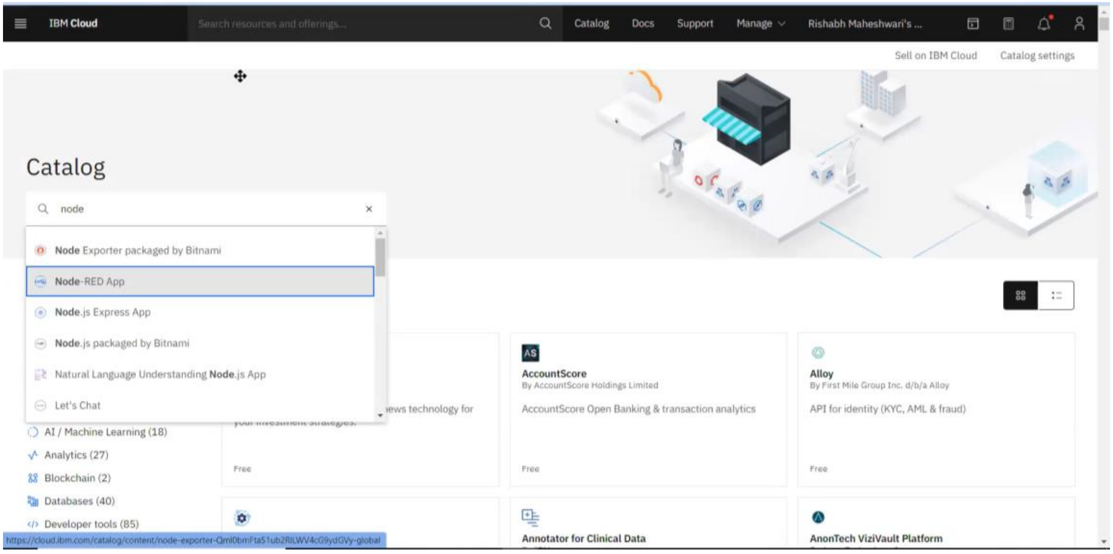
Web Application Development With Node-RED Service

Rishabh Maheshwari
19BCY10145

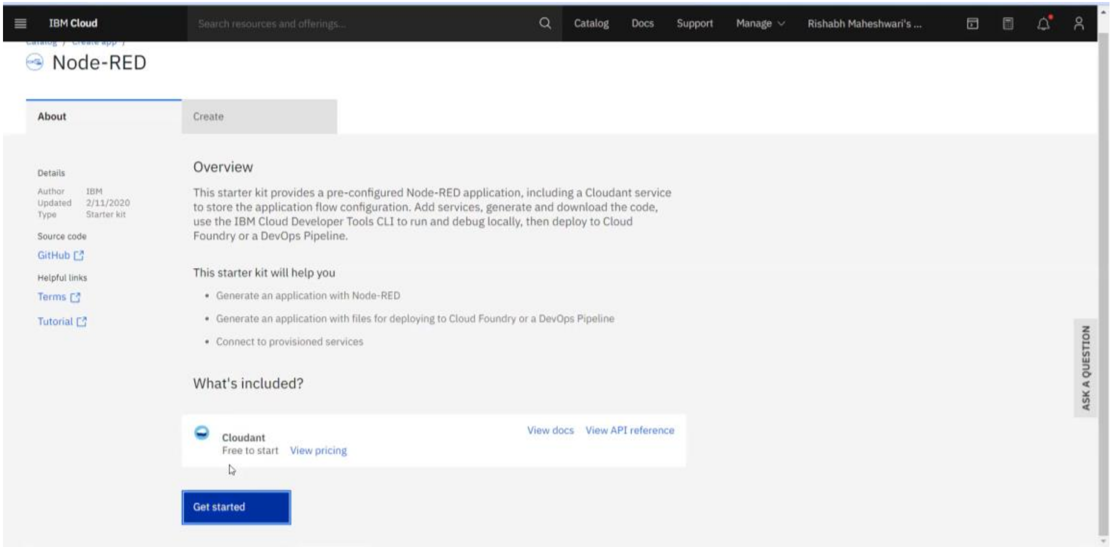
Introduction to Node-RED and its features. Install the required nodes and configure the nodes to get the sensor data from the IBM IoT platform. Develop a Web UI to display the sensor parameters and configure the buttons for sending commands to the IBM IoT platform. configure the Node-RED to send message notifications.

Procedure to Create Node-RED service on IBM Cloud:

- Open IBM Cloud Service and Search **Node-RED** in Catalog.


IBM Cloud
Search resources and offerings...
Catalog
Docs
Support
Manage
Rishabh Maheshwari's ...
Sell on IBM Cloud
Catalog settings
Catalog
node
Node Exporter packaged by Bitnami
Node-RED App
Node.js Express App
Node.js packaged by Bitnami
Natural Language Understanding Node.js App
Let's Chat
AI / Machine Learning (18)
Analytics (27)
Blockchain (2)
Databases (40)
Developer tools (85)
ews technology for
AccountScore
By AccountScore Holdings Limited
AccountScore Open Banking & transaction analytics
Alloy
By First Mile Group Inc. d/b/a Alloy
API for identity (KYC, AML & fraud)
Free
Annotator for Clinical Data
AnonTech ViziVault Platform
https://cloud.ibm.com/catalog/content/node-exporter-Qml0bmFta51ub2RlLWV4cG9ydGVy-global

- Create a Node-RED service by Cloudant. Click on **Get Started**.



Node-RED

Details

Author	IBM
Updated	2/11/2020
Type	Starter kit

Source code

GitHub

Helpful links

Terms

Tutorial

Overview

This starter kit provides a pre-configured Node-RED application, including a Cloudant service to store the application flow configuration. Add services, generate and download the code, use the IBM Cloud Developer Tools CLI to run and debug locally, then deploy to Cloud Foundry or a DevOps Pipeline.

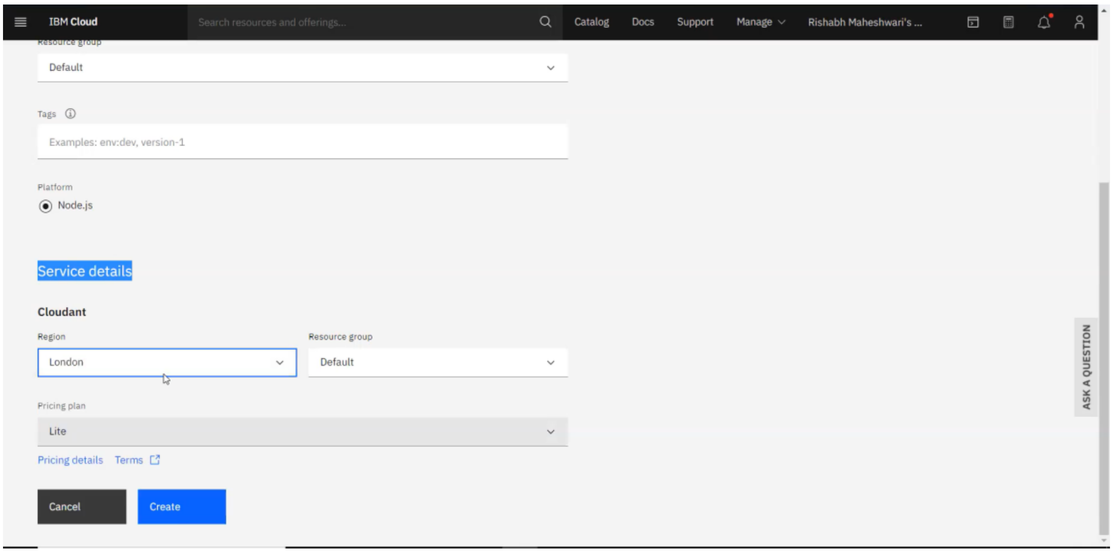
This starter kit will help you

- Generate an application with Node-RED
- Generate an application with files for deploying to Cloud Foundry or a DevOps Pipeline
- Connect to provisioned services

What's included?

Cloudant
Free to start

- Change Location to London region. Then click on **Create**.



