IOT(Internet Of Things)

Project: Asset Tracking Using Beacons

By

ECE_D11

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1.INTRODUCTION:

1.1 Overview

Asset tracking is the process of keeping track of your company's physical assets and their information (location, status, due dates, etc.). Depending on your business, physical assets can mean different kinds of equipment, IT devices, tools, or vehicles.

Asset tracking provides the option to pay per asset and includes advanced features on top of Maps, Routes, and Places. It's ideal for businesses who need to plan complex routes, geolocate assets precisely and frequently, manage and operate thousands of assets at scale, or understand real-time road conditions. Create efficient routes for even the most complex fleet itineraries.OurTracking combines desktop software, barcode scanners, barcode labels, and mobile devices that will help users understand where assets are, how they are being utilized and what actions need to be taken to keep efficiency.

1.2 Purpose

Asset tracking and management is a key requirement for any industry. Beacons can significantly reduce the cost and complexity of this job. There are multiple ways to track assets using beacons.

2.LITERATURE SURVEY:

2.1 Existing Problem

1.Time consuming to note the data of every package.

2.Cluster of packages.

3.Confusion among the packages.

2.2 Proposed Solution

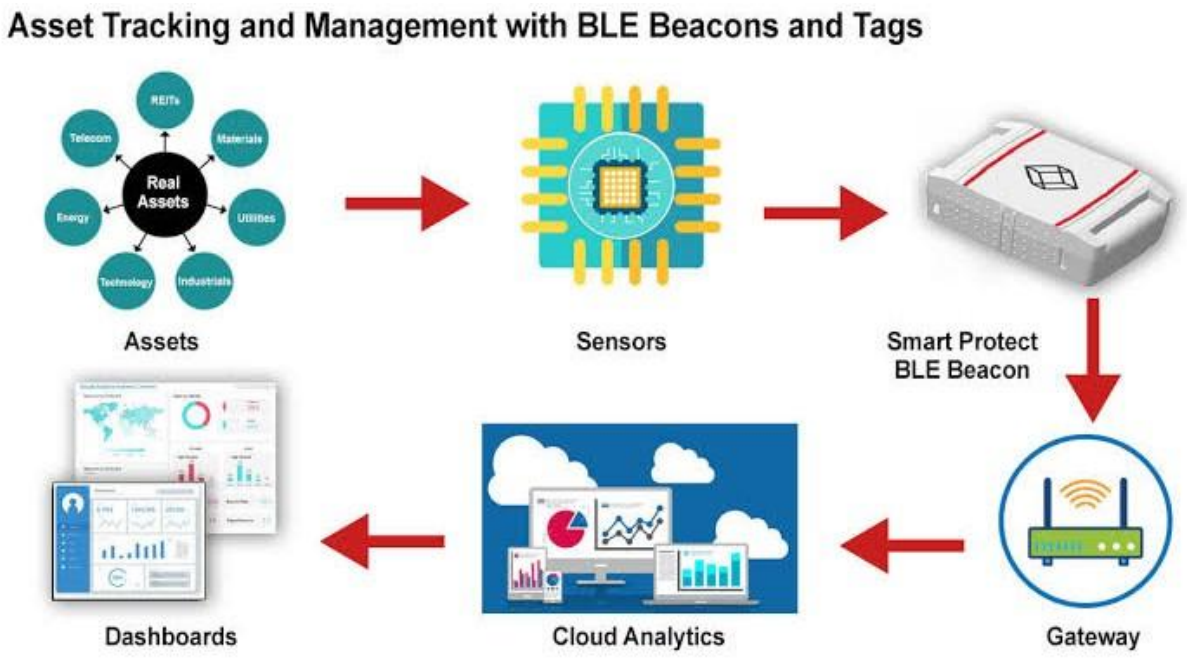
Indoor navigation with beacons (the most common types are the iBeacon and Eddystone) offer decisive advantages for projects that are dependent on high accuracy and want to include Apple devices. Beacons enable indoor navigation when used in a client-based procedure, for example for airline passengers using an app – cross-platform and with an accuracy of up to 1 meter. Server-based tracking of persons or goods (beacon tracking) can be realized using appropriate receiver hardware. For this purpose, the beacon is attached to the asset to be tracked or carried by the person to be located. While tracking with well-established Bluetooth Low Energy (Bluetooth 4.0) beacons offers accuracies of a few meters, the new Bluetooth 5.1 standard opens up new perspectives for accuracies in the submeter range. These prospects are based on the "direction finding" function of Bluetooth 5.1, which enables determining the direction of radio signals.Beacons can also provide sensor data. They may include sensor capabilities in order to allow the detection of movement (accelerometer), temperature, humidity, air pressure, light, and magnetism. This makes them particularly suitable for applications in the field of home and office automation, healthcare, retail, and industry. More on condition sensors

