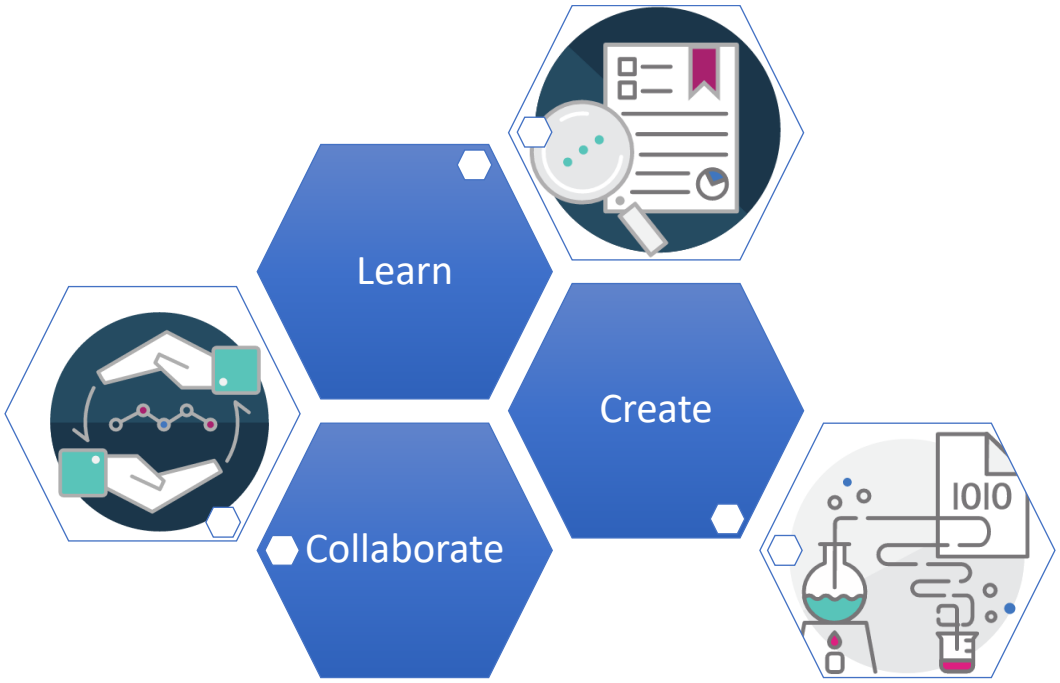
IBM Cloud

Analytics, Blockchain and Internet of Things (IoT)

Lab Guide



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Document Revision History

Rev #	File Name	Date
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Table of Contents

Lab Environment Overview

Software and Tools

Software	Link
GitHub	https://github.com/team-wolfpack
IBM Cloud	https://www.ibm.com/cloud/

Lesson 1: IBM Cloud Signup

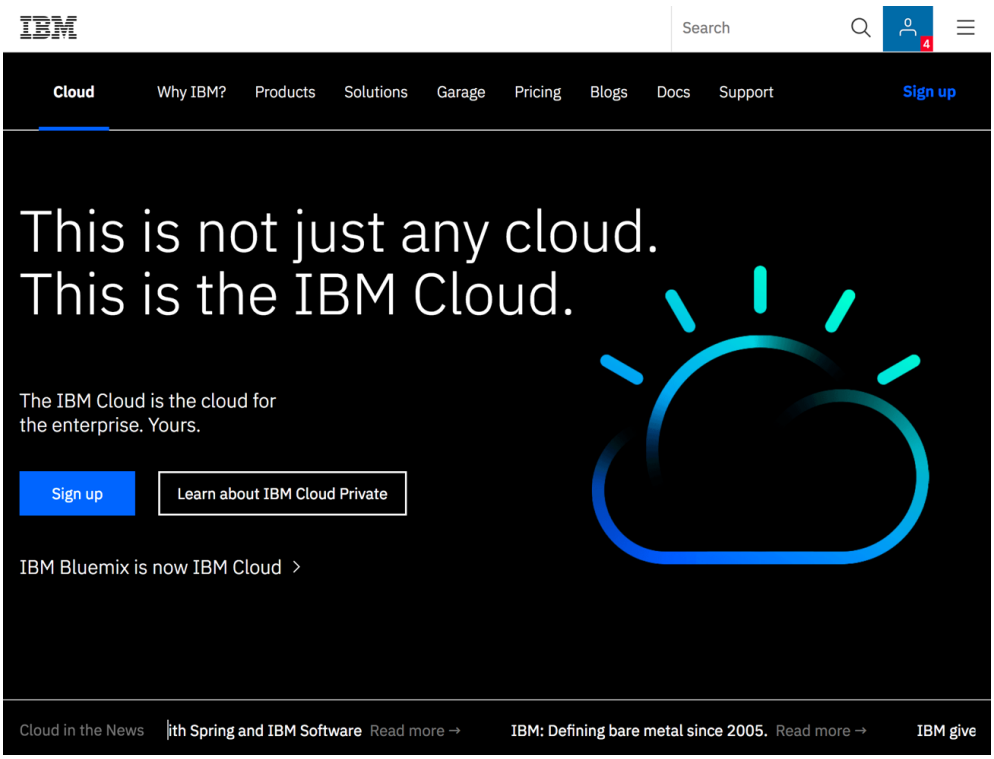
Purpose:	This lesson introduces the subject of Cloud. After completing the lesson, you should be able to: • Understand Cloud • Navigate IBM Cloud Platform

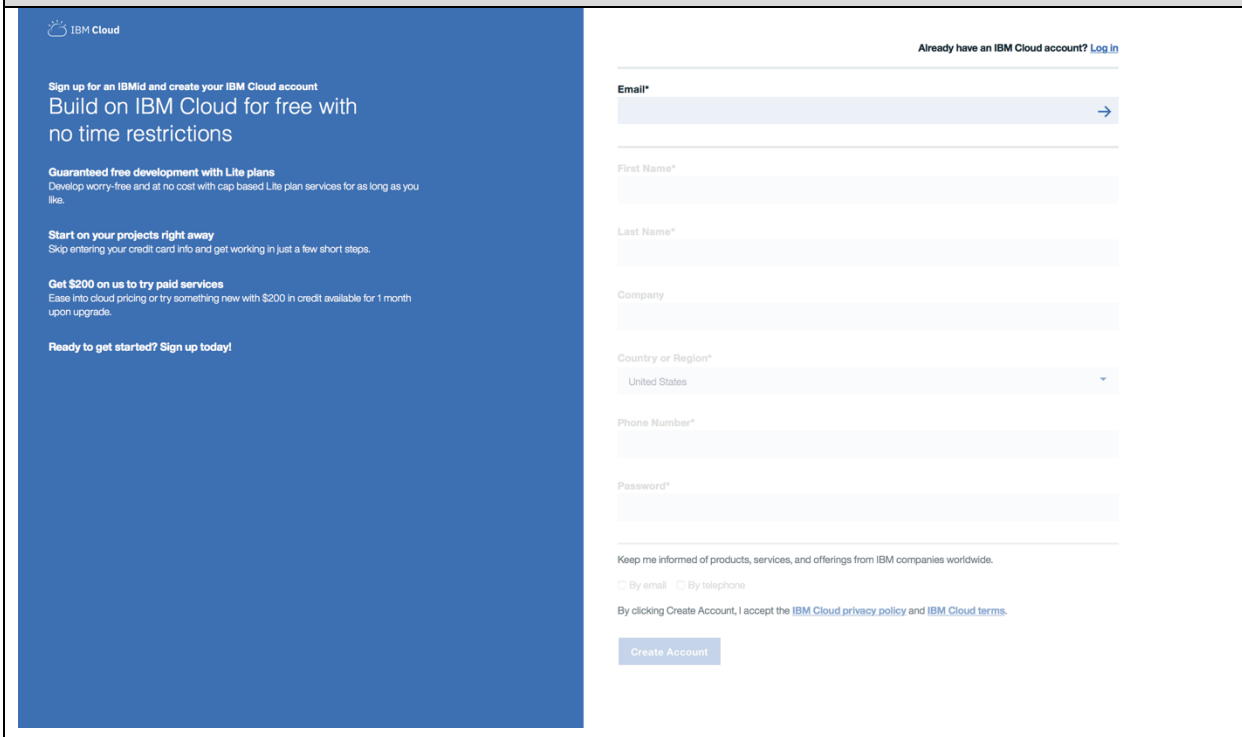
Tasks:	Tasks you will complete in this exercise include: • Signing up for IBM Cloud • Navigating the IBM Cloud Platform

Lab 1 Workflow Overview

1. Signing up for IBM Cloud
2. Navigating the IBM Cloud Platform

Lesson 1 Instructions

Action
1.Signing up for IBM Cloud a. Go to https://www.ibm.com/cloud/ b. We are going to sign up for a free IBM Cloud account. c. Click “Sign up”.      d. Fill in the required boxes. e. Click “Create Account”.

Action


2.Navigating the IBM Cloud Platform

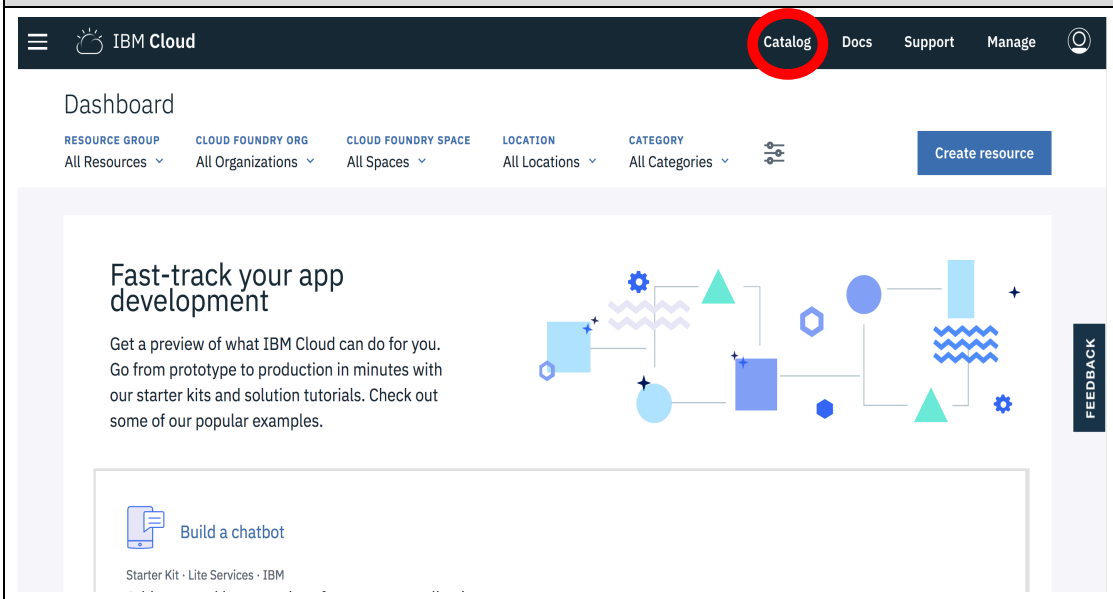
a. Log into IBM Cloud at https://console.bluemix.net/dashboard/apps/

b. If this is the first time you are using IBM Cloud (formerly Bluemix), an “About your IBMid Account Privacy” window will appear. Select Proceed

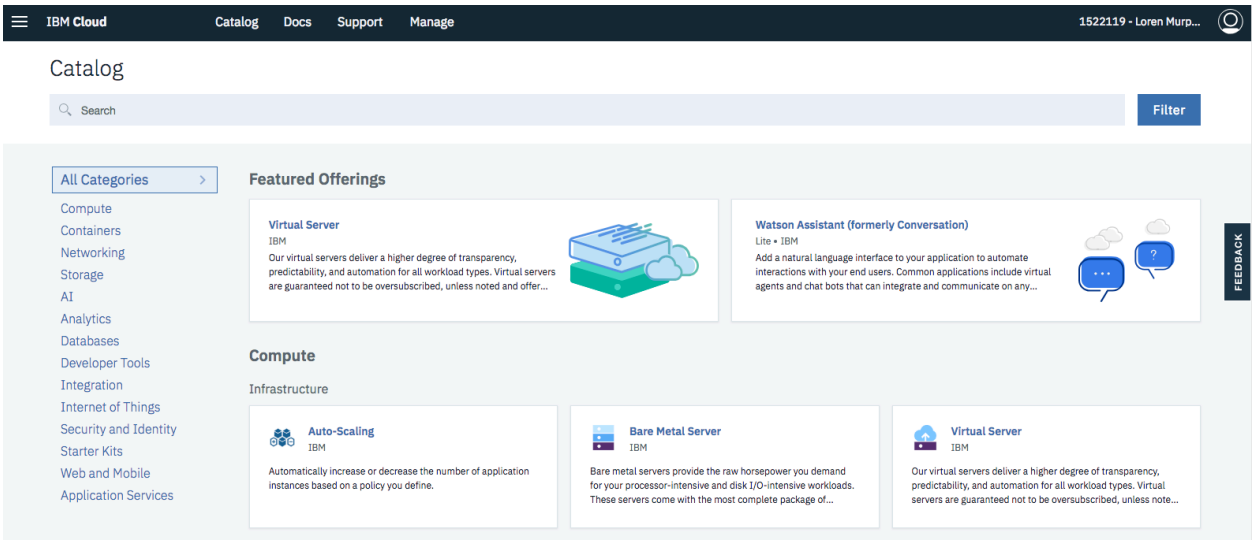
c. We are now looking at the IBM Cloud Dashboard.

d. Click on the “Catalog” button found in the upper right hand corner of the screen.

Action



e. The Catalog is a compilation of the services offered on the IBM Cloud.



As you look around the catalog, there are a few places to observe. The page is laid out for simple navigation. We already selected the Catalog button to open the Catalog. The Docs link provides details on each of the services. We will touch on this when we initialize our service here in a bit. The Support page is available to answer any questions that cannot be found in Docs. And lastly Manage is where you can manager your account Space and Organization. You can have multiple Spaces. This is a way to keep different projects organized.

Action

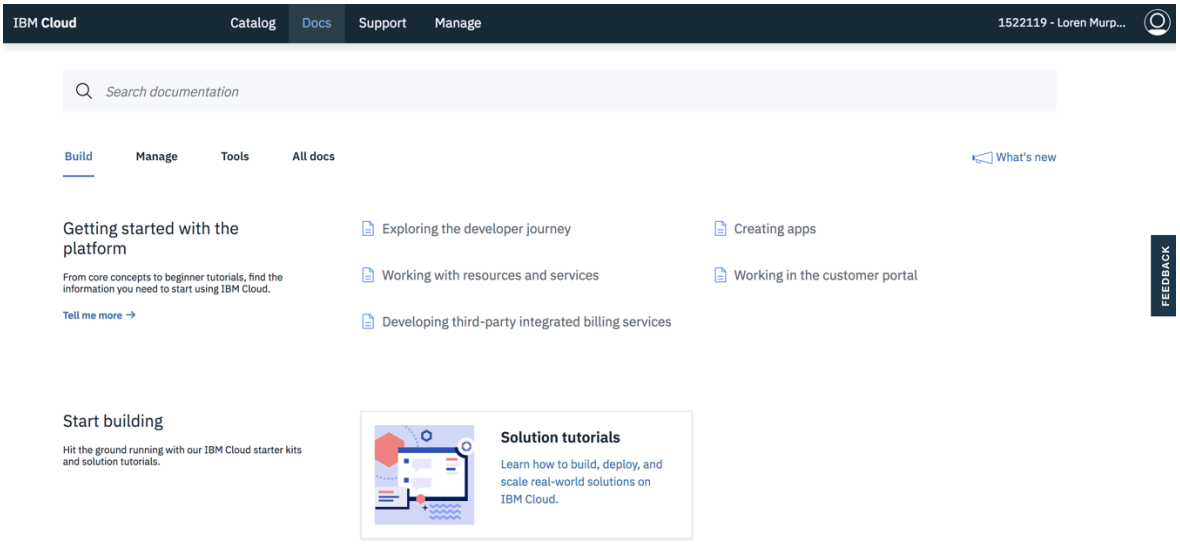
Services are organized in categories. These include Infrastructure, Compute, Storage, Watson, etc. Each service will have a title, icon, brief explanation of the service, and a label (“IBM”, “Third Party”, “Lite”)

f. IBM Cloud supports both IBM products and services, as well as third-party. A “Lite” label indicates that you can provision a free version of the service using your Lite Cloud account.

Going along the same navigation bar as we found the catalog, we can see docs, support and manage.

g. Click on **“Docs”**.

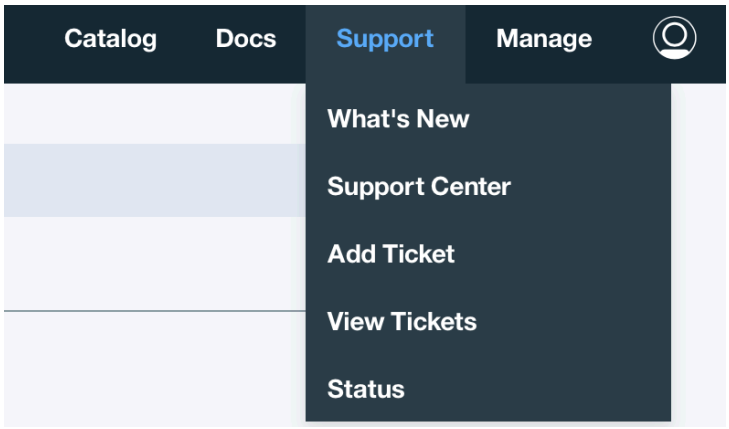
This is the first “go to” resource if you have questions about any of the services. IBM Cloud Docs houses tutorials, demo’s, videos, starter kits…if you have questions about a service, this is a great resource. Scrolling down you can see that there are numerous links. Each service has a link. Click on one to look at the type of documentation. The documentation ranges from “getting started” and high level “what is this service” to technical details about deploying the services.



Action

h. Click on **“Support”.**

Support is a next level of information and help. When you click on it, it will display a drop down menu. If the answers cannot be solved by looking for Docs OR if an emergency situation arises with one of the services, this is where you go to open a ticket. Once the ticket is open, this is also where you can see the status of your tickets. The “What’s new” tab will show you what is new on IBM Cloud. This is where you can go to see recent updates or releases on services.



i. Click on **“Manage”.**

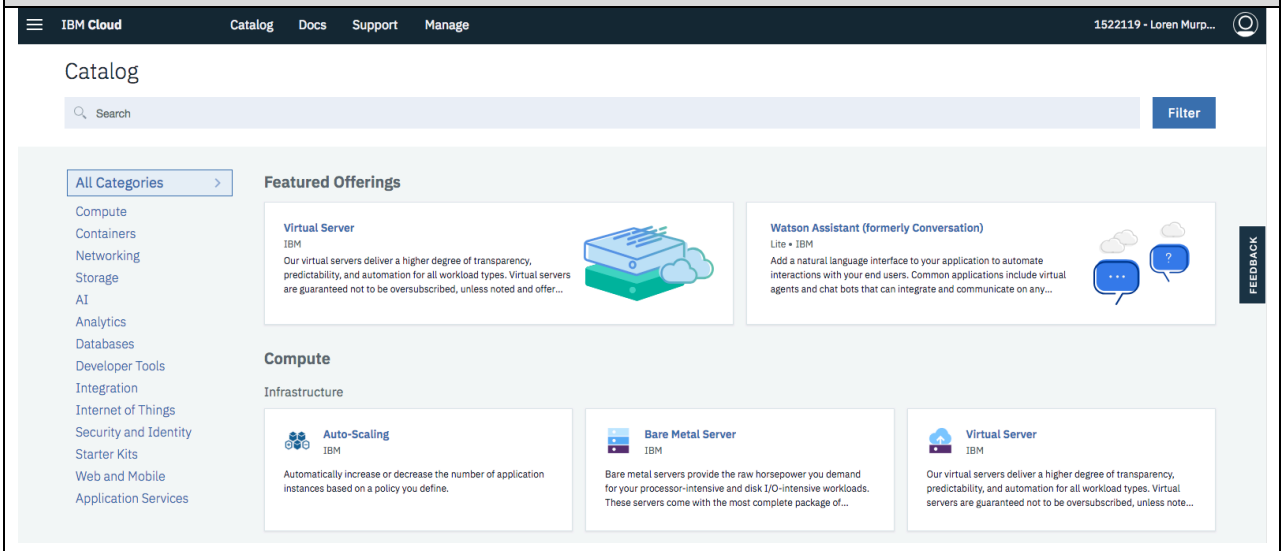
Manage is where you can keep track of your own account, billing and usage and security. Within the account tab, you can monitor users, groups, organizations, etc.

j. Click on the **head icon**.

Finally, the head icon will bring you to your personal account page. This is another way to access and manage your accounts such as organizations you are a part of or spaces you are working in.

k. Return to the catalog

Action



End of Lesson 1

Lesson 2: Configure Watson Internet of Things (IoT) Service

Purpose:	This lab introduces the Watson IoT Platform and how to register devices.

Tasks:	Tasks you will complete in this lab exercise include: • Provision Watson IoT Service • Register Devices

Lesson 2: Workflow Overview

1. Project Overview
2. Provision Watson IoT Service
3. Register Devices

Lesson 2: Instructions

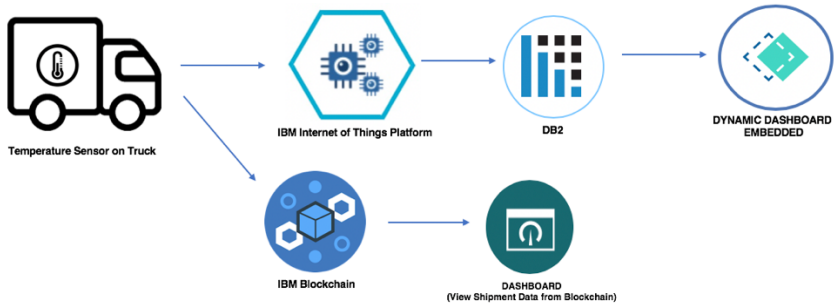
1. Project Overview

This lab is based on the IBM Code Pattern, "IoT Asset Tracking on a Blockchain"

Our global economy and populations depend on safe delivery of perishable goods (food, medicine, livestock, etc.). Whenever public health officials issue a warning about bacterial outbreaks affecting the food supply, there are investigations into the source and cause of the contamination. Often these perishable goods are sensitive to environmental conditions during shipment. Were the perishable goods exposed to extreme temperatures? To preserve freshness, shipments of perishable goods might have refrigeration requirements because no one wants to eat unsafely warmed meat or bruised apples. If the shipment exceeds these temperature thresholds, the goods are likely damaged and might become a health hazard.

Tracking the conditions of the shipment across multiple participants using a blockchain provides verification and trust, while sensors within the shipment records environmental conditions in real-time. Is the truck refrigeration sufficient for this particular type of good? What temperature ranges were prescribed in the Smart Contract? Once it arrives at the final destination, is this shipment still safe or damaged?

This lab will simulate a temperature sensor within a shipment of perishable goods. As the truck travels to its final destination, the temperature, location, and reading time of shipment will be recorded in the blockchain. The shipment information will also be sent to the Watson IoT platform for further real-time analysis and persisted within Db2 on Cloud for further analysis and visualization.

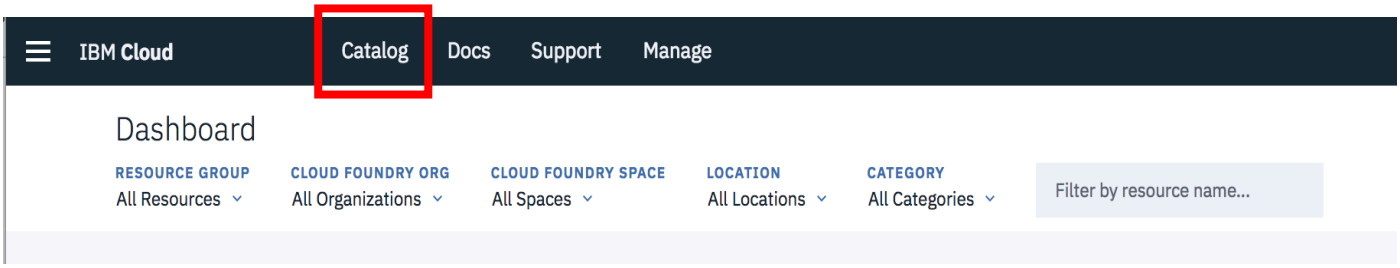


Action

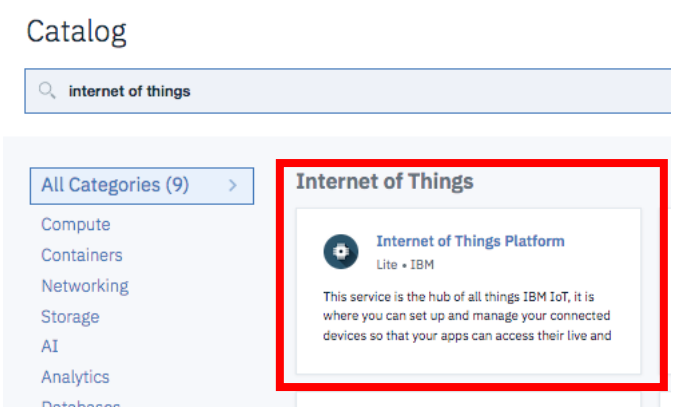
2. Provision Internet of Things Platform Service

a. Log into IBM Cloud at https://console.bluemix.net/dashboard/apps/

b. Click the "**Catalog**" button found in the left hand side of the screen.

