



Connecting a Conveyor Belt Simulator

Open Lab | Digital Summit 2019



Connecting a Conveyor Belt Simulator to IBM Watson IoT Platform

Introduction

This document contains a step-by-step process for creating an IBM Cloud IoT Service, running conveyor belt simulator locally, sending the state of the conveyor like start/stop and RPM to the Watson IoT, defining the rules in IoT platform and informing it to the user.

Pre-Requisites

All attendees must have their workstation (with Internet) to participate in the lab (Both PC and MAC are compatible). The following pre-requisites will help you to make the Hands-on Lab experience easier.

- Active email ID for registering with IBM Cloud
- Download and Install Node JS
- Text Editor such as Sublime Text (or) Notepad ++

Technology Involved

- IBM Watson IoT Platform
- Miracle's conveyor belt Simulator
- Node JS

Lab Steps

Let us get started with the lab!

The following steps will outline how you can run a conveyor belt simulator locally.

This application helps in sending the state of conveyor to the user and notify them.

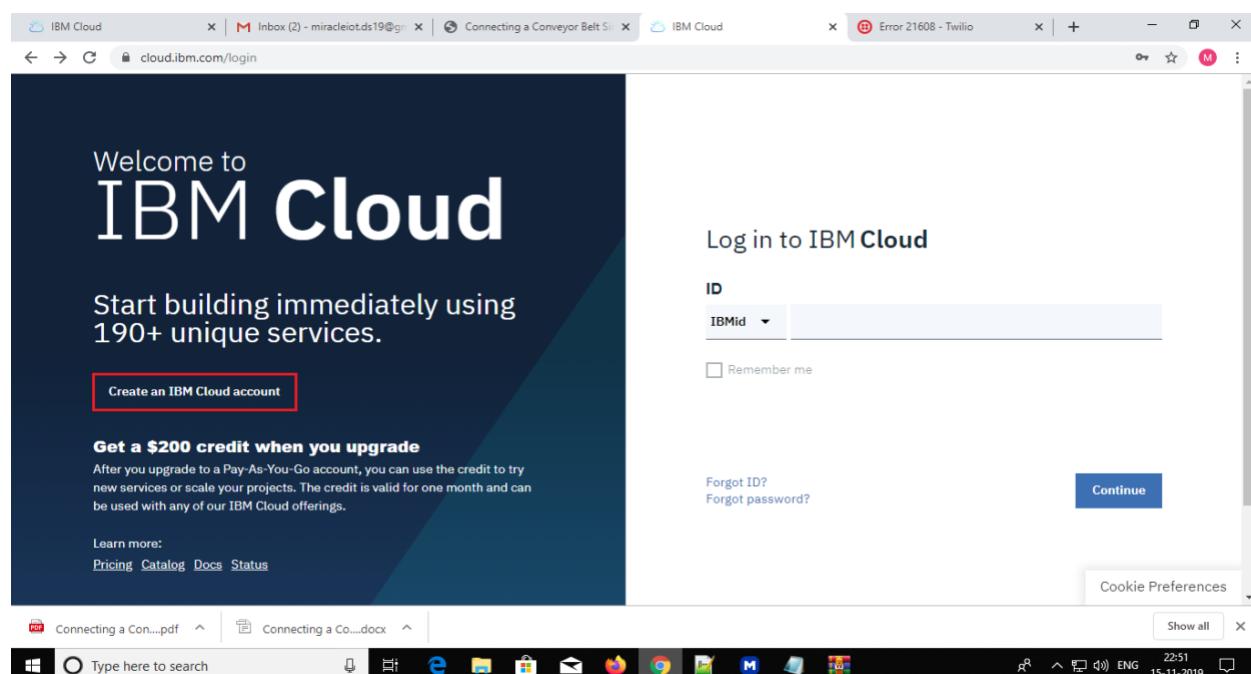
Step #1 | Create IBM Cloud Account

The first step will be to make sure that we have access to the IBM Cloud Console with either the free trial option (or) the paid subscription option.

Create a IBM Cloud account or Login to IBM Cloud at

<https://cloud.ibm.com/login>

Click on **Create an IBM Cloud account**.



Provide the information to the required fields.

Already have an IBM Cloud account? [Log in](#)

Create a free account

Join us in the cloud and start building today.

Email

First Name

Last Name

Country or Region

India

Password

IBM may use my contact data to keep me informed of products, services and offerings:

by email. by telephone.

You can withdraw your marketing consent at any time by sending an email to netsupp@us.ibm.com. Also you may unsubscribe from receiving marketing emails by clicking the unsubscribe link in each such email.

More information on our processing can be found in the [IBM Privacy Statement](#). By submitting this form, I acknowledge that I have read and understand the IBM Privacy Statement.

I accept the product [Terms and Conditions](#) of this registration form.

Create Account

After Clicking on **Create Account**, a confirmation mail will be sent to your registered mail id. Click on **Confirm account** and then login to your IBM Cloud account.

Log in to IBM Cloud

ID

 Remember me

Password

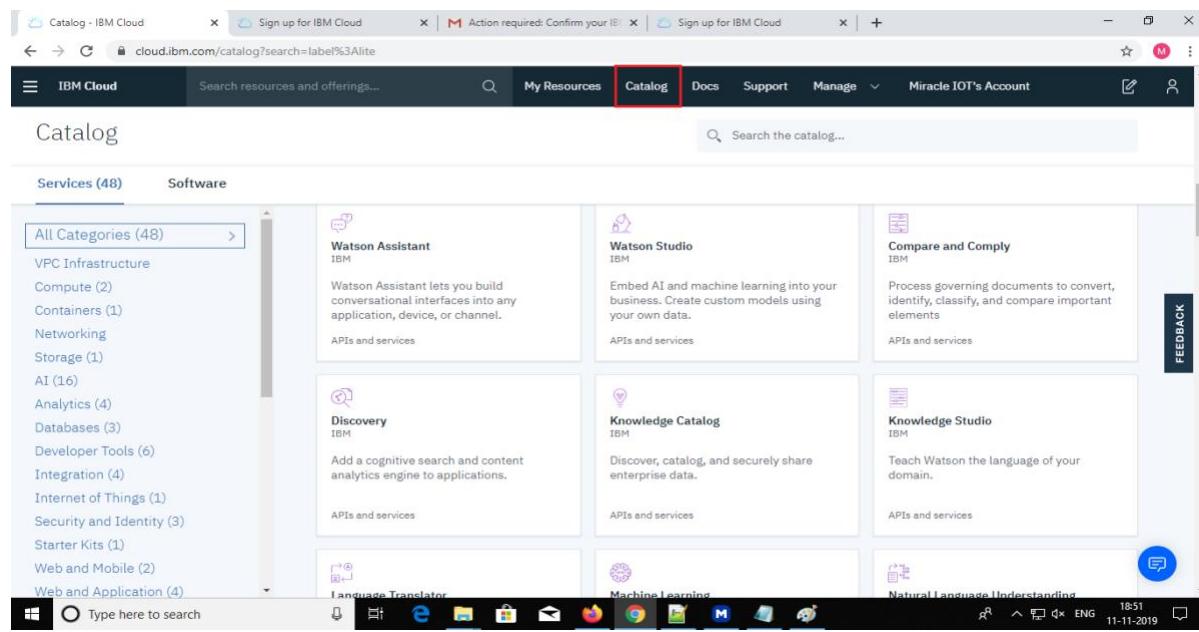
[Forgot ID?](#)[Forgot password?](#)[Continue](#)

After you log in, you can see the dashboard where you can take a look at your applications and services.

The screenshot shows the IBM Cloud dashboard. At the top, there are several tabs: 'IBM Cloud' (highlighted with a red box), 'Sign up for IBM Cloud', 'Action required: Confirm your IBM Cloud account', 'Sign up for IBM Cloud', and others. Below the tabs, the main navigation bar includes 'My Resources', 'Catalog', 'Docs', 'Support', 'Manage', and 'Miracle IOT's Account'. A search bar says 'Search resources and offerings...'. On the left, a sidebar has 'Dashboard' (highlighted with a red box) and 'Customize'. The main content area has three main sections: 'Resource summary' (with links to 'What is a resource?', 'Regions for resource deployment', and 'Best practices for organizing resources in resource group'), 'Planned maintenance' (listing a 'Next event: Tue, Nov 12, 2019 6:30 AM Security and Kernel Update (Non-Flex plans)'), and 'Location status' (listing 'Asia Pacific', 'Europe', and 'North America'). The 'For you' section features a 'Watson Studio' card and a 'Starter kit' card. At the bottom, there's a search bar, a taskbar with various icons, and system status information: '18:50 11-11-2019 ENG'.

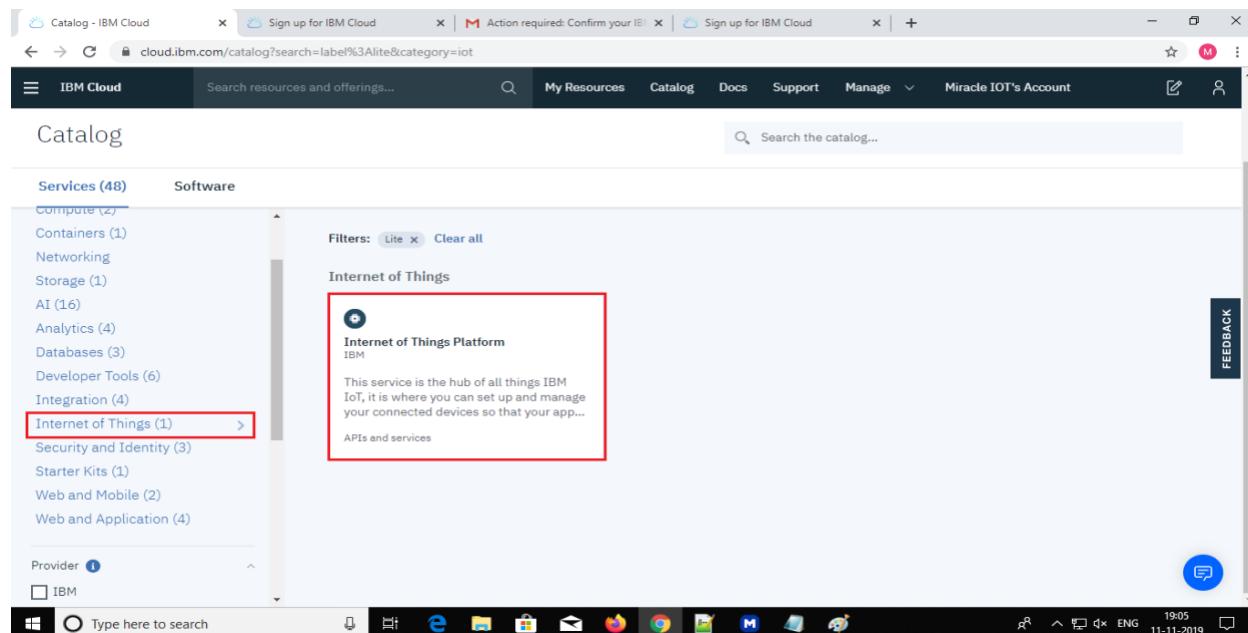
Step #2 | Create Application and Watson IoT Service

Click on **Catalog**, for creating an application.



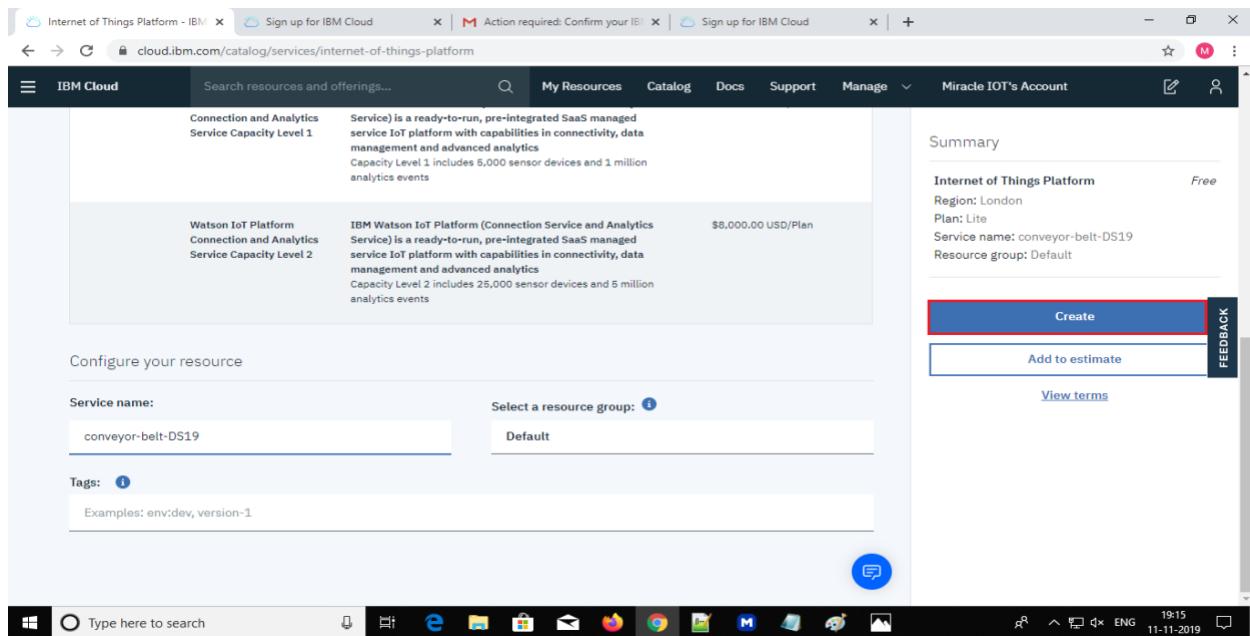
The screenshot shows the IBM Cloud Catalog interface. The top navigation bar includes links for Catalog, Docs, Support, Manage, and Miracle IOT's Account. The Catalog tab is highlighted with a red box. Below the navigation is a search bar labeled "Search the catalog...". The main content area is titled "Catalog" and displays "Services (48)". On the left, there is a sidebar with a "All Categories (48)" dropdown menu containing various service categories such as VPC Infrastructure, Compute, Containers, Networking, Storage, AI, Analytics, Databases, Developer Tools, Integration, Internet of Things, Security and Identity, Starter Kits, Web and Mobile, and Web and Application. A "Type here to search" input field is also present in the sidebar. The main content area lists several services: Watson Assistant, Watson Studio, Compare and Comply, Discovery, Knowledge Catalog, Knowledge Studio, Language Translator, Machine Learning, and Natural Language Understanding. Each service card includes a brief description and the IBM logo.

Click on the **Internet of Things** on the left side, you will be able to see the available services. Click on the **Internet of Things Platform Service**.



This screenshot shows the same IBM Cloud Catalog interface as the previous one, but with a specific focus on the "Internet of Things" category. The sidebar on the left has a red box around the "Internet of Things (1)" link under the "Compute" category. The main content area now displays a single service card for the "Internet of Things Platform" by IBM. The card includes a brief description: "This service is the hub of all things IBM IoT, it is where you can set up and manage your connected devices so that your app...". The "APIs and services" link below the description is also highlighted with a red box. The rest of the interface, including the top navigation bar and other service cards, remains the same as in the first screenshot.

Click on **Create** by giving a Unique Service name.

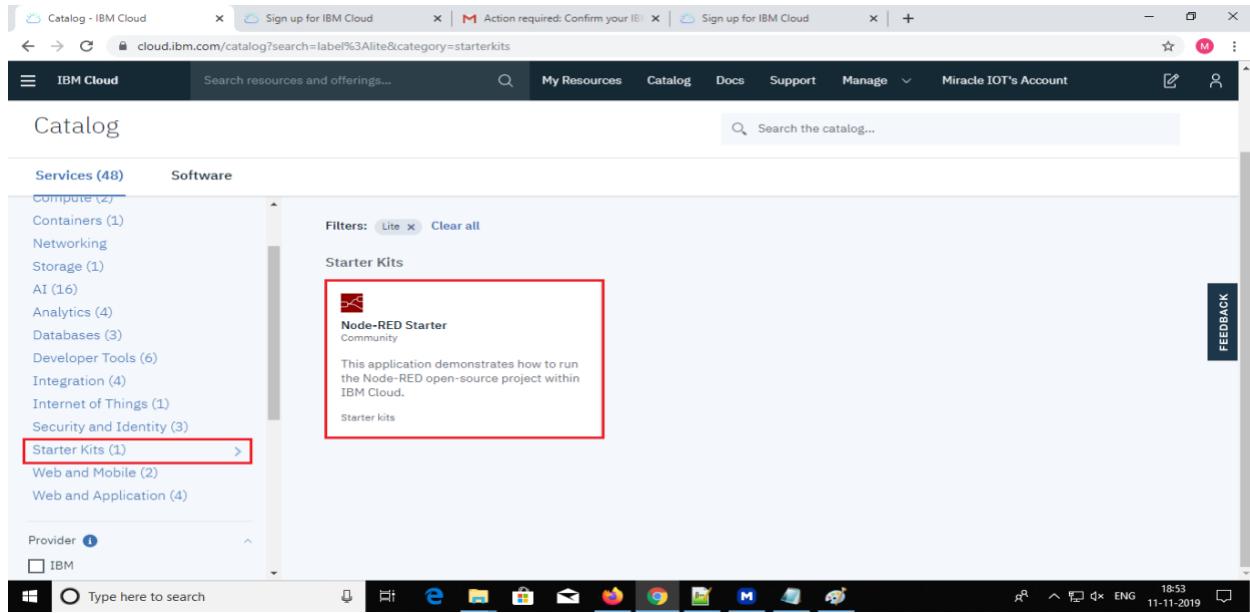


The screenshot shows the IBM Cloud Catalog interface. On the left, there's a sidebar with 'IBM Cloud' and a search bar. The main area displays two service options:

- Connection and Analytics Service Capacity Level 1**: Described as a ready-to-run, pre-integrated SaaS managed service IoT platform with capabilities in connectivity, data management and advanced analytics. Capacity Level 1 includes 5,000 sensor devices and 1 million analytics events.
- Watson IoT Platform Connection and Analytics Service Capacity Level 2**: Described as a ready-to-run, pre-integrated SaaS managed service IoT platform with capabilities in connectivity, data management and advanced analytics. Capacity Level 2 includes 25,000 sensor devices and 5 million analytics events.

