

IBM Cloud



Analytics, Blockchain and Internet of Things (IoT)

Lab Guide





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Prepared & Revised by:

Loren Murphy – lmurphy@us.ibm.com

Dave Wakeman – dwakeman@us.ibm.com



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Lab Environment Overview

Software and Tools

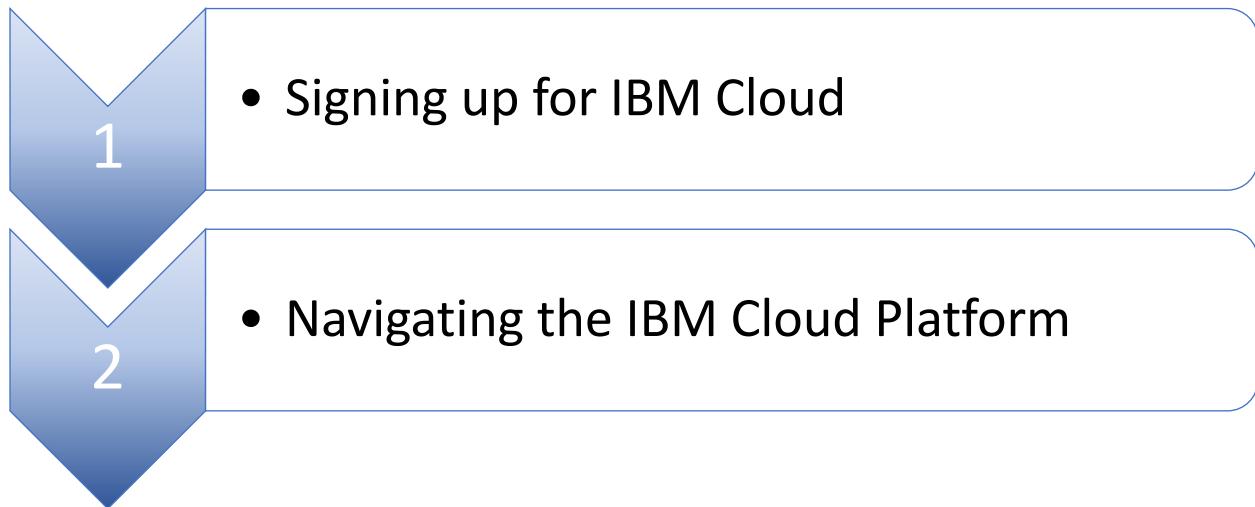
Software	Link
GitHub	https://github.com/team-wolfpack
IBM Cloud	https://www.ibm.com/cloud/



