SPRINT-4

DATE	13 NOV 2022
TEAM ID	PNT2022TMID37959
PROJECT NAME	SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

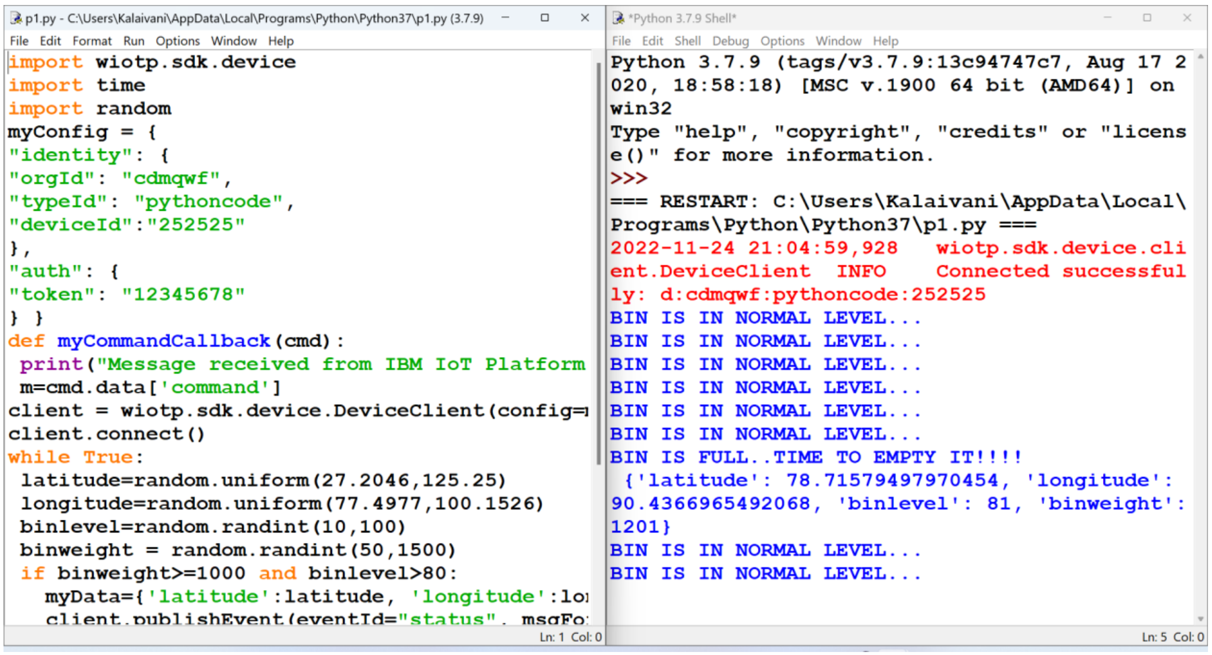
1.Simulate python code in Python IDE software to transmit data to IBM Watson IOT platform

Python code:

```
#Installing necessary libraries
import wiotp.sdk.device
import time
import random
import requests
import math
#Configuration details for connecting python script to IBM Watson IOT
Platform
myConfig = {
"identity": {
"orgId": "mldk59",
"typeId": "pythoncode",
"deviceId":"252525"
},
"auth": {
"token": "QZqODYo6U*Q6b+IpuC"
} }
def myCommandCallback(cmd):
 print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
 m=cmd.data['command']
```

```
#Connecting the client to ibm watson iot platform
client = wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect()
#Generate Random values for latitude, longitude in a circular distribution from
the
current location and
#alert the garbage collector to go to the particular location where the bin level
and
bin weight exceeds the threshold
while True:
   res = requests.get('https://ipinfo.io/')
   data = res.json()
   loc = data['loc'].split(',')
   theta = random.uniform(0,2*math.pi)
   area = (0.05**2)*math.pi
   radius = math.sqrt(random.uniform(0,area/math.pi))
   latitude,longitude = [float(loc[0])+radius*math.cos(theta),
float(loc[1])+radius*math.sin(theta)]
   binlevel=random.randint(10,100)
   binweight = random.randint(50,1500)
   if binweight>=1000 and binlevel>80:
    myData={'latitude':latitude, 'longitude':longitude,'binlevel':binlevel,
'binweight':binweight}
   client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=
0, onPublish=None)
##print("Published data Successfully: %s", myData)
   print("BIN IS FULL..TIME TO EMPTY IT!!!!\n",myData)
   client.commandCallback = myCommandCallback
   time.sleep(2)
#break
  else :
    print("BIN IS IN NORMAL LEVEL...")
    time.sleep(2)
#Disconnect the client connection
client.disconnect()
```

Python IDE output:

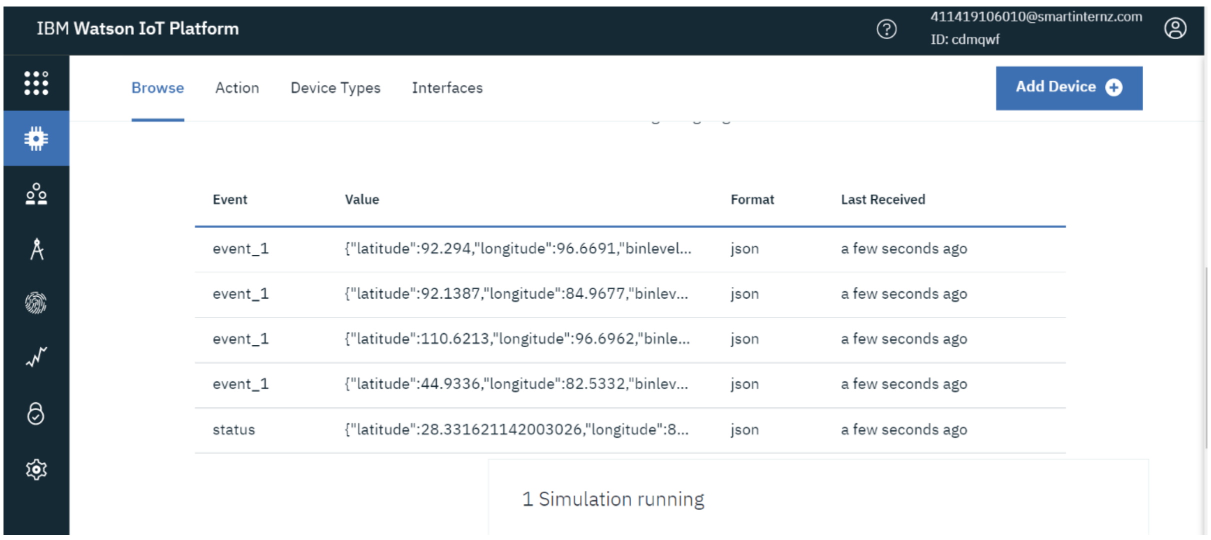

p1.py - C:\Users\Kalaivani\AppData\Local\Programs\Python\Python37\p1.py (3.7.9)
File Edit Format Run Options Window Help
Python 3.7.9 Shell
File Edit Shell Debug Options Window Help
Ln: 1 Col: 0
Ln: 5 Col: 0

```
import wiotp.sdk.device
import time
import random
myConfig = {
"identity": {
"orgId": "cdmqwf",
"typeId": "pythoncode",
"deviceId":"252525"
},
"auth": {
"token": "12345678"
} }
def myCommandCallback(cmd):
 print("Message received from IBM IoT Platform
 m=cmd.data['command']
client = wiotp.sdk.device.DeviceClient(config=
client.connect()
while True:
 latitude=random.uniform(27.2046,125.25)
 longitude=random.uniform(77.4977,100.1526)
 binlevel=random.randint(10,100)
 binweight = random.randint(50,1500)
 if binweight>=1000 and binlevel>80:
   myData={'latitude':latitude, 'longitude':lo
   client.publishEvent(eventId="status", msgFo
```

```
Python 3.7.9 (tags/v3.7.9:13c94747c7, Aug 17 2
020, 18:58:18) [MSC v.1900 64 bit (AMD64)] on
win32
Type "help", "copyright", "credits" or "licens
e()" for more information.
>>>
=== RESTART: C:\Users\Kalaivani\AppData\Local\
Programs\Python\Python37\p1.py ===
2022-11-24 21:04:59,928   wiotp.sdk.device.cli
ent.DeviceClient  INFO    Connected successful
ly: d:cdmqwf:pythoncode:252525
BIN IS IN NORMAL LEVEL...
BIN IS IN NORMAL LEVEL...
BIN IS IN NORMAL LEVEL...
BIN IS IN NORMAL LEVEL...
BIN IS IN NORMAL LEVEL...
BIN IS IN NORMAL LEVEL...
BIN IS FULL..TIME TO EMPTY IT!!!!
 {'latitude': 78.71579497970454, 'longitude':
90.4366965492068, 'binlevel': 81, 'binweight':
1201}
BIN IS IN NORMAL LEVEL...
BIN IS IN NORMAL LEVEL...
```

2. Data is transferred to IBM Watson IoT platform.

IBM Platform output:

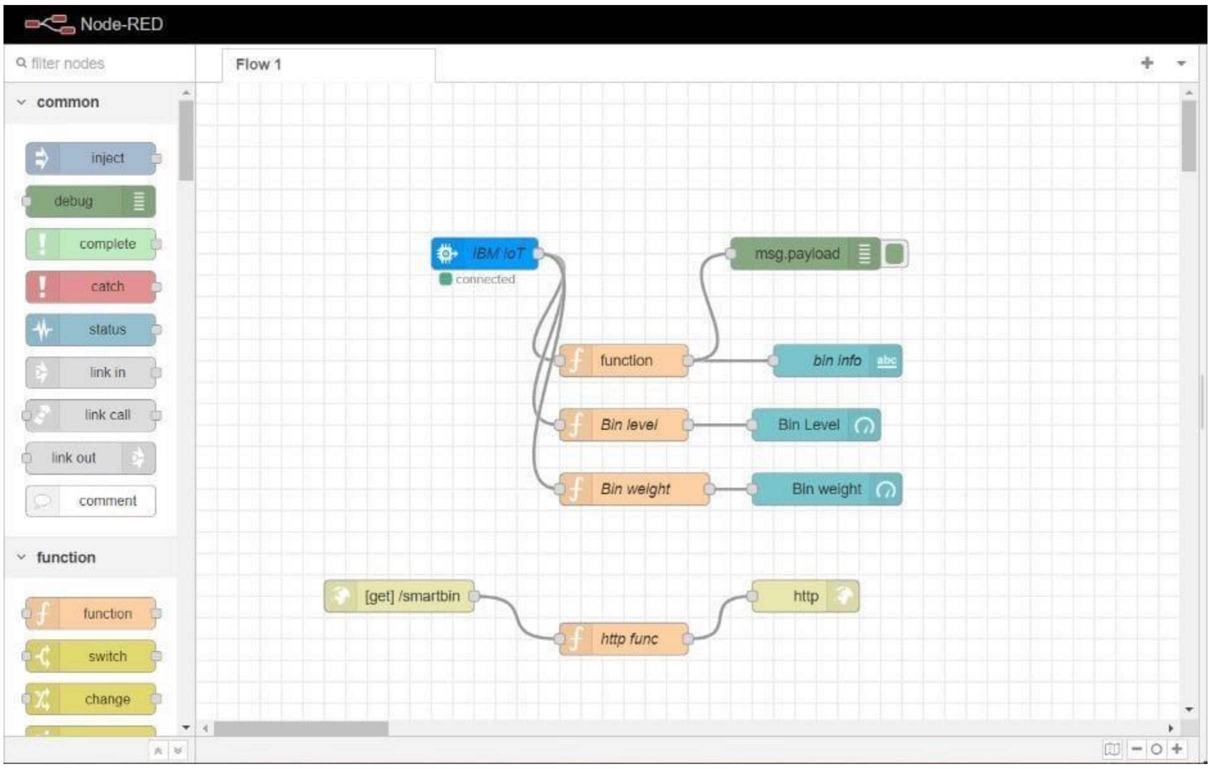


Event	Value	Format	Last Received
event_1	{"latitude":92.294,"longitude":96.6691,"binlevel...	json	a few seconds ago
event_1	{"latitude":92.1387,"longitude":84.9677,"binlev...	json	a few seconds ago
event_1	{"latitude":110.6213,"longitude":96.6962,"binle...	json	a few seconds ago
event_1	{"latitude":44.9336,"longitude":82.5332,"binlev...	json	a few seconds ago
status	{"latitude":28.331621142003026,"longitude":8...	json	a few seconds ago

1 Simulation running

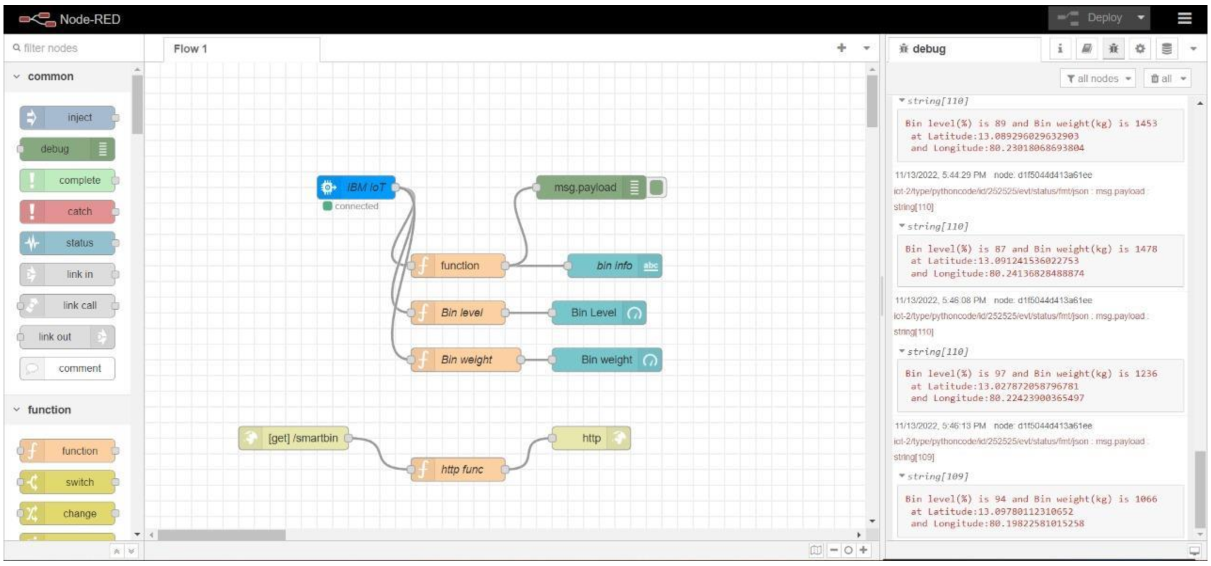
3. Data transfer from IBM Watson IOT platform and Python IDE to Node-RED.

Node-RED:



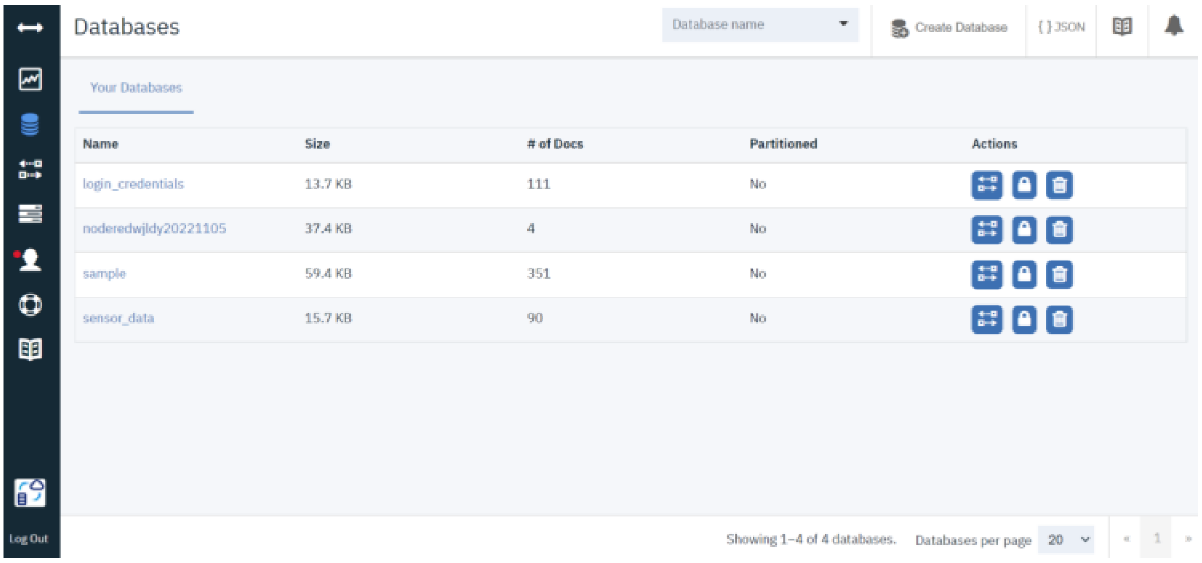
4. Node-RED Connection setup for data transmission from IBM Watson IoT platform to Node-RED dashboard and viewing in Web UI .

