Project Report

Project	IoT Based Safety Gadget for Child Safety Monitoring and Notification
Team Id	PNT2022TMID19486
Member 1	Dharani Dharan A
Member 2	Balaji L
Member 3	Benildus R
Member 4	Gowtham S

1. INTRODUCTION

1.1 PROJECT OVERVIEW

In most of the houses both the parents will be going to work. So, they can’t monitor their child’s activity continuously.In crowded area there is possibility of losing the child it becomes difficult to track the location of the child which makes the parents nervous.

1.2 PURPOSE

Child safety and tracking is of utmost importance as children are the most vulnerable. With increasing crime rates such as child kidnaping, child trafficking, child abuse and so on, the need for an advanced smart security system has become a necessity.Create a Geo-fence around the location of the child to continuously check whether the child is within the range of the Geo-fence. If the child crosses the range of the Geo-fence a notification will be automatically generated and will be sent to the parents/caretaker. The notification of the location of the child will be sent to the parents once every fixed amount of time.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

SMART CHILD SAFETY WEARABLE DEVICE

Bannuru Ranjeeth; B. Srinivasa Reddy; Y. Manoj Kumar Reddy; S. Suchitra; B. Pavithra
The Technical point of this paper is to have an ordinary correspondence between the kid and parent through the gadget which helps in finding the area, pulse and temperature of the kid utilizing the gadget empowered with the pulse sensor, temperature sensor and GPS tracker. This gadget empowers association between the youngster and parent through the WIFI module cooperation utilizing IoT. The parent can get to the kid data intermittently by interfacing through this gadget.

CHILD SAFETY WEARABLE DEVICE USING ARDUINO

S.Annapurna Devi; V.Preethi
The platform of this project will be running on Arduino microcontroller board based on the ATmega 328p and functions of sending and receiving SMS connecting to the internet which is provided by the GSM shield.Also, additional modules employed which will provide the currentlocation of the child to parent via SMS. The second measure added isSOS Light indicator that will be programmed with Arduino UNO boardto display the SOS signal using Morse code. Therefore, the wearabledevice proposed will be communicating with the parent via SMS, whichwould ensure that there is a secure communication link.

CHILD SAFETY DEVICE

Sai Pramodh Kumar.K; Bhavishya.p; Geetha.K; Rajesh Reddy.K; Patan Mahammad Akhil
This paper describes about safe and secured electronic system for child which comprises of an Arduino controller and buzzer, Node MCU, sim holder, power supply cable, GSM and GPS are used in this project. In this paper mainly focus on sensing the children’s Temperature, humidity and GPS location. By monitoring the activities, the state of the child is analyzed. By using GPS, if child reaches the critical state then the latitude and longitude of that particular location is sent to the parents through

Blynk Application and the data of child is stored in the authenticated ThingSpeak personal account and will be easy to track the child's activity and can store for few days.

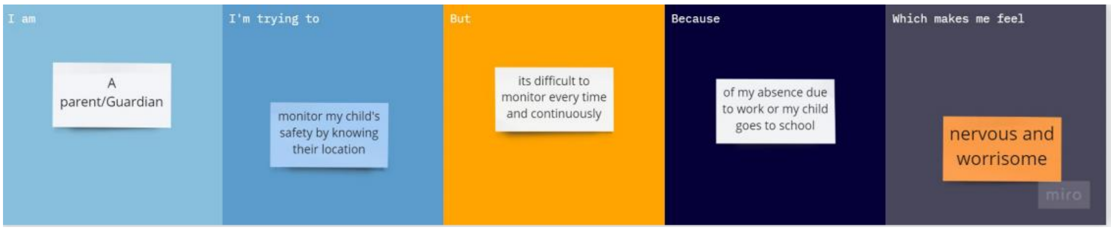
2.2 REFERENCES

1. B. Ranjeeth, B. S. Reddy, Y. M. K. Reddy, S. Suchitra and B. Pavithra, "Smart Child Safety Wearable Device," 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), 2020, pp. 116-120, doi: 10.1109/ICESC48915.2020.9156001.

2. A. Srinivasan, S. Abirami, N. Divya, R. Akshya and B. S. Sreeja, "Intelligent Child Safety System using Machine Learning in IoT Devices," 2020 5th International Conference on Computing, Communication and Security (ICCCS), 2020, pp. 1-6, doi: 10.1109/ICCCS49678.2020.9277136.

3. Z. Gao, H. Guo, Y. Xie, Y. Luo, H. Lu and K. Yan, "ChildGuard: A Child-Safety Monitoring System," in IEEE MultiMedia, vol. 24, no. 4, pp. 48-57, October-December 2017, doi: 10.1109/MMUL.2017.4031309.

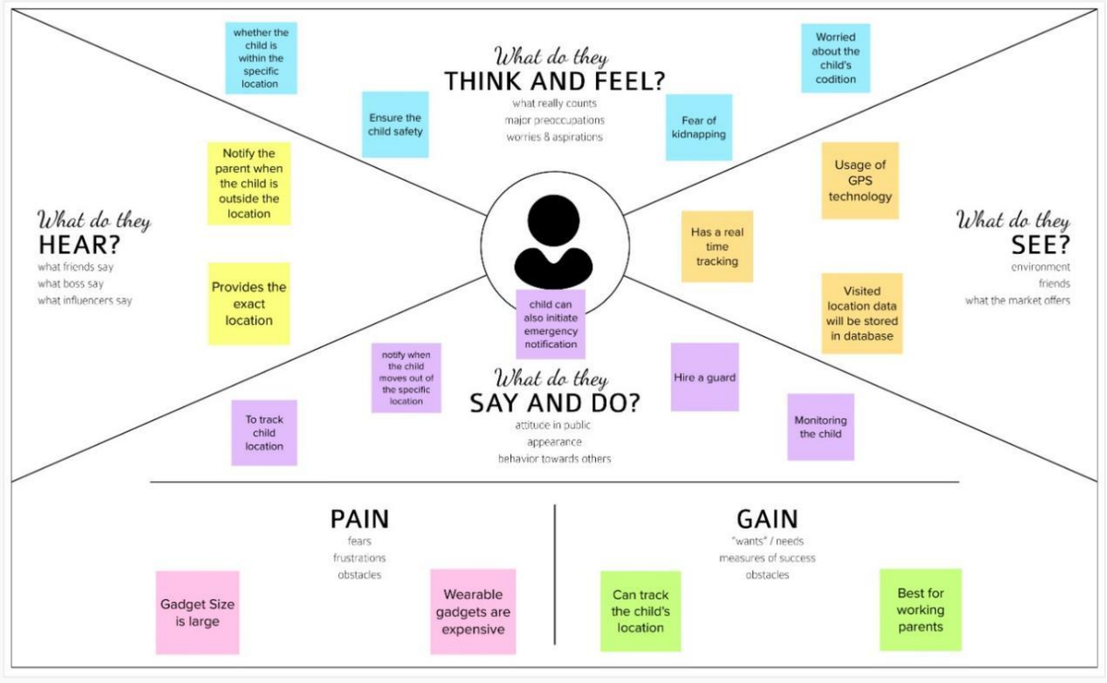
2.3 PROBLEM STATEMENT DEFINITION



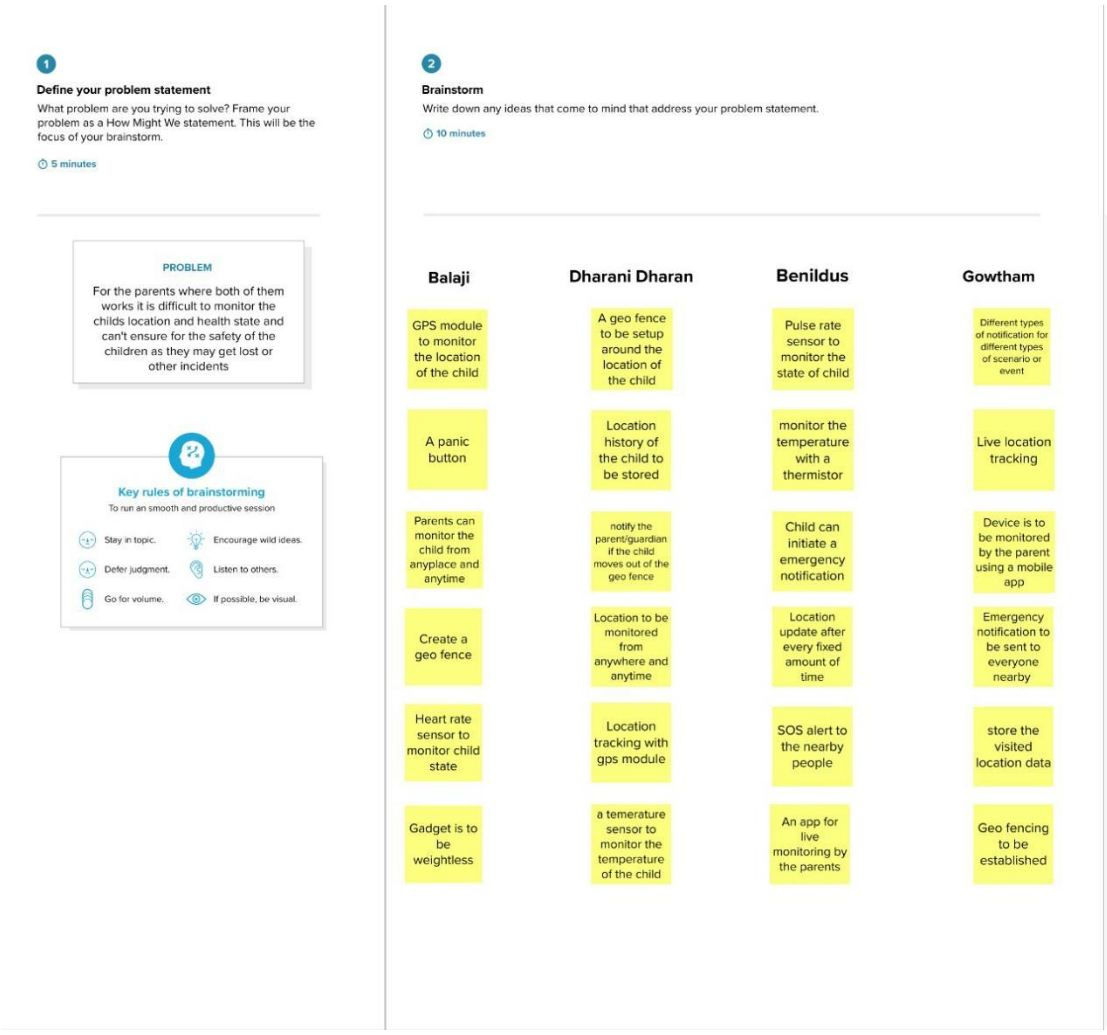
I am	I'm trying to	But	Because	Which makes me feel
A parent/Guardian	monitor my child's safety by knowing their location	its difficult to monitor every time and continuously	of my absence due to work or my child goes to school	nervous and worrisome

3 . IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION & BRAINSTORMING



1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

PROBLEM

For the parents where both of them works it is difficult to monitor the childs location and health state and can't ensure for the safety of the children as they may get lost or other incidents

Key rules of brainstorming

To run an smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

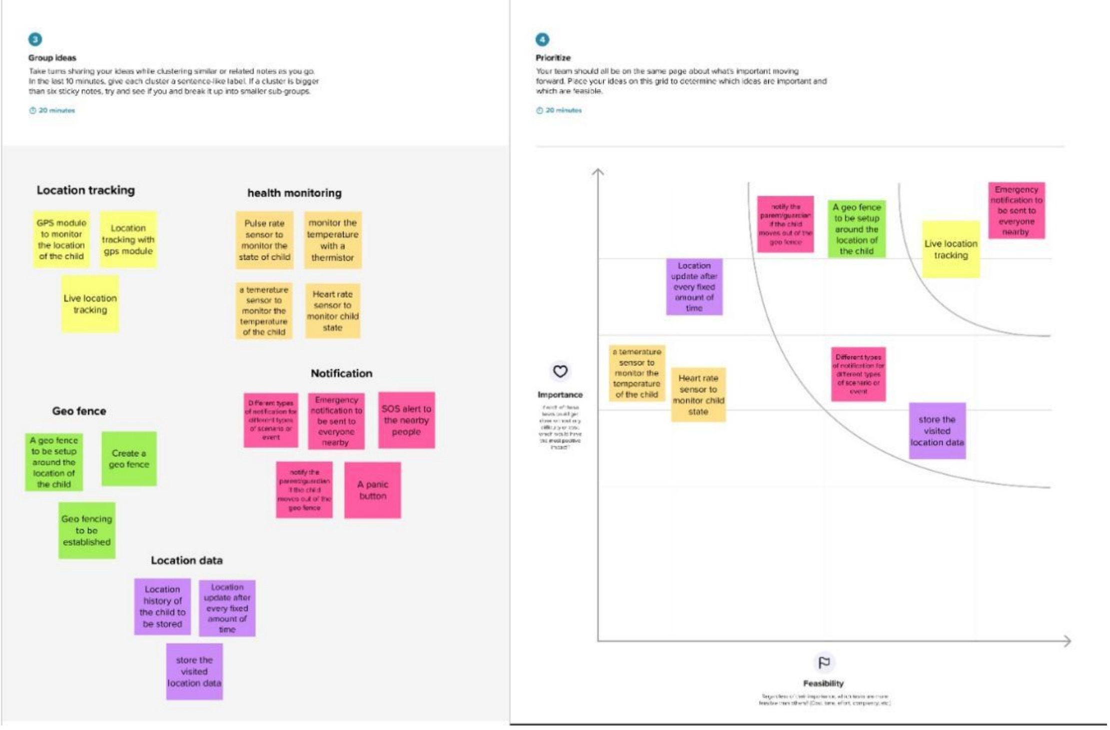
2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

Balaji	Dharani Dharan	Benildus	Gowtham
GPS module to monitor the location of the child	A geo fence to be setup around the location of the child	Pulse rate sensor to monitor the state of child	Different types of notification for different types of scenario or event
A panic button	Location history of the child to be stored	monitor the temperature with a thermistor	Live location tracking
Parents can monitor the child from anyplace and anytime	notify the parent/guardian if the child moves out of the geo fence	Child can initiate a emergency notification	Device is to be monitored by the parent using a mobile app
Create a geo fence	Location to be monitored from anywhere and anytime	Location update after every fixed amount of time	Emergency notification to be sent to everyone nearby
Heart rate sensor to monitor child state	Location tracking with gps module	SOS alert to the nearby people	store the visited location data
Gadget is to be weightless	a temerature sensor to monitor the temperature of the child	An app for live monitoring by the parents	Geo fencing to be established



3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

Location tracking

- GPS module to monitor the location of the child
- Location tracking with gps module
- Live location tracking

health monitoring

- Pulse rate sensor to monitor the state of child
- monitor the temperature with a thermistor
- a temerature sensor to monitor the temperature of the child
- Heart rate sensor to monitor child state

Notification

- Different types of notification for different types of scenario or event
- Emergency notification to be sent to everyone nearby
- SOS alert to the nearby people
- notify the parent/guardian if the child moves out of the geo fence
- A panic button

Geo fence

- A geo fence to be setup around the location of the child
- Create a geo fence
- Geo fencing to be established

Location data

- Location history of the child to be stored
- Location update after every fixed amount of time
- store the visited location data

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

notify the parent/guardian if the child moves out of the geo fence
A geo fence to be setup around the location of the child
Live location tracking
Emergency notification to be sent to everyone nearby
Location update after every fixed amount of time
a temerature sensor to monitor the temperature of the child
Heart rate sensor to monitor child state
Different types of notification for different types of scenario or event
store the visited location data
Importance
Feasibility

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

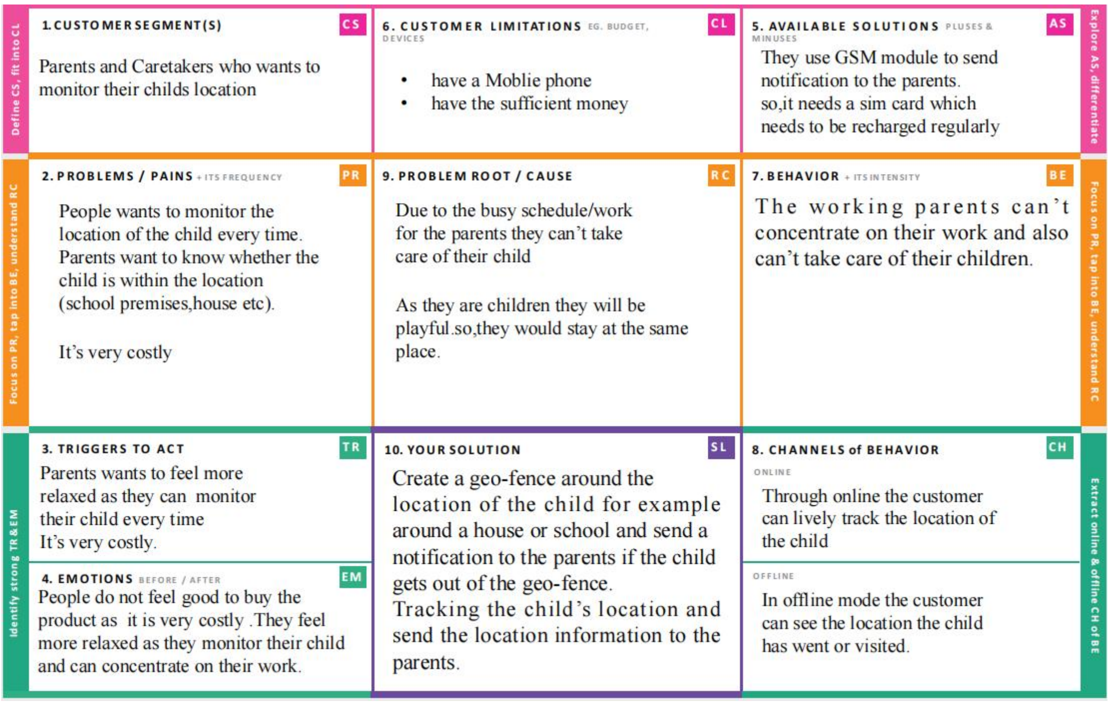
Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	In most of the houses both the parents will be going to work. So, they can't monitor their child's activity continuously. In crowded area there is possibility of losing the child it becomes difficult to track the location of the child which makes the parents nervous.
2.	Idea / Solution description	To create an app which shows the location of the child through the GPS module. Create a Geo-fence around the location of the child to continuously check whether the child is within the range of the Geo-fence. If the child crosses the range of the Geo-fence a notification will be automatically generated and will be sent to the parents/caretaker. The notification of the location of the child will be sent to the parents once every fixed amount of time.
3.	Novelty / Uniqueness	Providing different types of notification for different types of situation. The device will automatically send a notification to the parents if it is required from the cloud.
4.	Social Impact / Customer Satisfaction	This will create a safe and peaceful environment for both the parents and the children by making the parents relaxed by knowing the child's location and providing the freedom for children. This device makes the parents to feel at ease about their child's location as they can monitor the location of the child any time from anywhere.