Below these, a section titled 'Configure your resource' allows users to set a 'Service name' (conveyor-belt-DS19), 'Select a resource group' (Default), and add 'Tags'. A 'Create' button is prominently displayed on the right side of the page.

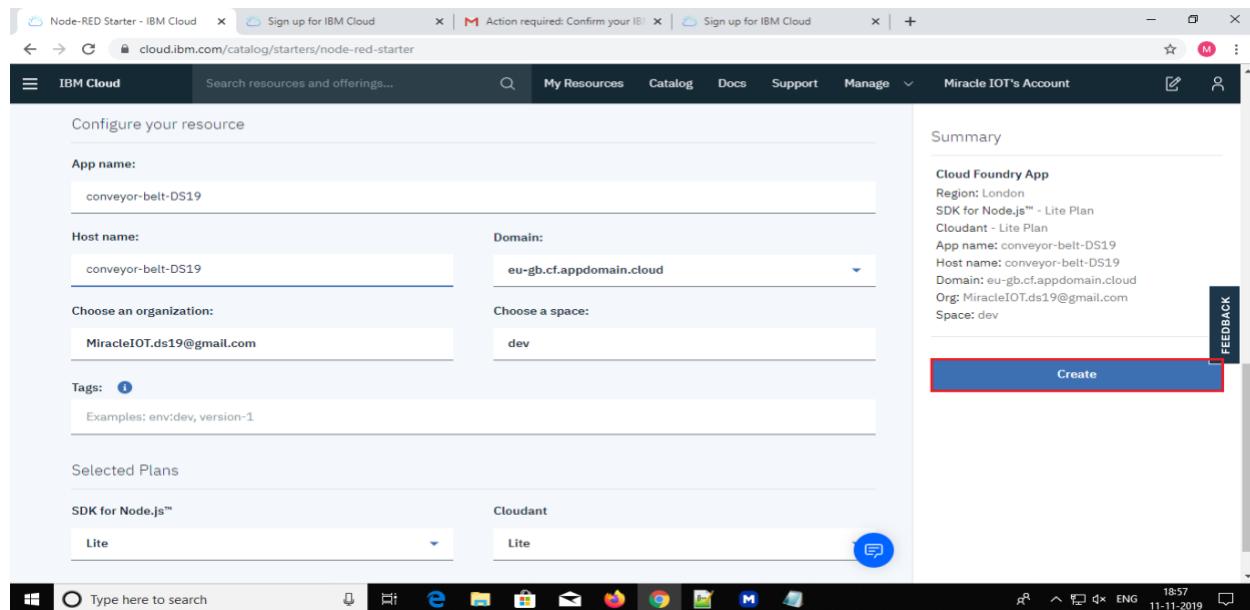
Again in the Catalog, Click on **Starter Kits** on the left side, you will be able to see the available services. Select **Node-Red Starter**.



The screenshot shows the IBM Cloud Catalog interface with the 'Catalog' tab selected. On the left, a sidebar lists various service categories like Compute, Containers, Networking, Storage, AI, Analytics, Databases, Developer Tools, Integration, Internet of Things, Security and Identity, and Starter Kits. The 'Starter Kits' link is highlighted with a red box. The main area shows a list of starter kits, with the 'Node-RED Starter' option highlighted by a red box. A brief description of the Node-RED Starter kit is provided: 'This application demonstrates how to run the Node-RED open-source project within IBM Cloud.'

The Starter Kit will have **SDK for Node.js** service by default for us to use as services. It will also have **Node-RED** pre-installed for you.

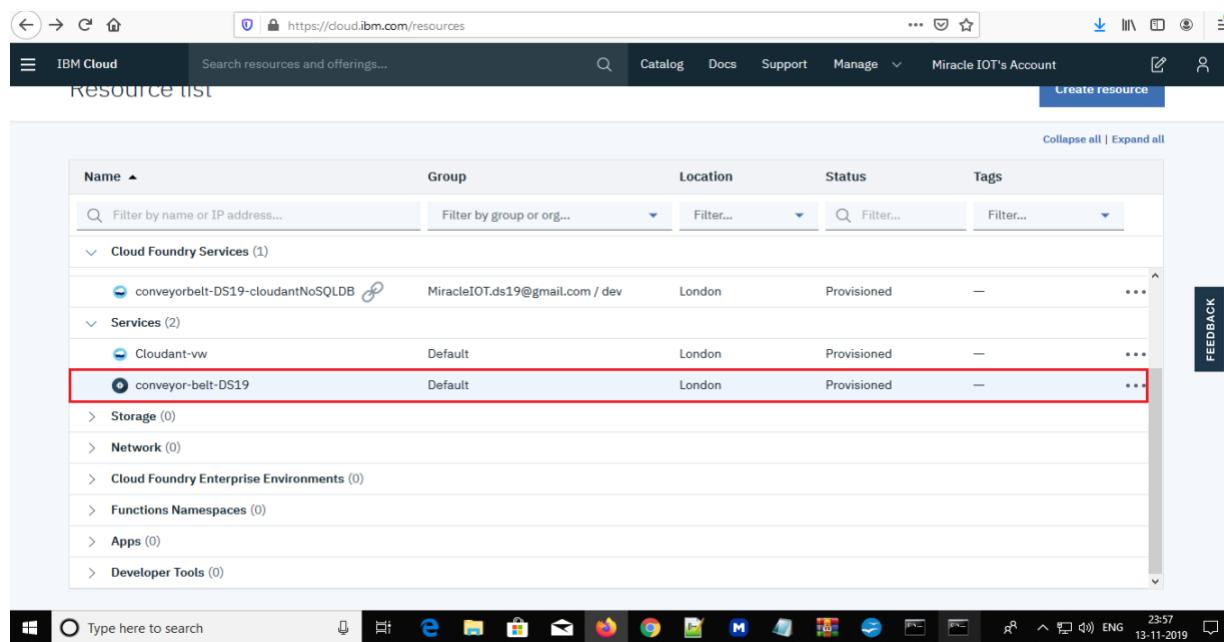
Give a unique name to your application here and click on **Create**. Application names must be unique as they will be on a public domain.



The screenshot shows the IBM Cloud interface for creating a new application. The 'App name:' field contains 'conveyor-belt-DS19'. The 'Host name:' field contains 'conveyor-belt-DS19'. The 'Domain:' dropdown is set to 'eu-gb.cf.appdomain.cloud'. The 'Choose a space:' dropdown is set to 'dev'. Under 'Selected Plans', the 'Cloudant' plan is selected. The 'Create' button at the bottom right is highlighted with a red box.

Step #3 | Register your Conveyor Belt (Simulator)

Go back to your IBM cloud account (Resources List).



The screenshot shows the IBM Cloud Resources List page. The table displays various resources, including 'conveyor-belt-DS19' which is highlighted with a red box. The columns include Name, Group, Location, Status, and Tags.

Name	Group	Location	Status	Tags
conveyor-belt-DS19	MiracleIOT.ds19@gmail.com / dev	London	Provisioned	—
Cloudant-vw	Default	London	Provisioned	—
conveyor-belt-DS19	Default	London	Provisioned	—

Click on the **Launch** button. This will redirect you to your IoT Platform Organization space.

Service Details - IBM Cloud | Sign up for IBM Cloud | Action required: Confirm your IBM Cloud account | Sign up for IBM Cloud | cloud.ibm.com/services/iotf-service/crm%3Av1%3Abluemix%3Apublic%3Aiotf-service%3Aeu-gb%3Aa%2F8125ce186d9f4fa5afdf2970ffb85843%3A77e30fe2-7951-4d42-8441-d09... | + | Mircale IOT's Account

IBM Cloud Search resources and offerings... My Resources Catalog Docs Support Manage Miracle IOT's Account

Manage Plan Connections

Resource list / **conveyor-belt-DS19**

Resource group: Default Location: London Add Tags

conveyor-belt-DS19

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.

Launch Docs

Ready for the next level?

IBM Watson IoT Platform Journey

Lite Non-Production Production

As the Organization is new, there will be no registered devices so, click on **Device Types** and click on **Add Device Type**.

Service Details - IBM Cloud | IBM Watson IoT Platform | Sign up for IBM Cloud | Action required: Confirm your IBM Cloud account | Sign up for IBM Cloud | c9wvmu.internetofthings.ibmcloud.com/dashboard/devices/types | + | Mircale IOT's Account

IBM Watson IoT Platform

miracleiot.ds19@gmail.com ID: c9wvmu

Browse Action **Device Types** Interfaces

Add Device Type +

This table lists all device types that are defined. You can filter the list and search for the name and description. You can modify and configure existing device types and add new device types.

Type the name to search f...

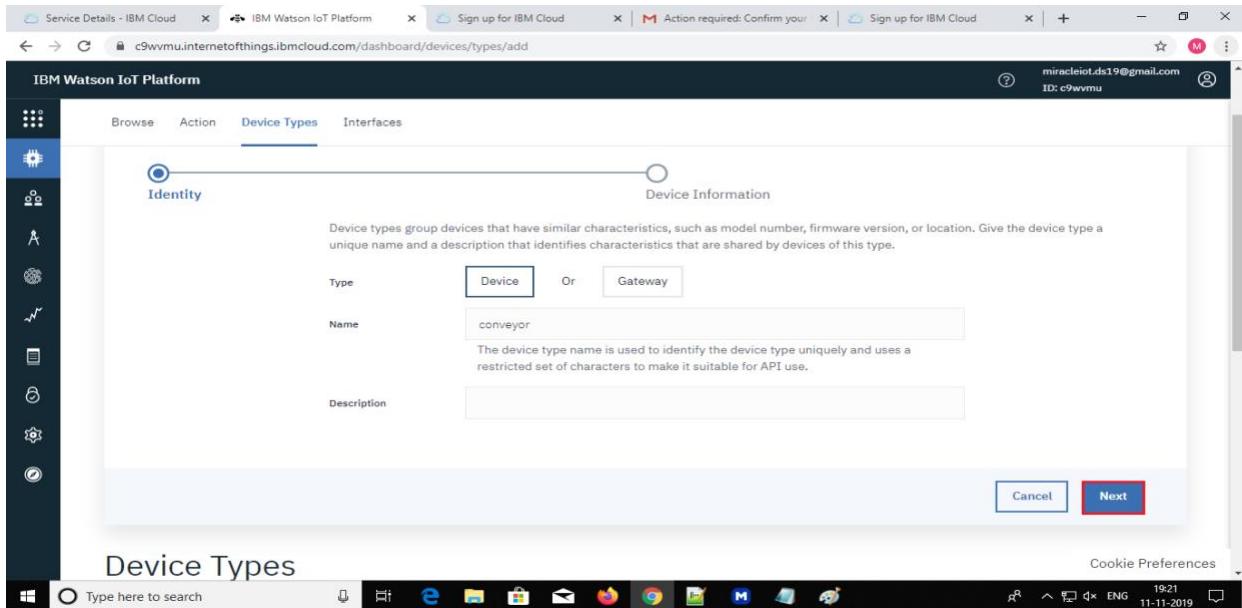
	Name	Description	Number of Devices	Class ID	Date Added
	Gateway		0		

You don't have any device types created.

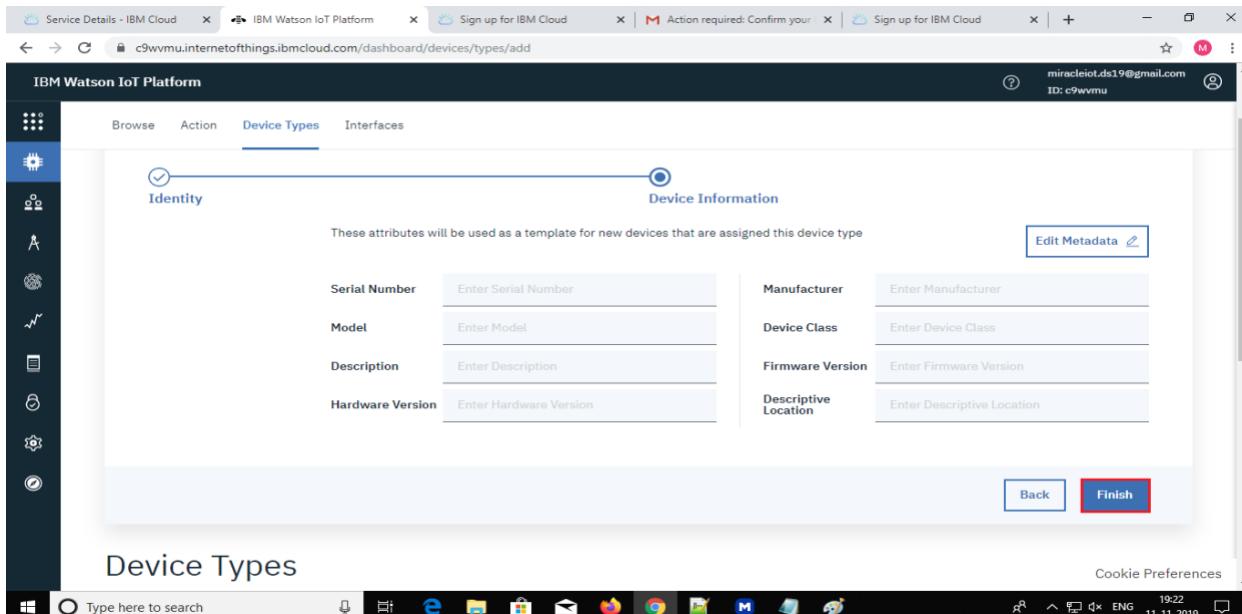
Add Device Type

Observe that we have 2 options. As we want to create a Device Type and not a Gateway, click on **Device**.

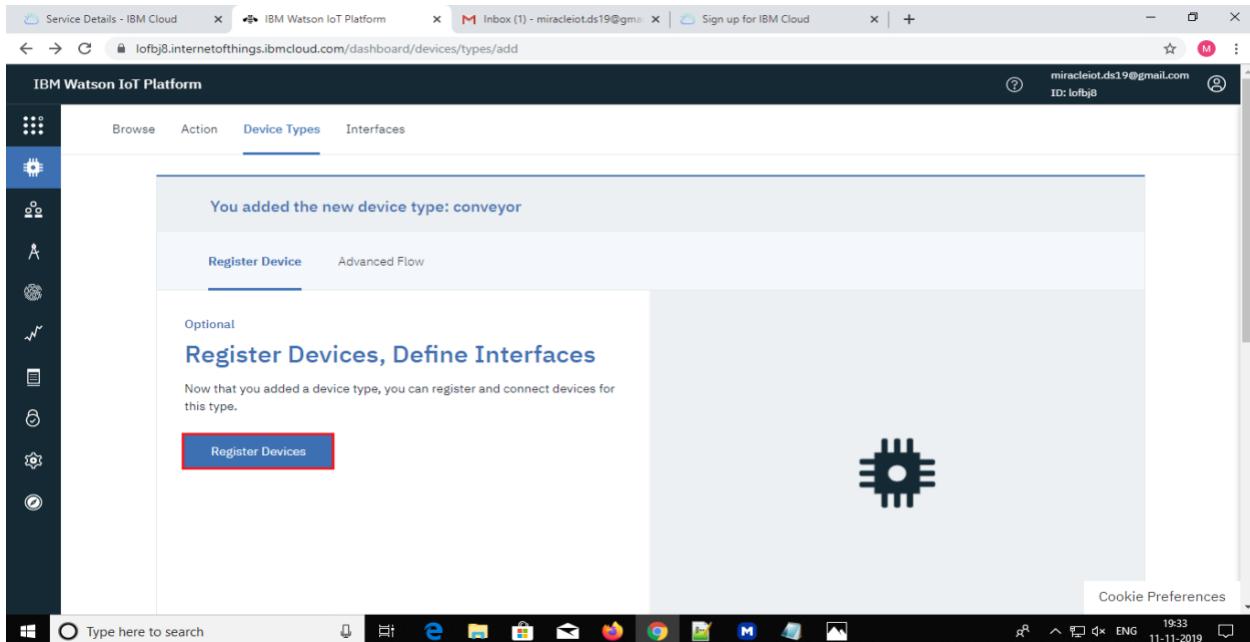
Specify a name for the device type to be added and give a description (Optional). For example, you can give **Conveyor** for Name field. Click on the **Next** option.



