.set('date_time',msg.payload)
3 return msg;
Enabled
debug
all nodes
undefined
8/1/2021, 6:10:08 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : Object
{ id: 266, name: "HARSHITH", Date_Time: "2021-08-01 18:08:19" }
8/1/2021, 6:10:09 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:10 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:11 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : Object
{ id: 266, name: "HARSHITH", Date_Time: "2021-08-01 18:08:19" }
8/1/2021, 6:10:12 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:13 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined


Node-RED : node-red-oitir-2021
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range
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connected
staff
Iotproject
Edit function node
Delete
Cancel
Done
Properties
Name
staffname
Setup
On Start
On Message
On Stop
1 msg.payload = msg.payload.name
2 global.set('name[i]',msg.payload)
3 return msg;
Enabled
debug
all nodes
undefined
8/1/2021, 6:10:08 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : Object
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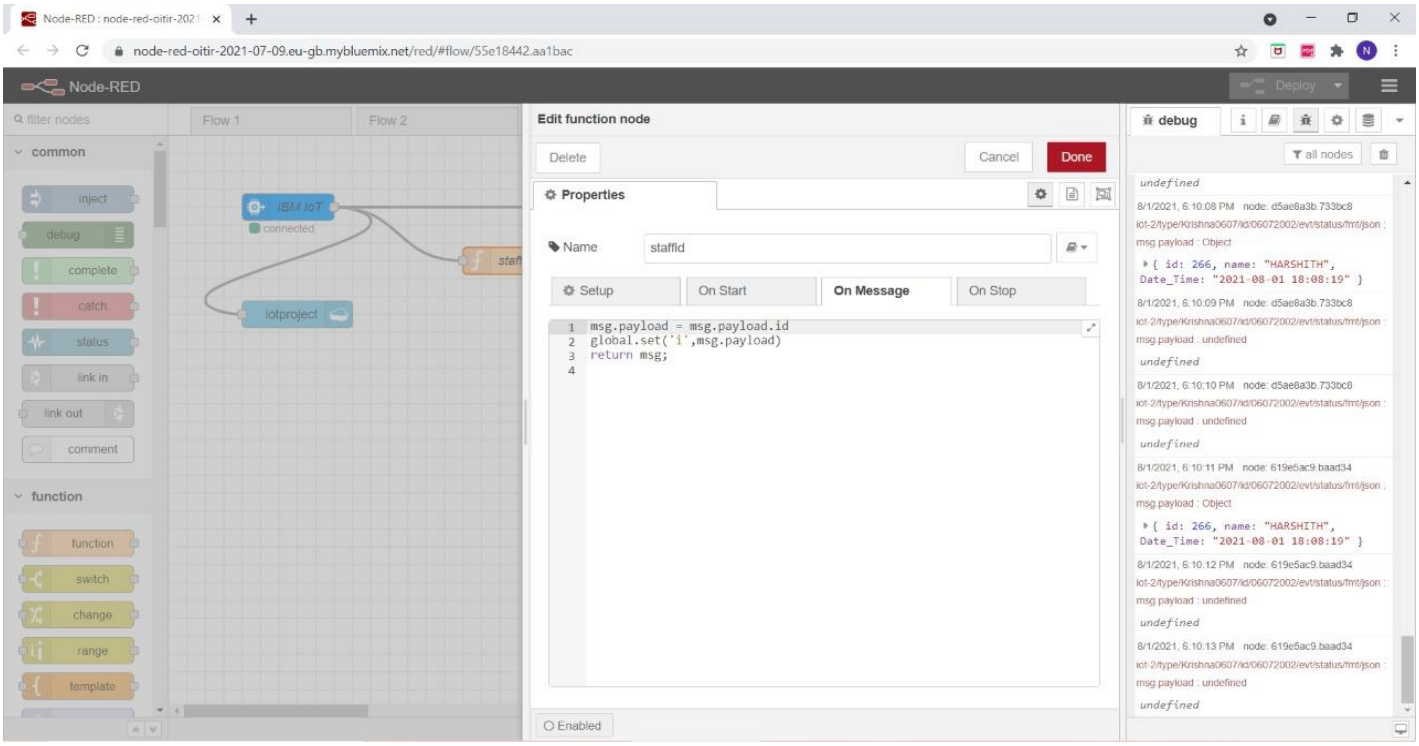
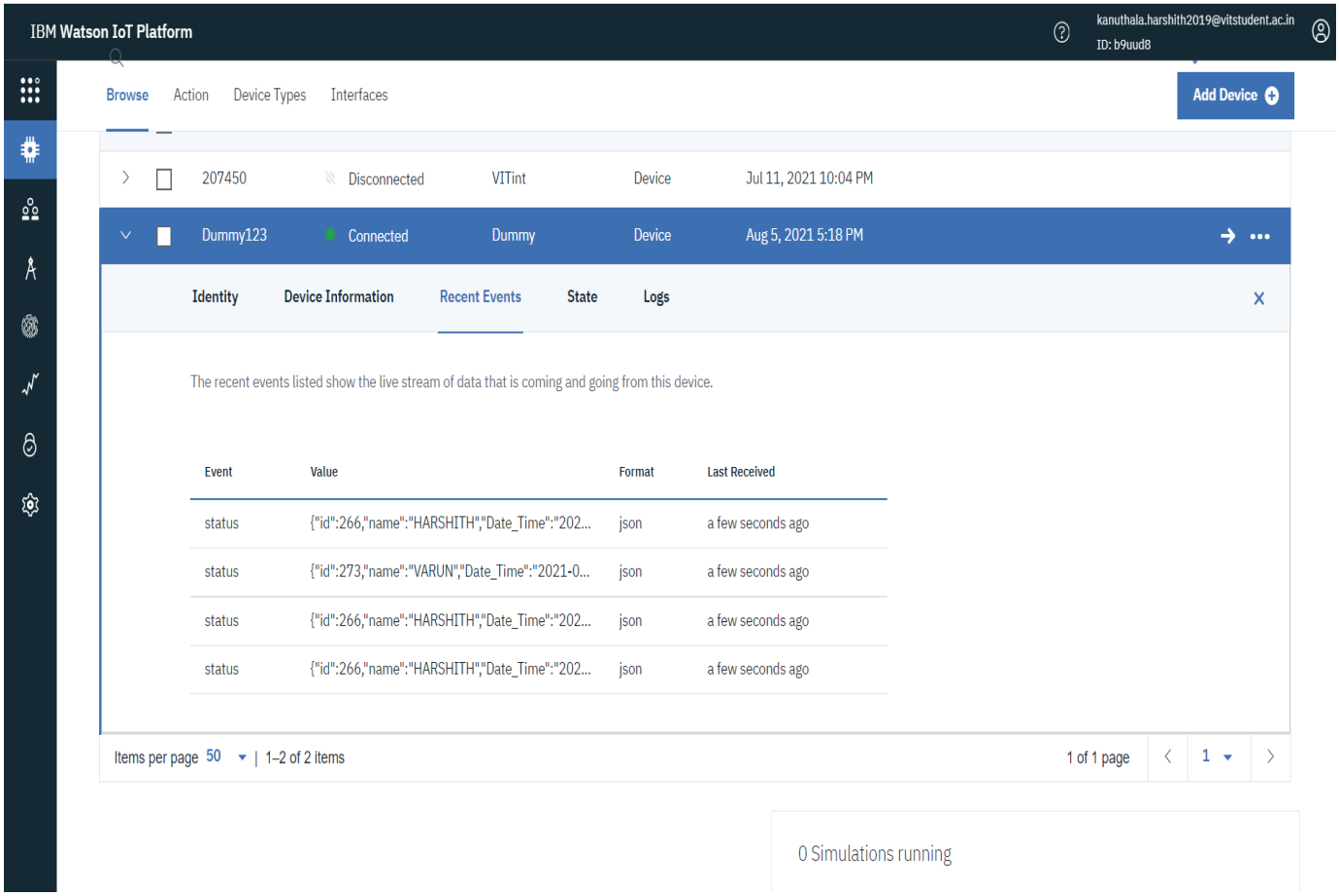
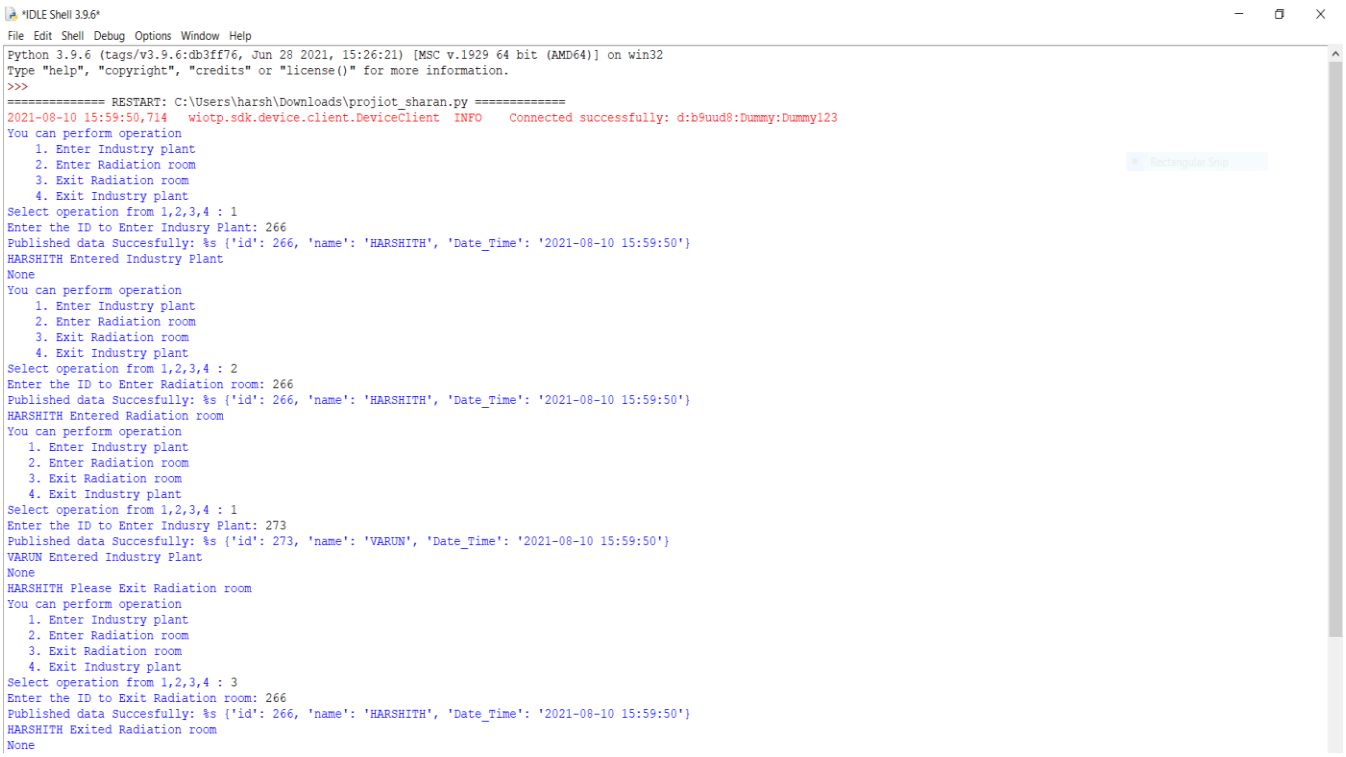