5.	Business Model (Revenue Model)	Selling the product to the parents and childcare centers with a device and three months free subscription for live tracking and notification service. If they like this usage of the device they can pay and get the subscription for different duration and packs. By using this device the parents can feel relaxed about their children and can concentrate on their work.
6.	Scalability of the Solution	The continuous tracking of the child's live location and storing the names of the past location the child has visited in a database for the use of any emergency purposes

3.4 PROBLEM SOLUTION FIT



1.CUSTOMERSEGMENT(S)

Parents and Caretakers who wants to monitor their childs location

6. CUSTOMER LIMITATIONS EG. BUDGET, DEVICES

- have a Moblie phone
- have the sufficient money

5. AVAILABLE SOLUTIONS PLUSES & MINUSES

They use GSM module to send notification to the parents. so,it needs a sim card which needs to be recharged regularly

2. PROBLEMS / PAINS + ITS FREQUENCY

People wants to monitor the location of the child every time. Parents want to know whether the child is within the location (school premises,house etc).

It’s very costly

9. PROBLEM ROOT / CAUSE

Due to the busy schedule/work for the parents they can’t take care of their child

As they are children they will be playful.so,they would stay at the same place.

7. BEHAVIOR + ITS INTENSITY

The working parents can’t concentrate on their work and also can’t take care of their children.

3. TRIGGERS TO ACT

Parents wants to feel more relaxed as they can monitor their child every time
It’s very costly.

4. EMOTIONS BEFORE / AFTER

People do not feel good to buy the product as it is very costly .They feel more relaxed as they monitor their child and can concentrate on their work.

10. YOUR SOLUTION

Create a geo-fence around the location of the child for example around a house or school and send a notification to the parents if the child gets out of the geo-fence.
Tracking the child’s location and send the location information to the parents.

8. CHANNELS of BEHAVIOR

ONLINE

Through online the customer can lively track the location of the child

OFFLINE

In offline mode the customer can see the location the child has went or visited.

CS
CL
AS
PR
RC
BE
TR
EM
SL
CH
Define CS, fit into CL
Focus on PR, tap into BE, understand RC
Identify strong TR & EM
Explore AS, differentiate
Focus on PR, tap into BE, understand RC
Extract online & offline CH of BE

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through website Registration through app
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User login	Setting up User Id and password
FR-4	App permission	Grant the permission for the app to to access location, contact etc..
FR-5	Interface with the Device	Connecting the device with the registered app with the device ID.
FR-6	Setting Geo-location	Creating the Geo-location area in the map
FR-7	Database	Location history is stored in the cloud. Can be accessed from the dashboard.
FR-8	Tracking location	Tracking the location through app. Tracking the location through website.

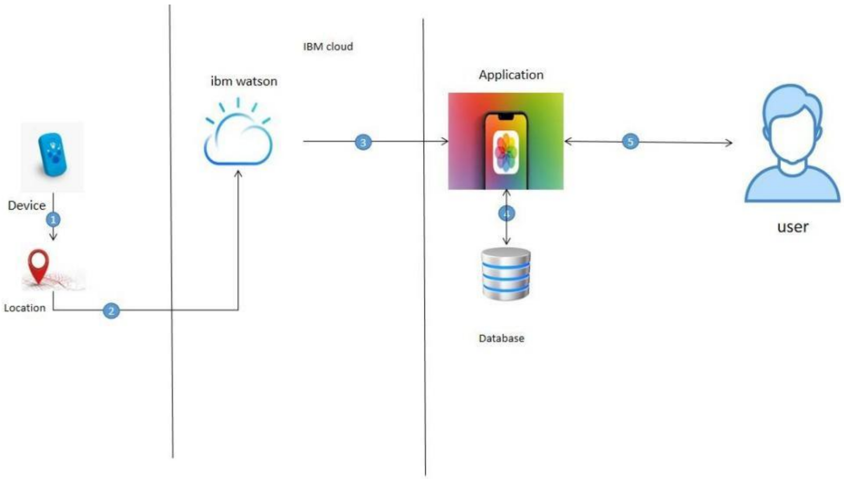
4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The device and its applications are user-friendly. The device is portable and easy to use.
NFR-2	**Security**	Providing permission for some information can only be decided by the user. Location data can only be viewed by the user.
NFR-3	**Reliability**	An update will be provided if any errors are found in the device.
NFR-4	**Performance**	The performance of the device decrease in a network less area. No interference between users.

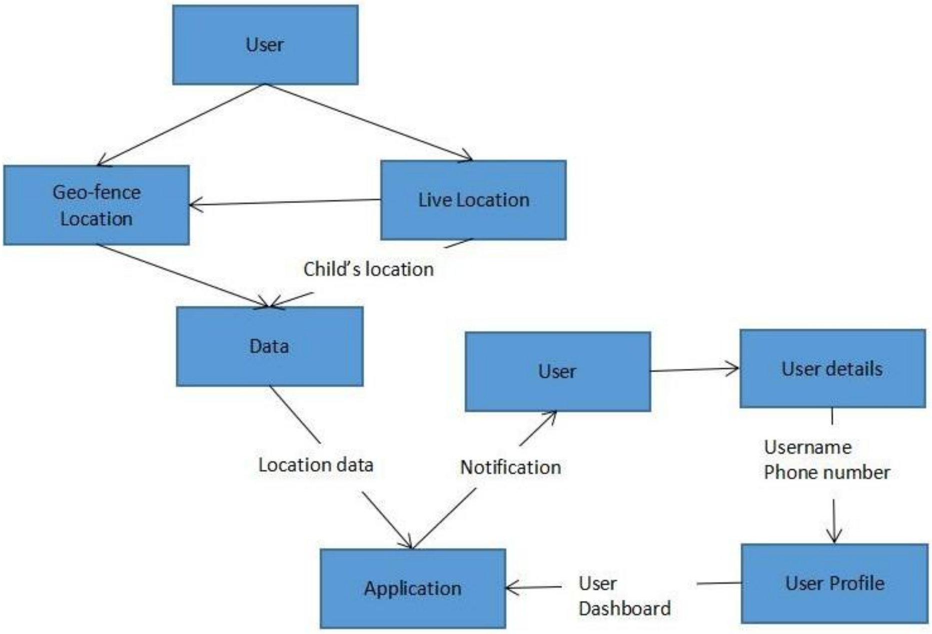
		Location tracking will be accurate.
NFR-5	**Availability**	If there is any update then the device wont be able to operate for a amount of time.
NFR-6	**Scalability**	A single device can be monitored by two users.

5. PROJECT DESIGN

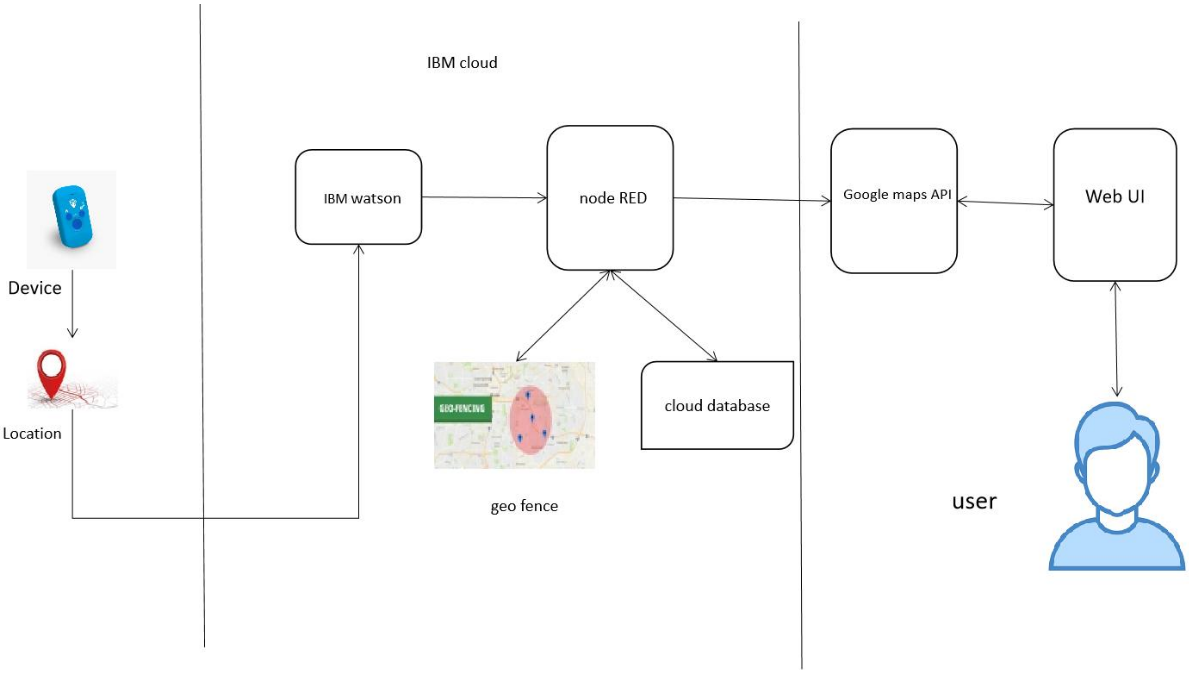
5.1 DATA FLOW DIAGRAMS

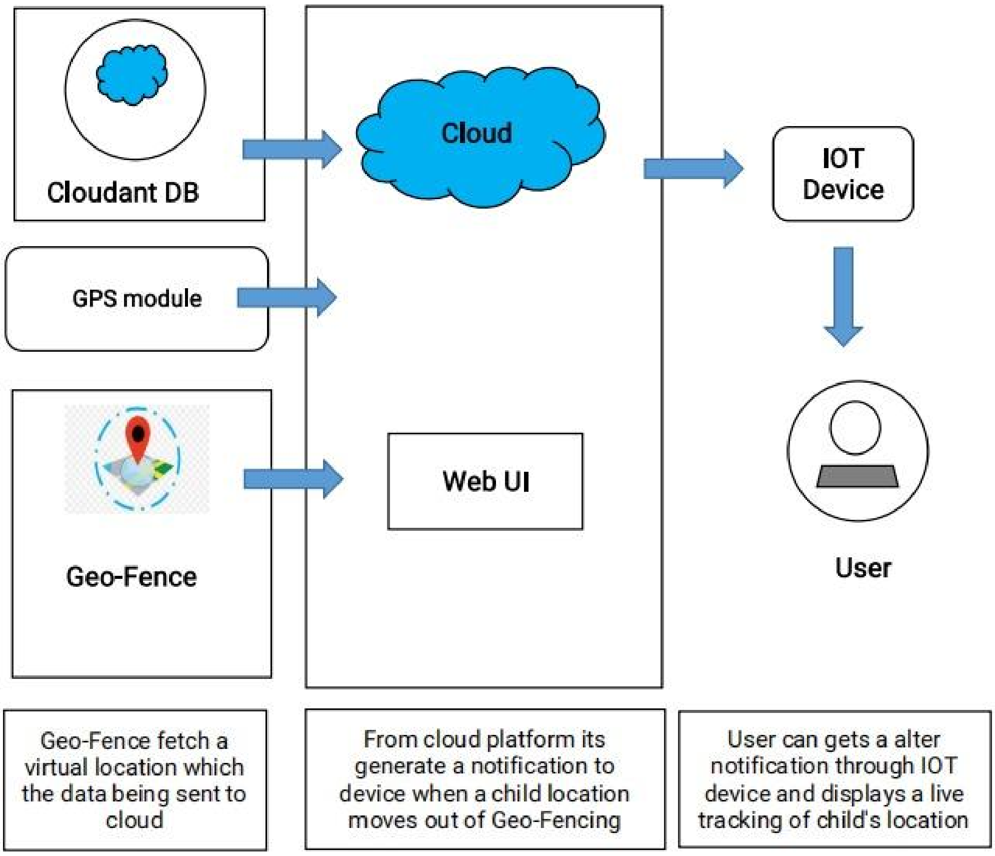


1. GPS tracking device tracks the location of a child.
2. Location data collected from the device is sends to IBM watson cloud.
3. The Processed data from the IBM watson cloud is send to User application.
4. The data are stored in the database can be accessed through the application
5. The user can use the application to view the child's location and the visited location history



5.2 SOLUTION & TECHNICAL ARCHITECTURE




Cloudant DB
Cloud
IOT Device
GPS module
Web UI
Geo-Fence
User
Geo-Fence fetch a virtual location which the data being sent to cloud
From cloud platform its generate a notification to device when a child location moves out of Geo-Fencing
User can gets a alter notification through IOT device and displays a live tracking of child's location

Components & Technologies:

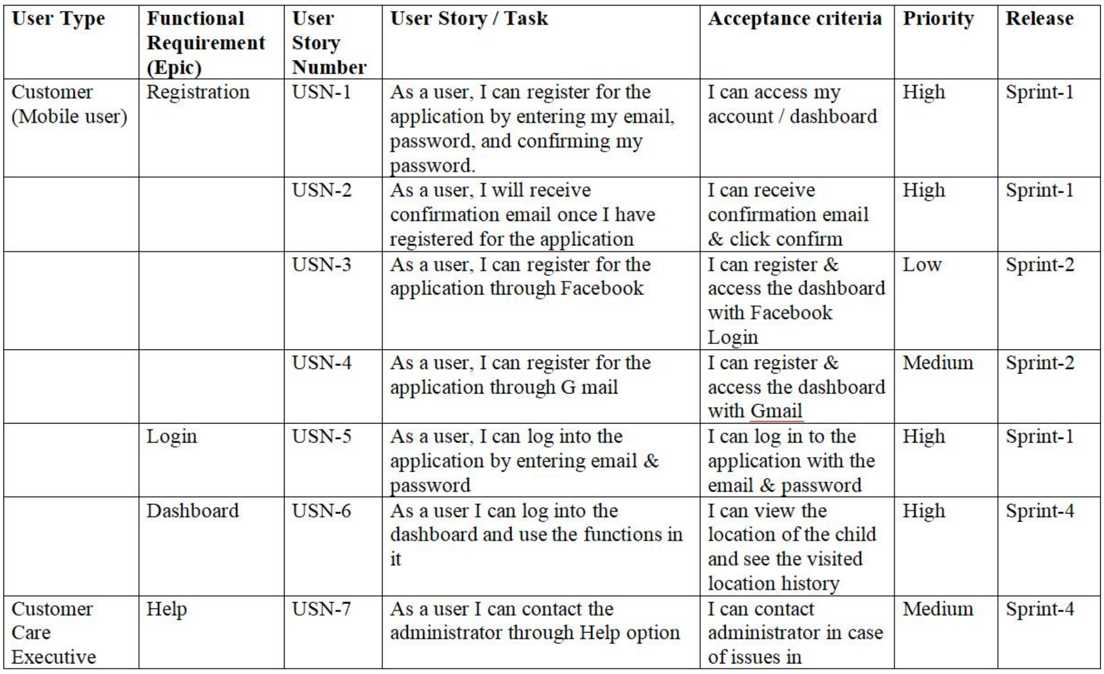
S.No	Component	Description	Technology
1.	User Interface	User interacts with the device through the mobile application.	MIT app inventor.
2.	Application Logic-1	The data from the device are collected and sent to the application	IBM Watson
3.	Application Logic-2	Connect the device to the internet and the application	Node RED

4.	Database	Child’s visited location history will be stored	MySQL
5.	Cloud Database	Database Service on Cloud	IBM Cloudant
6.	File Storage	File’s based on the location are stored	IBM Block Storage or Other Storage Service
7.	External API-1	To create the geo fence and monitor the location	Google maps API
8.	Infrastructure (Server / Cloud)	Application Deployment on Cloud	Cloud Foundry

Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	MIT app inventor
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	Encryption
3.	Scalable Architecture	Update for the application is provided every time if an error is found	cloud
4.	Availability	The application has to be available every time without any problems	IBM cloud
5.	Performance	The device works best with good network	High speed and stable network

5.3 USER STORIES



User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through G mail	I can register & access the dashboard with Gmail	Medium	Sprint-2
	Login	USN-5	As a user, I can log into the application by entering email & password	I can log in to the application with the email & password	High	Sprint-1
	Dashboard	USN-6	As a user I can log into the dashboard and use the functions in it	I can view the location of the child and see the visited location history	High	Sprint-4
Customer Care Executive	Help	USN-7	As a user I can contact the administrator through Help option	I can contact administrator in case of issues in	Medium	Sprint-4

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Dharani Dharan, Benildus
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	Medium	Balaji
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	1	High	Gowtham
Sprint-2	Dashboard	USN-4	As a user I can log into the dashboard and use the functions in it	2	High	Gowtham, Benildus
Sprint-3	Interface	USN-5	As a user I can connect the device to the mobile application	1	High	DharaniDharan,Gowtham
Sprint-3	Track the location	USN-6	As the user I can track the location of the device	1	High	Benildus,Balaji

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-4		USN-7	As the user I can see the live location of the device in the dashboard	2	High	Balaji
Sprint-2	Creating a Geo-fence	USN-8	As a user I can create a geo-fence around a location that is required	2	High	Balaji,Dharani Dharan
Sprint-4	Notification	USN-9	As a user I can receive notification for certain events	2	High	Benildus
Sprint-4	Database	USN-10	As a user I can view the travelled location history	2	Medium	Dharani Dharan
Sprint-4		USN-11	As a user I can select the data that needs to be displayed	2	Low	Gowtham