Node-RED:



```
▾string[110]
Bin level(%) is 89 and Bin weight(kg) is 1453
 at Latitude:13.089296029632903
 and Longitude:80.23018068693804
11/13/2022, 5:44:29 PM   node: d1f5044d413a61ee
iot-2/type/pythoncode/id/252525/evt/status/fmt/json : msg.payload :
string[110]
▾string[110]
Bin level(%) is 87 and Bin weight(kg) is 1478
 at Latitude:13.091241536022753
 and Longitude:80.24136828488874
11/13/2022, 5:46:08 PM   node: d1f5044d413a61ee
iot-2/type/pythoncode/id/252525/evt/status/fmt/json : msg.payload :
string[110]
▾string[110]
Bin level(%) is 97 and Bin weight(kg) is 1236
 at Latitude:13.027872058796781
 and Longitude:80.22423900365497
11/13/2022, 5:46:13 PM   node: d1f5044d413a61ee
iot-2/type/pythoncode/id/252525/evt/status/fmt/json : msg.payload :
string[109]
▾string[109]
Bin level(%) is 94 and Bin weight(kg) is 1066
 at Latitude:13.09780112310652
 and Longitude:80.19822581015258
```

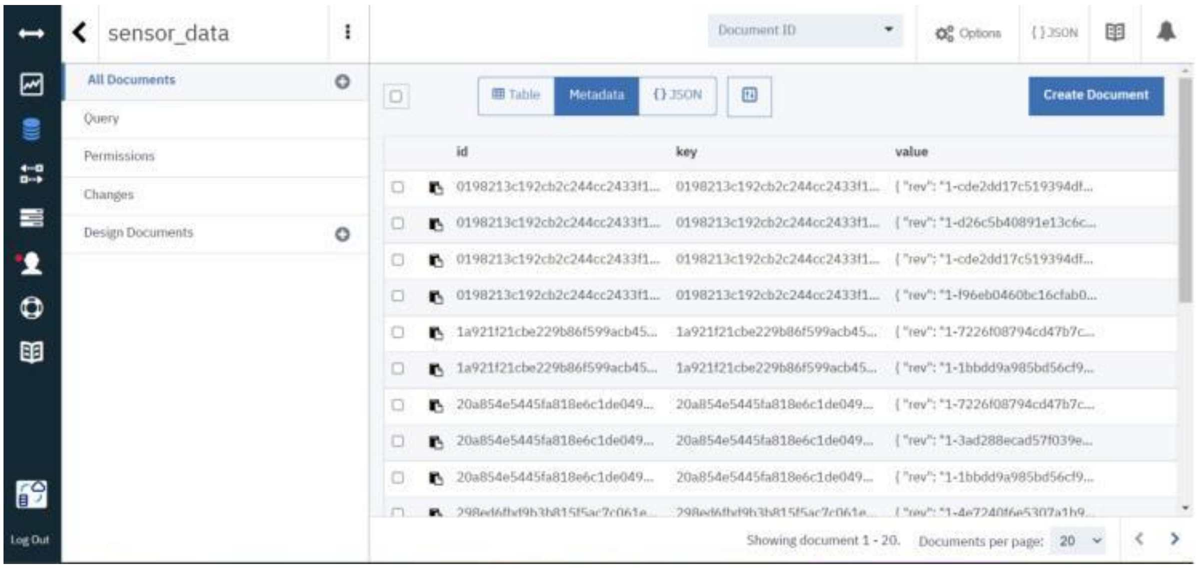
5. Storing database in IBM Cloudant DB.


Databases

Your Databases

Name	Size	# of Docs	Partitioned	Actions
login_credentials	13.7 KB	111	No	
noderedwjldy20221105	37.4 KB	4	No	
sample	59.4 KB	351	No	
sensor_data	15.7 KB	90	No	

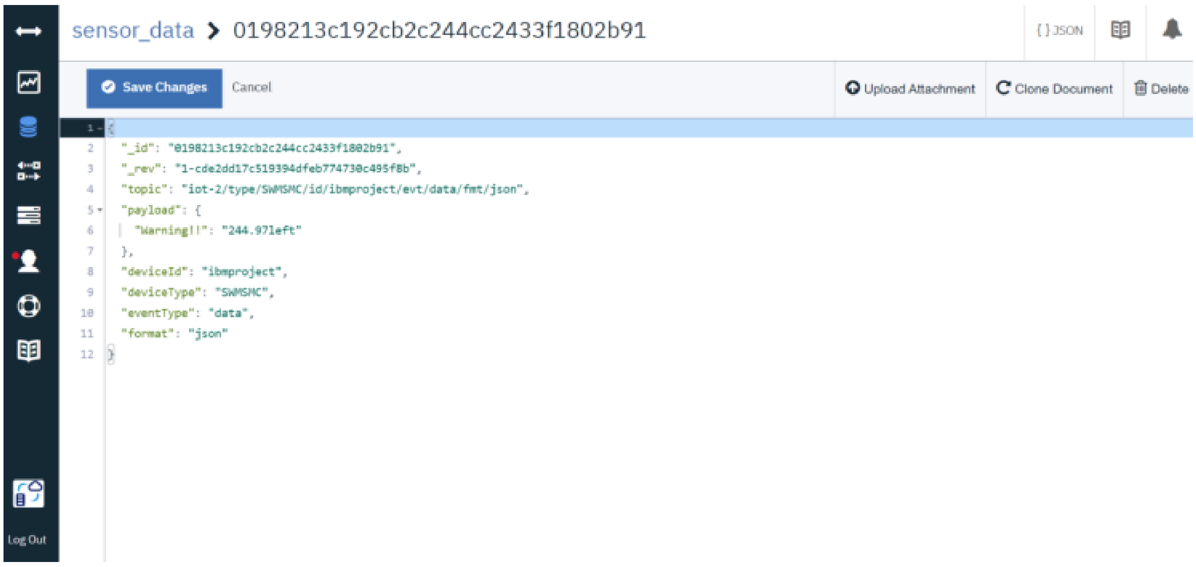
Showing 1–4 of 4 databases. Databases per page 20