Asset tracking and management is a key requirement for any industry. Beacons can significantly reduce the cost and complexity of this job. There are multiple ways to track assets using beacons. For instance, you can mount BLE receivers in a permanent fixture and tag assets to beacons. When an asset comes into proximity of a BLE-enabled receiver, it tracks the movement via mobile data or Wi-Fi and logs the data. You can either take action or store the information for management and analytics purposes. Using beacons, you can cost-effectively track thousands of assets in real-time, 24/7.

There are instances wherein you cannot mount BLE receivers in permanent fixtures in temporary locations such as conference halls or function halls. In such cases, you can fix beacons in different places and track assets using a mobile app. By tagging assets to beacons, you can track each asset from the mobile app. Implementation is easy as there is no need for wiring or costly installation.

3.THEORITICAL ANALYSIS :

3.1 Block Diagram



3.2 Hardware/Software designing:

Software Designing:

The software used for this system is:

a. Python

b. IOT Open Hardware platforms

c. IOT Cloud Platform

d. IOT Communication Technologies

e. IOT Communication Protocols

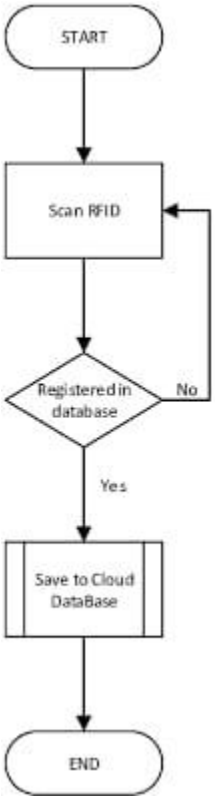
4.EXPERIMENTAL INVESTIGATION :

Internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers and the ability to transfer data over a The network.without requiring human-to-human or human-to-computer interaction. The definition of the Internet of things has evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems.

The IoT can assist in the integration of communications, control, and information processing across various transportation systems. Application of the IoT extends to all aspects of transportation systems (i.e. the vehicle, the infrastructure, and the driver or user). Dynamic interaction between these components of a transport system enables inter- and intra-vehicular communication, smart traffic control, smart parking, electronic toll collection systems, vehicle control, safety, and road assistance. For example, an IoT platform can continuously monitor the location and vacancies of spaces in parking.

