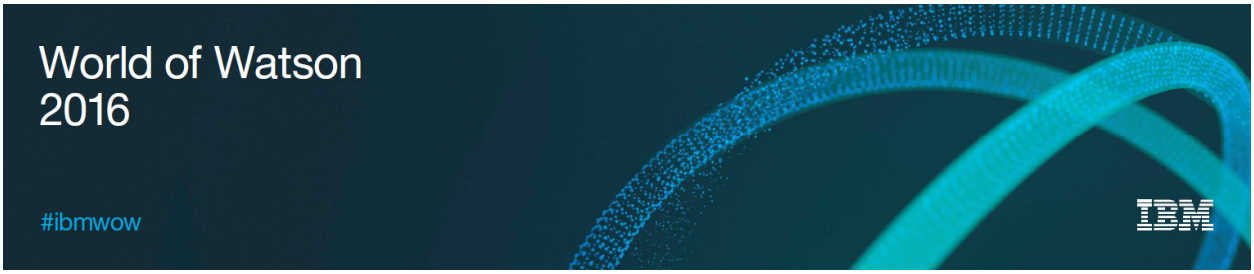

Hands-on Lab Instructions

Session 3282

Integrating IBM Watson IoT Platform and IBM Blockchain

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Download Lab Instructions From

http://ibm.biz/wowiotlab

Table of Contents

Overview

Section 1 – Setup Bluemix

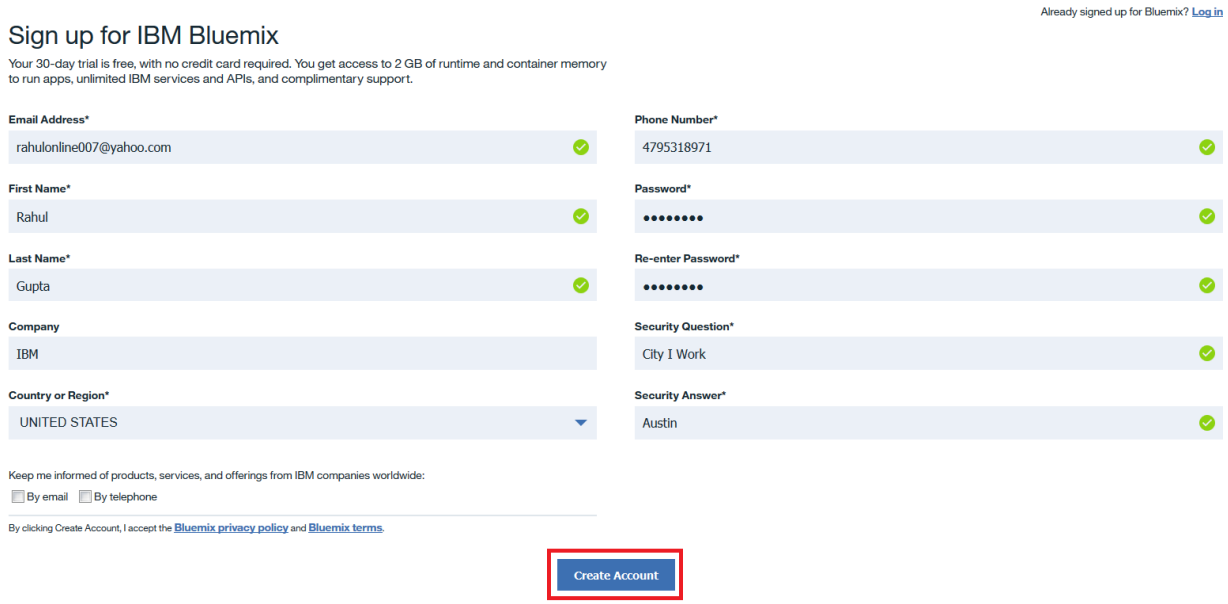
Signup for Bluemix – New User

- This lab requires a IBM Bluemix account. If you don't have access to IBM Bluemix already, you can register for a 30-day free trial at the following URL:

  https://console.ng.bluemix.net/registration

- Fill all the details and then click on ***Create Account*** to complete the registration process. Check your email inbox to complete the registration as shown in figure below.

Note: Please check the Junk folder if you don't see email from ***The Bluemix Team*** in your email inbox.

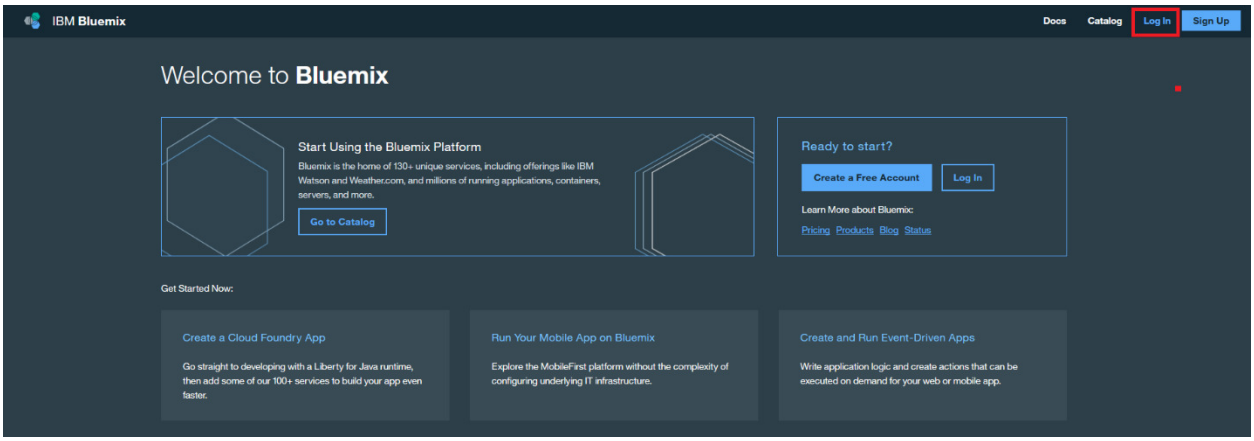


Log-In Bluemix – New User and Existing Users

- If you already have a IBM Bluemix account, you can directly login using the URL below:

https://console.ng.bluemix.net/

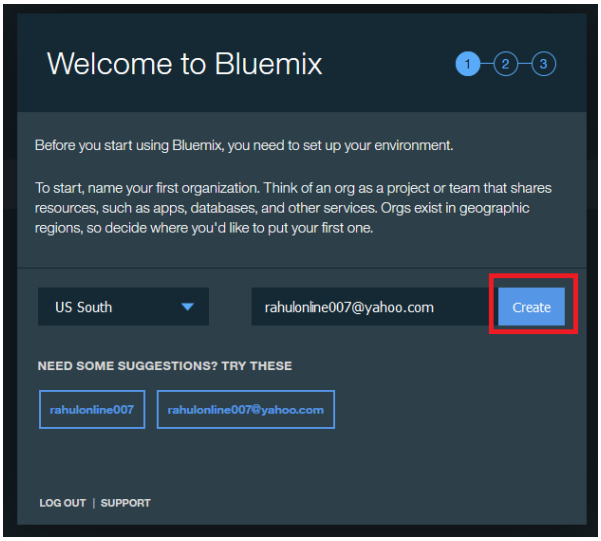
- Click on the Log-In button to login.



Create Bluemix organization – New User

- Once you have logged into IBM Bluemix create a Bluemix organization following the steps in the image below. Create an organization with your Bluemix account email id.

Note: *Existing Bluemix users can ignore this step*

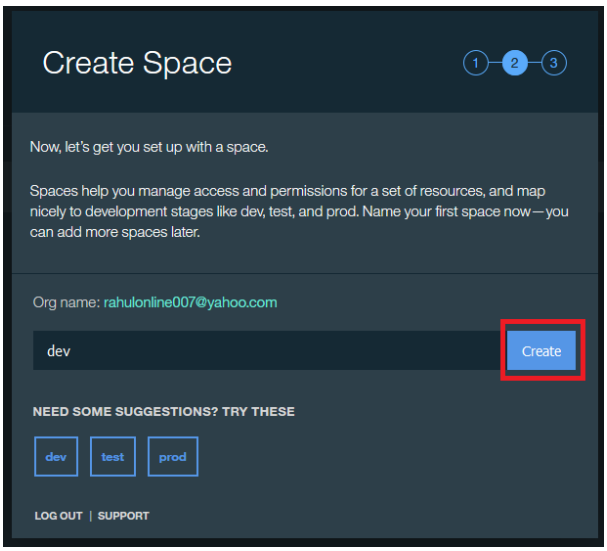


An organization is the highest concept. When you create an account you get your own "organization". You can invite others to your organization, can get invited to join other organizations or create organizations.