sensor_data

	id	key	value
☐	0198213c192cb2c244cc2433f1...	0198213c192cb2c244cc2433f1...	{ "rev": "1-cde2dd17c519394df...
☐	0198213c192cb2c244cc2433f1...	0198213c192cb2c244cc2433f1...	{ "rev": "1-d26c5b40891e13c6c...
☐	0198213c192cb2c244cc2433f1...	0198213c192cb2c244cc2433f1...	{ "rev": "1-cde2dd17c519394df...
☐	0198213c192cb2c244cc2433f1...	0198213c192cb2c244cc2433f1...	{ "rev": "1-f96eb0460bc16cfab0...
☐	1a921f21cbe229b86f599acb45...	1a921f21cbe229b86f599acb45...	{ "rev": "1-7226f08794cd47b7c...
☐	1a921f21cbe229b86f599acb45...	1a921f21cbe229b86f599acb45...	{ "rev": "1-1bbdd9a985bd56cf9...
☐	20a854e5445fa818e6c1de049...	20a854e5445fa818e6c1de049...	{ "rev": "1-7226f08794cd47b7c...
☐	20a854e5445fa818e6c1de049...	20a854e5445fa818e6c1de049...	{ "rev": "1-3ad288ecad57f039e...
☐	20a854e5445fa818e6c1de049...	20a854e5445fa818e6c1de049...	{ "rev": "1-1bbdd9a985bd56cf9...
☐	298ed6fbd9b3b815f5ac7c061e...	298ed6fbd9b3b815f5ac7c061e...	{ "rev": "1-4e7240f6e5307a1b9...

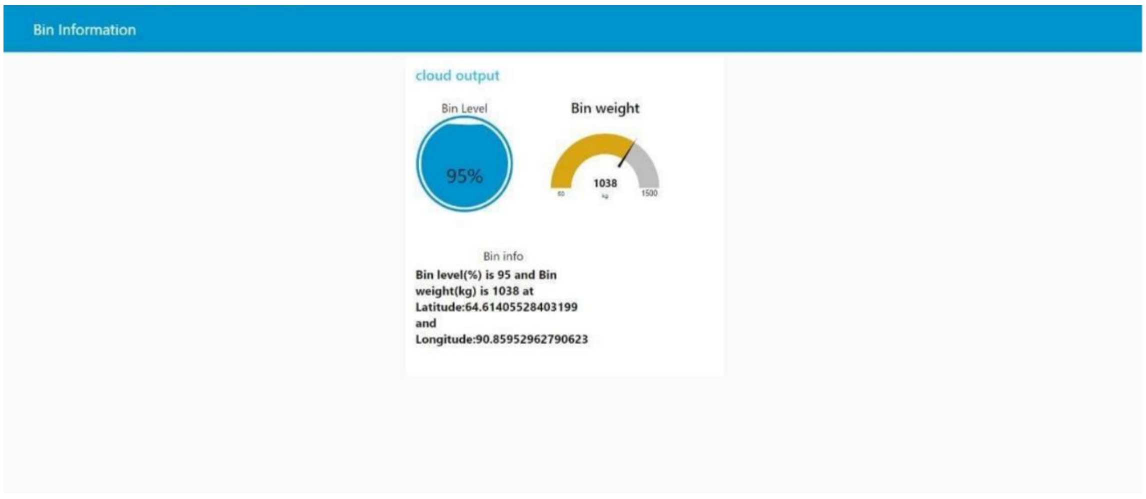
Showing document 1 - 20. Documents per page: 20

6. Data is stored in JSON format



```
{
  "_id": "0198213c192cb2c244cc2433f1802b91",
  "_rev": "1-cde2dd17c519394dfeb774730c495f8b",
  "topic": "iot-2/type/SWMSMC/id/ibmproject/evt/data/fmt/json",
  "payload": {
    "Warning!!": "244.97left"
  },
  "deviceId": "ibmproject",
  "deviceType": "SWMSMC",
  "eventType": "data",
  "format": "json"
}
```

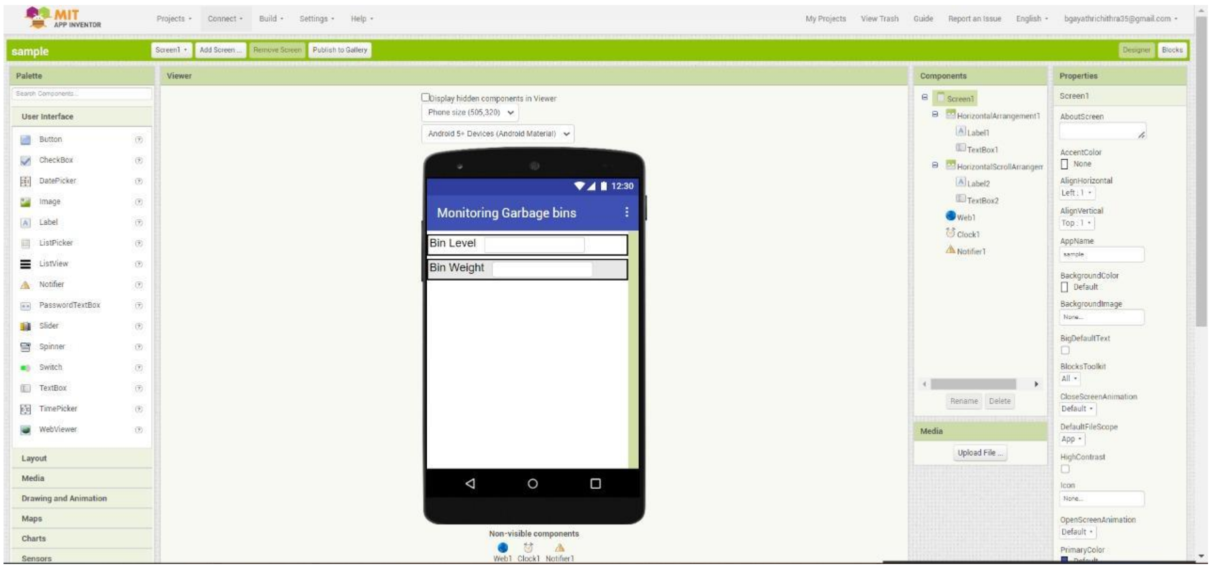
Web UI:



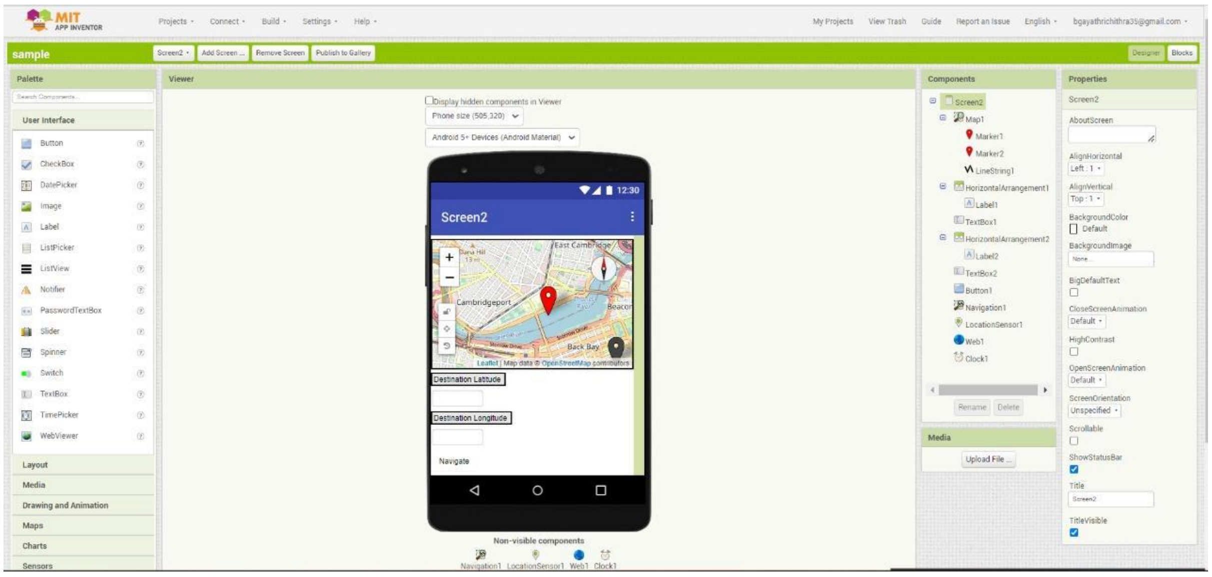
Bin level(%) is 95 and Bin weight(kg) is 1038 at Latitude:64.61405528403199 and Longitude:90.85952962790623

7. App is created using MIT App inventer

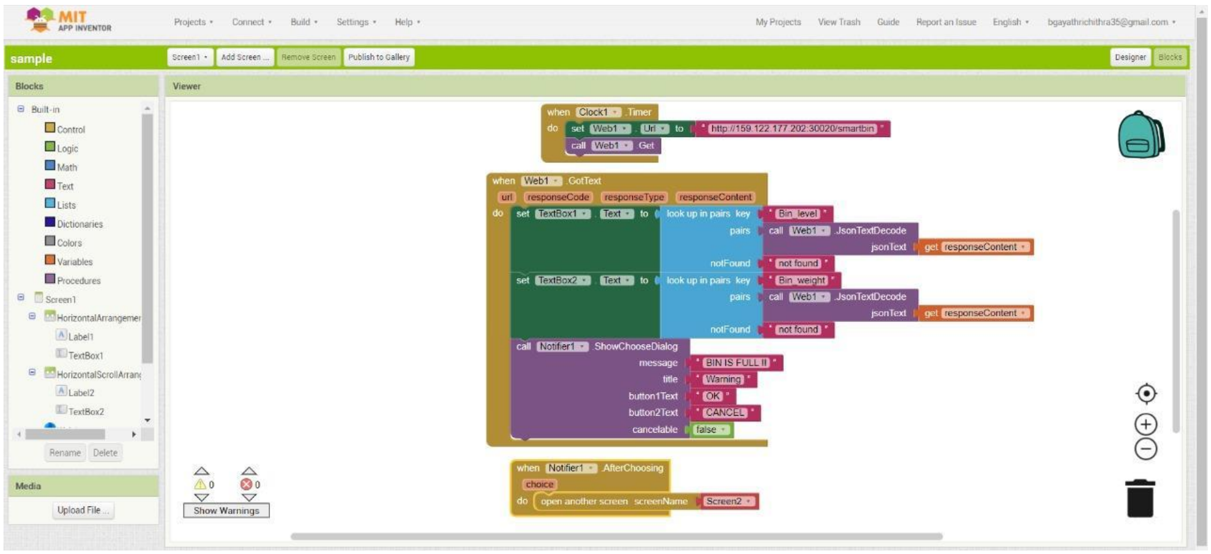
Screen 1:



Screen 2:



Block of Screen 1 :