6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

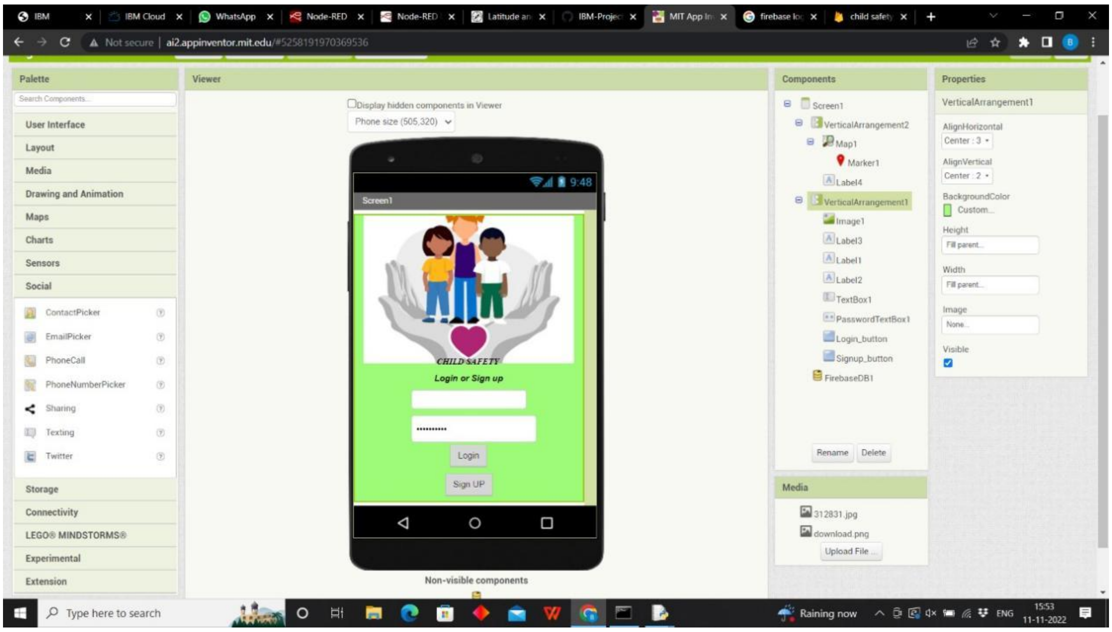
6.3 REPORTS FROM JIRA

https://pnt2022tmid19486.atlassian.net/jira/software/projects/IBSGFCMN/boards/1/roadmap?shared=&atlOrigin=eyJpIjoiNGMyZTMwYjRjY2E4NGMyYTgwY2Y1ZDc2ZmY5MGU0MjYiLCJwIjoiaiJ9

7.CODING AND SOLUTIONING

7.1 SPRINT – 1

Login or sign up page



VerticalArrangement1

AlignHorizontal: Center : 3

AlignVertical: Center : 2

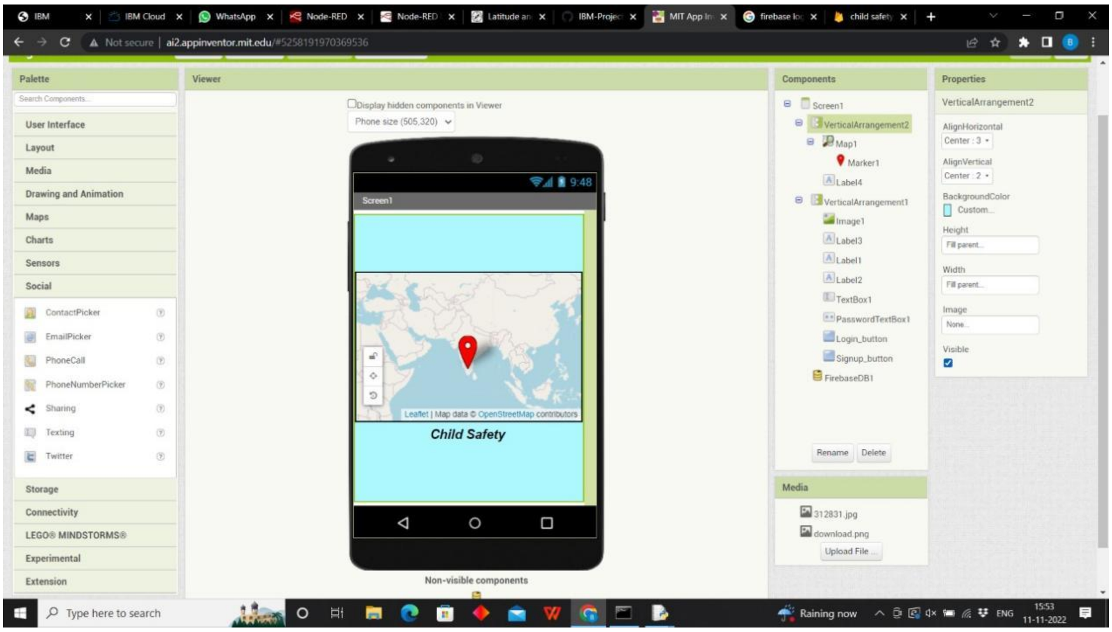
BackgroundColor: Custom...

Height: Fill parent...

Width: Fill parent...

Image: None...

Visible: ☑



VerticalArrangement2

AlignHorizontal: Center : 3

AlignVertical: Center : 2

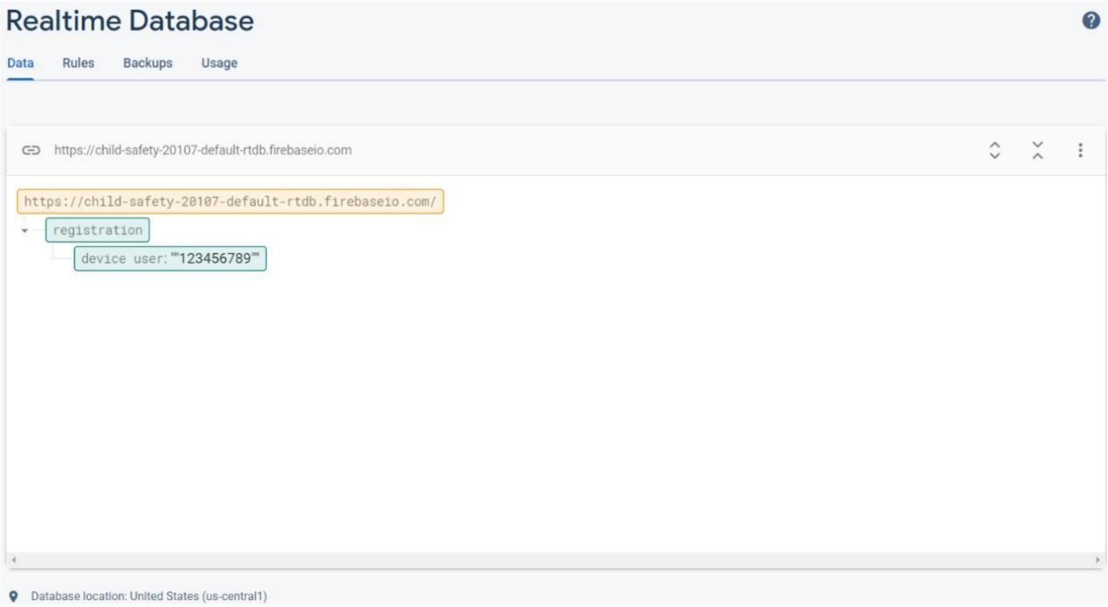
BackgroundColor: Custom...

Height: Fill parent...

Width: Fill parent...

Image: None...

Visible: ☑



https://child-safety-20107-default-rtdb.firebaseio.com

https://child-safety-20107-default-rtdb.firebaseio.com/

registration

device user: ""123456789""

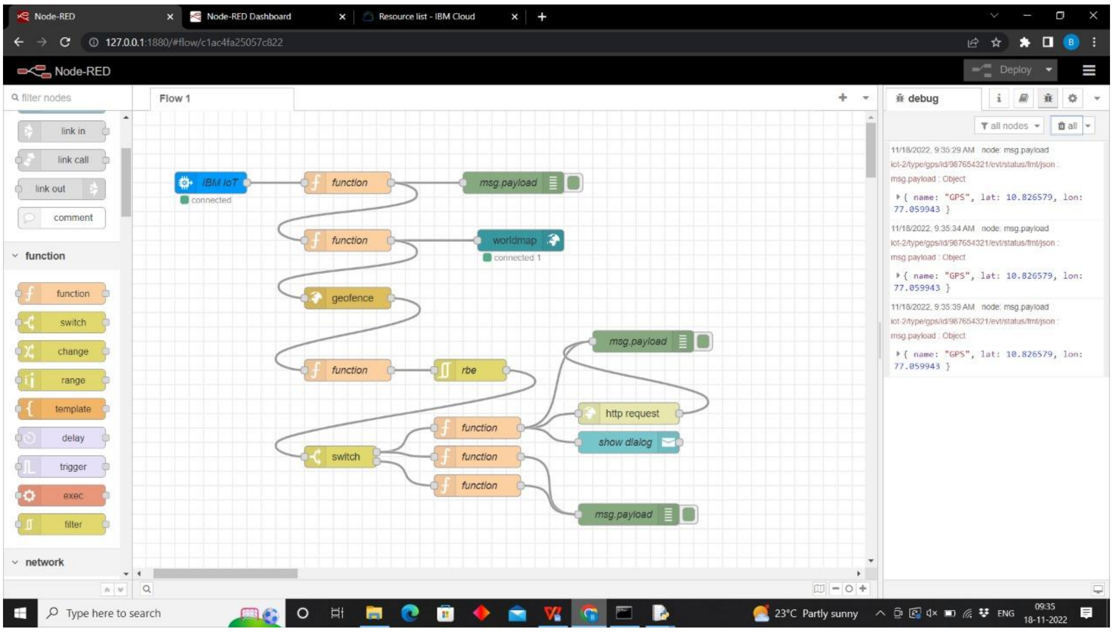
Database location: United States (us-central1)

7.2 SPRINT 2

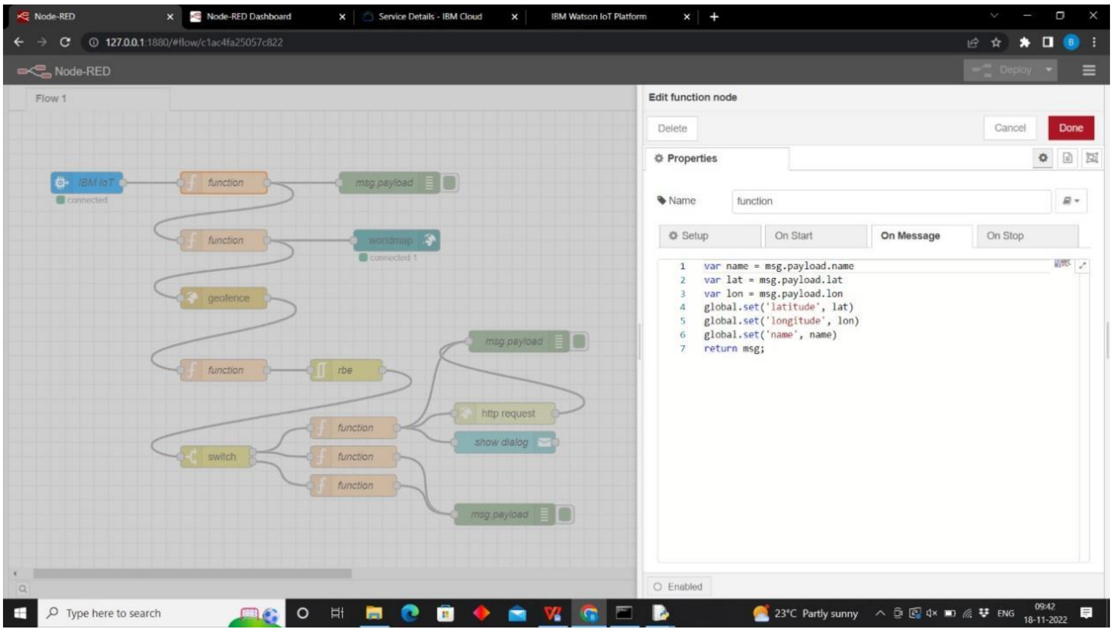
Creating Geo-fence using node-red

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

myConfig={
   "identity":{
      "orgId":"hi70w8",
      "typeId":"gps",
      "deviceId":"987654321"
   },
   "auth":{
      "token":"24688462"
   }
}
client=wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=No
ne)
client.connect()

while True:
   name="Child"
   test_list = [[10.820155, 77.016172],[10.832851,
77.080561],[10.826579, 77.059943],[10.828149,77.060658]]
```

```
random_num = random.choice(test_list)
#outside
#latitude=10.820155
#longitude=77.016172

#latitude=10.832851
#longitude=77.080561

#inside
#latitude=10.826579
#longitude=77.059943

#latitude=10.828149
#longitude=77.060658

latitude=random_num[0]
longitude=random_num[1]

myData={'name':name,'lat':latitude,'lon':longitude}

client.publishEvent(eventId="status",msgFormat="json",data=myData,
qos=0,onPublish=None)
print("Data published to IBM platform:",myData)
time.sleep(10)
client.disconnect()
```



```
11/18/2022, 9:35:29 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
▸{ name: "GPS", lat: 10.826579, lon:
77.059943 }
11/18/2022, 9:35:34 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
▸{ name: "GPS", lat: 10.826579, lon:
77.059943 }
11/18/2022, 9:35:39 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
▸{ name: "GPS", lat: 10.826579, lon:
77.059943 }
```



Edit function node

Delete Cancel Done

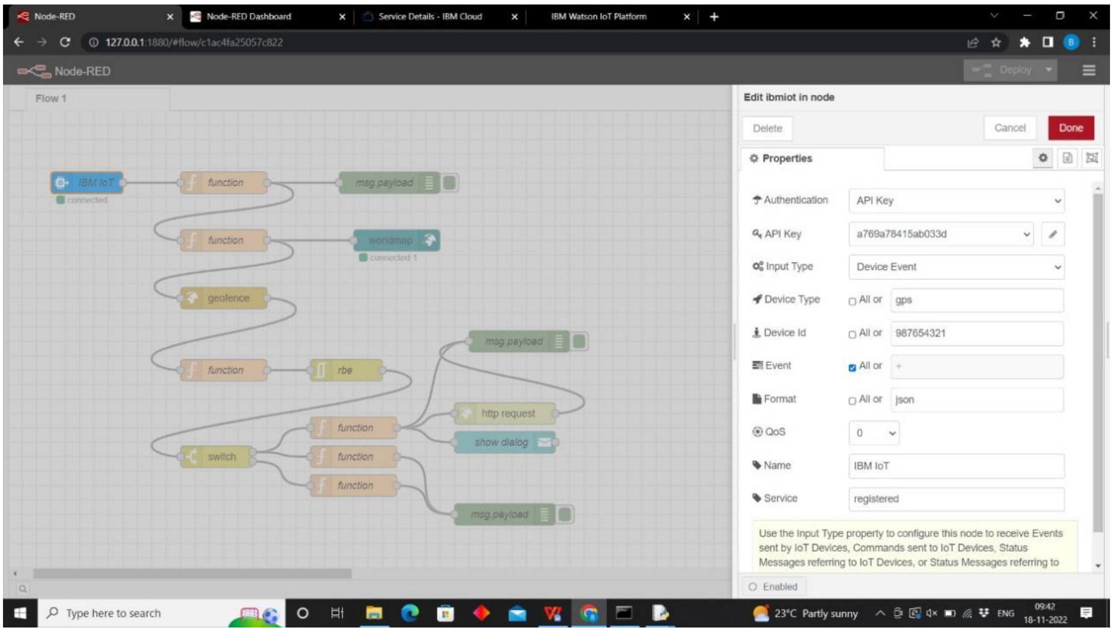
Properties

Name: function

Setup | On Start | **On Message** | On Stop

```
var name = msg.payload.name
var lat = msg.payload.lat
var lon = msg.payload.lon
global.set('latitude', lat)
global.set('longitude', lon)
global.set('name', name)
return msg;
```

○ Enabled



Edit ibmiot in node

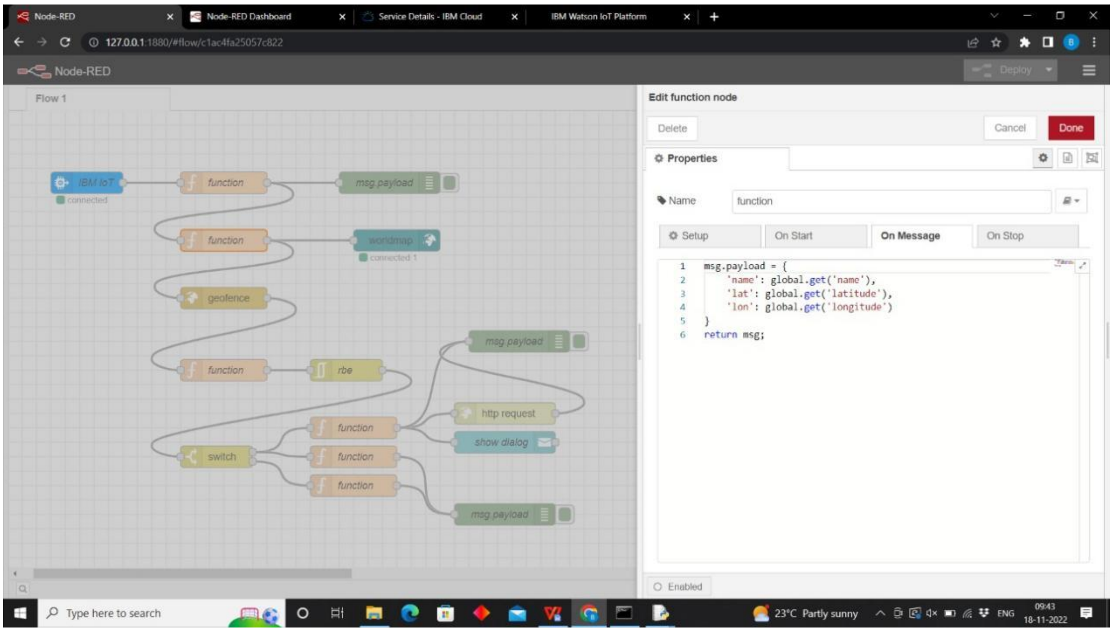
Delete Cancel Done

Properties

Authentication: API Key
API Key: a769a78415ab033d
Input Type: Device Event
Device Type: □ All or gps
Device Id: □ All or 987654321
Event: ☑ All or +
Format: □ All or json
QoS: 0
Name: IBM IoT
Service: registered

Use the Input Type property to configure this node to receive Events sent by IoT Devices, Commands sent to IoT Devices, Status Messages referring to IoT Devices, or Status Messages referring to

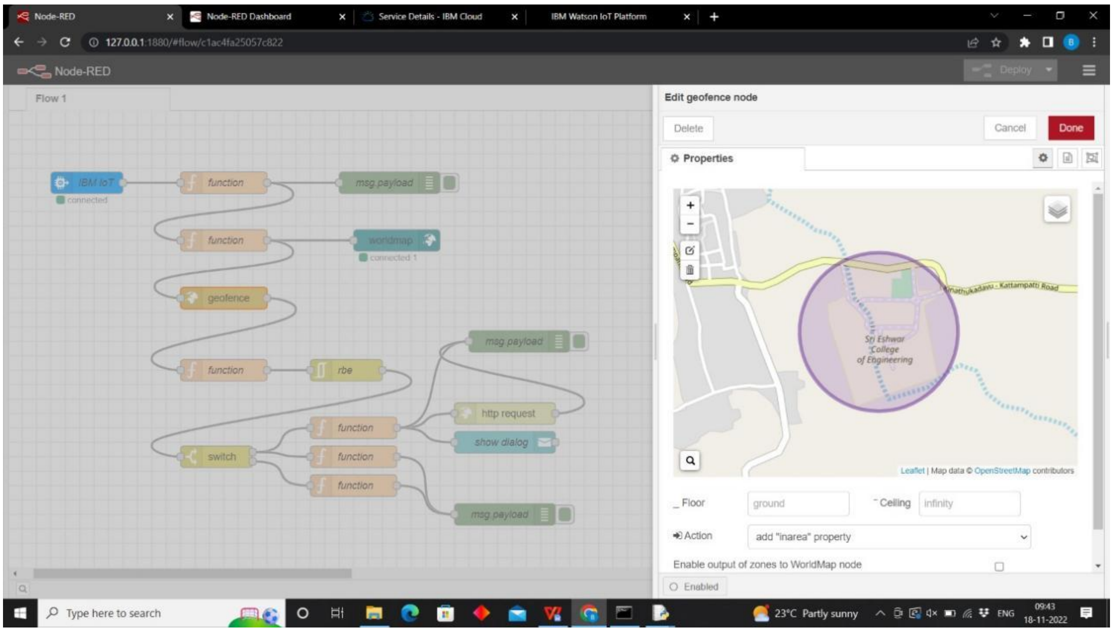
○ Enabled



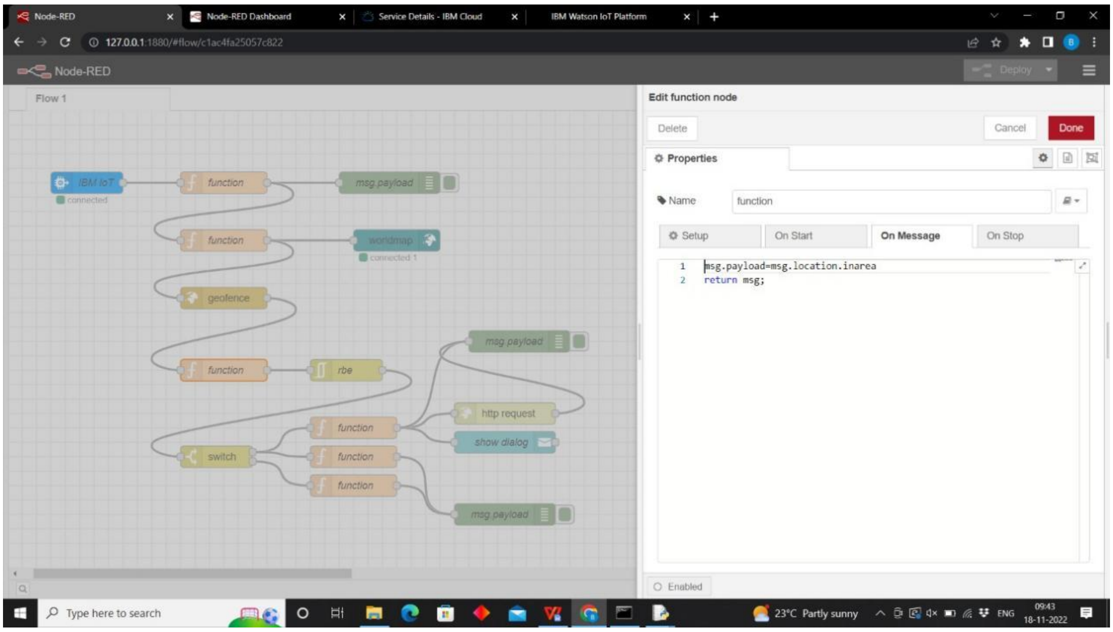
Name: function

Setup | On Start | On Message | On Stop