Create Bluemix space – New User

- Create a space with name **dev**

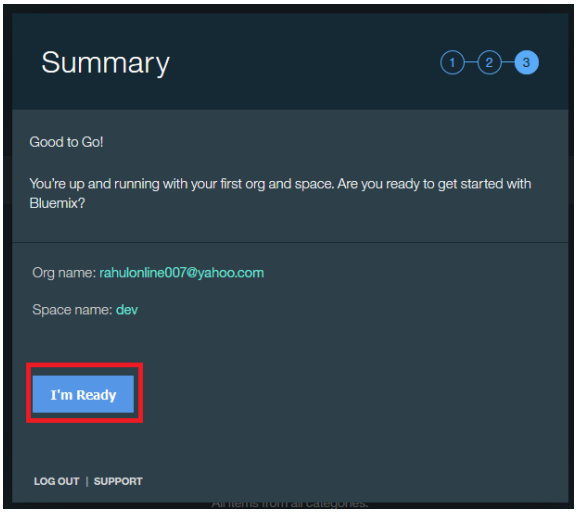
Note: *Existing Bluemix users can ignore this step*



Spaces are used to group related applications and services together. There can be multiple spaces within an organization. When an application or service is created they are assigned a specific space.

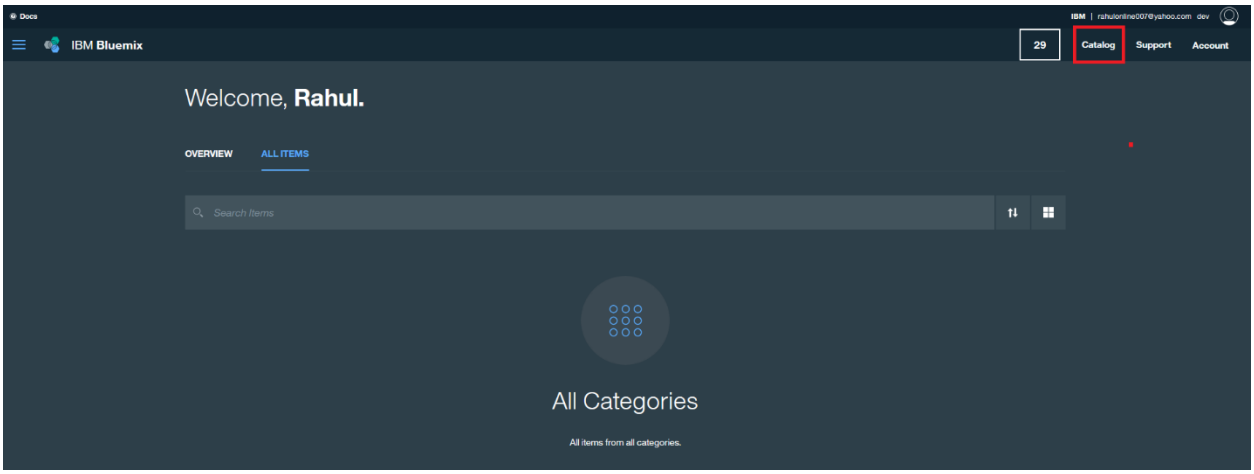
Complete creation of organization and space– New User

- This step completes the setup of Bluemix organization and space. You can now proceed with creation of IBM Watson IoT Platform and IBM Blockchain services in the next step.

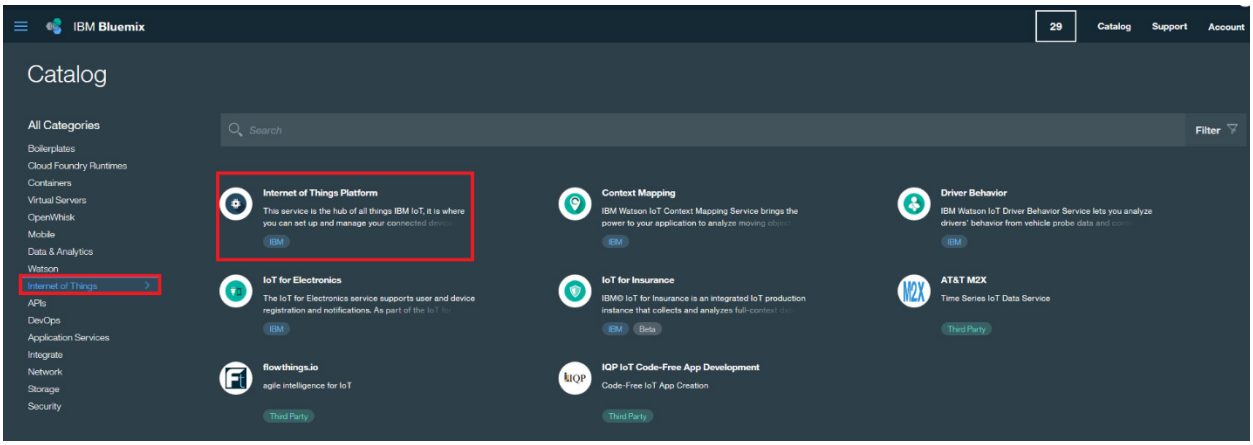


Create IBM Watson IoT Platform Organization

- Once you have logged in IBM Bluemix, click on the **Catalog** to browse the different services offered in IBM Bluemix platform.

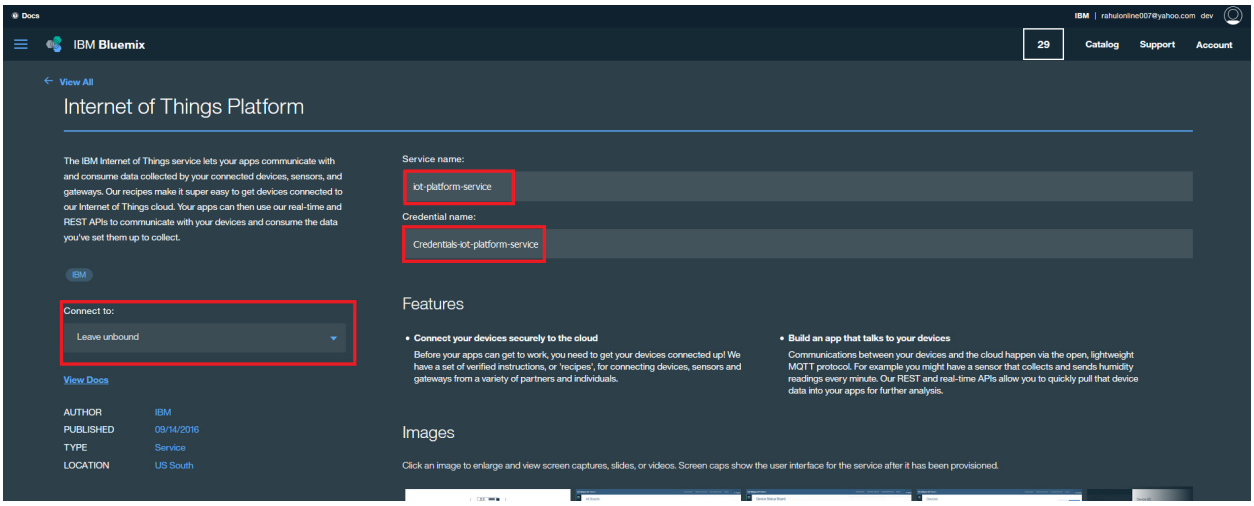


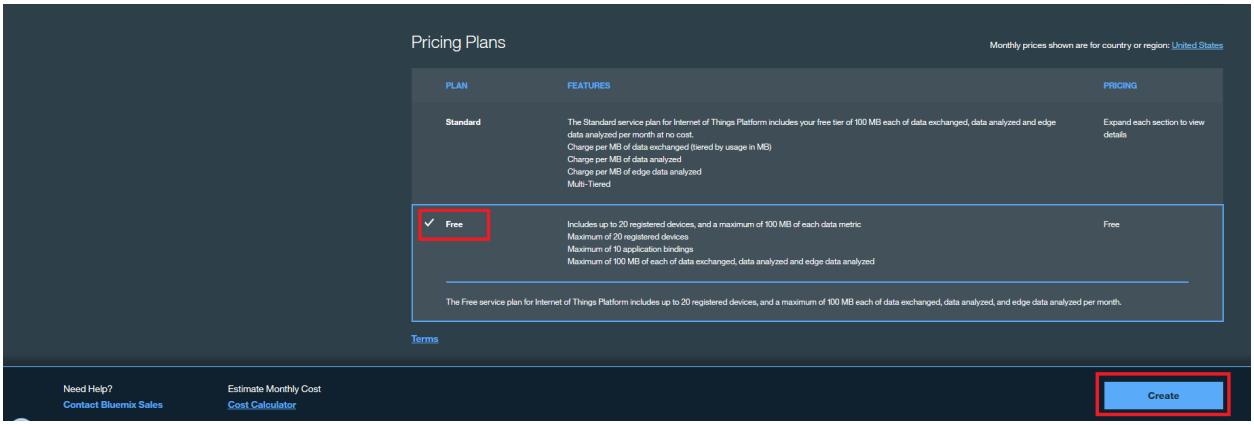
- In the services catalog select **Internet of Things** in the left menu and then click on **Internet of Things Platform**



