CoviCare EXECUTION GUIDE

CONTENTS

Introduction

The covid pandemic has completely changed our outlook towards everything. Post covid, there is going to be massive changes in the work culture of people. Bringing a change in the way people work is the absolute need of the hour. Companies cannot afford to overlook the health conditions of their employees. They also have to ensure that their employees practice social distancing. Even if one employee in the company is infected, it can easily spread to others. This implies that workplaces can turn out to be potential hotspots if things are left unchecked. Hence,**Social distancing and constant health monitoring is required in workplaces where thousands work.**

Our idea is to implement a lost cost solution that can bring about social distancing and can track the health of the employees at the same time but not at the cost of their valuable time. It ensures a normal working environment with a minimal change.

- Node MCU
- IBM Cloud
- Ultrasonic Sensor HC-SR04
- Pulse Sensor
- MLX90614
- Nodered
- GPS Module NEO-6MV2
- RFID Tag
- Buzzer

Prerequisites

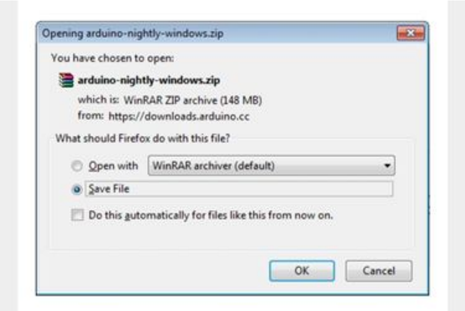
Software

- Arduino IDE

ARDUINO
Genuino
AN OPEN PROJECT WRITTEN, DEBUGGED, AND SUPPORTED BY ARDUINO.CC AND THE ARDUINO COMMUNITY WORLDWIDE
LEARN MORE ABOUT THE CONTRIBUTORS OF ARDUINO.CC on arduino.cc/credits

How to install Arduino IDE?

Step 1-Download the most suitable version from the Arduino official website. Unzip the file.



Opening arduino-nightly-windows.zip

You have chosen to open:

arduino-nightly-windows.zip

which is: WinRAR ZIP archive (148 MB)

from: https://downloads.arduino.cc

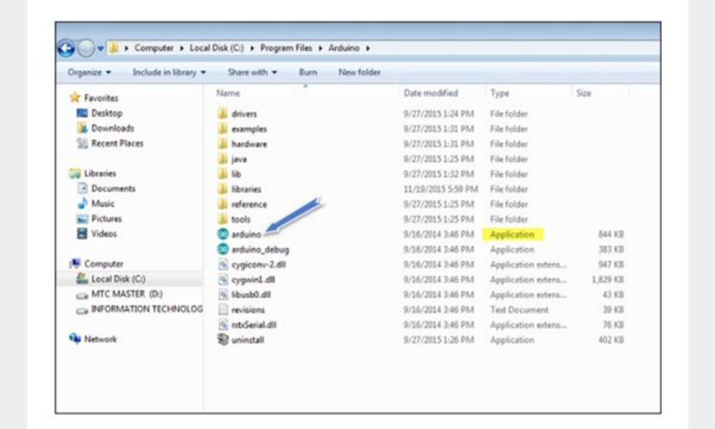
What should Firefox do with this file?

○ Open with WinRAR archiver (default)

● Save File

□ Do this automatically for files like this from now on.

Step 2: Power up your Nodemcu.Inside the unzipped folder you can find the application icon with infinity label.Double-click to start the IDE.

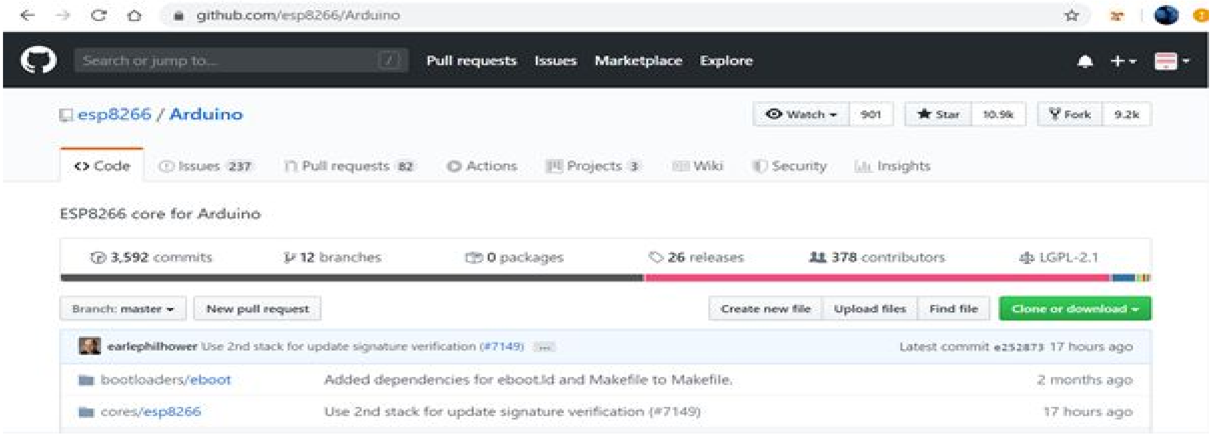


Name	Date modified	Type	Size
drivers	9/27/2015 1:24 PM	File folder	
examples	9/27/2015 1:31 PM	File folder	
hardware	9/27/2015 1:31 PM	File folder	
java	9/27/2015 1:25 PM	File folder	
lib	9/27/2015 1:32 PM	File folder	
libraries	11/19/2015 5:59 PM	File folder	
reference	9/27/2015 1:25 PM	File folder	
tools	9/27/2015 1:25 PM	File folder	
arduino	9/16/2014 3:46 PM	Application	844 KB
arduino_debug	9/16/2014 3:46 PM	Application	383 KB
cygiconv-2.dll	9/16/2014 3:46 PM	Application extens...	947 KB
cygwin1.dll	9/16/2014 3:46 PM	Application extens...	1,829 KB
libusb0.dll	9/16/2014 3:46 PM	Application extens...	43 KB
revisions	9/16/2014 3:46 PM	Text Document	39 KB
rxtxSerial.dll	9/16/2014 3:46 PM	Application extens...	76 KB
uninstall	9/27/2015 1:26 PM	Application	402 KB

ARDUINO 1.8.12 is installed.

- Library for NodeMCU

Link:"https://github.com/esp8266/Arduino"



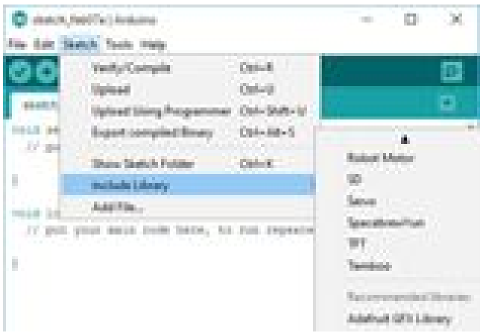
ESP8266 core for Arduino

3,592 commits · 12 branches · 0 packages · 26 releases · 378 contributors · LGPL-2.1

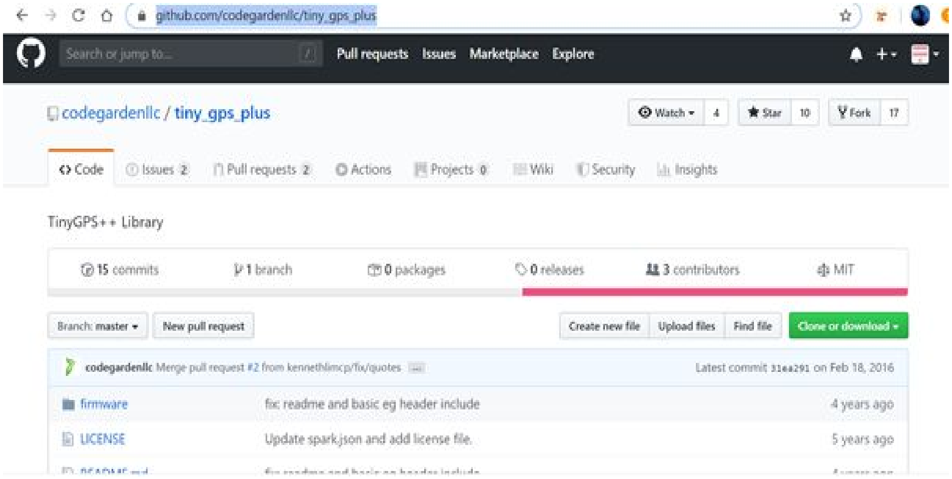
earlephilhower Use 2nd stack for update signature verification (#7149)		Latest commit e252873 17 hours ago
bootloaders/eboot	Added dependencies for eboot.ld and Makefile to Makefile.	2 months ago
cores/esp8266	Use 2nd stack for update signature verification (#7149)	17 hours ago

Library for NodeMCU is installed from the given link as shown above. This Library has to be used for implementing the features of the project.