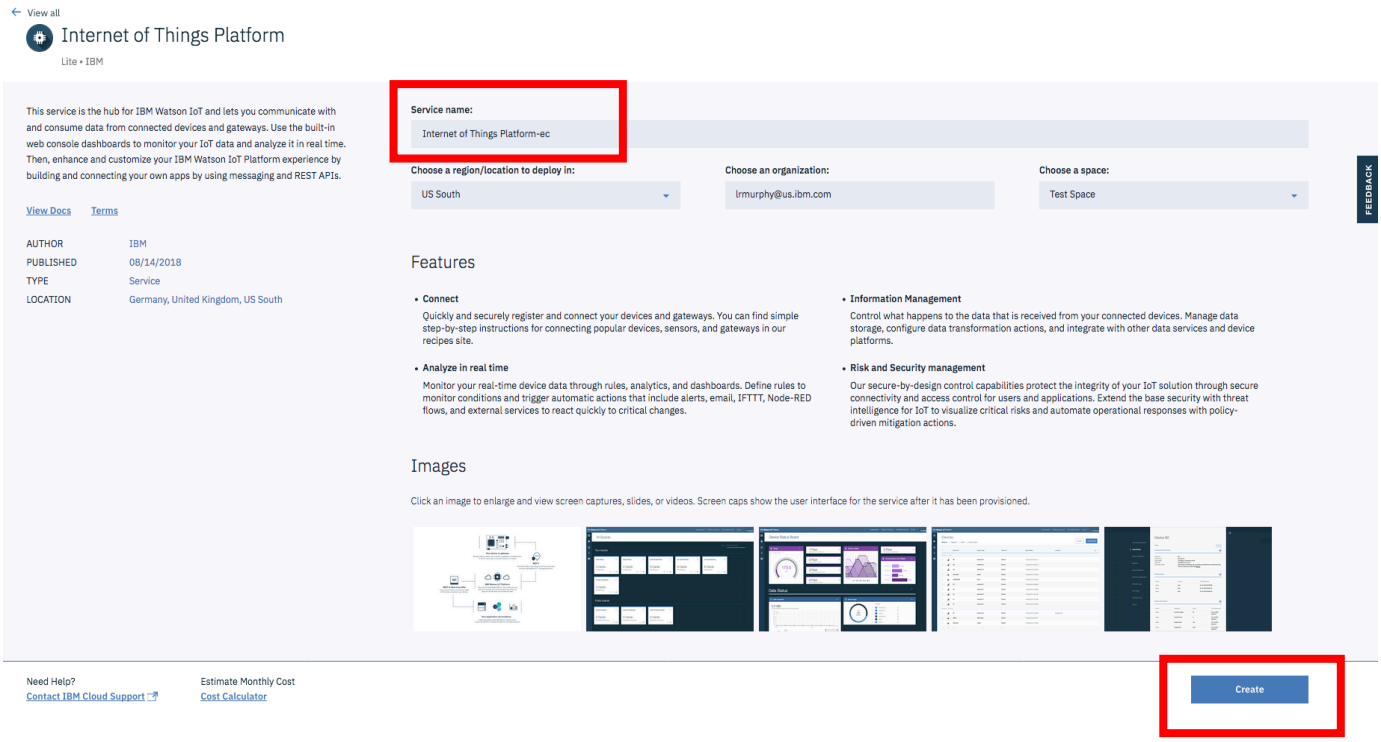


c. In the search bar, type **internet of things** and select **Internet of Things Platform.**

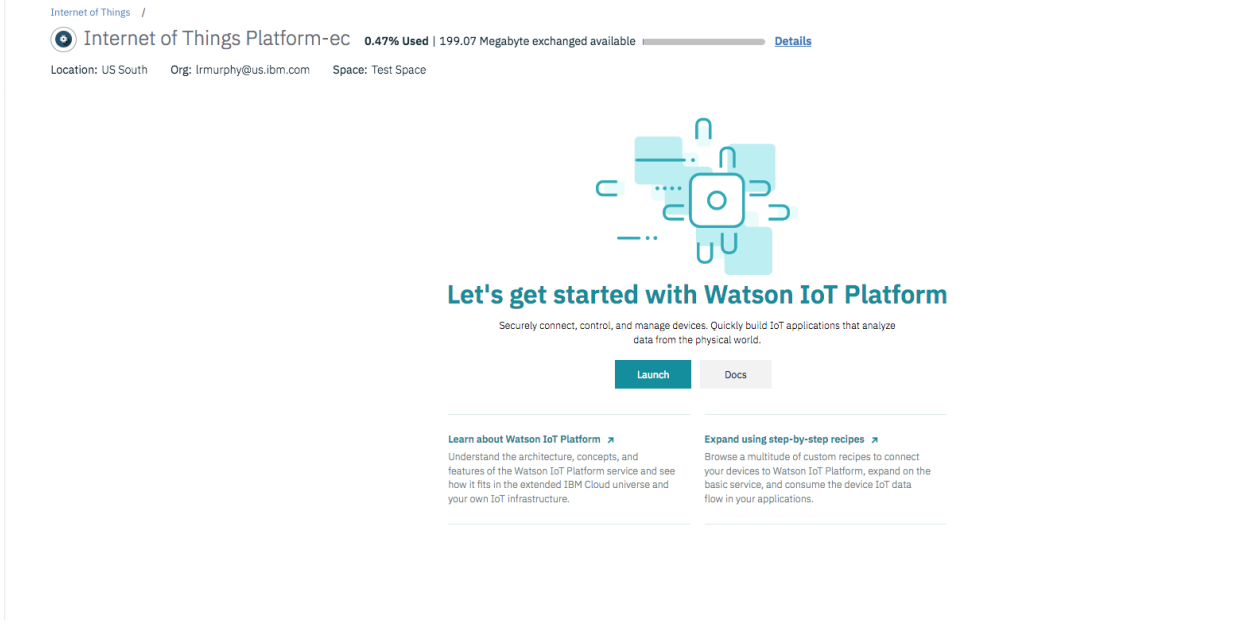


d. Keep the default service name and select **Create**

Action



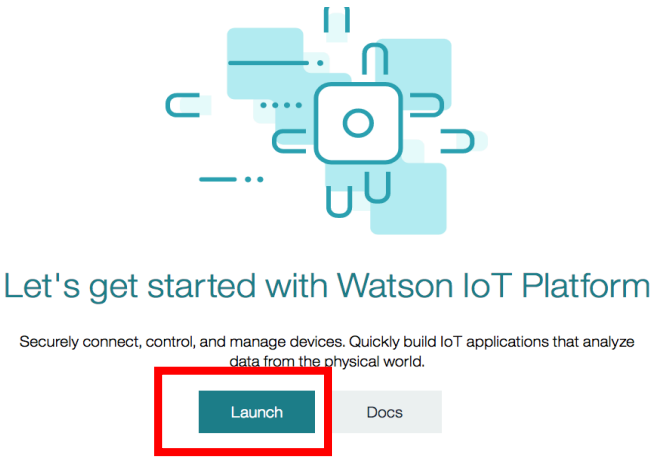
e. Once provisioned, you will see the Internet of Things Platform page.



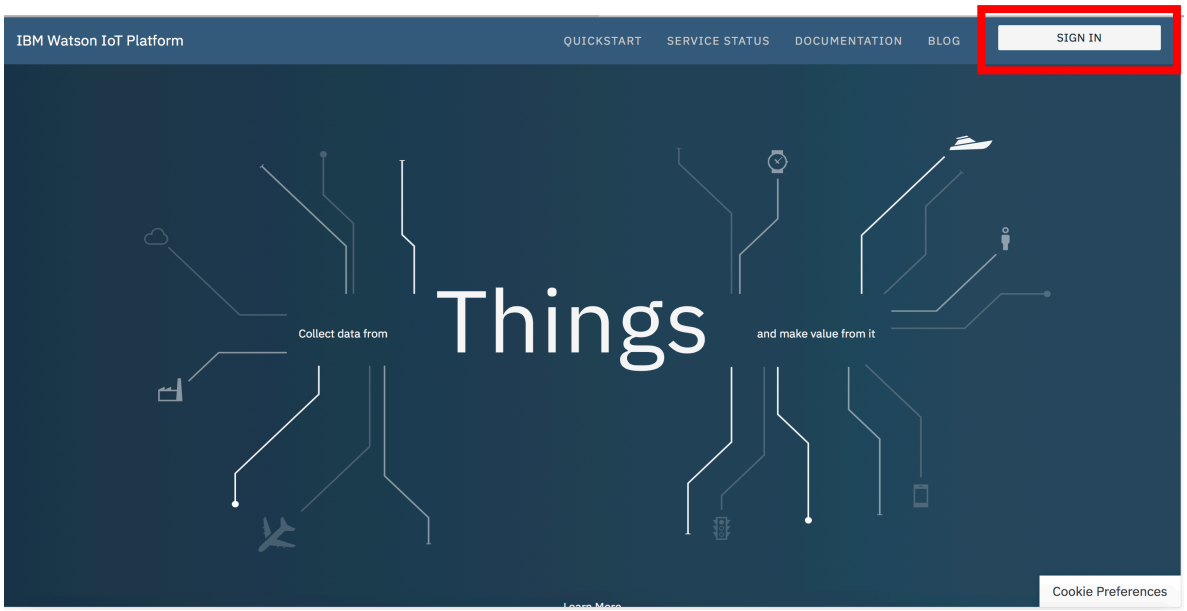
Action

3. Register Devices in IoT Platform

a. Select **Launch** to enter into the IBM Watson IoT Platform organization space

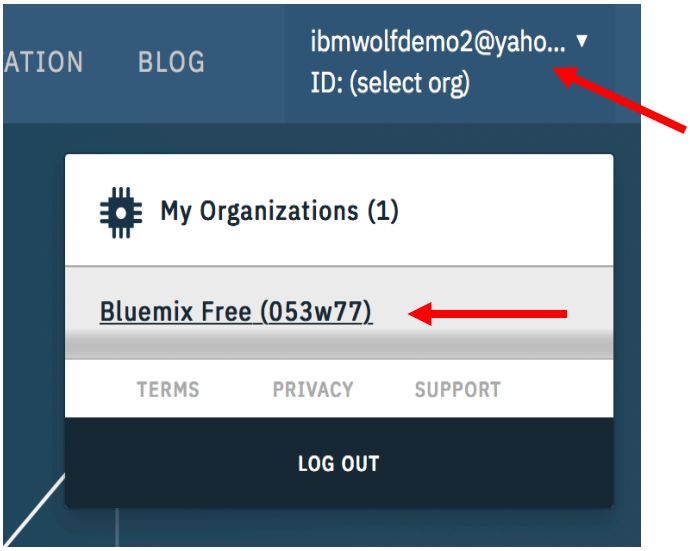


b. You should now see the IBM Watson IoT Platform welcome screen. If you are not automatically logged in, in the upper right corner click **Sign In** and login with your IBM Cloud ID and password

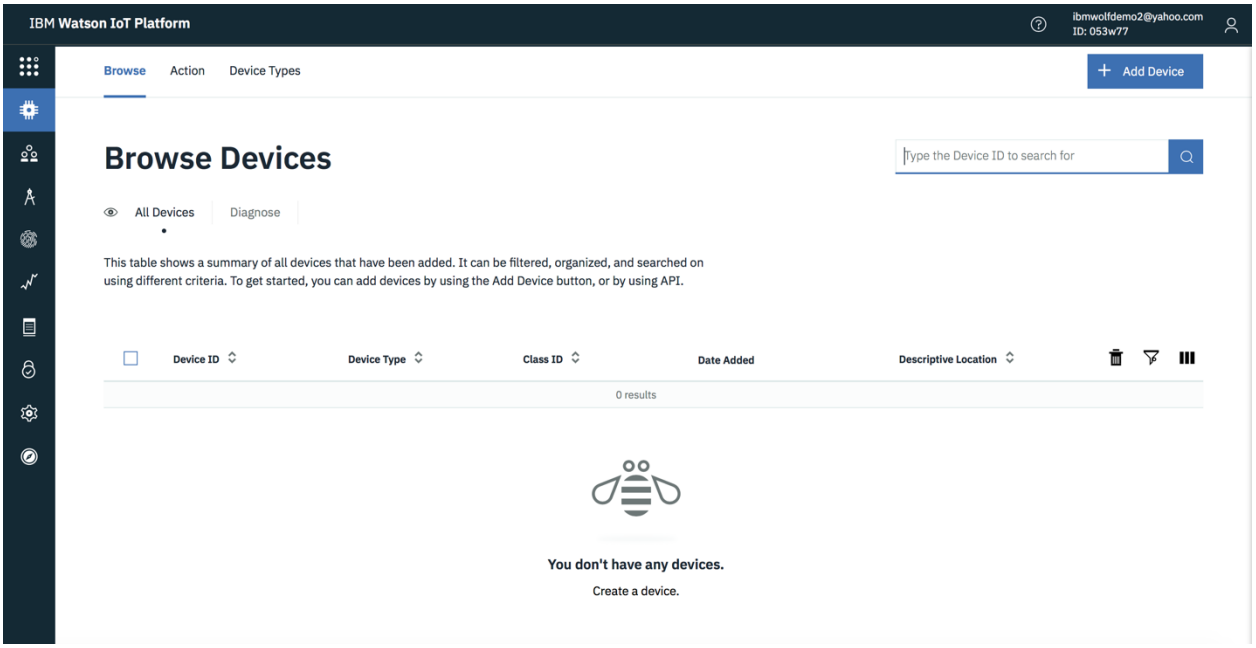


c. Click your **IBM Cloud ID** in the upper right corner and select the **Bluemix Free Ord ID**. The IoT organization is a space used for connecting and managing devices to the IoT Platform so your applications can access their live and historical data.

Action



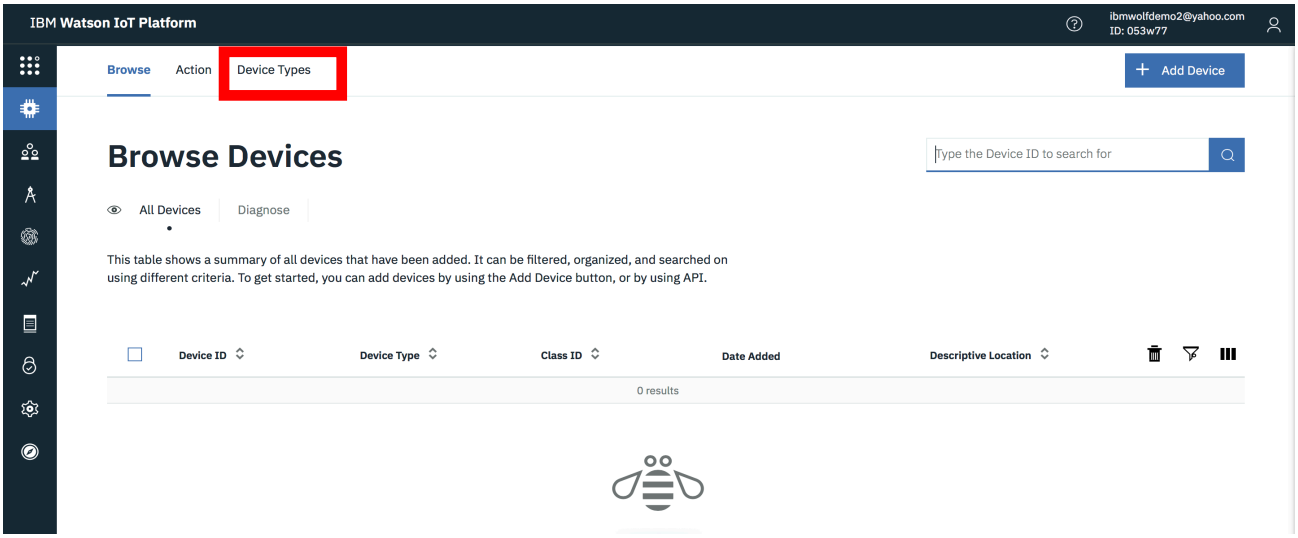
d. You should now see your Browse Devices page.



Action

In the lab we will simulate a Temperature Sensor on a carrier truck connecting to the IoT Platform. Each device connected to the IBM Watson IoT Platform is associated with a device type. Device types are intended to be groups of devices which share common characteristics. In order to add devices in IBM Watson IoT Platform, you need to create a device type.

e. From the Browse Devices page, select the Device Types tab in the upper left menu

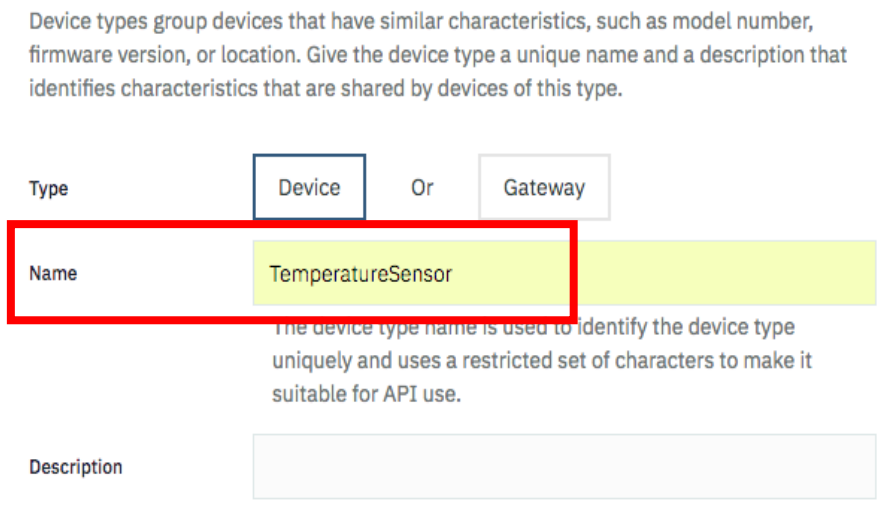


f. Select **Add Device Type,** from the upper right corner

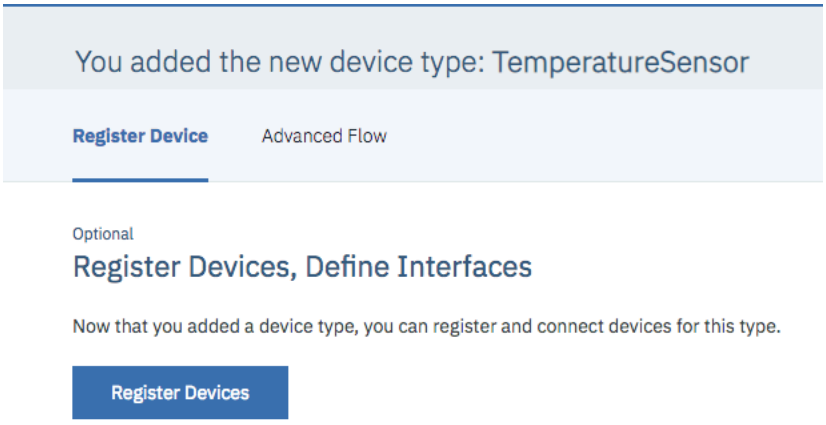
Observe there are 2 options provided: Device type and Gateway type. This lab will focus on adding devices not a gateway. Gateways are a specialized class of devices in the IBM Watson IoT Platform which serve as access points to the Platform for other devices. Gateway devices can register new devices and can send and receive data on behalf of devices connected to them.

g. For Type, select **Device.** For Name, type **TemperatureSensor**. Click **Next**.

Action

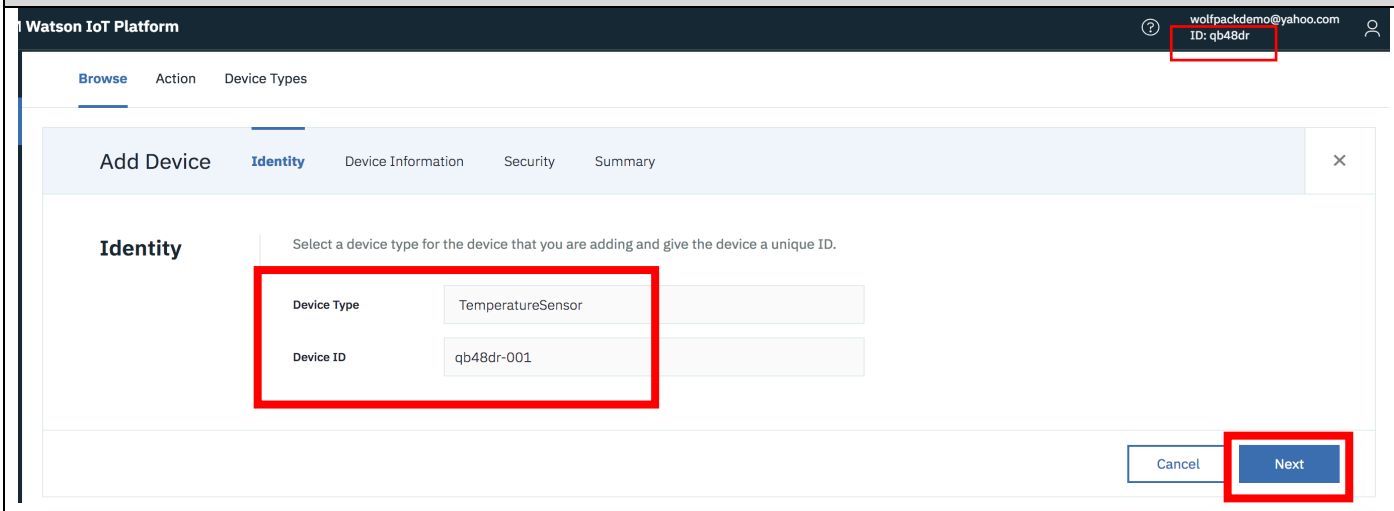


h. Leave Device Information blank. Select **Done.** You have successfully added a new device type. Now we need to register Devices of that type.

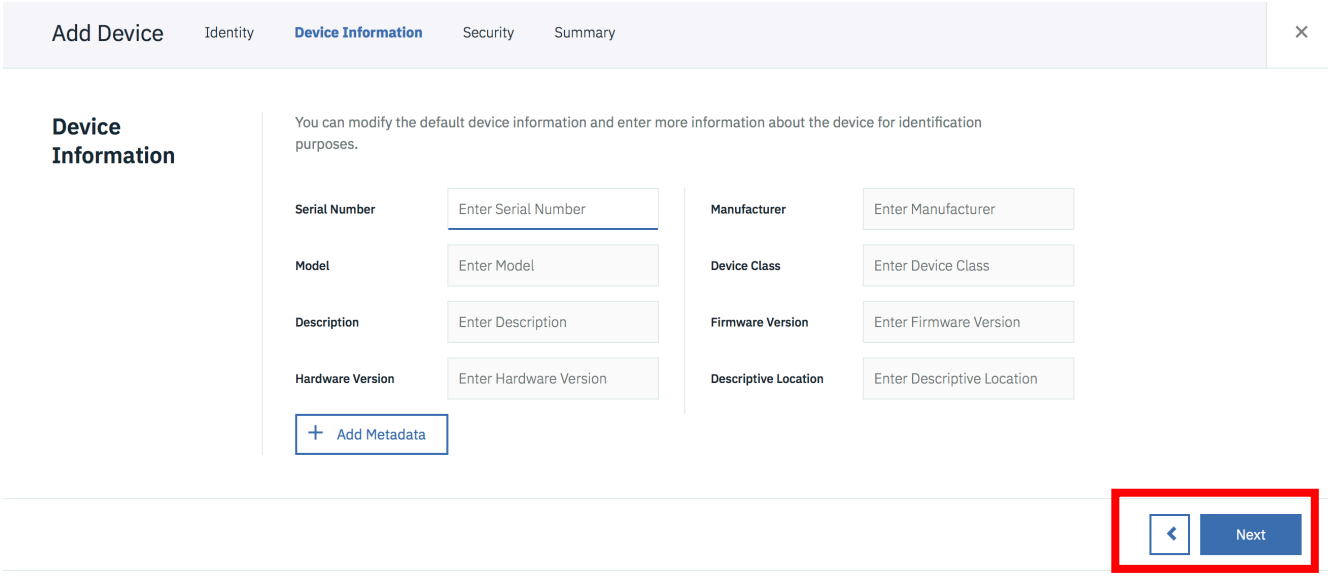


a. Select **Register Devices.** Device Type should be **TemperatureSensor**. For Device ID, type **<Your IoT Org ID>-001.** Your IoT Org ID can be found in the upper right corner, below your IBM ID. Click **Next**