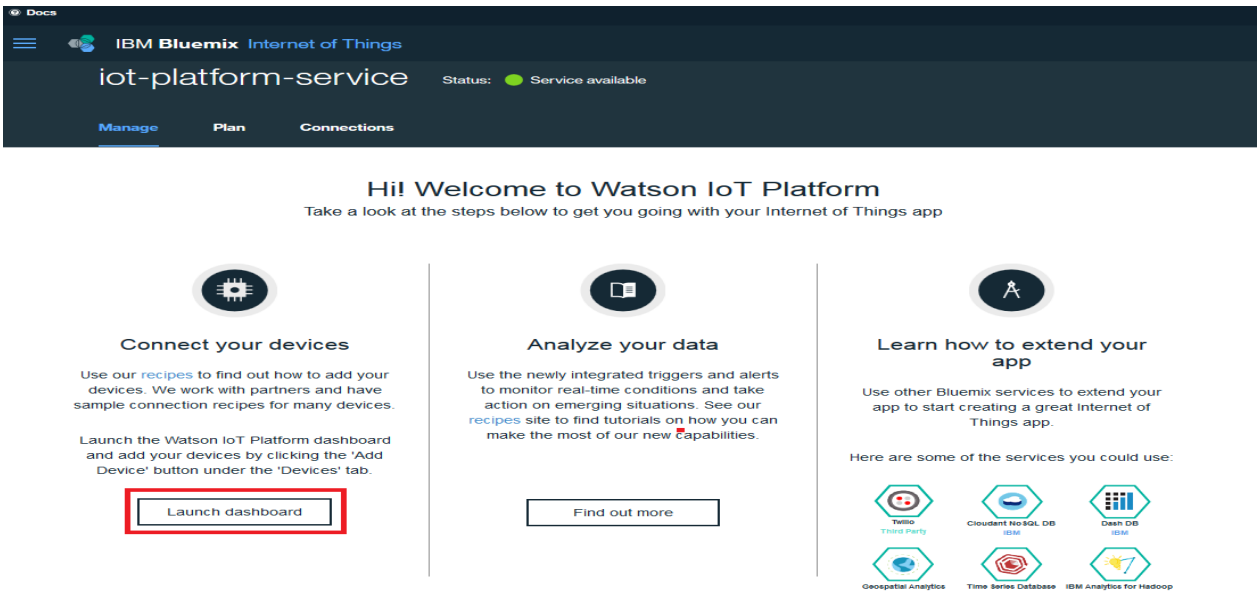
- To create the IBM Watson Internet of Things Platform, enter following details or something easier which could be remembered:
  - **Service Name:** iot-platform-service
  - **Credentials Name:** Credentials- iot-platform-service
  - **Pricing Plans –** Free

- Click on the **Create** button the create a new instance of IBM Watson IoT Platform service in IBM Bluemix.





- Once the service is created you can launch the IBM Watson IoT Platform dashboard by clicking the **launch dashboard** button.

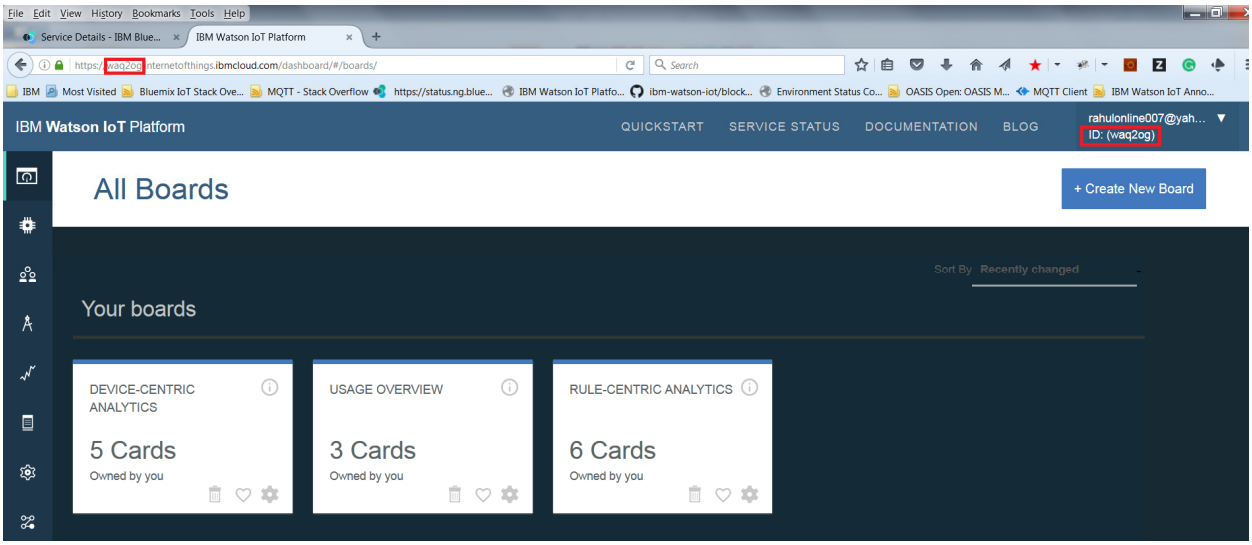


- Watson IoT Dashboard will be opened in a new browser tab. Familiarize yourself with the dashboard and specially the IoT Platform organization ID.

Note: The Watson IoT Platform organization ID is different from the IBM Bluemix organization ID

- Copy the Organization ID in a notepad.

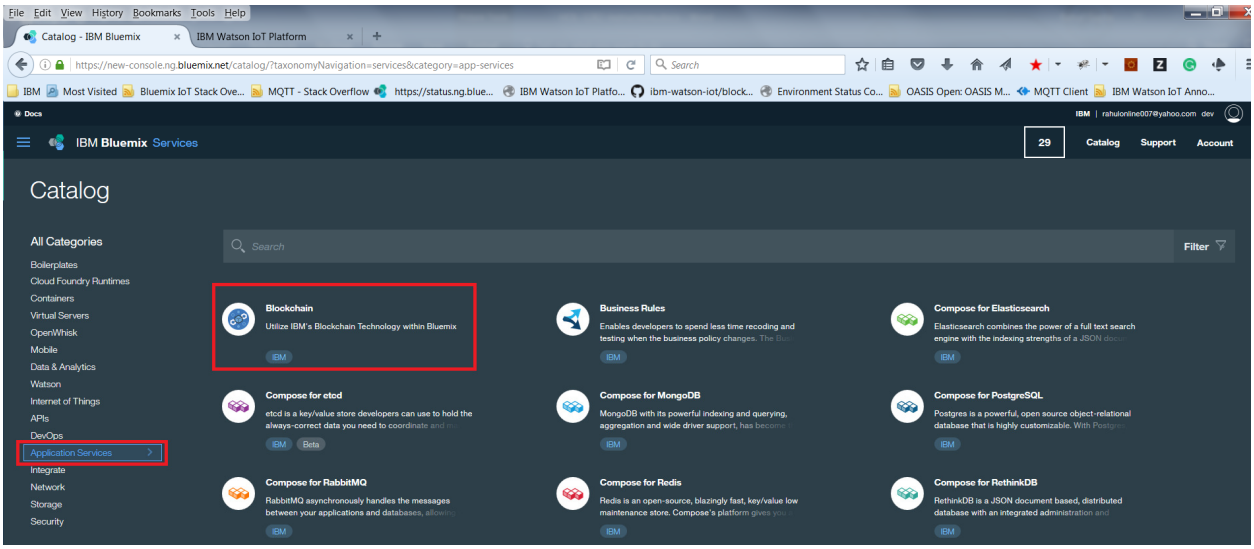
Note: In the image below the organization ID is highlighted in the rectangular box, every IoT Platform service has a unique organization ID.



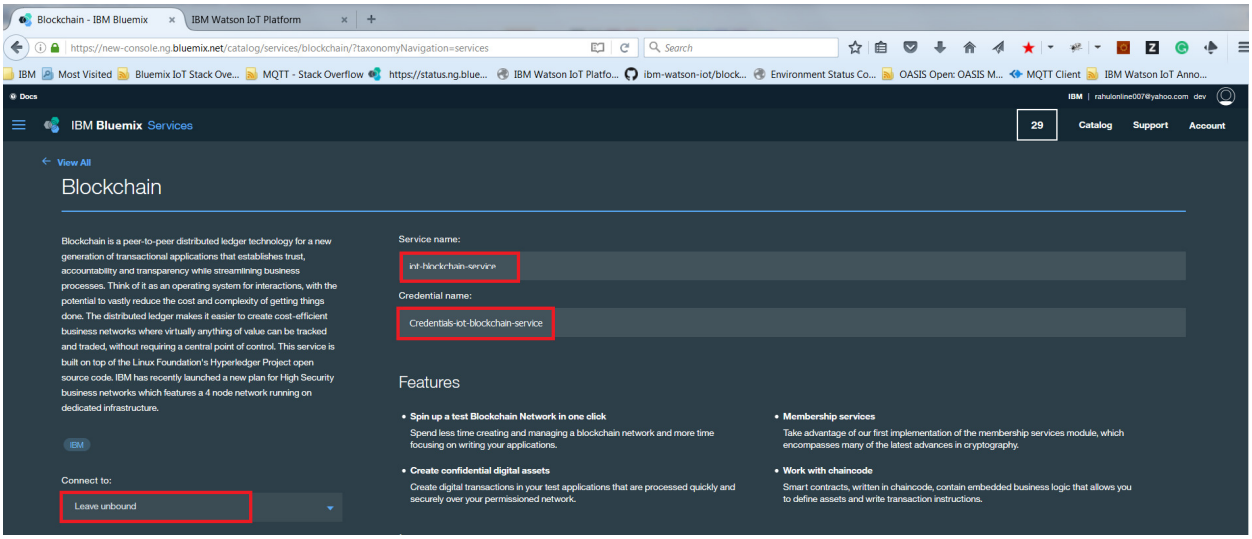
- This completes the creation of IBM Watson IoT Platform service and we can now proceed with creation of IBM Blockchain service.