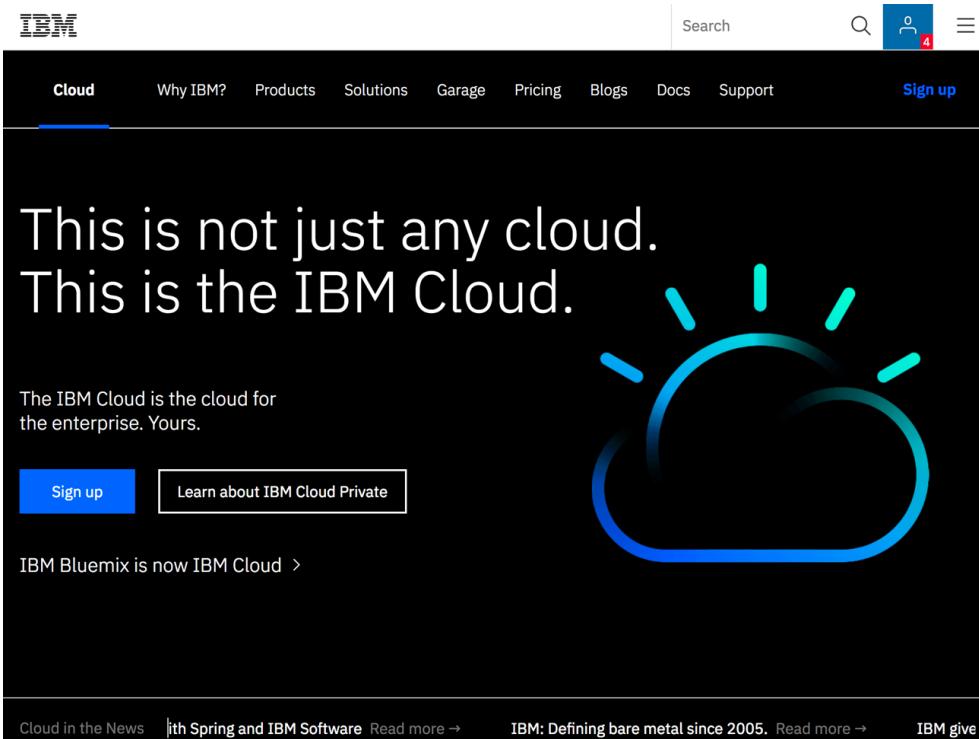
Lesson 1: IBM Cloud Signup

Purpose:	This lesson introduces the subject of Cloud. After completing the lesson, you should be able to: <ul style="list-style-type: none">• Understand Cloud• Navigate IBM Cloud Platform
Tasks:	Tasks you will complete in this exercise include: <ul style="list-style-type: none">• Signing up for IBM Cloud• Navigating the IBM Cloud Platform

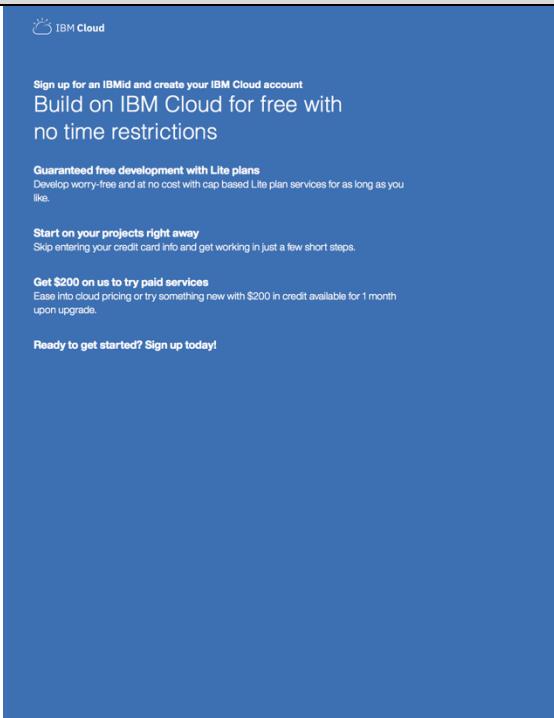
Lab 1 Workflow Overview



Lesson 1 Instructions

Action
<p><u>1.Signing up for IBM Cloud</u></p> <ol style="list-style-type: none">Go to https://www.ibm.com/cloud/We are going to sign up for a free IBM Cloud account.Click “Sign up”.  <p>The screenshot shows the IBM Cloud homepage with a dark background. At the top, there's a navigation bar with links for Cloud, Why IBM?, Products, Solutions, Garage, Pricing, Blogs, Docs, Support, and Sign up. A user icon with a '4' notification is also present. The main headline reads "This is not just any cloud. This is the IBM Cloud." Below it, a sub-headline says "The IBM Cloud is the cloud for the enterprise. Yours." There are two buttons: "Sign up" and "Learn about IBM Cloud Private". A large blue cloud icon is on the right. At the bottom, there are links for Cloud in the News, IBM Spring and IBM Software, IBM: Defining bare metal since 2005, and IBM give.</p> <ol style="list-style-type: none">Fill in the required boxes.Click “Create Account”.