To include the library:- Sketch->include library->Click on the required one or Add .ZIP library.



- Tinygps+ (for NEO 6M module) Library



TinyGPS++ Library

15 commits · 1 branch · 0 packages · 0 releases · 3 contributors · MIT

codegardenllc Merge pull request #2 from kennethlimcp/fix/quotes		Latest commit 31ea291 on Feb 18, 2016
firmware	fix readme and basic eg header include	4 years ago
LICENSE	Update spark.json and add license file.	5 years ago

Install the Tinygps+ library from the link https://github.com/codegardenllc/tiny_gps_plus to include the library used to implement the gps tracking feature which would help determine the location of the worker.

Arduino Environment

In tools menu set the following:

- Board : NodeMCU 1.0 (ESP-12E Module)
- Upload Speed : 115200
- CPU Frequency : 160 MHz
- Flash Size : 4M (1M SPIFFS)
- Debug Port : Disabled
- Debug Level : None
- IwIP Variant : v2 Lower Memory
- vTables: Flash
- Exceptions: Disabled
- Erase Flash : Only Sketch
- SSL Support : Basic SSL ciphers (lower ROM use)
- Port : *Connect the ESP8266 to your laptop using a MicroUSB cable and then select your port, depending on OS*

Once the environment is set up, choose the code file, compile it and then flash it to the board. We will also need a local WiFi network to connect nodemcu.

Also add the following lines to the arduino code.

```
// Add WiFi connection information

char ssid[] = " ";  // your network SSID (name)

char pass[] = "  ";  // your network password
```

Hardware

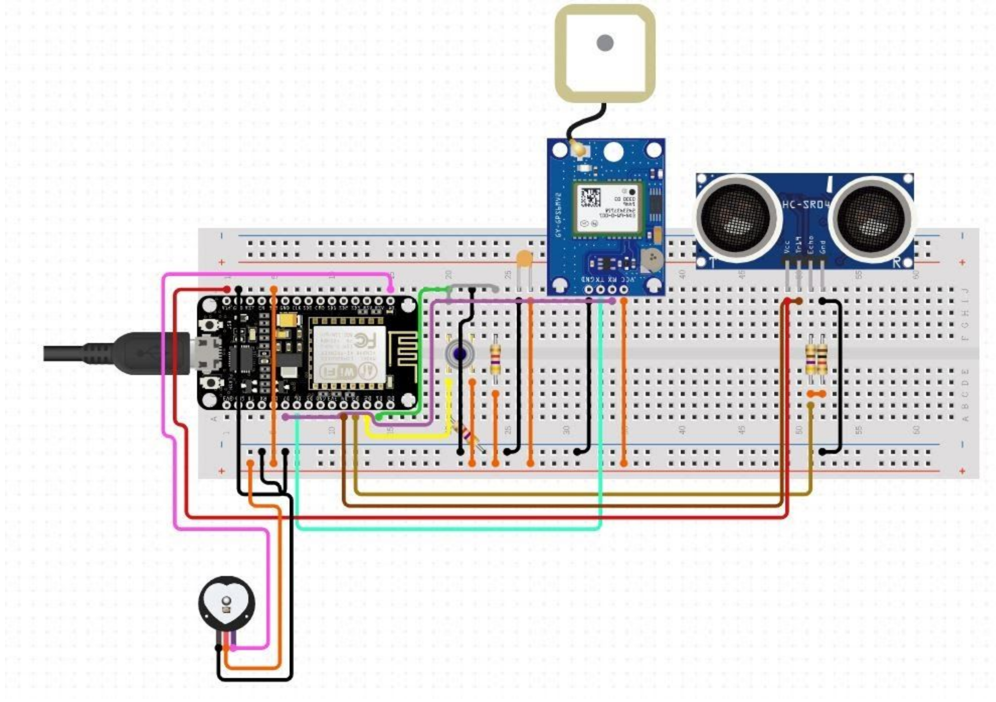
The hardware required is as follows:-

1. Nodemcu
2. RFID Tag
3. Ultrasonic sensor HC-SR04
4. Pulse Sensor
5. MLX90614
6. GPS

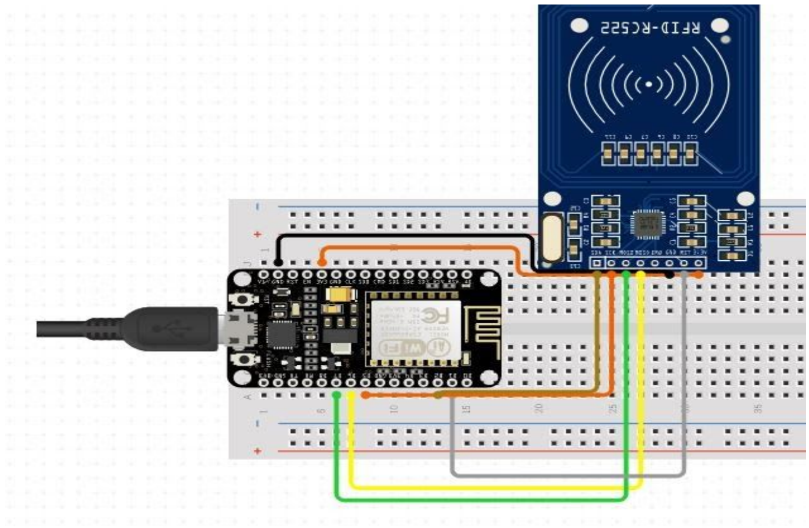
7. Push button
8. Jumper wires

HARDWARE SETUP

Circuit of module with user:



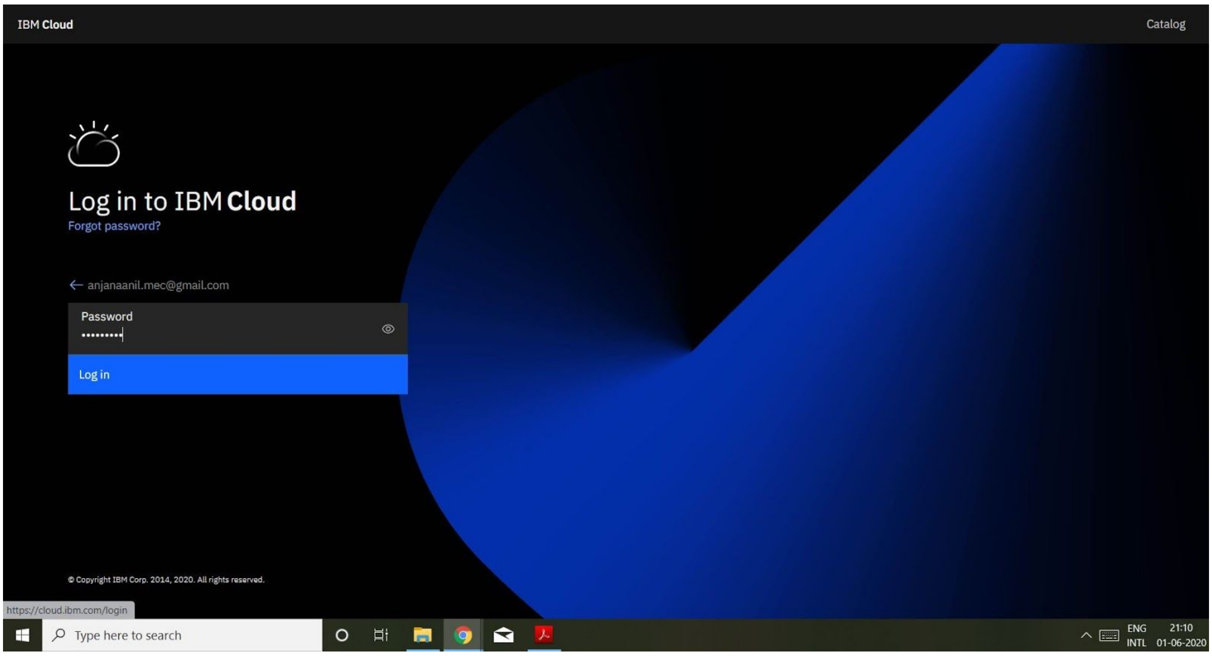
Scanner:



IBM ACCOUNT

Create IBM Account:

Go to IBM Platform to create an IBM account.