Resource group: Default

Tags: Examples: env:dev, version-1

Platform: ● Node.js

Service details

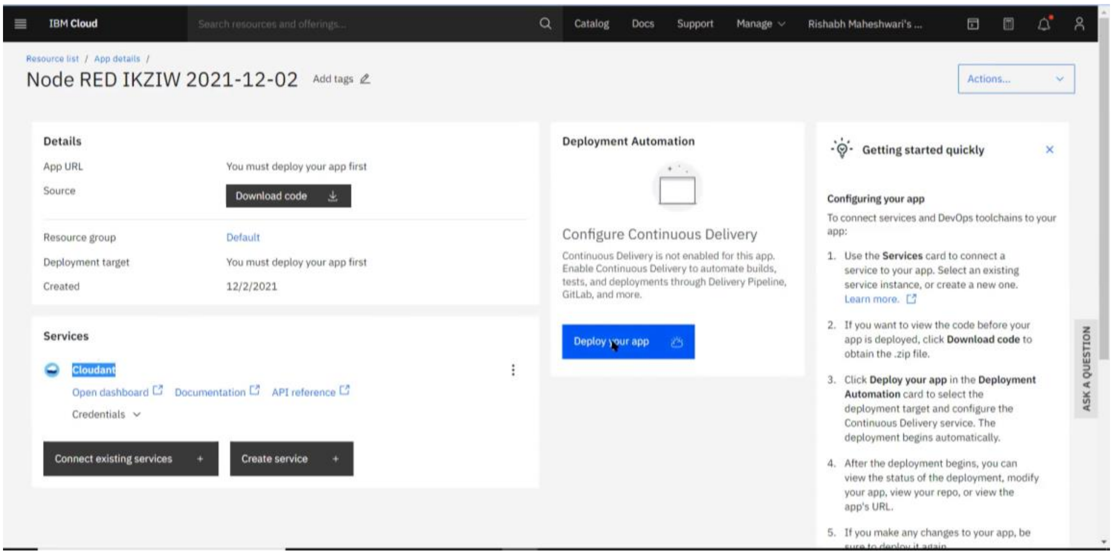
Cloudant

Region: London

Resource group: Default

Pricing plan: Lite

- After that click on **Deploy your App** to create pipelines and networks.



Resource list / App details /

Node RED IKZIW 2021-12-02

Details

App URL: You must deploy your app first

Source

Resource group: Default

Deployment target: You must deploy your app first

Created: 12/2/2021

Services

Cloudant

Open dashboard · Documentation · API reference

Credentials

Deployment Automation

Configure Continuous Delivery

Continuous Delivery is not enabled for this app. Enable Continuous Delivery to automate builds, tests, and deployments through Delivery Pipeline, GitLab, and more.

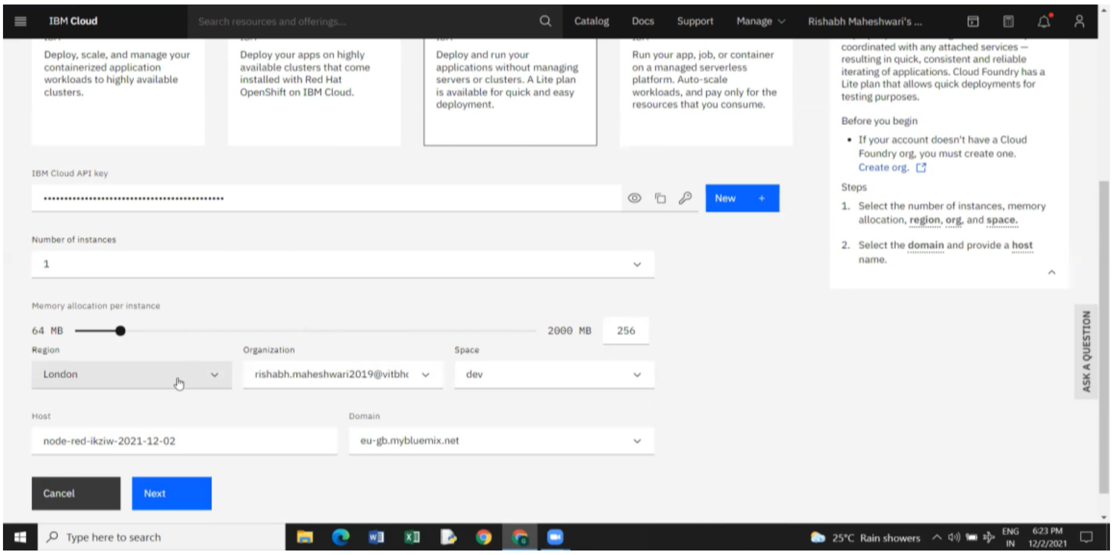
Getting started quickly

Configuring your app

To connect services and DevOps toolchains to your app:

1. Use the **Services** card to connect a service to your app. Select an existing service instance, or create a new one. Learn more.
2. If you want to view the code before your app is deployed, click **Download code** to obtain the .zip file.
3. Click **Deploy your app** in the **Deployment Automation** card to select the deployment target and configure the Continuous Delivery service. The deployment begins automatically.
4. After the deployment begins, you can view the status of the deployment, modify your app, view your repo, or view the app's URL.
5. If you make any changes to your app, be sure to deploy it again.

- Generate a new API key available in the next window. Change the region to London. Click on NEXT.



Deploy, scale, and manage your containerized application workloads to highly available clusters.

Deploy your apps on highly available clusters that come installed with Red Hat OpenShift on IBM Cloud.

Deploy and run your applications without managing servers or clusters. A Lite plan is available for quick and easy deployment.

Run your app, job, or container on a managed serverless platform. Auto-scale workloads, and pay only for the resources that you consume.

coordinated with any attached services — resulting in quick, consistent and reliable iterating of applications. Cloud Foundry has a Lite plan that allows quick deployments for testing purposes.

Before you begin

- If your account doesn't have a Cloud Foundry org, you must create one. Create org.

Steps

1. Select the number of instances, memory allocation, region, org, and space.
2. Select the domain and provide a host name.

IBM Cloud API key: ••

Number of instances: 1

Memory allocation per instance: 64 MB – 2000 MB: 256

Region: London

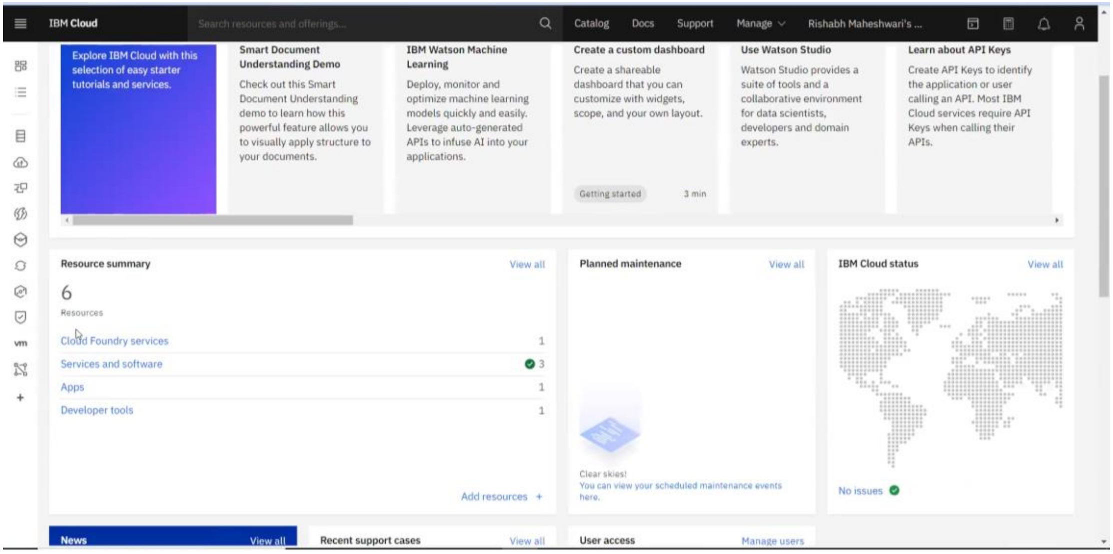
Organization: rishabh.maheshwari2019@vitbh‹

Space: dev

Host: node-red-ikziw-2021-12-02

Domain: eu-gb.mybluemix.net

- Now in the IBM Cloud Dashboard new resources should now be available.



Explore IBM Cloud with this selection of easy starter tutorials and services.

Smart Document Understanding Demo
Check out this Smart Document Understanding demo to learn how this powerful feature allows you to visually apply structure to your documents.

IBM Watson Machine Learning
Deploy, monitor and optimize machine learning models quickly and easily. Leverage auto-generated APIs to infuse AI into your applications.

Create a custom dashboard
Create a shareable dashboard that you can customize with widgets, scope, and your own layout.
Getting started 3 min

Use Watson Studio
Watson Studio provides a suite of tools and a collaborative environment for data scientists, developers and domain experts.

Learn about API Keys
Create API Keys to identify the application or user calling an API. Most IBM Cloud services require API Keys when calling their APIs.