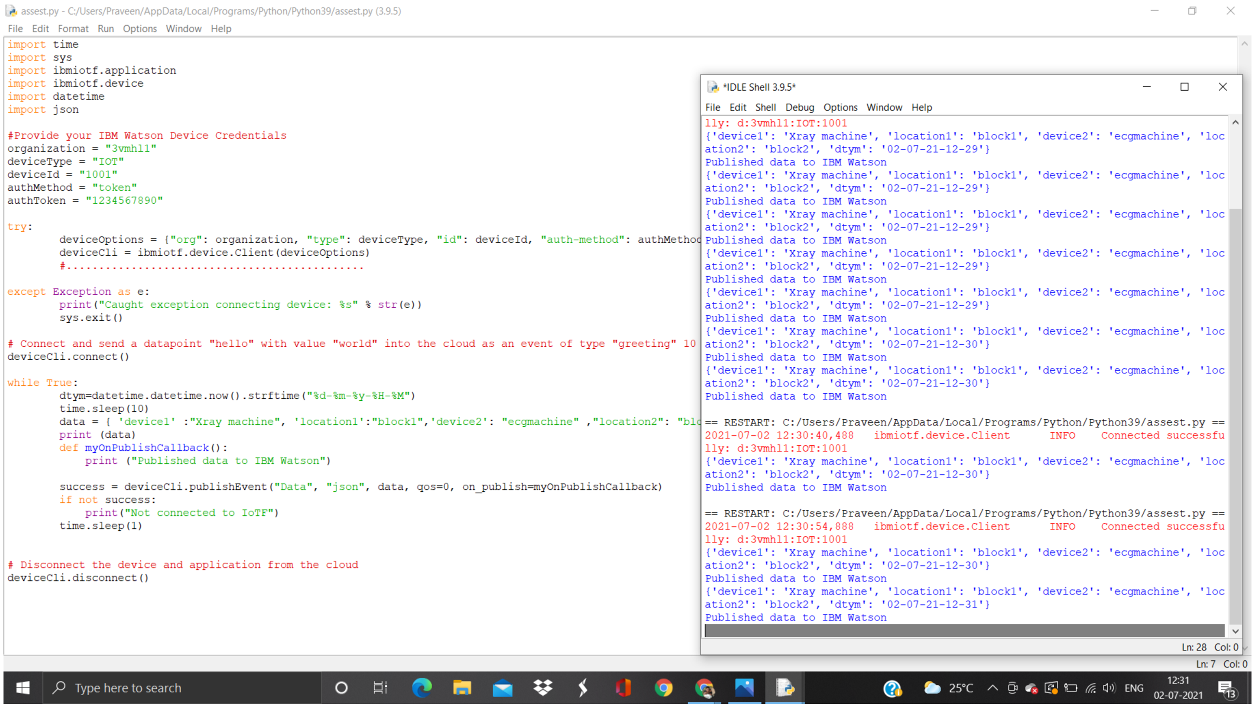
This can only be possible with the IoT and its seamless connectivity among devices. Sensors such as GPS, Humidity, and Temperature send data to the IoT platform and then the data is ANALYSED and then sent to the users. This way, users can track the real-time status of vehicles and can make appropriate decisions. The smart parking system is an IOT based device which is capable of automatic sensing of vehicles. ALSO, the data of sensors will be displayed in graphical form on the IBM cloud page.

5.FLOWCHART:



6.Result:

Python code:



assest.py - C:/Users/Praveen/AppData/Local/Programs/Python/Python39/assest.py (3.9.5)
File Edit Format Run Options Window Help
import time
import sys
import ibmiotf.application
import ibmiotf.device
import datetime
import json
#Provide your IBM Watson Device Credentials
organization = "3vmhl1"
deviceType = "IOT"
deviceId = "1001"
authMethod = "token"
authToken = "1234567890"
try:
deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod
deviceCli = ibmiotf.device.Client(deviceOptions)
#..
except Exception as e:
print("Caught exception connecting device: %s" % str(e))
sys.exit()
# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10
deviceCli.connect()
while True:
dtym=datetime.datetime.now().strftime("%d-%m-%y-%H-%M")
time.sleep(10)
data = { 'device1' :"Xray machine", 'location1':"block1",'device2': "ecgmachine" ,"location2": "blo
print (data)
def myOnPublishCallback():
print ("Published data to IBM Watson")
success = deviceCli.publishEvent("Data", "json", data, qos=0, on_publish=myOnPublishCallback)
if not success:
print("Not connected to IoTF")
time.sleep(1)
# Disconnect the device and application from the cloud
deviceCli.disconnect()
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
{'device1': 'Xray machine', 'location1': 'block1', 'device2': 'ecgmachine', 'location2': 'block2', 'dtym': '02-07-21-12-29'}
Published data to IBM Watson
== RESTART: C:/Users/Praveen/AppData/Local/Programs/Python/Python39/assest.py ==
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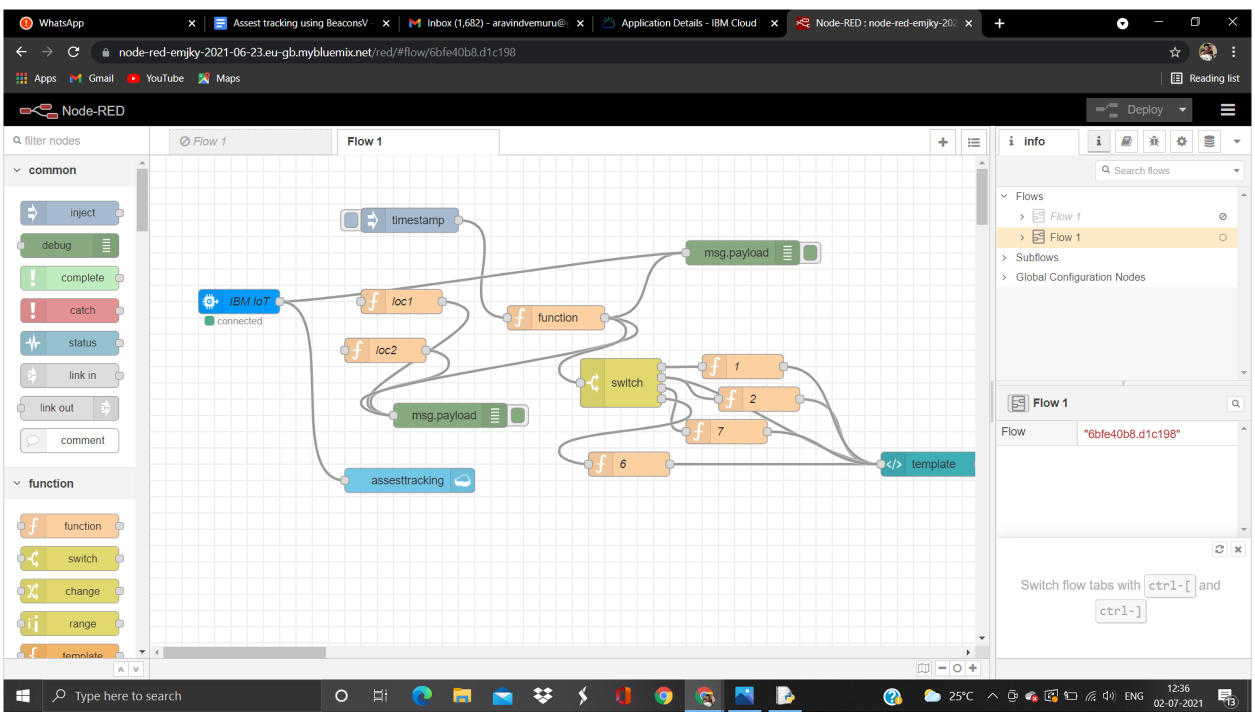
Type here to search
25°C ENG 12:31 02-07-2021

Node-red:



Node-RED
Deploy
filter nodes
Flow 1
common
inject
debug
complete
catch
status
link in
link out
comment
function
function
switch
change
range
template
timestamp
msg.payload
IBM IoT
connected
loc1
loc2
function
switch
1
2
7
6
msg.payload
assesttracking
template
info
Search flows
Flows
Flow 1
Subflows
Global Configuration Nodes
Flow
"6bfe40b8.d1c198"
Switch flow tabs with ctrl-[and ctrl-]
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Type here to search
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7.ADVANTAGES AND DISADVANTAGES :

Advantages :

- It helps companies and users track assets and efficiently in real time
- The data collected can be used to make informed decisions helping to reduce wastage and achieve cost savings
- Easy to implement,no costly wiring or installation required
- Long battery life
- GPS for outdoor location tracking
- Beacon based location
- Suitable for tracking in high metallic environments,mining industries.

Disadvantages:

- Requires mounting where power is available
- Requires stable Wifi or cellular data
- Higher installation and hardware costs
- Dependent on all users having mobile devices
- Requires all users to install a mobile application.

8. APPLICATIONS:

- It is used in indoor personal location
- It is mainly used in hospitals,hotels
- Proximity marketing
- Employee safety management

9.CONCLUSION:

Asset tracking is an essential subset of decision processes in asset management. Whether in the transportation, manufacturing, health, or construction sectors, the benefits of gathering real-time information about particular assets can be very valuable. Some industries will use the information to streamline maintenance workflows , some will use it to optimize the purchasing of new assets, and others will use it to track the location and performance of moving assets.