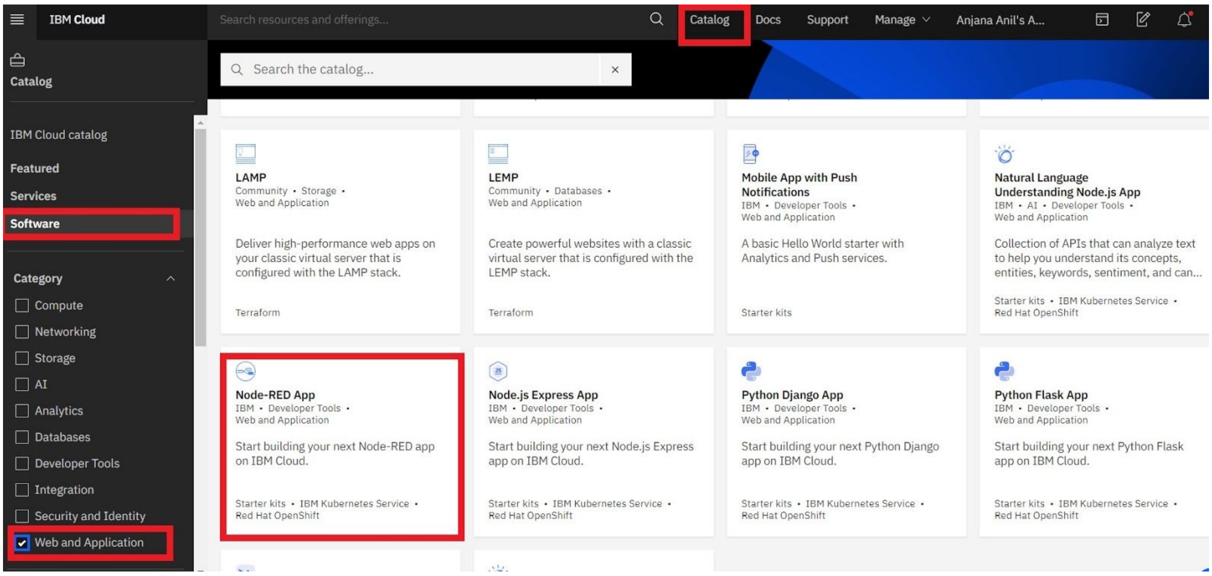
To create Node-Red Application

1.From Dashboard select catalog.

2.Select Software

3.Select Web and Application

4.Select Node-Red App



LAMP
Community • Storage • Web and Application
Deliver high-performance web apps on your classic virtual server that is configured with the LAMP stack.
Terraform

LEMP
Community • Databases • Web and Application
Create powerful websites with a classic virtual server that is configured with the LEMP stack.
Terraform

Mobile App with Push Notifications
IBM • Developer Tools • Web and Application
A basic Hello World starter with Analytics and Push services.
Starter kits

Natural Language Understanding Node.js App
IBM • AI • Developer Tools • Web and Application
Collection of APIs that can analyze text to help you understand its concepts, entities, keywords, sentiment, and can...
Starter kits • IBM Kubernetes Service • Red Hat OpenShift

Node-RED App
IBM • Developer Tools • Web and Application
Start building your next Node-RED app on IBM Cloud.
Starter kits • IBM Kubernetes Service • Red Hat OpenShift

Node.js Express App
IBM • Developer Tools • Web and Application
Start building your next Node.js Express app on IBM Cloud.
Starter kits • IBM Kubernetes Service • Red Hat OpenShift

Python Django App
IBM • Developer Tools • Web and Application
Start building your next Python Django app on IBM Cloud.
Starter kits • IBM Kubernetes Service • Red Hat OpenShift

Python Flask App
IBM • Developer Tools • Web and Application
Start building your next Python Flask app on IBM Cloud.
Starter kits • IBM Kubernetes Service • Red Hat OpenShift

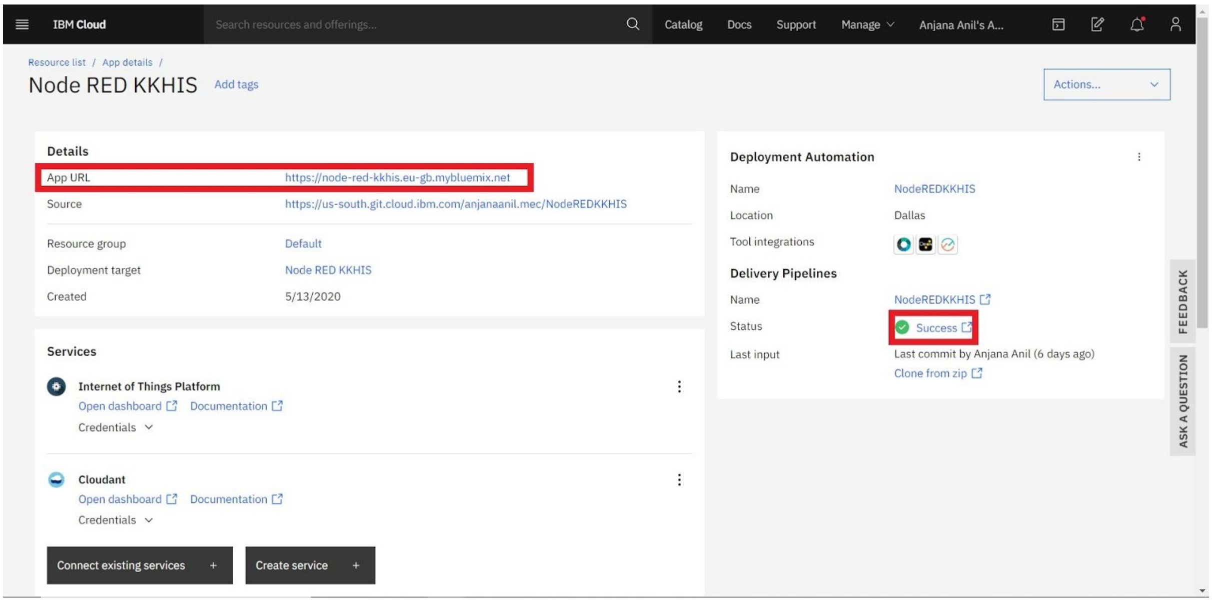
5.Keep all the values to default and continue with the App development.

- Wait until the Cloudant service has been deployed
- Press the Create Service + button, then select the Internet of Things section and press the Next button.
- Select the Internet of Things Platform then press the Next button
- Press Create to add the Internet of Things Platform to your application.
- Also generate the IBM cloud API key.

6.Once you select on click **Create app**, then proceed to click on **Deploy App.**

7.After deployment wait for the status to turn into **Success.**

8.App URL will appear after successful deployment . Click on the App URL



Node RED KKHIS

Details

App URL	https://node-red-kkhis.eu-gb.mybluemix.net
Source	https://us-south.git.cloud.ibm.com/anjanaanil.mec/NodeREDKKHIS
Resource group	Default
Deployment target	Node RED KKHIS
Created	5/13/2020