Resource summary View all
6
Resources

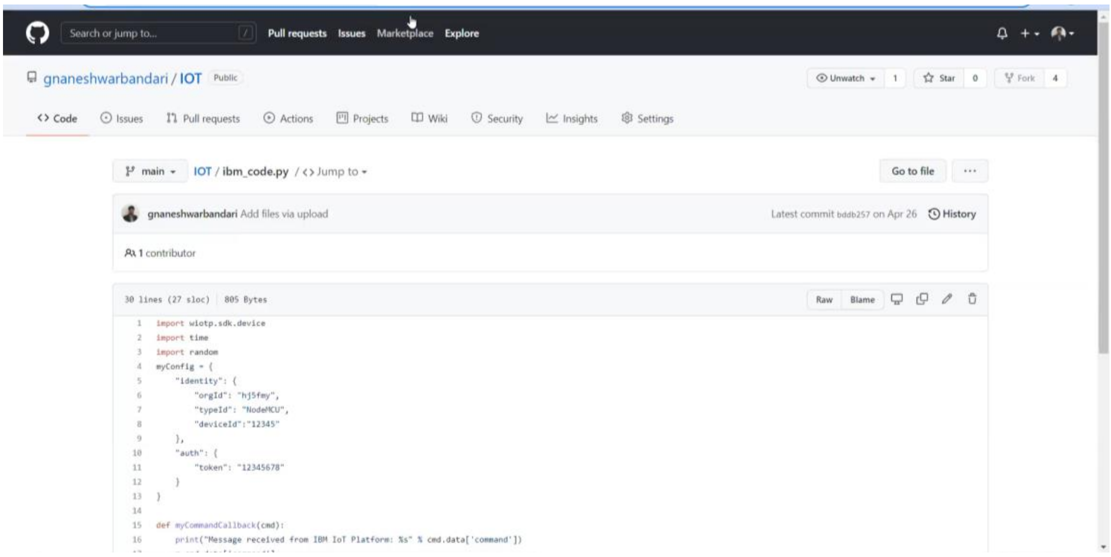
Cloud Foundry services	1
Services and software	✓ 3
Apps	1
Developer tools	1

Add resources +

Planned maintenance View all
Clear skies!
You can view your scheduled maintenance events here.

IBM Cloud status View all
No issues ✓

- This is a sample Python code for sending message notifications to the IBM IoT platform.



gnaneshwarbandari Add files via upload

Latest commit bddb257 on Apr 26

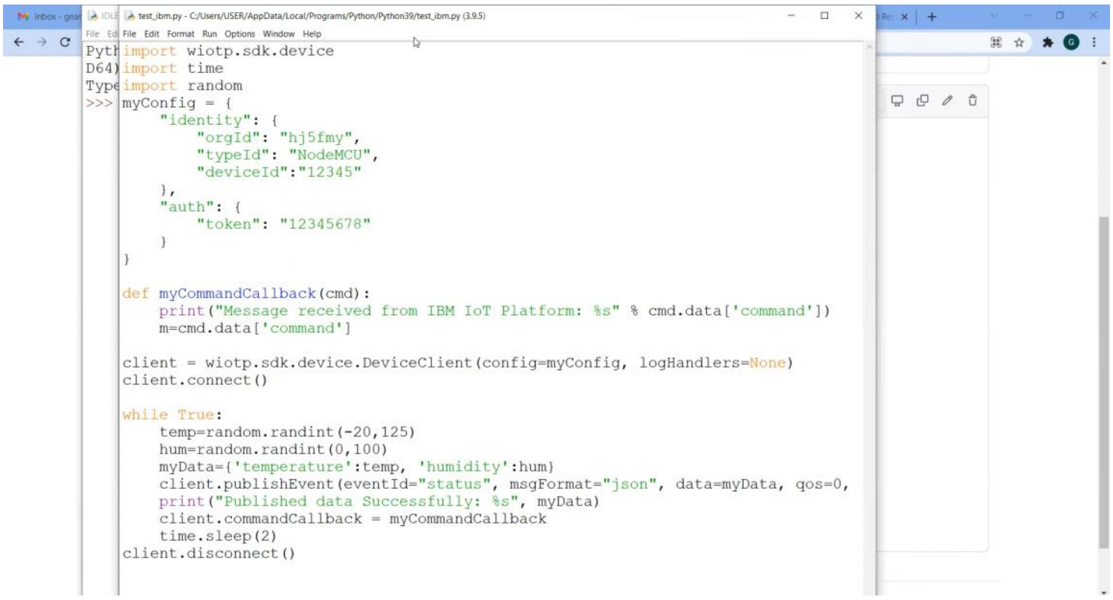
1 contributor

30 lines (27 sloc) | 805 Bytes

```python
import wiotp.sdk.device
import time
import random
myConfig = {
    "identity": {
        "orgId": "hj5fmy",
        "typeId": "NodeMCU",
        "deviceId":"12345"
    },
    "auth": {
        "token": "12345678"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
```

- We need to change the credentials with our own and save this code using Python IDLE.


test_ibm.py - C:/Users/USER/AppData/Local/Programs/Python/Python39/test_ibm.py (3.9.5)
File Edit Format Run Options Window Help

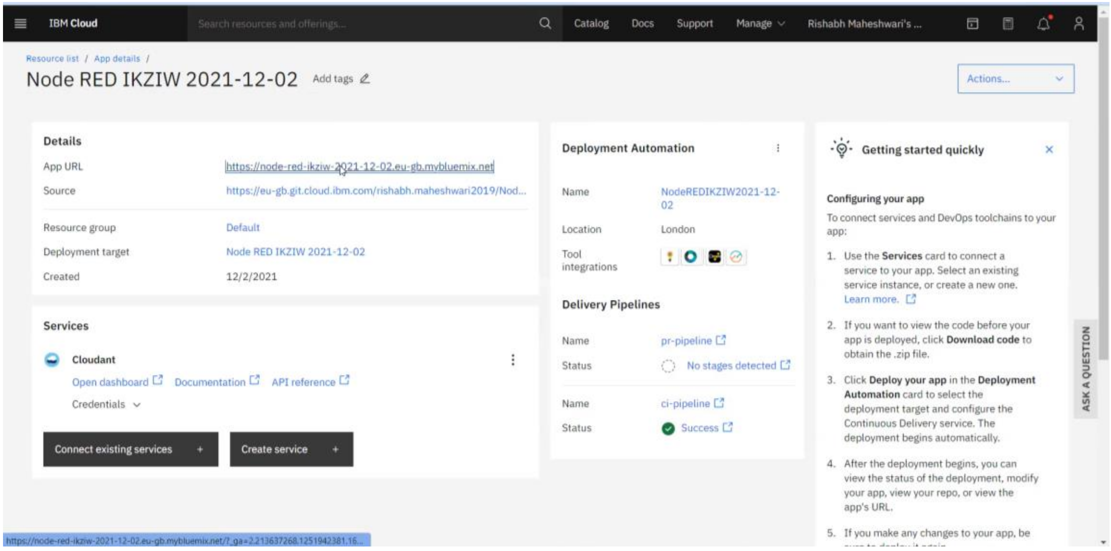
```
import wiotp.sdk.device
import time
import random
myConfig = {
    "identity": {
        "orgId": "hj5fmy",
        "typeId": "NodeMCU",
        "deviceId":"12345"
    },
    "auth": {
        "token": "12345678"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

while True:
    temp=random.randint(-20,125)
    hum=random.randint(0,100)
    myData={'temperature':temp, 'humidity':hum}
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
    print("Published data Successfully: %s", myData)
    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
```

- For opening Node-RED the app URL will be available once we open the app from IBM Clouds’ resource list.



Node RED IKZIW 2021-12-02

Details

App URL	https://node-red-ikziw-2021-12-02.eu-gb.mybluemix.net
Source	https://eu-gb.git.cloud.ibm.com/rishabh.maheshwari2019/Nod...
Resource group	Default
Deployment target	Node RED IKZIW 2021-12-02
Created	12/2/2021

Services

Cloudant

Open dashboard   Documentation   API reference

Credentials

Connect existing services +   Create service +

Deployment Automation

Name	NodeREDIKZIW2021-12-02
Location	London
Tool integrations	

Delivery Pipelines

Name	pr-pipeline
Status	No stages detected
Name	ci-pipeline
Status	Success

Getting started quickly

Configuring your app

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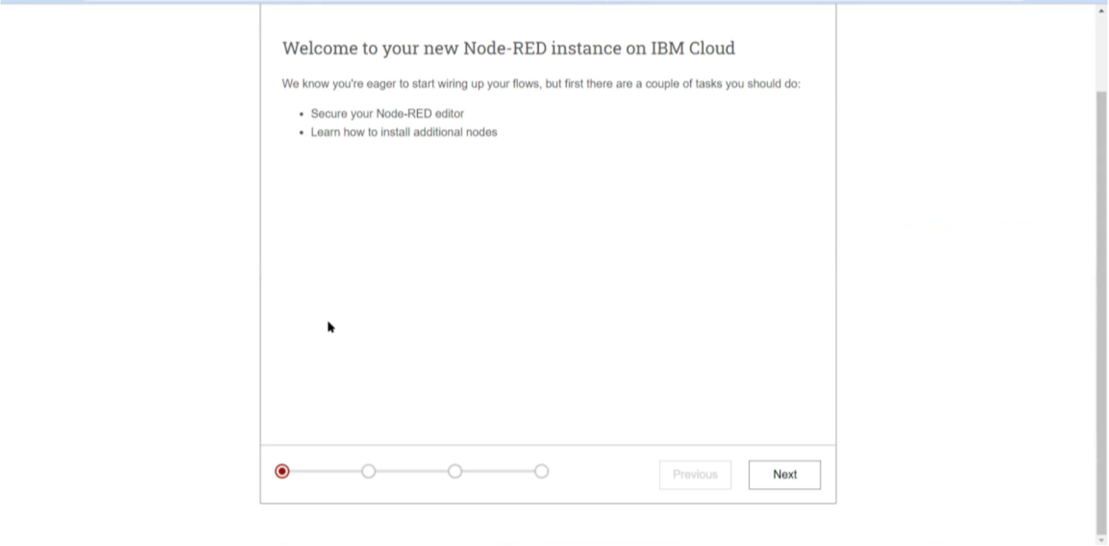
3. Click **Deploy your app** in the **Deployment Automation** card to select the deployment target and configure the Continuous Delivery service. The deployment begins automatically.
4. After the deployment begins, you can view the status of the deployment, modify your app, view your repo, or view the app's URL.
5. If you make any changes to your app, be

https://node-red-ikziw-2021-12-02.eu-gb.mybluemix.net/?_ga=2.213637268.1251942381.16...