Action

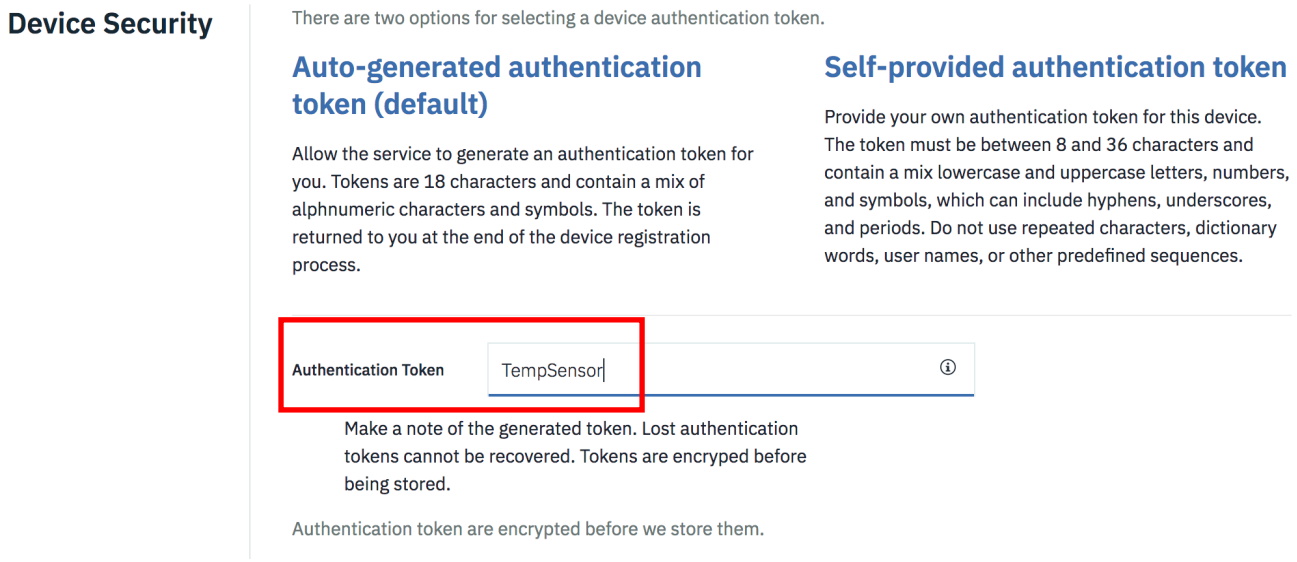


b. Leave Device Information blank. Select **Next.**

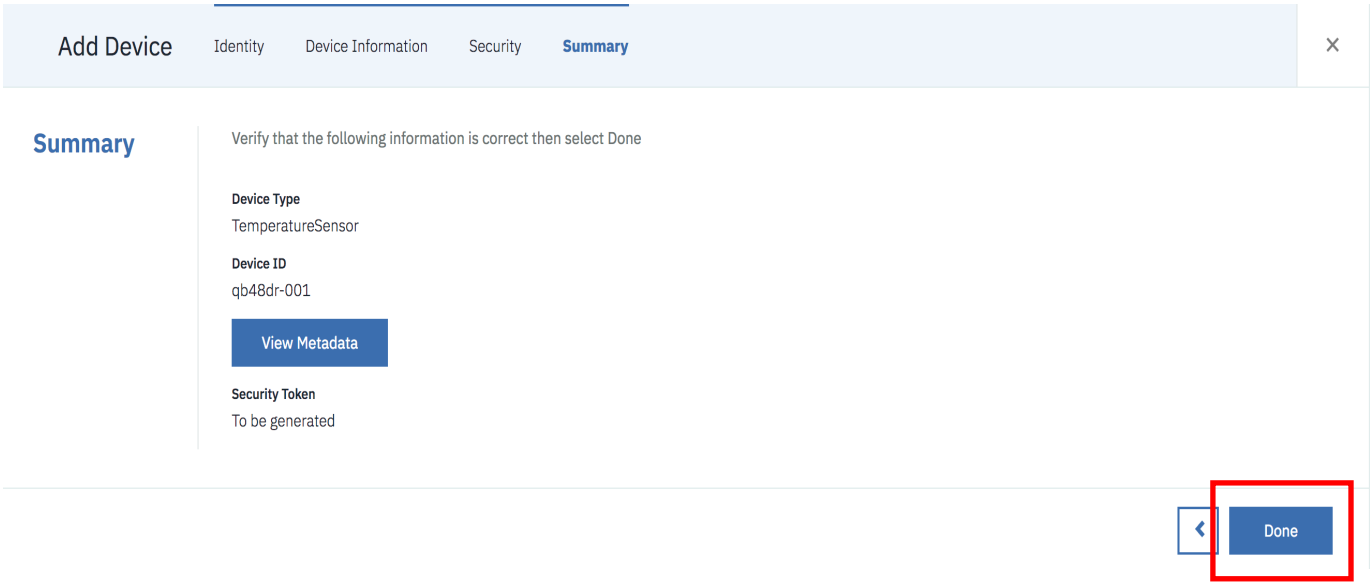


c. Type **TempSensor** as the authentication token. Select **Next.**

Action

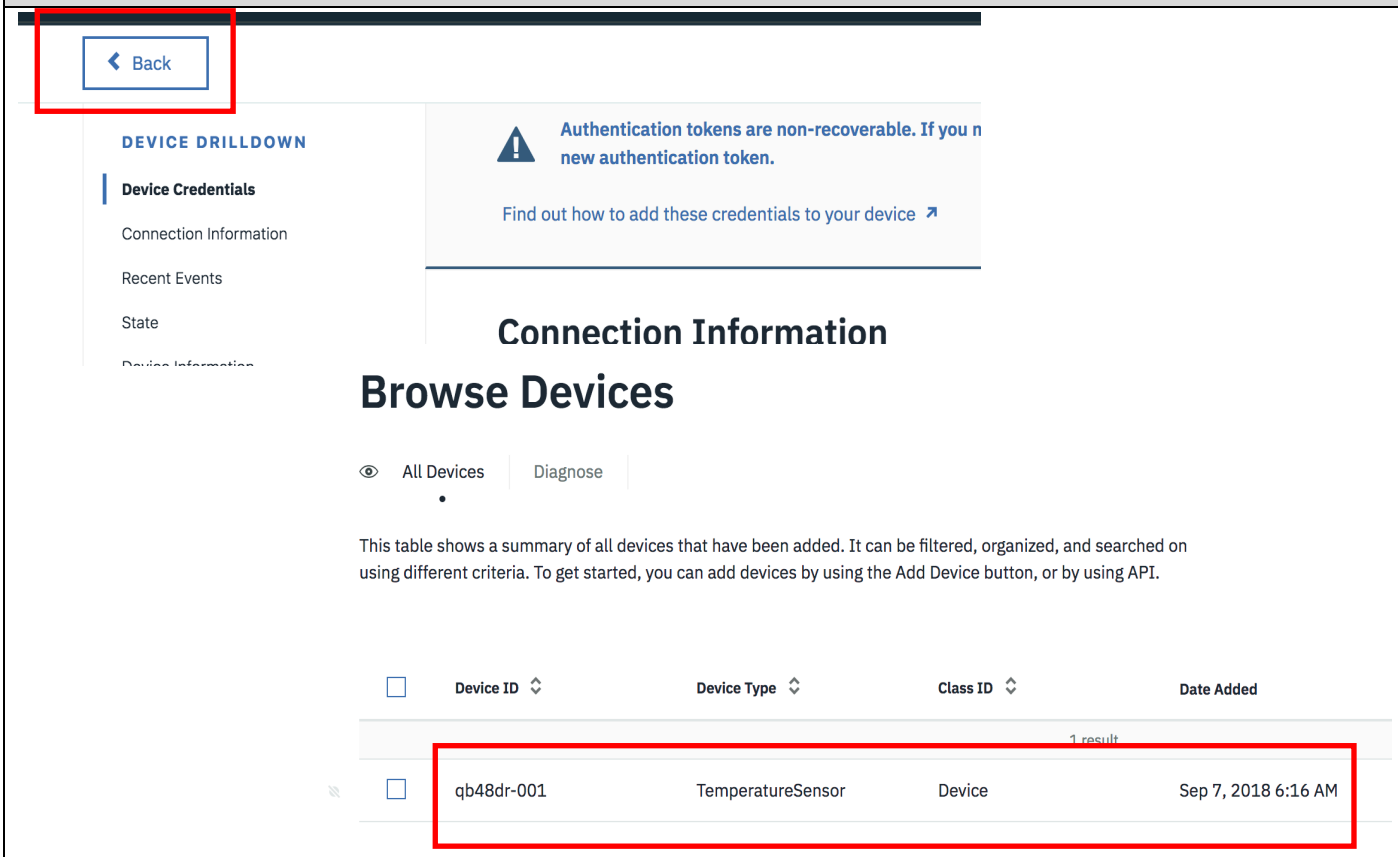


d. Click **Done** to add your device and to receive your device credentials. Be sure to **write down the credentials and save** for later use.



e. Click **Back** in the upper left corner. Your device should now be listed on the “Browse Devices” page.

Action



Congratulations! You have successfully provisioned the IoT Service and Registered a Device.

End of Lesson 2

Lesson 3: Configure Db2 on Cloud

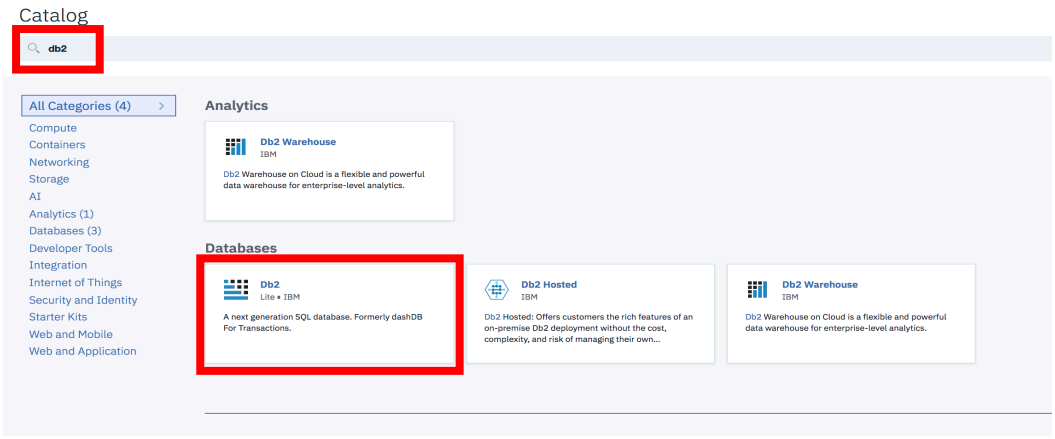
Purpose:	This lab introduces how a to provision the Db2 on Cloud service and create a table. The database will be used to persist IoT sensor data.

Tasks:	The tasks you will complete in this section are: • Provision Db2 on Cloud Service • Create Table in Db2 on Cloud

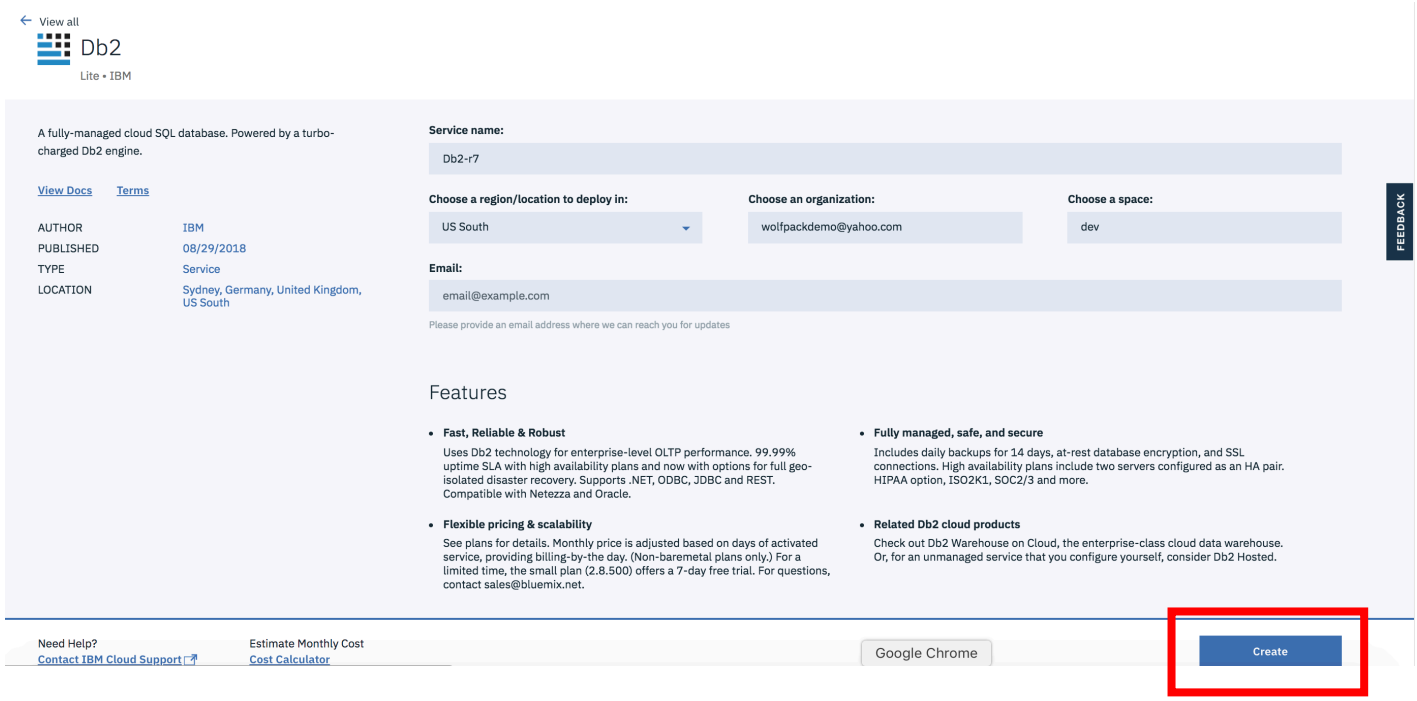
Lesson 3: Workflow Overview

1. Provision Db2 on Cloud
2. Create Table in Db2 on Cloud

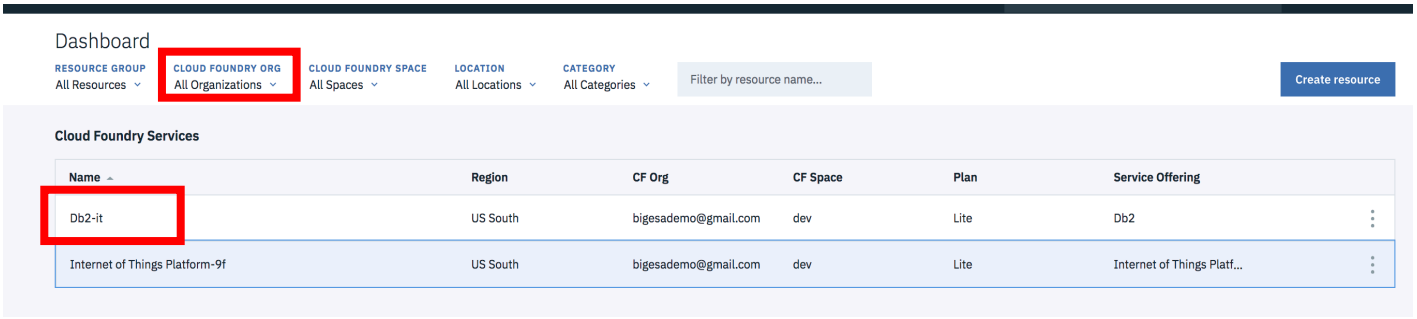
Lesson 3 Instructions

Action
1. Provision Db2 a. Go back to your IBM Cloud catalog at https://console.bluemix.net/catalog/ b. Search for **Db2** and select the **Db2** Service      c. Keep the default service name and click **Create**

Action

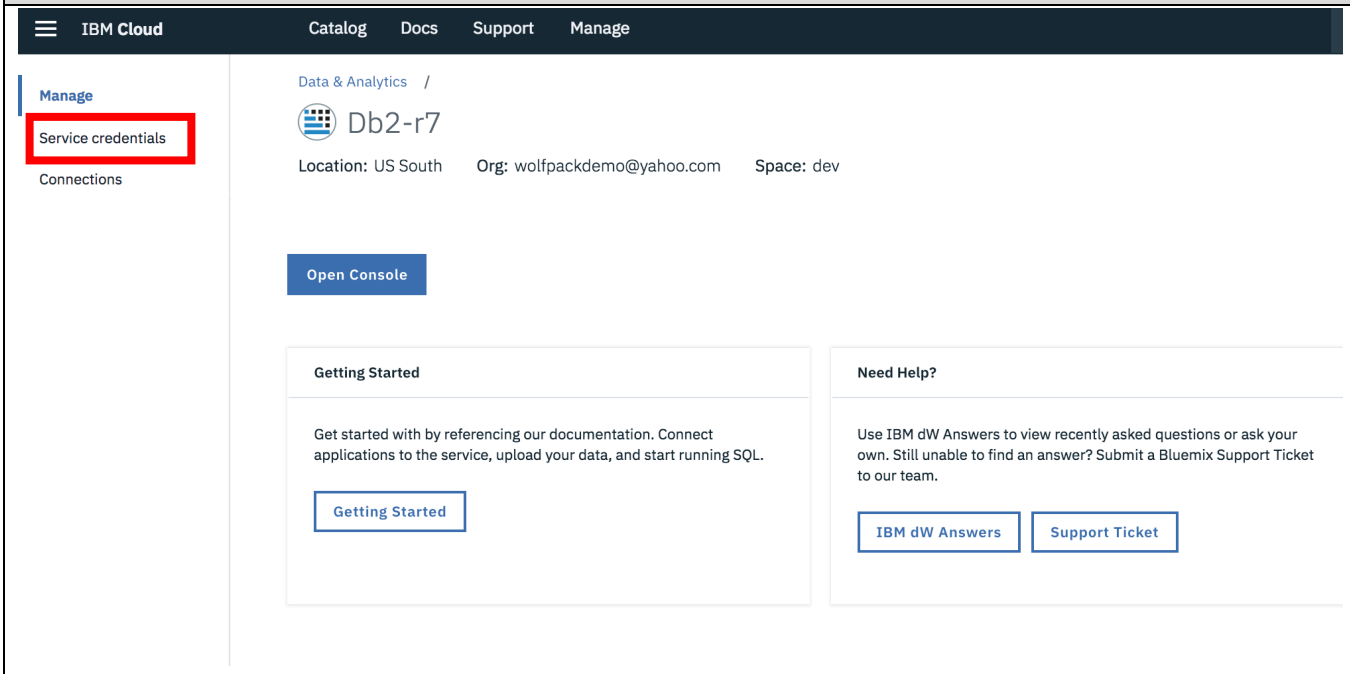


d. From the dashboard, select your **cloud foundry org** and click your newly provisioned **Db2 service**.

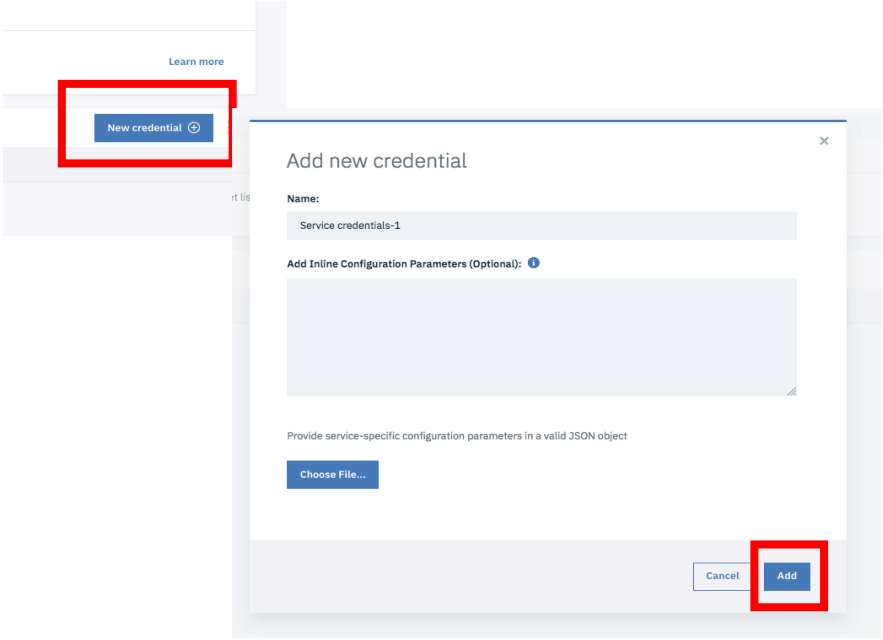


e. From the Db2 service page, click **Service Credentials**

Action

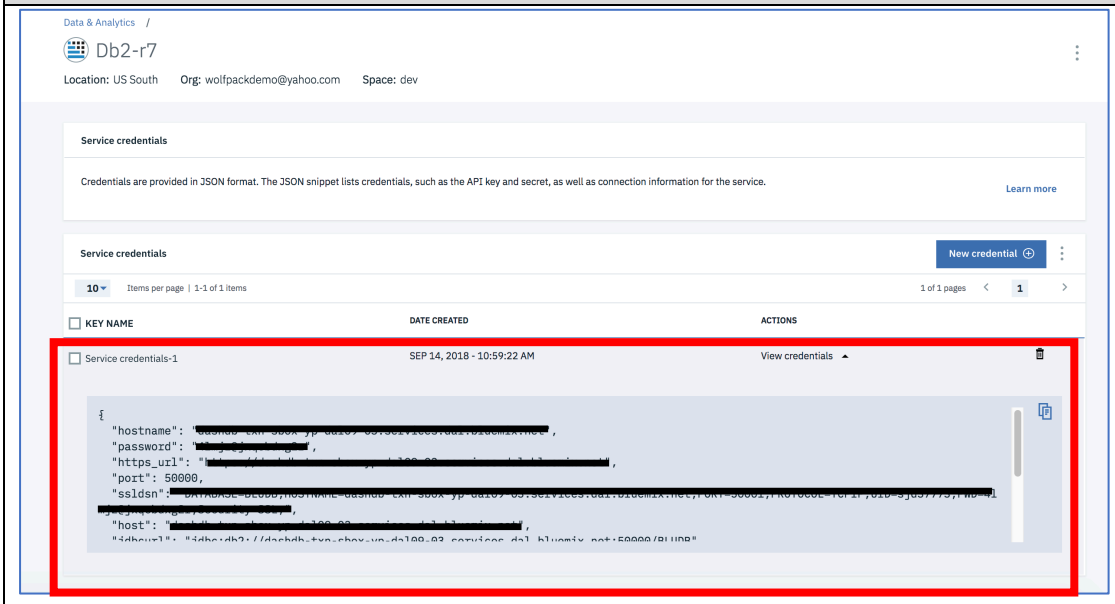


f. Click **New Credential** and **Add** to create a new credential



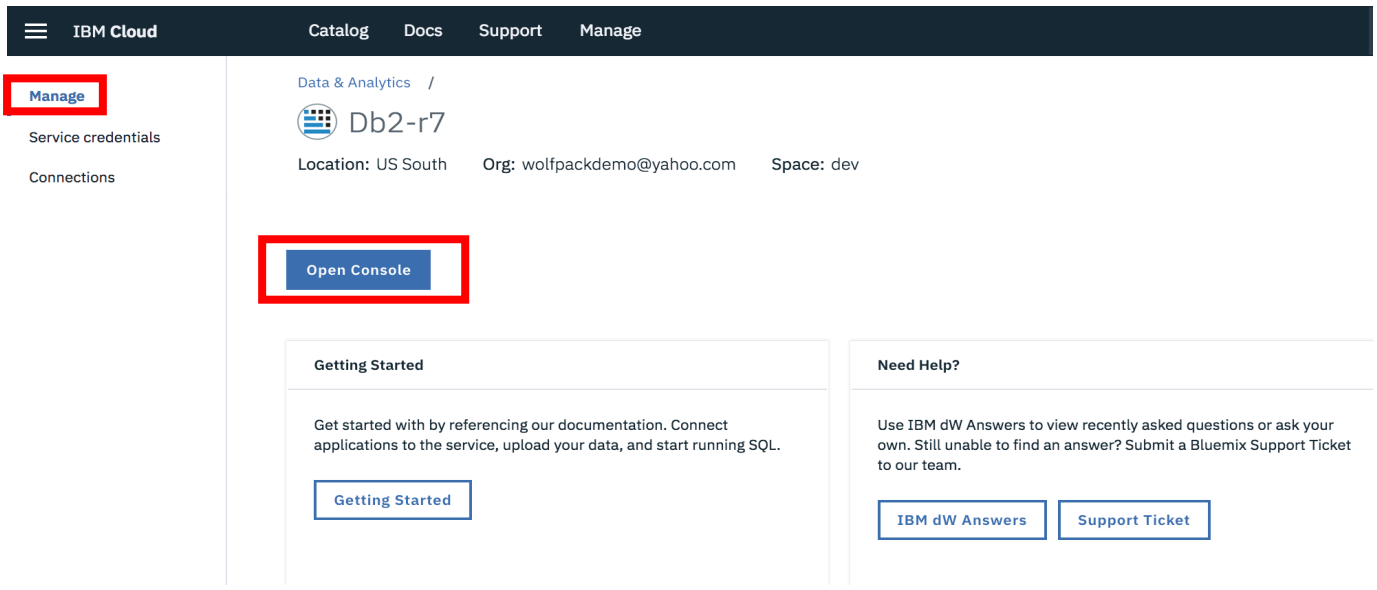
g. **Copy and save** the service credentials

Action



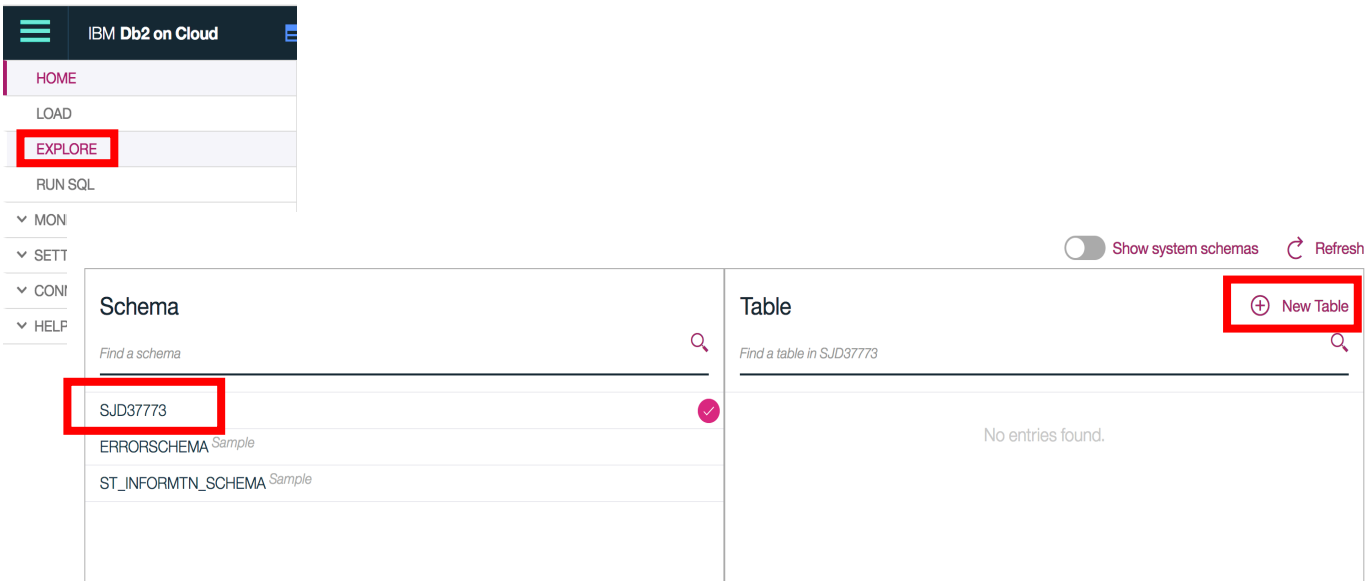
2. Create Table in Db2

a. Select **Manage** from the menu on the left-hand side to return to the main page. Click **Open Console** to launch the Db2 on Cloud service



b. From the menu, select **Explore**. Select the schema called **XXXYYYY,** (where x are letters and Y are numbers. ie: MLT10842, SJD37773 etc). Click **New Table.**

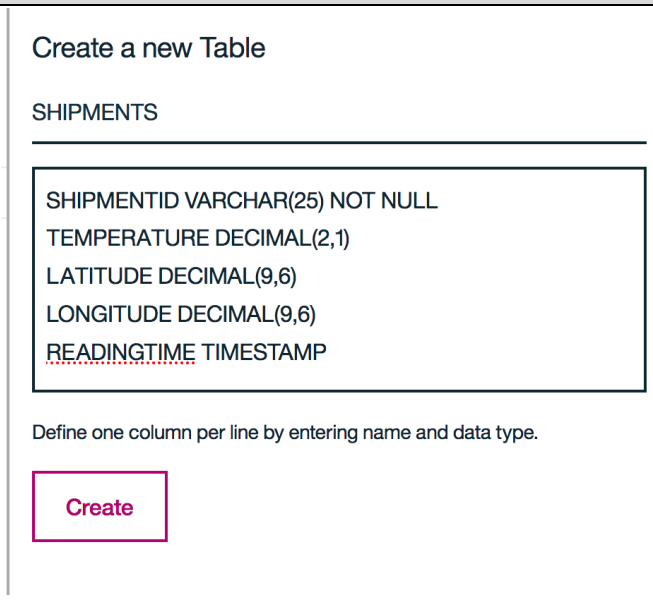
Action



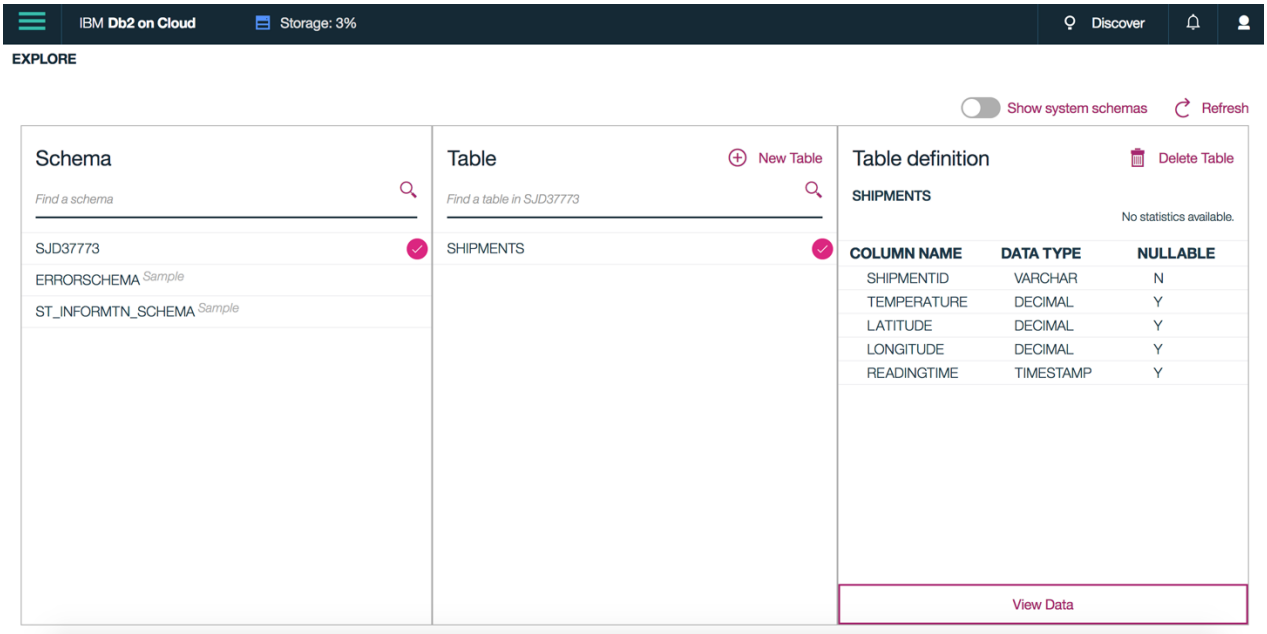
c. Name the table, **SHIPMENTS**, and enter the following columns. When done, click **Create**

SHIPMENTID VARCHAR(25) NOT NULL
TEMPERATURE DECIMAL(2,1)
LATITUDE DECIMAL(9,6)
LONGITUDE DECIMAL(9,6)
READINGTIME TIMESTAMP

Action



d. You have now successfully created a table in Db2 on Cloud.