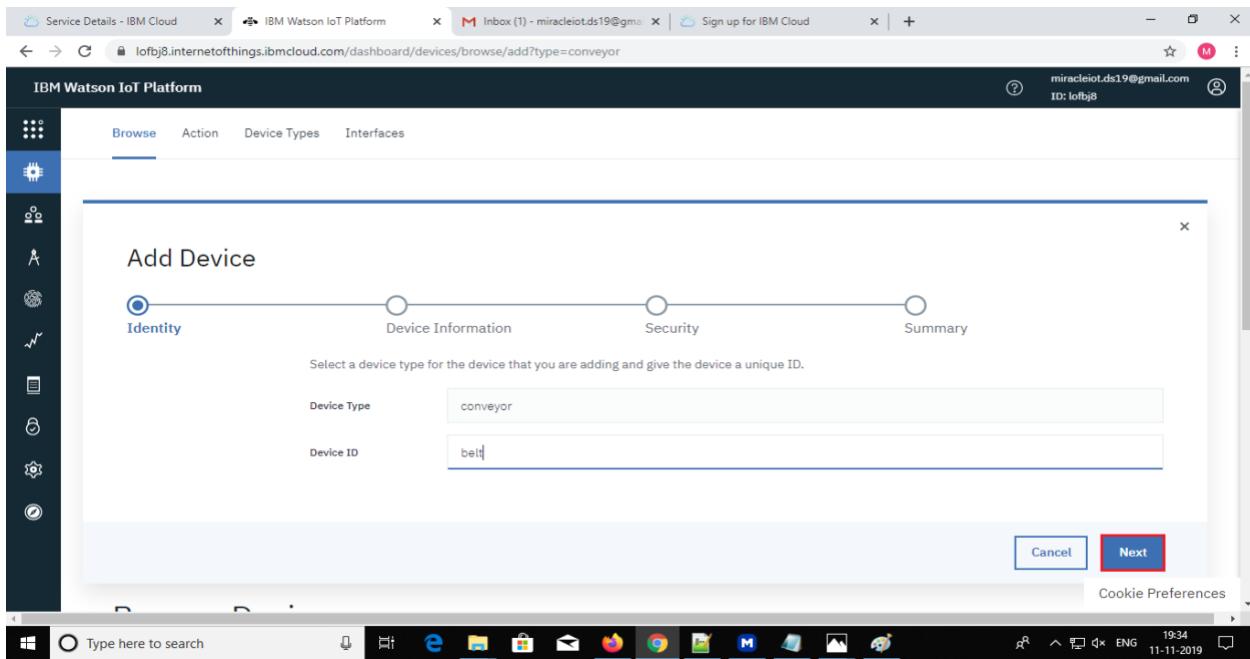
If you want to insert any “Device Information”, you can insert it here (this is optional). Click on **Finish**.



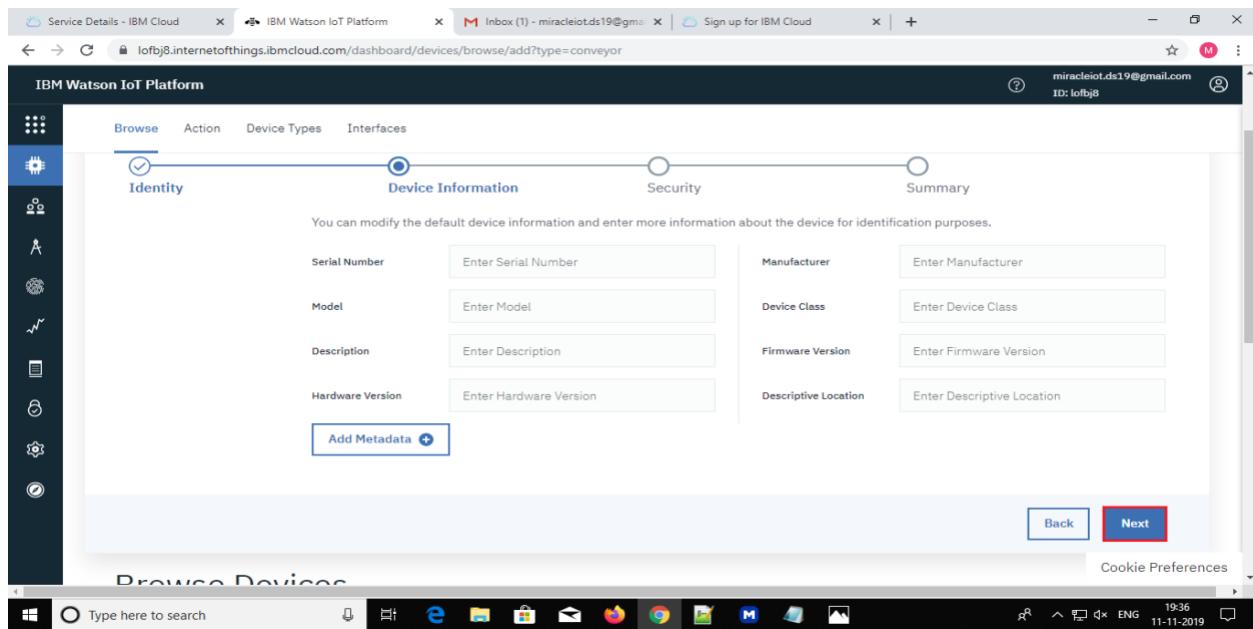
Click on **Register Devices**.



When prompted, Select the Existing **Device Type** as **Conveyor** and provide the **Device ID**, then click on **Next**.



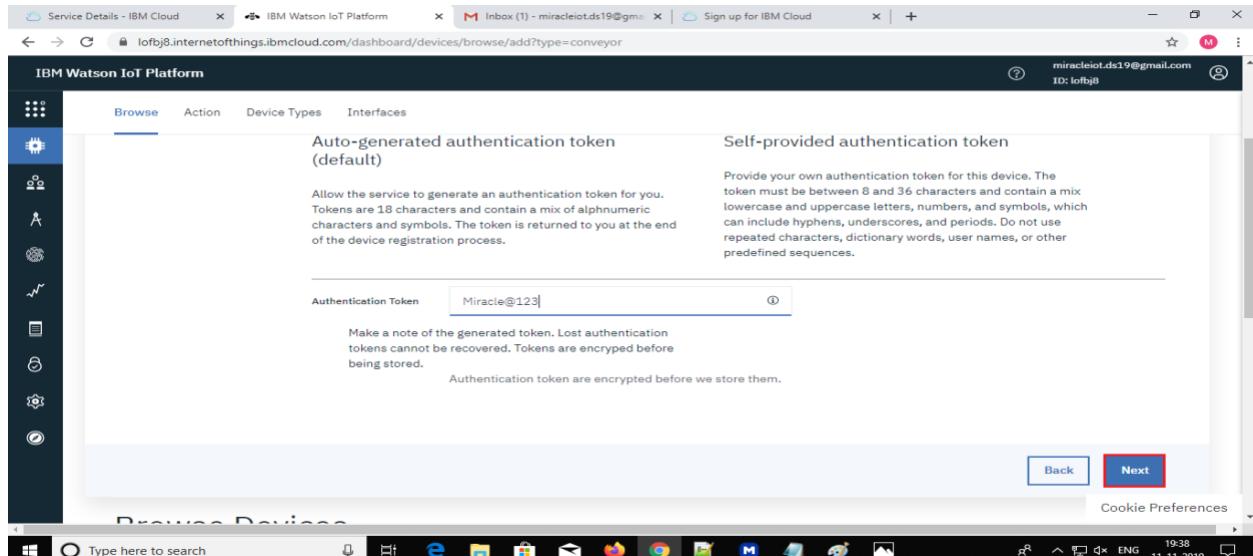
If you want to insert any “Device Information”, you can insert it here (this is optional). Click on **NEXT**.



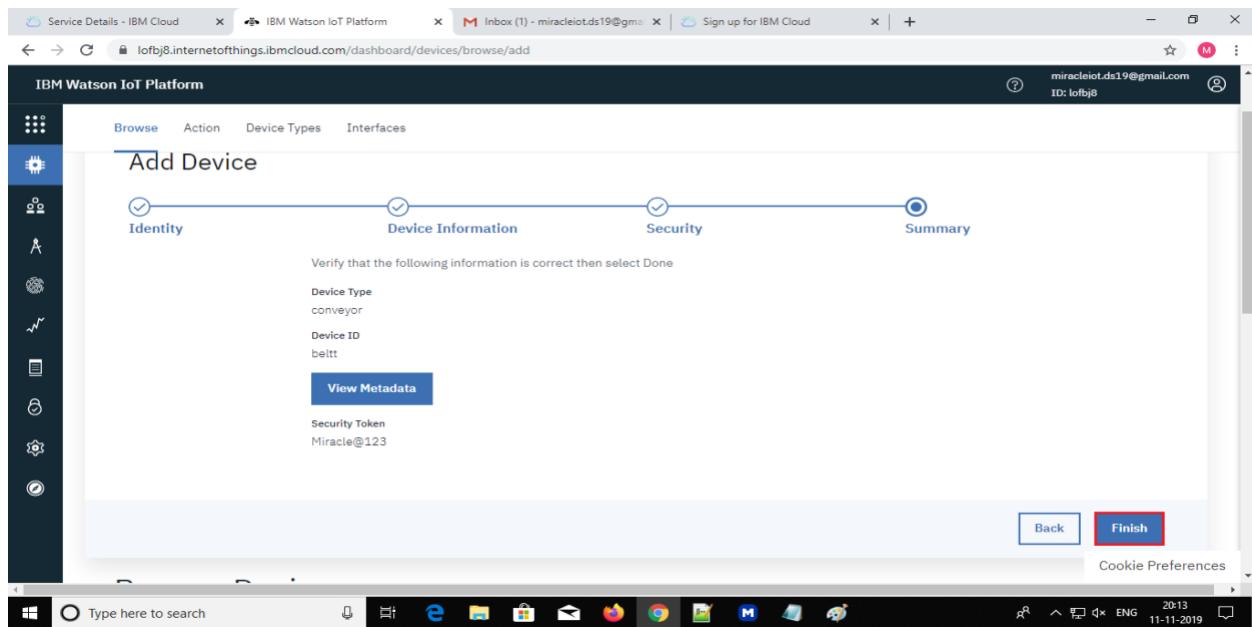
Enter the **Authentication Token** of your own or it will generate automatically.

Note: Make a note of the generated or entered authentication token. Lost authentication tokens cannot be recovered.

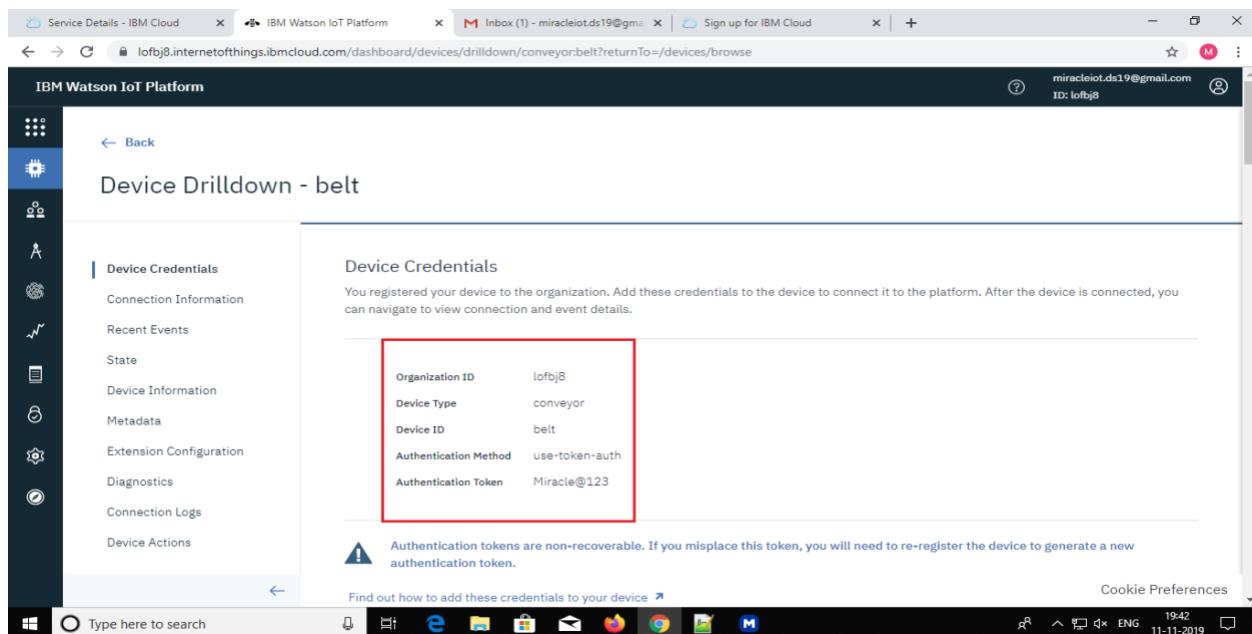
Click on **Next**.



Click on **Finish**, the Device Type is created successfully.



Note : After registering, save the credentials of the registered device.



Click Apps on the Dashboard to Generate API Keys.

The screenshot shows the IBM Watson IoT Platform dashboard. In the center, there's a section titled "Browse API Keys". Below it, a table lists one API key: "a-lofbj8-uu4gpkvtn" with a role of "Device Application". At the top right of this section, there's a blue button labeled "+ Generate API Key". The entire screenshot is framed by a blue border.

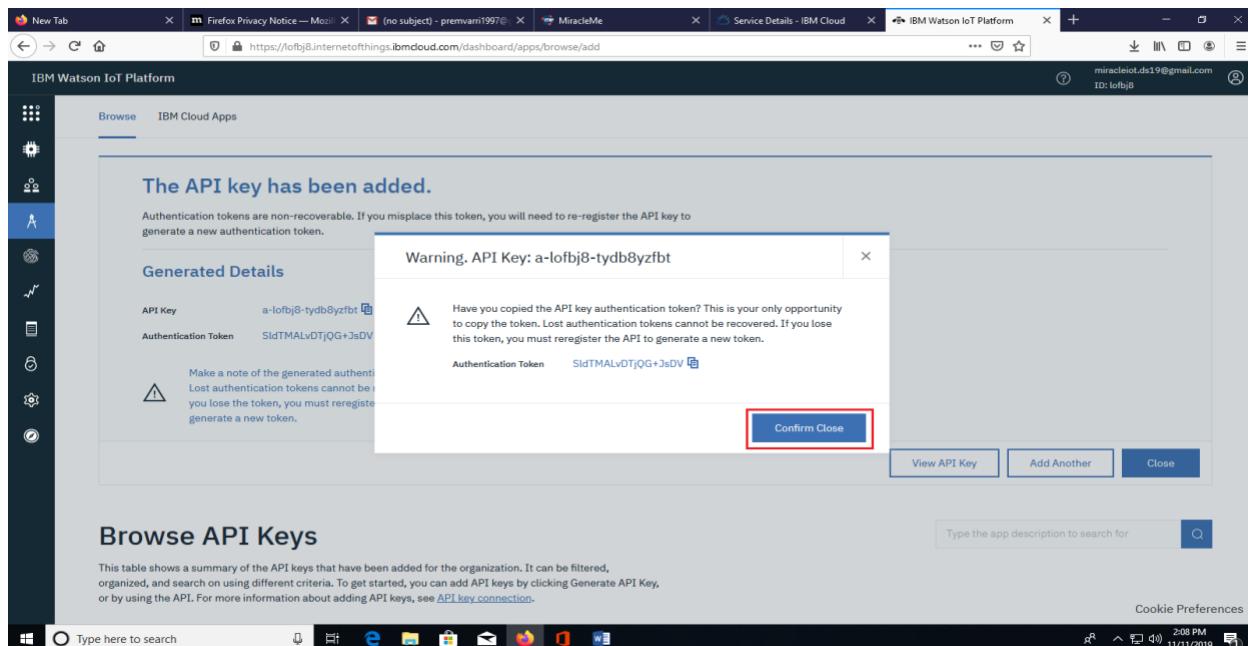
Click on Next.

This screenshot shows a modal dialog box titled "Generate API Key". It has two tabs: "Information" (which is selected) and "Permissions". Under "Information", there is a "Description" input field and an "API Key Expires" section with a switch set to "Off". At the bottom right of the dialog, there are "Cancel" and "Next" buttons, with "Next" being highlighted with a red box. The background of the dialog shows the "Browse API Keys" page from the previous screenshot.

Click on Generate Key.