- This window shown below will be visible the very first time you open the Node-RED app. Click **Next** three times and then click on Finish.

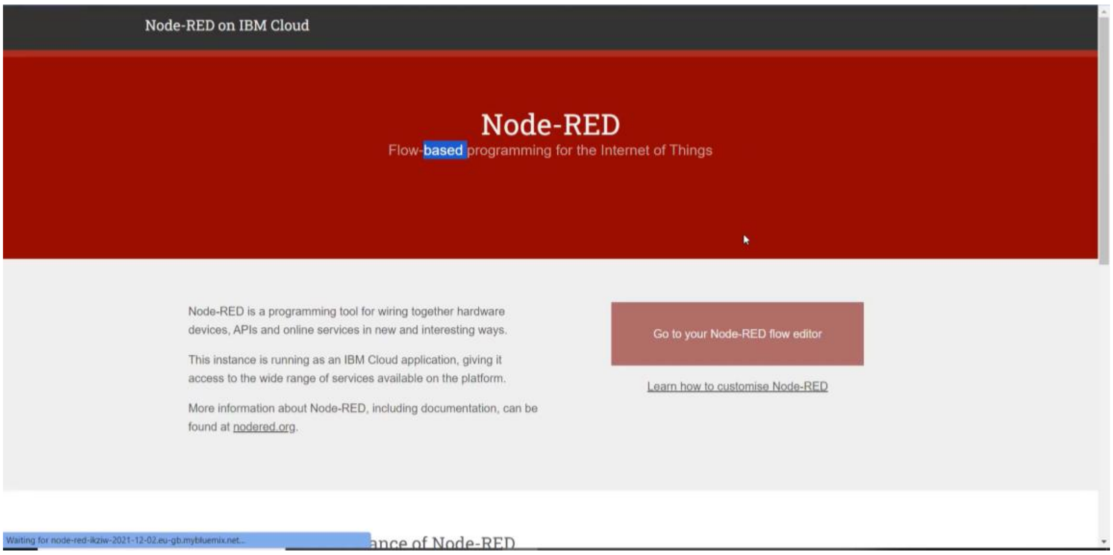


Welcome to your new Node-RED instance on IBM Cloud

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

- Click on the Go to your Node-RED flow editor icon to open the flow window.



Node-RED on IBM Cloud

Node-RED

Flow-based programming for the Internet of Things

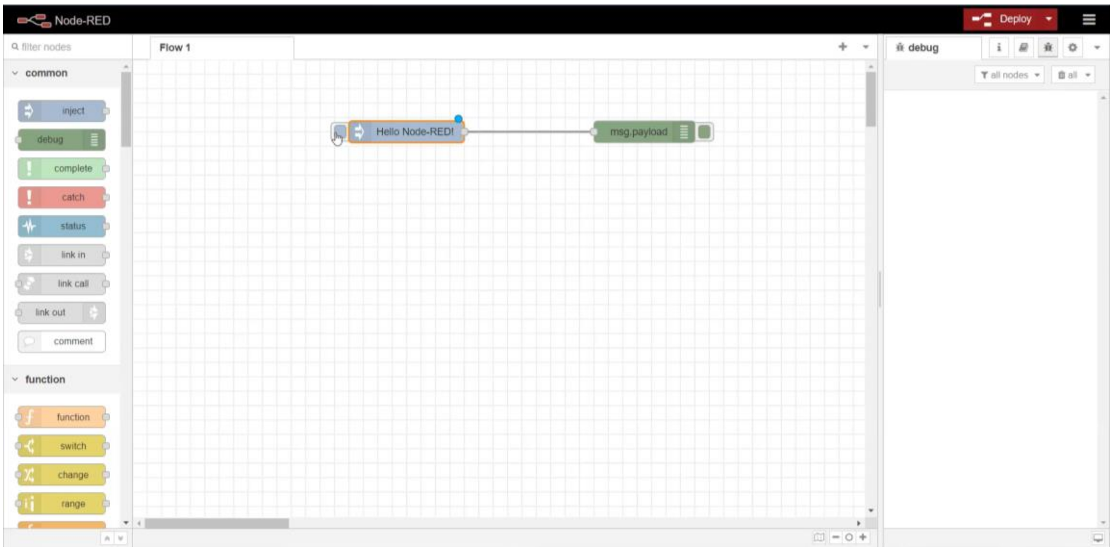
Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

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

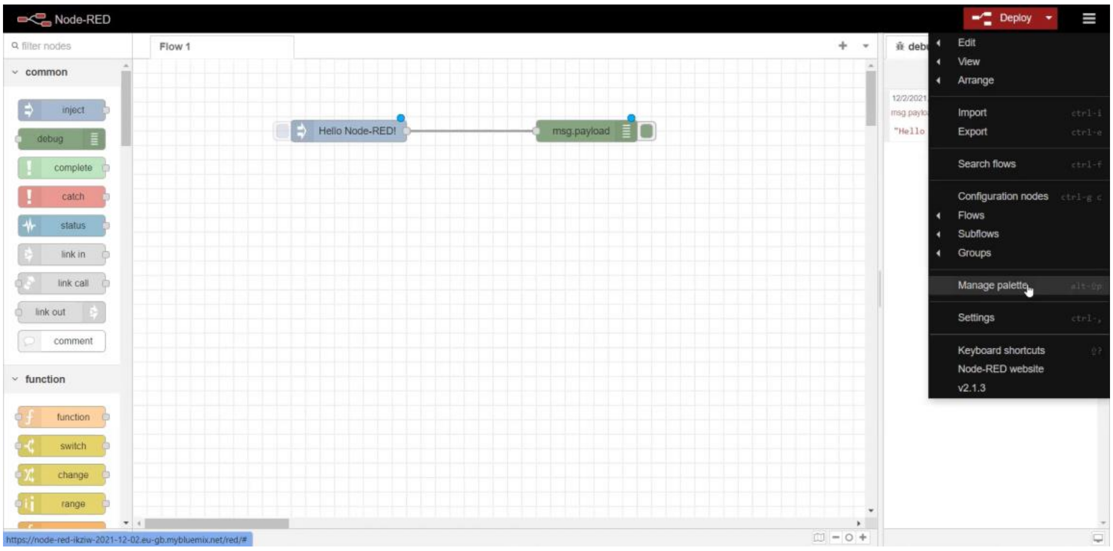
More information about Node-RED, including documentation, can be found at nodered.org.

Go to your Node-RED flow editor
Learn how to customise Node-RED
Waiting for node-red-ikziw-2021-12-02.eu-gb.mybluemix.net...
ance of Node-RED

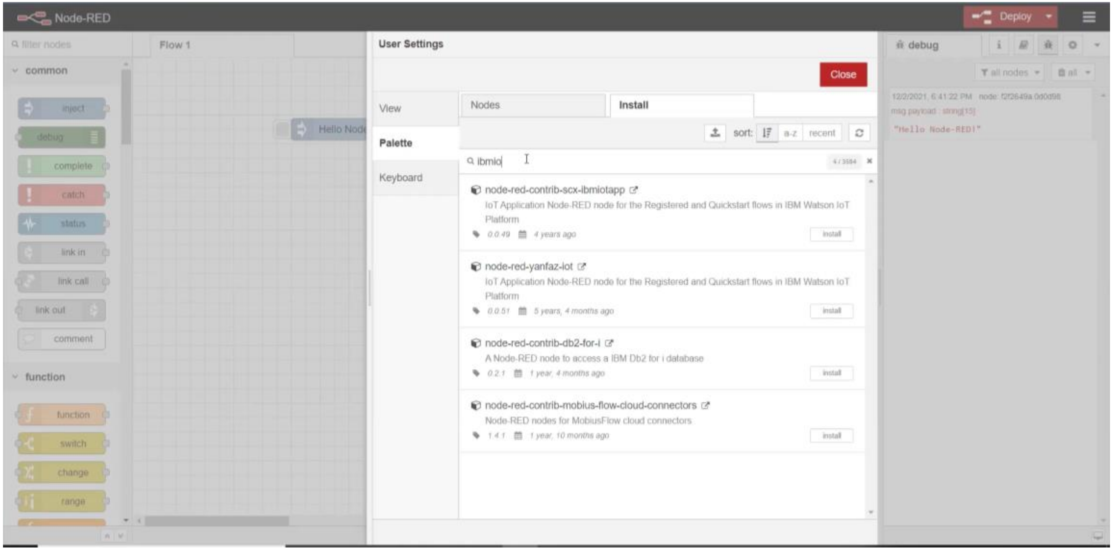
- For Developing the Web UI and displaying the sensor parameters and configure the buttons for sending commands to the IBM IoT platform follow the steps shown below-



- For installing the repositories and get Pallets open Manage Pallets.