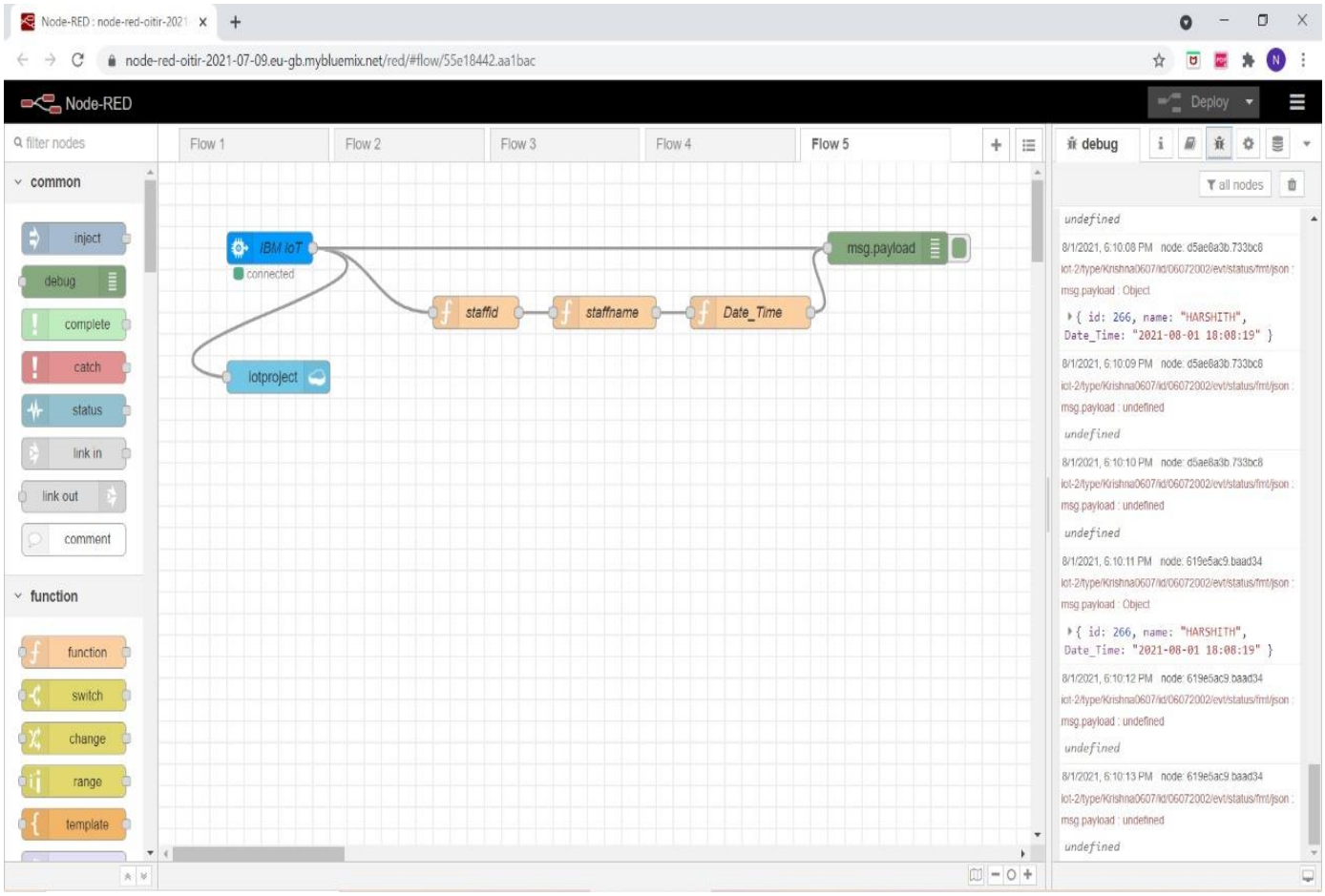
8/1/2021, 6:10:09 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:10 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:11 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : Object
{ id: 266, name: "HARSHITH", Date_Time: "2021-08-01 18:08:19" }
8/1/2021, 6:10:12 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:13 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined


