# REPORT

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PROBLEM STATEMENT:

Smart Connected Signs For Improved Road Safety Using IBM Cloud

Features:

- To replace the static signboards, smart connected sign boards are used.
- These smart connected sign boards get the speed limitations from a web app using weather API and updates automatically.
- Based on the weather changes the speed may increase or decrease.
- Based on the traffic and fatal situations the diversion signs are displayed.
- Guide(Schools), Warning and Service(Hospitals, Restaurant) signs are also displayed accordingly.
- Different modes of operations can be selected with the help of buttons
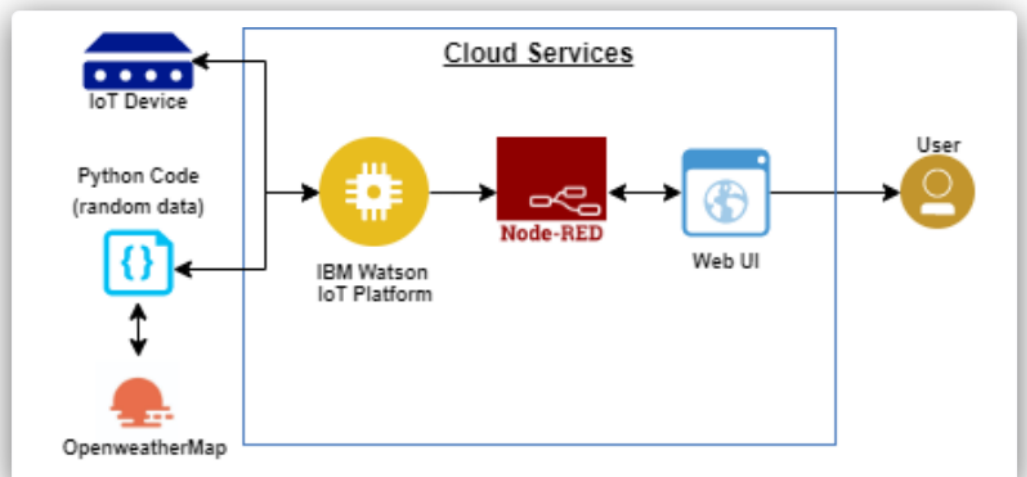
SOLUTION:

Python Program:

```
import wiotp.sdk.device
import time
import random
import requests, json
```

```python
myConfig = {
    "identity": {
        "orgId": "l0lyjx",
        "typeId": "AApp1",
        "deviceId":"12345"
    },
    "auth": {
        "token": "12345678"
    }
}

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()

BASE_URL = "https://api.openweathermap.org/data/2.5/weather?"
CITY = "Hyderabad"
URL = BASE_URL + "q=" + "delhi" + "&appid=" + "c4aa755540f66e8c800cbfd67df6ddcb"

while True:
    response = requests.get(URL)
    if response.status_code == 200:
        data = response.json()
        main = data['main']
        temperature = main['temp']
        humidity = main['humidity']
        pressure = main['pressure']
        report = data['visibility']
        repo=random.randint(0,5)
        if repo==1:
            prt="SLOW DOWN , SCHOOL IS NEAR"
        elif repo==3:
            prt="SLOW DOWN , HOSPITAL NEARBY"
        elif repo==5:
            prt="NEED HELP, POLICE STATION NEARBY"
        else:
            prt=""
        speed=random.randint(0,150)
        if speed>=100:
            prt3="SLOW DOWN , Speed Limit Exceeded"
        elif speed>=60 and speed<100:
            prt3="Moderate Speed"
        else:
            prt3=""
        sign=random.randint(0,5)
```

```
    if sign==1:
        prt2="Right Diversion ->"
    elif sign==3:
        prt2="Left Diversion <-"
    elif sign==5:
        prt2="U Turn"
    else:
         prt2=""
    if temperature<=50:
        prt4="Fog Ahead, Drive Slow"
    else:
         prt4="Clear Weather"


  else:
    print("Error in the HTTP request")
         myData={'Temperature':temperature,  'Message':prt,  'Sign':prt2,  'Speed':prt3,
'Visibility':prt4}
         client.publishEvent(eventId="status",  msgFormat="json",  data=myData,  qos=0,
onPublish=None)
    print("Published data Successfully: %s", myData)
    client.commandCallback = myCommandCallback
    time.sleep(5)
client.disconnect()
```
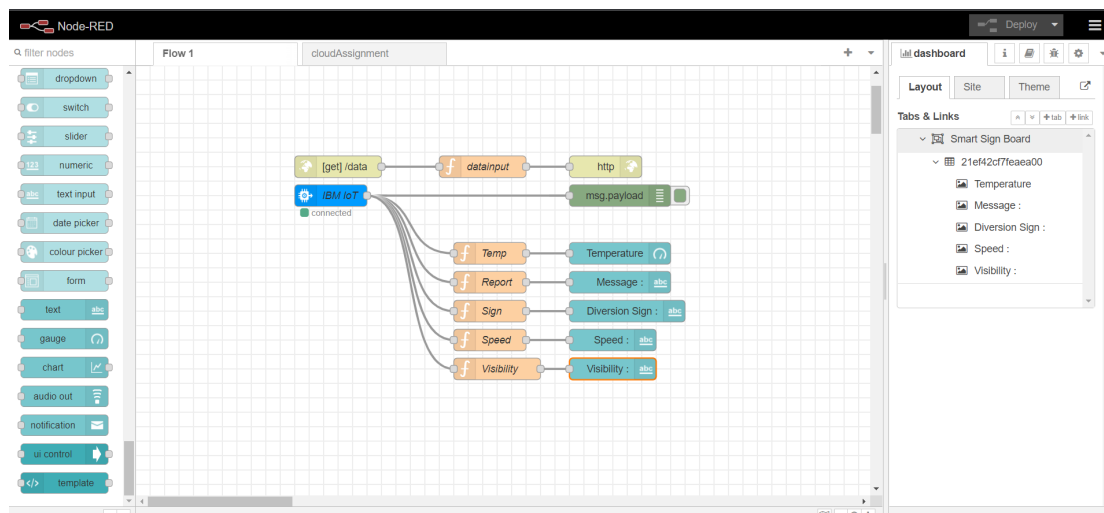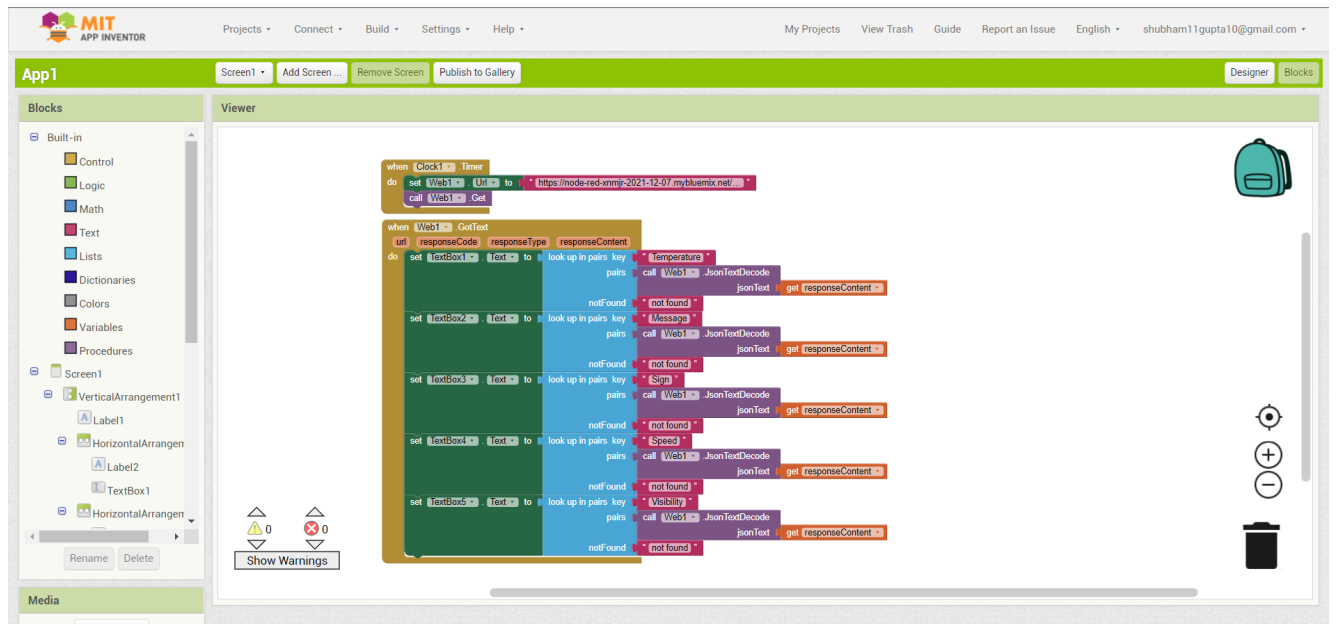
CODE EXPLANATION-