- Search for **ibmiot** in the Install section and install the first option visible in the image.



ibmio

4 / 3584

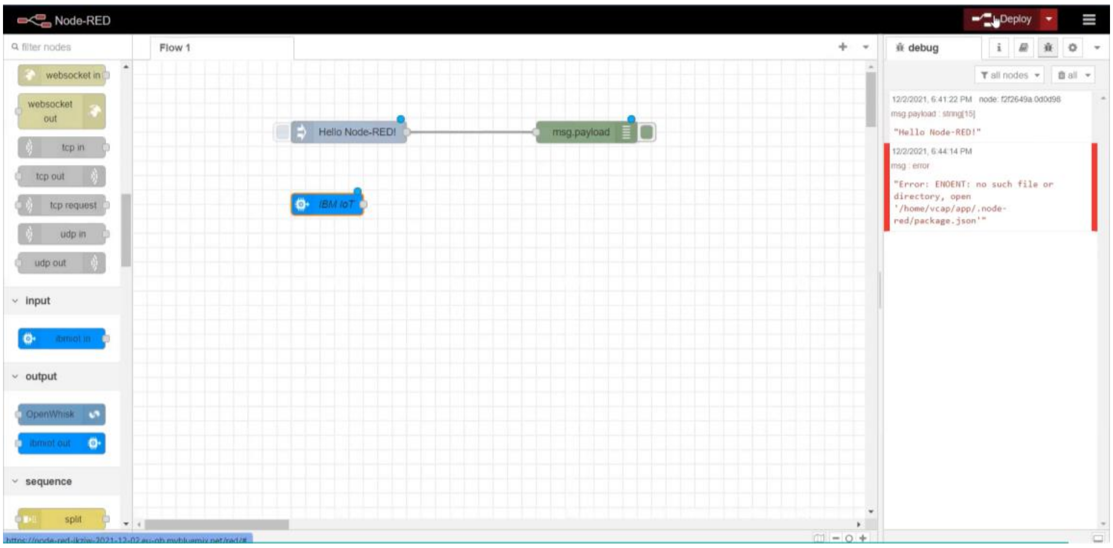
node-red-contrib-scx-ibmiotapp
IoT Application Node-RED node for the Registered and Quickstart flows in IBM Watson IoT Platform
0.0.49 4 years ago install

node-red-yanfaz-iot
IoT Application Node-RED node for the Registered and Quickstart flows in IBM Watson IoT Platform
0.0.51 5 years, 4 months ago install

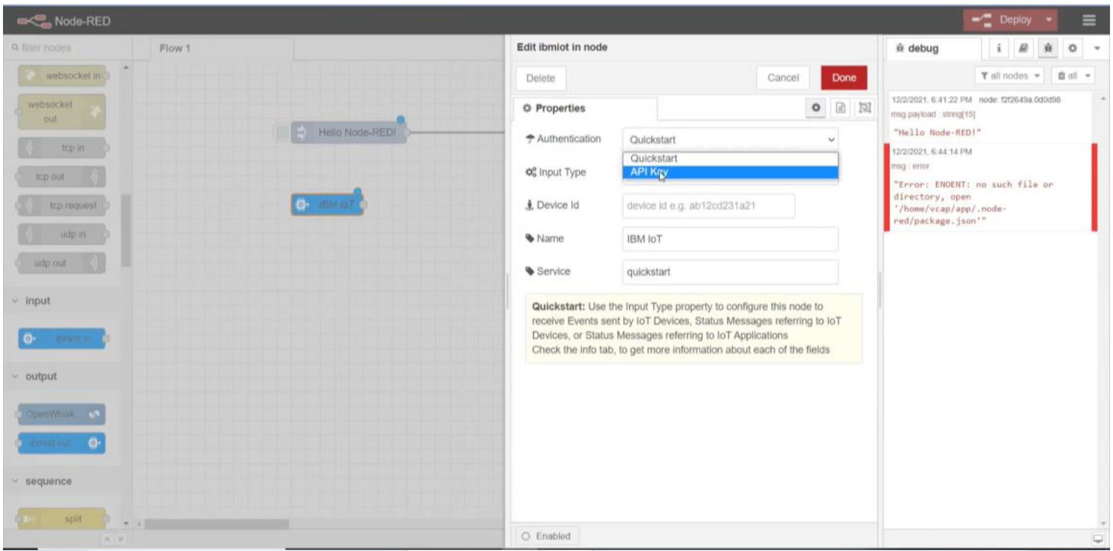
node-red-contrib-db2-for-i
A Node-RED node to access a IBM Db2 for i database
0.2.1 1 year, 4 months ago install

node-red-contrib-mobius-flow-cloud-connectors
Node-RED nodes for MobiusFlow cloud connectors
1.4.1 1 year, 10 months ago install

- Now follow the steps shown in sequence to proceed.



```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"
12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or
directory, open
'/home/vcap/app/.node-
red/package.json'"
```



Edit ibmiot in node

Delete Cancel Done

Properties

Authentication: Quickstart
- Quickstart
- API Key

Input Type

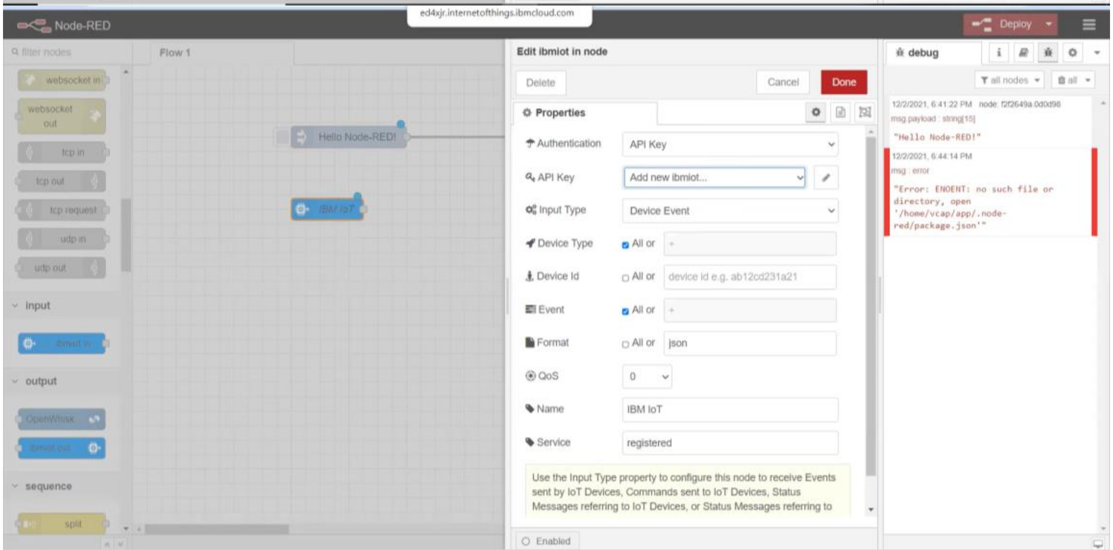
Device Id: device id e.g. ab12cd231a21

Name: IBM IoT

Service: quickstart

Quickstart: Use the Input Type property to configure this node to receive Events sent by IoT Devices, Status Messages referring to IoT Devices, or Status Messages referring to IoT Applications
Check the info tab, to get more information about each of the fields

```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"
12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or
directory, open
'/home/vcap/app/.node-
red/package.json'"
```



Edit ibmiot in node

Delete Cancel Done

Properties

Authentication: API Key

API Key: Add new ibmiot...