Services

Internet of Things Platform

Cloudant

Deployment Automation

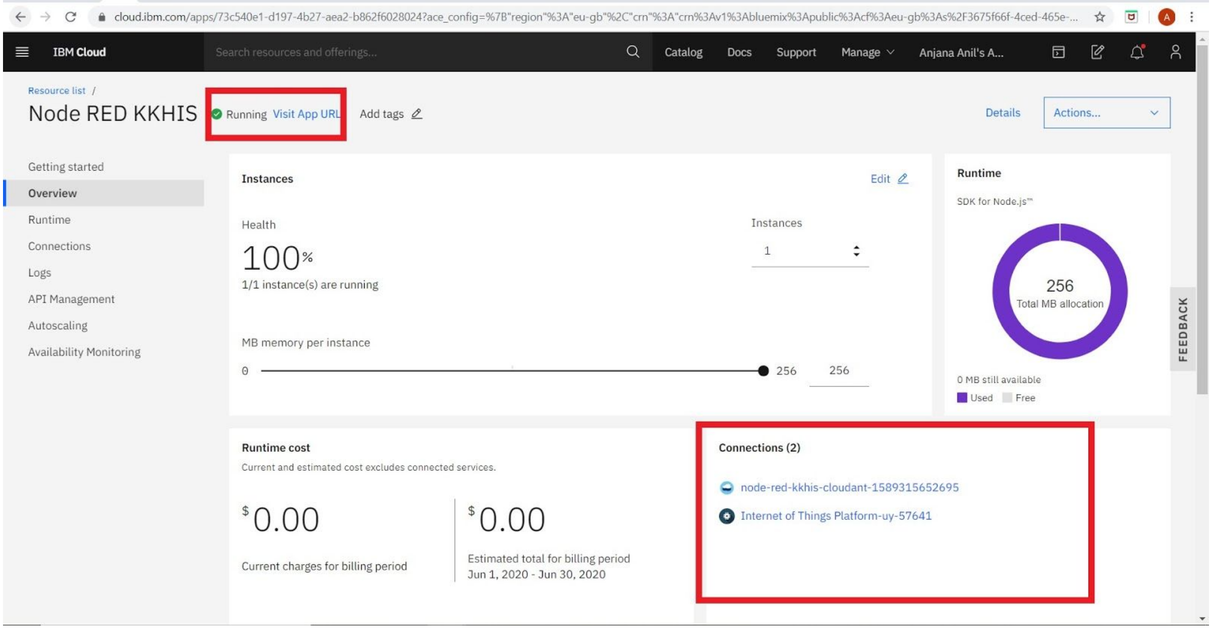
Name	NodeREDKKHIS
Location	Dallas
Tool integrations	

Delivery Pipelines

Name	NodeREDKKHIS
Status	Success
Last input	Last commit by Anjana Anil (6 days ago) Clone from zip

9.Add connections to the associated services clicking Connections --> Add Connections.

10.Click on Visit App URL in the Overview page.



cloud.ibm.com/apps/73c540e1-d197-4b27-aea2-b862f6028024?ace_config=%7B"region"%3A"eu-gb"%2C"crn"%3A"crn%3Av1%3Abluemix%3Apublic%3Acf%3Aeu-gb%3As%2F3675f66f-4ced-465e-...

Node RED KKHIS

Running Visit App URL Add tags

Instances

Health

100%

1/1 instance(s) are running

Instances: 1

MB memory per instance: 0 — 256, 256

Runtime

SDK for Node.js™

256 Total MB allocation

0 MB still available

■ Used □ Free

Runtime cost

Current and estimated cost excludes connected services.

$0.00 Current charges for billing period

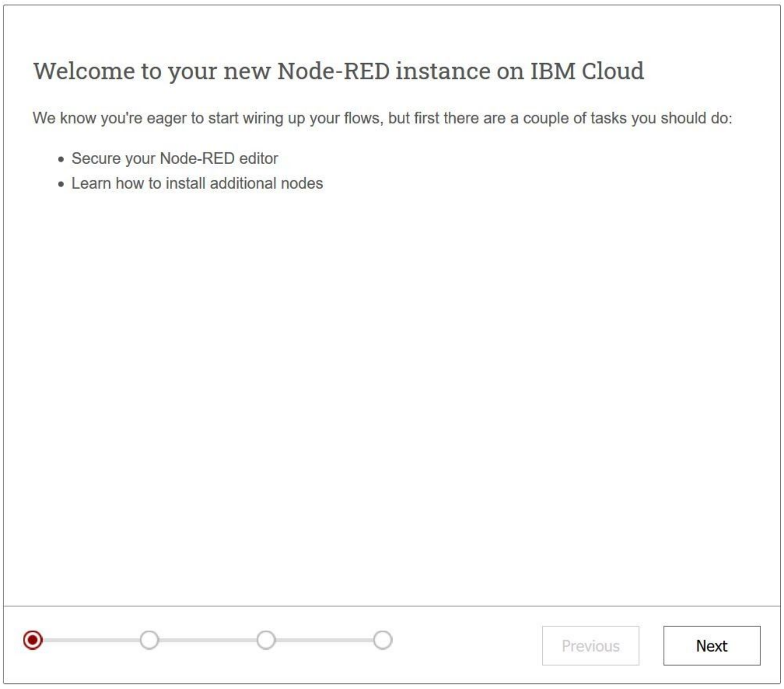
$0.00 Estimated total for billing period Jun 1, 2020 - Jun 30, 2020

Connections (2)

node-red-kkhis-cloudant-1589315652695

Internet of Things Platform-uy-57641

11.Setup the Node RED editor.

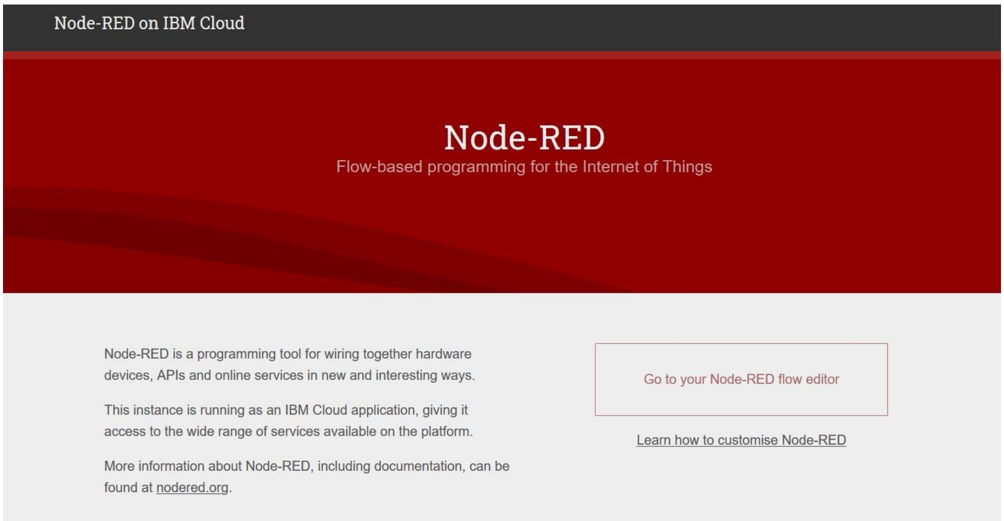


Welcome to your new Node-RED instance on IBM Cloud

We know you're eager to start wiring up your flows, but first there are a couple of tasks you should do:

- Secure your Node-RED editor
- Learn how to install additional nodes

12.Continue clicking on Next and click on Finish at the end to launch the Node RED editor.



Node-RED on IBM Cloud

Node-RED

Flow-based programming for the Internet of Things

Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

This instance is running as an IBM Cloud application, giving it access to the wide range of services available on the platform.

More information about Node-RED, including documentation, can be found at nodered.org.

Go to your Node-RED flow editor
Learn how to customise Node-RED

13.Click on Node-RED flow editor.

14. The Node-Red Editor window opens:

Before importing the flow following has to be installed:-

15.Install-

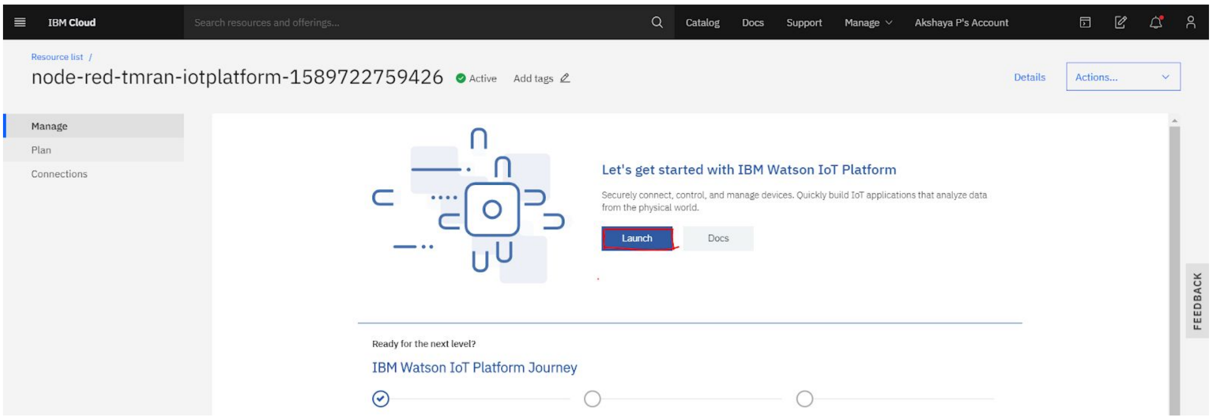
1. node-red-contrib-ibm-watson-iot
2. node-red-contrib-scx-ibmiotapp
3. node-red-dashboard
4. node-red-node-twilio
5. node-red-contrib-ibmpush

Incase it fails, add the following to package.json file

1. "node-red-contrib-ibm-watson-iot":"0.x",
2. "node-red-contrib-scx-ibmiotapp":"0.x",
3. "node-red-dashboard":"2.x",
4. "node-red-node-twilio":"0.x",
5. "node-red-contrib-ibmpush":"0.x",

Watson IoT Platform

Go to top menu ≡ -> Resource list->IoT Platform.



