

## Sprint 02

# Signs with Smart Connectivity for Better Road Safety

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Sprint Goals:

Push data from local code to cloud

Program Code:

> weather.py

This file is a utility function that fetches the weather from OpenWeatherAPI. It returns only certain required parameters of the API response.

# Python code

import requests as reqs

def get(myLocation,APIKEY):

    apiURL =

    f"https://api.openweathermap.org/data/2.5/weather?q={myLocation}&appid={API KEY}"

    responseJSON = (reqs.get(apiURL)).json()

    returnObject = {

        "temperature" : responseJSON['main']['temp'] - 273.15,

        "weather" : [responseJSON['weather'][\_]['main'].lower() for \_ in range(len(responseJSON['weather']))],

        "visibility" : responseJSON['visibility']/100, # visibility in percentage where 10km is 100% and 0km is 0%

    }

    if("rain" in responseJSON):

        returnObject["rain"] = [responseJSON["rain"][key] for key in responseJSON["rain"]]

    return(returnObject)

> publishData.py

This code pushes data to the cloud and logs data. IBM Cloud is configured such that the data is displayed in the following website: [CLICK TO OPEN NODE RED DASHBOARD](#)

```
# Python code
```

```
# IMPORT SECTION STARTS
```

```
import wiotp.sdk.device # python -m pip install  
wiotpimport time
```

```
# IMPORT SECTION ENDS
```

```
# _____
```

```
# API CONFIG SECTION STARTS
```

```
myConfig = {  
    "identity" : {  
        "orgId" : "epmoec",  
        "typeId" : "testDevice",  
        "deviceId" : "device0"  
    },  
    "auth" : {  
        "token" : "?-KDXUPMvDo_TK2&b1"  
    }  
}
```

```
# API CONFIG SECTION ENDS
```

```
# _____
```

```
# FUNCTIONS SECTION STARTS
```

```
def myCommandCallback(cmd):  
    print("recieved cmd : ",cmd)
```

```
def logData2Cloud(location,temperature,visibility):  
    client = wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)  
    client.connect()  
    client.publishEvent(eventId="status",msgFormat="json",data={  
        "temperature" :  
        temperature,"visibility" :  
        visibility, "location" :  
        location  
    },qos=0,onPublish=None)  
    client.commandCallback = myCommandCallback  
    client.disconnect()  
    time.sleep(1)
```

```
# FUNCTIONS SECTION ENDS
```

```
> brain.py
```

This file is a utility function that returns only essential information to be displayed at the hardware side and abstracts all the unnecessary details. This is where the code

flow logic is implemented.

```
from datetime import datetime as dt
```

```
from publishData import logData2Cloud as log2cloud
```

```
# IMPORT SECTION ENDS
```

```
# _____
```

```
# UTILITY LOGIC SECTION STARTS
```

```
def processConditions(myLocation,APIKEY,localityInfo):
```

```
    weatherData = weather.get(myLocation,APIKEY)
```

```
    log2cloud(myLocation,weatherData["temperature"],weatherData["visibility"])
```

```
    finalSpeed = localityInfo["usualSpeedLimit"] if "rain" not in weatherData else  
localityInfo["usualSpeedLimit"]/2
```

```
    finalSpeed = finalSpeed if weatherData["visibility"]>35 else finalSpeed/2
```

```
    if(localityInfo["hospitalsNearby"]):#
```

```
        hospital zone
```

```
        doNotHonk = True
```

```
    else:
```

```
        if(localityInfo["schools"]["schoolZone"]==False):#
```

```
            neither school nor hospital zone
```

```
            doNotHonk = False
```

```
        else:
```

```
            # school zone
```

```
            now = [dt.now().hour,dt.now().minute]
```

```
            activeTime = [list(map(int,_.split(":"))) for _ in
```

```
localityInfo["schools"]["activeTime"]]
```

```
            doNotHonk = activeTime[0][0]<=now[0]<=activeTime[1][0] and  
activeTime[0][1]<=now[1]<=activeTime[1][1]
```

```
    return({
```

```
        "speed" : finalSpeed,
```

```
        "doNotHonk" : doNotHonk
```

```
    })
```

```
# UTILITY LOGIC SECTION ENDS
```

```
> main.py
```

The code that runs in a forever loop in the micro-controller. This calls all the util functions from other python files and based on the return value transduces changes in the output hardware display.

```
# Python code
```

```
# IMPORT SECTION STARTS
```

```
import brain
```

```
# IMPORT SECTION ENDS
```

```
# _____
```

```
# USER INPUT SECTION STARTS
```

```
myLocation = "Chennai,IN"
```

```
APIKEY = "bf4a8d480ee05c00952bf65b78ae826b"
```

```
localityInfo = {  
    "schools" : {  
        "schoolZone" : True,  
        "activeTime" : ["7:00","17:30"] # schools active from 7 AM till 5:30 PM  
    },  
    "hospitalsNearby" : False,  
    "usualSpeedLimit" : 40 # in km/hr  
}
```

```
# USER INPUT SECTION ENDS
```

```
# _____
```

```
# MICRO-CONTROLLER CODE STARTS
```

```
while True :
```

```
    print(brain.processConditions(myLocation,APIKEY,localityInfo))
```

```
'''
```

MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 3 AS PER OUR PLANNED SPRINT SCHEDULE

```
'''
```

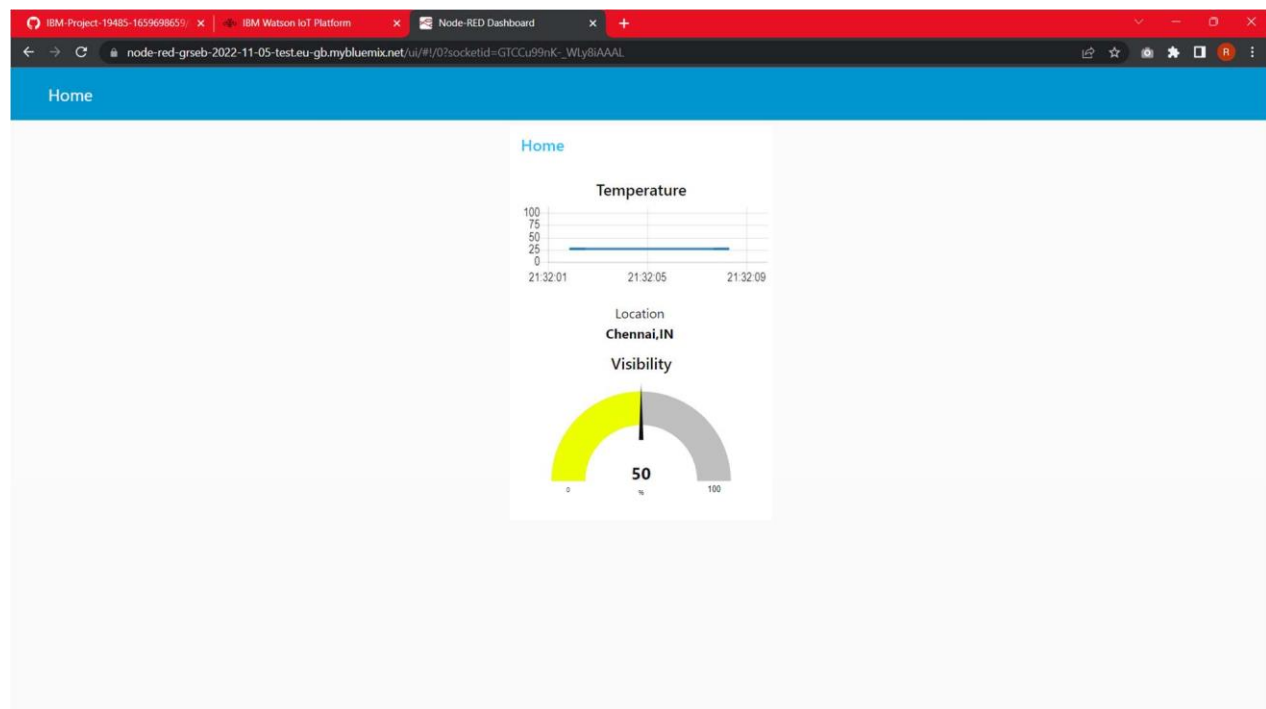
```
# MICRO-CONTROLLER CODE ENDS
```

Output :