Input Type: Device Event

Device Type: ☑ All or +

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

Event: ☑ All or +

Format: ☐ All or json

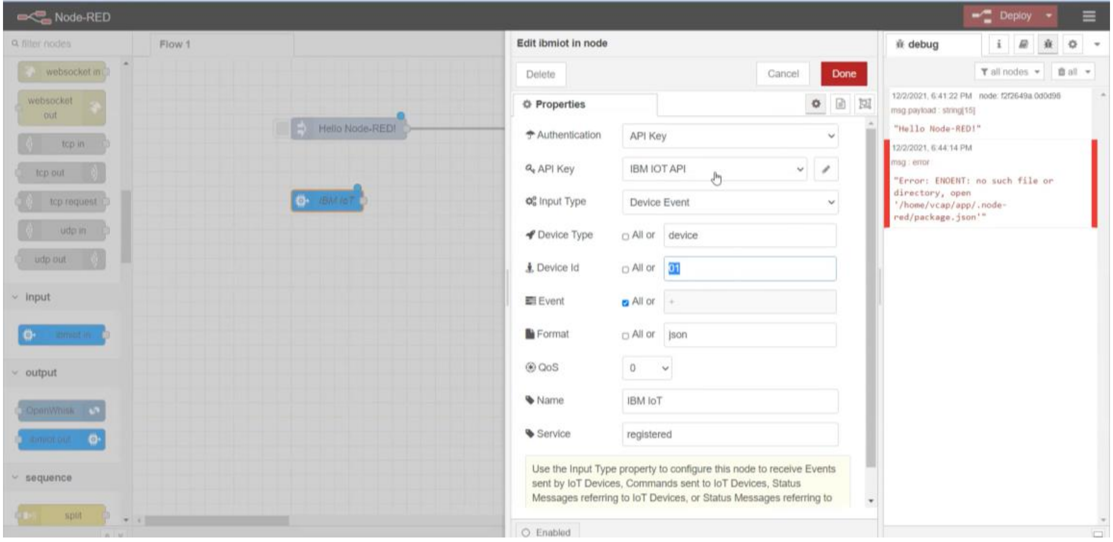
QoS: 0

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

```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"
12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or
directory, open
'/home/vcap/app/.node-
red/package.json'"
```



Edit ibmiot in node

Delete Cancel Done

Properties

Authentication: API Key

API Key: IBM IOT API

Input Type: Device Event

Device Type: ☐ All or device

Device Id: ☐ All or 01

Event: ☑ All or +

Format: ☐ All or json

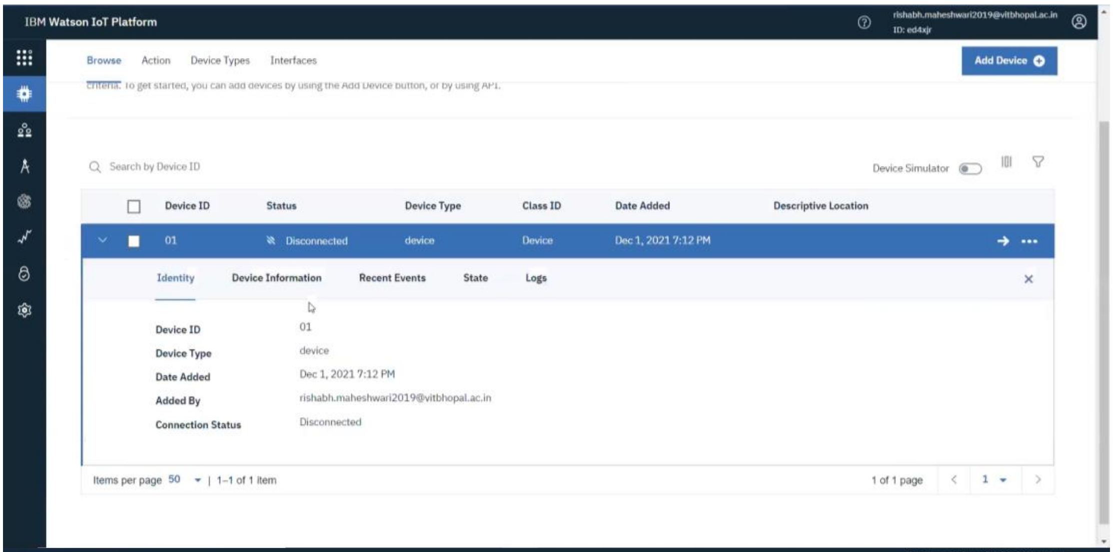
QoS: 0

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

```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"
12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or
directory, open
'/home/vcap/app/.node-
red/package.json'"
```

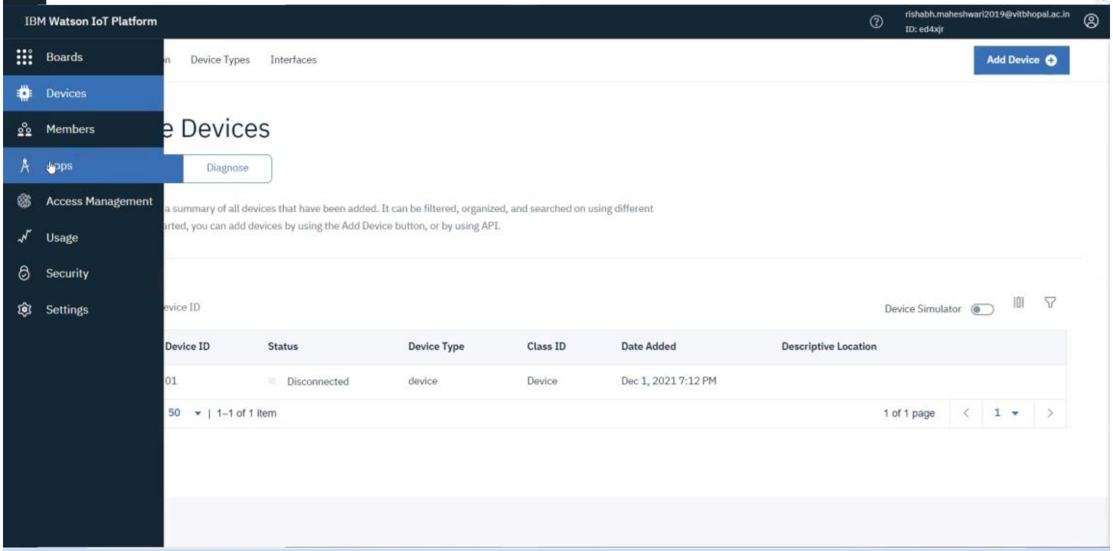


criteria. To get started, you can add devices by using the Add Device button, or by using API.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
01	Disconnected	device	Device	Dec 1, 2021 7:12 PM	

Device ID	01
Device Type	device
Date Added	Dec 1, 2021 7:12 PM
Added By	rishabh.maheshwari2019@vitbhopal.ac.in
Connection Status	Disconnected

Items per page 50 | 1–1 of 1 item 1 of 1 page 1

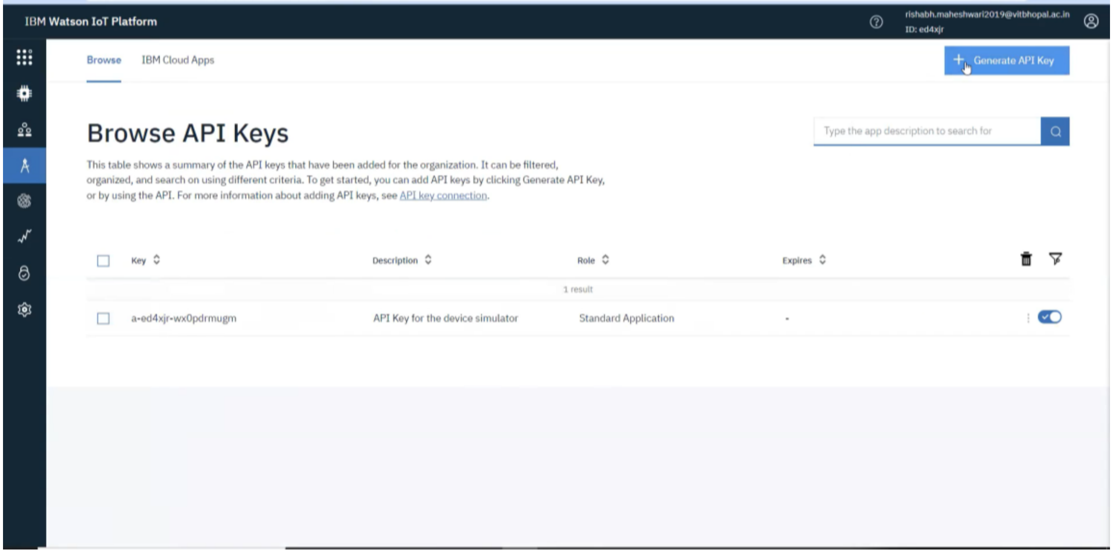


e Devices

a summary of all devices that have been added. It can be filtered, organized, and searched on using different arted, you can add devices by using the Add Device button, or by using API.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
01	Disconnected	device	Device	Dec 1, 2021 7:12 PM	