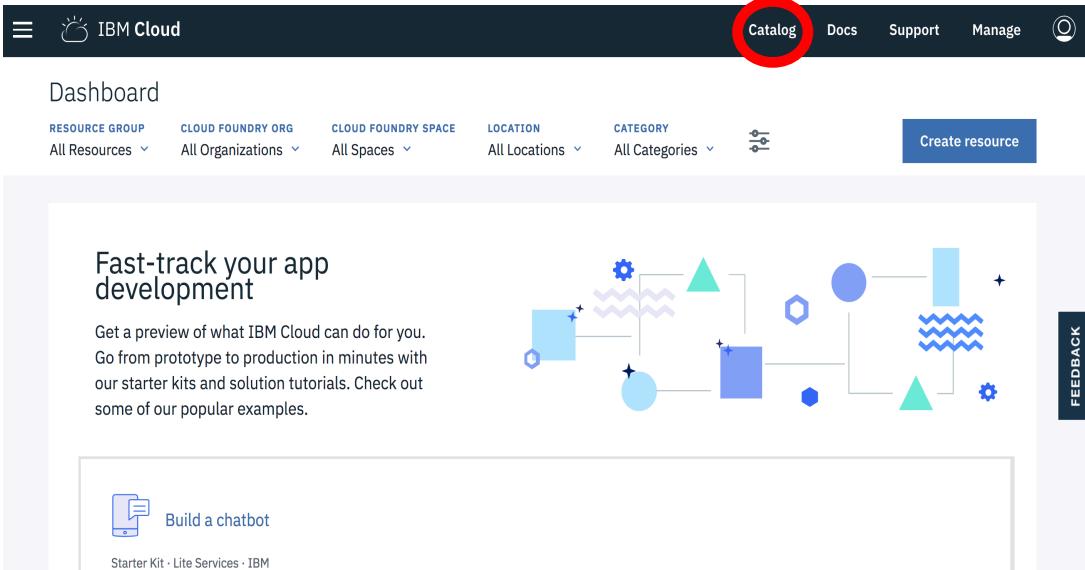
Action	
 A screenshot of the IBM Cloud sign-up page. It features a blue sidebar on the left with various promotional sections: "IBM Cloud", "Sign up for an IBMid and create your IBM Cloud account", "Build on IBM Cloud for free with no time restrictions", "Guaranteed free development with Lite plans", "Start on your projects right away", "Get \$200 on us to try paid services", and "Ready to get started? Sign up today!". The main content area on the right has fields for "Email*", "First Name*", "Last Name*", "Company", "Country or Region*" (set to United States), "Phone Number*", "Password*", and a checkbox for "Keep me informed of products, services, and offerings from IBM companies worldwide". There are also radio buttons for "By email" and "By telephone", and a link to the "IBM Cloud privacy policy and IBM Cloud terms". A "Create Account" button is at the bottom.	<p>Already have an IBM Cloud account? Log in</p> <p>Email* →</p> <p>First Name*</p> <p>Last Name*</p> <p>Company</p> <p>Country or Region* United States</p> <p>Phone Number*</p> <p>Password*</p> <p>Keep me informed of products, services, and offerings from IBM companies worldwide. <input type="checkbox"/> By email <input type="checkbox"/> By telephone By clicking Create Account, I accept the IBM Cloud privacy policy and IBM Cloud terms.</p> <p>Create Account</p>