```
msg.payload = {
    'name': global.get('name'),
    'lat': global.get('latitude'),
    'lon': global.get('longitude')
}
return msg;
```

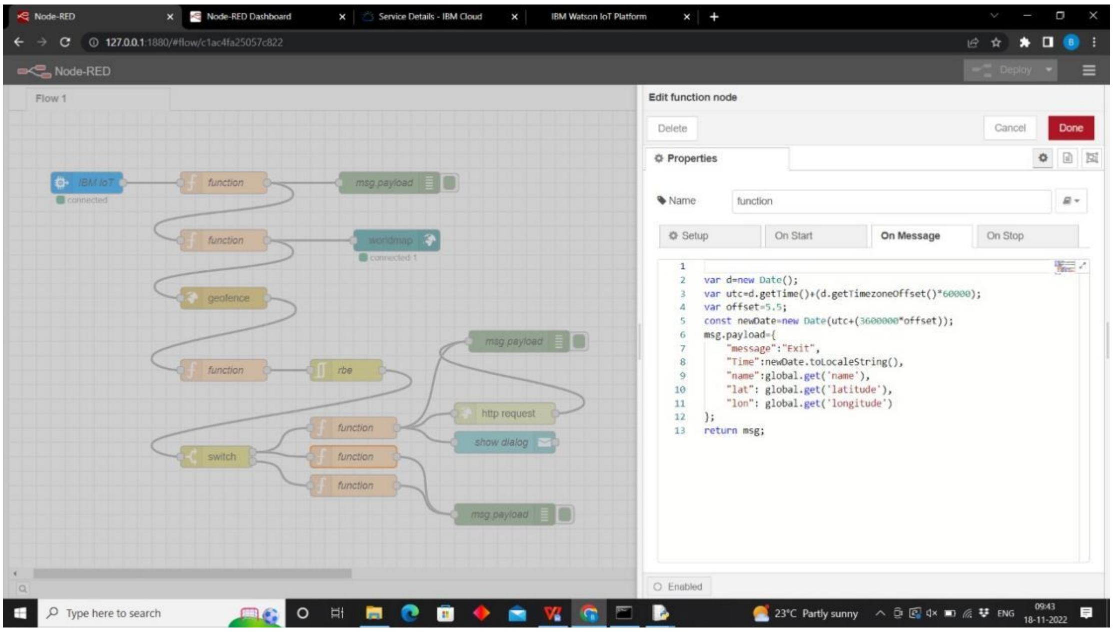


Floor: ground
Ceiling: infinity
Action: add "inarea" property
Enable output of zones to WorldMap node □



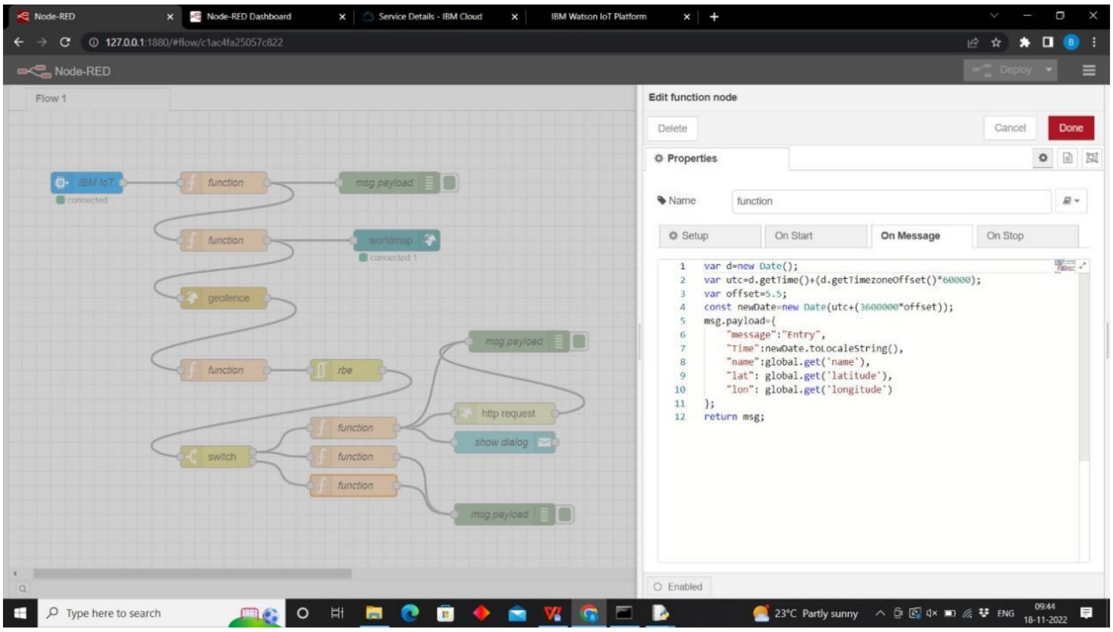
Name: function

```
msg.payload=msg.location.inarea
return msg;
```



Name: function

```

var d=new Date();
var utc=d.getTime()+(d.getTimezoneOffset()*60000);
var offset=5.5;
const newDate=new Date(utc+(3600000*offset));
msg.payload={
    "message":"Exit",
    "Time":newDate.toLocaleString(),
    "name":global.get('name'),
    "lat": global.get('latitude'),
    "lon": global.get('longitude')
};
return msg;
```



Edit function node

Delete | Cancel | Done

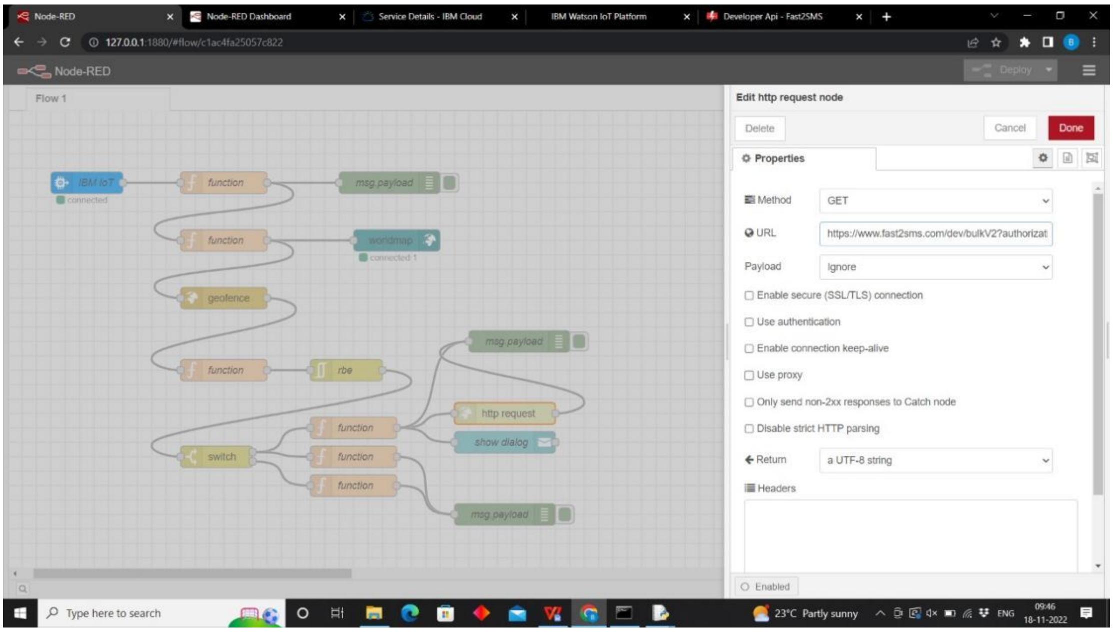
Properties

Name: function

Setup | On Start | **On Message** | On Stop

```
var d=new Date();
var utc=d.getTime()+(d.getTimezoneOffset()*60000);
var offset=5.5;
const newDate=new Date(utc+(3600000*offset));
msg.payload={
    "message":"Entry",
    "Time":newDate.toLocaleString(),
    "name":global.get('name'),
    "lat": global.get('latitude'),
    "lon": global.get('longitude')
};
return msg;
```

○ Enabled



Edit http request node

Delete | Cancel | Done

Properties

Method: GET

URL: https://www.fast2sms.com/dev/bulkV2?authorizat

Payload: Ignore

□ Enable secure (SSL/TLS) connection

□ Use authentication

□ Enable connection keep-alive

□ Use proxy

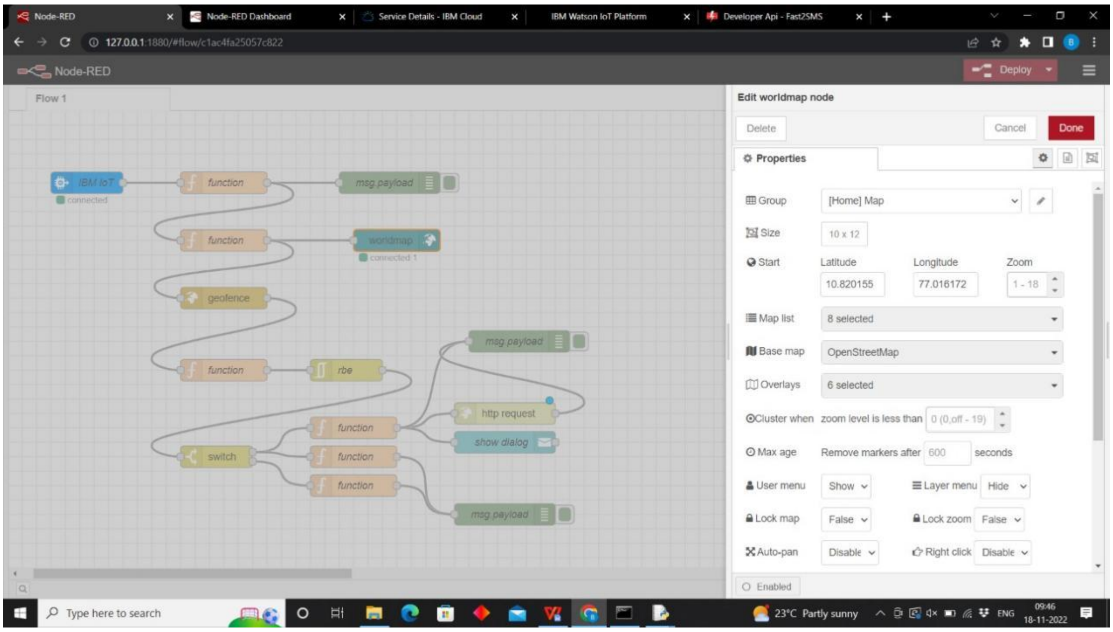
□ Only send non-2xx responses to Catch node

□ Disable strict HTTP parsing

Return: a UTF-8 string

Headers

○ Enabled



Edit worldmap node

Group: [Home] Map

Size: 10 x 12

Start: Latitude 10.820155, Longitude 77.016172, Zoom 1 - 18

Map list: 8 selected

Base map: OpenStreetMap

Overlays: 6 selected

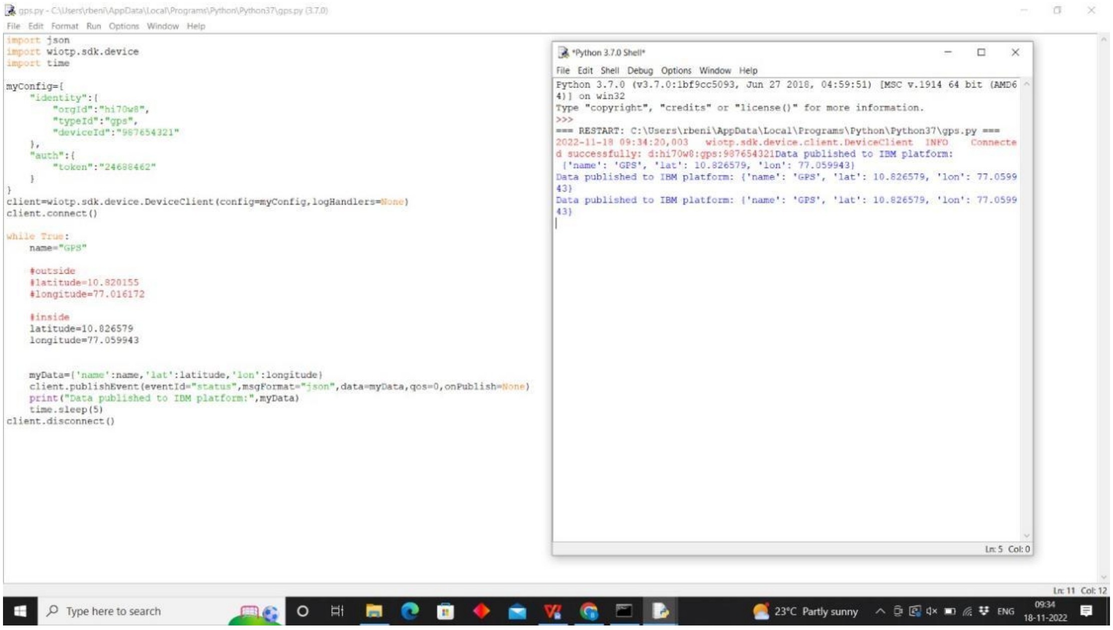
Cluster when zoom level is less than 0 (0,off - 19)

Max age: Remove markers after 600 seconds

User menu: Show   Layer menu: Hide

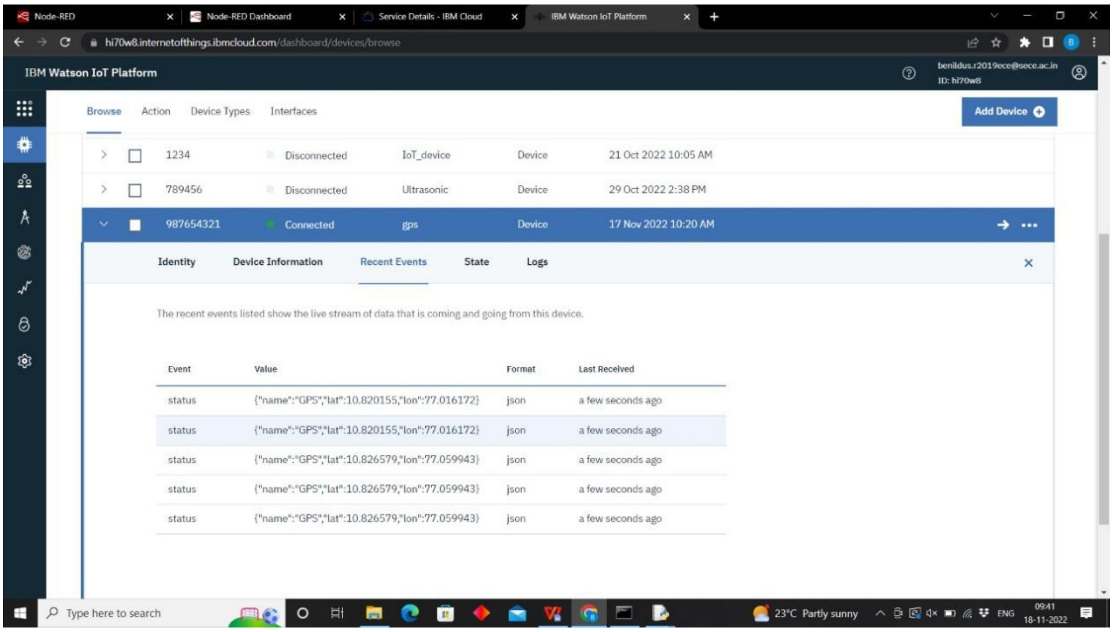
Lock map: False   Lock zoom: False

Auto-pan: Disable   Right click: Disable


gps.py - C:\Users\rbeni\AppData\Local\Programs\Python\Python37\gps.py (3.7.0)
File Edit Format Run Options Window Help
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Ln: 5 Col: 0
Ln: 11 Col: 12
Type here to search
23°C Partly sunny
ENG
09:34
18-11-2022