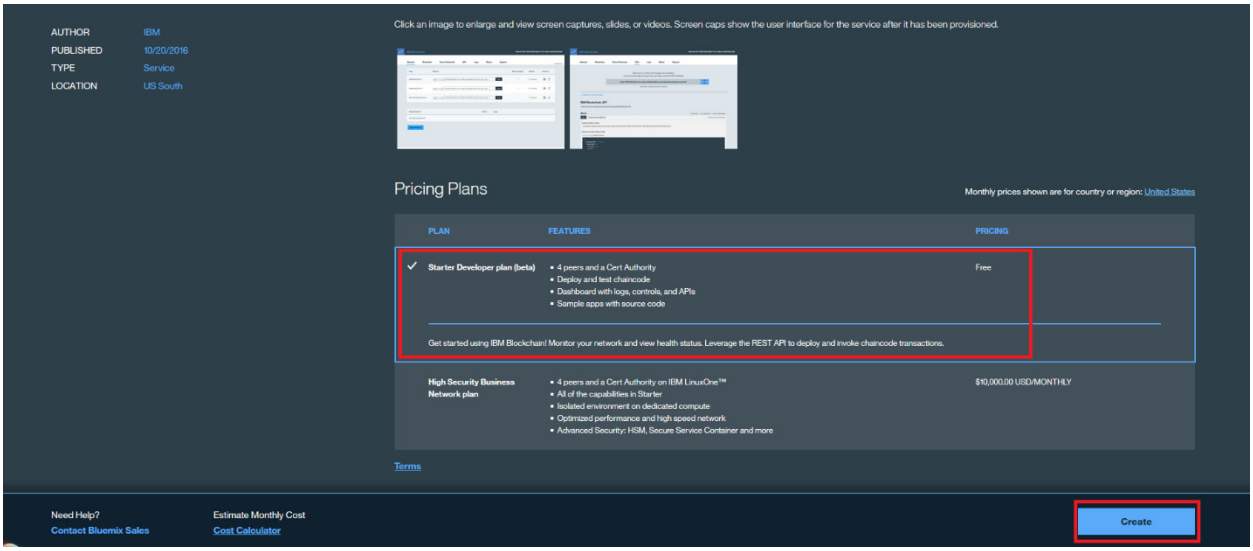
Create IBM Watson IoT Blockchain Service

- To create IBM Blockchain service, get back the IBM Bluemix **catalog**
- Click on the **Application Service** in the catalog menu
- Select **IBM Blockchain** as shown in the image on next page.

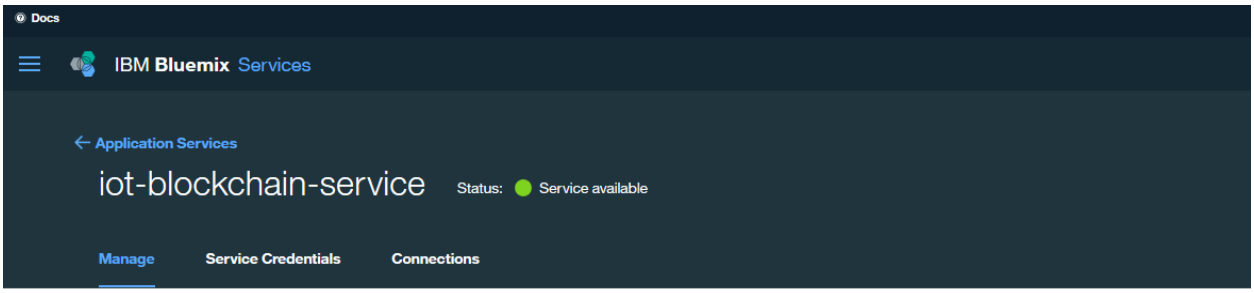


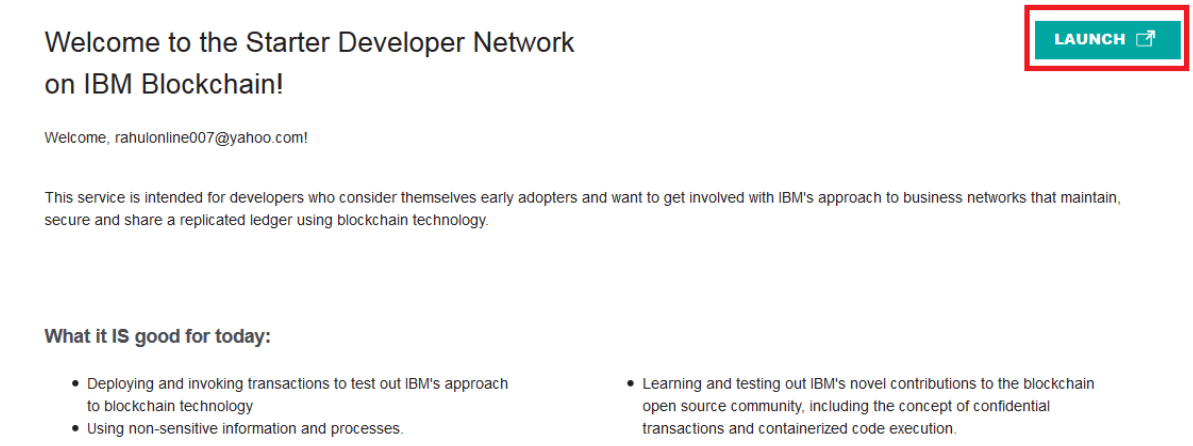
- To create the IBM Blockchain service, enter following details or something easier which could be remembered:
  - **Service Name:** iot-blockchain-service
  - **Credentials Name:** Credentials- iot-blockchain-service
  - **Pricing Plans –** Starter Developer Plan (Beta)



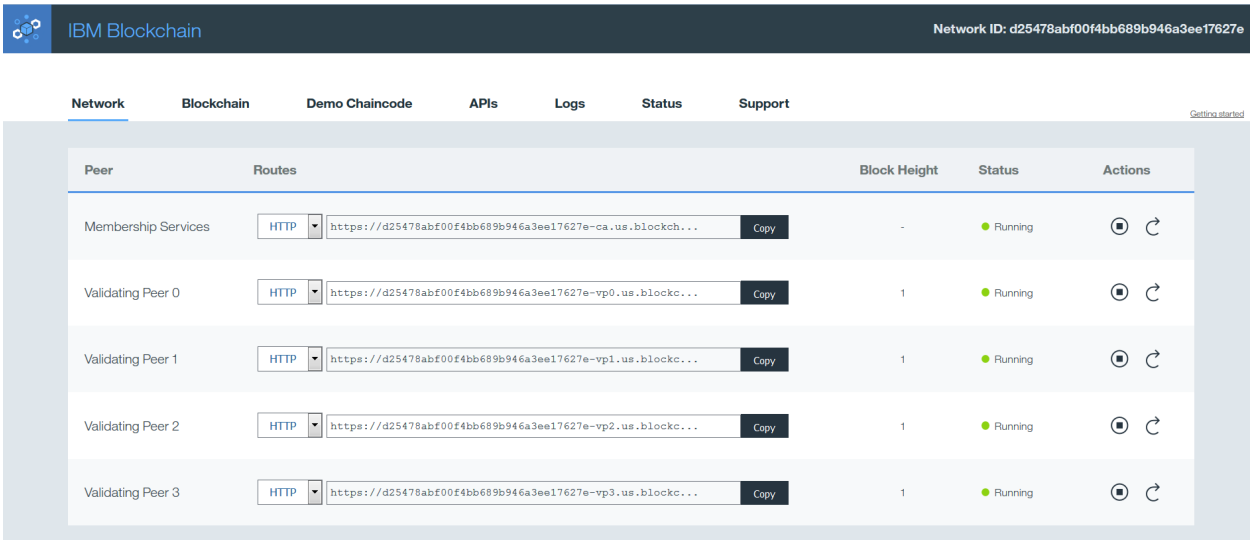


- Once the IBM Blockchain service is created, click on the Launch Button and that will launch the IBM Blockchain service dashboard in a new browser Tab window.