End of Lesson 3

Lesson 4: Configuring Node-RED

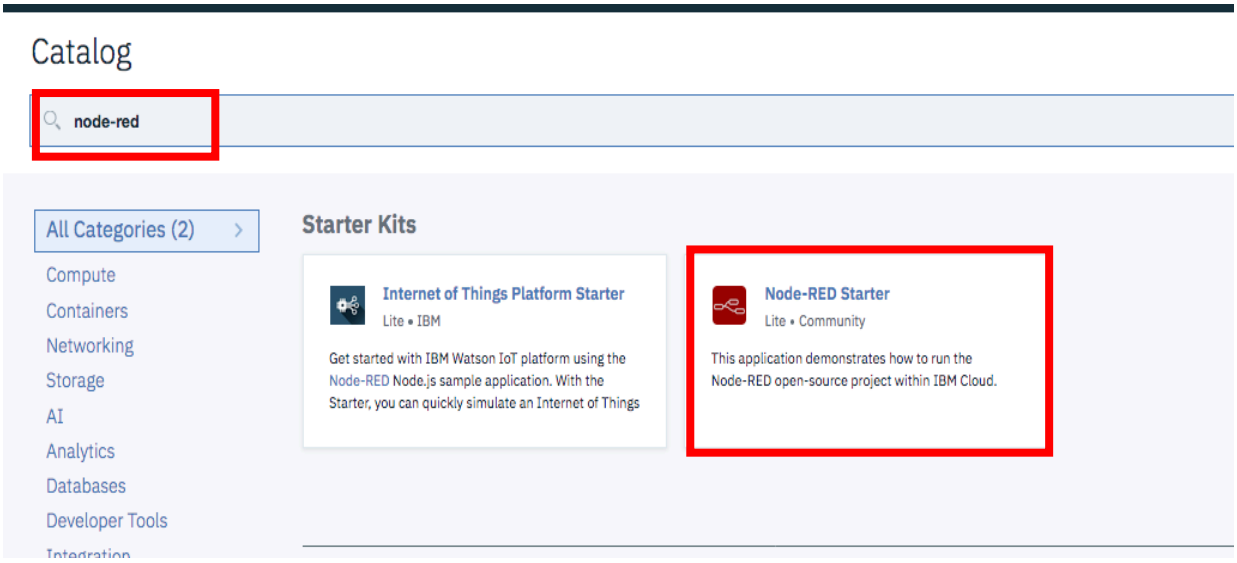
Purpose:	This lesson introduces the Node-RED service which will be used to simulate Temperature Sensor readings from the carrier truck. The temperature data will be added to the Blockchain as well as persisted into Db2 on Cloud for historical analysis and visualization.

Tasks:	Tasks you will complete in this lab exercise include: • Provision Node-RED Service • Import Node-RED Flows • Configure Node-RED Flows • Run Node-Red Flows • View Shipment Data in the Blockchain • View Real-time Temperature data in IoT Platform • View Temperature Sensor data in Db2 on Cloud

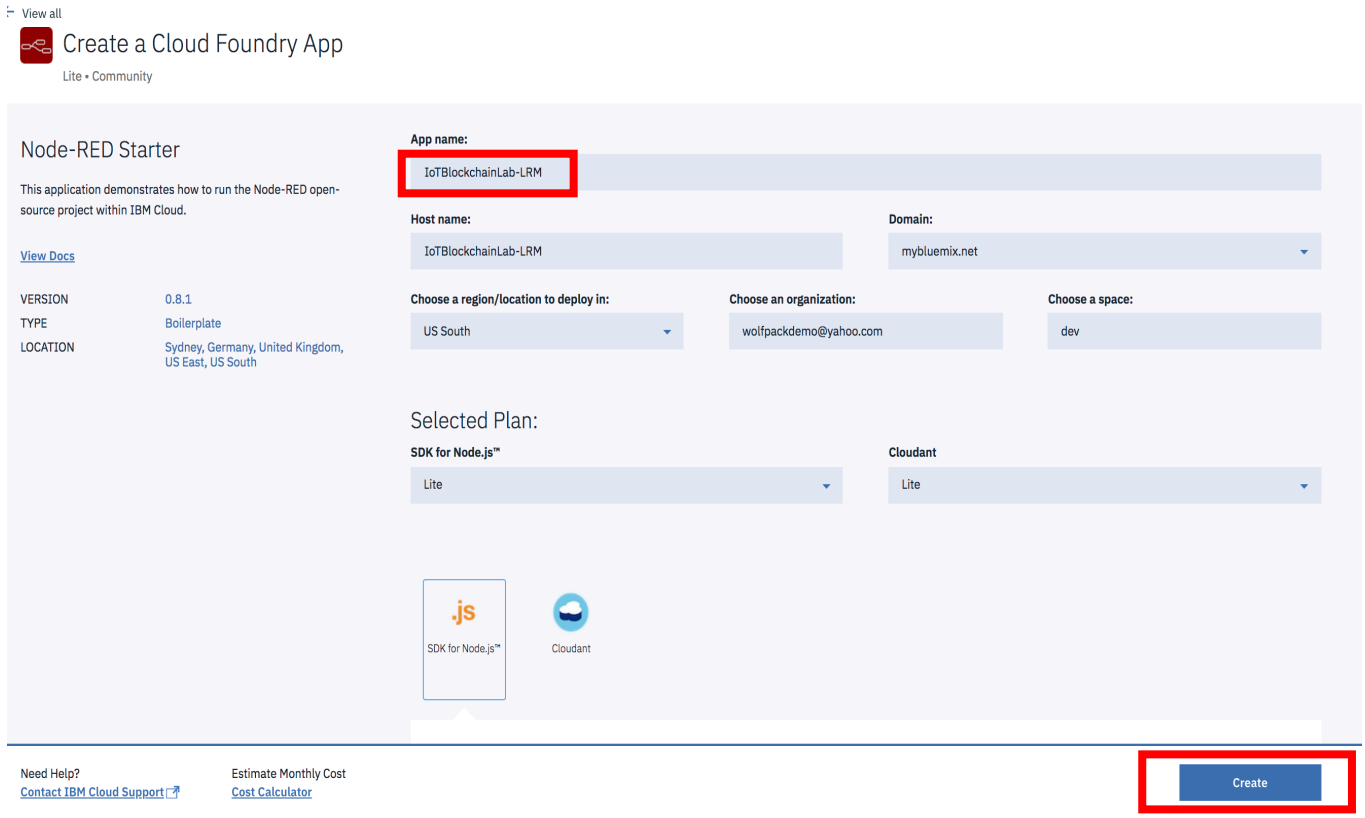
Lesson 4: Workflow Overview

1. Provision Node-RED Service
2. Import Node-RED Flow
3. Configure Node-RED Flow
4. Run Node-Red Flow
5. View Shipment Data in the Blockchain
6. View Real-time Temperature Data in IoT Platform
7. View Temperature Sensor Data in Db2 on Cloud

Lesson 4: Instructions

Action
1.Provision Node-RED Service Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways. It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palette that can be deployed to its runtime in a single-click. In this lab, we will use Node-RED to create a flow that simulates a Temperature Sensor on a Carrier Truck. Node-RED will also coordinate API calls to the Blockchain and Watson IoT services. a. Go to your IBM Cloud account catalog at https://console.bluemix.net/catalog/ b. Search for **node-red** and select the **Node-Red Starter** service.      c. Give the app a unique name and select **Create**.

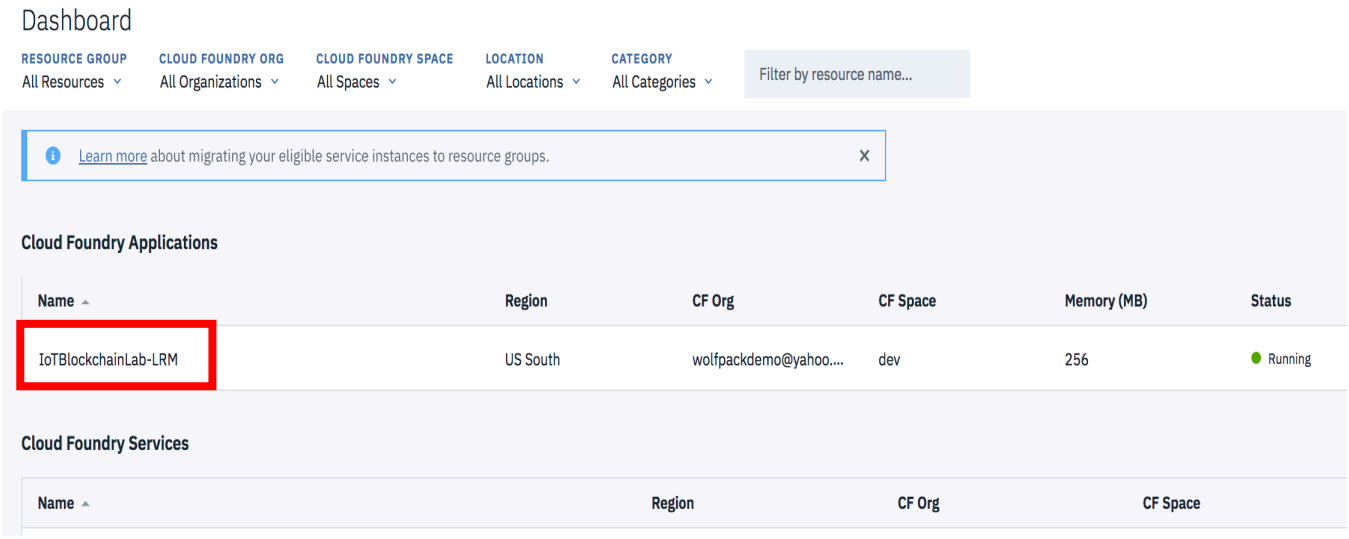
Action



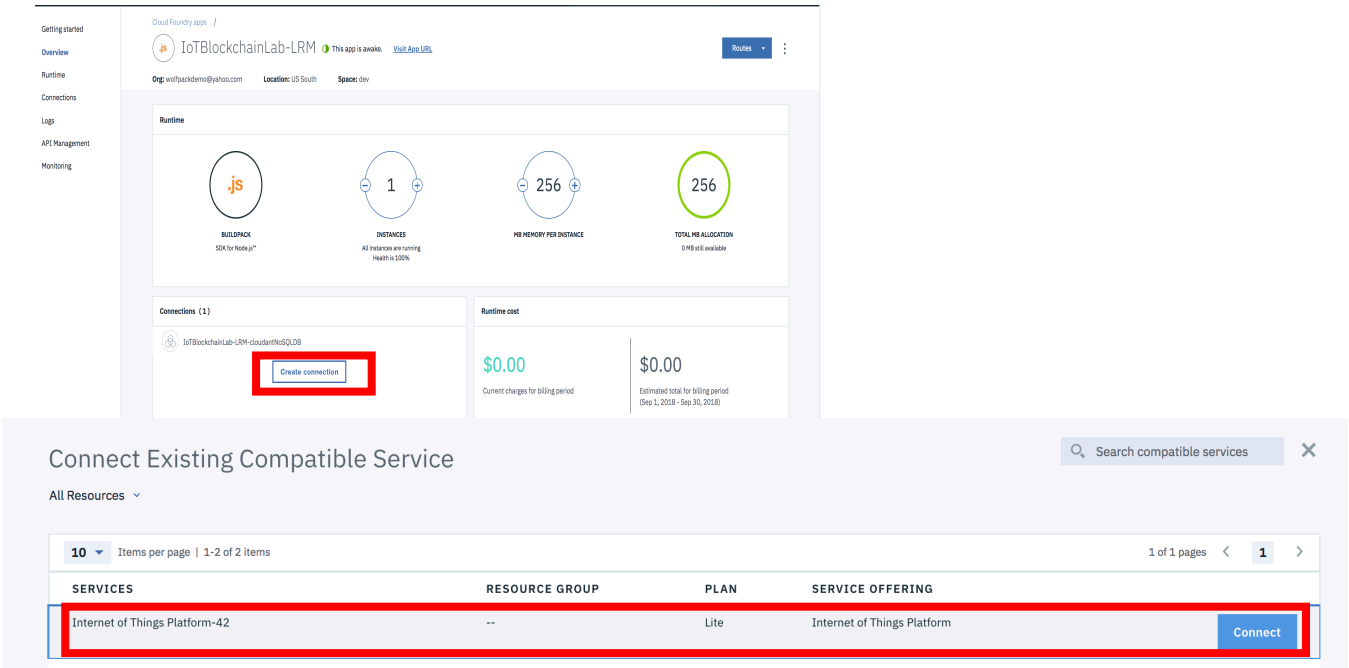
d. Click on the IBM Cloud logo in the upper left corner to return to your dashboard

e. Your cloud foundry application will now appear on your dashboard. **Click on the application name**.

Action

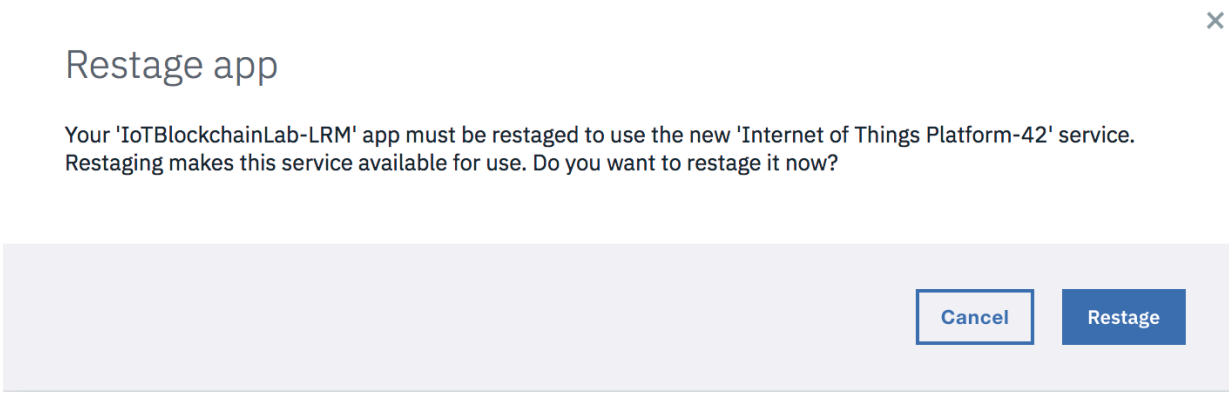


f. Notice Cloudant NoSQL DB is already connected to the application. The database is created by default when a Node-RED service is provisioned. Select **Create Connection** and **connect your Internet of Things Platform Service**

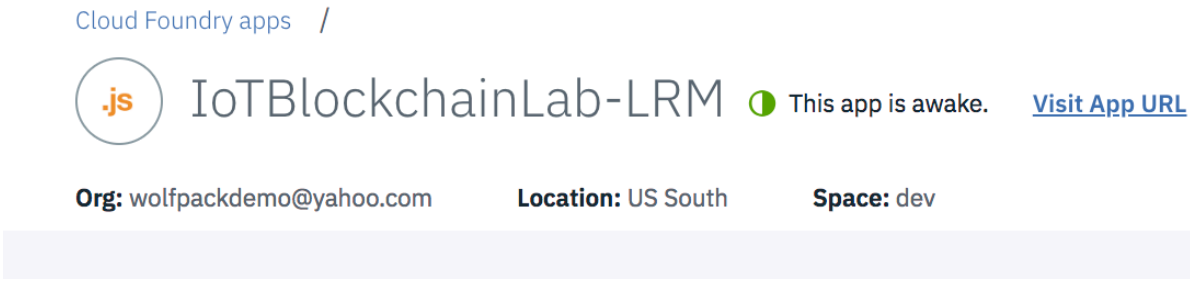


g. **Restage** your app. If the restage fails, just restart your app.

Action

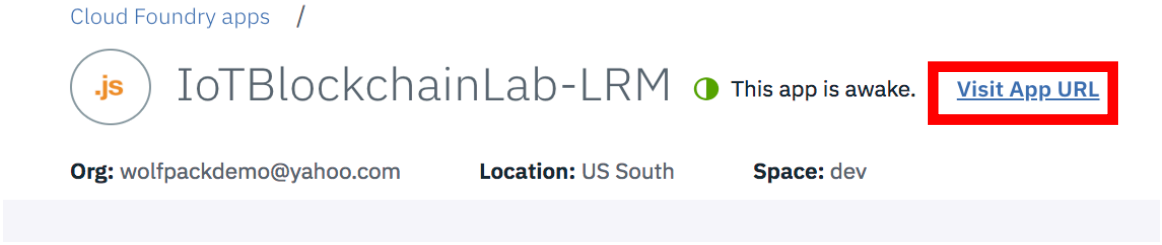


h. Once your app is restaged, the **Visit App URL** link will become active.



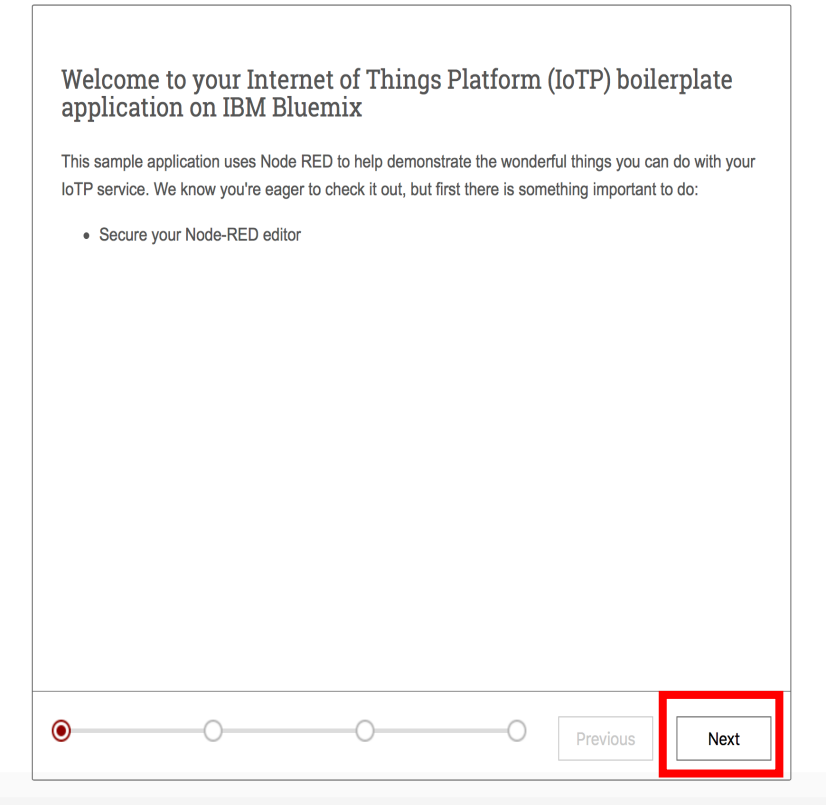
2. Import Node-RED Flow

a. From the cloud foundry application homepage, click **Visit App URL.** This will open the Node-RED sample application.

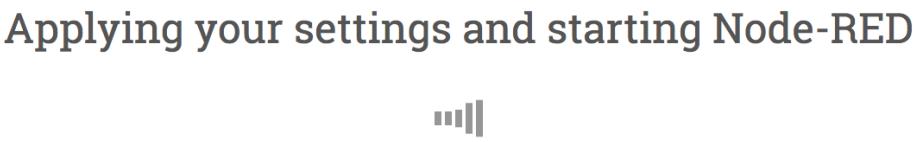


b. The Node-Red editor will give you a few options, make your selections and click **Next** through them. *(Example: fill in name and password for security, select "node-red-dashboard", finish the install)*

Action

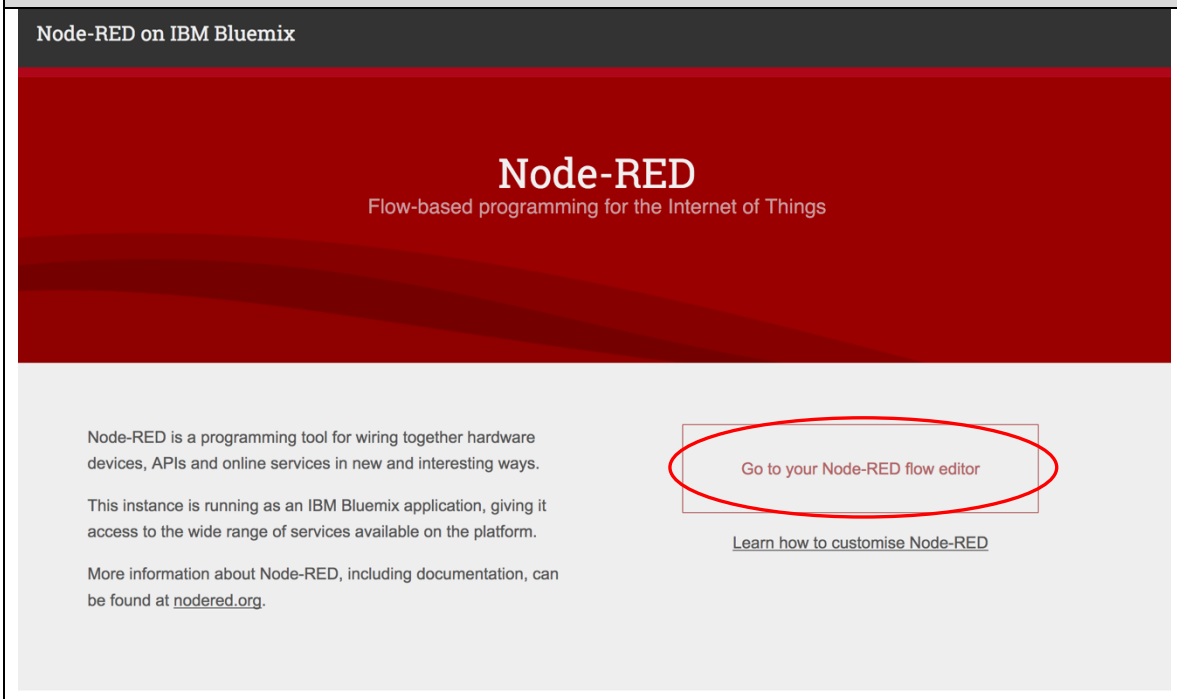


c. Click **Finish** to complete the Node-RED configuration.

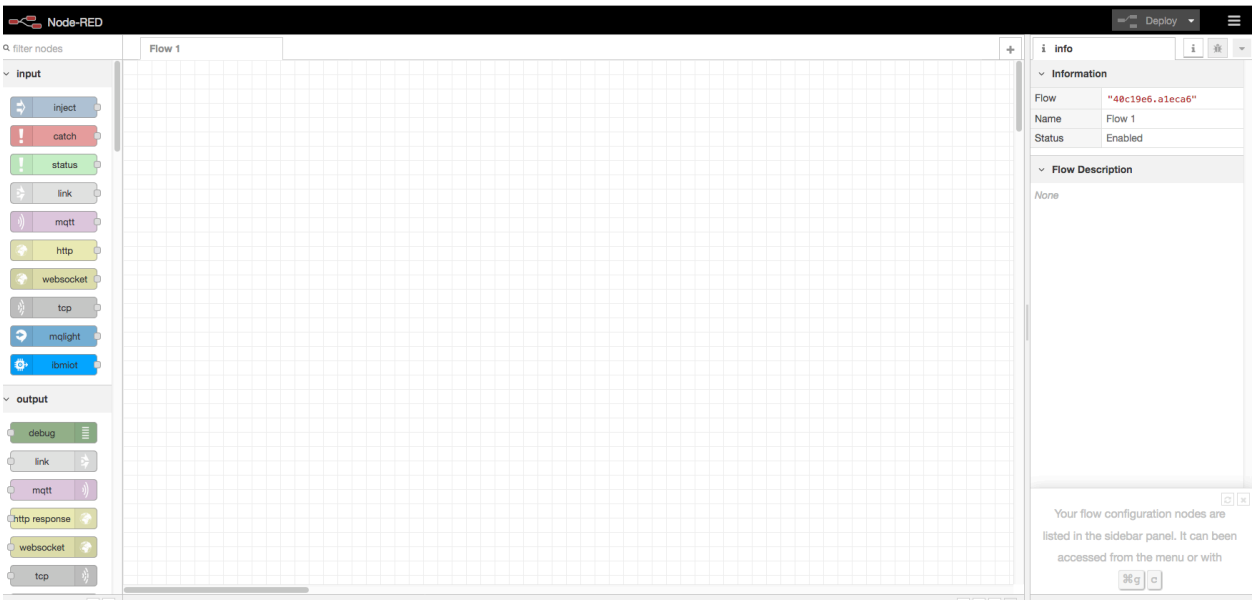


d. Click **Go to your Node-RED flow editor** to open Node-RED. If you receive an error, restart the application.