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

Catalog

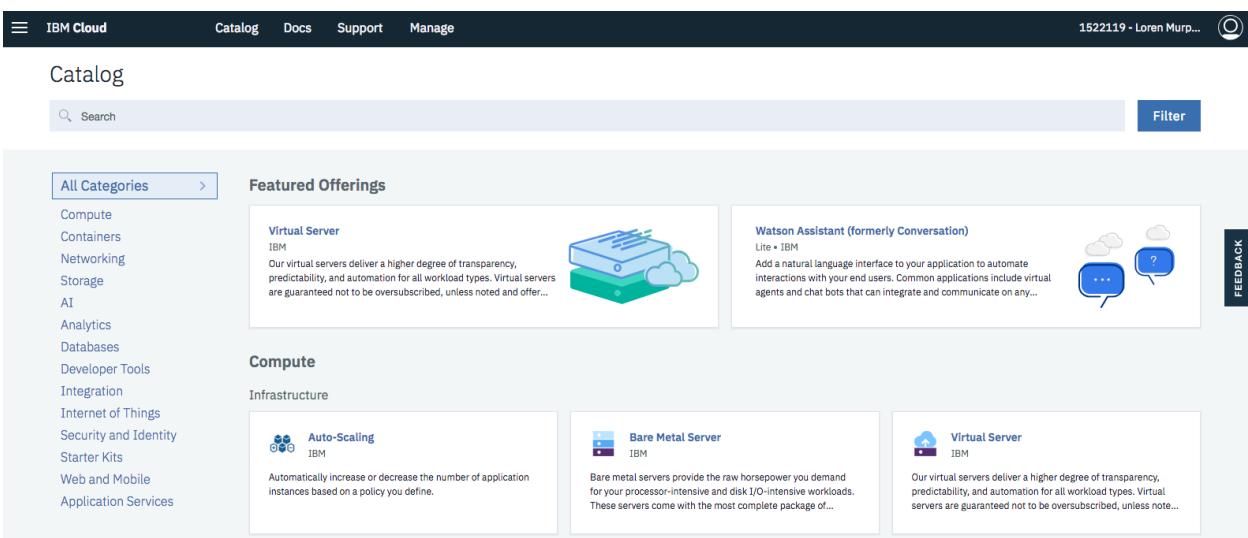


Fast-track your app development

Get a preview of what IBM Cloud can do for you. Go from prototype to production in minutes with our starter kits and solution tutorials. Check out some of our popular examples.

 Build a chatbot
Starter Kit · Lite Services · IBM

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 manage 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”)

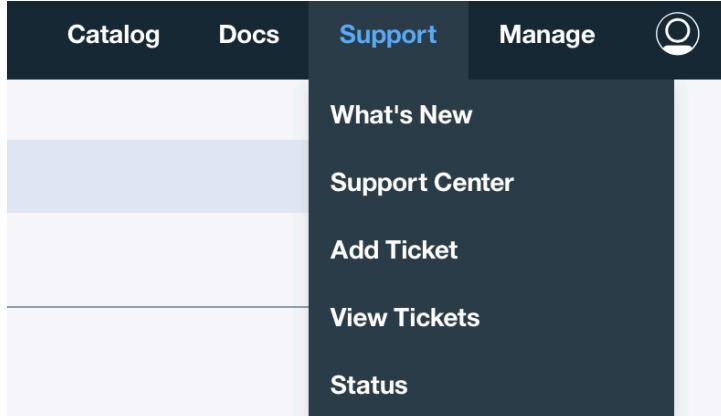
- f. IBM Cloud supports both IBM products and services, as well as third-party. A “Lite” label indicates that you can provision a free version of the service using your Lite Cloud account.

IBM Third Party Lite

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

IBM Cloud Catalog Docs Support Manage 1522119 - Loren Murp... 

Catalog

Search  Filter 

All Categories >

Featured Offerings

Virtual Server IBM Our virtual servers deliver a higher degree of transparency, predictability, and automation for all workload types. Virtual servers are guaranteed not to be oversubscribed, unless noted and offer...		Watson Assistant (formerly Conversation) Lite + IBM Add a natural language interface to your application to automate interactions with your end users. Common applications include virtual agents and chat bots that can integrate and communicate on any...	
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Compute