50 | 1–1 of 1 item 1 of 1 page 1



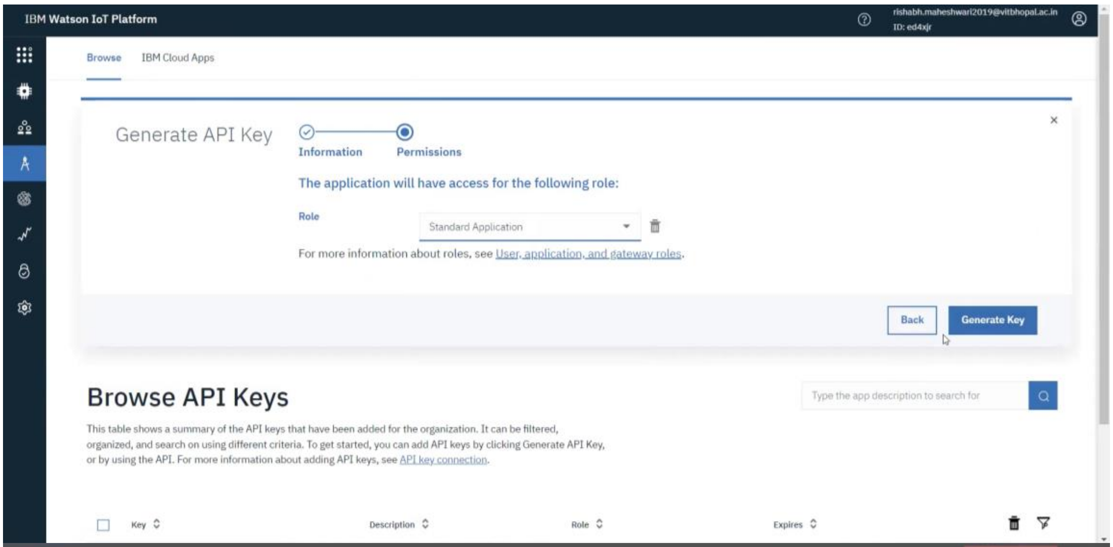
IBM Watson IoT Platform
rishabh.maheshwari2019@vitbhopal.ac.in
ID: ed4xjr
Browse
IBM Cloud Apps
Generate API Key
Type the app description to search for

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.

1 result

Key	Description	Role	Expires
a-ed4xjr-wx0pdrmugm	API Key for the device simulator	Standard Application	-



IBM Watson IoT Platform — rishabh.maheshwari2019@vitbhopal.ac.in ID: ed4xjr

Browse | IBM Cloud Apps

Generate API Key — Information | Permissions

The application will have access for the following role:

Role: Standard Application

For more information about roles, see User, application, and gateway roles.

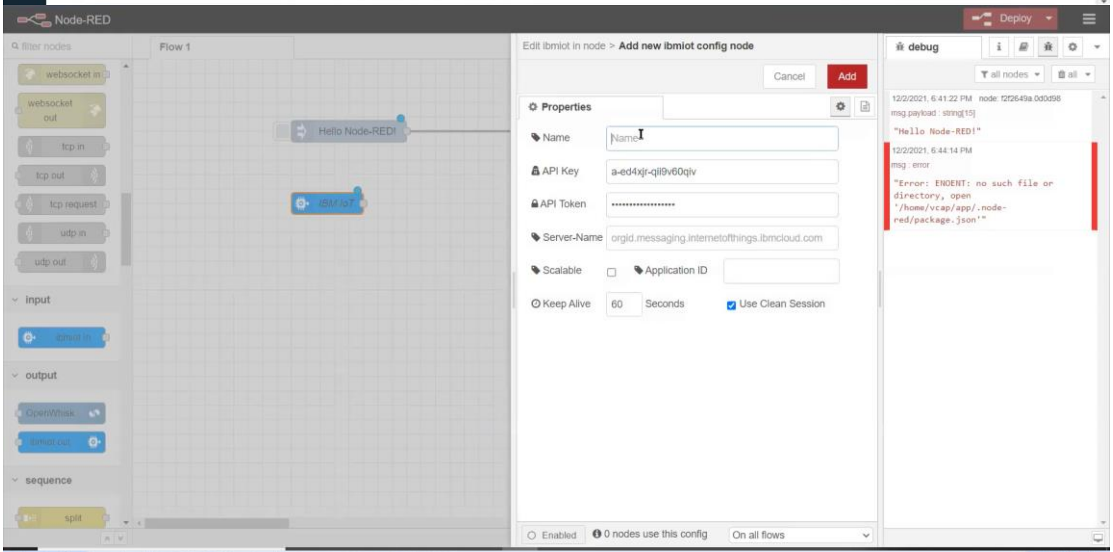
Back | Generate Key

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.

Type the app description to search for

Key	Description	Role	Expires



Edit ibmiot in node > Add new ibmiot config node

Cancel | Add

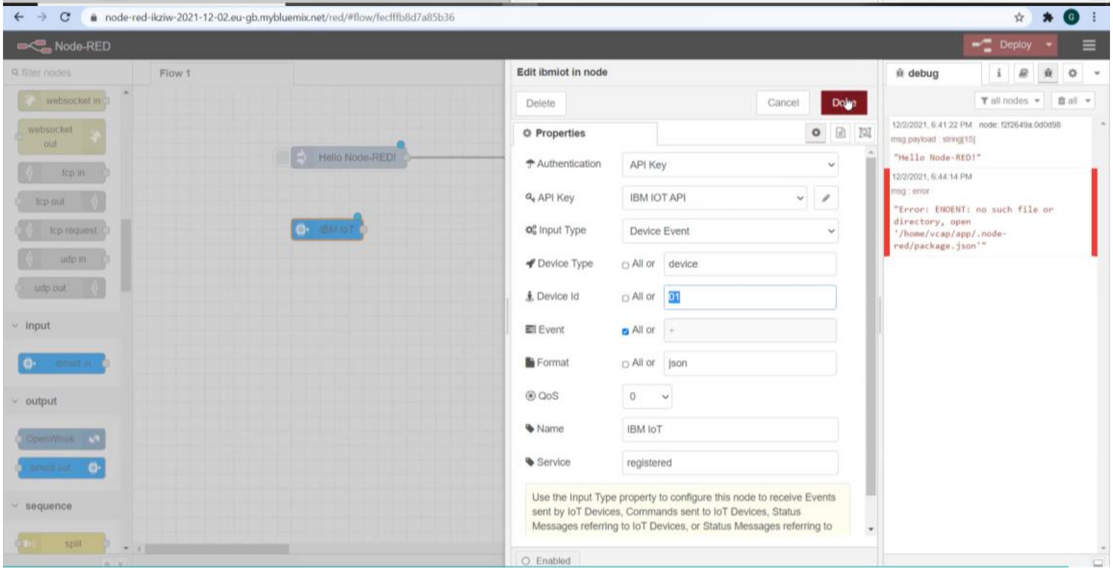
Properties

- Name: Name
- API Key: a-ed4xjr-qil9v60qiv
- API Token: ••••••••••••••••••
- Server-Name: orgid.messaging.internetofthings.ibmcloud.com
- Scalable: □ Application ID:
- Keep Alive: 60 Seconds ☑ Use Clean Session

○ Enabled — 0 nodes use this config — On all flows

debug

```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"
12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or directory, open '/home/vcap/app/.node-red/package.json'"
```



node-red-ikziw-2021-12-02.eu-gb.mybluemix.net/red/#flow/fecfffb8d7a85b36

Edit ibmiot in node

Delete | Cancel | Done

Properties

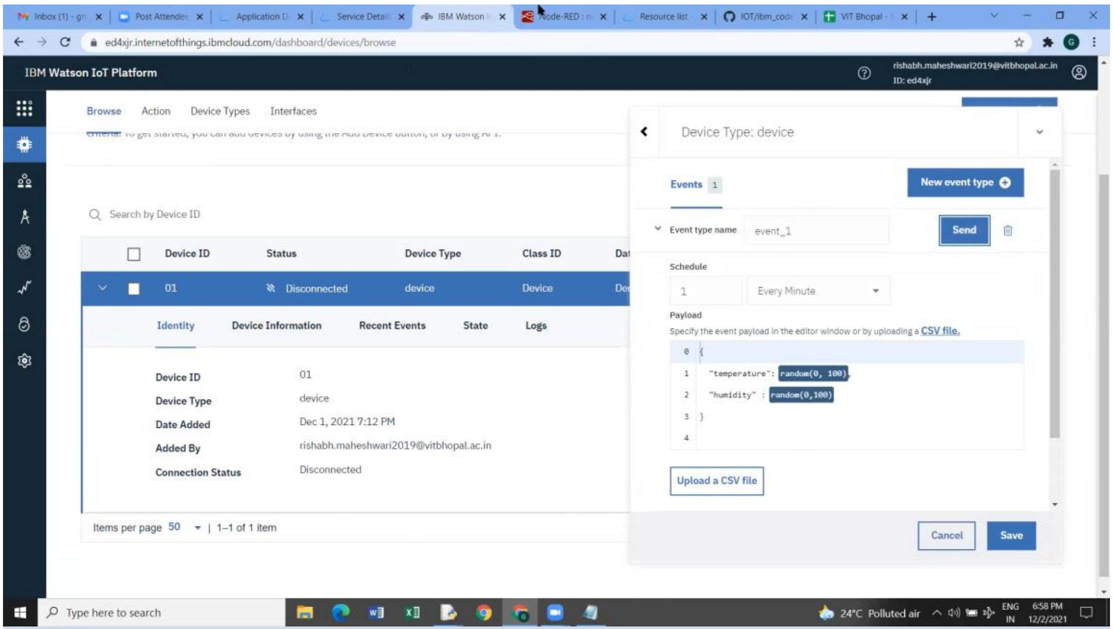
- Authentication: API Key
- API Key: IBM IOT API
- Input Type: Device Event
- Device Type: □ All or device
- Device Id: □ All or 01
- Event: ☑ All or +
- Format: □ All or json
- QoS: 0
- Name: IBM IoT
- Service: registered