Action

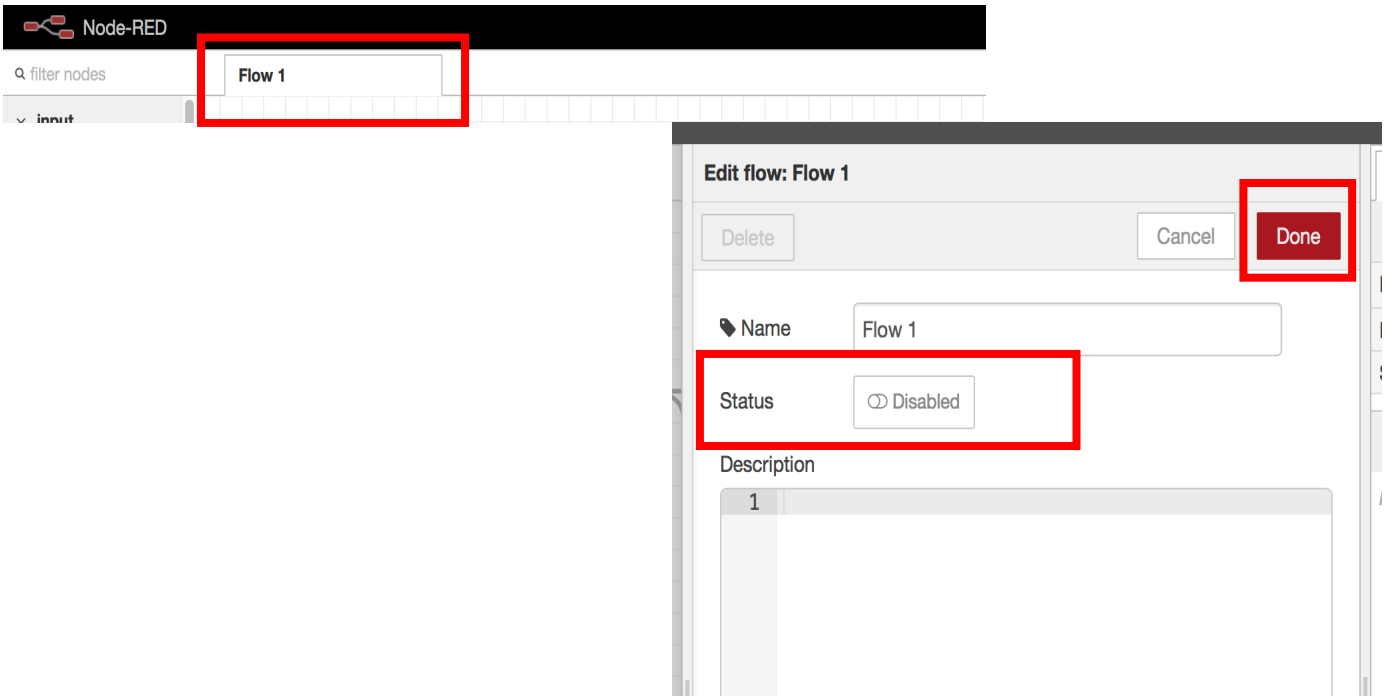


e. The Node-RED flow editor will appear. The left panel lists all of the nodes available to build a Node-RED flow. The right panel displays information about the Flow.



Action

f. Double click the **Flow 1** tab. Change the status of the Flow to **disabled**. Click **Done**

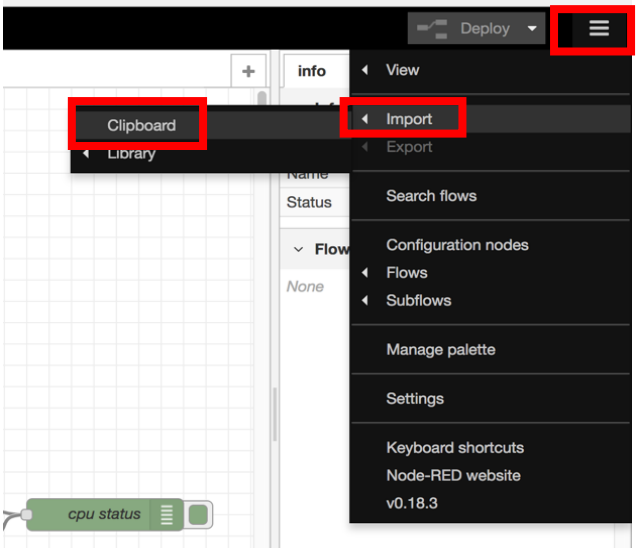


g. The **Flow 1** tab should now have a **disabled icon** beside it

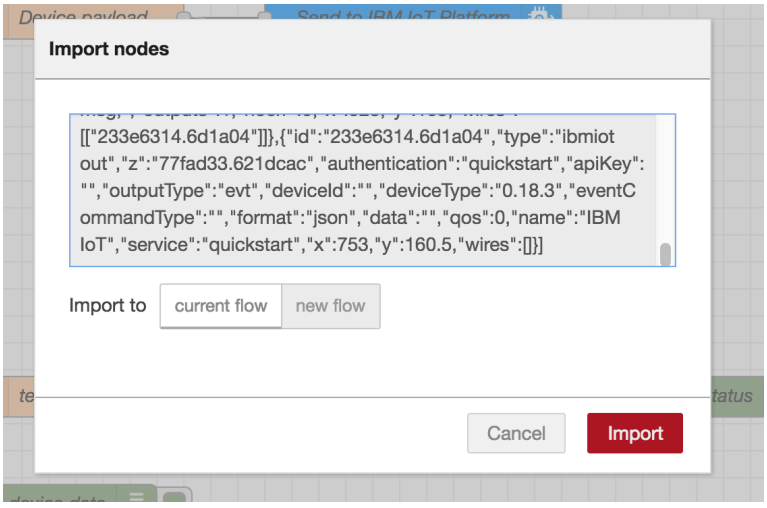
h. A starter flow, **IoT_Blockchain_NodeREDFlow.json**, has been provided to you for the lab. Open the file and copy its contents.

i. Select the **3-bar menu tile** in the upper right corner, select **Import** -> **Clipboard**

Action

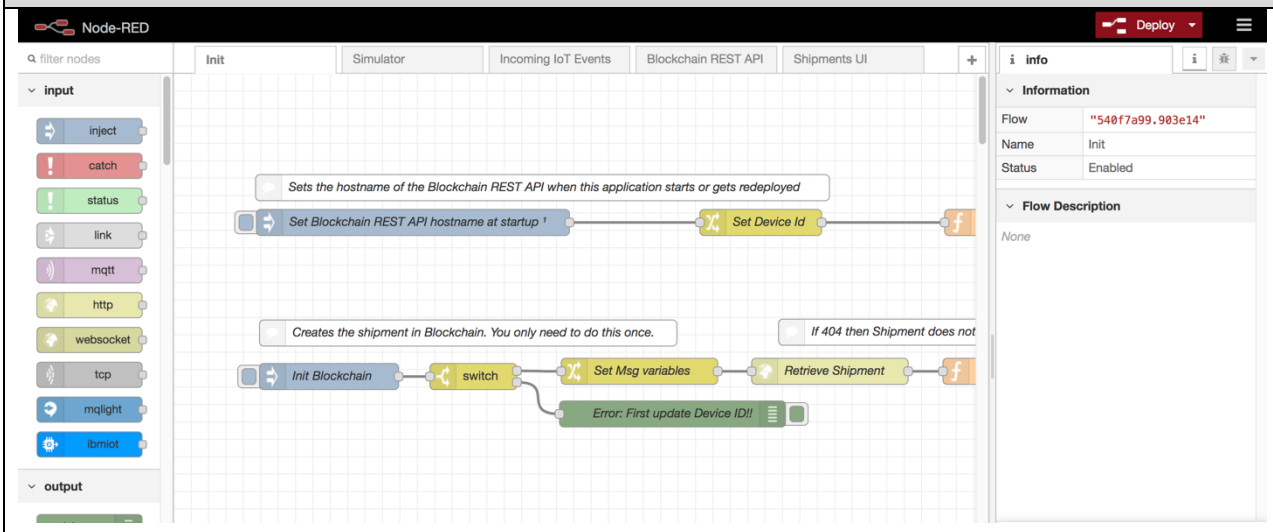


j. Paste the contents from the **IoT_Blockchain_NodeREDFlow.json** file into the clipboard. Select import to **New Flow** and click **Import**



k. Notice four new flows, **Init, Simulator, Incoming IoT Events, Blockchain REST API** and **Shipments UI** have been imported.

Action



Init Flow

This flow sets your shipment ID to your device ID. By using the device ID as the shipment ID in blockchain it is easy to associate the temperature readings from the device to the shipment in blockchain.

Simulator flow

This flow simulates the physical device by sending messages one at a time to the Watson IoT Platform, just as an actual device would.

Incoming IoT Events Flow

This flow captures the events that are being sent to Watson IoT Platform. These events originate from an IoT device, or in the case of this lab, the Simulator Flow.

Blockchain REST API

The flows on this tab make the calls to the REST API for the blockchain business network. These calls are used to create a shipment, retrieve one or submit a temperature reading.

Shipments UI

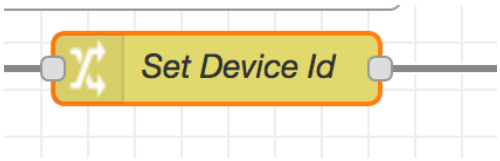
This flow renders a simple user interface that first retrieves the shipment from blockchain and renders the list of the shipment's temperature readings. If you see readings on this tab then events are being captured from Watson IoT Platform and are being successfully sent to blockchain.

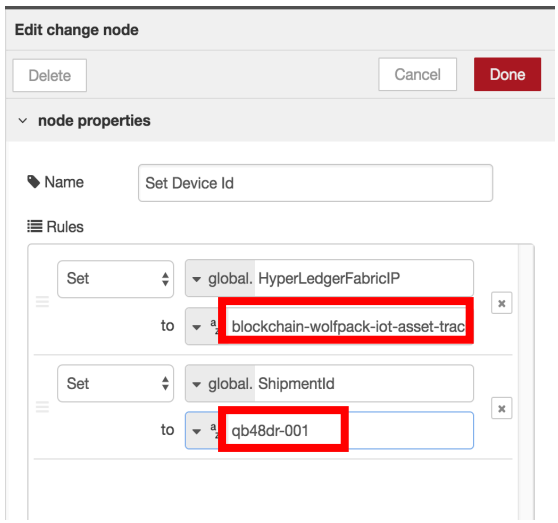
3. Configure Node-RED Flows

a. Click the **Init** tab, double click the **Set Device ID** node. Input the **device ID** you registered in the IoT Service as your ShipmentID. Also update the HyperLedgerFabricIP with the

Action

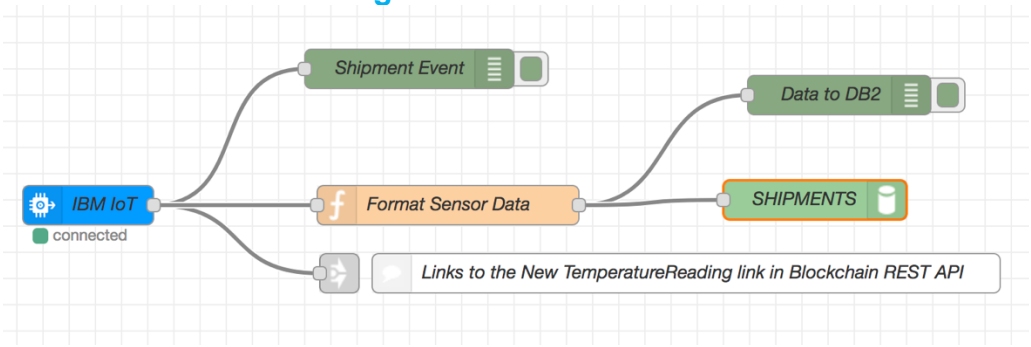
URL from your instructor. Click **Done**





- **HyperLedgerFabricIP**= The blockchain IP URL provided by your instructor
- **ShipmentID** = Your Device ID from the Watson IoT Platform. *ie: <orgID>-001*

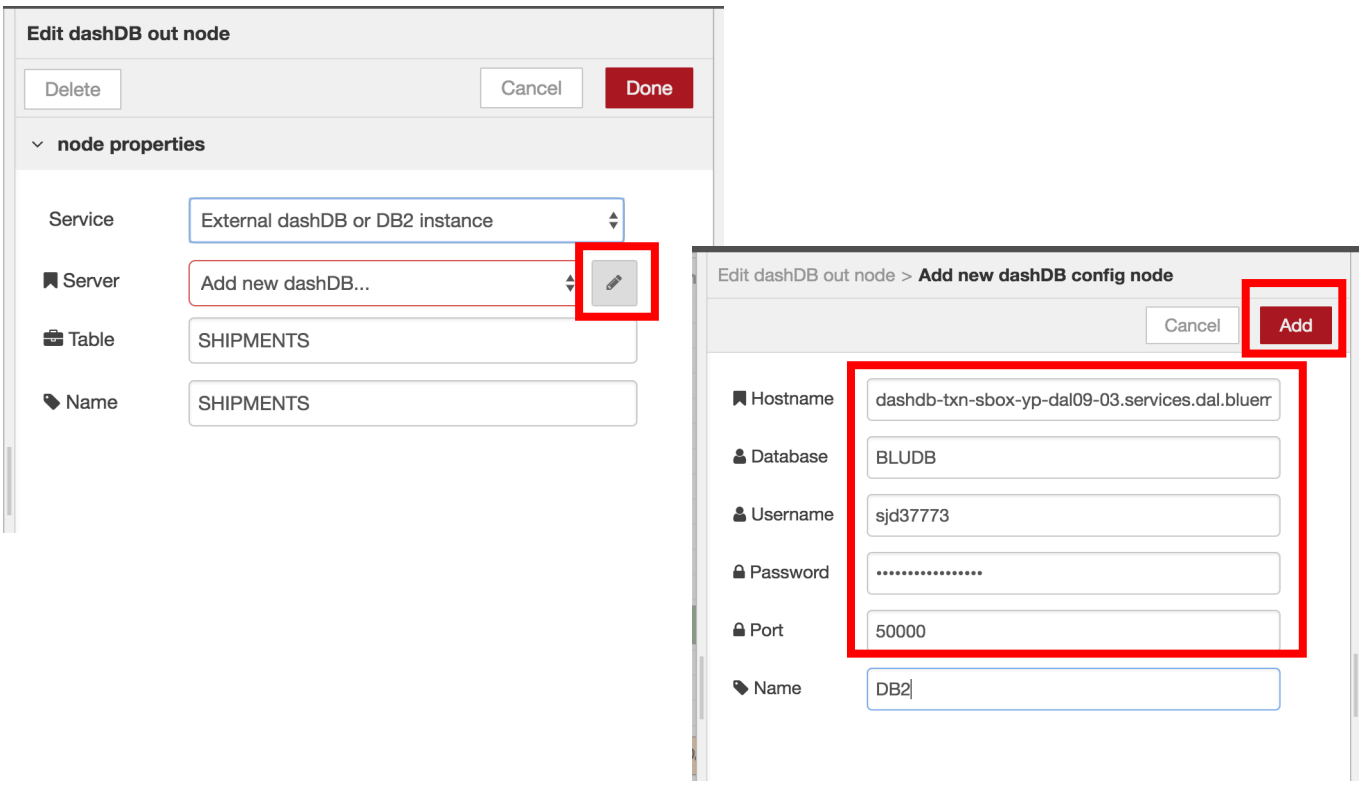
b. Select the **Incoming IoT Events** tab. The flow should look like the following.



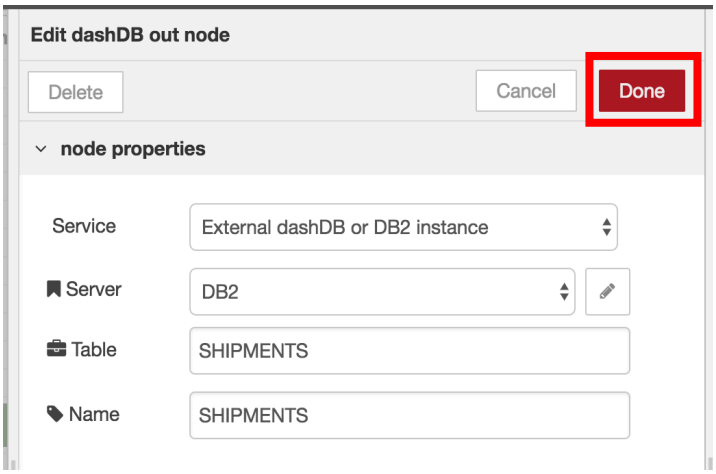
c. Double click the **Shipments** node.

Action

d. Click the **Edit** icon and input in the connection information you saved for the previously provisioned Db2 on Cloud service. Click **Add**

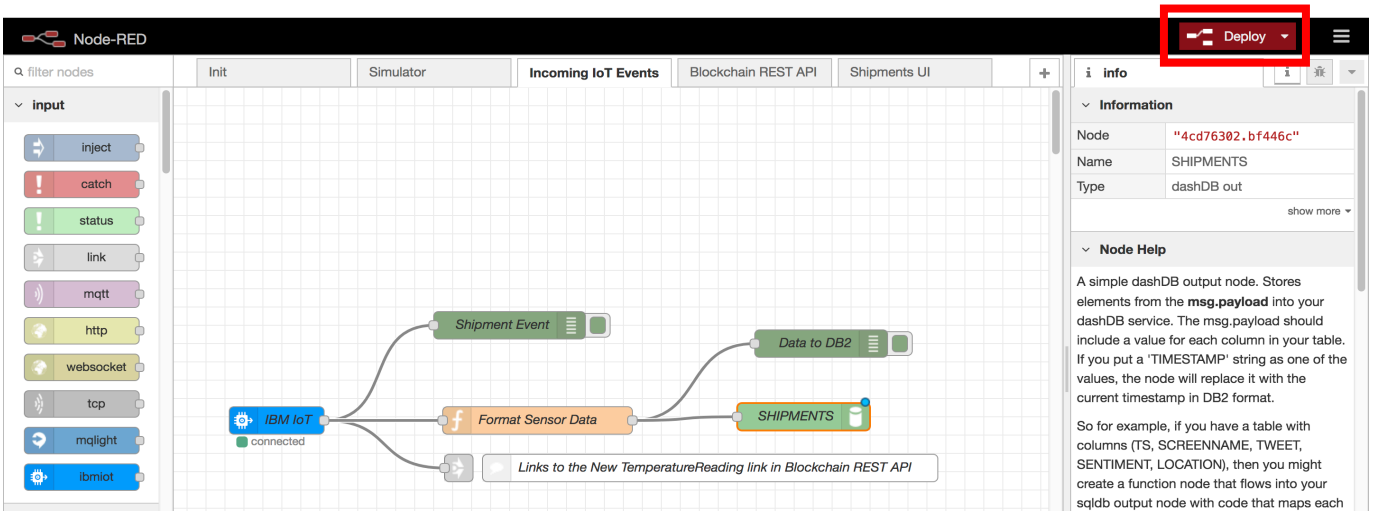


e. Click **Done**



Action

f. In the upper right corner, click **Deploy** button



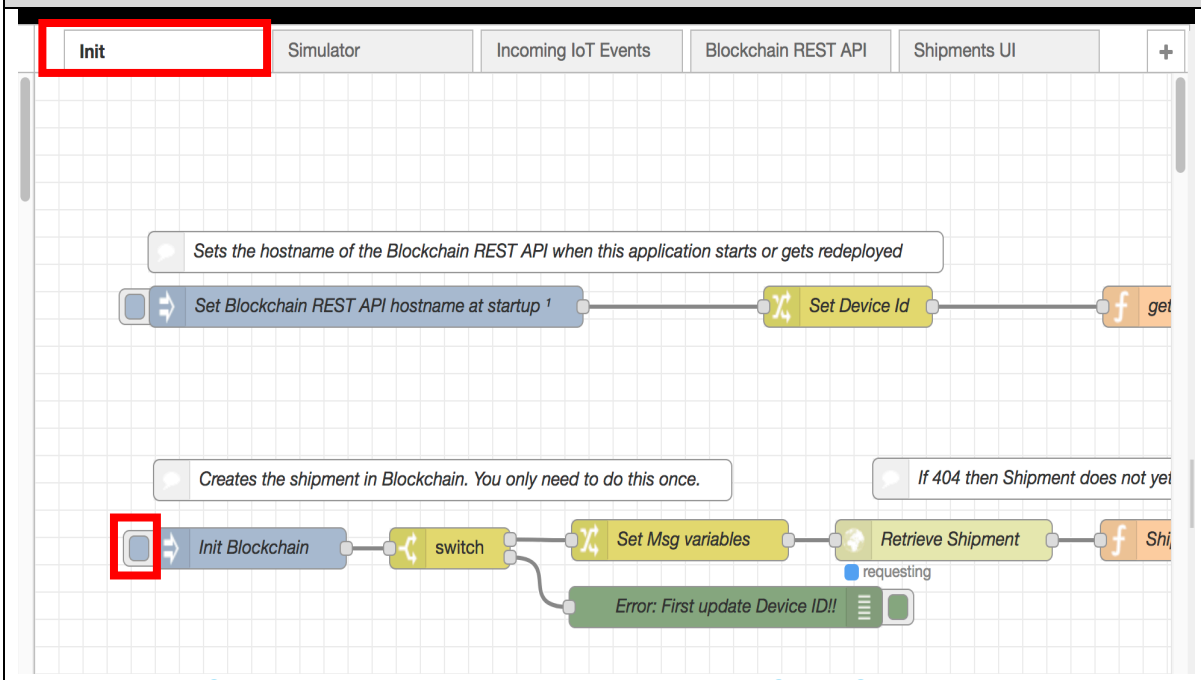
Congratulations! Your node-RED Flow is configured.

4.Run Node-RED Flow

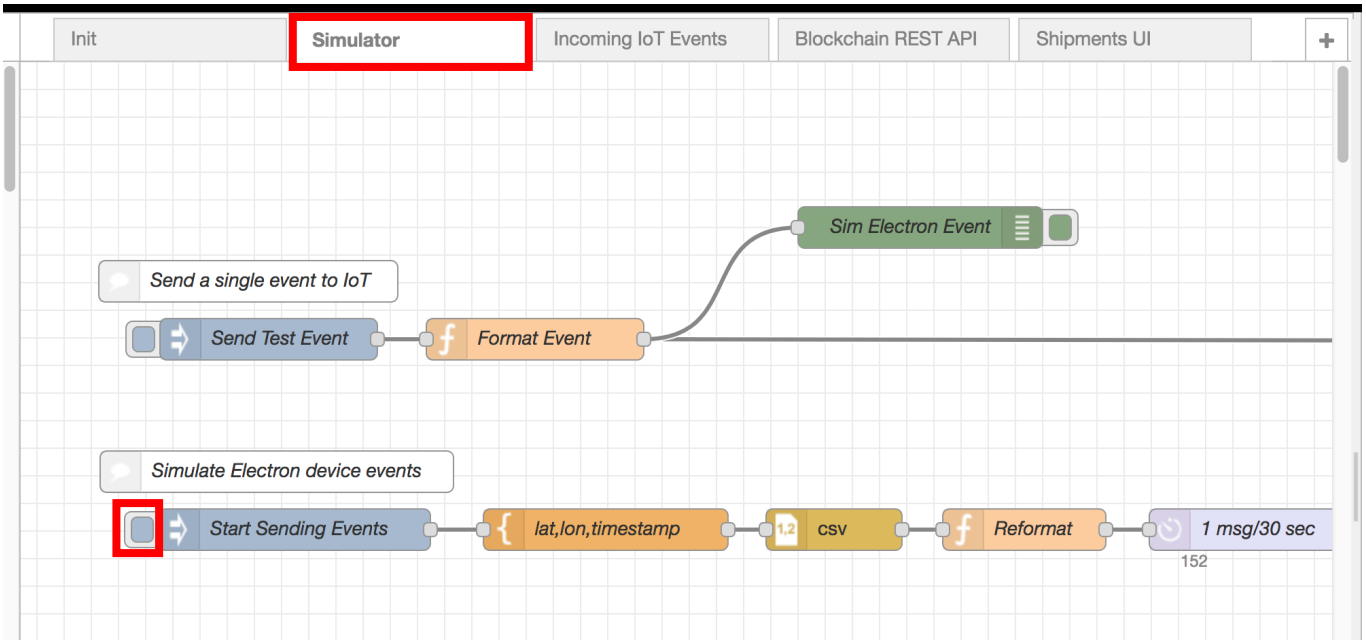
Now that our flow is configured, we need to run the flow.

a. In the **Init** tab, click on the **button** next to Init Blockchain. This will create the new shipment within your blockchain.

Action



b. In the **Simulator** tab, click the **button next to Start Sending Events**. This will start the simulation of device events.

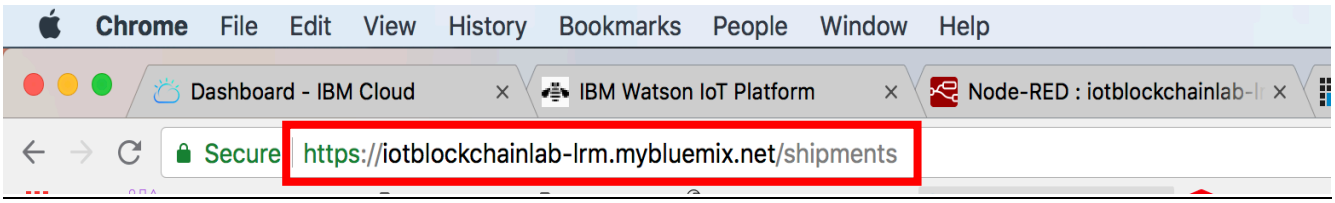


4. View Shipment Data in Blockchain

Next we will view our Shipment Data that is being added to the Blockchain.

Action

a. Open a new tab in your browser and go to **https://<*name of Node-RED application*>.mybluemix.net/shipments.** You previously defined the name of the application when you provisioned the Node-RED Service. **Note:** Your application name will be different than below.

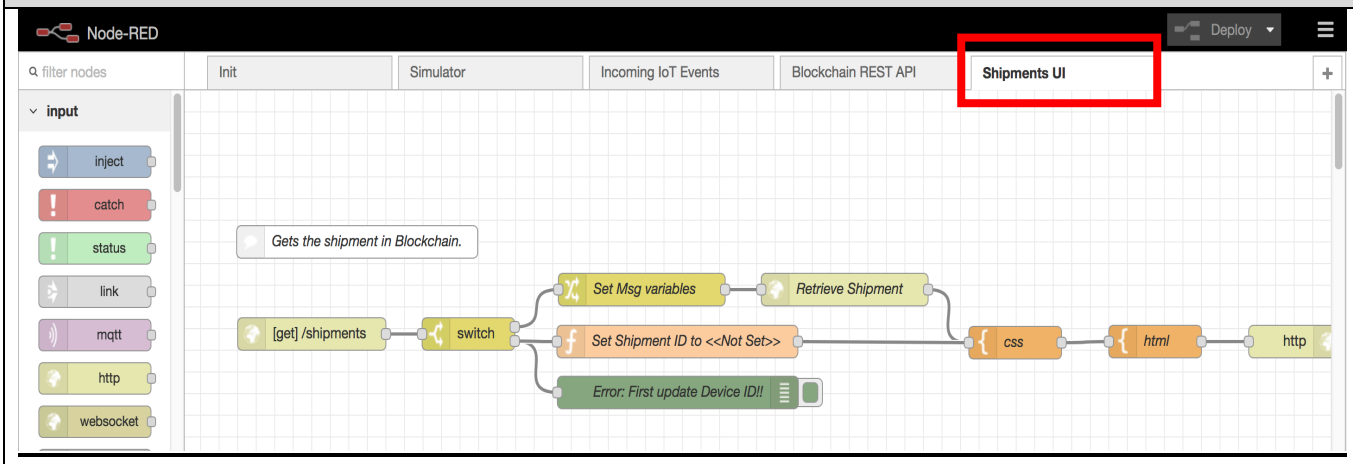


b. The webpage will display the temperature readings in the Blockchain for your unique Shipment ID. The Node-RED flow to create this webpage can be found under the **Shipment UI** tab.