11.BIBLIOGRAPHY :

https://cloud.ibm.com/

https://cloud.ibm.com/catalog#services

node-red-emjky-2021-06-23.eu-gb.mybluemix.net/red/#flow/693c287f.1c8308

https://node-red-emjky-2021-06-23.eu-gb.mybluemix.net/ui

12.APPENDIX:

a.Source Code:

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import datetime
import json

#Provide your IBM Watson Device Credentials
organization = "3vmhl1"
deviceType = "IOT"
deviceId = "1001"
authMethod = "token"
authToken = "1234567890"

try:
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod, "auth-token": authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #.....................................
```

```
except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10 times
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while True:
    dtym=datetime.datetime.now().strftime("%d-%m-%y-%H-%M")
    time.sleep(10)
    data = { 'device1' :"Xray machine", 'location1':"block1",'device2': "ecgmachine" ,"location2": "block2","dtym":dtym}
    print (data)
    def myOnPublishCallback():
      print ("Published data to IBM Watson")

    success = deviceCli.publishEvent("Data", "json", data, qos=0, on_publish=myOnPublishCallback)
    if not success:
      print("Not connected to IoTF")
    time.sleep(1)


# Disconnect the device and application from the cloud
deviceCli.disconnect()
```
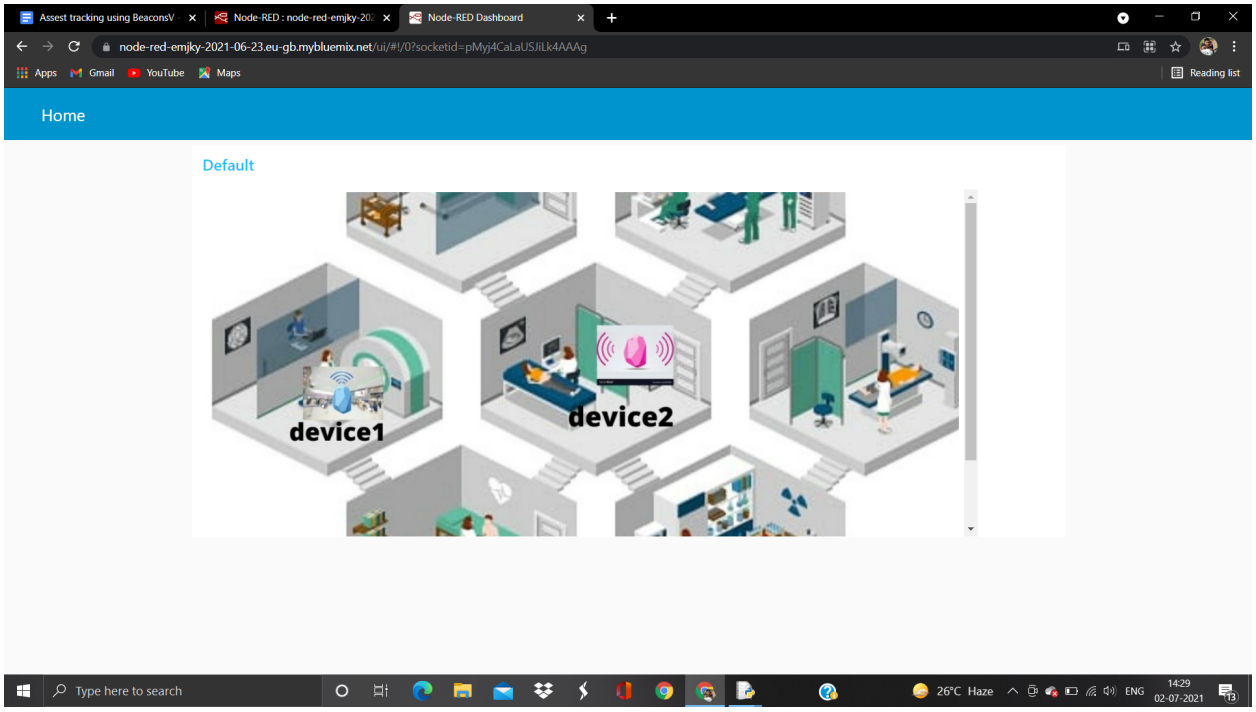

B. UI Output


Assest tracking using BeaconsV
Node-RED : node-red-emjky-202
Node-RED Dashboard
node-red-emjky-2021-06-23.eu-gb.mybluemix.net/ui/#!/0?socketid=pMyj4CaLaUSJiLk4AAAg
Apps
Gmail
YouTube
Maps
Reading list
Home
Default
device1
device2
Type here to search
26°C Haze
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