```python
import json
import wiotp.sdk.device
import time

myConfig={
    "identity":{
        "orgId":"hi70w8",
        "typeId":"gps",
        "deviceId":"987654321"
    },
    "auth":{
        "token":"24688462"
    }
}
client=wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect()

while True:
    name="GPS"

    #outside
    #latitude=10.820155
    #longitude=77.016172

    #inside
    latitude=10.826579
    longitude=77.059943


    myData={'name':name,'lat':latitude,'lon':longitude}
    client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)
    print("Data published to IBM platform:",myData)
    time.sleep(5)
client.disconnect()
```

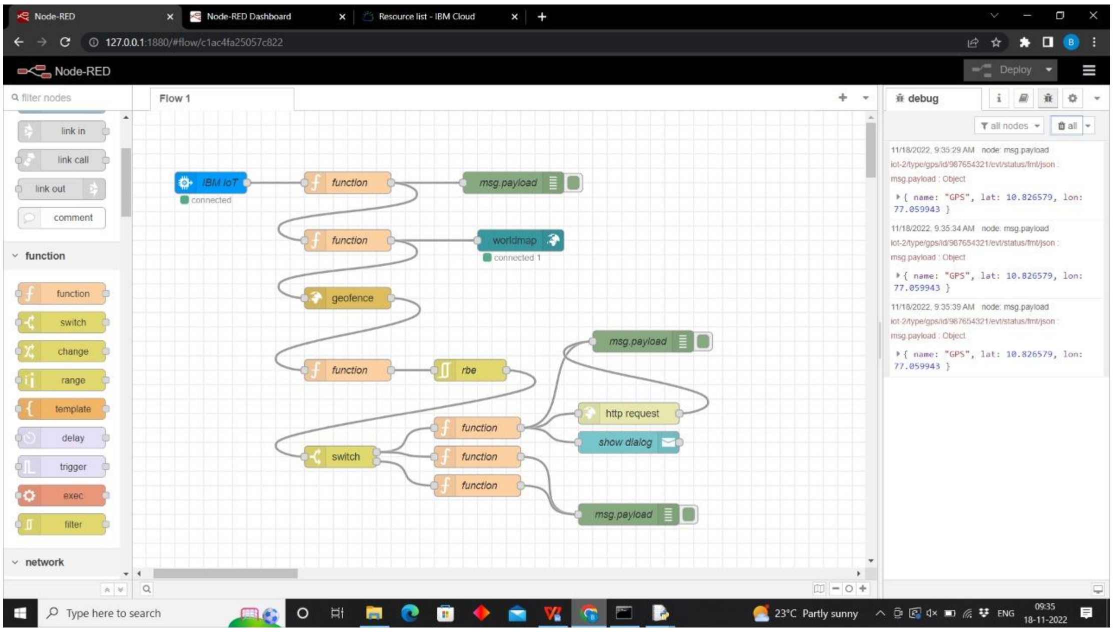
```
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD6
4)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
=== RESTART: C:\Users\rbeni\AppData\Local\Programs\Python\Python37\gps.py ===
2022-11-18 09:34:20,003   wiotp.sdk.device.client.DeviceClient  INFO    Connecte
d successfully: d:hi70w8:gps:987654321Data published to IBM platform:
 {'name': 'GPS', 'lat': 10.826579, 'lon': 77.059943}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
```



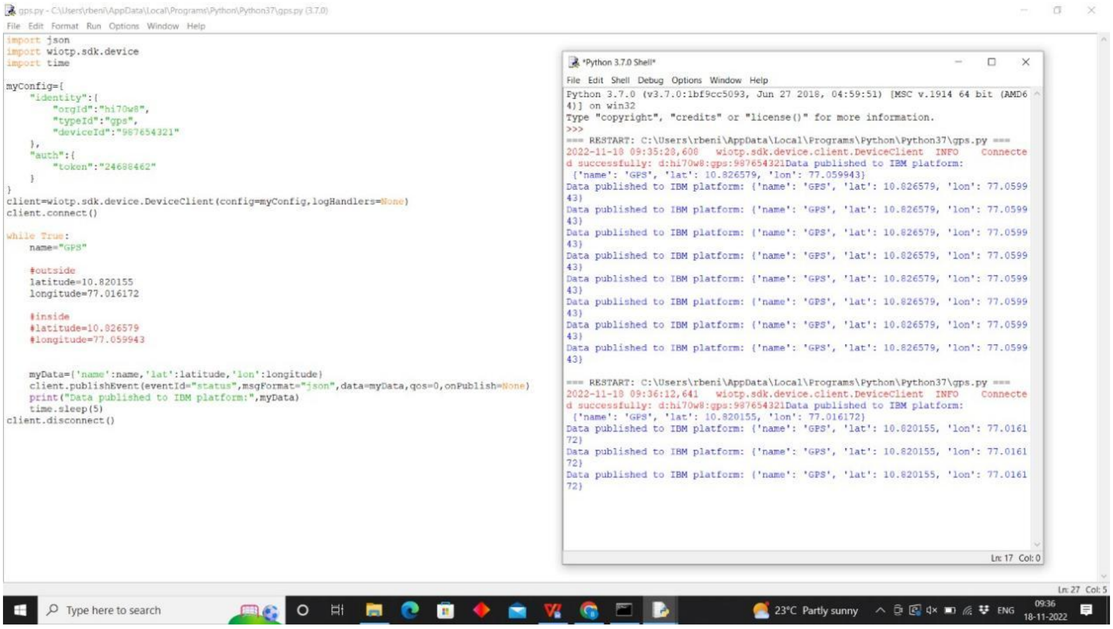
1234	Disconnected	IoT_device	Device	21 Oct 2022 10:05 AM
789456	Disconnected	Ultrasonic	Device	29 Oct 2022 2:38 PM
987654321	Connected	gps	Device	17 Nov 2022 10:20 AM

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
status	{"name":"GPS","lat":10.820155,"lon":77.016172}	json	a few seconds ago
status	{"name":"GPS","lat":10.820155,"lon":77.016172}	json	a few seconds ago
status	{"name":"GPS","lat":10.826579,"lon":77.059943}	json	a few seconds ago
status	{"name":"GPS","lat":10.826579,"lon":77.059943}	json	a few seconds ago
status	{"name":"GPS","lat":10.826579,"lon":77.059943}	json	a few seconds ago



```
11/18/2022, 9:35:29 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
 ▸{ name: "GPS", lat: 10.826579, lon:
77.059943 }
11/18/2022, 9:35:34 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
 ▸{ name: "GPS", lat: 10.826579, lon:
77.059943 }
11/18/2022, 9:35:39 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
 ▸{ name: "GPS", lat: 10.826579, lon:
77.059943 }
```



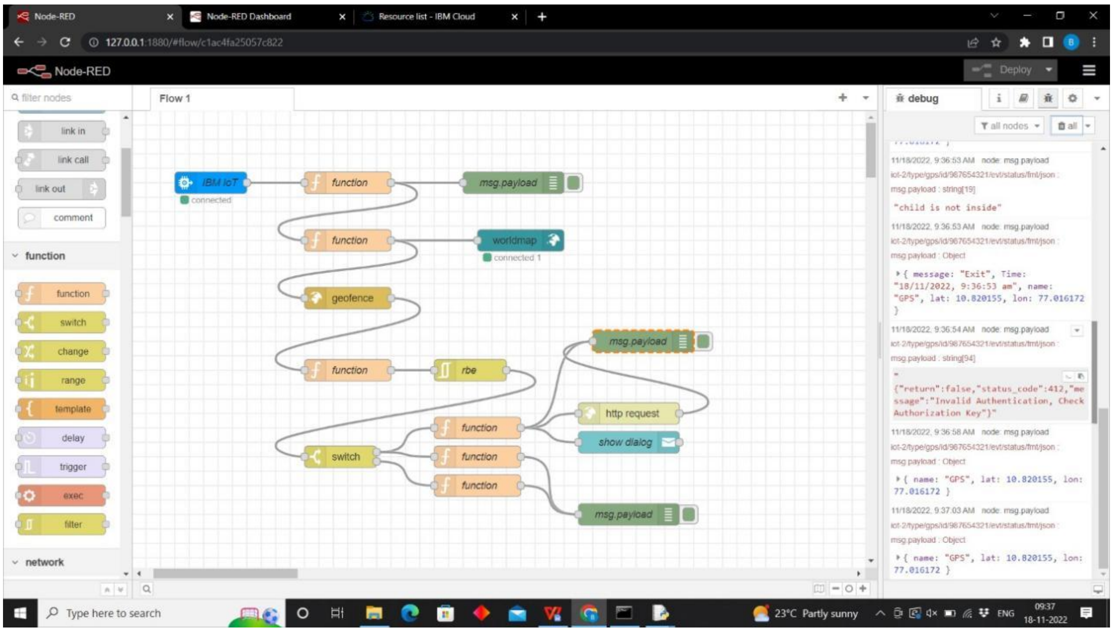
gps.py - C:\Users\rbeni\AppData\Local\Programs\Python\Python37\gps.py (3.7.0)

```python
import json
import wiotp.sdk.device
import time

myConfig={
    "identity":{
        "orgId":"hi70w8",
        "typeId":"gps",
        "deviceId":"987654321"
    },
    "auth":{
        "token":"24688462"
    }
}
client=wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect()

while True:
    name="GPS"

    #outside
    latitude=10.820155
    longitude=77.016172

    #inside
    #latitude=10.826579
    #longitude=77.059943


    myData={'name':name,'lat':latitude,'lon':longitude}
    client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)
    print("Data published to IBM platform:",myData)
    time.sleep(5)
client.disconnect()
```

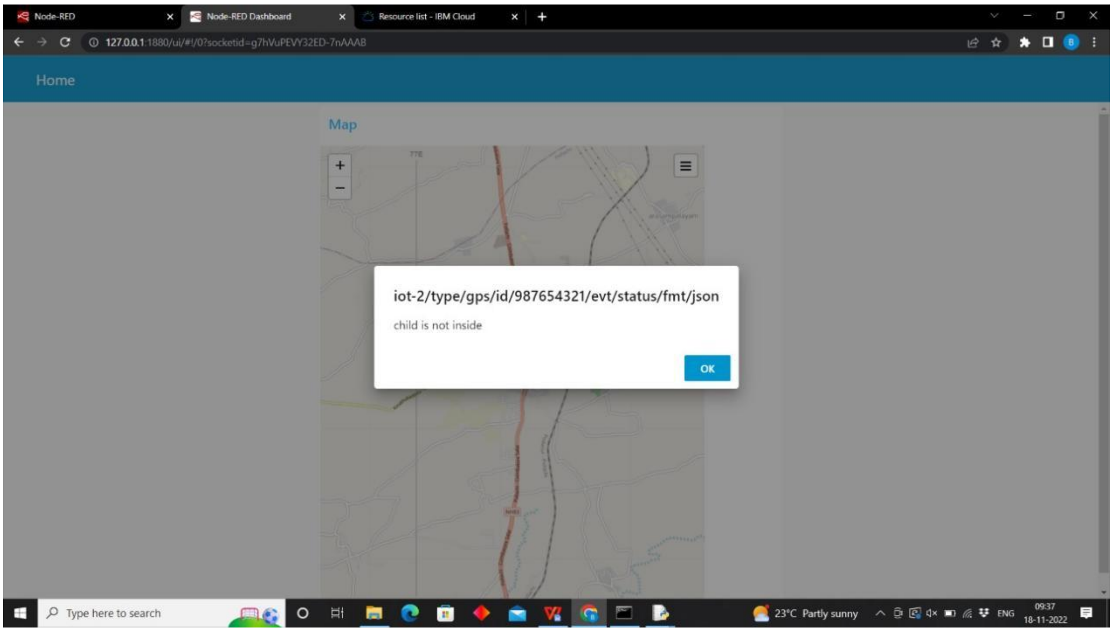
Python 3.7.0 Shell

```
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD6
4)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
=== RESTART: C:\Users\rbeni\AppData\Local\Programs\Python\Python37\gps.py ===
2022-11-18 09:35:28,608   wiotp.sdk.device.client.DeviceClient  INFO    Connecte
d successfully: d:hi70w8:gps:987654321Data published to IBM platform:
 {'name': 'GPS', 'lat': 10.826579, 'lon': 77.059943}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.826579, 'lon': 77.0599
43}

=== RESTART: C:\Users\rbeni\AppData\Local\Programs\Python\Python37\gps.py ===
2022-11-18 09:36:12,641   wiotp.sdk.device.client.DeviceClient  INFO    Connecte
d successfully: d:hi70w8:gps:987654321Data published to IBM platform:
 {'name': 'GPS', 'lat': 10.820155, 'lon': 77.016172}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.820155, 'lon': 77.0161
72}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.820155, 'lon': 77.0161
72}
Data published to IBM platform: {'name': 'GPS', 'lat': 10.820155, 'lon': 77.0161
72}
```

File Edit Format Run Options Window Help
File Edit Shell Debug Options Window Help
Ln: 17 Col: 0
Ln: 27 Col: 5
Type here to search
23°C Partly sunny
ENG
09:36
18-11-2022

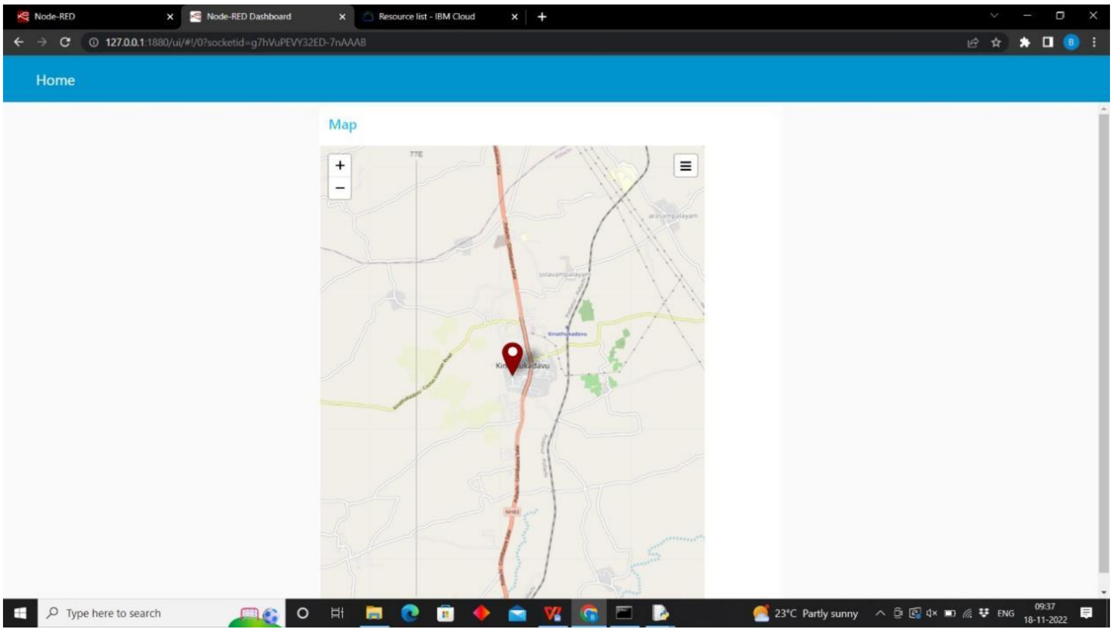


```
11/18/2022, 9:36:53 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : string[19]
"child is not inside"

11/18/2022, 9:36:53 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
▸{ message: "Exit", Time:
"18/11/2022, 9:36:53 am", name:
"GPS", lat: 10.820155, lon: 77.016172
}

11/18/2022, 9:36:54 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : string[94]
"
{"return":false,"status_code":412,"me
ssage":"Invalid Authentication, Check
Authorization Key"}"

11/18/2022, 9:36:58 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
▸{ name: "GPS", lat: 10.820155, lon:
77.016172 }