Temperature readings for shipment qb48dr-001 in Blockchain

Temperature	Reading Time	Latitude	Longitude
8	2017-09-21-16.00.00	18.44081	-66.08068
9	2017-09-21-16.00.33	18.4407	-66.08066
4	2017-09-21-16.01.07	18.44068	-66.08056
5	2017-09-21-16.01.40	18.44075	-66.08048
8	2017-09-21-16.02.14	18.44096	-66.08041
1	2017-09-21-16.02.47	18.44231	-66.07729
6	2017-09-21-16.03.21	18.44151	-66.07404
8	2017-09-21-16.03.54	18.43819	-66.07246
5	2017-09-21-16.04.28	18.43214	-66.0744
2	2017-09-21-16.05.01	18.42868	-66.07512
4	2017-09-21-16.05.35	18.42595	-66.07329
8	2017-09-21-16.06.08	18.41985	-66.07091
4	2017-09-21-16.06.42	18.41096	-66.0701
1	2017-09-21-16.07.15	18.4059	-66.06997
5	2017-09-21-16.07.49	18.39935	-66.07111
5	2017-09-21-16.08.22	18.38967	-66.07228

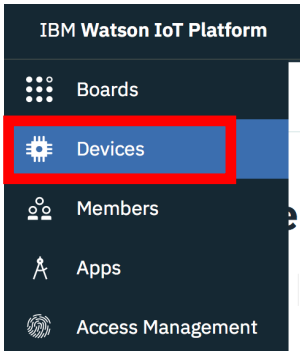
Action



5. View Real-time Device Data in IoT Platform

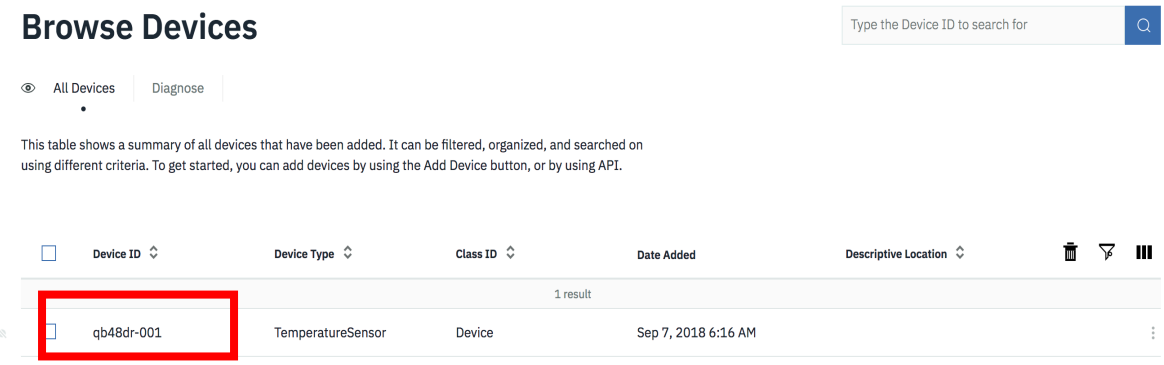
Next we need to validate the temperature sensor data is being sent the IoT Platform real-time.

a. Open your IoT Platform Service and select the **Devices** tab from the menu on the left hand-side.

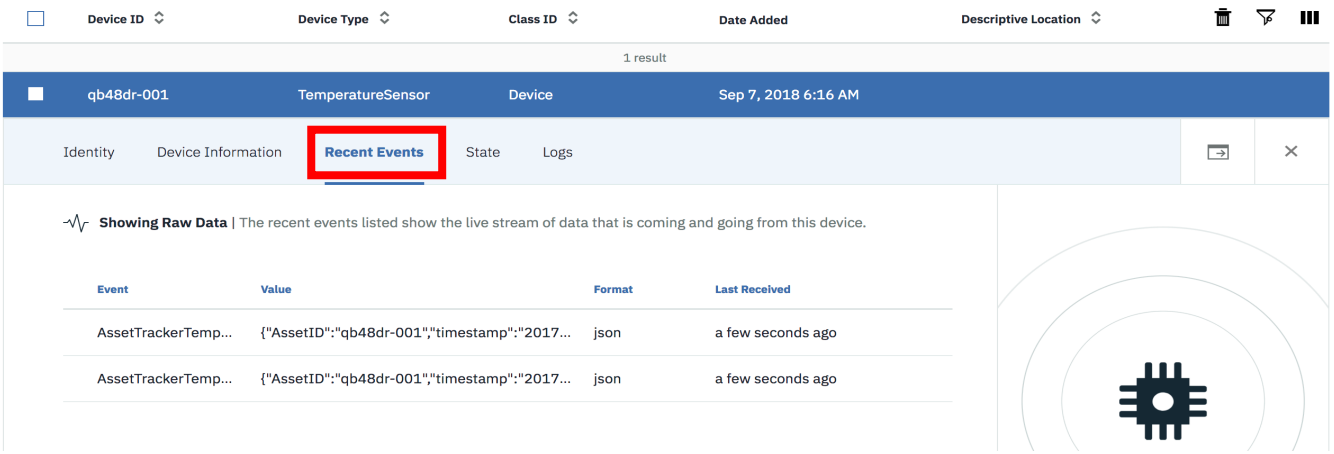


b. Under Browse Devices, click **your device ID** to see additional information about your temperature sensor

Action



c. Click the **Recent Events** tab. You should see the real-time temperature sensor events coming in from your Node-RED flow.

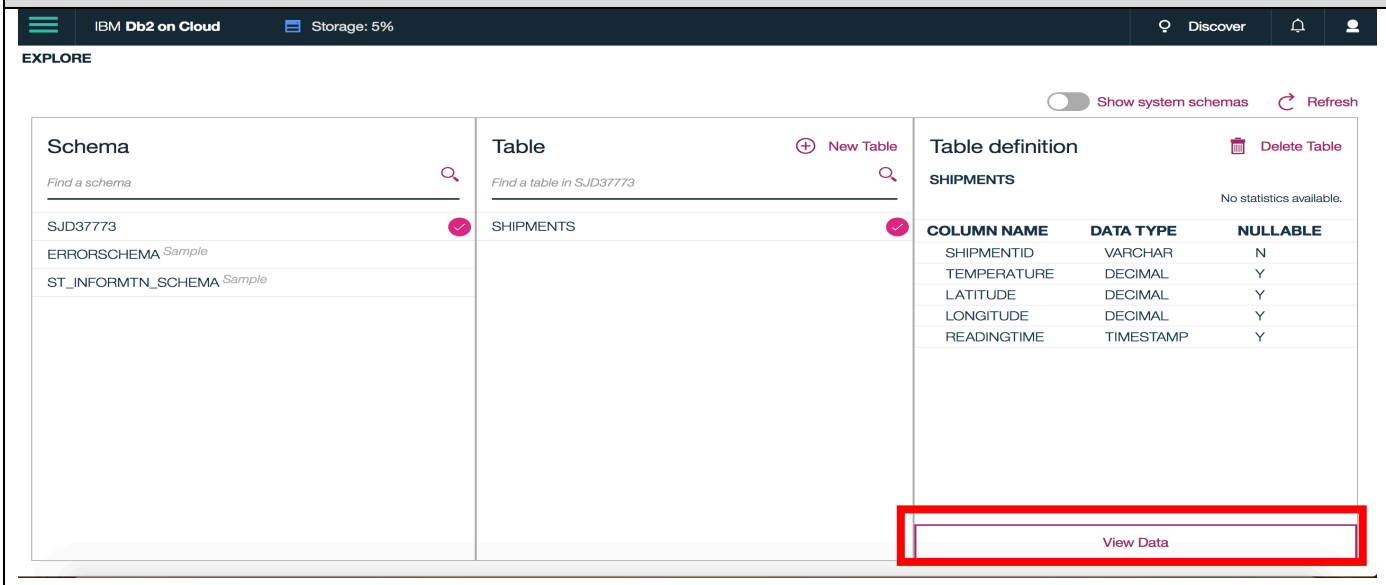


6.View data in Db2 on Cloud Service

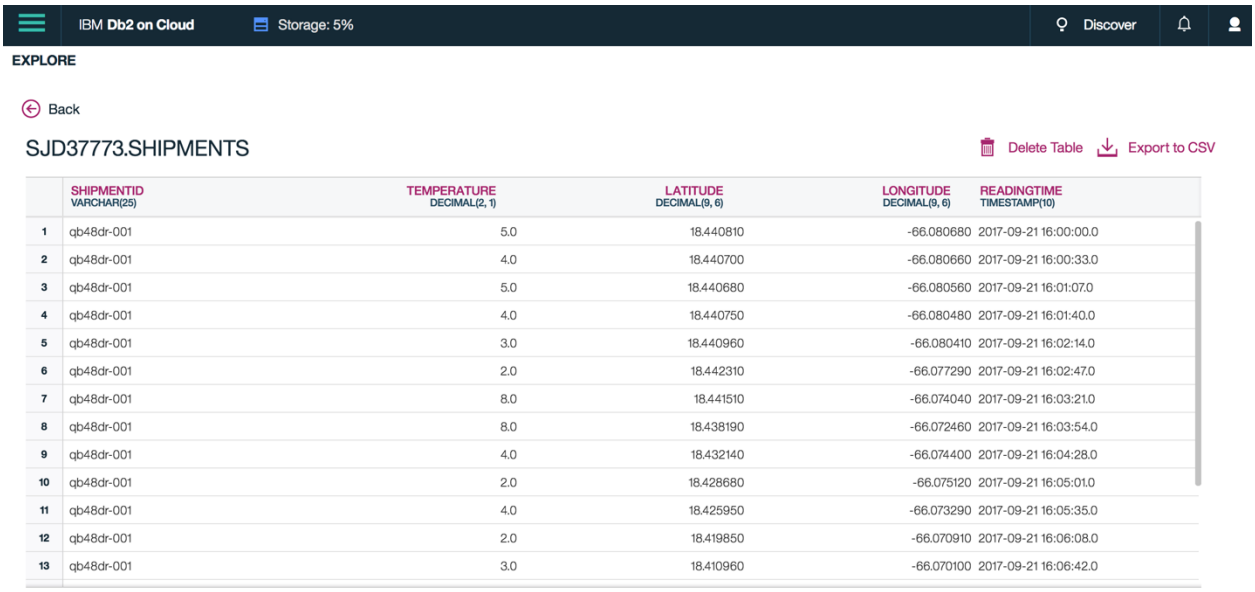
Lastly, we need to validate that the IoT information is being stored in Db2 on Cloud.

a. Open your Db2 on Cloud service and navigate to your **Shipment** table. Click **View Data**

Action



b. Your temperature sensor data should now be visible in Db2 on Cloud.



	SHIPMENTID VARCHAR(25)	TEMPERATURE DECIMAL(2, 1)	LATITUDE DECIMAL(9, 6)	LONGITUDE DECIMAL(9, 6)	READINGTIME TIMESTAMP(10)
1	qb48dr-001	5.0	18.440810	-66.080680	2017-09-21 16:00:00.0
2	qb48dr-001	4.0	18.440700	-66.080660	2017-09-21 16:00:33.0
3	qb48dr-001	5.0	18.440680	-66.080560	2017-09-21 16:01:07.0
4	qb48dr-001	4.0	18.440750	-66.080480	2017-09-21 16:01:40.0
5	qb48dr-001	3.0	18.440960	-66.080410	2017-09-21 16:02:14.0
6	qb48dr-001	2.0	18.442310	-66.077290	2017-09-21 16:02:47.0
7	qb48dr-001	8.0	18.441510	-66.074040	2017-09-21 16:03:21.0
8	qb48dr-001	8.0	18.438190	-66.072460	2017-09-21 16:03:54.0
9	qb48dr-001	4.0	18.432140	-66.074400	2017-09-21 16:04:28.0
10	qb48dr-001	2.0	18.428680	-66.075120	2017-09-21 16:05:01.0
11	qb48dr-001	4.0	18.425950	-66.073290	2017-09-21 16:05:35.0
12	qb48dr-001	2.0	18.419850	-66.070910	2017-09-21 16:06:08.0
13	qb48dr-001	3.0	18.410960	-66.070100	2017-09-21 16:06:42.0

Congratulations! You have successfully provisioned and configured the node-RED flow. Your flow is simulating temperature sensor data and sending the information to the IoT Platform and Blockchain Service.

End of Lesson 4

Lesson 5: Visualizing Data in the IoT Platform

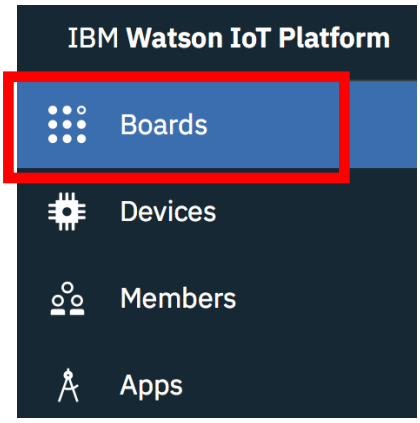
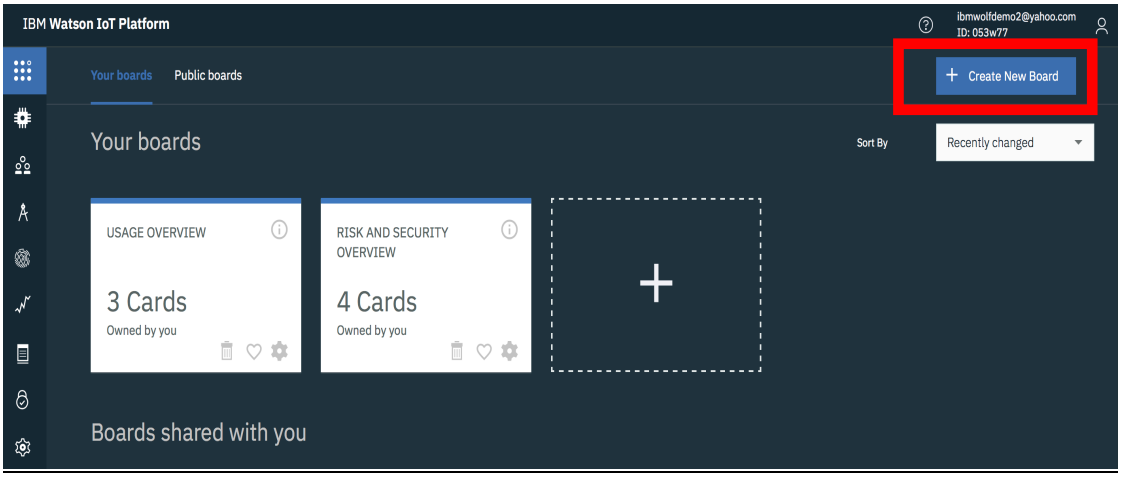
Purpose:	This lesson introduces boards within the IBM IoT Platform which are used to visualize data.

Tasks:	Tasks you will complete in this lab exercise include: • Create a Board within the IBM IoT Platform • Visualize temperature sensor data

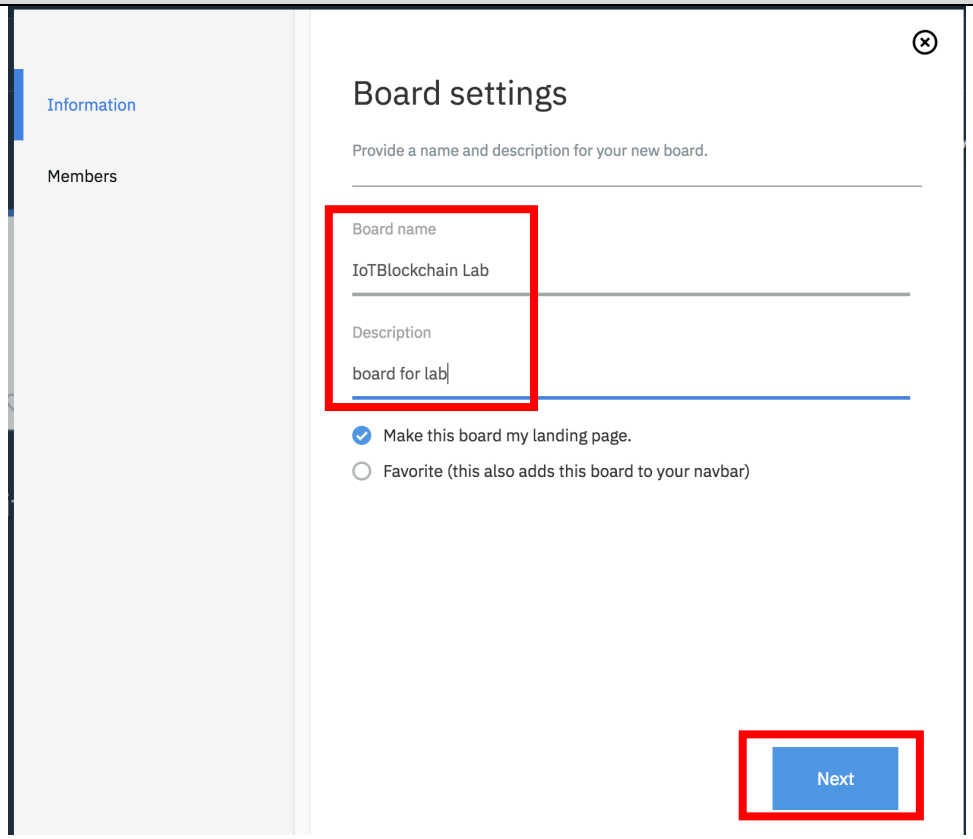
Lesson 5: Workflow Overview

1. Create a Board within the IBM IoT Platform
2. Visualize Temperature Sensor Data

Lesson 5: Instructions

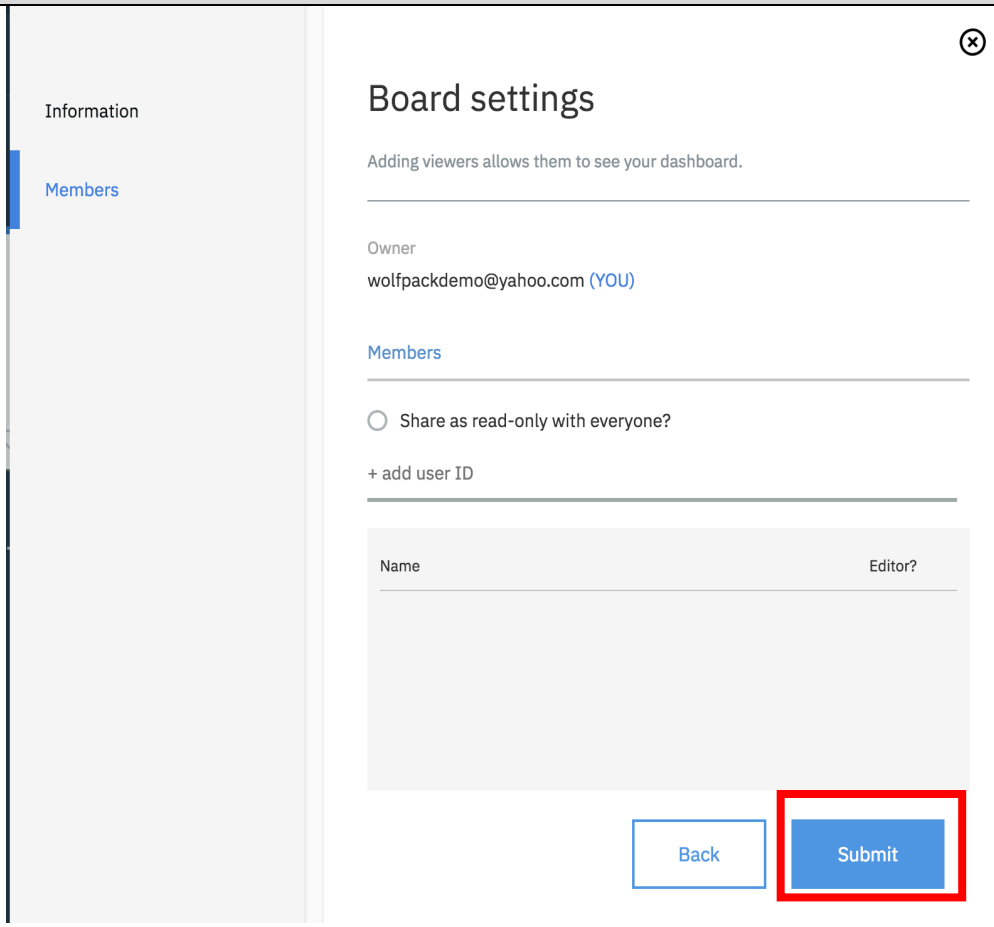
Action
1. Create Board a. In the Watson IoT Platform, select **Boards** from the menu on the left hand-side.      b. Click **Create New Board**, from the upper right corner.      c. Name the board, **IoTBlockchain Lab**, and provide a short description. Click **Next**

Action

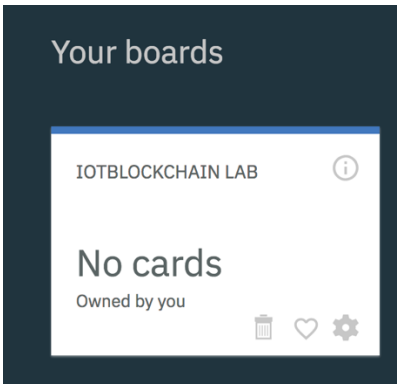


d. Keep the default Board Settings and click **Submit.**

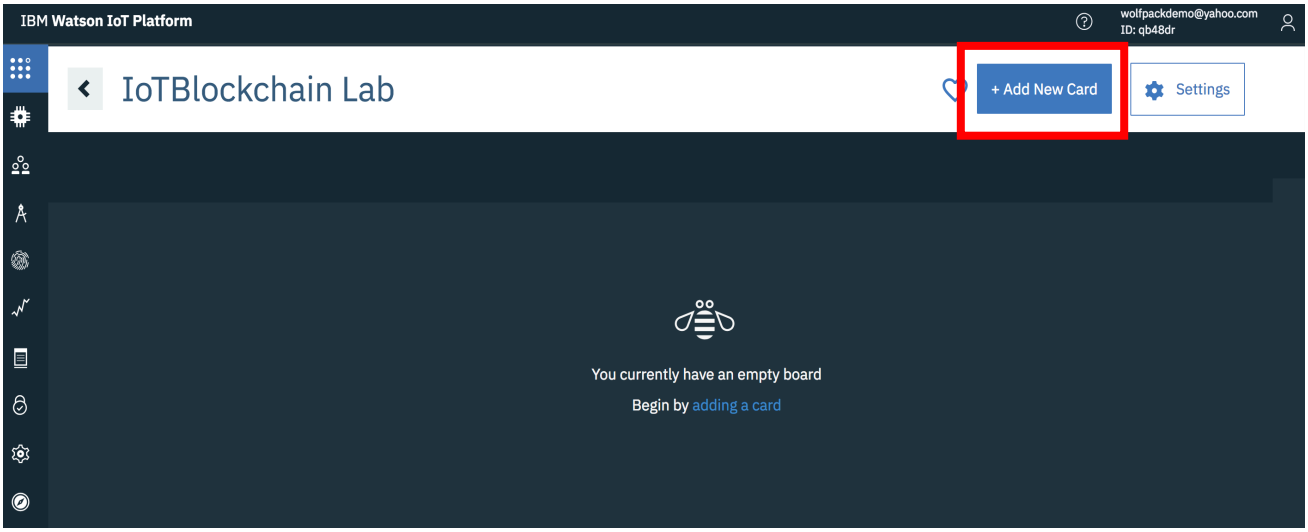
Action



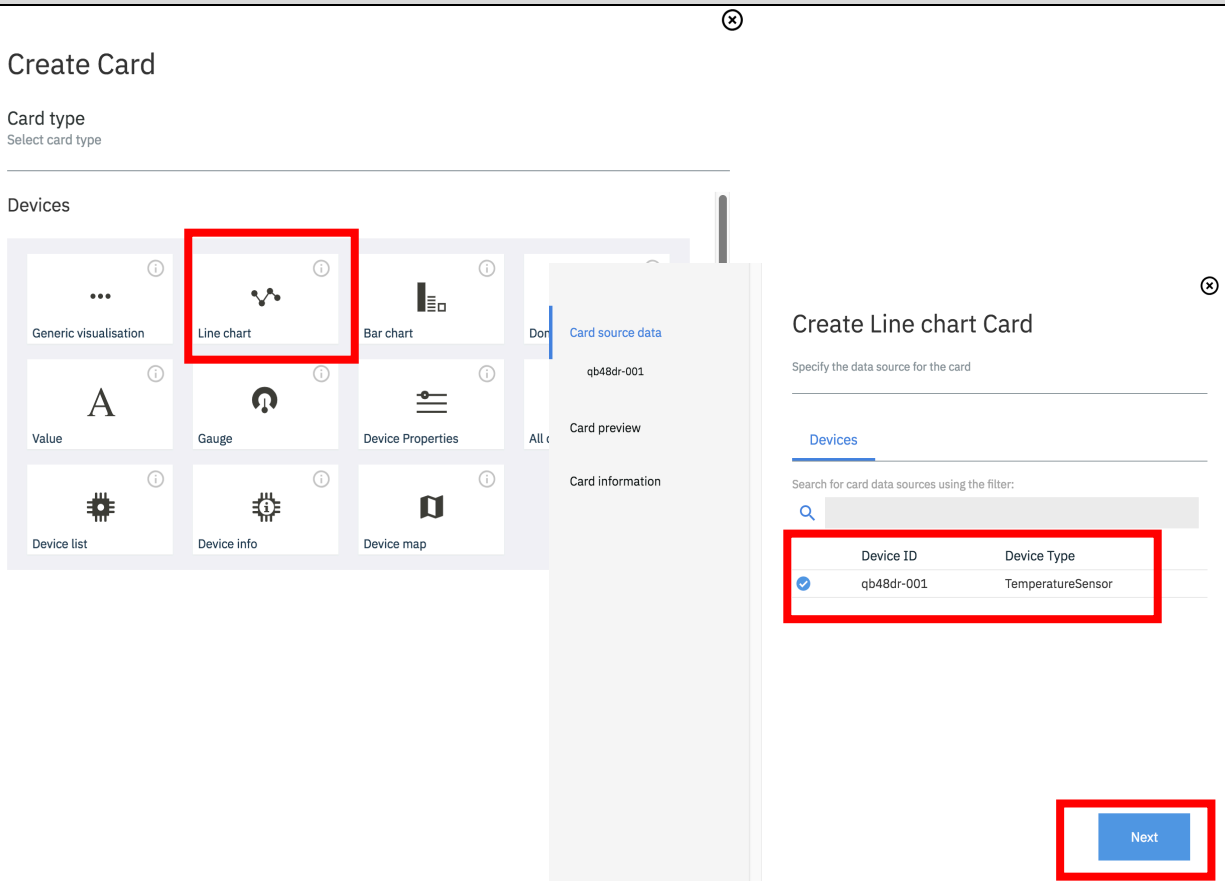
e. Your board should now appear under **Your Boards**.