The screenshot shows a browser window with multiple tabs open. The active tab is 'IBM Watson IoT Platform' at <https://lofbj8.internetofthings.ibmcloud.com/dashboard/apps/browse/add>. A modal dialog box titled 'Generate API Key' is displayed, showing the 'Information' tab selected. It lists a single role: 'Visualization Application'. Below the roles is a note: 'The application will have access for the following role:' followed by a dropdown menu set to 'Visualization Application'. At the bottom of the dialog are 'Back' and 'Generate Key' buttons, with 'Generate Key' highlighted with a red box. The background shows the main 'Browse API Keys' page, which includes a search bar and a table of generated API keys. One row in the table is highlighted with a red box, showing the 'Generated Details' section which contains the 'API Key' and 'Authentication Token' fields. The 'API Key' field is also highlighted with a red box.

Save the API Key and Authentication Token, then click on Close.



The API key has been added.

Authentication tokens are non-recoverable. If you misplaced this token, you will need to re-register the API key to generate a new authentication token.

Generated Details

API Key	a-lofbj8-tydb8yzfbt
Authentication Token	SldTMALvDTjQG+JsdV

Make a note of the generated authentication token. Lost authentication tokens cannot be recovered. If you lose the token, you must reregister the API to generate a new token.

Warning, API Key: a-lofbj8-tydb8yzfbt

Have you copied the API key authentication token? This is your only opportunity to copy the token. Lost authentication tokens cannot be recovered. If you lose this token, you must reregister the API to generate a new token.

Authentication Token SldTMALvDTjQG+JsdV

Confirm Close

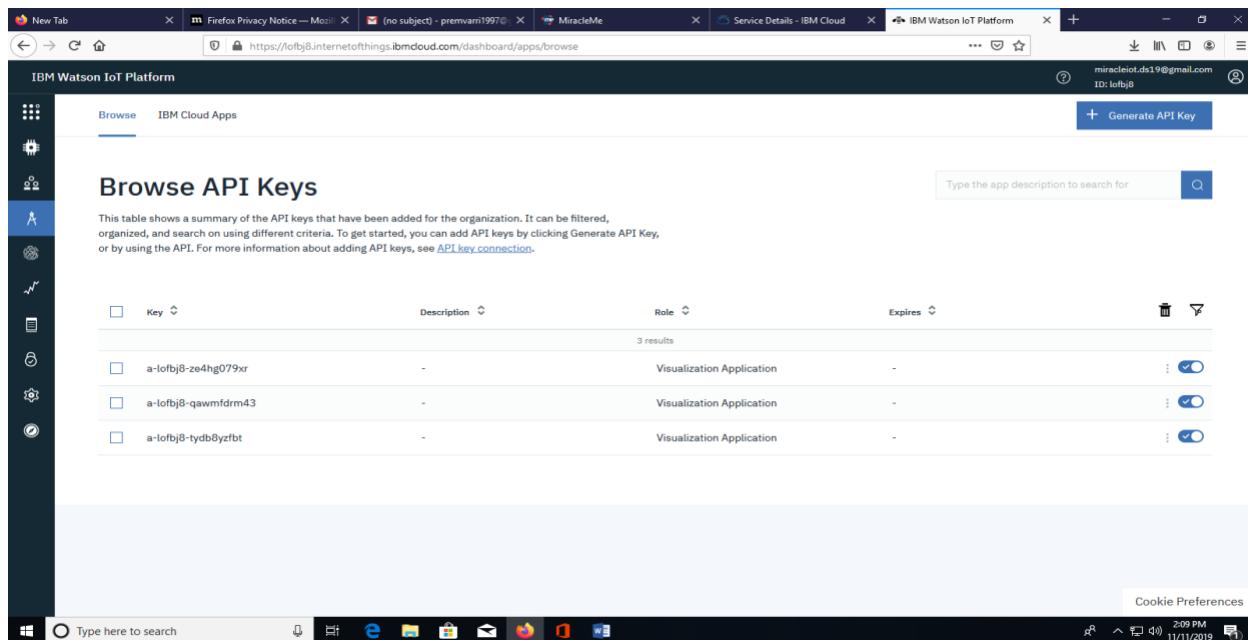
View API Key Add Another Close

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 here to search

You can see the created API Key and Authentication Token on the Apps Dashboard.



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](#).

Key	Description	Role	Expires	Action
a-lofbj8-ze4hg079xr	-	Visualization Application	-	<input checked="" type="checkbox"/>
a-lofbj8-qawmfdrm43	-	Visualization Application	-	<input checked="" type="checkbox"/>
a-lofbj8-tydb8yzfbt	-	Visualization Application	-	<input checked="" type="checkbox"/>

3 results

Type here to search

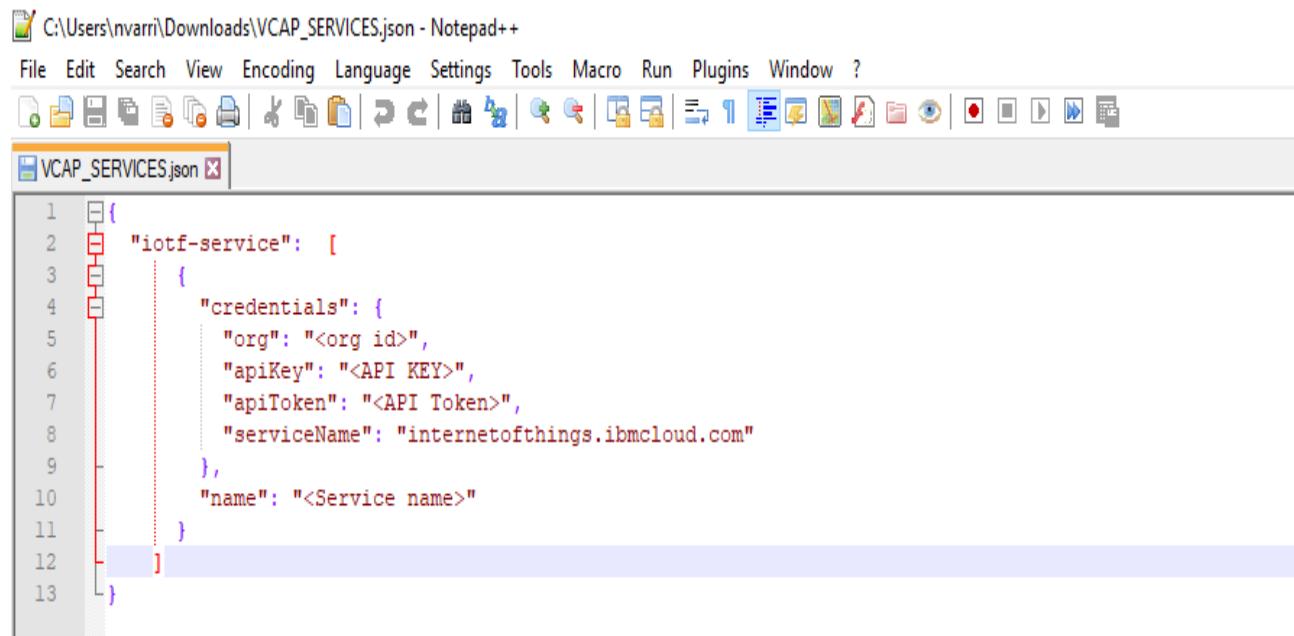
Note: Once it is created, the application will take about 2 minutes for staging and start running.

Step #4 | Configure the Simulator

For your simulator to communicate device data via MQTT to the IoT Platform we will need to configure it with the required endpoints and the registration details. Open the **VCAP_SERVICES.json** file.

Update the details of the file with the configuration details as mentioned in the comments. The following are the details that you should have with you to modify the file,

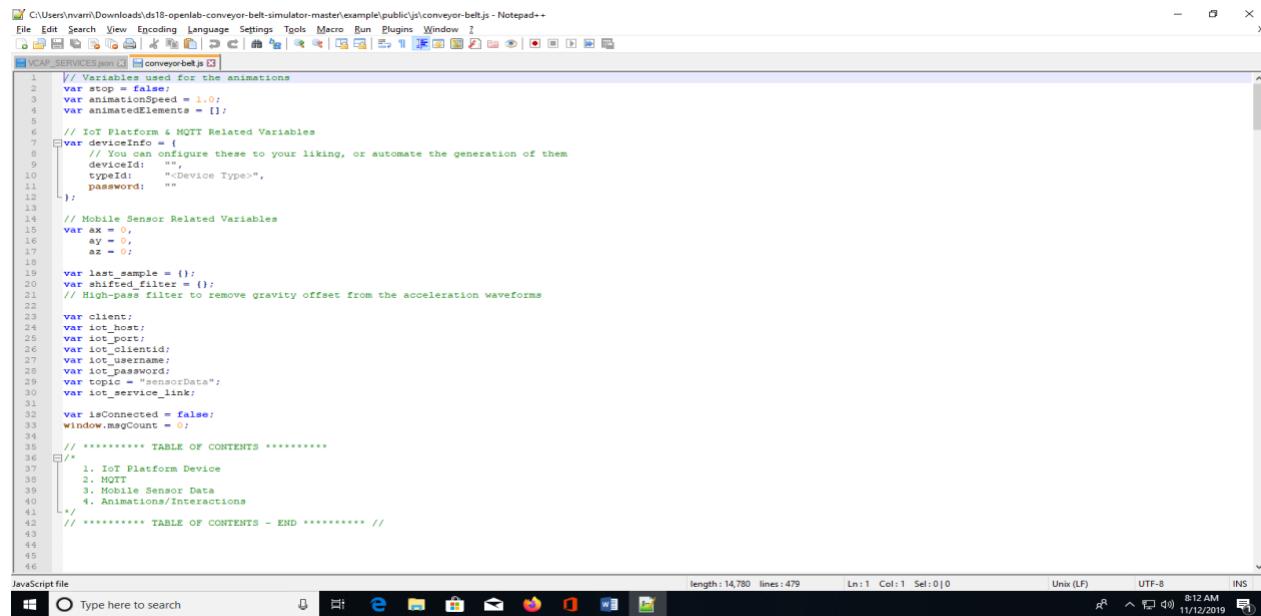
```
{  
  "iotf-service": [  
    {  
      "credentials": {  
        "org": "<org name>",  
        "apiKey": "<API key>",  
        "apiToken": "<Authentication Token>",  
        "serviceName": "internetofthings.ibmcloud.com"  
      },  
      "name": "<IoT service name>"  
    }  
  ]  
}
```



The screenshot shows the Notepad++ application window with the file **VCAP_SERVICES.json** open. The code is displayed with syntax highlighting, where `org`, `apiKey`, `apiToken`, and `serviceName` are highlighted in red. The JSON structure is shown with code folding, indicated by dotted lines and collapsed sections. The Notepad++ interface includes a toolbar with various icons and a menu bar with options like File, Edit, Search, View, Encoding, Language, Settings, Tools, Macro, Run, Plugins, Window, and ?.

```
1  {  
2    "iotf-service": [  
3      {  
4        "credentials": {  
5          "org": "<org id>",  
6          "apiKey": "<API KEY>",  
7          "apiToken": "<API Token>",  
8          "serviceName": "internetofthings.ibmcloud.com"  
9        },  
10       "name": "<Service name>"  
11     }  
12   ]  
13 }
```

Goto **Conveyor_Belt_Simulator/public/js** and open the **conveyor-belt.js** file. Configure type id at line number #10 and save the file.



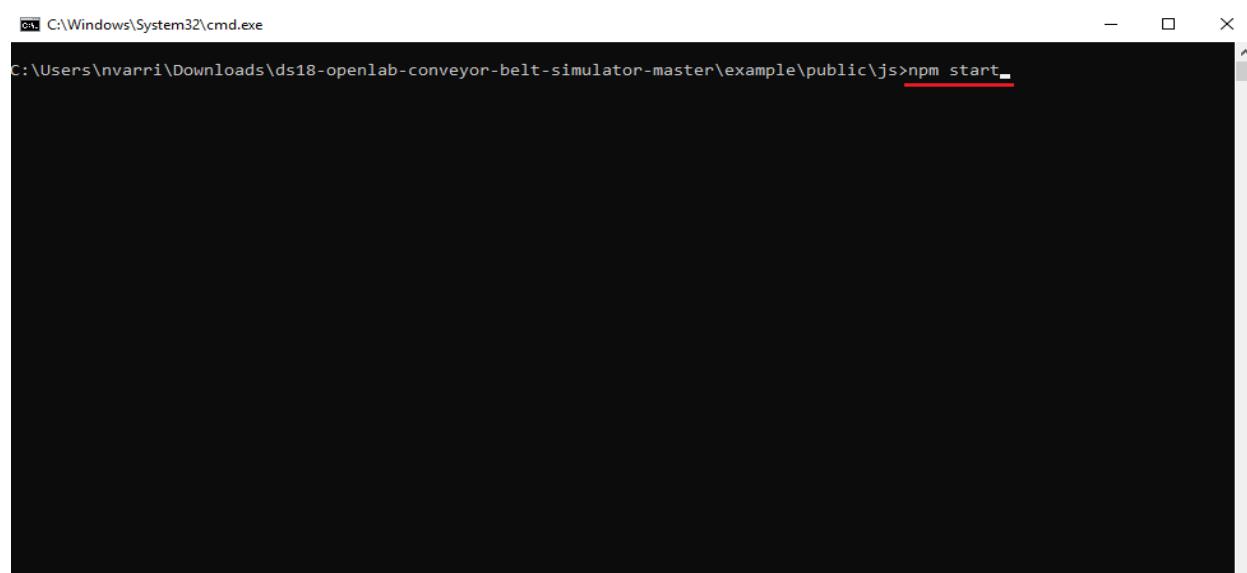
```

C:\Users\nvarri\Downloads\ds18-openlab-conveyor-belt-simulator-master\example\public\js\conveyor-belt.js - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window I
VCA_SERVICES.json [1] conveyor-belt.js [2]
1 // Variables used for the animations
2 var stop = false;
3 var animationSpeed = 1.0;
4 var animatedElements = [];
5
6 // IoT Platform & MQTT Related Variables
7 var deviceInfo = {
8     // You can configure these to your liking, or automate the generation of them
9     deviceId: "",
10     typeid: "<Device Type>",
11     password: ""
12 };
13
14 // Mobile Sensor Related Variables
15 var ax = 0,
16     ay = 0,
17     az = 0;
18
19 var last_sample = {};
20 var shifted_filter = {};
21 // High-pass filter to remove gravity offset from the acceleration waveforms
22
23 var client;
24 var iot_host;
25 var iot_id;
26 var iot_clientid;
27 var iot_username;
28 var iot_password;
29 var topic = "sensorData";
30 var iot_service_link;
31
32 var isConnected = false;
33 window.magCount = 0;
34
35 // ***** TABLE OF CONTENTS *****
36 /*
37 1. IoT Platform Device
38 2. MQTT
39 3. Mobile Sensor Data
40 4. Animations/Interactions
41 */
42 // ***** TABLE OF CONTENTS - END *****
43
44
45
46

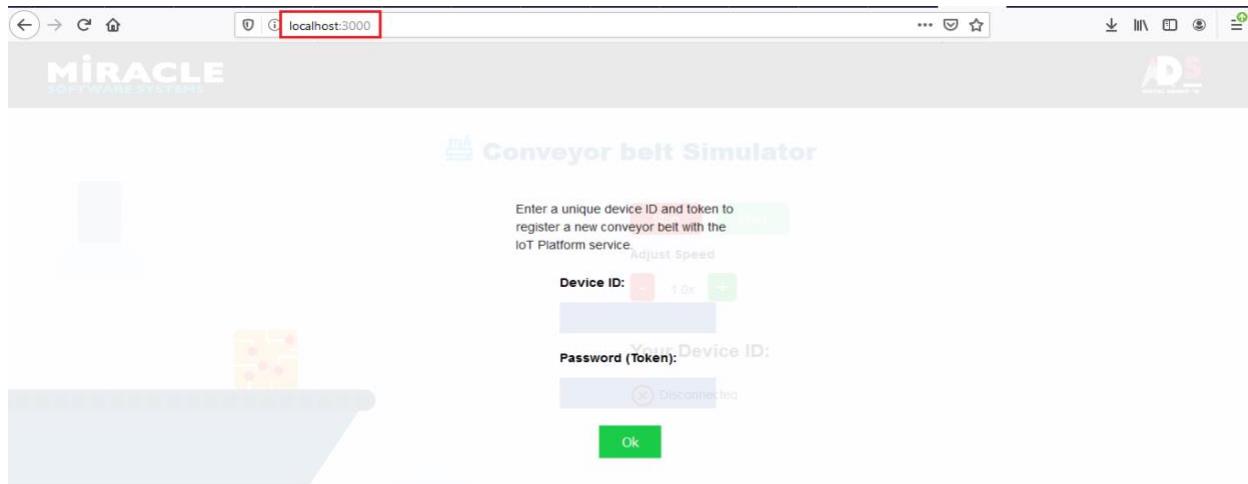
```

Step #5 | Launch the Simulator

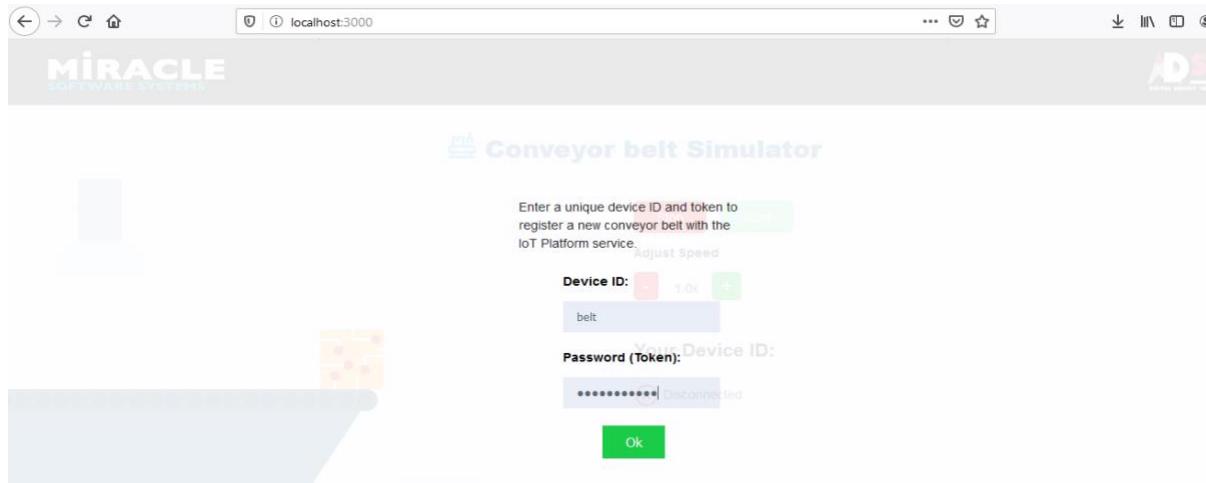
Go to Conveyor_Belt_Simulator/bin Directory and give cmd in the path to open command prompt and run **npm start**.