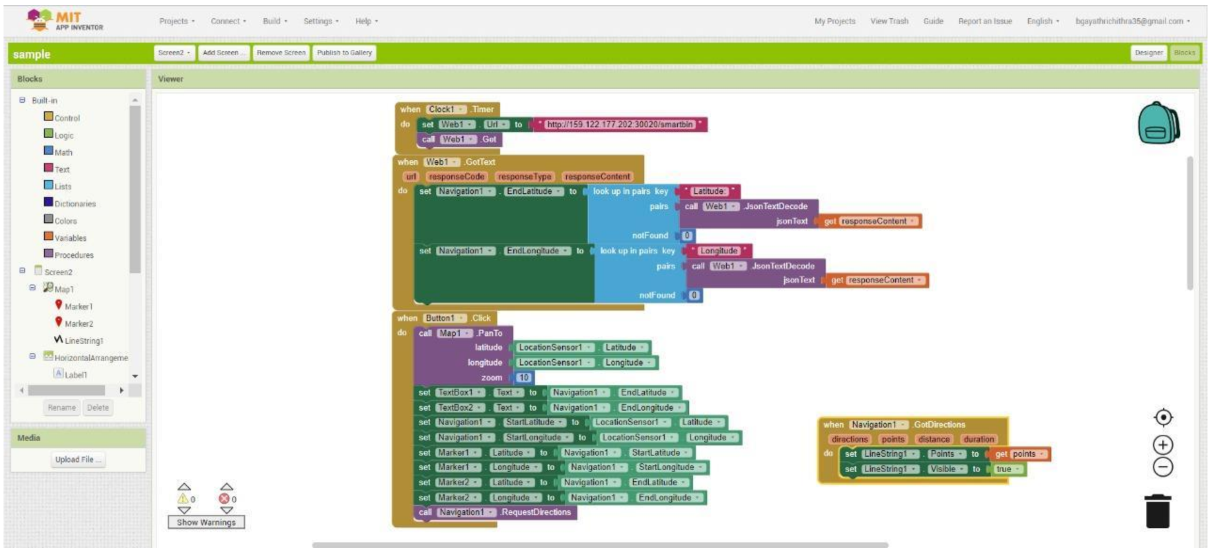


```
when Clock1 .Timer
do  set Web1 . Url to "http://159.122.177.202:30020/smartbin"
    call Web1 .Get

when Web1 .GotText
 url  responseCode  responseType  responseContent
do  set TextBox1 . Text to  look up in pairs  key "Bin_level"
                                              pairs  call Web1 .JsonTextDecode
                                                               jsonText  get responseContent
                                           notFound "not found"
    set TextBox2 . Text to  look up in pairs  key "Bin_weight"
                                              pairs  call Web1 .JsonTextDecode
                                                               jsonText  get responseContent
                                           notFound "not found"
    call Notifier1 .ShowChooseDialog
                          message "BIN IS FULL !!"
                            title "Warning"
                      button1Text "OK"
                      button2Text "CANCEL"
                       cancelable  false

when Notifier1 .AfterChoosing
 choice
do  open another screen  screenName  Screen2
```

Block of Screen 2 :



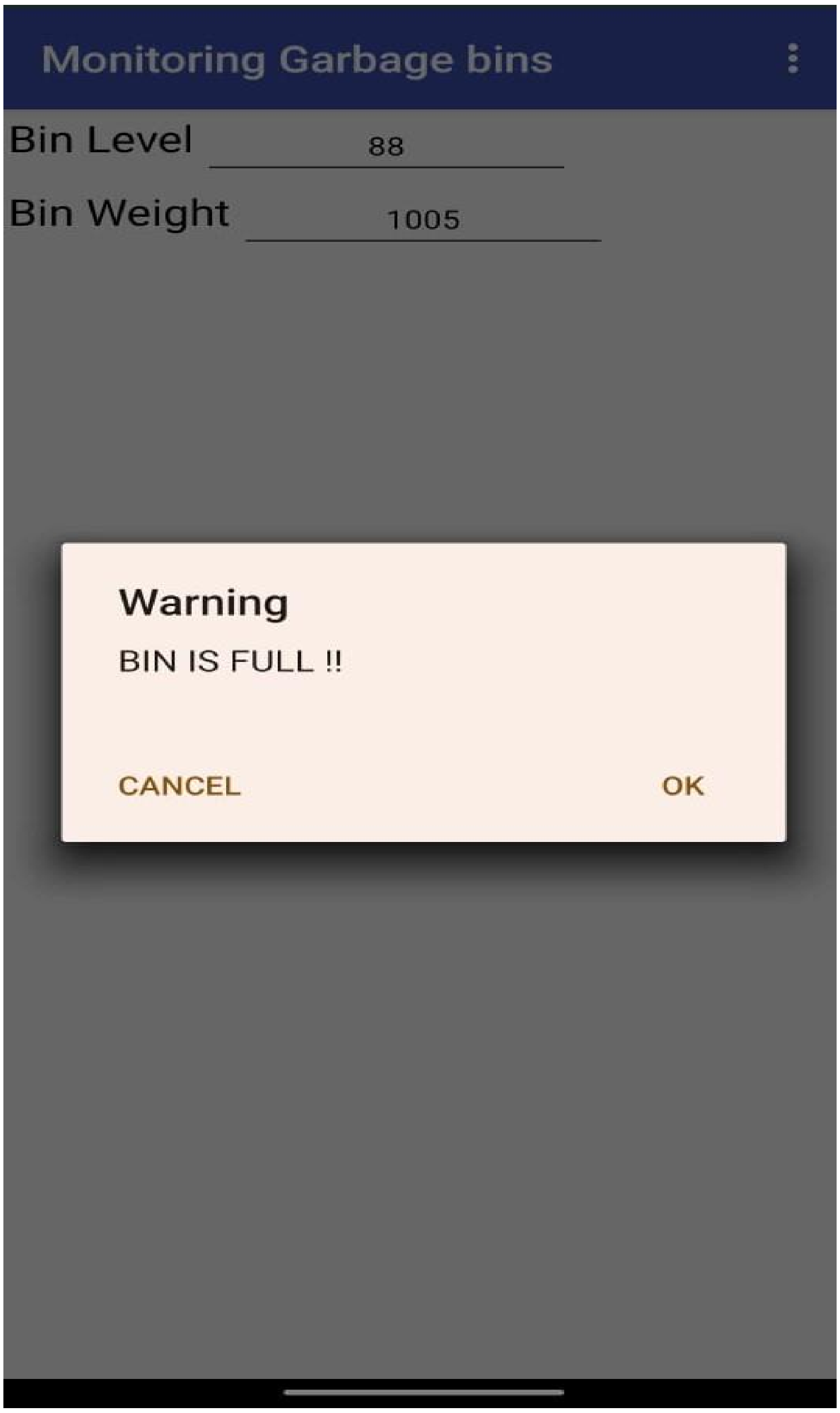
```
when Clock1 .Timer
do  set Web1 . Url to "http://159.122.177.202:30020/smartbin"
    call Web1 .Get

when Web1 .GotText
 url  responseCode  responseType  responseContent
do  set Navigation1 . EndLatitude to  look up in pairs  key "Latitude:"
                                                        pairs  call Web1 .JsonTextDecode
                                                                         jsonText  get responseContent
                                                     notFound  0
    set Navigation1 . EndLongitude to  look up in pairs  key "Longitude"
                                                         pairs  call Web1 .JsonTextDecode
                                                                          jsonText  get responseContent
                                                      notFound  0

when Button1 .Click
do  call Map1 .PanTo
           latitude  LocationSensor1 . Latitude
          longitude  LocationSensor1 . Longitude
               zoom  10
    set TextBox1 . Text to  Navigation1 . EndLatituda
    set TextBox2 . Text to  Navigation1 . EndLongitude
    set Navigation1 . StartLatitude to  LocationSensor1 . Latitude
    set Navigation1 . StartLongitude to  LocationSensor1 . Longitude
    set Marker1 . Latitude to  Navigation1 . StartLatitude
    set Marker1 . Longitude to  Navigation1 . StartLongitude
    set Marker2 . Latitude to  Navigation1 . EndLatitude
    set Marker2 . Longitude to  Navigation1 . EndLongitude
    call Navigation1 .RequestDirections

when Navigation1 .GotDirections
 directions  points  distance  duration
do  set LineString1 . Points to  get points
    set LineString1 . Visible to  true
```