Let's get started with IBM Watson IoT Platform

Securely connect, control, and manage devices. Quickly build IoT applications that analyze data from the physical world.

Ready for the next level?

IBM Watson IoT Platform Journey

Launch the platform.

Press the + Add Device and create a Device id-”your_choice” and Device type-”esp8266”. Skip over and press next until the token is prompted. Give one of your choice and you will finally reach the device drilldown page.

Note down the Org-ID, Device Type, Device ID and Authentication Token.It cannot be retrieved once you leave the page.

MQTT

We use MQTT to send data to IoT platform.
Add the following code in the Arduino IDE:

```
#define MQTT_HOST "ORG_ID.messaging.internetofthings.ibmcloud.com"
#define MQTT_PORT 1883
#define MQTT_DEVICEID "d:ORG_ID:DEVICE_TYPE:DEVICE_ID"
#define MQTT_USER "use-token-auth"
#define MQTT_TOKEN " "//TOKEN THAT YOU ENTERED WHILE ADDING DEVICE IN IoT PLATFORM
#define MQTT_TOPIC "iot-2/evt/status/fmt/json"
#define MQTT_TOPIC_DISPLAY "iot-2/cmd/display/fmt/json"
```

In place of ORG_ID,DEVIE_ID,DEVICE_TYPE and TOKEN, add the data you stored from the device drilldown page.

Open Connection Security Policy. Press the pencil icon next to Connection Security to edit the settings. Change the Default Security Level to TLS Optional, accept the Warning message by pressing the Ok button, then Save the change.This will use unsecured connection.

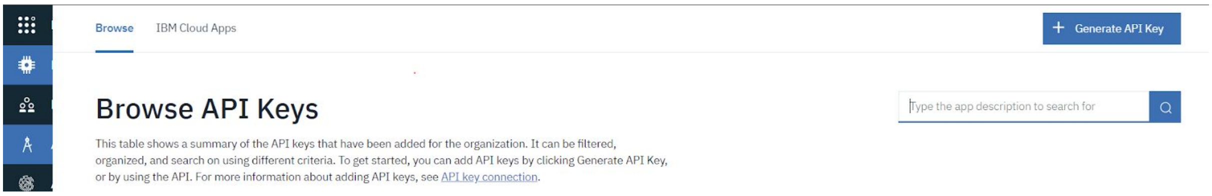
The rest of the mqtt code can be copied from the arduino code given.

On flashing the code, the data will be sent to the IoT platform.

Link to the code-”   “

Generating your own API Key

Go to IoT platform.Go to the App section and click generate API Key.
The API Key is used as the username when connecting and the API Token is the password.



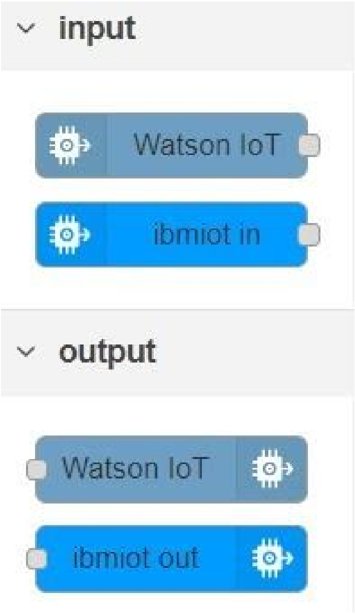
Browse API Keys

This table shows a summary of the API keys that have been added for the organization. It can be filtered, organized, and search on using different criteria. To get started, you can add API keys by clicking Generate API Key, or by using the API. For more information about adding API keys, see API key connection.

Setting up the nodes

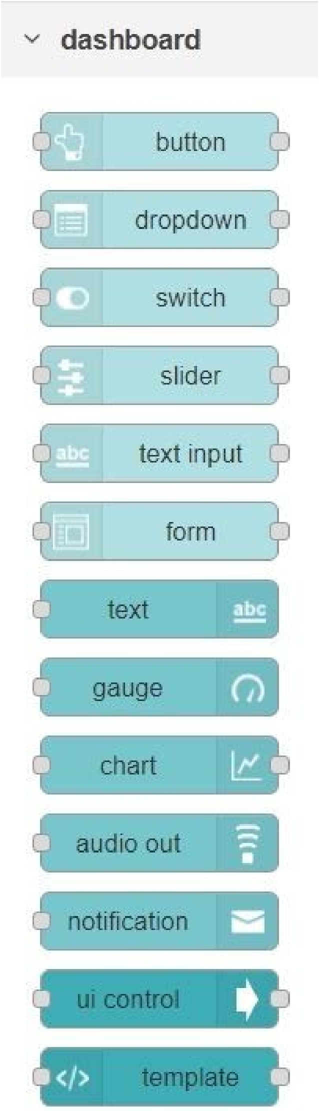
Following nodes are installed in Node-RED

- **Node-red-contrib-scx-ibmiotapp and Node-red-contrib-ibm-watson iot**



- **Node-red-dashboard**

The following nodes are installed in the Node-RED to provide widgets that show up in your application user interface (UI).