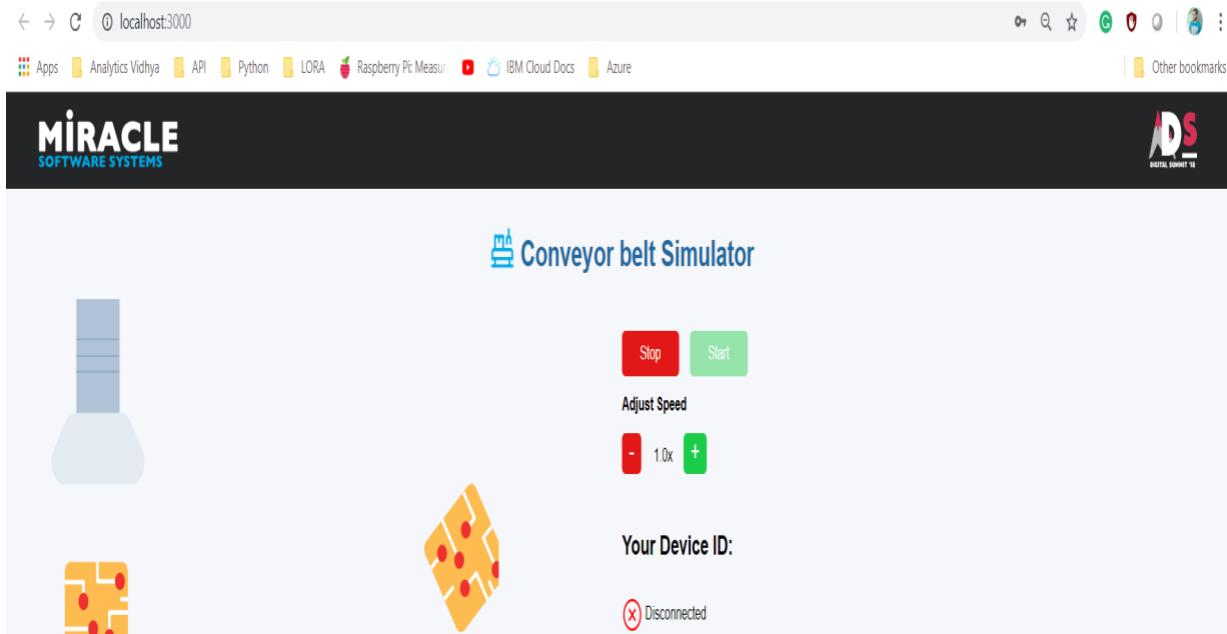


Open **localhost: 3000** on your web browser to launch the Conveyor Belt Simulator.

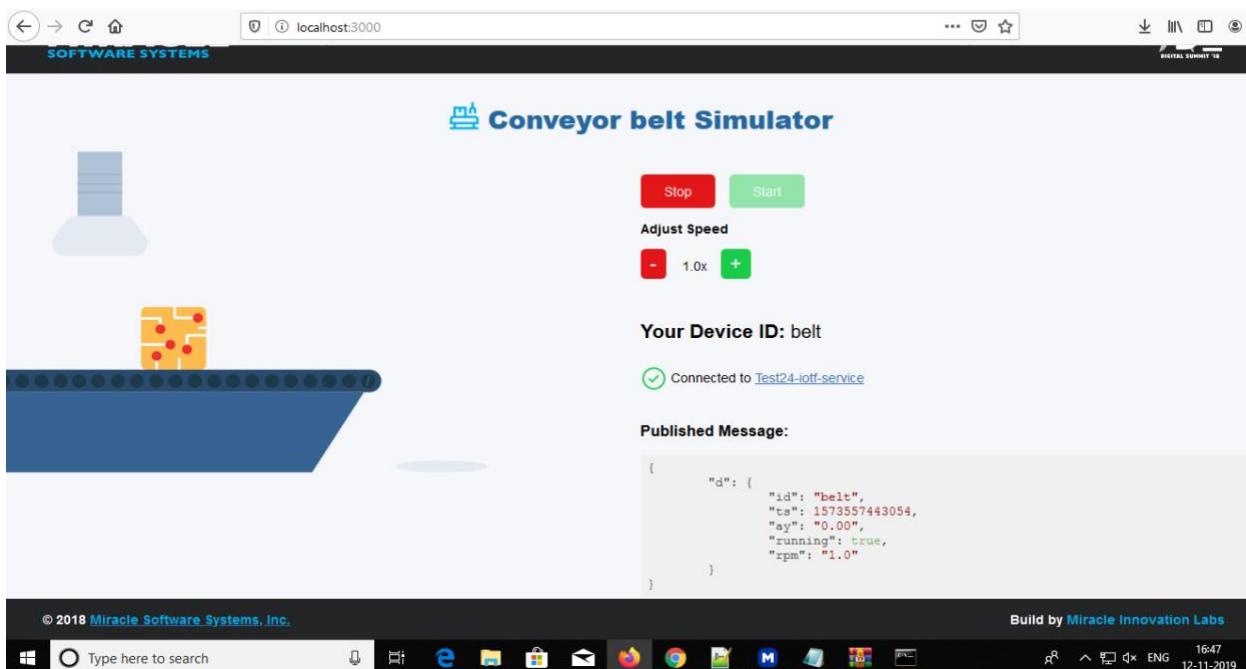


Enter **device id** and **password** (auth token), and click on **Ok**.





If the data is published successfully to the Watson IoT platform, the **Published Message** appears as shown below.



Open Command prompt for checking the response.

```
git npm
GET /socket.io/?EIO=3&transport=polling&t=MvVMHQ3 404 91.929 ms - 1466
GET /socket.io/?EIO=3&transport=polling&t=MvVMIvm 404 2.993 ms - 1466
GET / 304 5.454 ms -
GET /js/object-keys-polyfill.js 304 2.992 ms -
GET /js/conveyor-belt.js 304 5.575 ms -
GET /styleSheets/style.css 304 7.318 ms -
GET /iotf-client-bundle.min.js 304 8.812 ms -
GET /images/disconnected.svg 304 0.400 ms -
GET /logo.png 304 1.445 ms -
GET /dribbble.svg 304 1.791 ms -
GET / 304 1.445 ms -
GET /socket.io/?EIO=3&transport=polling&t=MvVMHPE 404 3.091 ms - 1466
GET /socket.io/?EIO=3&transport=polling&t=MvVMK7 404 8.964 ms - 1466
GET /socket.io/?EIO=3&transport=polling&t=MvVMLMh 404 7.737 ms - 1466
GET /credentials 304 1.863 ms -
BASIC CONFIG { org: '5a8mek',
  apiKey: 'a-5a8mek-grpjpb6sort',
  apiToken: '1z-g@1kbxBwUf9gm_rk',
  serviceName: 'Test24-iotf-service' }
{ id: 'Conveyor' }
GET /socket.io/?EIO=3&transport=polling&t=MvVMMq1 404 6.951 ms - 1466
createDeviceType {
  org: '5a8mek',
  apiKey: 'a-5a8mek-grpjpb6sort',
  apiToken: '1z-g@1kbxBwUf9gm_rk',
  serviceName: 'Test24-iotf-service' }
{ deviceId: 'belt', authToken: 'Miracle@123' }
STRING {"id": "5a8mek", "name": "5a8mek", "enabled": true, "type": "Bluemix Free", "bluemix": {"region": "eu-gb", "organizationGuid": "00000000-0000-0000-0000-000000000000", "serviceInstanceId": "crn:v1:bluemix:public:iotf-service:eu-gba:/8125ce186df4fa5afdf2970ff85843:40e5f61c-416b-446c-b55b-bd84dea53261:", "spaceGuid": "00000000-0000-0000-0000-000000000000", "serviceInstanceId": "crn:v1:bluemix:public:iotf-service:eu-gba:/8125ce186df4fa5afdf2970ff85843:40e5f61c-416b-446c-b55b-bd84dea53261:", "updated": "2019-11-12T11:01:35Z"} }
iotServiceLink end {"id": "5a8mek", "name": "5a8mek", "enabled": true, "type": "Bluemix Free", "bluemix": {"region": "eu-gb", "organizationGuid": "00000000-0000-0000-0000-000000000000", "serviceInstanceId": "crn:v1:bluemix:public:iotf-service:eu-gba:/8125ce186df4fa5afdf2970ff85843:40e5f61c-416b-446c-b55b-bd84dea53261:", "spaceGuid": "00000000-0000-0000-0000-000000000000", "updated": "2019-11-12T11:01:35Z"} }
GET /iotServiceLink 304 3114.568 ms -
createDeviceAnd
POST /api/registerDevice 200 4878.425 ms - 21
GET /images/connecting.svg 304 1.419 ms -
GET /images/connected.svg 304 0.898 ms -
GET /socket.io/?EIO=3&transport=polling&t=MvVMOIn 404 5.542 ms - 1466
GET /socket.io/?EIO=3&transport=polling&t=MvVMPmo 404 2.421 ms - 1466
GET /socket.io/?EIO=3&transport=polling&t=MvVMRh 404 4.815 ms - 1466
GET /socket.io/?EIO=3&transport=polling&t=MvVMSin 404 5.226 ms - 1466

```

Go back to Watson IoT Dashboard for checking the payload in **Recent Events**.

Event	Value	Format	Last Received
sensorData	[{"d": {"id": "belt", "ts": 1573557731990, "ay": "0.00..."}]	json	2 minutes ago
sensorData	[{"d": {"id": "belt", "ts": 1573557443054, "ay": "0.00..."}]	json	7 minutes ago

Click on the published data. The data is represented in JSON format.

The screenshot shows the IBM Watson IoT Platform interface. On the left, there's a sidebar with various icons. In the center, a modal window titled "Event Payload" is open, displaying the following JSON data:

```

1 | {
2 |   "d": {
3 |     "id": "belt",
4 |     "ts": 1573557731990,
5 |     "ay": "0.00",
6 |     "running": true,
7 |     "rpm": "1.0"
8 |   }
9 | }

```

Below the modal, the main dashboard shows a list of recent events for the device "belt".

Step #6 | Twilio Account Creation

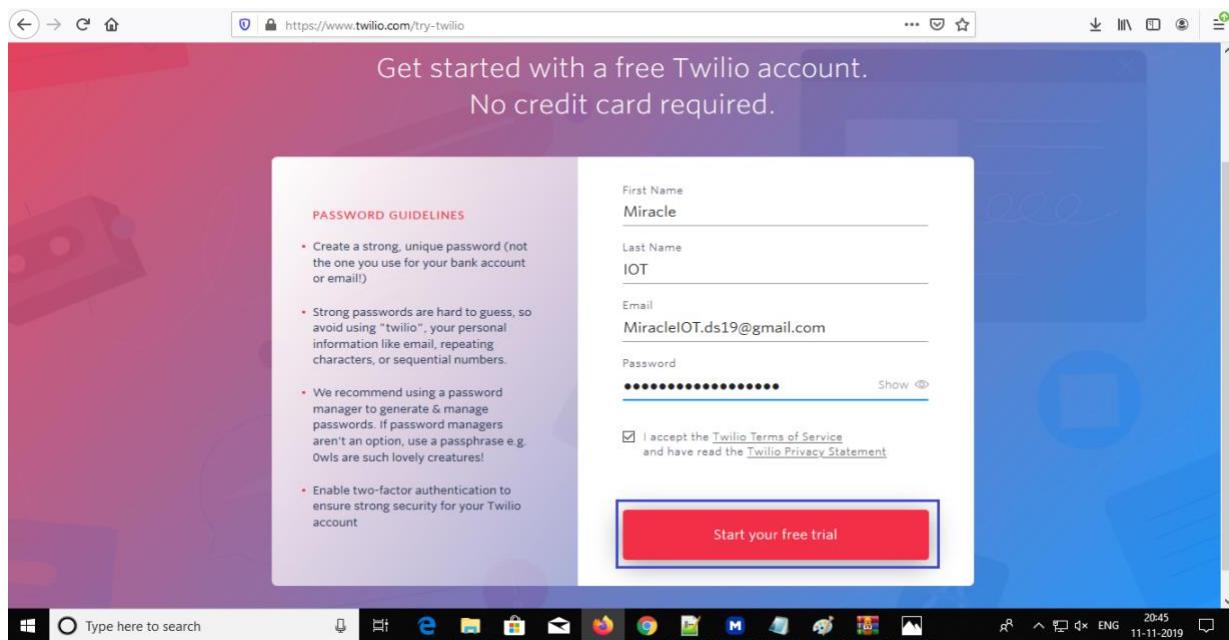
To create the Twilio account, go to <https://www.twilio.com/> and click on Sign up.

The screenshot shows the Twilio website. At the top, there's a navigation bar with links like "Service Details - IBM C", "IBM Watson IoT Platform", "Gmail", "Sign up for IBM Cloud", "Twilio - Communications", and buttons for "Talk to an expert" and "Sign up".