11/18/2022, 9:37:03 AM   node: msg.payload
iot-2/type/gps/id/987654321/evt/status/fmt/json :
msg.payload : Object
▸{ name: "GPS", lat: 10.820155, lon:
77.016172 }
```



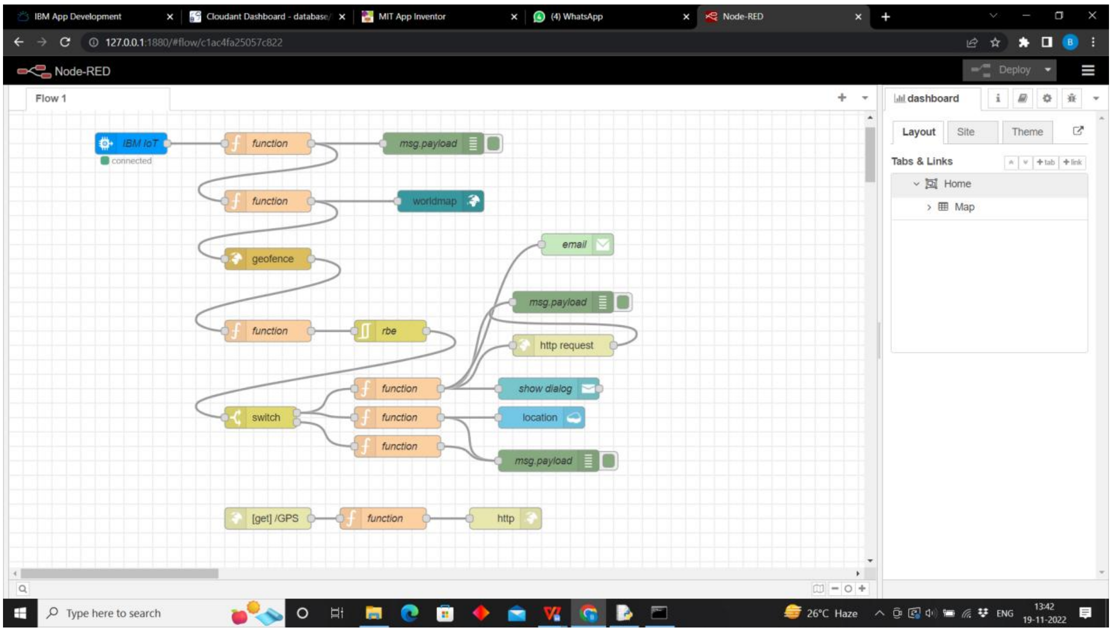
iot-2/type/gps/id/987654321/evt/status/fmt/json

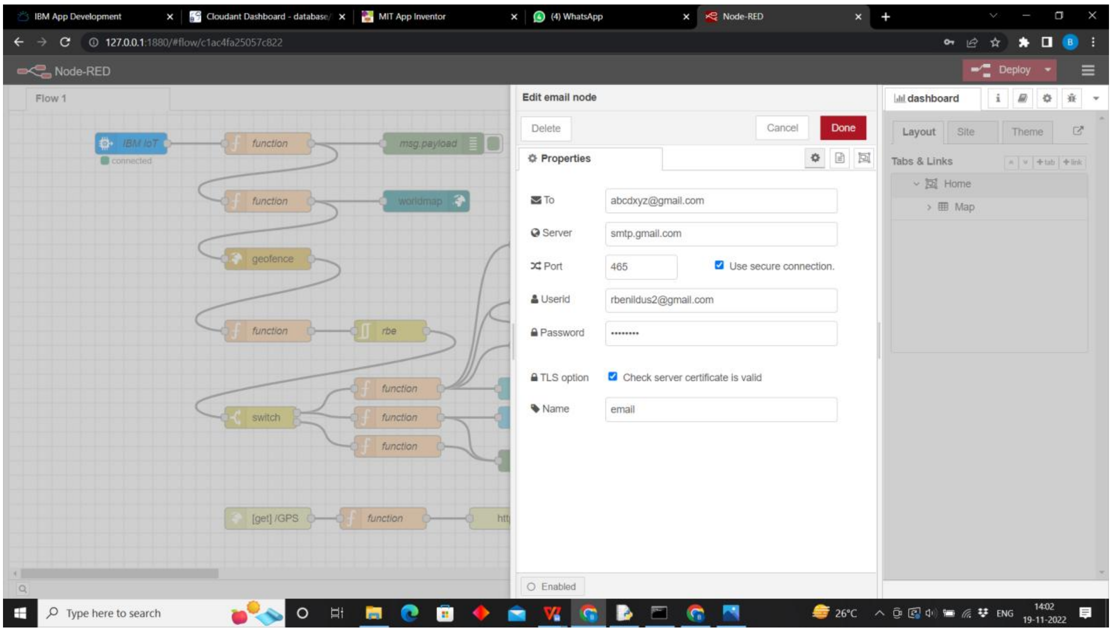
child is not inside



7.3 SPRINT 3

Setting up a Email notification:





Edit email node

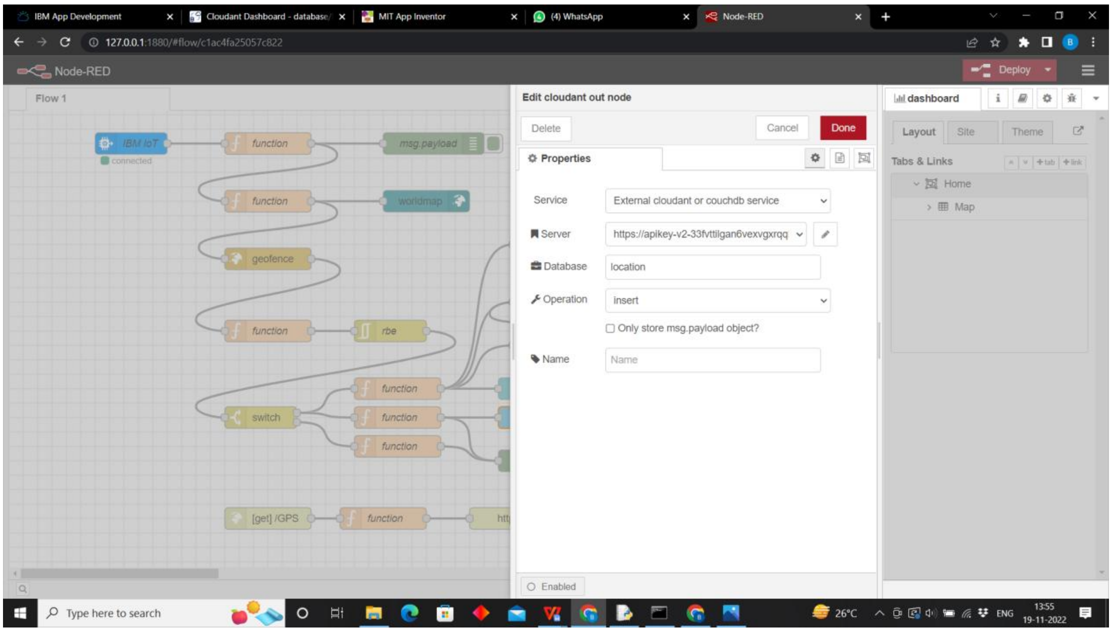
Delete Cancel Done

Properties

To	abcdxyz@gmail.com
Server	smtp.gmail.com
Port	465 ☑ Use secure connection.
Userid	rbenildus2@gmail.com
Password	••••••••
TLS option	☑ Check server certificate is valid
Name	email

○ Enabled

Connecting to the node red to IBM cloudant to store the time and location:



Edit cloudant out node

Service: External cloudant or couchdb service

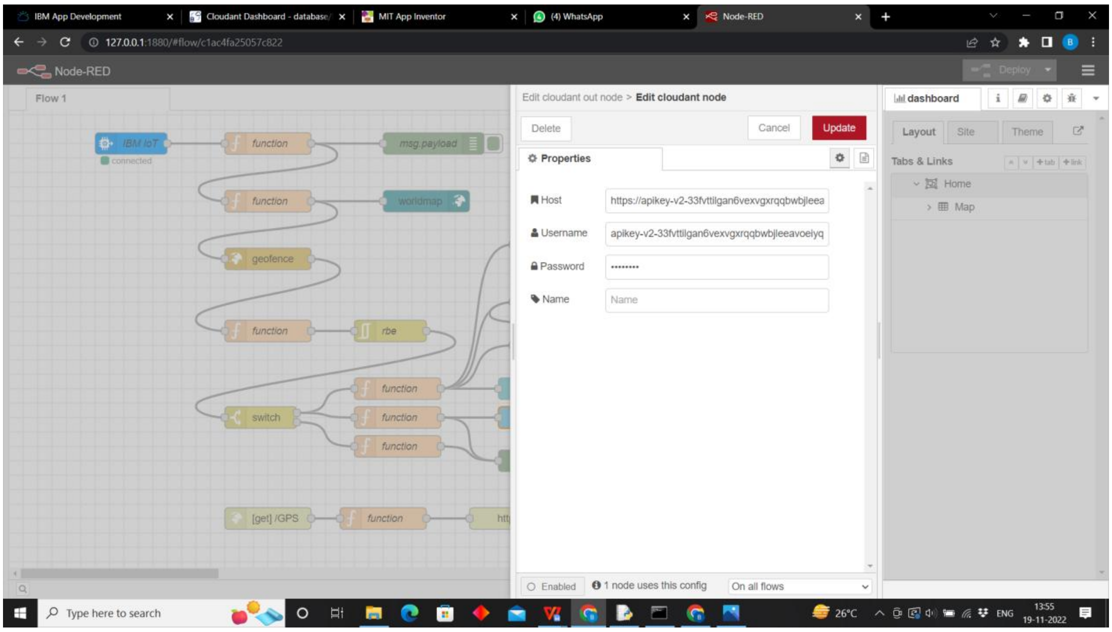
Server: https://apikey-v2-33fvttilgan6vexvgxrqq

Database: location

Operation: insert

□ Only store msg.payload object?

Name: Name



Edit cloudant out node > Edit cloudant node

Host: https://apikey-v2-33fvttilgan6vexvgxrqqbwbjleea

Username: apikey-v2-33fvttilgan6vexvgxrqqbwbjleeavoeiyq

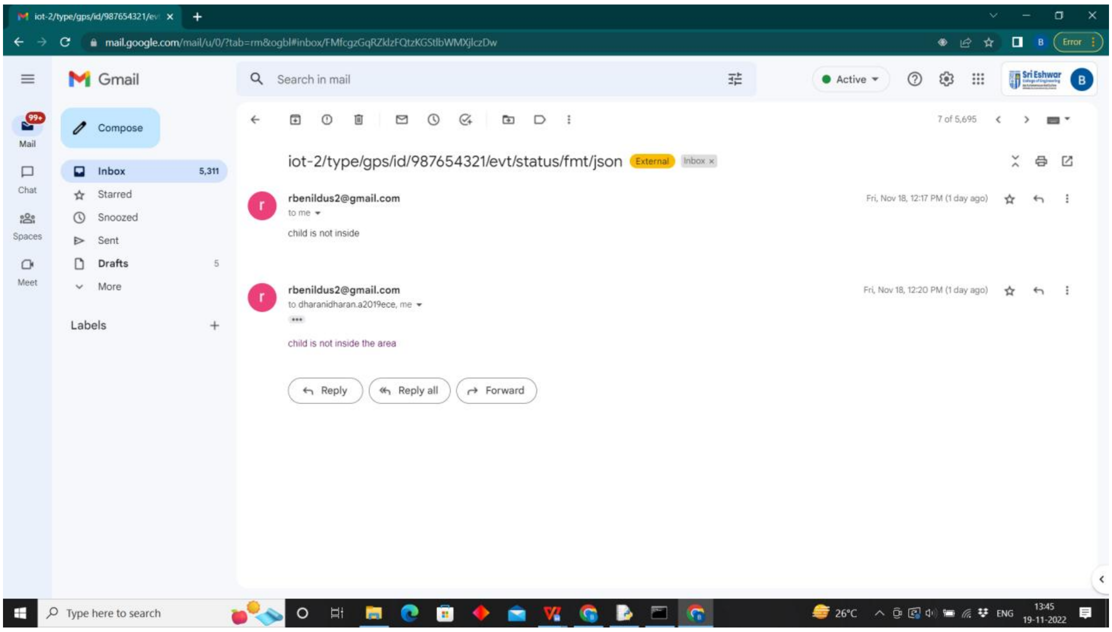
Password: ••••••••

Name: Name

1 node uses this config

On all flows

Notification is sent to email:



mail.google.com/mail/u/0/?tab=rm&ogbl#inbox/FMfcgzGqRZklzFQtzKGStlbWMXjlczDw

iot-2/type/gps/id/987654321/evt/status/fmt/json External Inbox ×

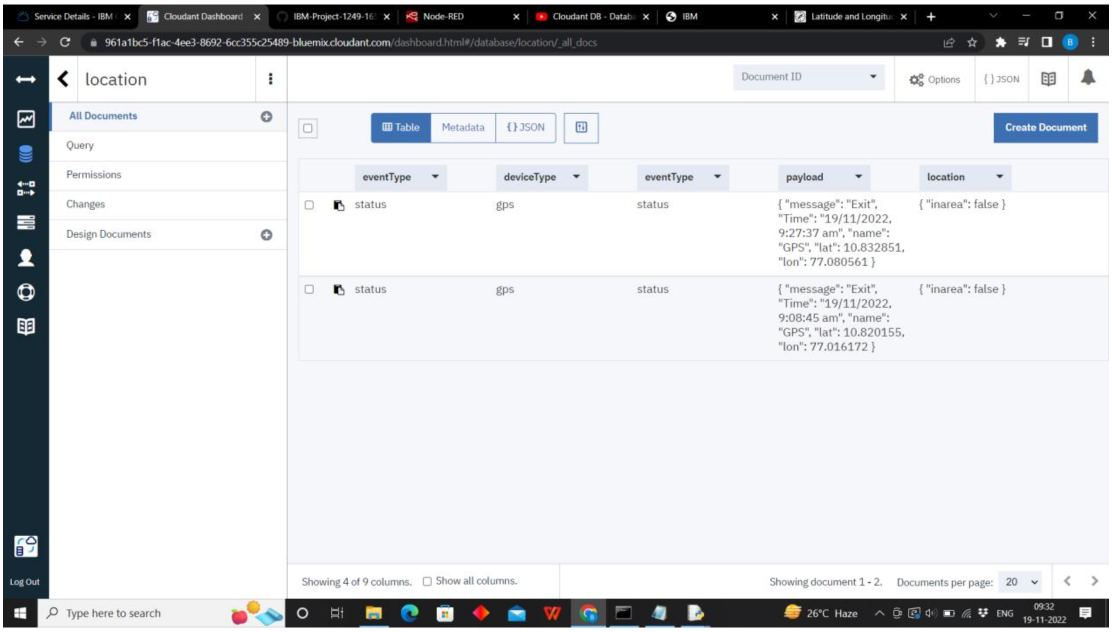
rbenildus2@gmail.com
to me
Fri, Nov 18, 12:17 PM (1 day ago)

child is not inside

rbenildus2@gmail.com
to dharanidharan.a2019ece, me
Fri, Nov 18, 12:20 PM (1 day ago)

child is not inside the area

Location and time is stored in the cloud:



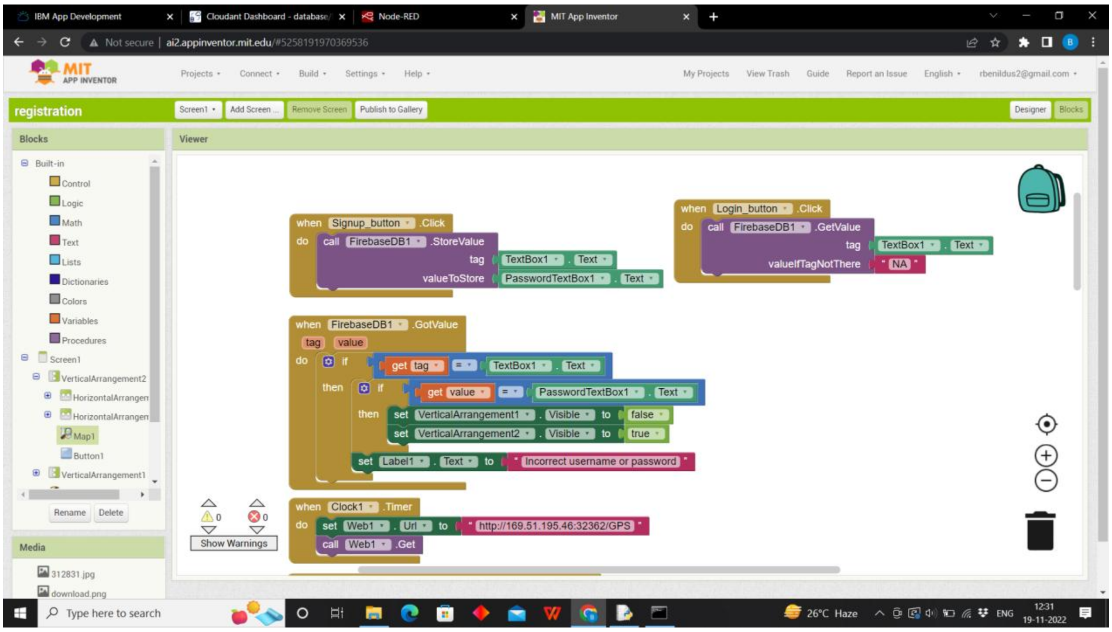
961a1bc5-f1ac-4ee3-8692-6cc355c25489-bluemix.cloudant.com/dashboard.html#/database/location/_all_docs

eventType	deviceType	eventType	payload	location
status	gps	status	{ "message": "Exit", "Time": "19/11/2022, 9:27:37 am", "name": "GPS", "lat": 10.832851, "lon": 77.080561 }	{ "inarea": false }
status	gps	status	{ "message": "Exit", "Time": "19/11/2022, 9:08:45 am", "name": "GPS", "lat": 10.820155, "lon": 77.016172 }	{ "inarea": false }

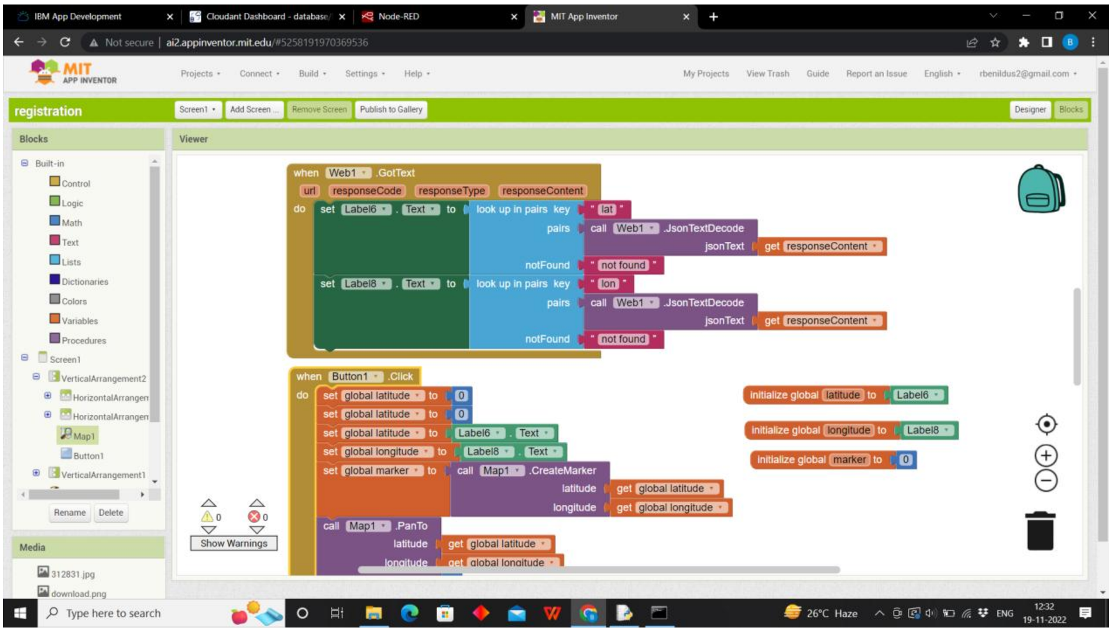
Showing 4 of 9 columns. □ Show all columns. Showing document 1 - 2. Documents per page: 20

7.4 SPRINT 4:

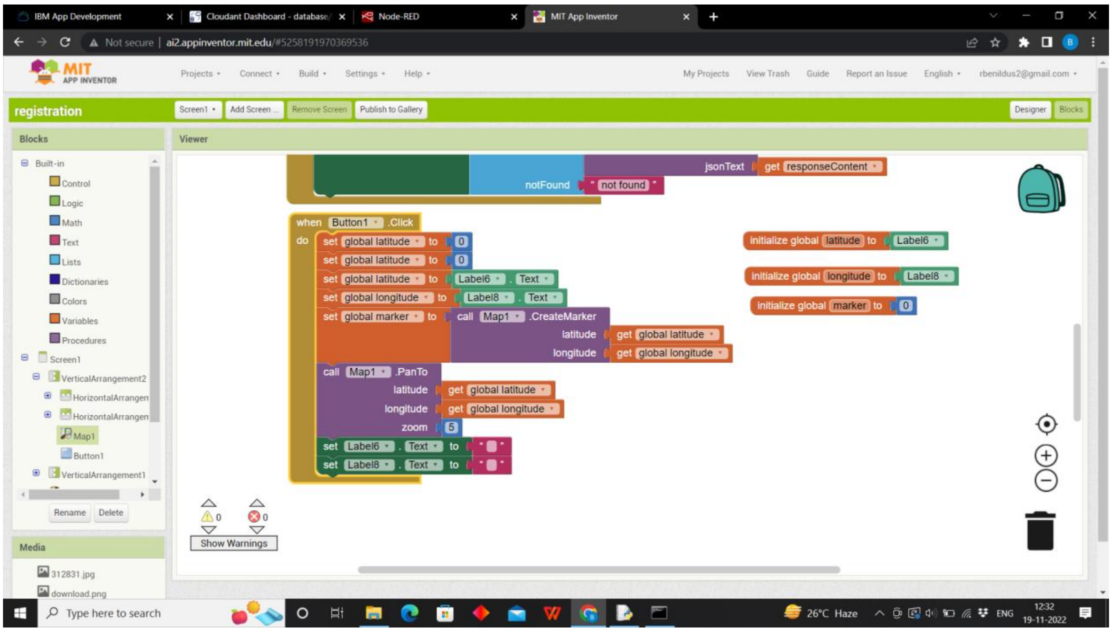
Code in MIT app inventor:



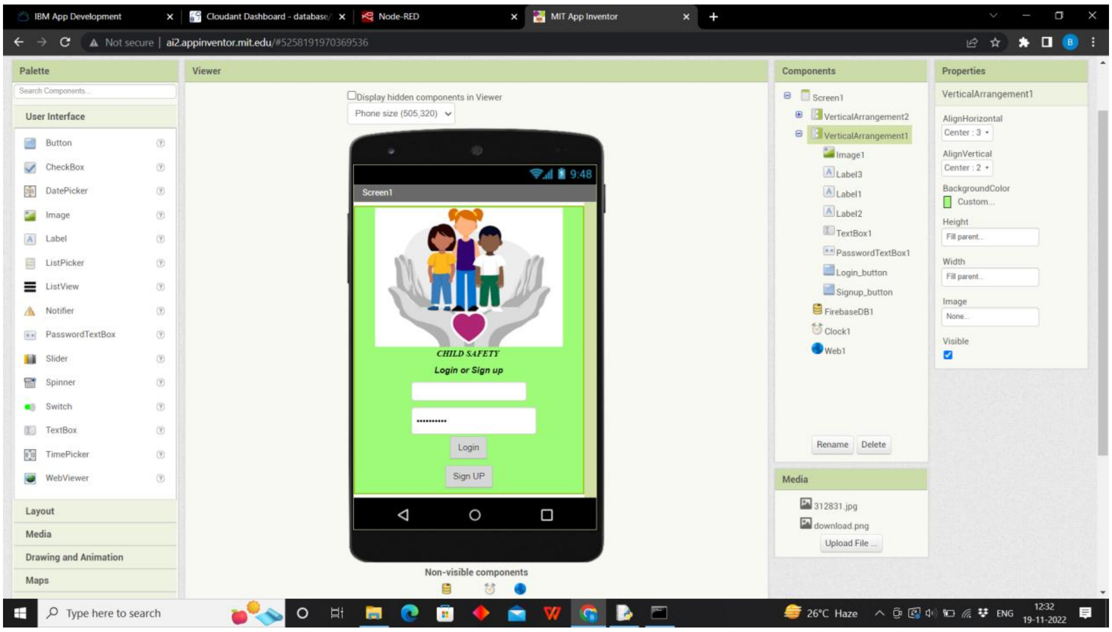
```
when Signup_button.Click
do  call FirebaseDB1.StoreValue
         tag          TextBox1.Text
         valueToStore PasswordTextBox1.Text