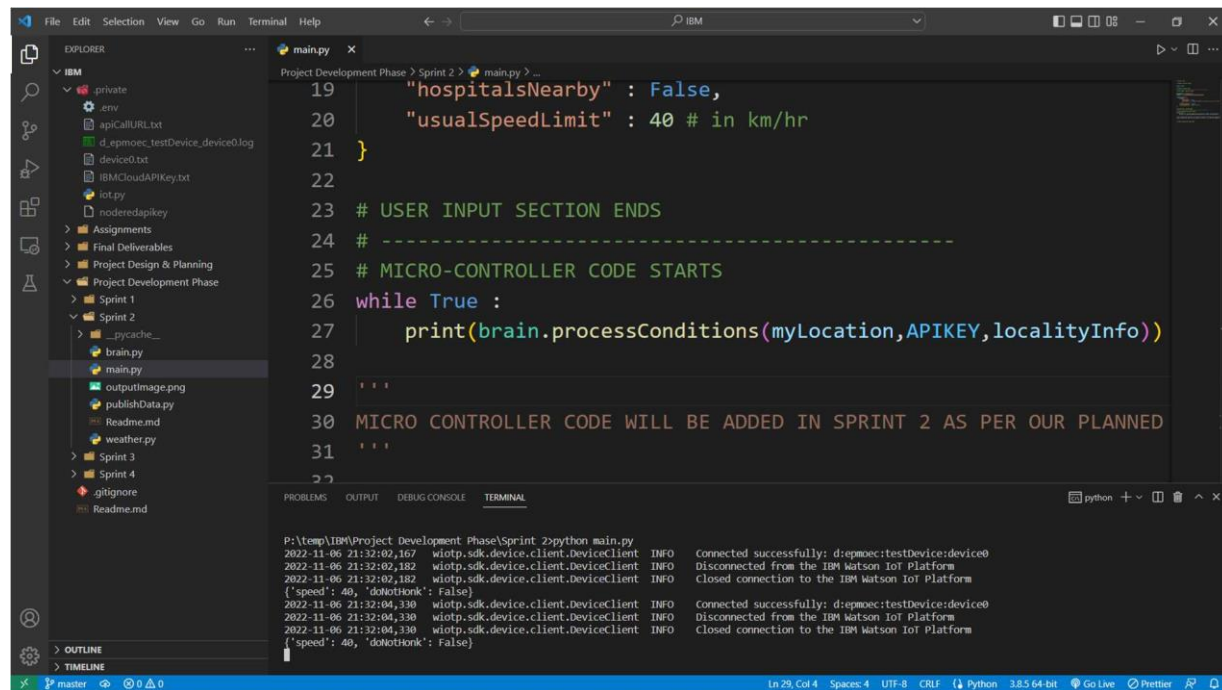
## LINK TO NODE RED DASHBOARD

### # Code Output

```
2022-11-06 21:38:33,452 wiotp.sdk.device.client.DeviceClient INFO
Connected successfully: d:epmoec:testDevice:device0
2022-11-06 21:38:33,452 wiotp.sdk.device.client.DeviceClient INFO
Disconnected from the IBM Watson IoT Platform
2022-11-06 21:38:33,452 wiotp.sdk.device.client.DeviceClient INFO      Closed
connection to the IBM Watson IoT Platform
{'speed': 40, 'doNotHonk': False}
2022-11-06 21:38:35,631 wiotp.sdk.device.client.DeviceClient INFO
Connected successfully: d:epmoec:testDevice:device0
2022-11-06 21:38:35,631 wiotp.sdk.device.client.DeviceClient INFO
Disconnected from the IBM Watson IoT Platform
2022-11-06 21:38:35,631 wiotp.sdk.device.client.DeviceClient INFO      Closed
connection to the IBM Watson IoT Platform
{'speed': 40, 'doNotHonk': False}
.
.
.
... repeats every 1
seclmages :
OutputImage2
```



## Output Image



The image shows a Visual Studio Code editor window with a project named "IBM". The Explorer sidebar on the left shows the project structure, including files like `private`, `env`, `apiCallURL.txt`, `d_epmoec_testDevice_device0.log`, `device0.txt`, `IBMApiKey.txt`, `test.py`, `orderedapikey`, `Assignments`, `Final Deliverables`, `Project Design & Planning`, `Project Development Phase`, `Sprint 1`, `Sprint 2` (selected), `Sprint 3`, `Sprint 4`, `.gitignore`, and `Readme.md`. Under `Sprint 2`, there are files `__pycache__`, `brain.py`, `main.py` (selected), `outputImage.png`, `publishData.py`, `Readme.md`, and `weather.py`.

The main editor window displays the content of `main.py`. The code is as follows:

```
19     "hospitalsNearby" : False,
20     "usualSpeedLimit" : 40 # in km/hr
21 }
22
23 # USER INPUT SECTION ENDS
24 # -----
25 # MICRO-CONTROLLER CODE STARTS
26 while True :
27     print(brain.processConditions(myLocation,APIKEY,localityInfo))
28
29 '''
30 MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 2 AS PER OUR PLANNED
31 '''
```

The bottom of the editor shows the TERMINAL output, which contains the following log messages:

```
P:\temp\IBM\Project Development Phase\Sprint 2>python main.py
2022-11-06 21:32:02,167 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:epmoec:testDevice:device0
2022-11-06 21:32:02,182 wiotp.sdk.device.client.DeviceClient INFO Disconnected from the IBM Watson IoT Platform
2022-11-06 21:32:02,182 wiotp.sdk.device.client.DeviceClient INFO Closed connection to the IBM Watson IoT Platform
{'speed': 40, 'doNotHonk': False}
2022-11-06 21:32:04,330 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:epmoec:testDevice:device0
2022-11-06 21:32:04,330 wiotp.sdk.device.client.DeviceClient INFO Disconnected from the IBM Watson IoT Platform
2022-11-06 21:32:04,330 wiotp.sdk.device.client.DeviceClient INFO Closed connection to the IBM Watson IoT Platform
{'speed': 40, 'doNotHonk': False}
```

The status bar at the bottom indicates the current file is `main.py`, line 29, column 4, using UTF-8 encoding with CRLF line endings. It also shows the Python version as 3.8.5 64-bit and the Go Live extension.