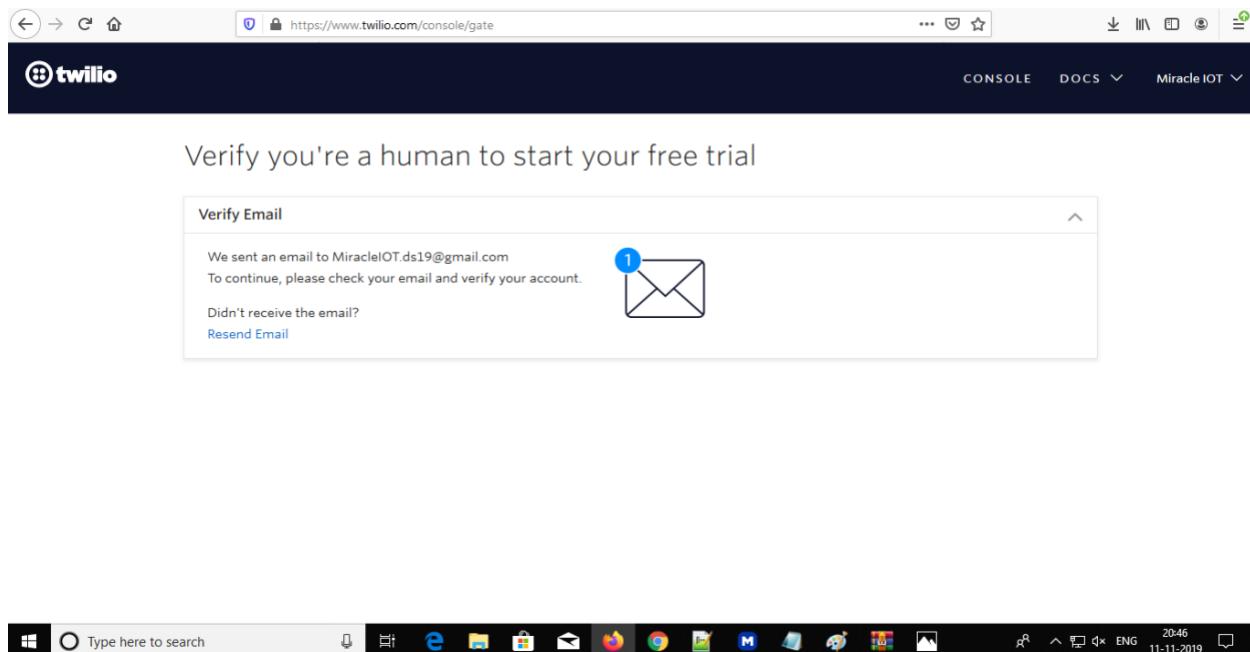
The main content area features a large image of a smiling woman with long hair, identified as Susan Hui. Text on the page includes:

- MEET TWILIO FLEX — THE FIRST FULLY-PROGRAMMABLE CONTACT CENTER PLATFORM
- SUPPORT LOG IN
- twilio
- Products Solutions Docs & Tools Customer Stories Partners Pricing
- DRIVE LEGENDARY CUSTOMER ENGAGEMENT
- Build 1:1 relationships at scale.
Build them with Twilio.
- Sign up and start building >
- Questions? Talk to an expert.
- Susan Hui
Flowers are just the start. Susan builds customer connections with Twilio Studio.
- Sign up

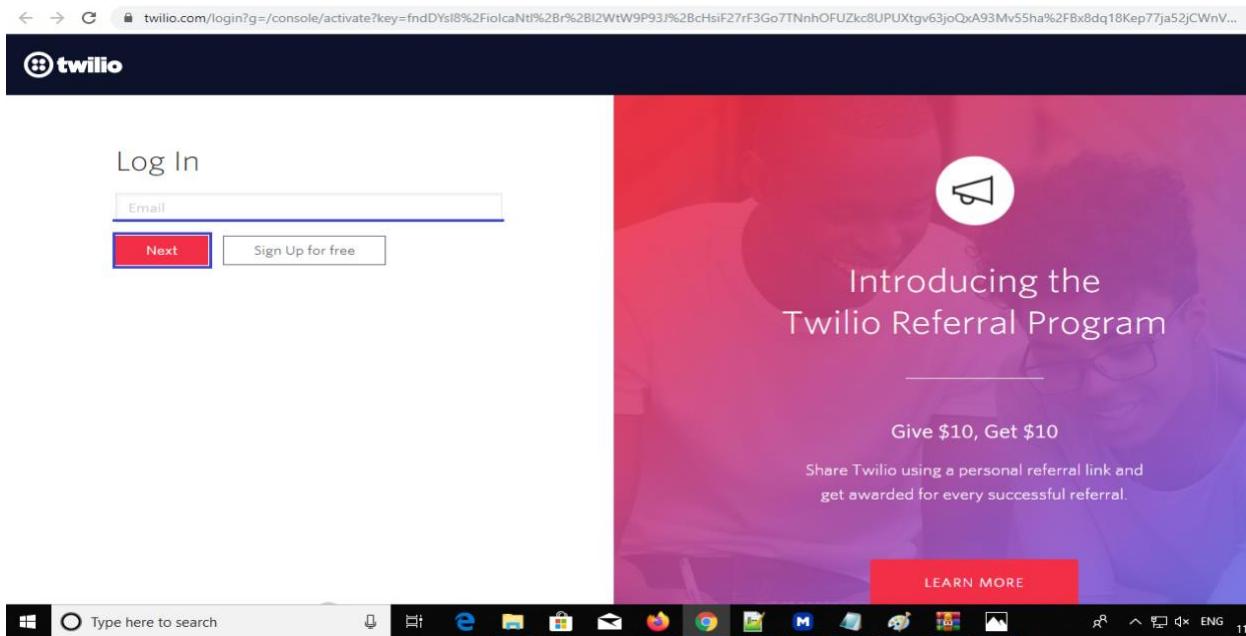
Provide all the necessary information to the required fields and click on **Start Your Free Trail**.



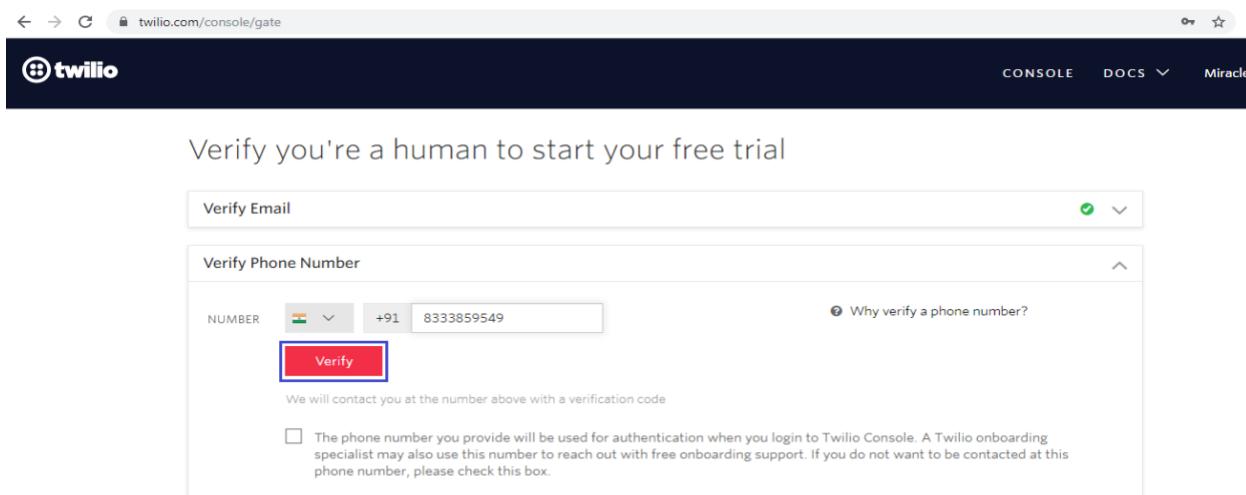
Verify your email by clicking on the link sent by Twilio to your registered mail id.



Login to your Twilio account by your Email Id provided during registration.



After providing the Email of the user, click on **Next**. It requests you to **Verify Phone Number**, please provide a valid phone number for verification.



twilio.com/console/gate

CONSOLE DOCS Miracle IOT

Verify you're a human to start your free trial

Verify Email

Verify Phone Number

Please enter the verification code we sent to <8333859549>

197967

Want to verify with a Call instead of SMS?

Didn't receive a code?
Resend Code (26)



Click on **Skip to dashboard** for the upcoming pages.

Which service/company are you integrating Twilio into? (last question)

This information helps us learn how to improve the integration experience.

WordPress	Agile CRM
Hubspot	Slack
Zoho CRM	Zapier
Other	<input type="button" value="Skip to dashboard"/>



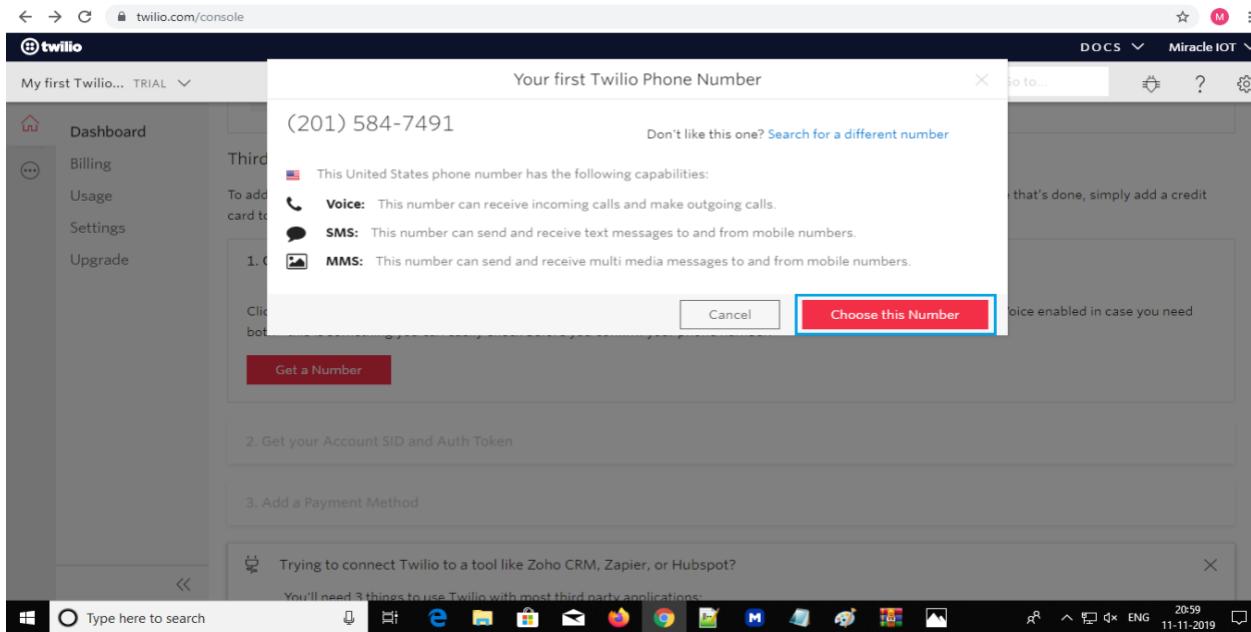
In the Dashboard of the Twilio, click on **Get a Number**.

The image contains two side-by-side screenshots of the Twilio console interface.

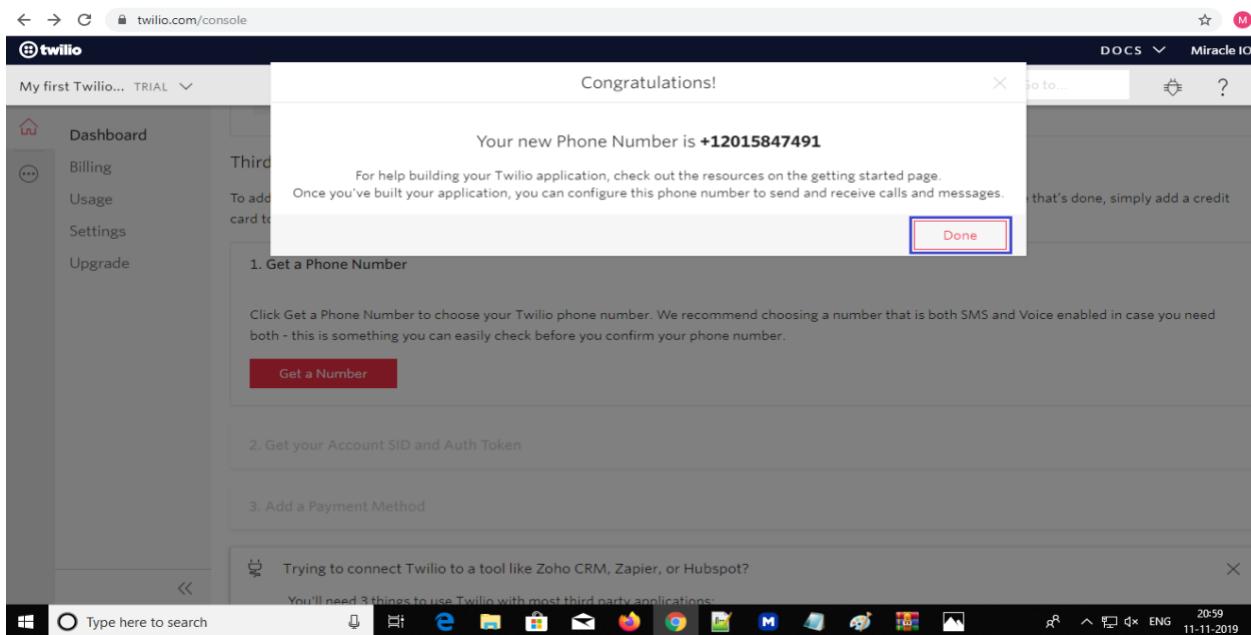
Top Screenshot: Shows the "My first Twilio project Dashboard". The dashboard includes a sidebar with links for Dashboard, Billing, Usage, Settings, and Upgrade. The main area displays "Project Info" with a trial balance of \$15.50 and a "Get a Trial Number" button. It also shows an Account SID (ACf05e2042e1d9b209a55b395f03691780) and an Auth Token (Show). A section titled "Here's how your Twilio Trial account works:" lists that you can send messages and make calls to verified numbers, and that messages and calls include a note about this coming from a "Twilio trial account." Below this, there's a link to learn more about the trial or upgrade.

Bottom Screenshot: Shows the "Third Party User Guide". It starts with a note about getting an Account SID and Auth Token. Step 1, "Get a Phone Number", is highlighted with a red box around the "Get a Number" button. Step 2, "Get your Account SID and Auth Token", and Step 3, "Add a Payment Method", are also listed.

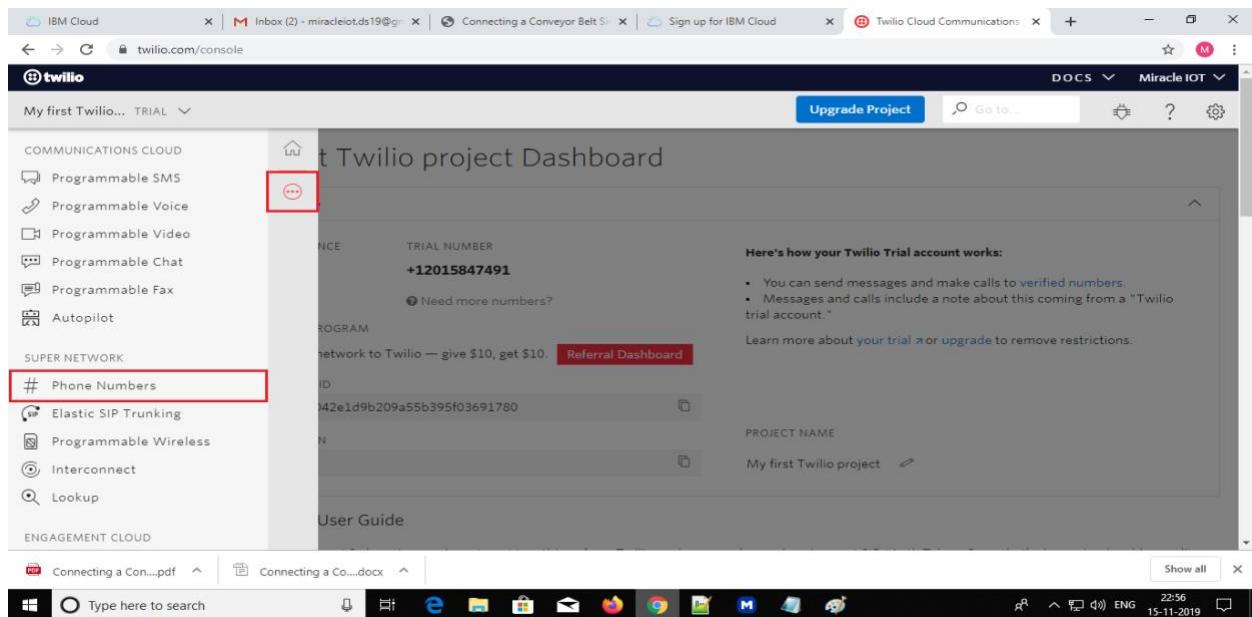
Click on **Choose this number** in the pop-up box.



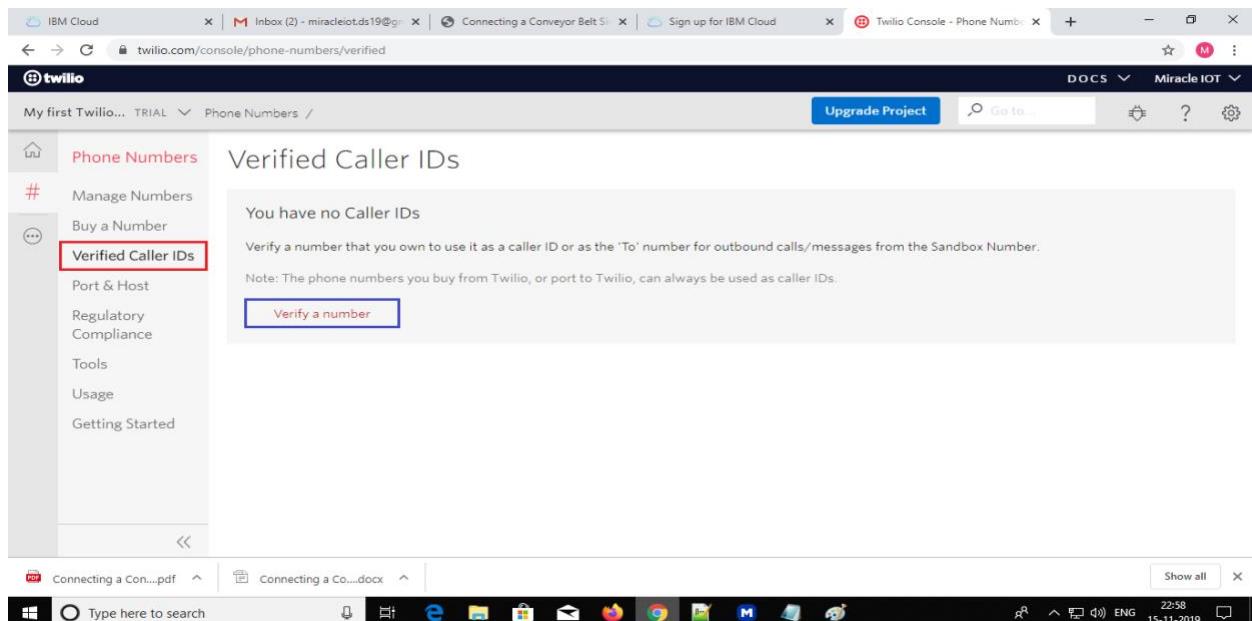
Click on Done.