2.Visualize Temperature Sensor Data

Action
a. We will visualize our temperature sensor data. Click on the **IoTBlockchain Lab** board and select **Add New Card** from the upper right corner    b. Select **Line Chart** as the card type and select **your device ID**. Click **Next**

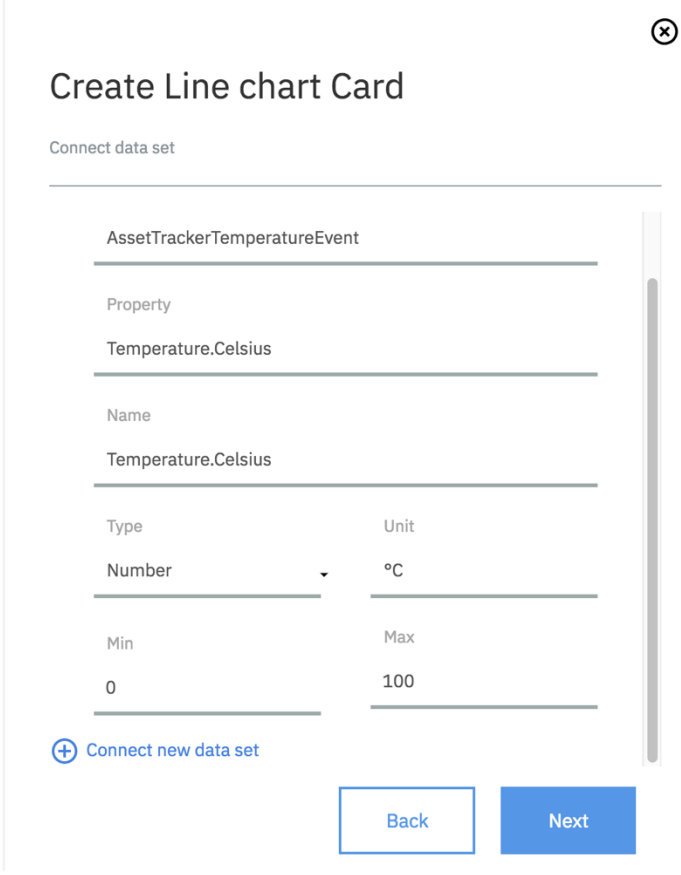
Action



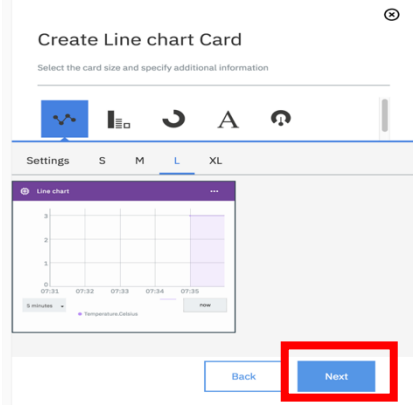
c. Click **Connect new data set** and input the following properties. Click **Next**

- **Event** = AssetTrackerTemperatureEvent
- **Property** = Temperature.Celsius
- **Name** = Temperature.Celsius
- **Type** = Number
- **Unit =** C

Action

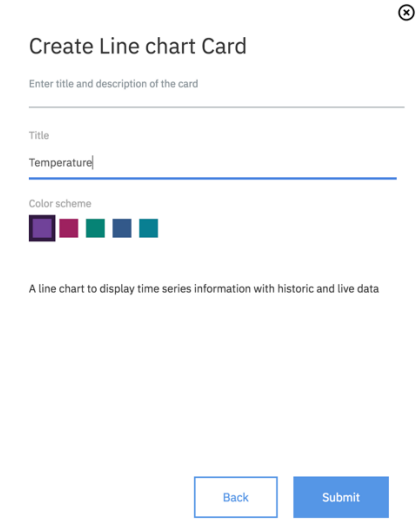


d. Select **L** as the chart size. Click **Next**

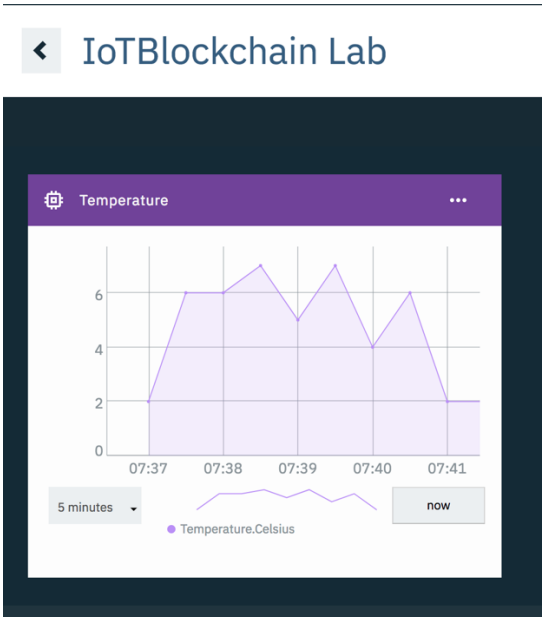


e. Name the chart **Temperature** and click **Submit**.

Action



f. You should now see your temperature values displayed in Real-time.



Congratulations! You have successfully visualized your sensor data.

End of Lesson 5

Lesson 6: Visualize Historical IoT Data in IBM Cognos Dashboard Embedded

Purpose:	This lesson will visualize the historical IoT data using IBM Cognos Dashboard Embedded within Watson Studio

Tasks:	Tasks you will complete in this lab exercise include: • Create a Watson Studio Project • Connect to Db2 on Cloud • Create Dashboard

Lesson 6: Workflow Overview

1. Create a Watson Studio Project
2. Connect to Db2 on Cloud
3. Create Dashboard

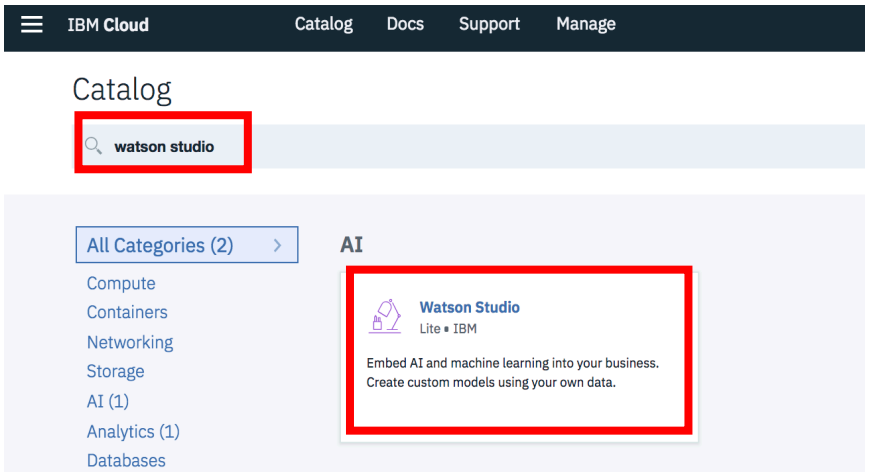
Lesson 6: Instructions

Action

1.Create Watson Studio Project

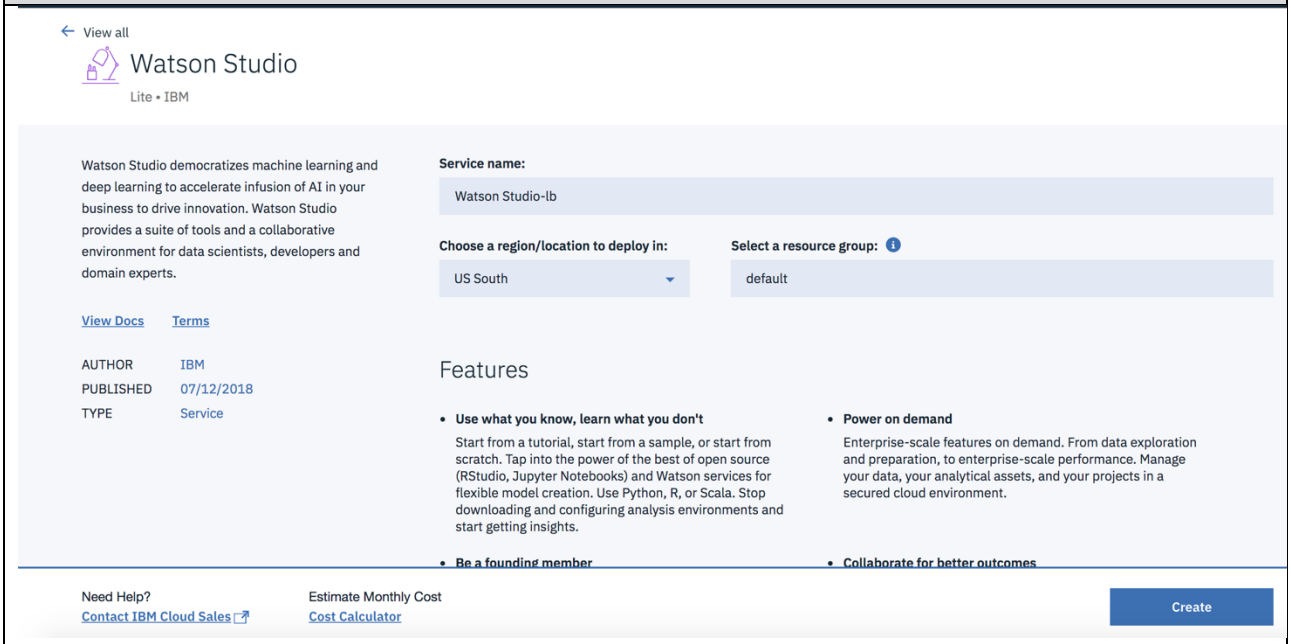
a. Go to the Catalog within your IBM Cloud account https://console.bluemix.net/catalog

b. Within the catalog, search for **Watson Studio** and select the **Watson Studio service**.

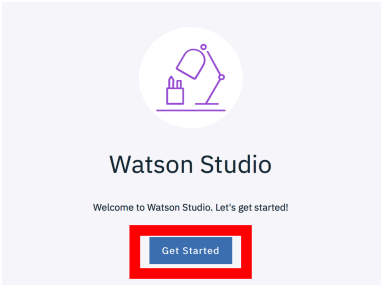


c. Rename the Watson Studio service name or keep the default name. Click **Create** to provision the service. Resource group should be default.

Action

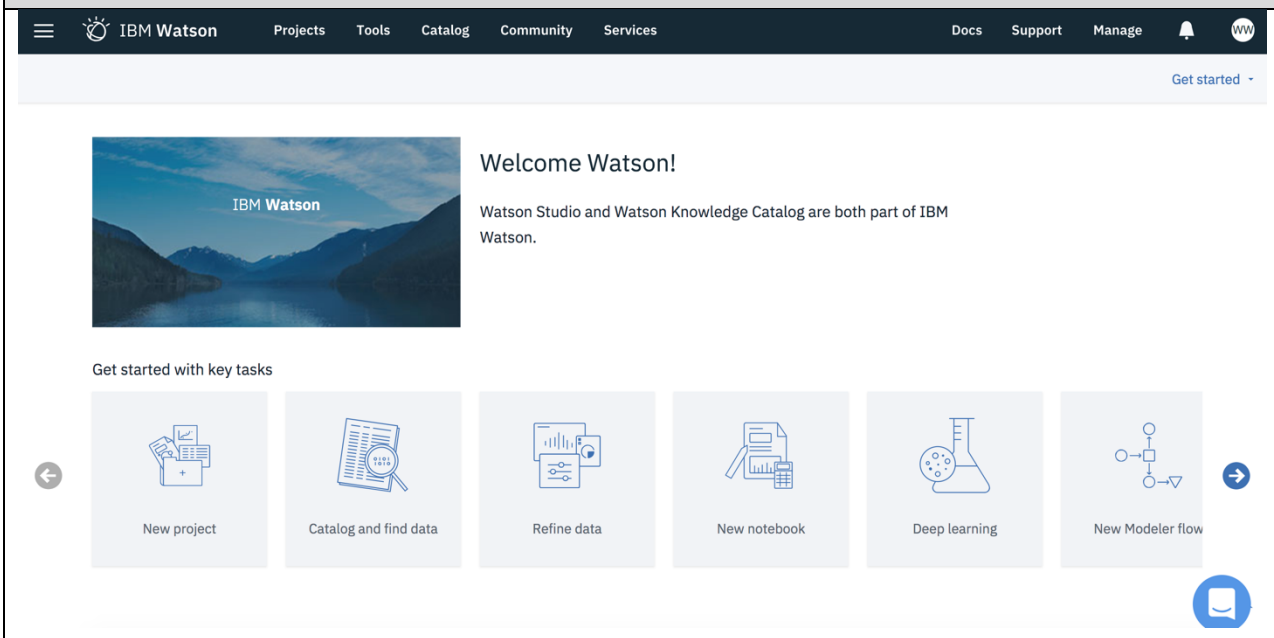


d. Once the service is provisioned, click **Get Started** to open Watson Studio.

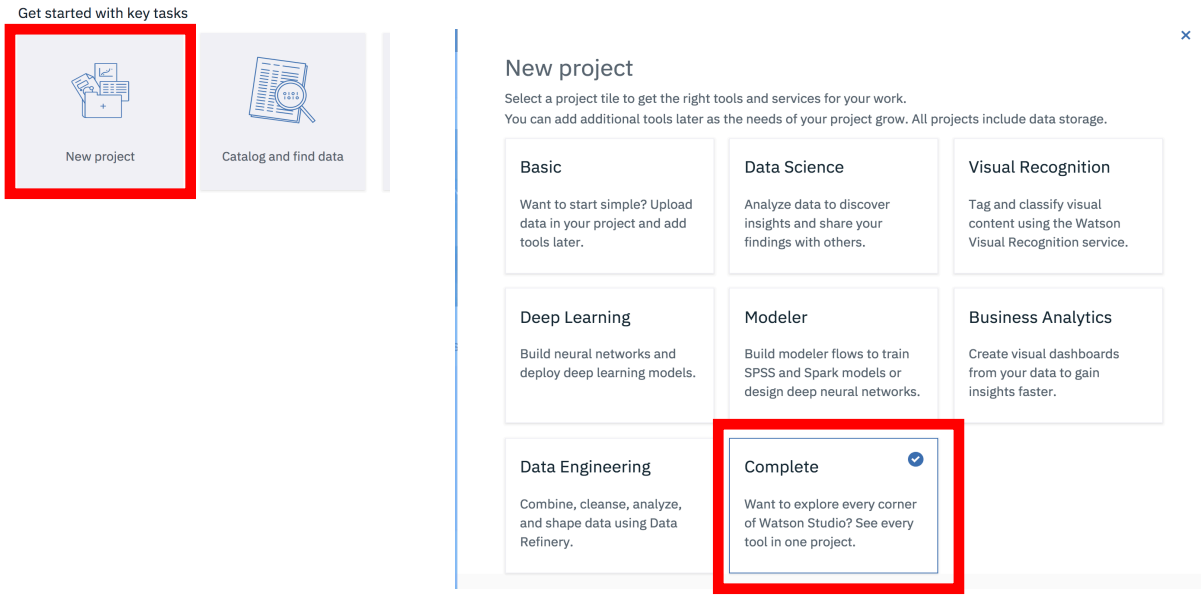


e. You will be brought to your **Home Page**

Action

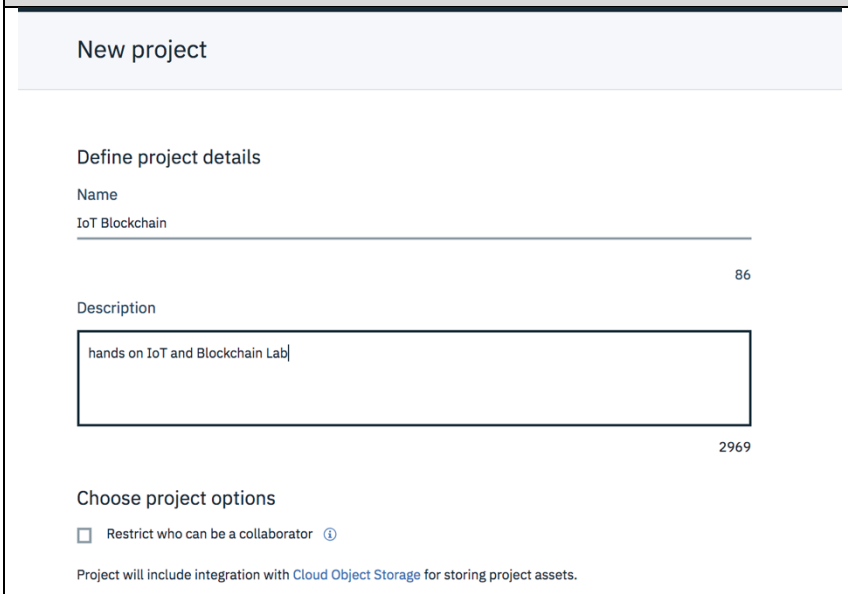


f. Click **New Project** and select **Complete**. Click **OK.**



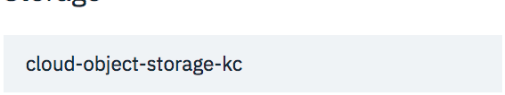
g. Name the project **IoT Blockchain** and add a meaningful description

Action



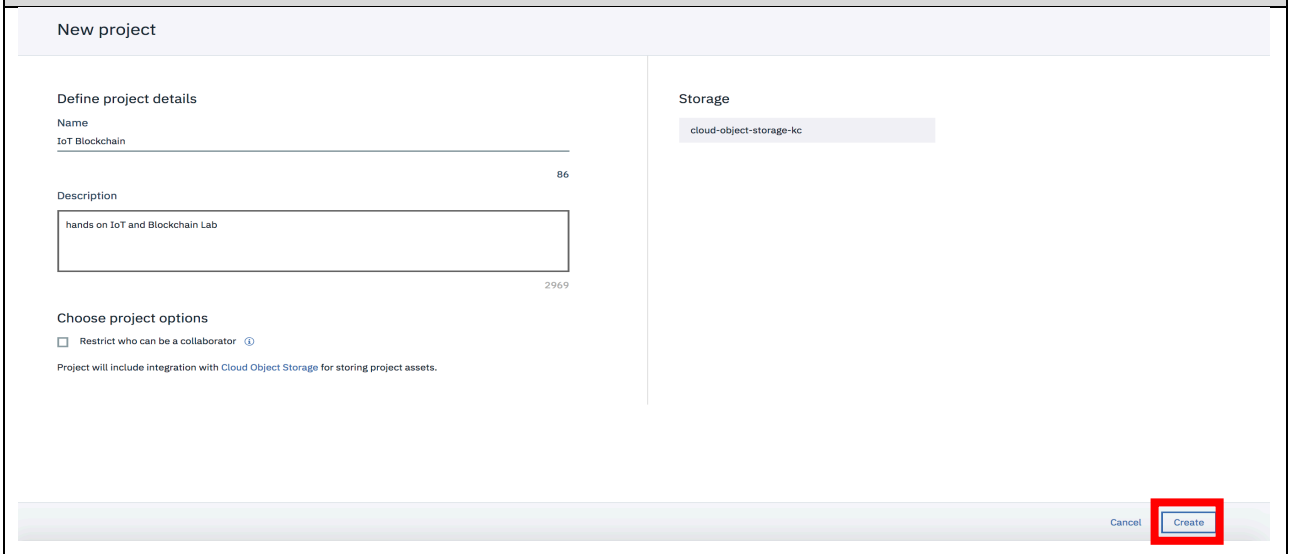
Define Storage:

- Under Define Storage, click **Add**
- Choose "**Lite**" plan then "**Create**"
- Verify your options then "**Confirm**"
- **Refresh.** Your storage instance should now appear. Note: The name will be different than below.

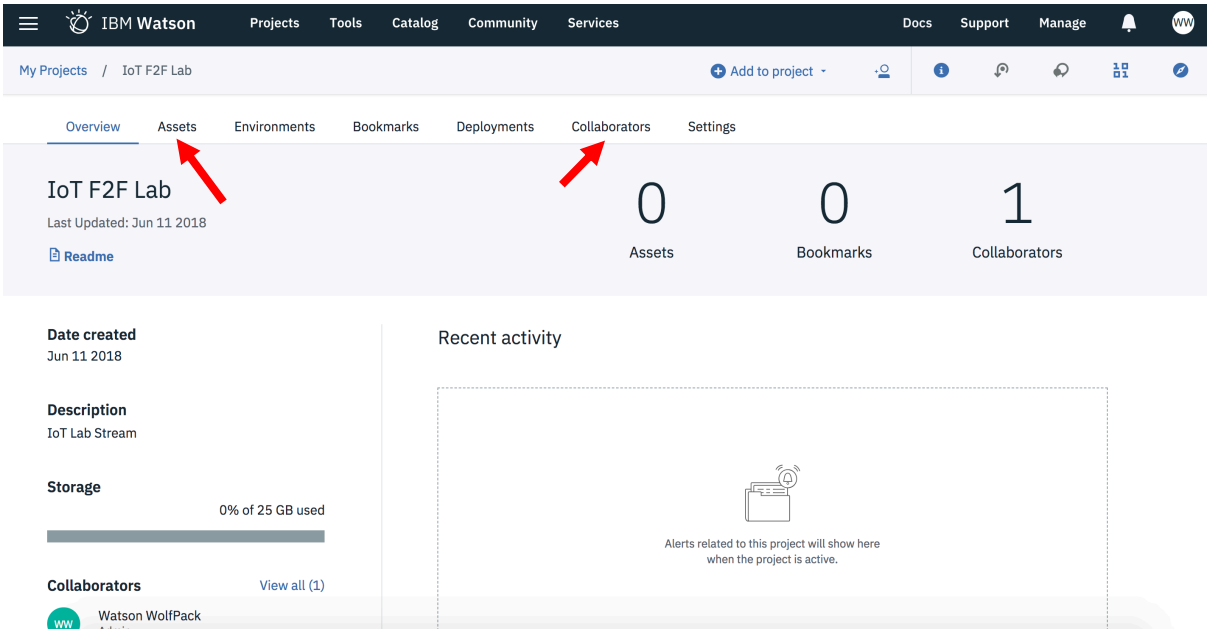


h. Click **Create** to create your project.

Action



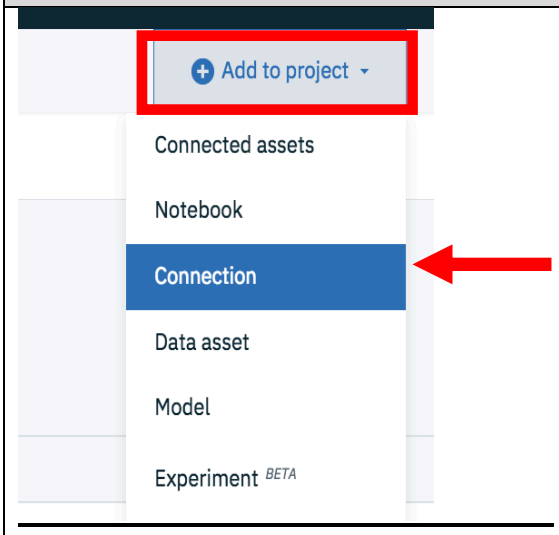
i. You now have a Project that is empty. You can use the tabs along the top to **add assets** to your project such as Connections, Notebooks, Data Assets, etc. You can also **add collaborators** to the Project.