- IBM Blockchain service is now instantiated and ready to be used.
- This service is provisioned with four validating peer and one member ship CA (certificate authority) server.



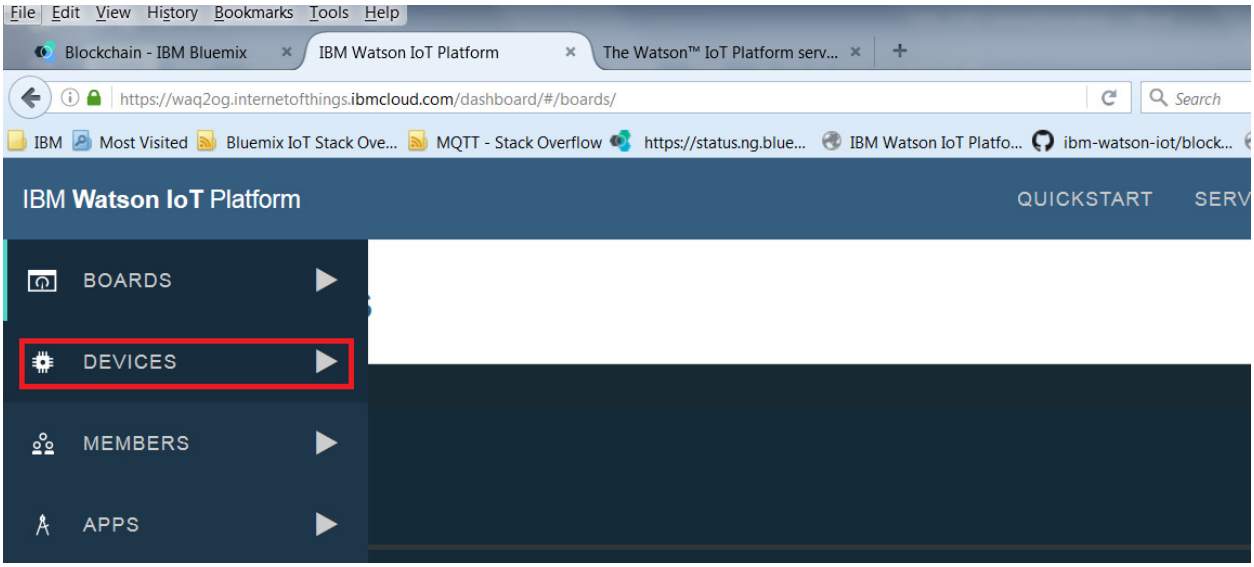
We have now created the IBM Bluemix service for the new users and later created the IBM Watson IoT Platform and IBM Blockchain service in Bluemix.

Note – Please don't close the browser tabs for IBM Watson IoT Platform dashboard and IBM Blockchain dashboard.

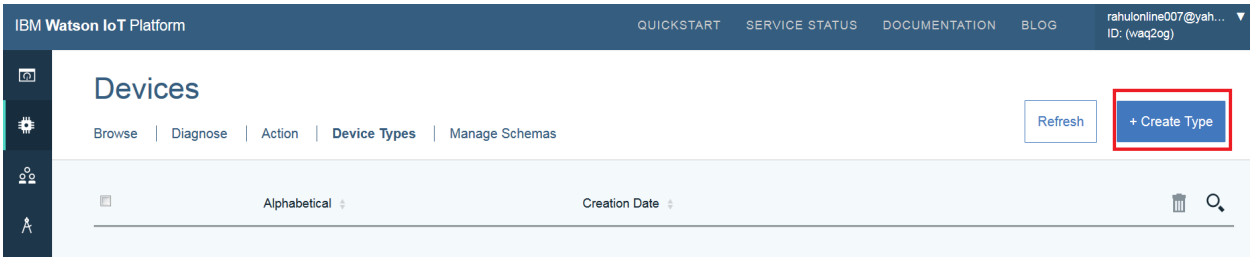
Section 2 – Configure IBM Watson IoT Platform devices and access

Create ELEVATOR device type

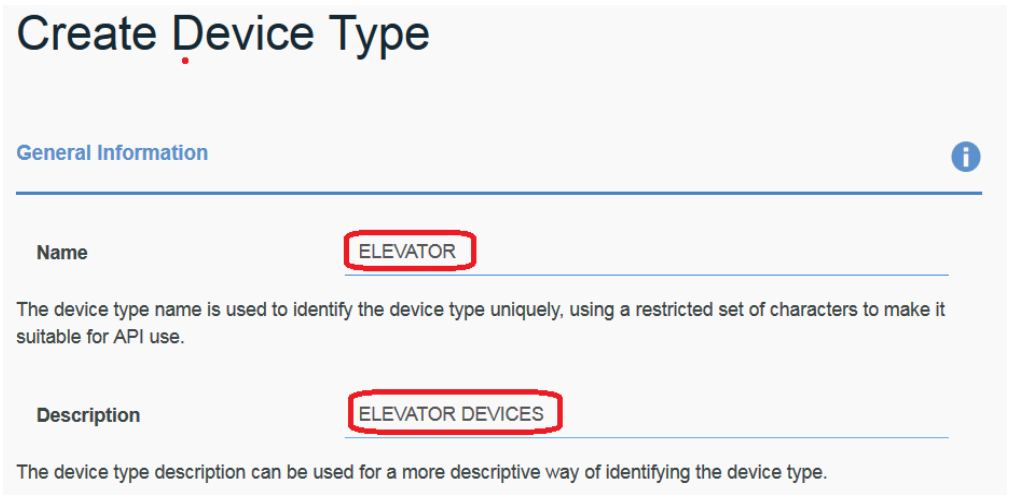
- Go to the IBM Watson IoT Platform dashboard tab in the browser window
- Click on **Devices**



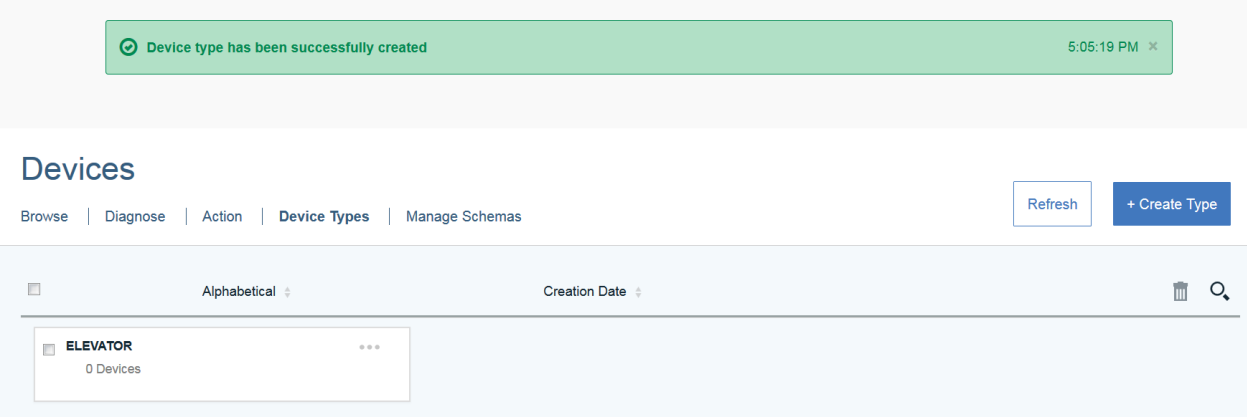
- Click on **Device Types** tab and then click **Create Type** button



- Create Device Type, Provide device name as **ELEVATOR** and description as **ELEVATOR DEVICES**

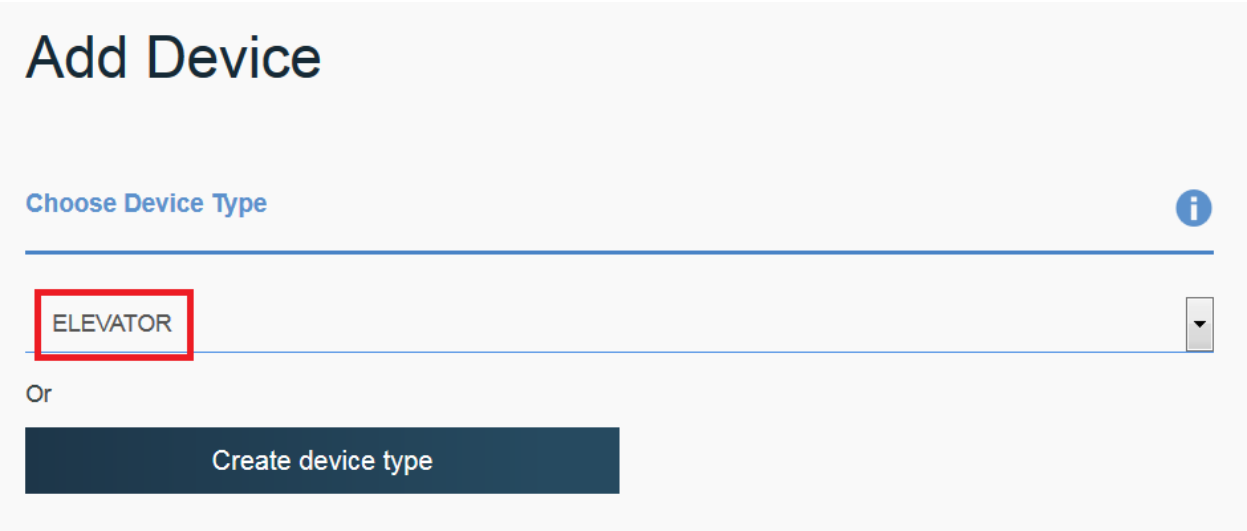


- Click on **Next** button
- Click **Next** on templates without selecting anything
- Click **Next** button in Submit Information
- Click Create button to create the **ELEVATOR** device type
- If device type ELEVATOR is successfully created, you will see a device type ELEVATOR in the dashboard