Here we have extracted weather data from OpenWeatherMap using the API call and using the data to display the temperature and define the visibility to provide an alert. Next, we have given the readings of speed, nearby places and diversion signs and display related messages on the screen while the temperature on the gauge.

Node-Red Structure:

MIT App Structure Backend:

MIT App Structure Frontend:
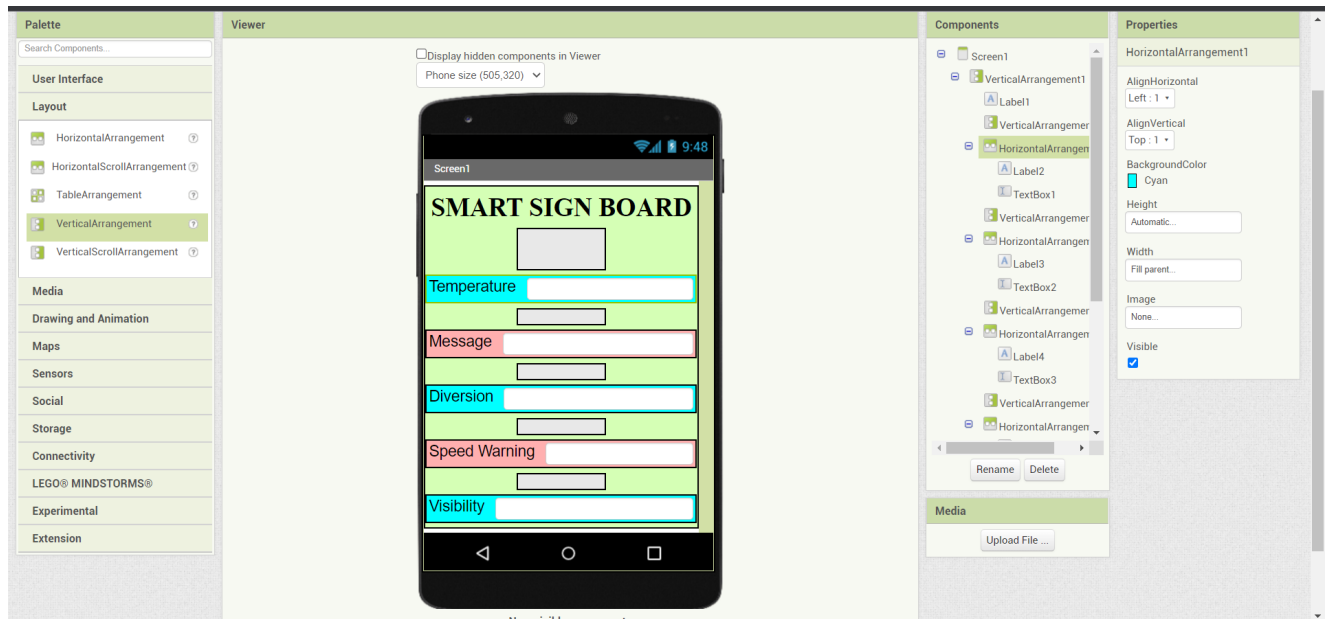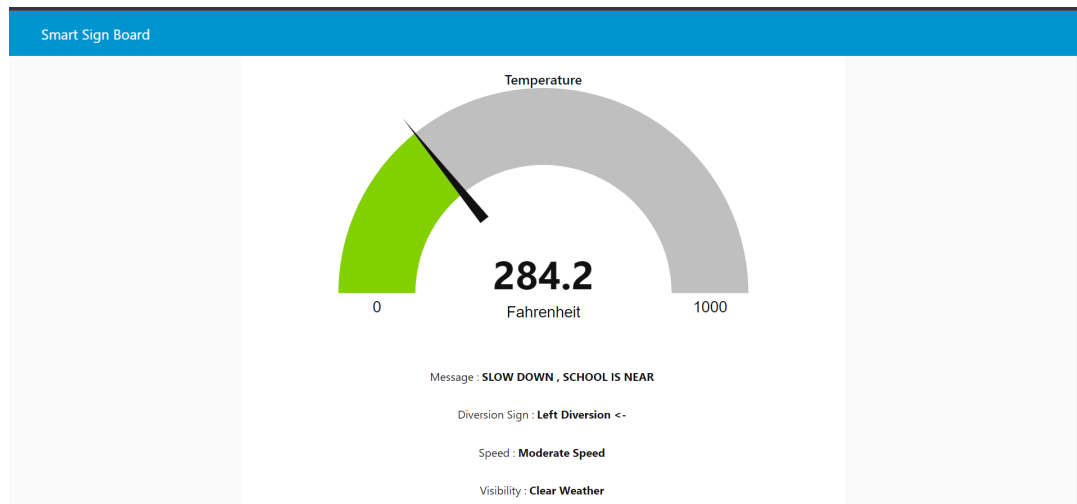
Android app display output:

SMART SIGN BOARD

Temperature	283.2
Message	SLOW DOWN , SCHOOL IS
Diversion	Right Diversion ->
Speed Warning	SLOW DOWN , Speed
Visibility	Clear Weather

Signboard display output:

Smart Sign Board

Temperature

284.2
Fahrenheit

0   1000

Message : **SLOW DOWN , SCHOOL IS NEAR**

Diversion Sign : **Left Diversion <-**

Speed : **Moderate Speed**

Visibility : **Clear Weather**

IBM Cloud output:

IBM Watson IoT Platform

shubhamgupta.2019@vitbhopal.ac.in
ID: l0lyjx

Browse   Action   Device Types   Interfaces   **Add Device** ⊕

>	12251	Disconnected	DEv1	Device	Dec 1, 2021 7:12 PM
∨	12345	Disconnected	AApp1	Device	Dec 7, 2021 6:32 AM

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	{"Temperature":284.2,"Message":"","Sign":"","Sp...	json	a few seconds ago
status	{"Temperature":284.2,"Message":"","Sign":"","Sp...	json	a few seconds ago
status	{"Temperature":284.2,"Message":"SLOW DOWN ...	json	a few seconds ago
status	{"Temperature":284.2,"Message":"","Sign":"","Sp...	json	a few seconds ago
status	{"Temperature":284.2,"Message":"","Sign":"","Sp...	json	a few seconds ago

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0 Simulations running

Python Code output:

```
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: D:\DOCS\pycode\calC.py =======================
2021-12-21 02:09:22,192    wiotp.sdk.device.client.DeviceClient   INFO    Connected successfully: d:l0lyjx
:AApp1:12345
Published data Successfully: %s {'Temperature': 283.2, 'Message': '', 'Sign': '', 'Speed': 'Moderate Spe
ed', 'Visibility': 'Clear Weather'}
Published data Successfully: %s {'Temperature': 283.2, 'Message': '', 'Sign': 'Left Diversion <-', 'Spee
d': '', 'Visibility': 'Clear Weather'}
Published data Successfully: %s {'Temperature': 283.2, 'Message': '', 'Sign': 'U Turn', 'Speed': 'SLOW D
OWN , Speed Limit Exceeded', 'Visibility': 'Clear Weather'}
Published data Successfully: %s {'Temperature': 283.2, 'Message': '', 'Sign': '', 'Speed': '', 'Visibili
ty': 'Clear Weather'}
Published data Successfully: %s {'Temperature': 283.2, 'Message': '', 'Sign': '', 'Speed': 'SLOW DOWN ,
Speed Limit Exceeded', 'Visibility': 'Clear Weather'}
```

Ln: 11 Col: 0