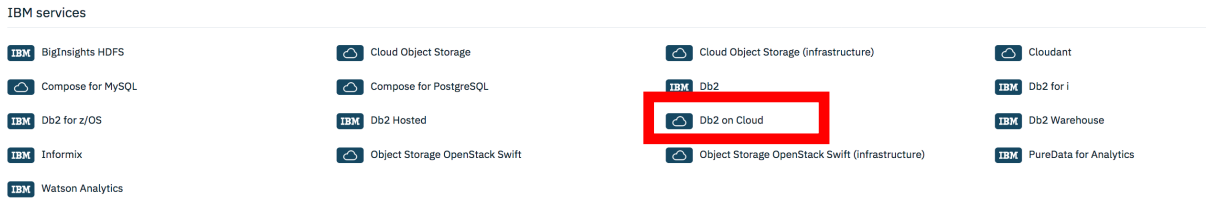
2.Connect to Db2 on Cloud

a. In the upper right corner select **Add to Project**, then **Connection**

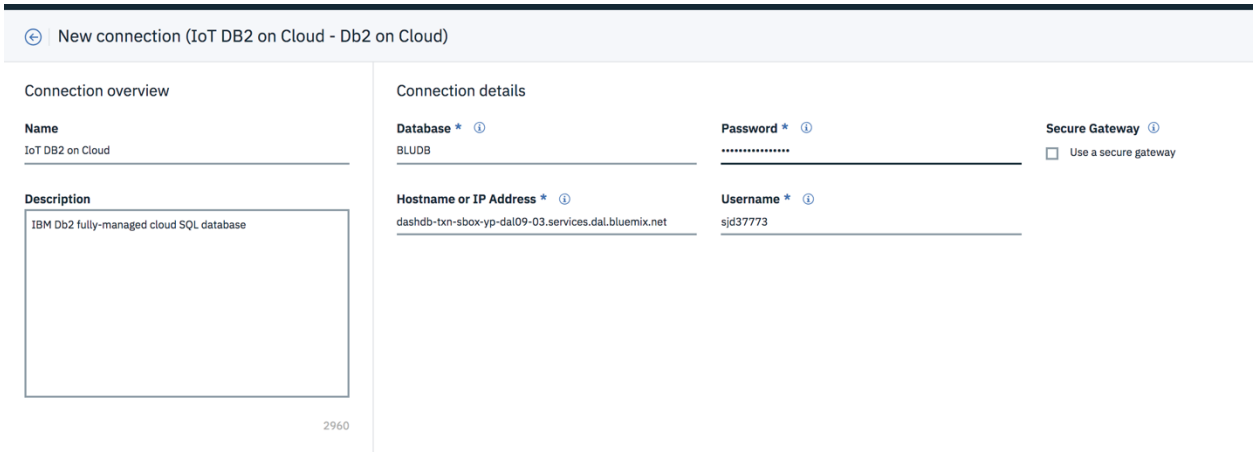
Action



b. Under **IBM Services**, select **Db2 on Cloud**

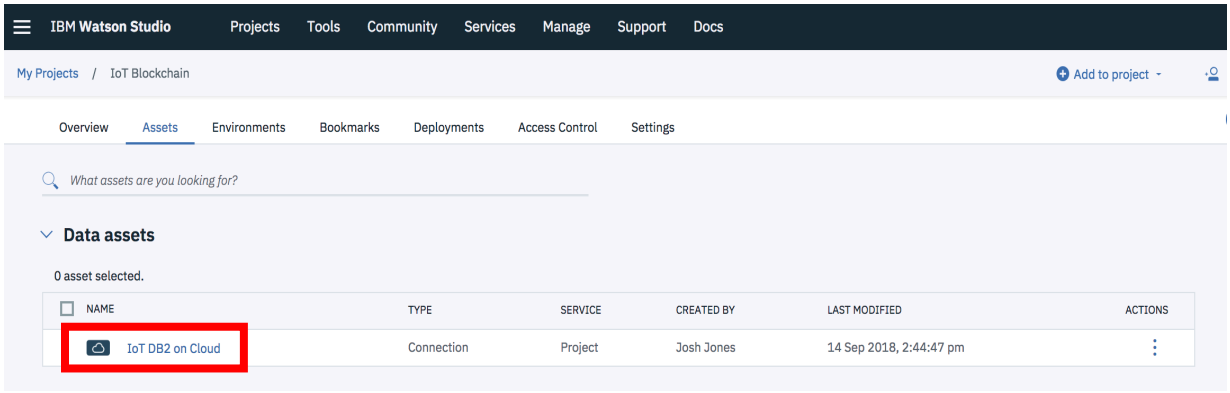


c. Name the connection "**IoT DB2 on Cloud**" and enter your **previously saved DB2 on Cloud credentials.** Click **Create**



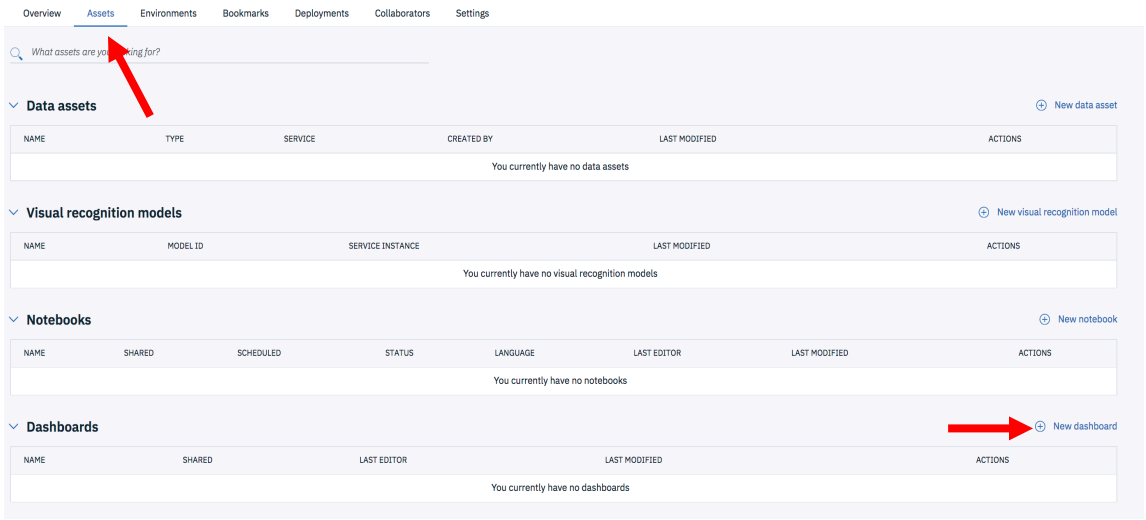
d. The connection to Db2 on Cloud now appears under **Data Assets**

Action



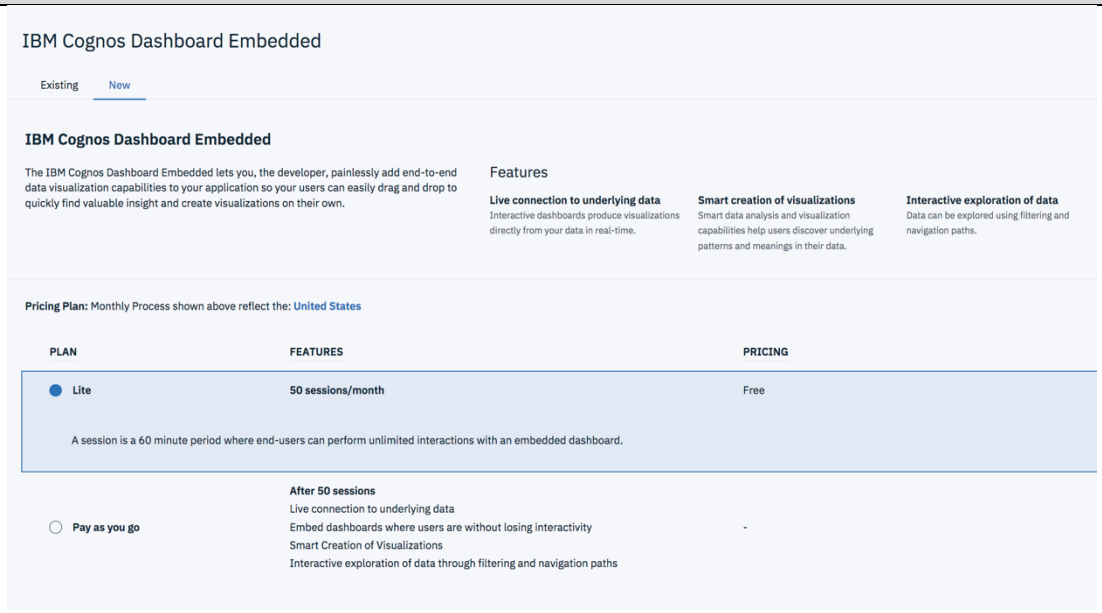
3.Create Dashboard

a. Click the **Assets** tab, then **New Dashboard**

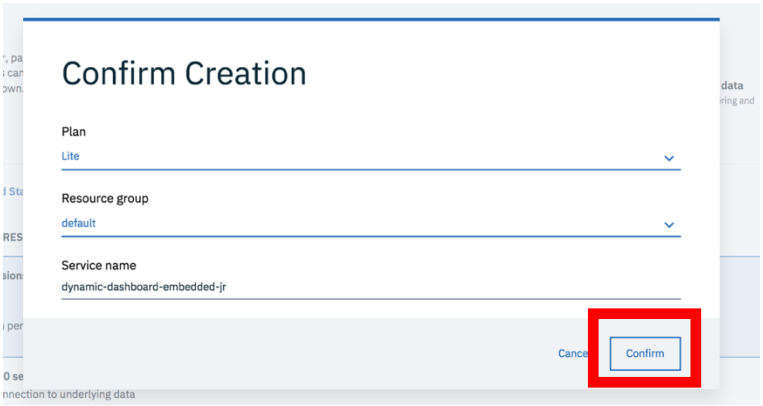


b. Click **Associate a Cognos Dashboard Embedded Service instance.** You will be taken to a page to provision the service**.** Select the **Lite** Plan and click **Create**

Action

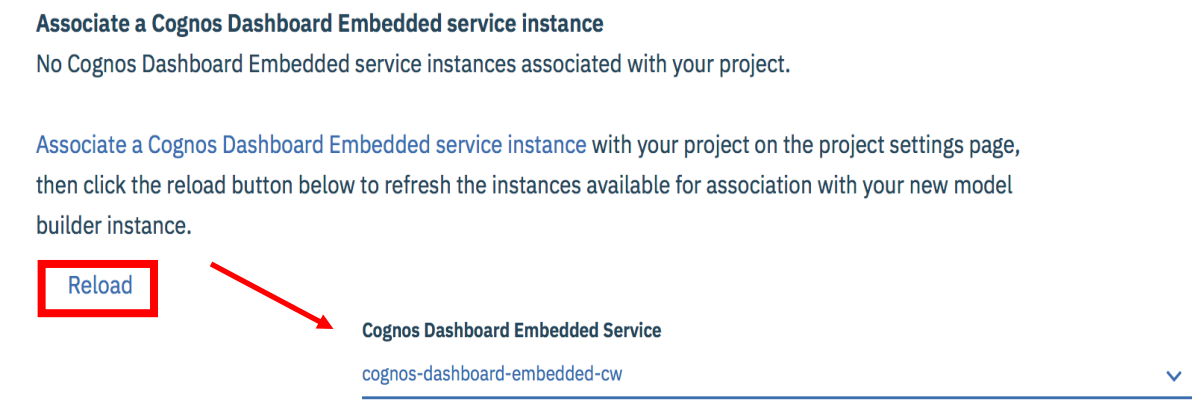


c. Keep the default Resource group and service name values and select **Confirm**

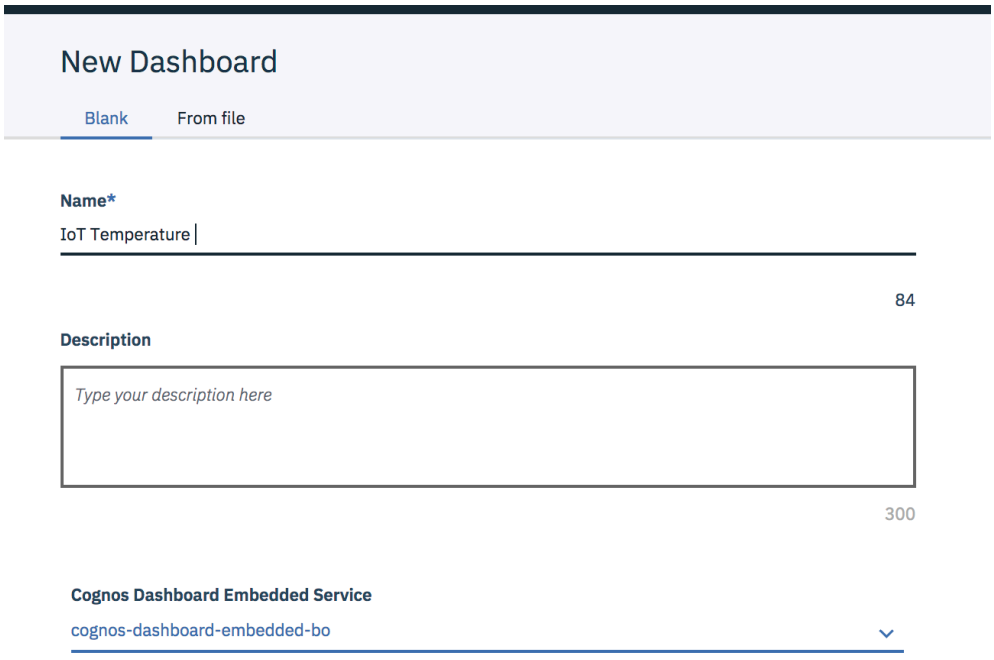


d. Click **Reload** and the newly provisioned **Cognos Dashboard Embedded Service** will appear.

Action

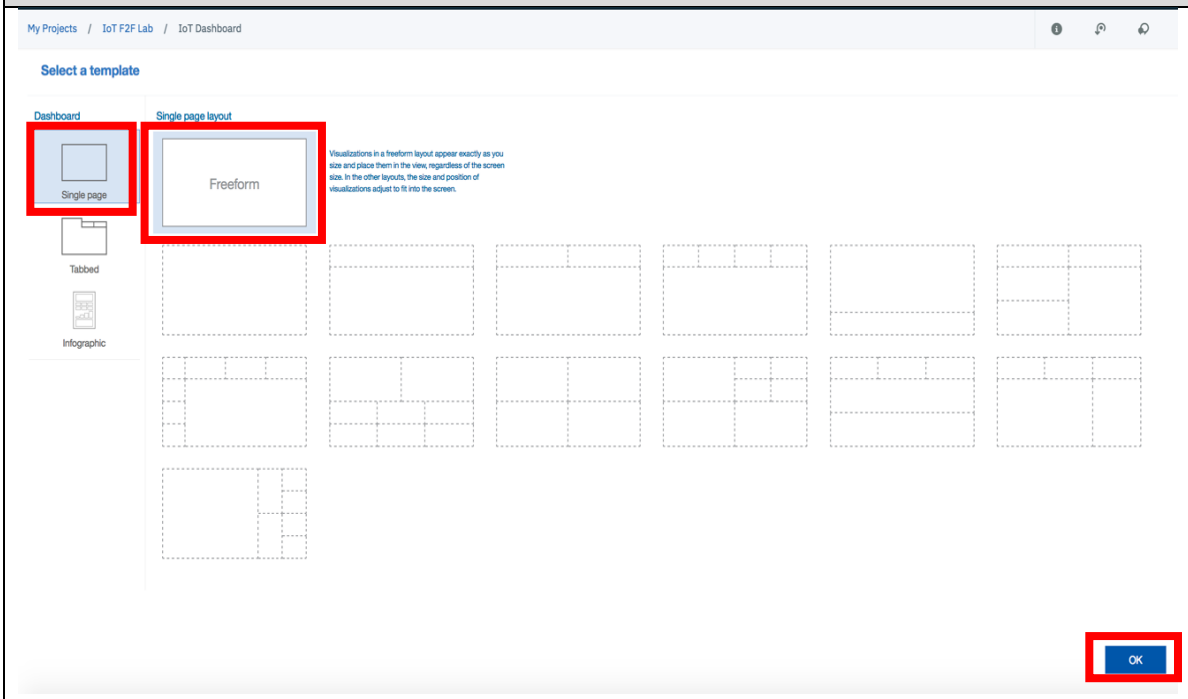


e. Name the dashboard **IoT Temperature** and click **Save**

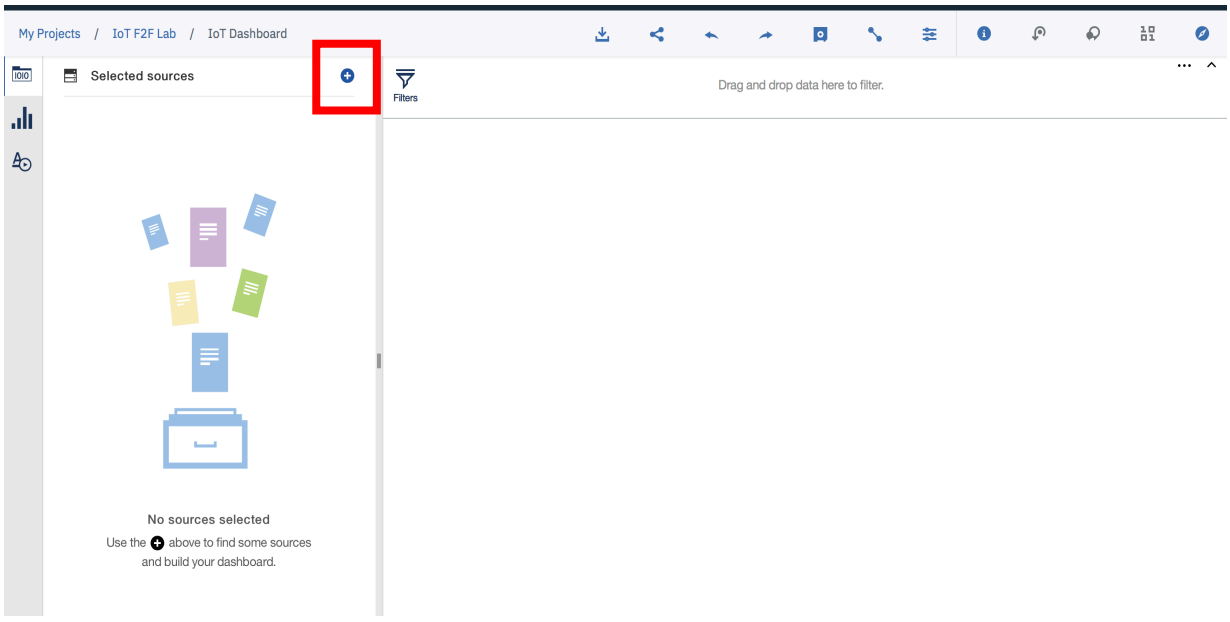


f. On the Select a Template page, select **Single Page** dashboard and **Freeform**. Click **OK**

Action

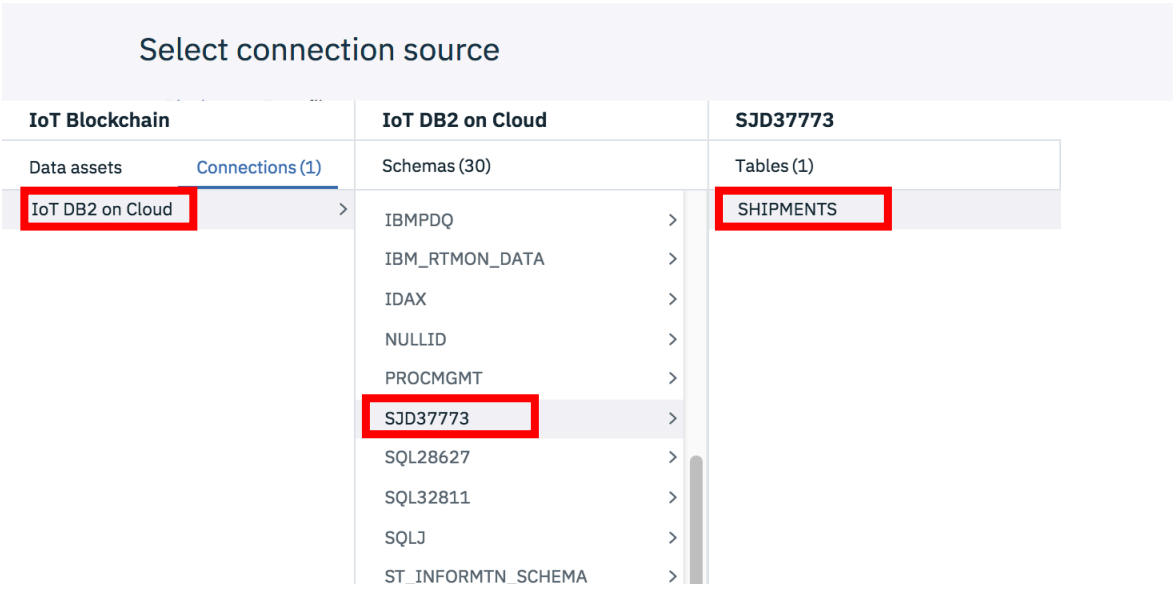


g. You will be taken to the homepage. Click the **+ button** beside **Selected Sources** to add data and build your dashboard.



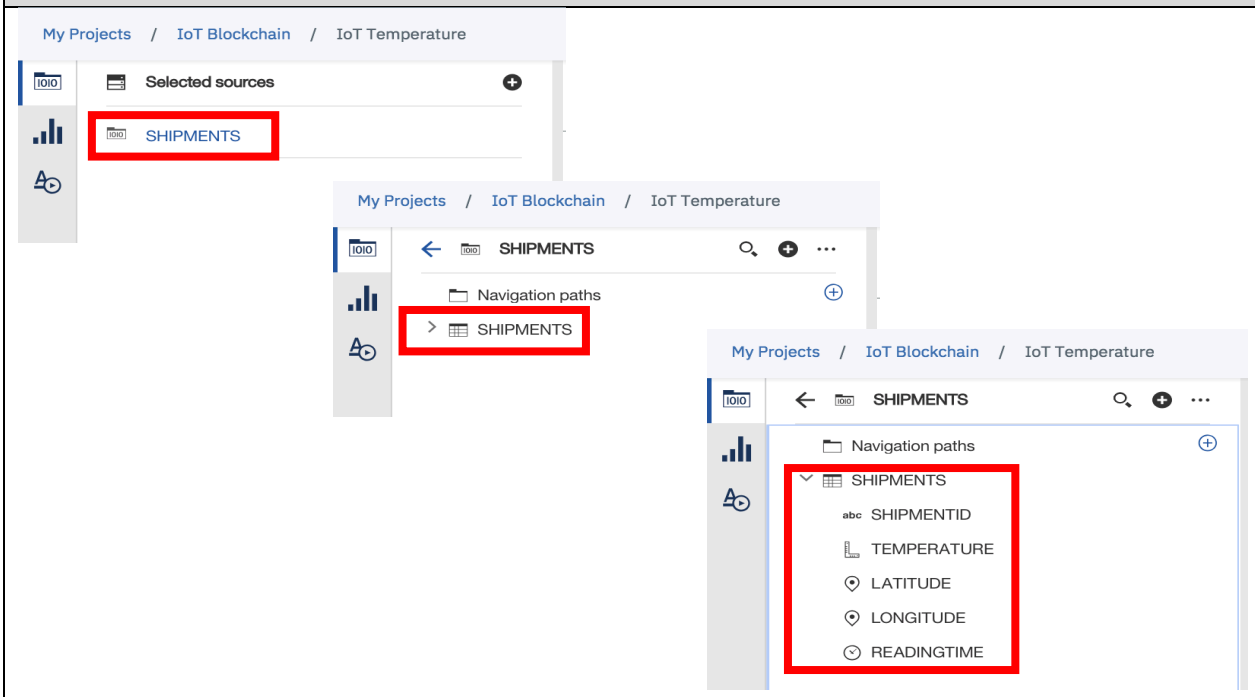
Action

h. Click the **Connections** tab. Select **IoT Db2 on Cloud** as the database, **SJDXXXX** as the Schemas and **IOTLAB** as the Table. Click **Select**

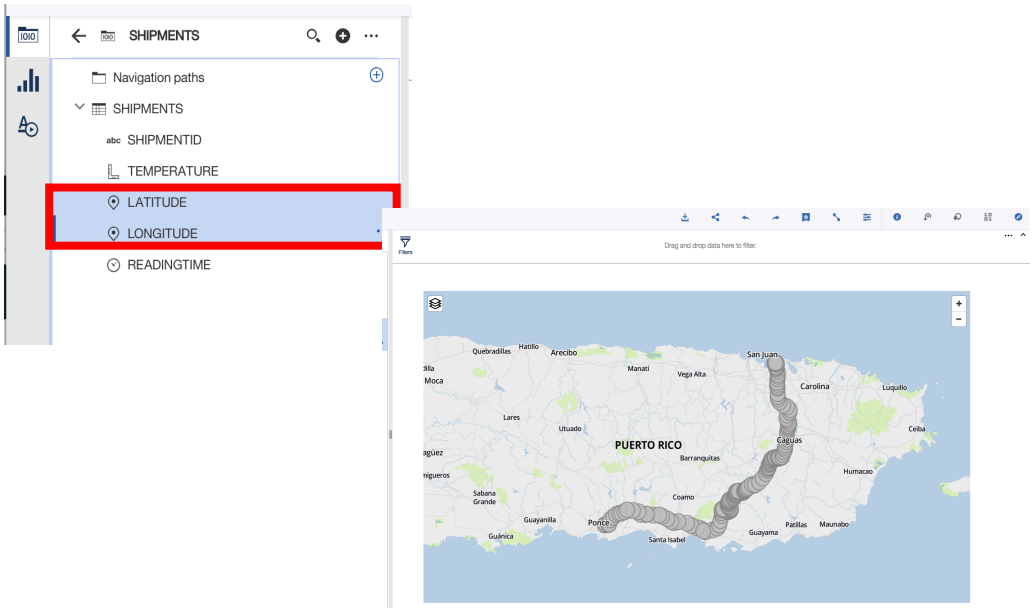


i. The **SHIPMENTS** table now appears under Selected source. Click **SHIPMENTS** and select the **dropdown arrow**. The table columns are now listed.

Action

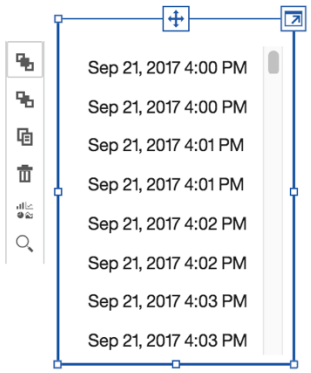


j. Select both **Latitude** and **Longitude** columns and drag and drop them onto the dashboard. A visualization of the truck's path should appear.

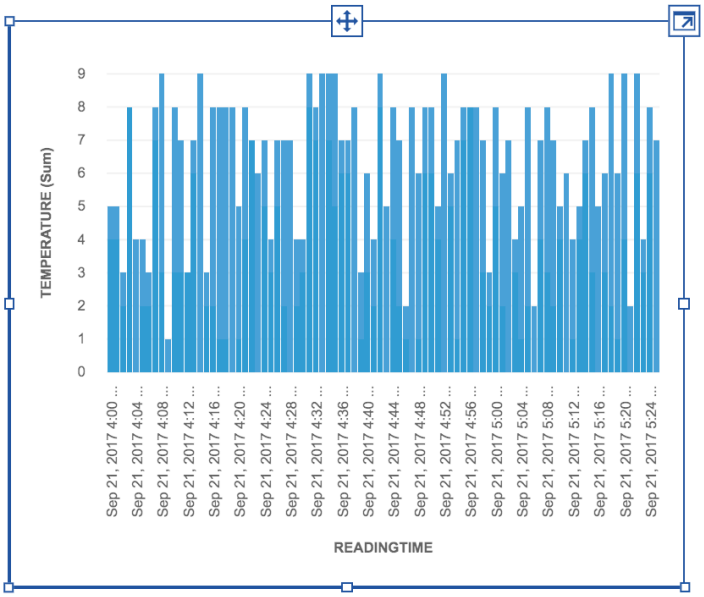


k. Select **Reading Time** and drag and drop it onto the dashboard.

Action

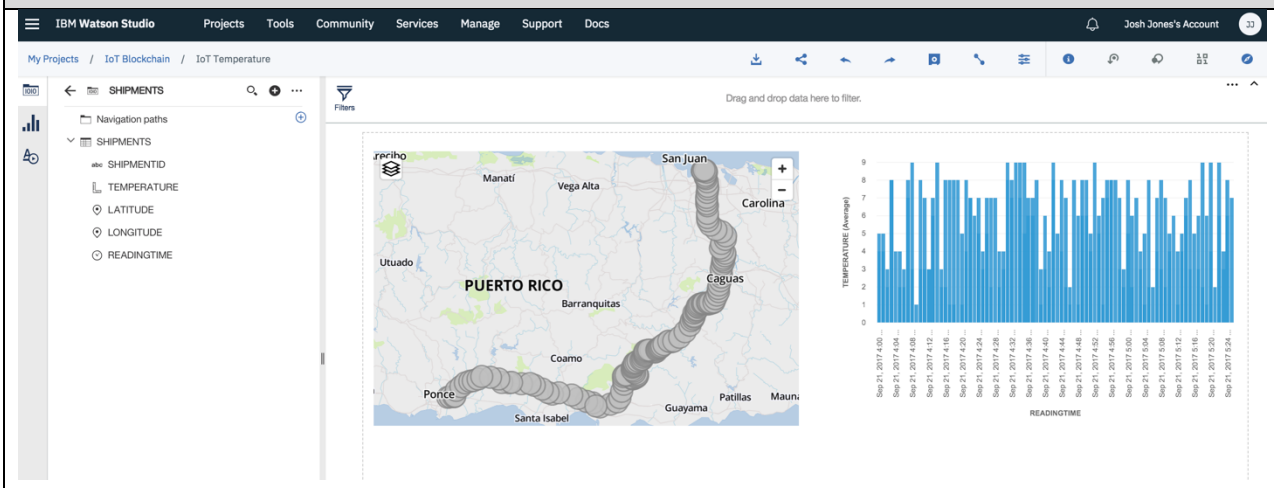


l. Next select **Temperature** and drag and drop it **on top of the Reading Time visualization**. The following visualization should appear which shows the temperature at each reading time.



m. Your final dashboard should look like the following.

Action



End of Lesson 6
End of Hands-on Workshop!