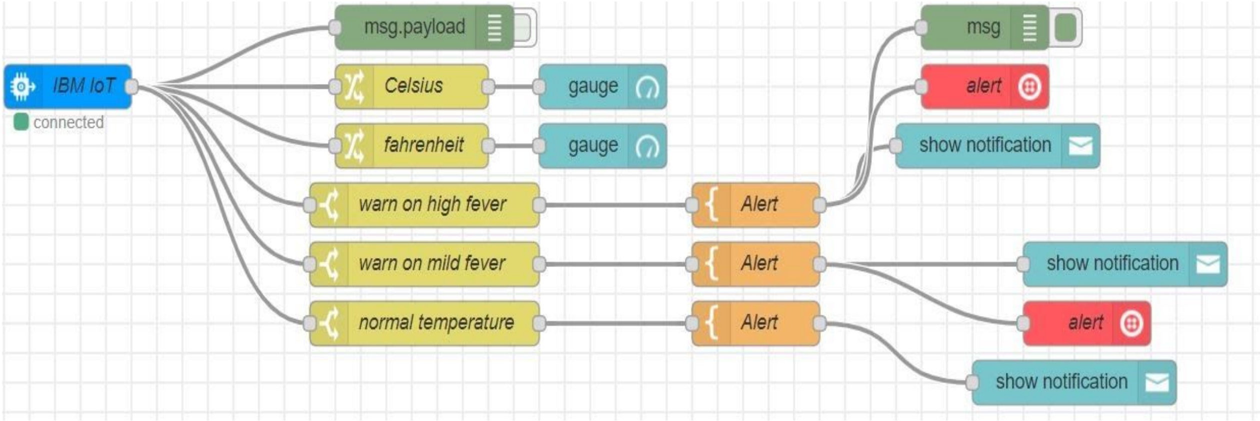


- **Node-red-node-twilio-**twilio

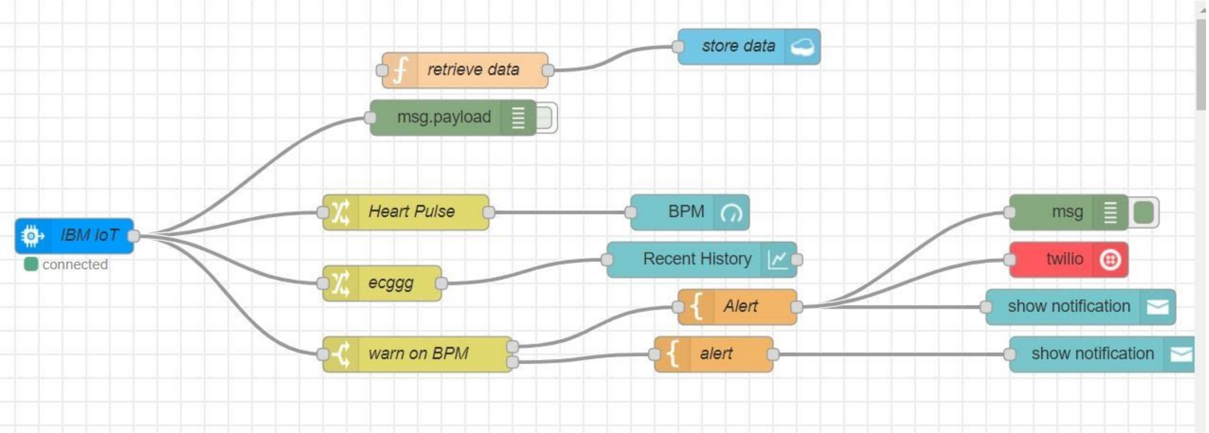
  Twilio APIs can add capabilities like voice, video, and messaging to applications.

FLOW OF NODE-RED

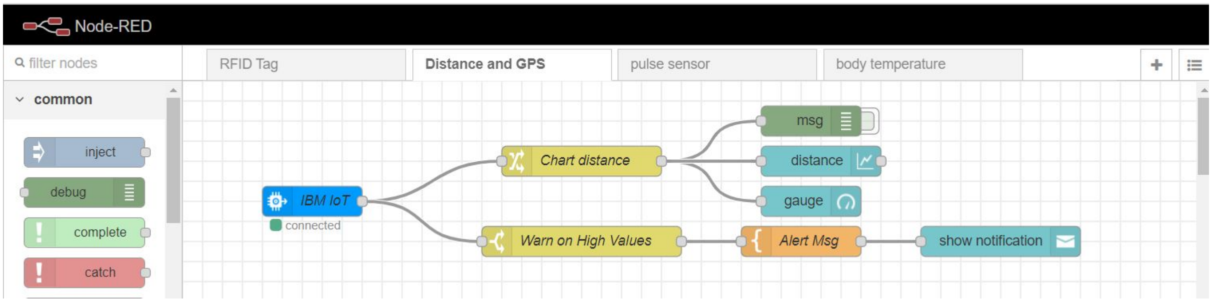
- **Body Temperature**



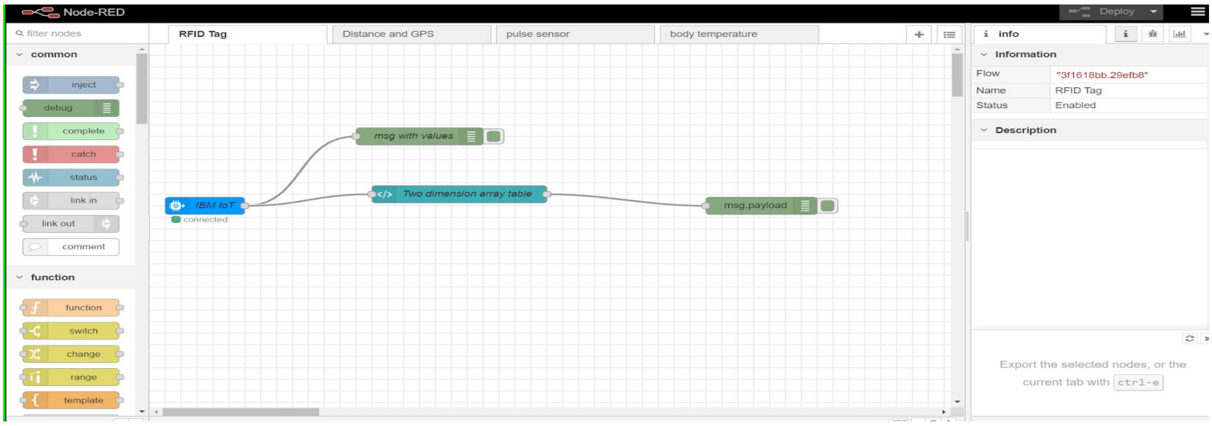
- **pulse sensor flow**



- **Obstacle detection**



- **RFID tag**

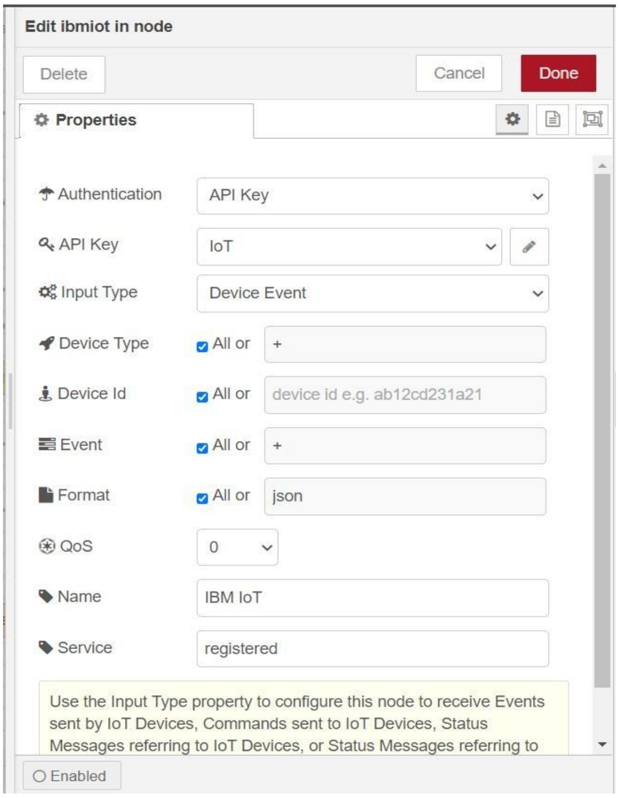


Flow "3f1618bb.29efb8"
Name RFID Tag
Status Enabled

Export the selected nodes, or the current tab with `ctrl-e`

IBM IoT input node

1. Drag an input > ibmiot in node from the palette on the left into the flow (the large blank area).
2. Double-click the new item.



Edit ibmiot in node

Authentication: API Key

API Key: IoT

Input Type: Device Event

Device Type: ☑ All or +

Device Id: ☑ All or device id e.g. ab12cd231a21

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

3. Specify these properties:
    - Authentication: API Key
    - API Key: Add new ibmiot
    - Input Type: Device Event
    - Device Type: All
    - Device Id: All
    - Event: All
    - Format: All
4. Click the pencil icon.
5. Create an IoT with these parameters:
    - Name: “your_choice”
    - API Key and API Token: The values you created for the API Key previously
    - Server-Name: The host name you used (six characters for your specific ID followed by .messaging.internetofthings.ibmcloud.com)
6. Click Add and then Done

Change Node

Change node allow you to change a message payload or add new properties. You can use this node to affect the properties in a message, either by changing existing ones, deleting them or adding new properties.

1. Drag and drop and change node
2. Double click and add properties based on the input to the node

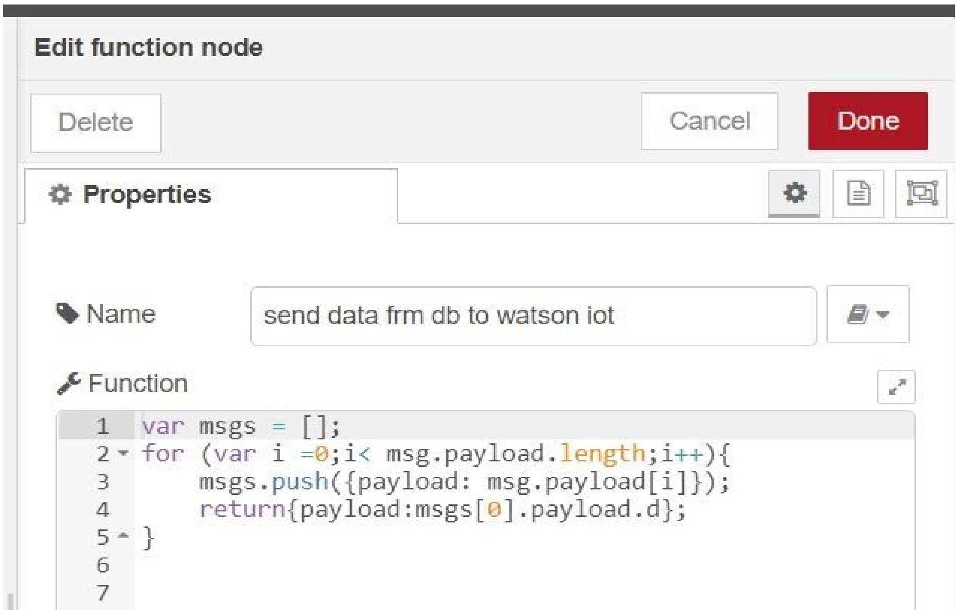
Template Node

1. Drag and drop template node
2. Double click and add the template to display if a value goes above or below a threshold.