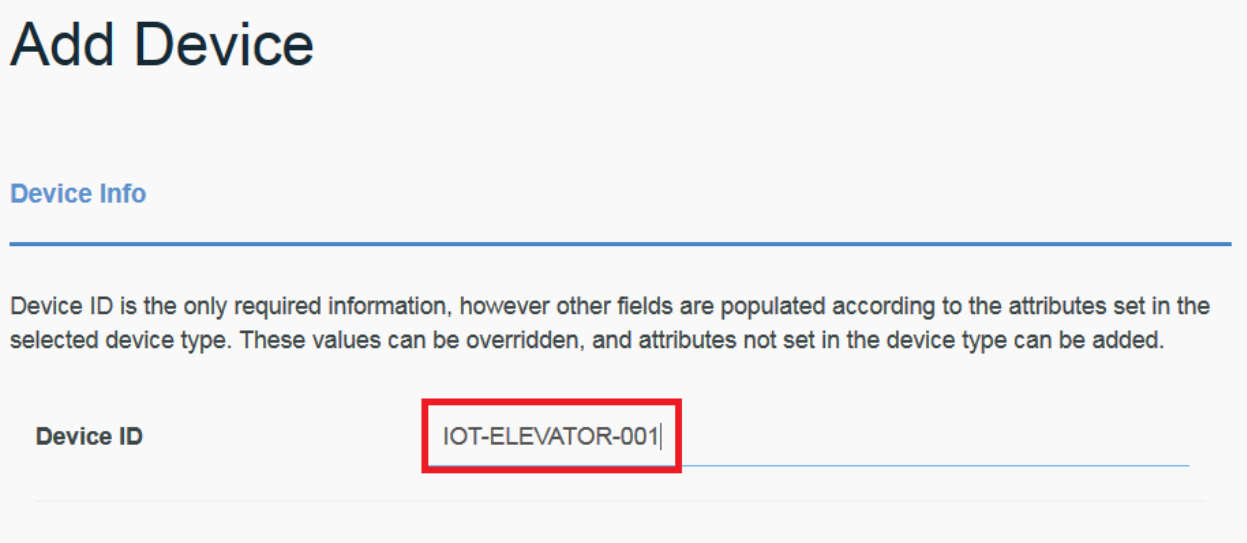


Create a device IOT-ELEVATOR-001 of device type ELEVATOR

- Go to the IBM Watson IoT Platform dashboard
- Click on **Devices**
- Click on **Browse** tab and then click on **Add Device** button
- To add a device, select the device type previously created: **ELEVATOR**



- Click **Next**
- Enter Device ID as: **IOT-ELEVATOR-001**

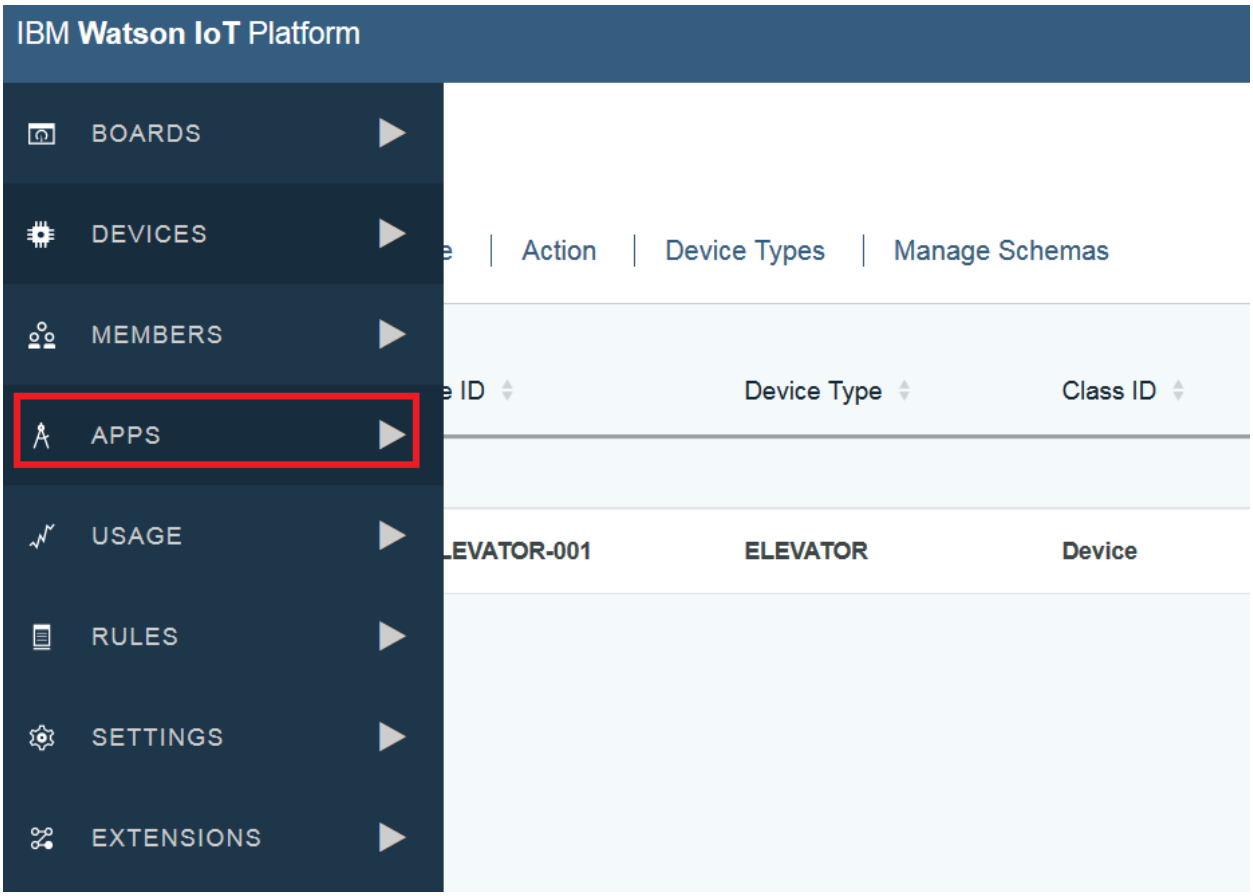


- Click **Next** on the Device Infor page
- Click **Next** on the Metadata page
- Click **Next** on the Security page
- Click **Next** on the Summary page
- Copy Organization ID, Device Type, Device ID into a notepad