Infrastructure

 Auto-Scaling IBM Automatically increase or decrease the number of application instances based on a policy you define.	 Bare Metal Server IBM Bare metal servers provide the raw horsepower you demand for your processor-intensive and disk I/O-intensive workloads. These servers come with the most complete package of...	 Virtual Server IBM Our virtual servers deliver a higher degree of transparency, predictability, and automation for all workload types. Virtual servers are guaranteed not to be oversubscribed, unless note...
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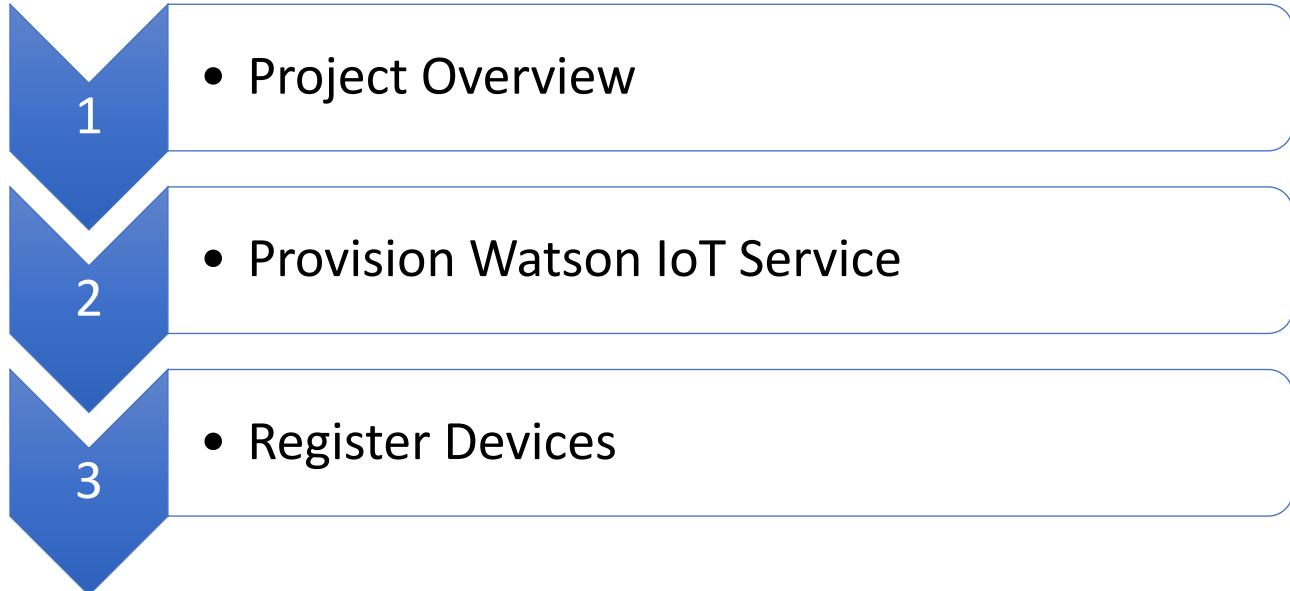
End of Lesson 1



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

Purpose:	This lab introduces the Watson IoT Platform and how to register devices.
Tasks:	<p>Tasks you will complete in this lab exercise include:</p> <ul style="list-style-type: none">• Provision Watson IoT Service• Register Devices