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

debug

```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"
12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or directory, open '/home/vcap/app/.node-red/package.json'"
```



Device ID	Status	Device Type	Class ID	Dat
01	Disconnected	device	Device	De

Device ID: 01
Device Type: device
Date Added: Dec 1, 2021 7:12 PM
Added By: rishabh.maheshwari2019@vitbhopal.ac.in
Connection Status: Disconnected

Items per page 50 | 1–1 of 1 item

Device Type: device

Events 1

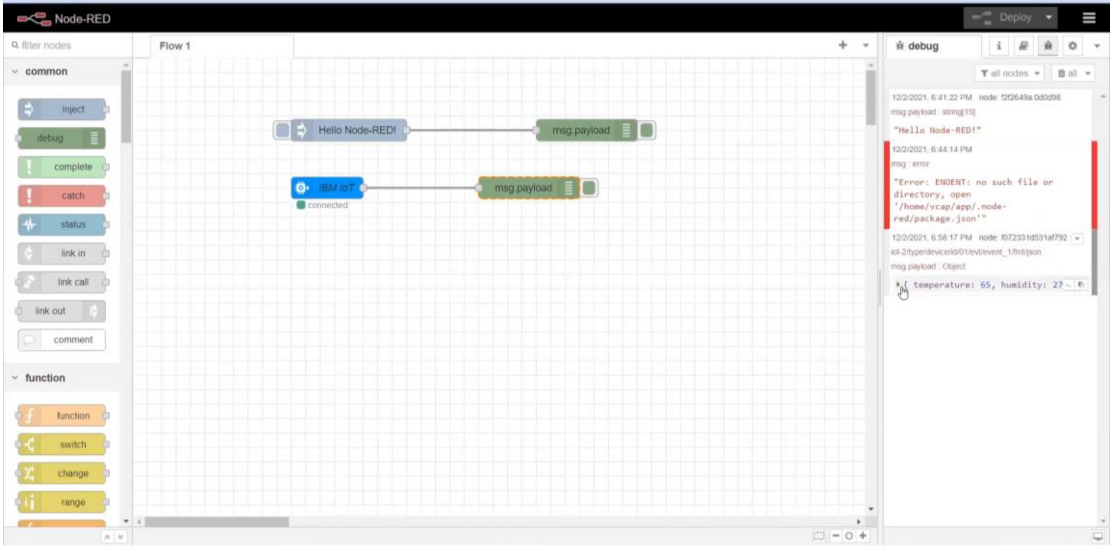
Event type name: event_1

Schedule: 1 Every Minute

Payload

Specify the event payload in the editor window or by uploading a CSV file.

```
{
  "temperature": random(0, 100),
  "humidity" : random(0,100)
}
```



```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
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msg : error
"Error: ENOENT: no such file or directory, open '/home/vcap/app/.node-red/package.json'"
12/2/2021, 6:58:17 PM  node: f072331d531af792
iot-2/type/device/id/01/evt/event_1/fmt/json :
msg.payload : Object
{ temperature: 65, humidity: 27
```

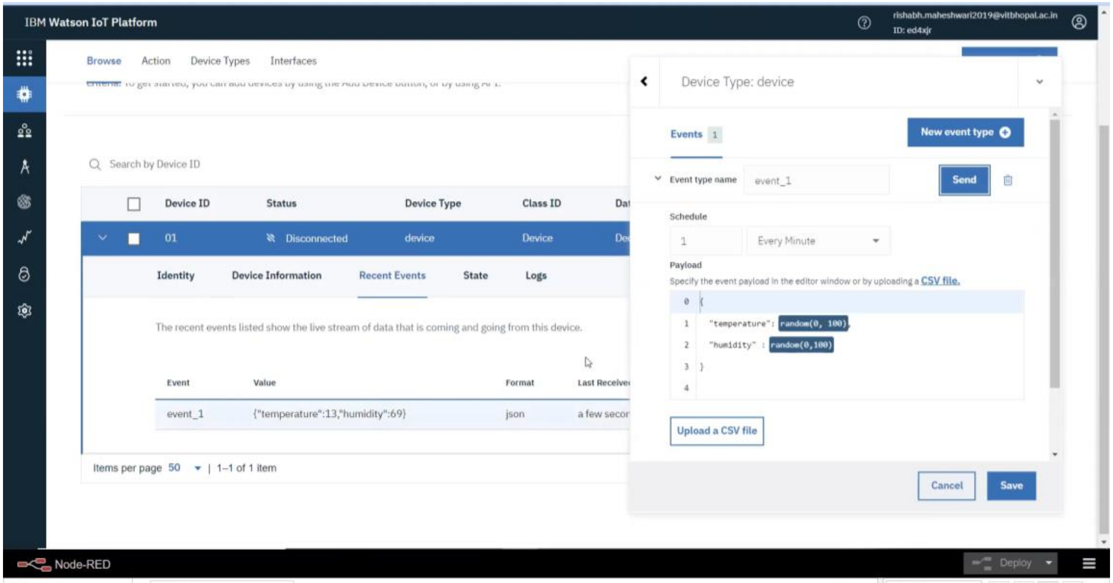

IBM Watson IoT Platform

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Browse | Action | Device Types | Interfaces

Search by Device ID

Device ID	Status	Device Type	Class ID
01	Disconnected	device	Device

Identity | Device Information | Recent Events | State | Logs

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

Event	Value	Format	Last Received
event_1	{"temperature":13,"humidity":69}	json	a few secon

Items per page 50 | 1–1 of 1 item

Device Type: device

Events 1 | New event type

Event type name: event_1 | Send

Schedule: 1 Every Minute

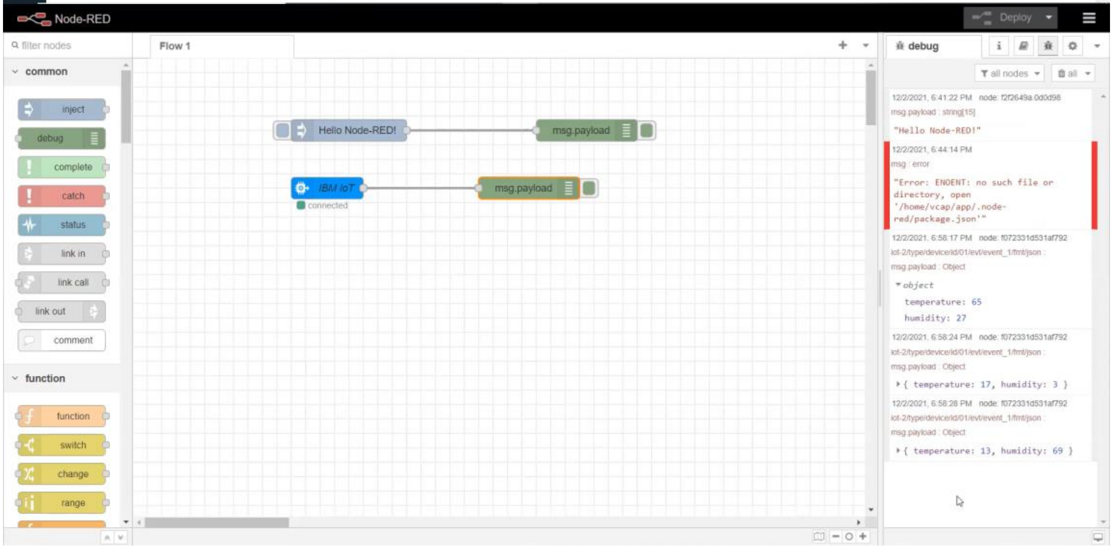
Payload

Specify the event payload in the editor window or by uploading a CSV file.

```
{
  "temperature": random(0, 100),
  "humidity" : random(0,100)
}
```

Upload a CSV file

Cancel | Save



```
12/2/2021, 6:41:22 PM  node: f2f2649a.0d0d98
msg.payload : string[15]
"Hello Node-RED!"

12/2/2021, 6:44:14 PM
msg : error
"Error: ENOENT: no such file or directory, open '/home/vcap/app/.node-red/package.json'"

12/2/2021, 6:58:17 PM  node: f072331d531af792
iot-2/type/device/id/01/evt/event_1/fmt/json :
msg.payload : Object
▾object
  temperature: 65
  humidity: 27

12/2/2021, 6:58:24 PM  node: f072331d531af792
iot-2/type/device/id/01/evt/event_1/fmt/json :
msg.payload : Object
▸{ temperature: 17, humidity: 3 }

12/2/2021, 6:58:28 PM  node: f072331d531af792
iot-2/type/device/id/01/evt/event_1/fmt/json :
msg.payload : Object
▸{ temperature: 13, humidity: 69 }
```