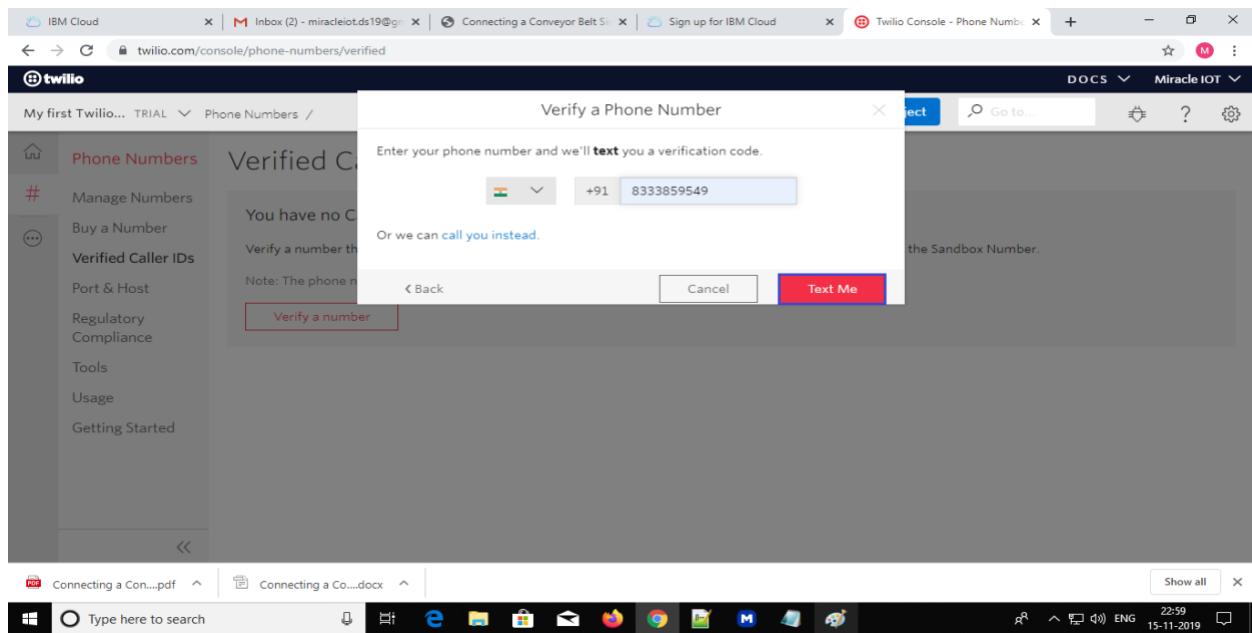
After Clicking on **Communications Cloud**, you can find the **Phone Numbers** option.



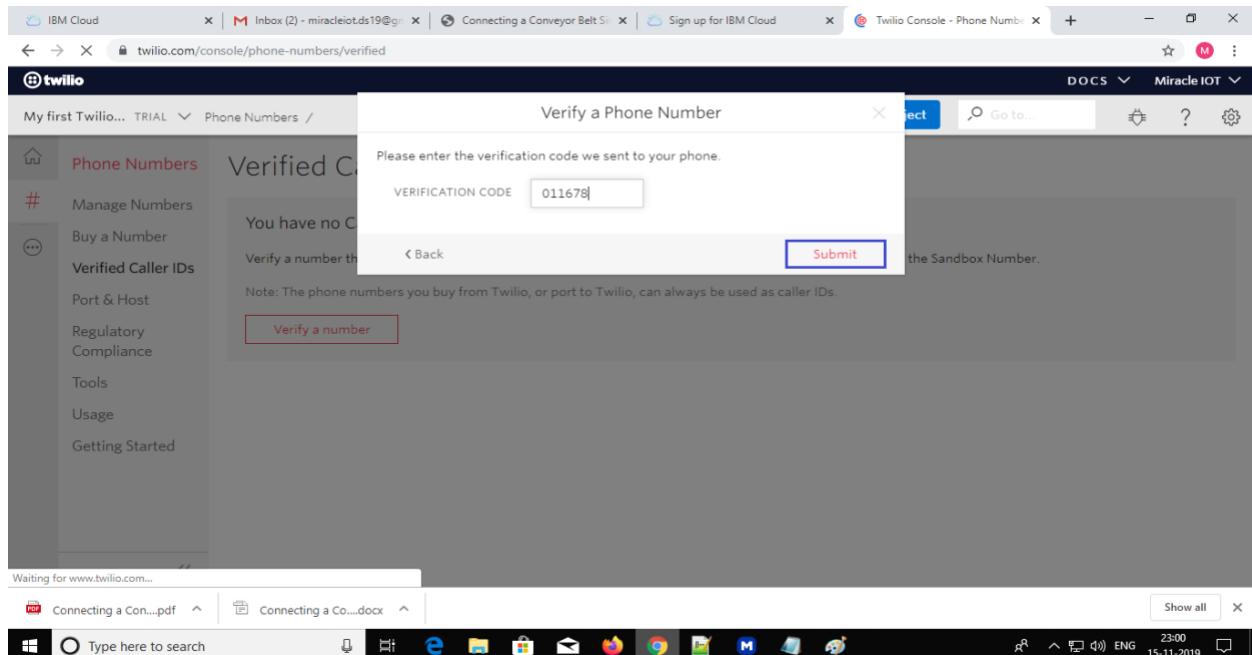
Your phone number needs to be verified in the Twilio in order to receive the SMS. Click on **Verified Caller IDs** on the left side of the Dashboard then click on **Verify a Number**.



Enter a valid active phone number in the pop-up box. Then Click on **Text Me**. An OTP is sent to your registered phone number.

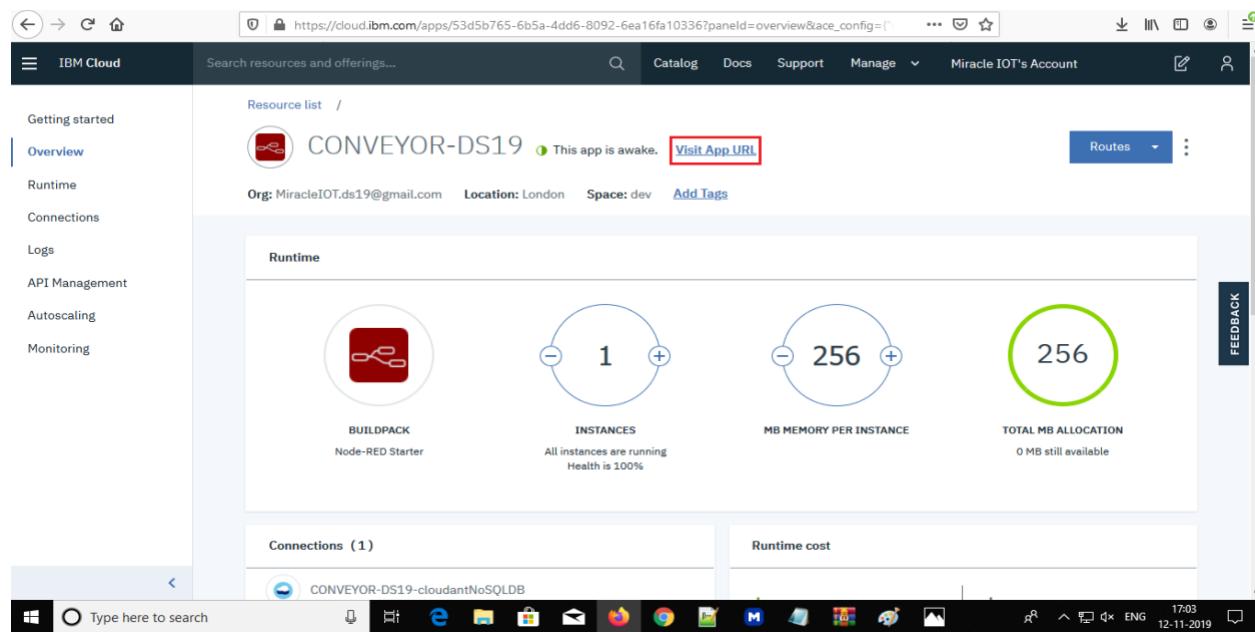


Enter the OTP in the pop-up box that is received to your registered phone number. Click on **Submit**, now your phone number is registered successfully.



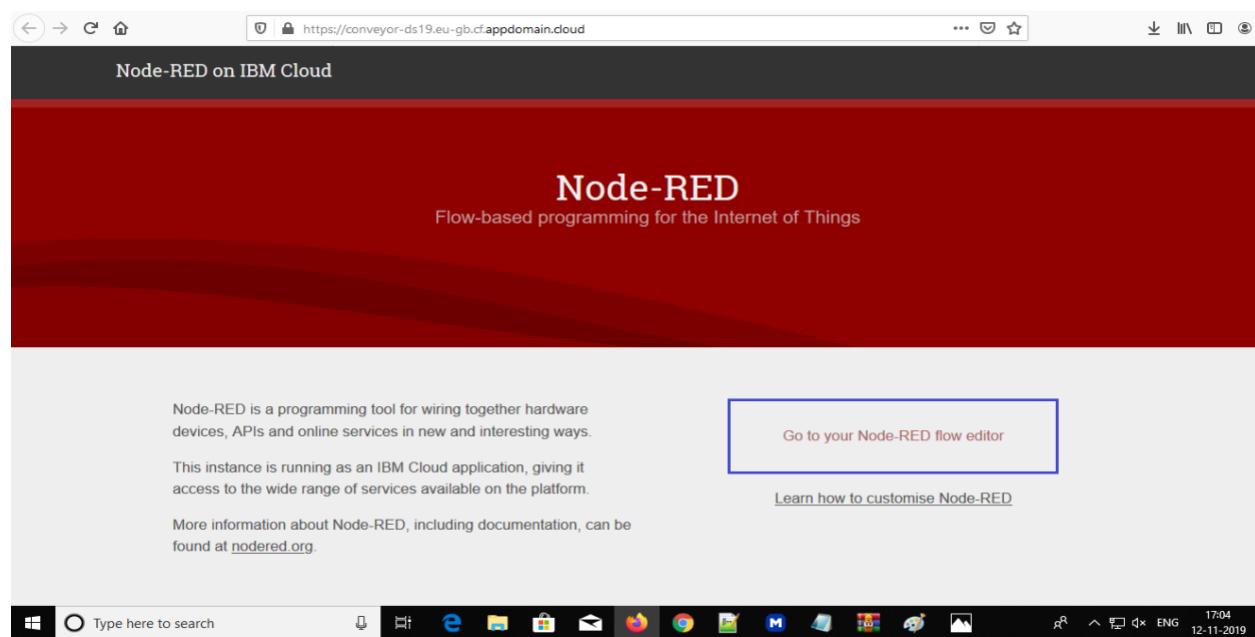
Step #7 | Data Reading with Node-Red and Twilio Integration

Go to your IBM Cloud Resources list. In the Node-Red click on **Visit App URL**.



The screenshot shows the IBM Cloud Resources list. On the left, there's a sidebar with options like Getting started, Overview (which is selected), Runtime, Connections, Logs, API Management, Autoscaling, and Monitoring. The main area displays the 'CONVEYOR-DS19' app details. It shows the app is awake, has an org of 'MiracleIOT.ds19@gmail.com', is located in London, and is in the dev space. A red box highlights the 'Visit App URL' button. Below this, there's a 'Runtime' section with four circular metrics: BUILDPACK (Node-RED Starter), INSTANCES (1), MB MEMORY PER INSTANCE (256), and TOTAL MB ALLOCATION (256). At the bottom, there are sections for 'Connections (1)' and 'Runtime cost'.

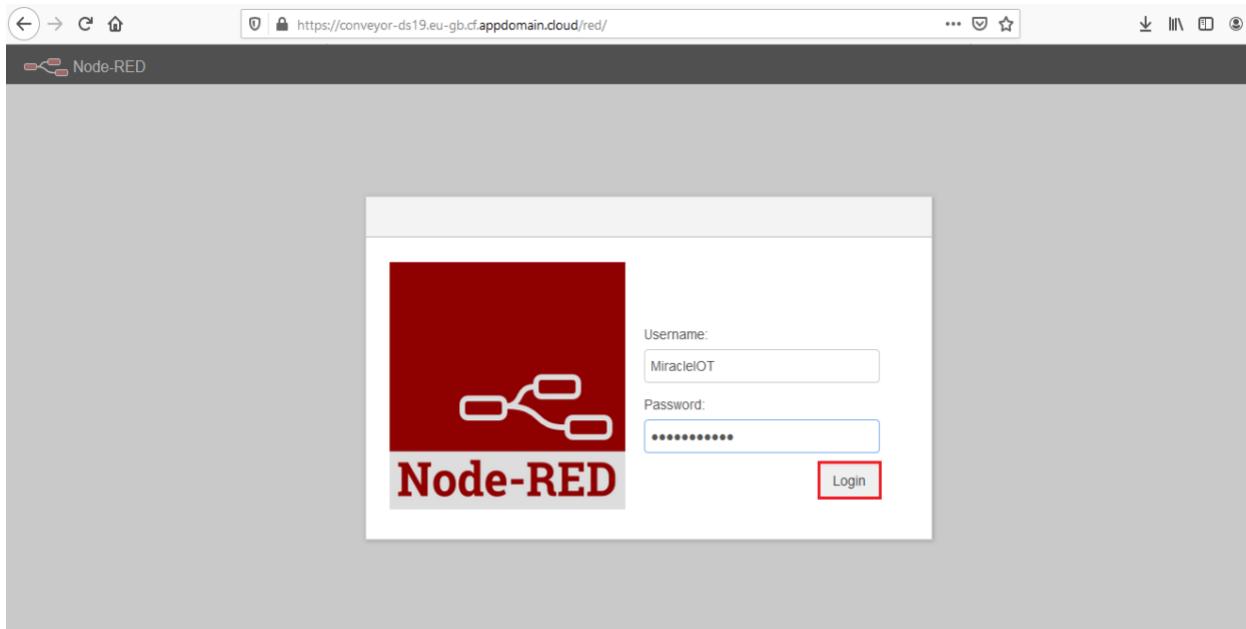
This will redirect you to the Node-Red tool in IBM Cloud. Click on **Go to your Node-Red Flow Editor**.



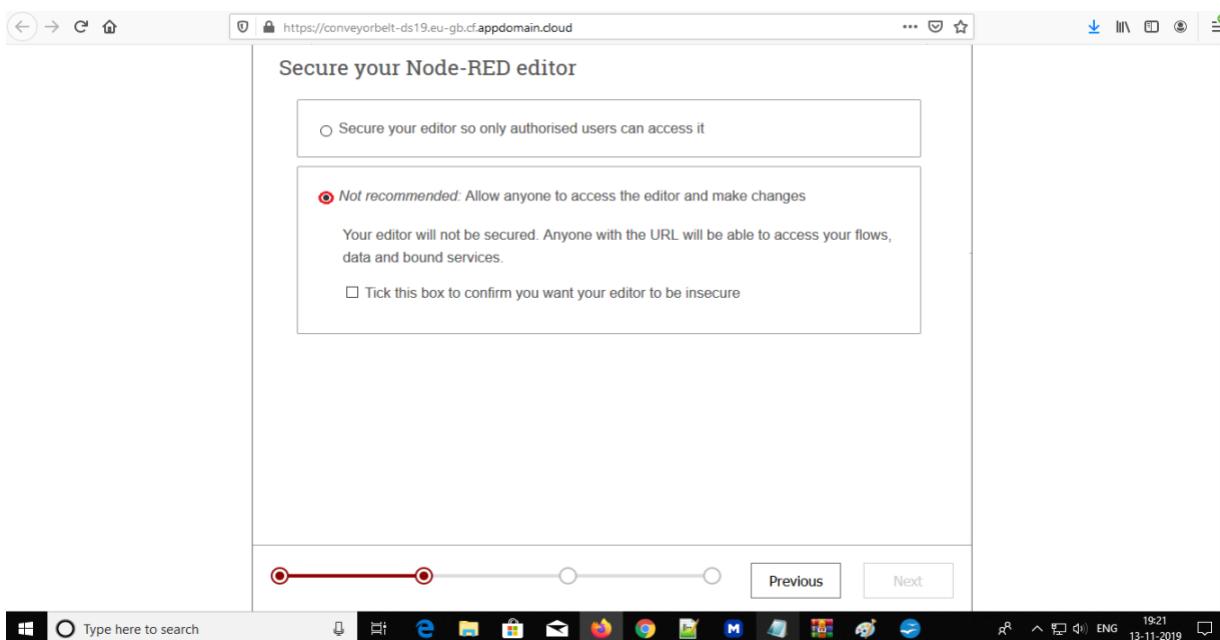
The screenshot shows the Node-RED on IBM Cloud interface. It features a red header bar with the text 'Node-RED on IBM Cloud'. Below this is a large red banner with the text 'Node-RED' and 'Flow-based programming for the Internet of Things'. The main content area contains text about Node-RED being a programming tool for wiring together hardware devices, APIs, and online services. It also mentions that the instance is running on IBM Cloud and provides a link to learn how to customise Node-RED. A blue box highlights the 'Go to your Node-RED flow editor' button. At the bottom, there's a Windows taskbar with various icons and a status bar indicating 17:04 and 12-11-2019.