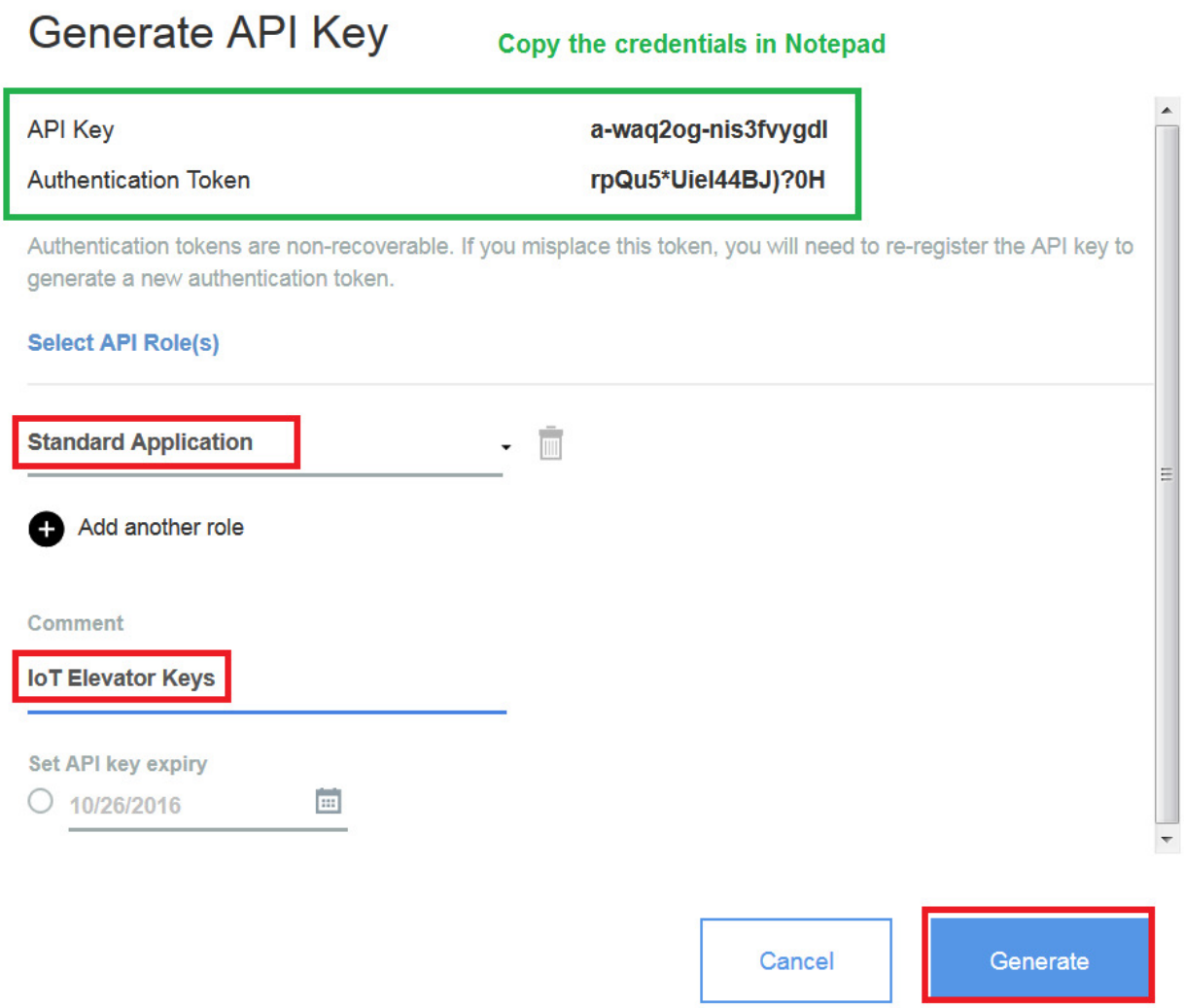
- IOT-ELEVATOR-001 device of device type ELEVATOR is now created. Close the device creation page and this device will now be visible in the dashboard.

Create API Keys to access this device from Elevator simulator

- Application credentials created in this step will be used by the simulator
- Go to the IBM IoT Watson Platform dashboard and click on APPS



- Click on Generate API Key
- Select Standard Application and add comments for the keys
- Before clicking **Generate**, *copy* the API Keys and Authentication Token in a notepad. These credentials will be used later in the elevator simulator

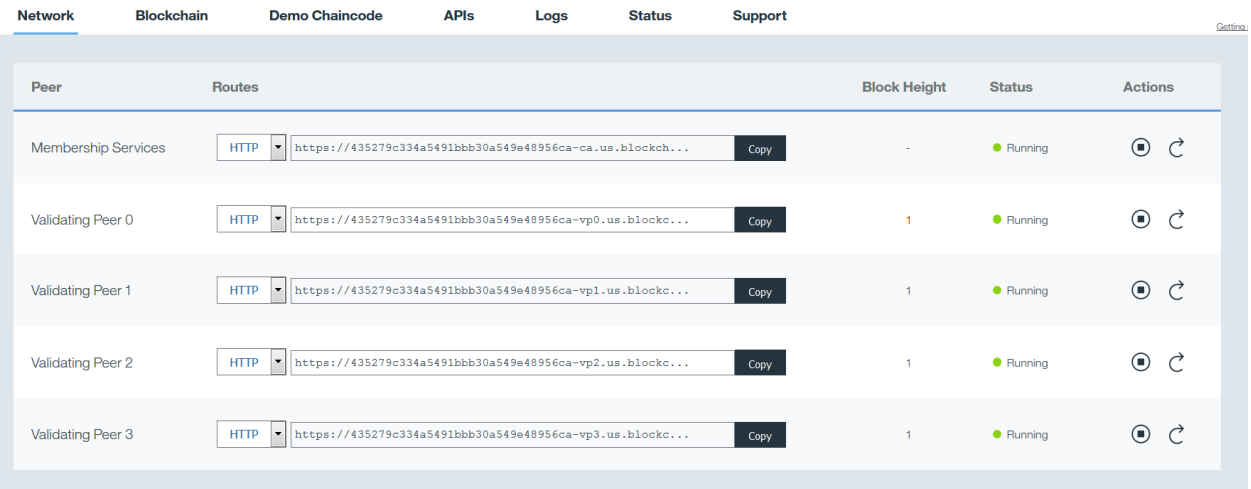


This completes the basic configuration on IBM Watson IoT Platform. We will revisit the Blockchain specific configurations after deploying the smart contract and completing the Blockchain configuration in next section.

Section 3: Register Blockchain users and Deploy smart contract

Blockchain Peer assignment and roles

- Go to the IBM Blockchain tab open previously in the browser
- In the network tab, you will see five peers in the network tab



In this lab, we will use three validating peers for three virtual business organizations:

Validating Peers	**Business Organizations**
Validating Peer 0	This peer will be used by the elevator company to have access to the data transmitted by the elevator to capture any anomalies and compliance
Validating Peer 1	This peer will be used by the customer who has purchased an elevator from the Elevator Company
Validating Peer 2	This peer will be used by the government agency who has the audit the elevators for safety and compliance

Note: The IoT Blockchain Service and IoT Watson IoT Platform service is created on behalf of the elevator company

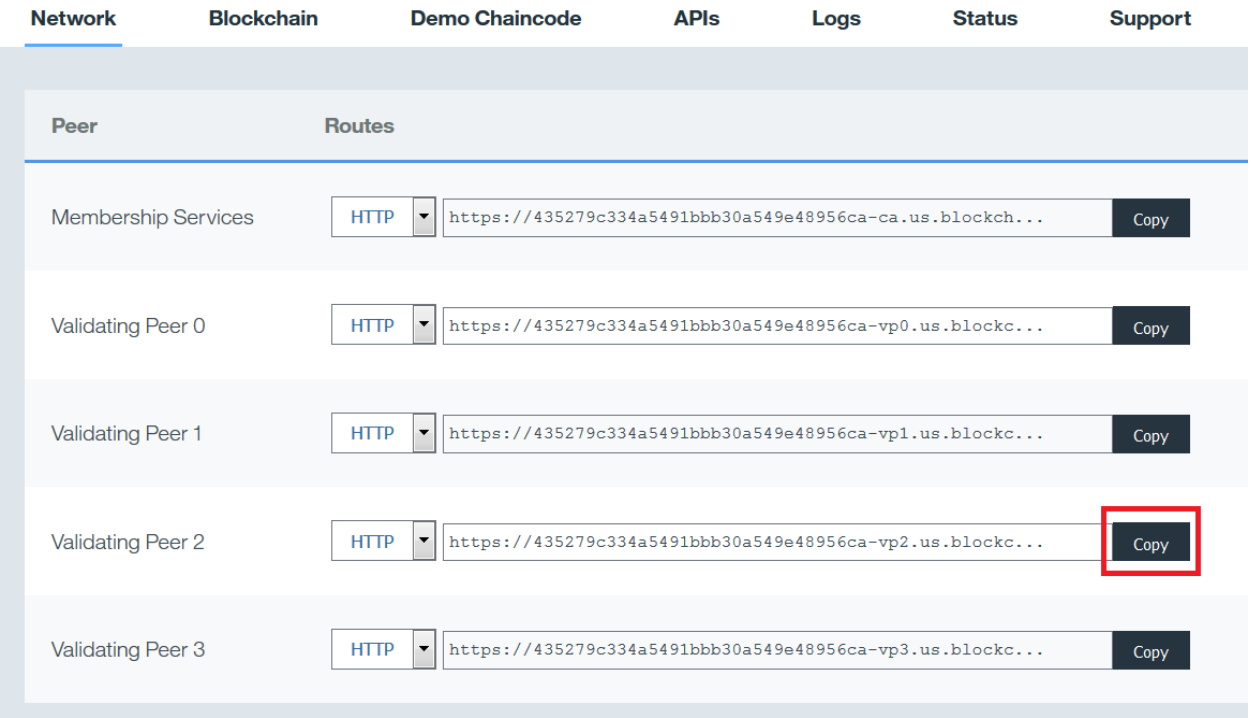
Register users from different organization with validating pees.

Note: IBM Blockchain service provides REST API for user registration, but in this lab, we will use a user interface for user registration.