Node-RED
Edit function node
Delete
Cancel
Done
Properties
Name
staffid
Setup
On Start
On Message
On Stop
msg.payload = msg.payload.id
global.set('i',msg.payload)
return msg;
debug
IBM IoT
connected
iotproject
Enabled

Result:


IBM Watson IoT Platform
kanuthala.harshith2019@vitstudent.ac.in
ID: b9uud8
Browse
Action
Device Types
Interfaces
Add Device
207450
Disconnected
VITint
Device
Jul 11, 2021 10:04 PM
Dummy123
Connected
Dummy
Device
Aug 5, 2021 5:18 PM
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
status
{"id":266,"name":"HARSHITH","Date_Time":"202...
json
a few seconds ago
status
{"id":273,"name":"VARUN","Date_Time":"2021-0...
json
a few seconds ago
status
{"id":266,"name":"HARSHITH","Date_Time":"202...
json
a few seconds ago
status
{"id":266,"name":"HARSHITH","Date_Time":"202...
json
a few seconds ago
Items per page 50
1–2 of 2 items
1 of 1 page
1
0 Simulations running


IDLE Shell 3.9.6
File Edit Shell Debug Options Window Help
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\harsh\Downloads\projiot_sharan.py ==========
2021-08-10 15:59:50,714 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:b9uud8:Dummy:Dummy123
You can perform operation
1. Enter Industry plant
2. Enter Radiation room
3. Exit Radiation room
4. Exit Industry plant
Select operation from 1,2,3,4 : 1
Enter the ID to Enter Industry Plant: 266
Published data Succesfully: %s {'id': 266, 'name': 'HARSHITH', 'Date_Time': '2021-08-10 15:59:50'}
HARSHITH Entered Industry Plant
None
You can perform operation
1. Enter Industry plant
2. Enter Radiation room
3. Exit Radiation room
4. Exit Industry plant
Select operation from 1,2,3,4 : 2
Enter the ID to Enter Radiation room: 266
Published data Succesfully: %s {'id': 266, 'name': 'HARSHITH', 'Date_Time': '2021-08-10 15:59:50'}
HARSHITH Entered Radiation room
You can perform operation
1. Enter Industry plant
2. Enter Radiation room
3. Exit Radiation room
4. Exit Industry plant
Select operation from 1,2,3,4 : 1
Enter the ID to Enter Industry Plant: 273
Published data Succesfully: %s {'id': 273, 'name': 'VARUN', 'Date_Time': '2021-08-10 15:59:50'}
VARUN Entered Industry Plant
None
HARSHITH Please Exit Radiation room
You can perform operation
1. Enter Industry plant
2. Enter Radiation room
3. Exit Radiation room
4. Exit Industry plant
Select operation from 1,2,3,4 : 3
Enter the ID to Exit Radiation room: 266
Published data Succesfully: %s {'id': 266, 'name': 'HARSHITH', 'Date_Time': '2021-08-10 15:59:50'}
HARSHITH Exited Radiation room
None


Node-RED : node-red-oitir-2021
node-red-oitir-2021-07-09.eu-gb.mybluemix.net/red/#flow/55e18442.aa1bac
Node-RED
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function
switch
change
range
template
IBM IoT
connected
staffid
staffname
Date_Time
msg.payload
Iotproject
debug
all nodes
undefined
8/1/2021, 6:10:08 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : Object
{ id: 266, name: "HARSHITH", Date_Time: "2021-08-01 18:08:19" }
8/1/2021, 6:10:09 PM node: d5ae8a3b.733bc8
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
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iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:11 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : Object
{ id: 266, name: "HARSHITH", Date_Time: "2021-08-01 18:08:19" }
8/1/2021, 6:10:12 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined
8/1/2021, 6:10:13 PM node: 619e5ac9.baad34
iot-2/type/Krishna0607/id/06072002/evt/status/fmt/json : msg.payload : undefined
undefined

Advantages:

Reduction in maintenance costs

Safety operator

Secured data

Flexible

Easy accessibility

Interference

Disadvantages:

Cost

High storage required

Disturbances

Conclusion:

This project is mainly focused on date and time of entry/exit of the employee. This can measure the total time spent in company by calculating time from exit and entry time. To ensure the safety of the employee, we use countdown from the time of entry to the radiation room and when the time limit has reached, alert is given to employee by making the buzzer on and displaying message to leave the radiation room in the OLED screen. This helps the safety of the employee. All the data is stored in the cloud, which can be accessed easily.

Bibolography:

Smart bridge lecture videos

IBM platform videos

https://thesmartbridge.com/documents/projects/SmartHomeAutomationusingIBMCloud.pdf

Source code:

https://github.com/gnaneshwarbandari/IOT/blob/main/ibm_code.py

https://github.com/divyanemuri/SmartInternz-IoT-Externship-2021/blob/master/Python_pubsubIBM.py