Provide **Username** and **Password** for the Node-Red editor and click on **Login**.

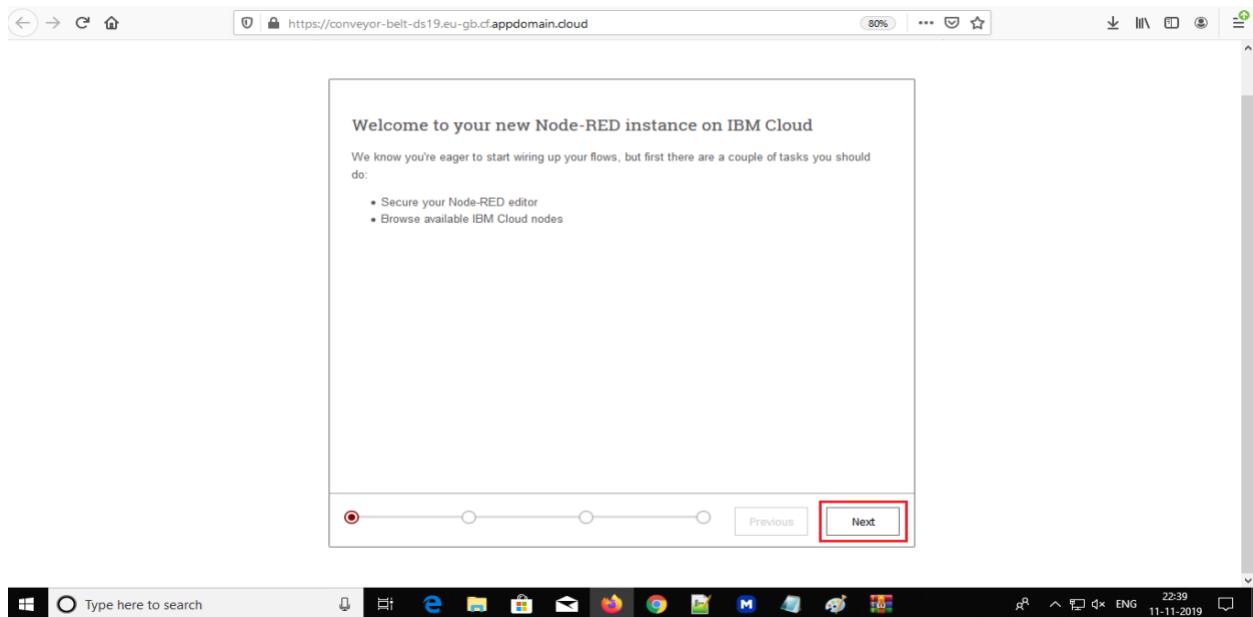
Note : Remember the **Username** and **Password**.



If you do not want login, you can proceed through **Not recommended** option.

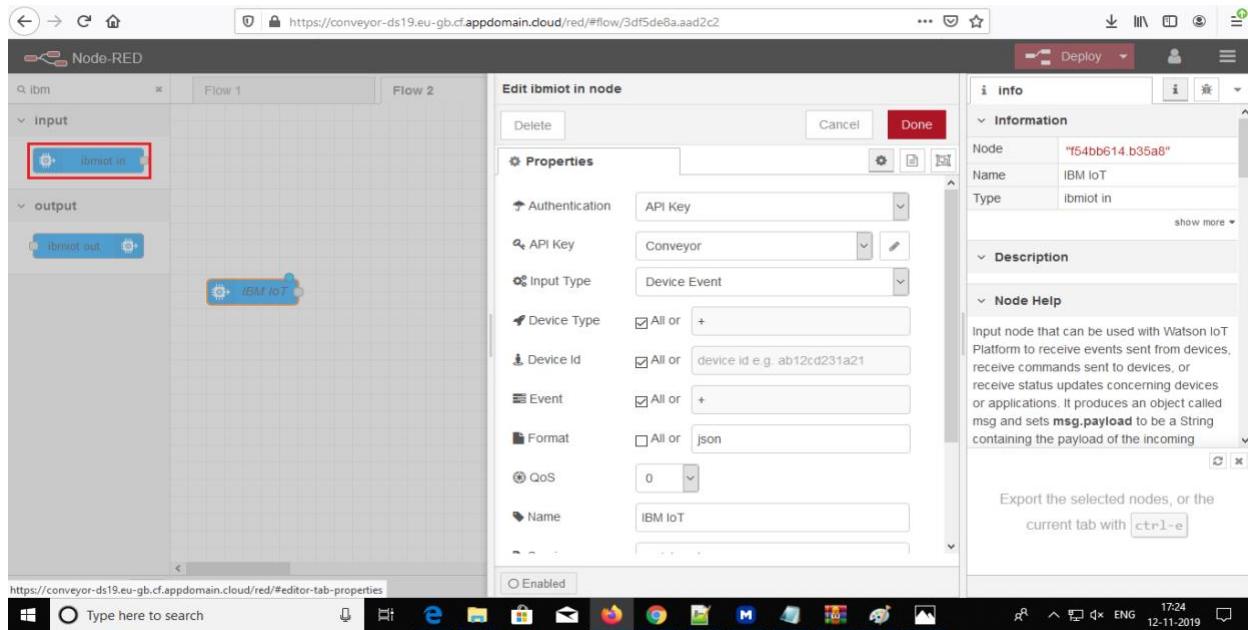


Click on Next to proceed further.

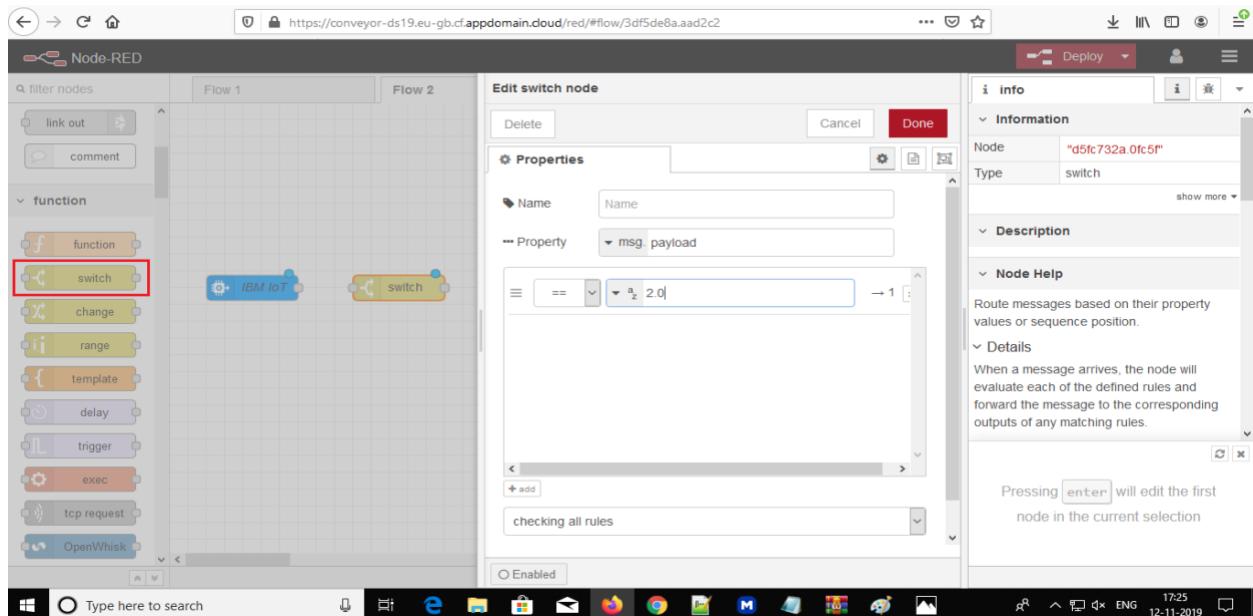


We need **ACCOUNT SID**, **AUTH TOKEN** and registered phone number to send the messages to the registered numbers.

Node-Red Flow sheet will be opened with a set of input and output nodes and a lot more. Click on + icon to create a new flow. Drag the IBM IoT input node into the workflow and edit it accordingly, with device information.

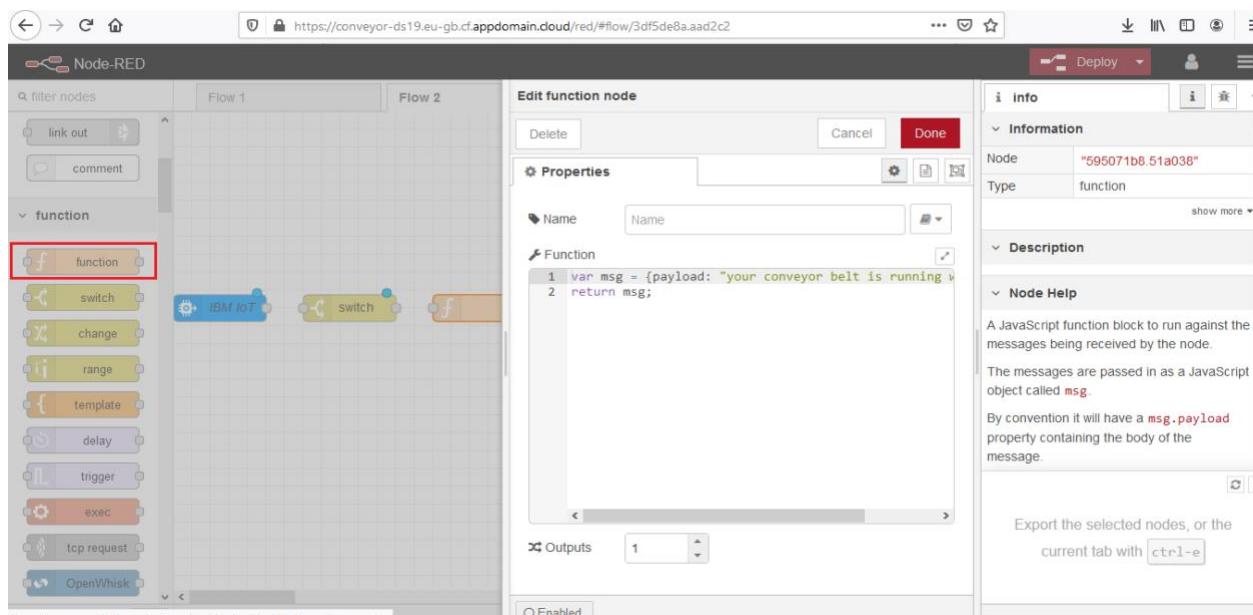


Use switch node to define the threshold value to the RPM to send the message to registered phone number.

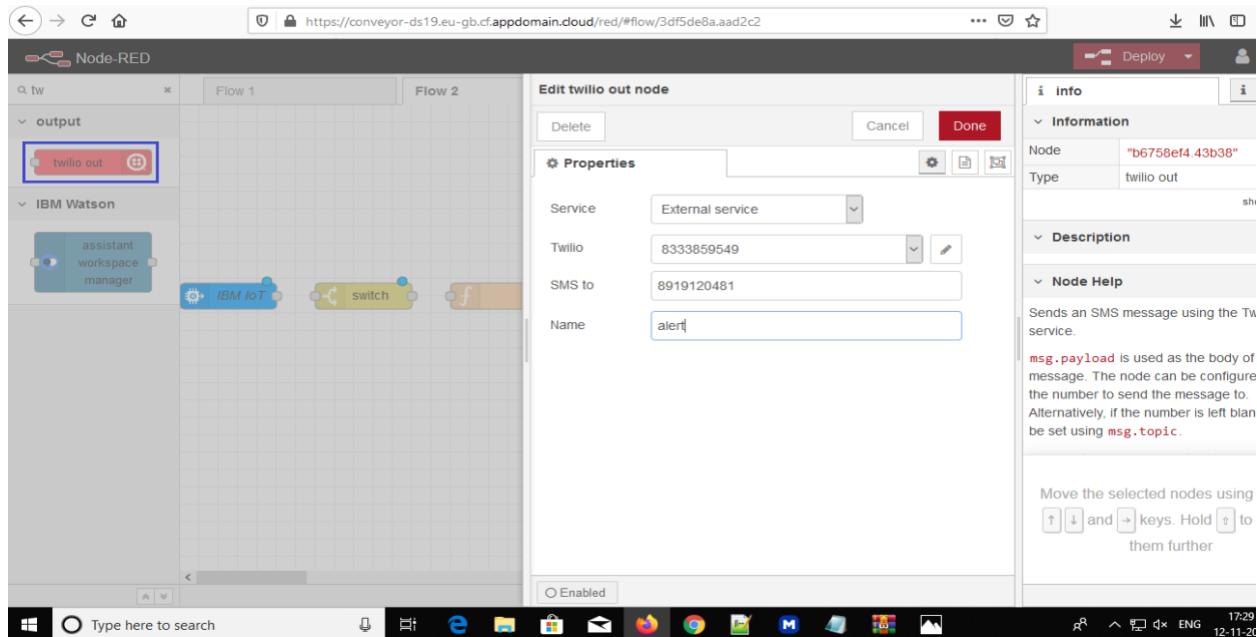


Use the function node to write the below custom message,

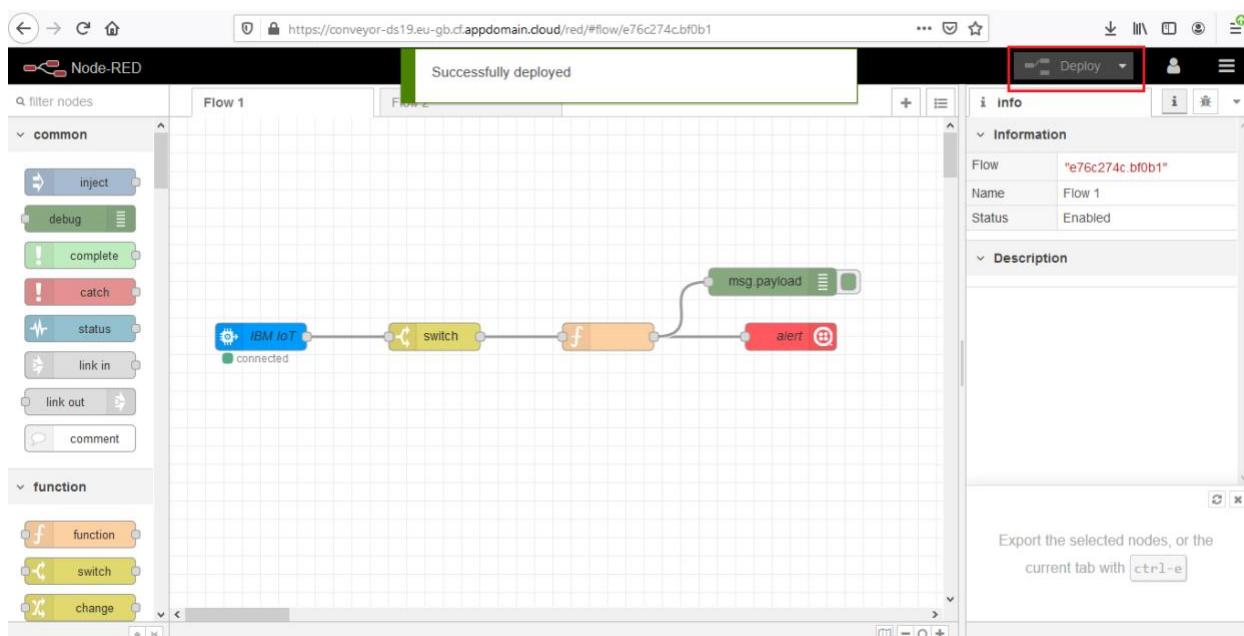
```
var msg = {payload: "your conveyor belt is running with a speed of  
" + msg.payload.d.rpm + " and has crossed the speed limit."}  
return msg;
```



Drag Twilio node into the workflow and edit that node with SID and TOKEN, which are there in Twilio account.



After connecting all the nodes click on deploy to save the modifications.



Now, send the data from Conveyor belt simulator once again to see the output in Node-Red and vary the RPM to send the message to registered Mobile Number.



For any questions regarding the lab please feel free to reach out to
innovation@miraclesoft.com. We hope you enjoyed the session with us!