8. Install MIT AI2 Companion in phone and scan the QR code showed in AI connect:

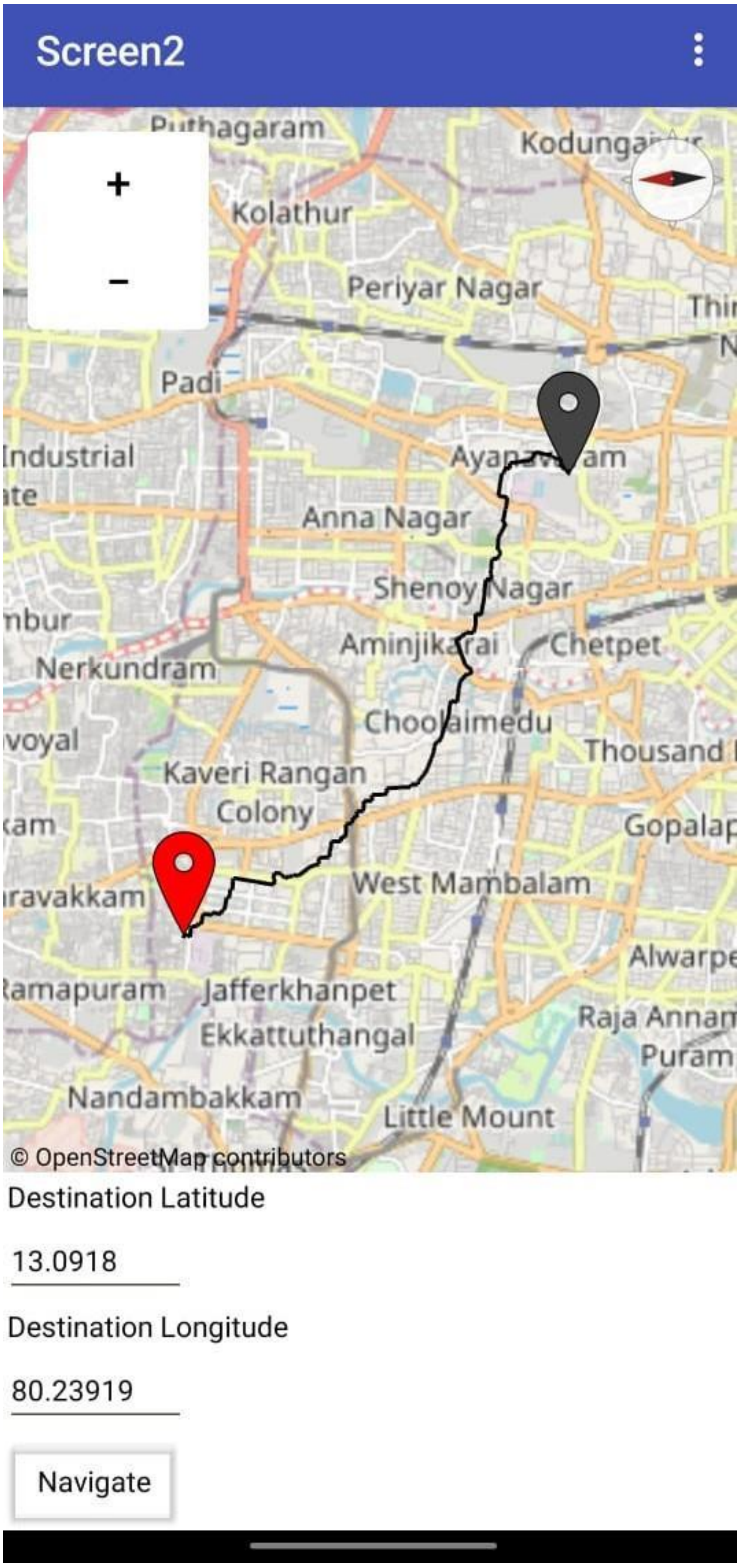

Monitoring Garbage bins

Bin Level 88

Bin Weight 1005

Warning

BIN IS FULL !!



Screen2

Destination Latitude

13.0918

Destination Longitude

80.23919

Navigate