Function Node

Function node are used to perform a specific function.

1. Drag and drop Function node
2. Double click on the node
3. Enter the code for the function to perform

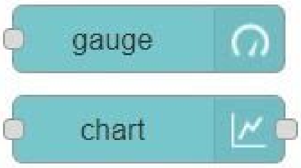


Name: send data frm db to watson iot

Function

```
var msgs = [];
for (var i =0;i< msg.payload.length;i++){
    msgs.push({payload: msg.payload[i]});
    return{payload:msgs[0].payload.d};
}
```

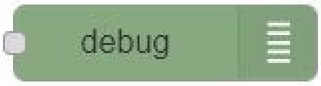
Chart and gauge node



These node are used to display the obtained values in dashboard

1. Drag and drop the chart or gauge node.
2. Double click on the node
3. Put the group name is set as the name of the tab the graph or gauge belongs
4. Gauge node can be used to set max and min value for the input and can also be used to set the units of the input.

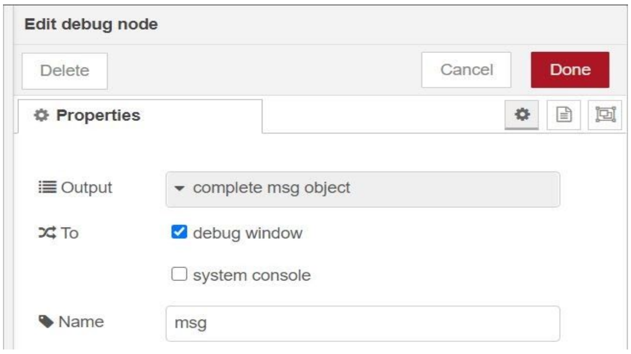
Debug Node



Debug nodes are used to check errors and values that are sent to different nodes.

1. Drag and drop debug node

2. Double click on the node
3. Error message if any will be shown in the debug messages



Edit debug node

Output: complete msg object

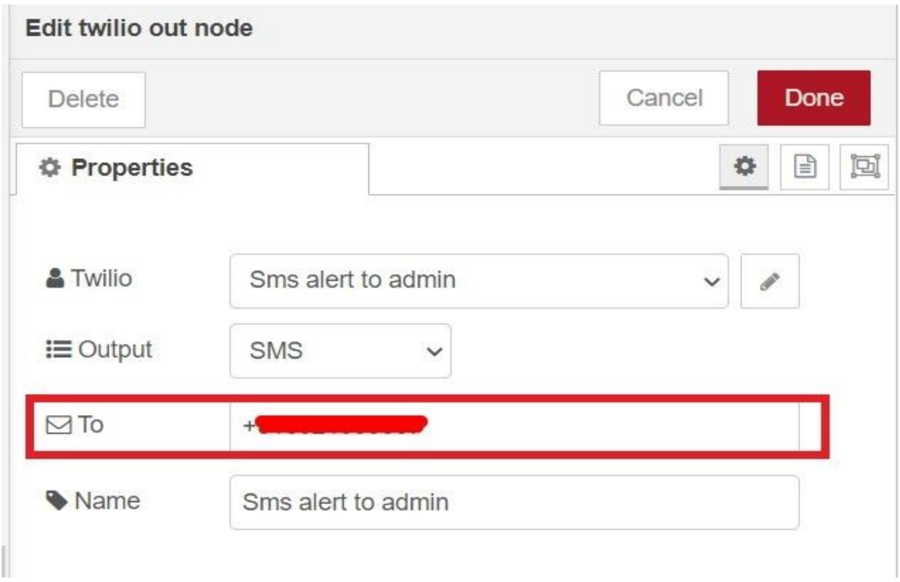
To: ☑ debug window

☐ system console

Name: msg

Twilio out node

Add Account SID ,the number from which you will receive the call and Token. Also specify output as either sms or call and the number to which you will receive the alert.



Edit twilio out node

Twilio: Sms alert to admin

Output: SMS

To: +[redacted]

Name: Sms alert to admin

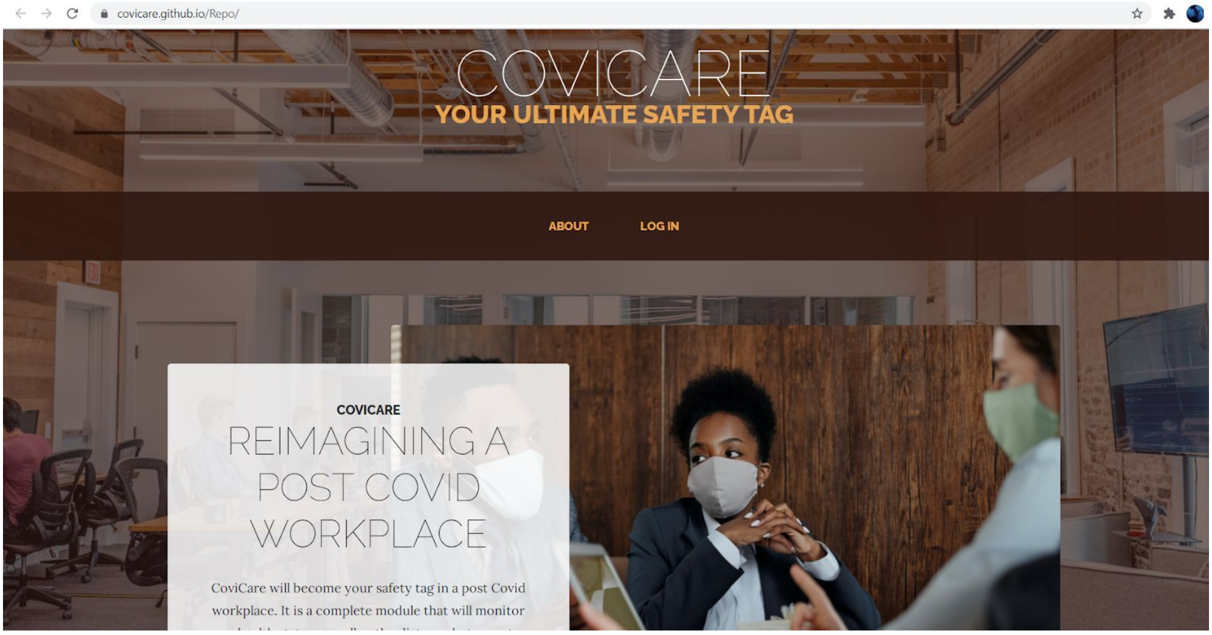
How to use CoviCare ?