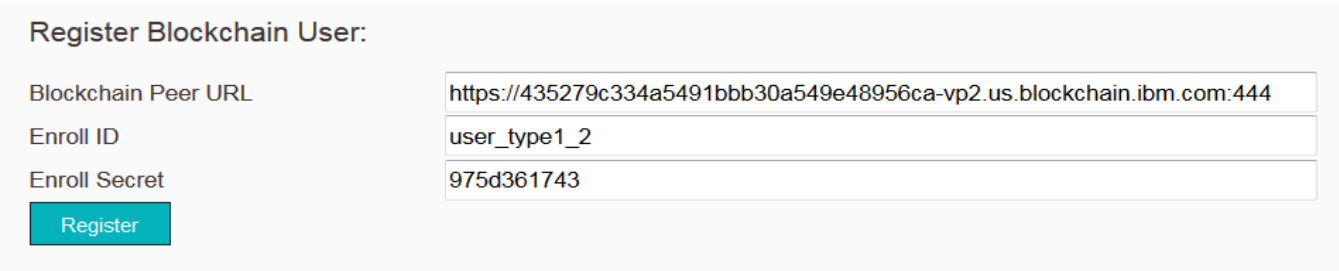
- In a new browser tab open this URL https://ibm.biz/wowsimulator
- Click on Register Users and Deploy Contract

Register a user from the government organization

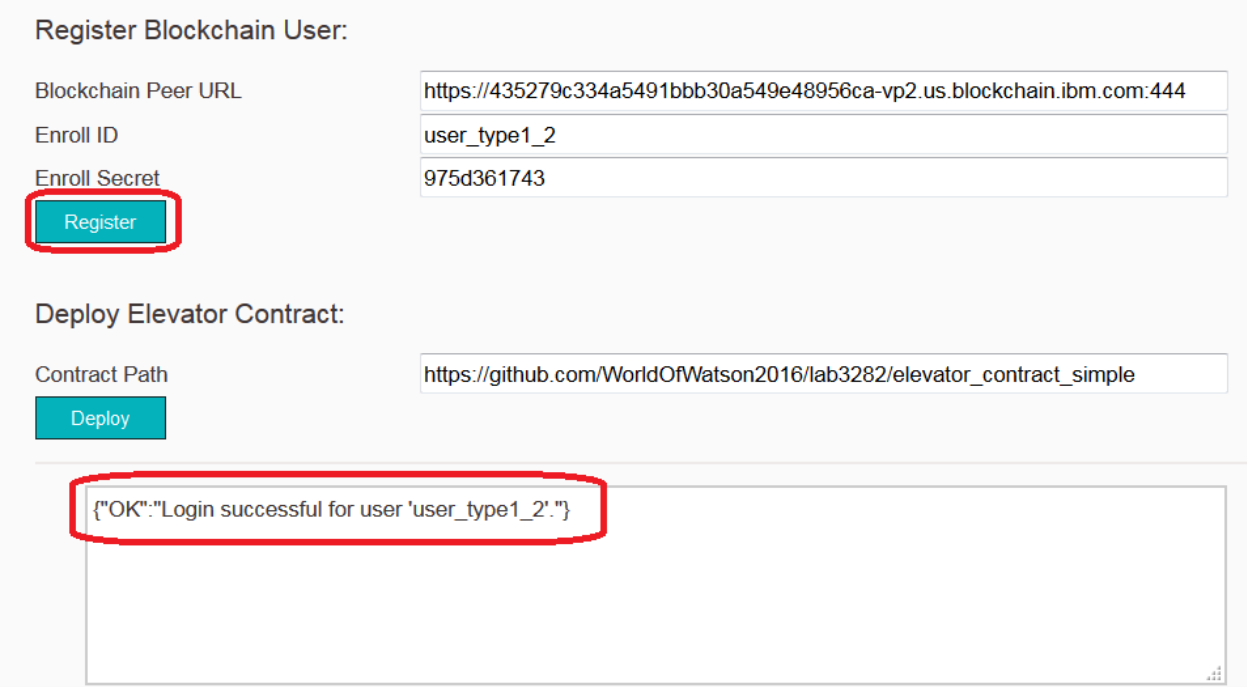
- Go to the Networks tab in IBM Blockchain Dashboard and copy the URL for Validation Peer 2



- At the right bottom of Network tab right click and open service credentials in a new tab
- Find the secret of user **"user_type1_2".** This secret will be needed for user registration with Validating Peer 2 of Blockchain
- Go back to the Register Users and Deploy Contract page on simulator application
- Enter the URL for Validating Peer 2 in Block Chain Peer URL text field
- Enter the username in Enroll ID text field
- Enter the secret in Enroll Secret text field



- Once the user is registered you will see the message as shown in image on next page



Register a user from the customer organization who purchased an Elevator

- Go to the Networks tab in IBM Blockchain Dashboard and copy the URL for Validation Peer 1
- At the right bottom of Network tab right click and open service credentials in a new tab
- Find the secret of user **"user_type1_1".** This secret will be needed for user registration with Validating Peer 1 of Blockchain
- Go back to the Register Users and Deploy Contract page on simulator application
- Enter the URL for Validating Peer 1 in Block Chain Peer URL text field
- Enter the username in Enroll ID text field
- Enter the secret in Enroll Secret text field
- Once the user is registered you will see the message as shown in image on next page

Register a user from Elevator manufacturing company

- Go to the Networks tab in IBM Blockchain Dashboard and copy the URL for Validation Peer 0
- At the right bottom of Network tab right click and open service credentials in a new tab
- Find the secret of user **"user_type1_0".** This secret will be needed for user registration with Validating Peer 0 of Blockchain
- Go back to the Register Users and Deploy Contract page on simulator application
- Enter the URL for Validating Peer 0 in Block Chain Peer URL text field
- Enter the username in Enroll ID text field
- Enter the secret in Enroll Secret text field
- Once the user is registered you will see the message as shown in image on next page

Deploy the Elevator Contract

In this lab as the Blockchain network is owned by the Elevator manufacturing company, we will deploy the smart contract to the Validating Peer 0. The Smart Contract or often called as chaincode and will be deployed to each validating peer in this network.

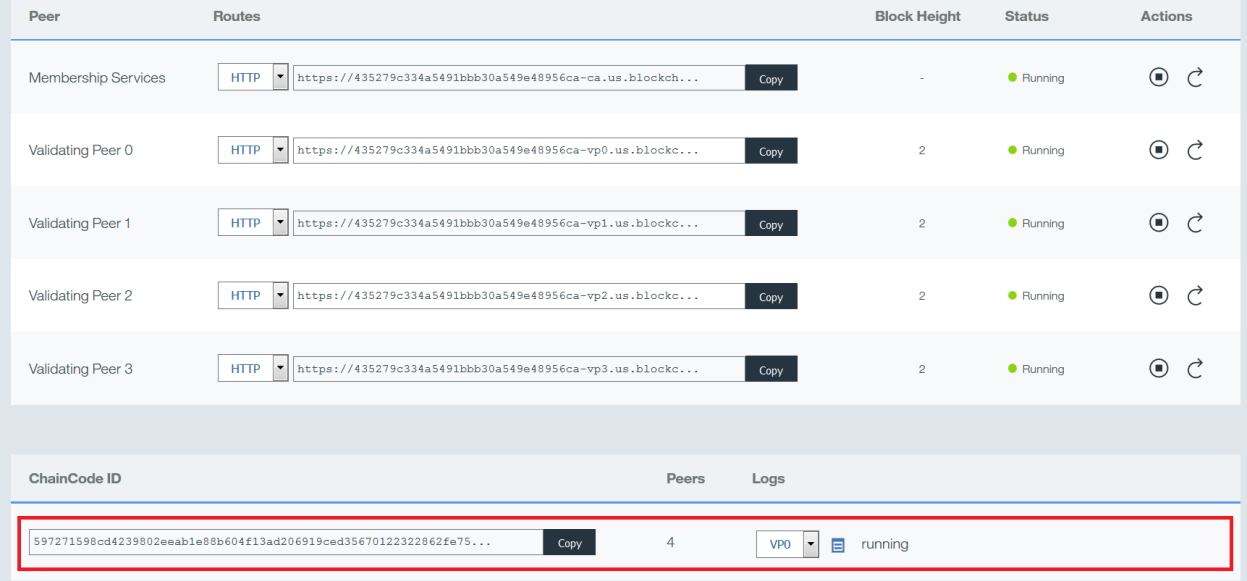
Elevator contract is already created and hosted in a public GitHub repository for you to have a look later: https://github.com/WorldOfWatson2016/lab3282/tree/master/elevator_contract_simple

- Go to the Networks tab in IBM Blockchain Dashboard and copy the URL for Validation Peer 0
- At the right bottom of Network tab right click and open service credentials in a new tab
- Find the secret of user **"user_type1_0".** This secret will be needed for user registration with Validating Peer 0 of Blockchain
- Go back to the Register Users and Deploy Contract page on simulator application
- Enter the URL for Validating Peer 0 in Block Chain Peer URL text field
- Enter the username in Enroll ID text field
- Enter the secret in Enroll Secret text field
- Click on the deploy Button

Note: The REST API to deploy the contract is asynchronous and the deployed contract may take three – four minutes to complete the deployment in all the four validating peers.

The response message contains the Chaincode ID. Every deployed chaincode gets a unique chaincode id in the Blockchain network. This Chaincode ID will be needed for integration with Watson IoT Platform but we can get this from Blockchain dashboard.

- In the Networks tab of Blockchain dashboard, observe the deployed chaincode on all the four validating peers in this Blockchain network.



- The ChainCode ID could be copied when needed from the Copy button of the deployed contract

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