when Login_button.Click
do  call FirebaseDB1.GetValue
         tag               TextBox1.Text
         valueIfTagNotThere " NA "

when FirebaseDB1.GotValue
  tag  value
do  if get tag = TextBox1.Text
    then  if get value = PasswordTextBox1.Text
          then  set VerticalArrangement1.Visible to false
                set VerticalArrangement2.Visible to true
          set Label1.Text to " Incorrect username or password "

when Clock1.Timer
do  set Web1.Url to " http://169.51.195.46:32362/GPS "
    call Web1.Get
```

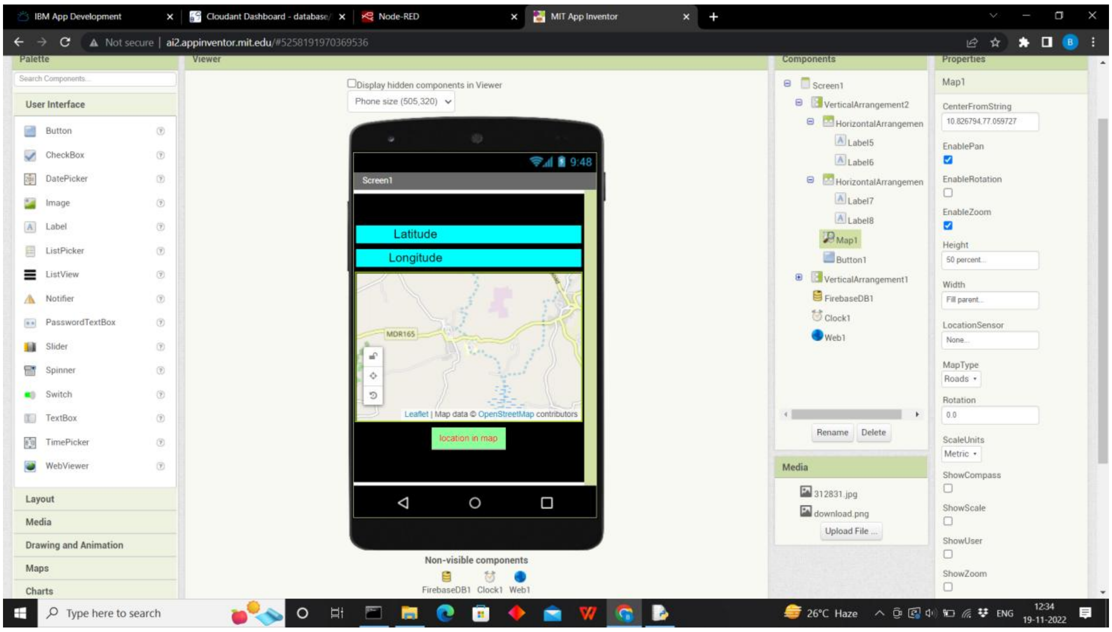


```
when Web1.GotText
  url  responseCode  responseType  responseContent
do  set Label6.Text to  look up in pairs  key  " lat "
                                          pairs  call Web1.JsonTextDecode
                                                      jsonText  get responseContent
                                          notFound  " not found "
    set Label8.Text to  look up in pairs  key  " lon "
                                          pairs  call Web1.JsonTextDecode
                                                      jsonText  get responseContent
                                          notFound  " not found "

when Button1.Click
do  set global latitude to 0
    set global latitude to 0
    set global latitude to Label6.Text
    set global longitude to Label8.Text
    set global marker to  call Map1.CreateMarker
                               latitude   get global latitude
                               longitude  get global longitude
    call Map1.PanTo
         latitude   get global latitude
         longitude  get global longitude

initialize global latitude to Label6

initialize global longitude to Label8

initialize global marker to 0
```



```
jsonText  get responseContent
notFound  " not found "

when Button1 .Click
do  set global latitude to 0
    set global latitude to 0
    set global latitude to Label6 . Text
    set global longitude to Label8 . Text
    set global marker to call Map1 .CreateMarker
                              latitude  get global latitude
                              longitude get global longitude
    call Map1 .PanTo
              latitude  get global latitude
              longitude get global longitude
              zoom 5
    set Label6 . Text to " "
    set Label8 . Text to " "