The user and admin can visit website:

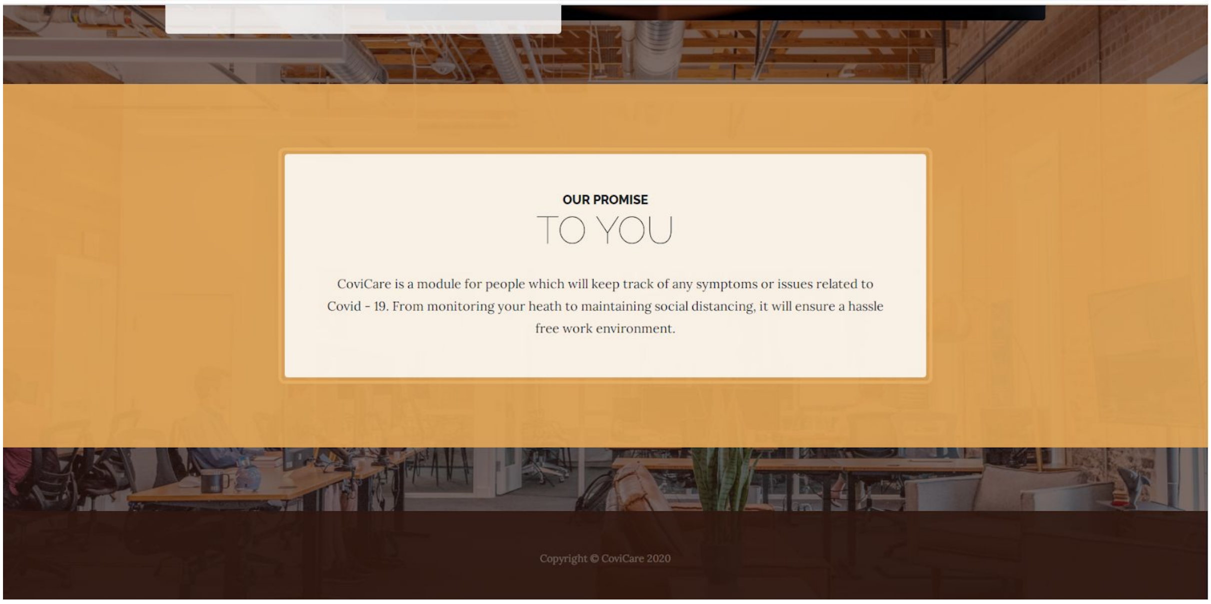
Link : https://covicare.github.io/Repo/
Demonstration video link :
https://drive.google.com/file/d/1jLFMDdcOZqKyhQXwOsE_FPvkyYnHlKWJ/view?usp=sharing

The user can either view the dashboard by logging in or can visit the Employment registration to register for the same.

For the purpose of attaining our goal to help as many people as we could, the Service is implemented as a user friendly website on a custom domain configured using a leading software development platform such as Github.
This ensures widening the reach of our service to millions of people through a widely supported and accessible hosting platform in a variety of browsers including Google Chrome, Mozilla Firefox and Microsoft edge .



CoviCare will become your safety tag in a post Covid workplace. It is a complete module that will monitor



OUR PROMISE

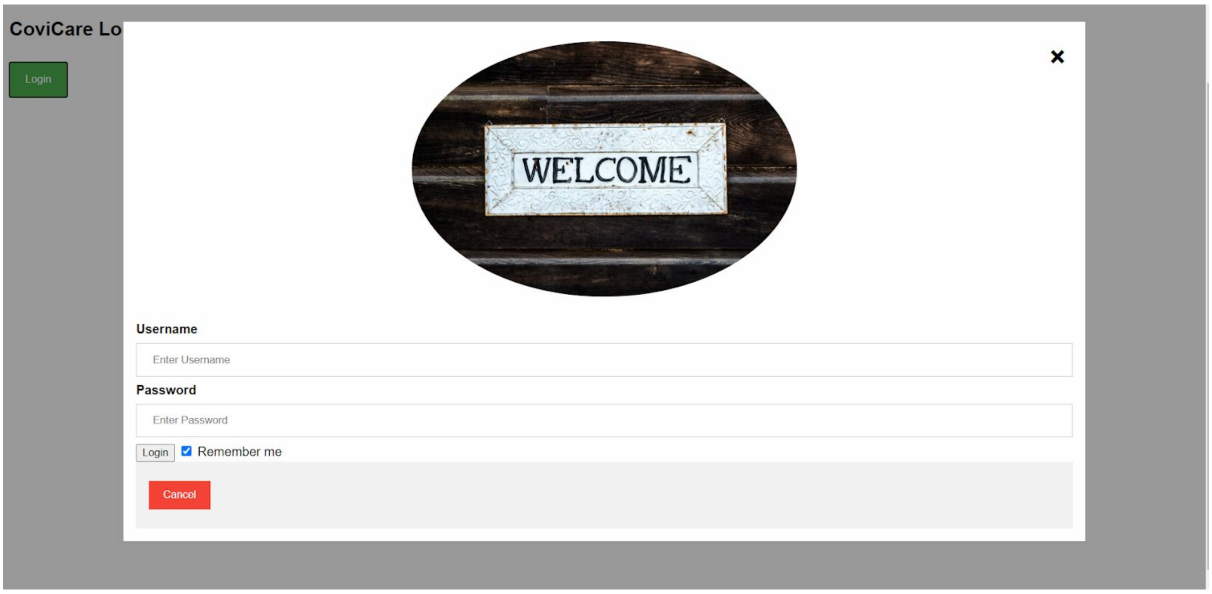
TO YOU

CoviCare is a module for people which will keep track of any symptoms or issues related to Covid - 19. From monitoring your heath to maintaining social distancing, it will ensure a hassle free work environment.

Copyright © CoviCare 2020

We have also taken great care regarding the Friendliness and Accessibility of our website by testing it against the standards stated by the Wave Accessibility Evaluation tool [https://wave.webaim.org] and receiving acceptable results.

- Use the link provided to reach the welcome page of our website.Scroll down to find a brief description regarding our service.
- Click on the **Login** option . You will be taken to a new page with a login button in the top left corner.
- Click on this button to get a login form .Give the credentials:Sample username and password given below
  Username :a
  Password :a



Username

Enter Username

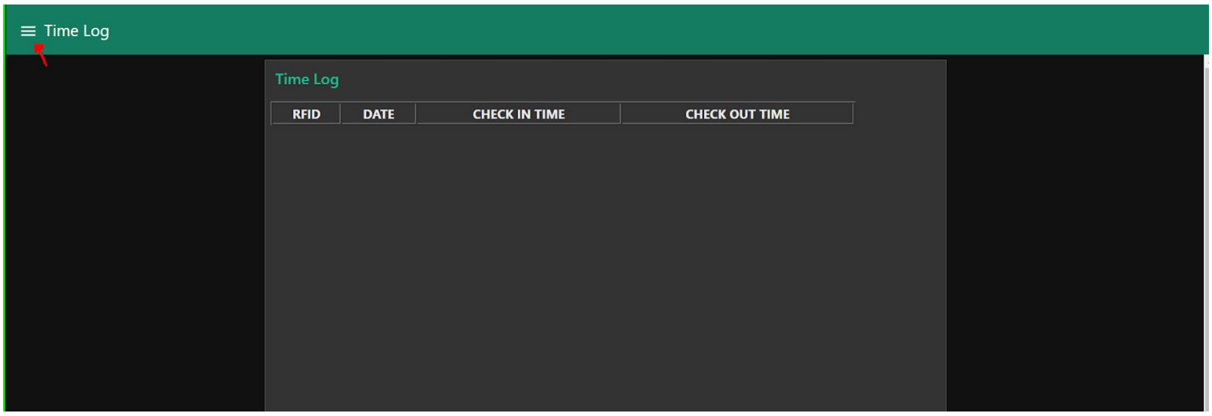
Password

Enter Password

☑ Remember me

- Be careful with this form as u get only **three attempts** to login .On successful login,you will be taken to the node red dashboard page of Sevak.
- This page is complete with the visualisations and alert systems to monitor the health conditions and surroundings of the employee.

- On clicking the sandwich button,you can navigate to different tabs containing information about different parameters measured.



RFID	DATE	CHECK IN TIME	CHECK OUT TIME

- The dashboard tabs can be selected and viewed from the list of tabs visible on clicking the option available in the top left corner.the list of tabs include:

  - Body Temperature [of the employee worker]
  - Pulse rate [pulse rate of the employee worker].
  - Distance monitoring
  - RFID tag
  - Current Covid Status

- All the above mentioned monitoring systems are equipped with an automatic alert system which
  - Location of the worker is monitored
  - Sends **sms or calls** the number provided with required information to the company in case symptoms arise in the worker.

The user can either view the dashboard by logging in or can visit the Employment registration to register for the same.

CLOUD LOGIN CREDENTIALS

Main cloud account:

Username: anjanaanil.mec@gmail.com
Password: Sevak@123

CONCLUSION

CoviCare is not just a tag. It is an all in one module that creates a hassle free work environment. From maintaining social distancing to monitoring your health, it will thoroughly ensure your well-being as well as those in your vicinity. We believe that CoviCare has the potential to become an essential part of everyday office life.