initialize global latitude to Label6
initialize global longitude to Label8
initialize global marker to 0
```





CenterFromString: 10.826794,77.059727

EnablePan ☑

EnableRotation ☐

EnableZoom ☑

Height: 50 percent...

Width: Fill parent...

LocationSensor: None...

MapType: Roads

Rotation: 0.0

ScaleUnits: Metric

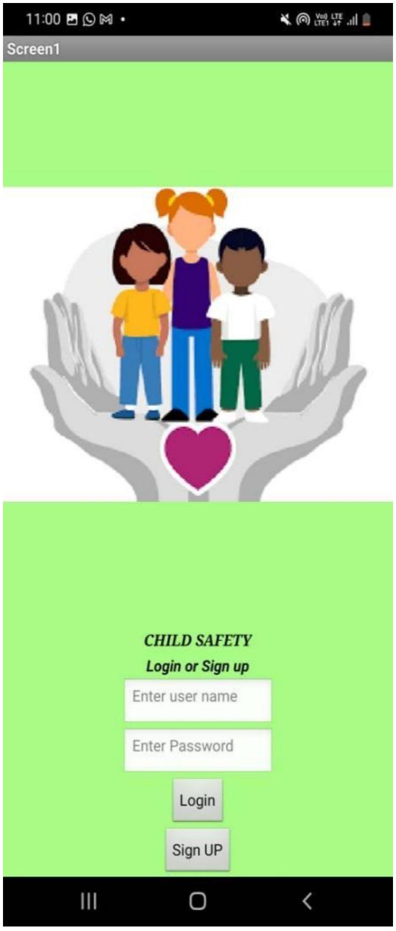
ShowCompass ☐

ShowScale ☐

ShowUser ☐

ShowZoom ☐

Mobile Application:

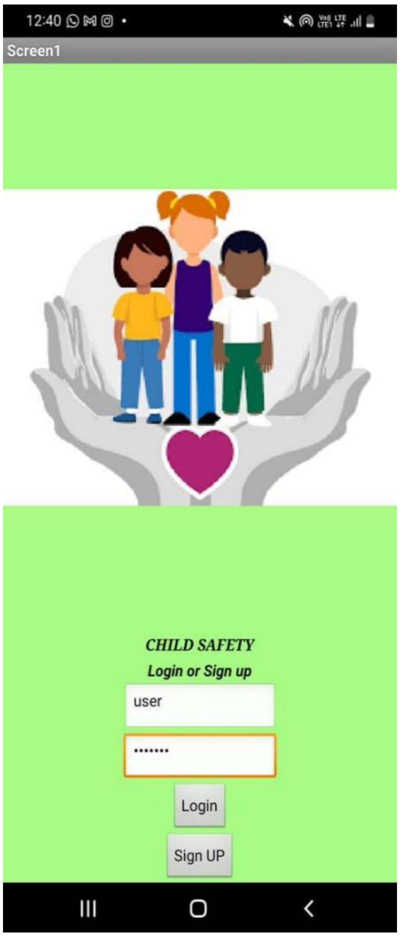


CHILD SAFETY

Login or Sign up

Enter user name

Enter Password



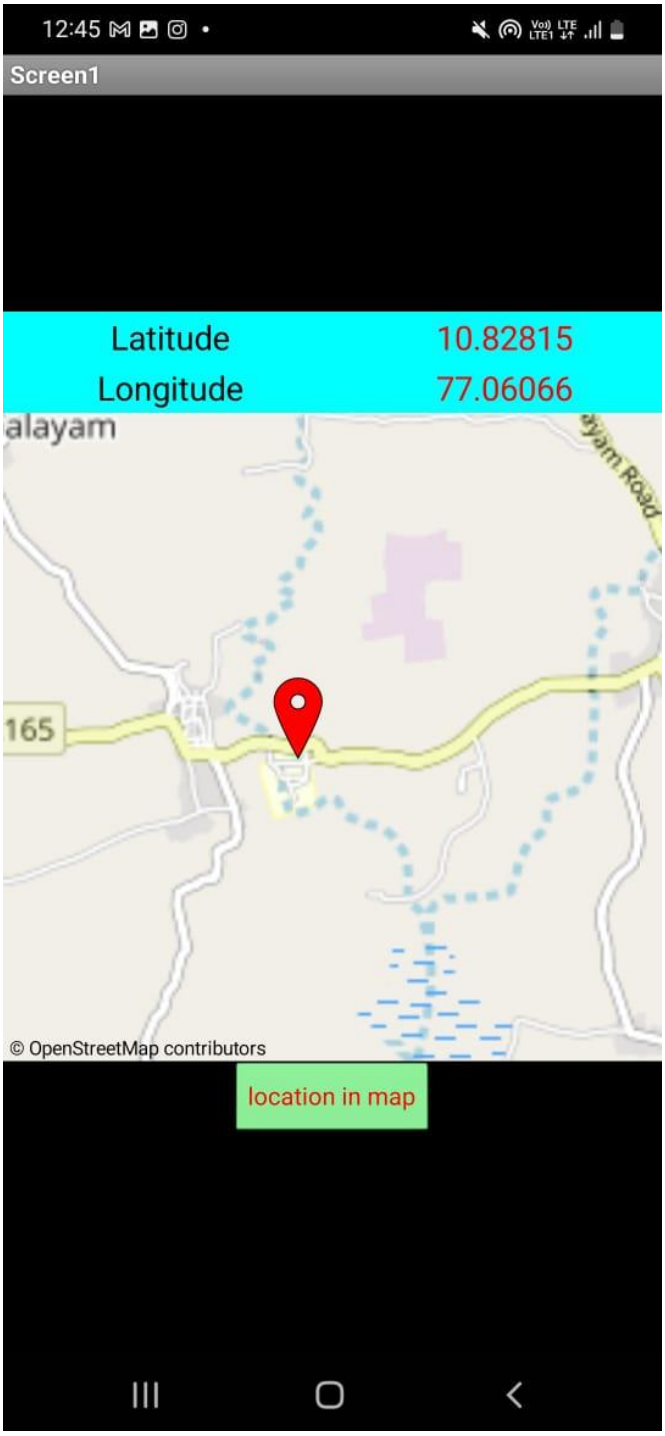
CHILD SAFETY

Login or Sign up

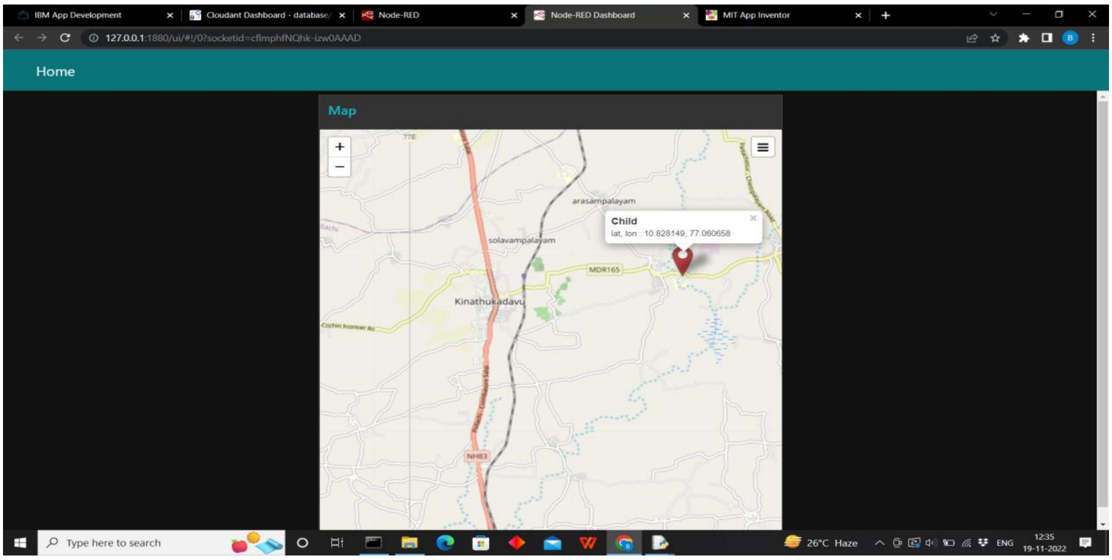
user

•••••••

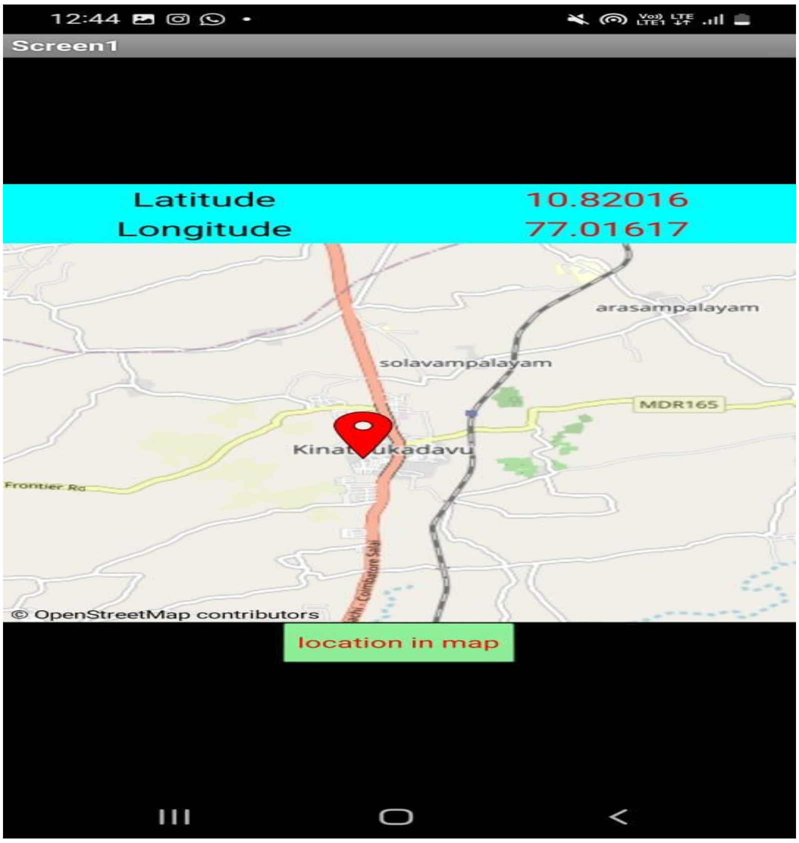
Location:



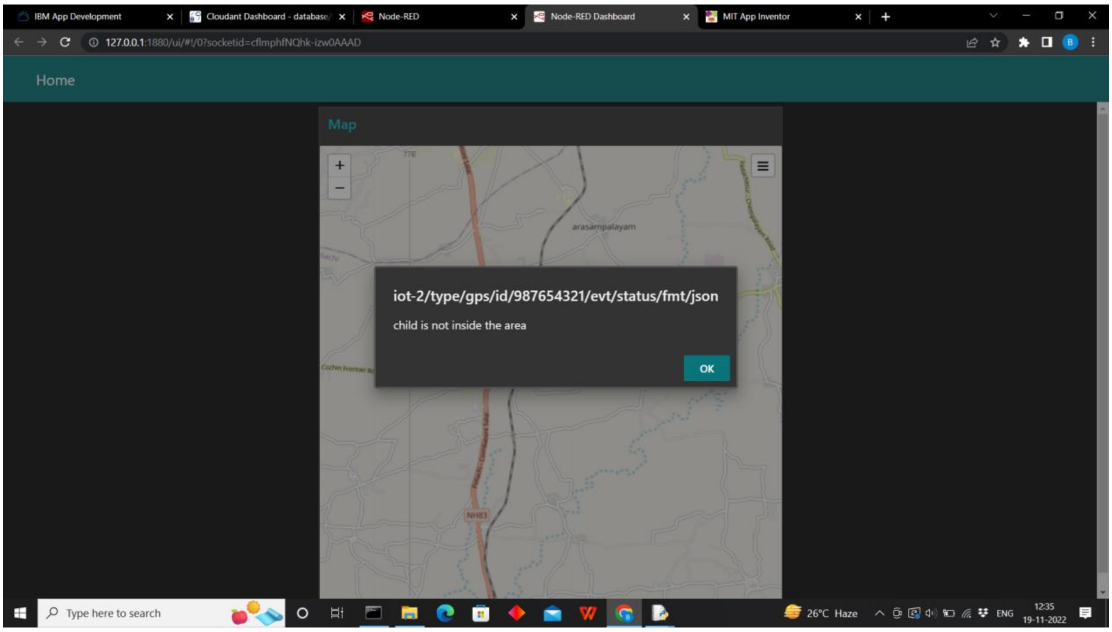
Latitude	10.82815
Longitude	77.06066



Child
lat, lon : 10.828149, 77.060658



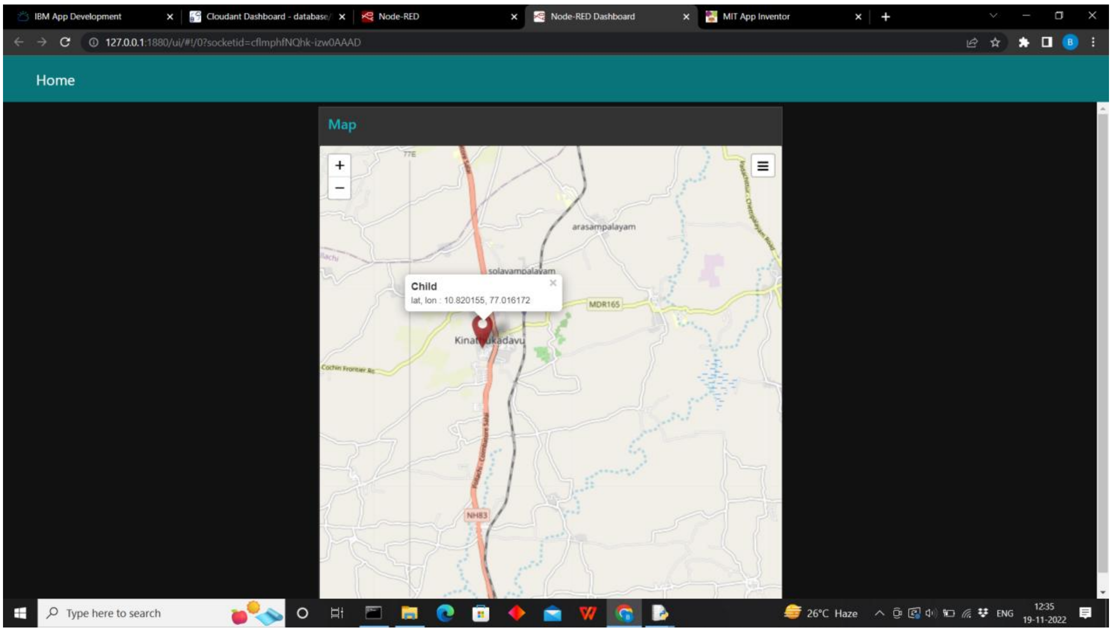
Latitude 10.82016
Longitude 77.01617



iot-2/type/gps/id/987654321/evt/status/fmt/json

child is not inside the area

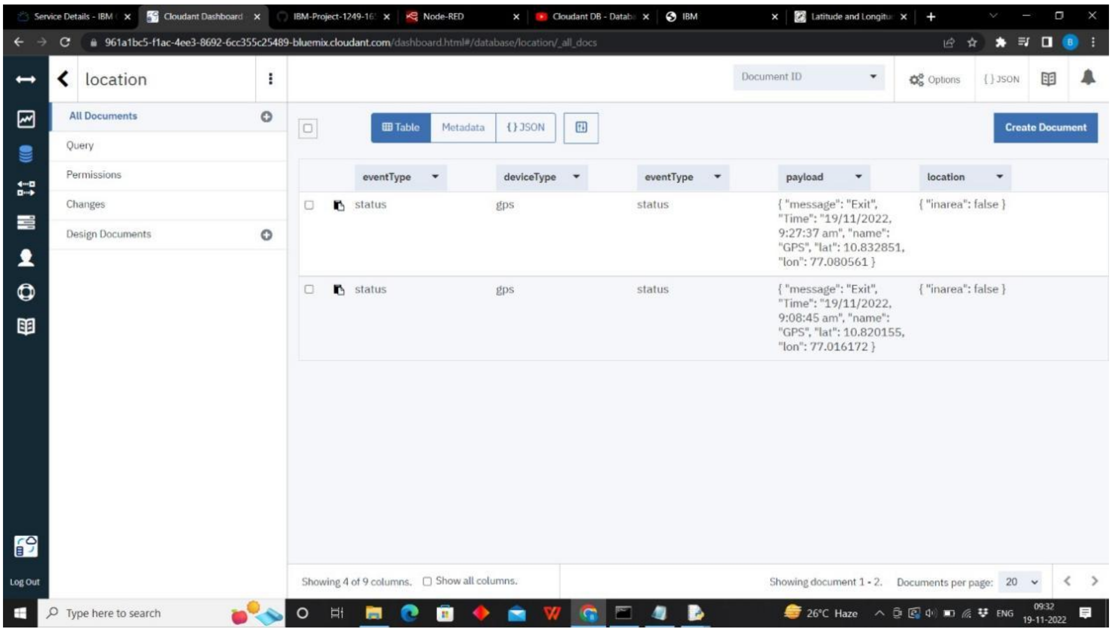
OK



Child

lat, lon : 10.820155, 77.016172

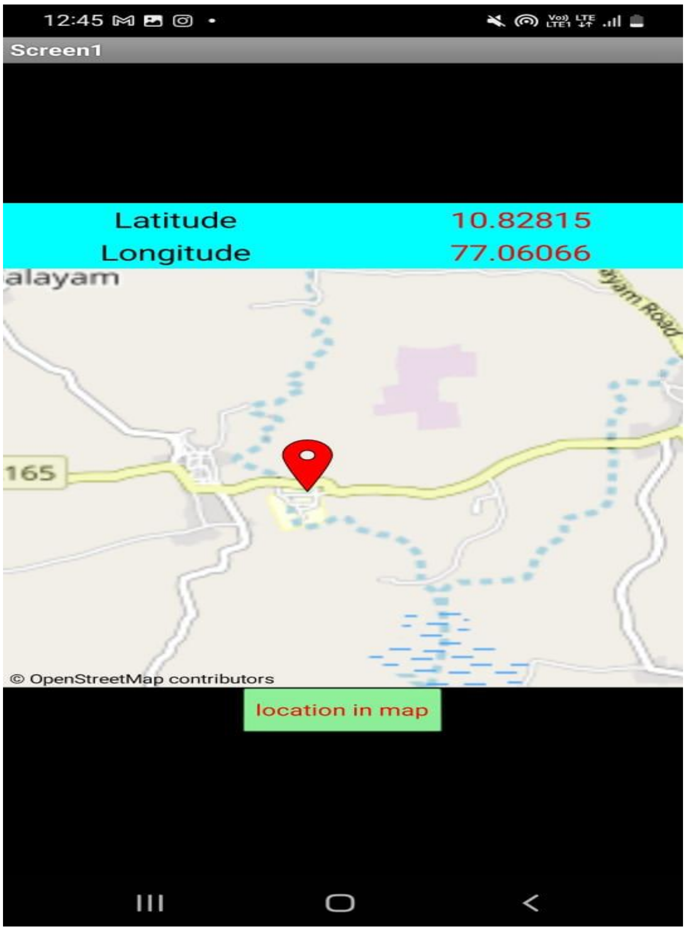
8.TESTING



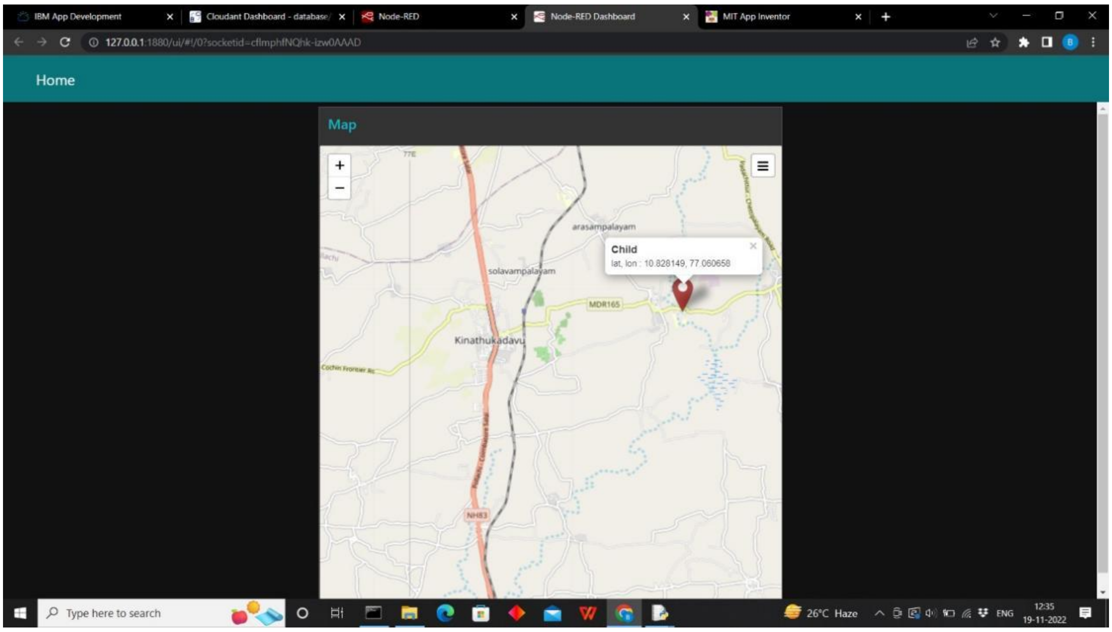
eventType	deviceType	eventType	payload	location
status	gps	status	{ "message": "Exit", "Time": "19/11/2022, 9:27:37 am", "name": "GPS", "lat": 10.832851, "lon": 77.080561 }	{ "inarea": false }
status	gps	status	{ "message": "Exit", "Time": "19/11/2022, 9:08:45 am", "name": "GPS", "lat": 10.820155, "lon": 77.016172 }	{ "inarea": false }

9. RESULT

Test 1-Result

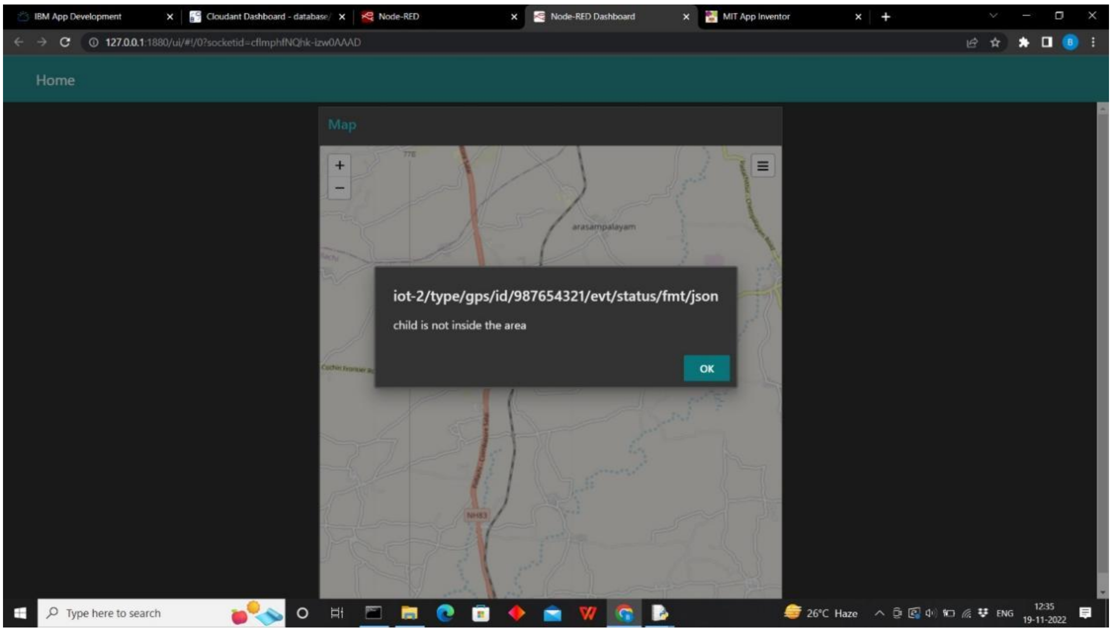


Latitude	10.82815
Longitude	77.06066



Child
lat, lon : 10.828149, 77.060658

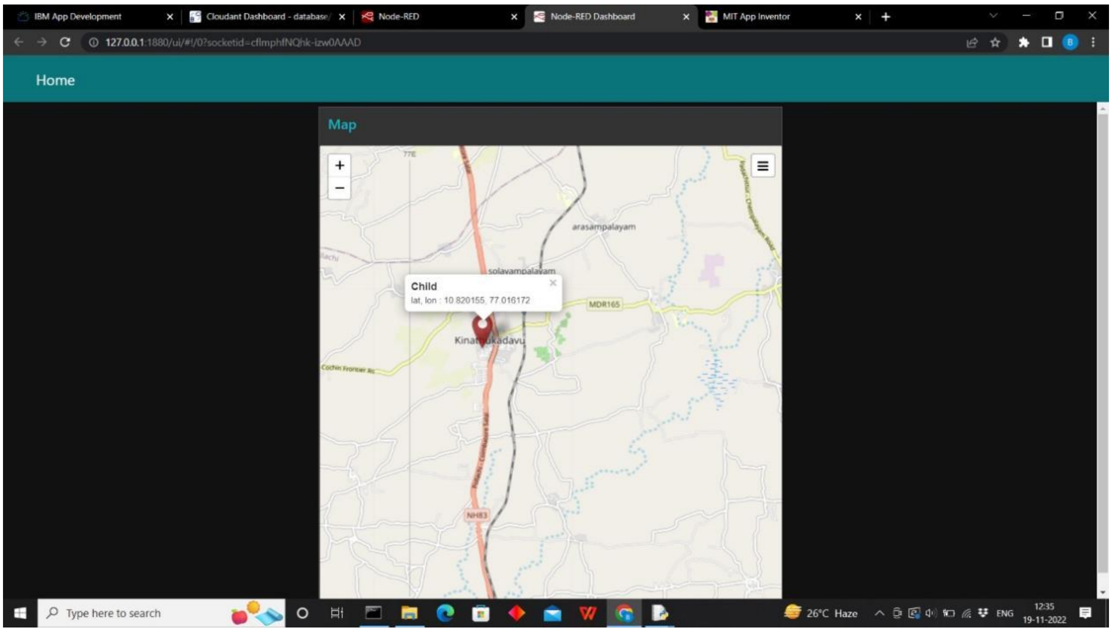
Test 2-Result



iot-2/type/gps/id/987654321/evt/status/fmt/json

child is not inside the area

OK



Child
lat, lon : 10.820155, 77.016172

10 . ADVANTAGES AND DISADVANTAGES

10.1 ADVANTAGES

- Monitoring your child's location as they travel to and from school
- Tracking children with special needs
- Knowing where your child is while they play outside
- Keeping track of them on vacations or trips
- Peace of mind when they are in someone else's care
- Reducing the risk of abductions
- Contingency in case of emergency

10.2 DISADVANTAGES

Poor Signal & Battery Life Concerns. There is nothing theoretical about the harm that results from the misuse of location data. Databases of our movements can disrupt lives in terrible ways if the information is misused or winds up in the wrong hands – which it inevitably will, no matter how well-intentioned

11. CONCLUSION

Parent, especially who live in urban area, needed to work day and night to sustain the family which causes them cannot know where their child is going during the working hour. However, with the child tracking app, parent can track and monitor their child with just a simple app. The parent is not possible to always stay beside of children as most of the parents needs to go for work. By having this child tracking system, parents can track the location of their children. In order to avoid the kidnapping cases, the child tracking system is needed.

12. FUTURE SCOPE

This Child Tracking Device can be used to obtain the real time location of the child by parents. The location can be send to desired number of users. The alarm can indicate the discomfort of the child and the persons near them can help the child. This device uses SMS based technology so the parents are able to use it more efficiently. In future this device can be improved in battery life time. The camera can also be attached so that the accurate environment where the child lies can be monitored by the parents.

13.APPENDIX

Source Code

```
import json
import wiotp.sdk.device
import time
import random
 myConfig={
   "identity":{
      "orgId":"hi70w8",
      "typeId":"gps",
      "deviceId":"987654321"
   },
   "auth":{
      "token":"24688462"
   }
}
client=wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=No
ne)
client.connect()
```

```
 while True:
name="Child"
                    test_list    =    [[10.820155,    77.016172],[10.832851,
77.080561],[10.826579, 77.059943],[10.828149,77.060658]]
   random_num = random.choice(test_list)
   #outside
   #latitude=10.820155
   #longitude=77.016172

   #latitude=10.832851
   #longitude=77.080561

   #inside
   #latitude=10.826579
   #longitude=77.059943

   #latitude=10.828149
   #longitude=77.060658

   latitude=random_num[0]
   longitude=random_num[1]
   myData={'name':name,'lat':latitude,'lon':longitude}
client.publishEvent(eventId="status",msgFormat="json",data=myData,qo
   s=0,onPublish=None)
   print("Data published to IBM platform:",myData)
   time.sleep(10)

client.disconnect()
```

GitHub & Project Demo Link

https://github.com/IBM-EPBL/IBM-Project-4409-1658731560

https://drive.google.com/folderview?id=1Iy8-aMIVdOD6_Ut52COzQuP5px_Xwvqj