Lesson 2: Workflow Overview



Lesson 2: Instructions

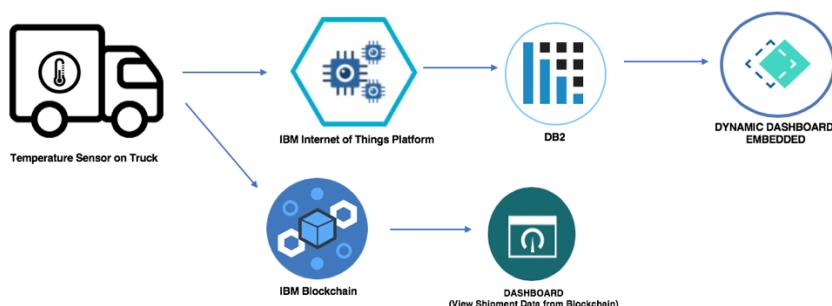
1. Project Overview

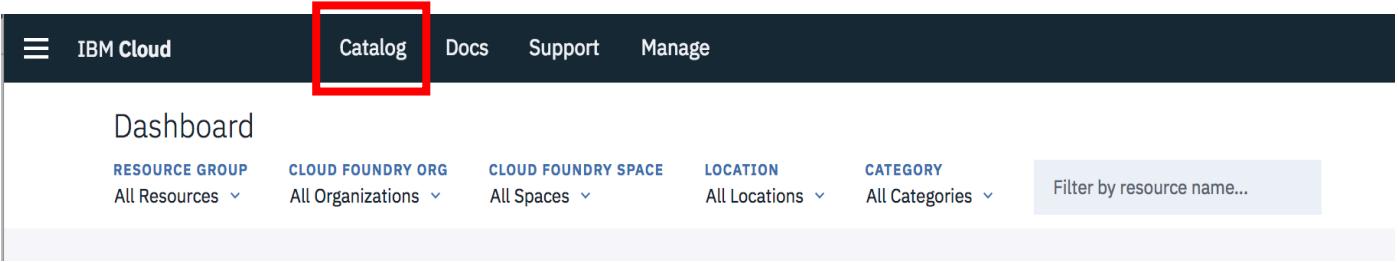
This lab is based on the IBM Code Pattern, "[IoT Asset Tracking on a Blockchain](#)"

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
<p>a. Log into IBM Cloud at https://console.bluemix.net/dashboard/apps/</p> <p>b. Click the “Catalog” button found in the left hand side of the screen.</p> 
<p>c. In the search bar, type internet of things and select Internet of Things Platform.</p>  <p>d. Keep the default service name and select Create</p>

Action

Internet of Things Platform

This service is the hub for IBM Watson IoT and lets you communicate with and consume data from connected devices and gateways. Use the built-in web console dashboards to monitor your IoT data and analyze it in real time. Then, enhance and customize your IBM Watson IoT Platform experience by building and connecting your own apps by using messaging and REST APIs.

Service name: Internet of Things Platform-ec

Choose a region/location to deploy in: US South

Choose an organization: lrmurphy@us.ibm.com

Choose a space: Test Space

Features

- Connect: Quickly and securely register and connect your devices and gateways. You can find simple step-by-step instructions for connecting popular devices, sensors, and gateways in our recipes site.
- Analyze in real time: Monitor your real-time device data through rules, analytics, and dashboards. Define rules to monitor conditions and trigger automatic actions that include alerts, email, IFTTT, Node-RED flows, and external services to react quickly to critical changes.
- Information Management: Control what happens to the data that is received from your connected devices. Manage data storage, configure data transformation actions, and integrate with other data services and device platforms.
- Risk and Security management: Our secure-by-design control capabilities protect the integrity of your IoT solution through secure connectivity and access control for users and applications. Extend the base security with threat intelligence for IoT to visualize critical risks and automate operational responses with policy-driven mitigation actions.

Images

Click an image to enlarge and view screen captures, slides, or videos. Screen caps show the user interface for the service after it has been provisioned.

Need Help? [Contact IBM Cloud Support](#) | Estimate Monthly Cost [Cost Calculator](#)

Create

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

Internet of Things / Internet of Things Platform-ec 0.47% Used | 199.07 Megabyte exchanged available | [Details](#)

Location: US South Org: lrmurphy@us.ibm.com Space: Test Space



Let's get started with Watson IoT Platform

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

Launch **Docs**

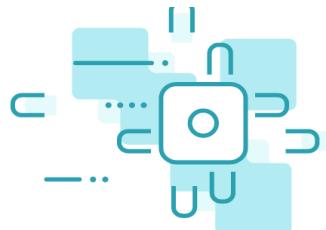
Learn about Watson IoT Platform Understand the architecture, concepts, and features of the Watson IoT Platform service and see how it fits in the extended IBM Cloud universe and your own IoT infrastructure.

Expand using step-by-step recipes Browse a multitude of custom recipes to connect your devices to Watson IoT Platform, expand on the basic service, and consume the device IoT data flow in your applications.

Action

3. Register Devices in IoT Platform

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

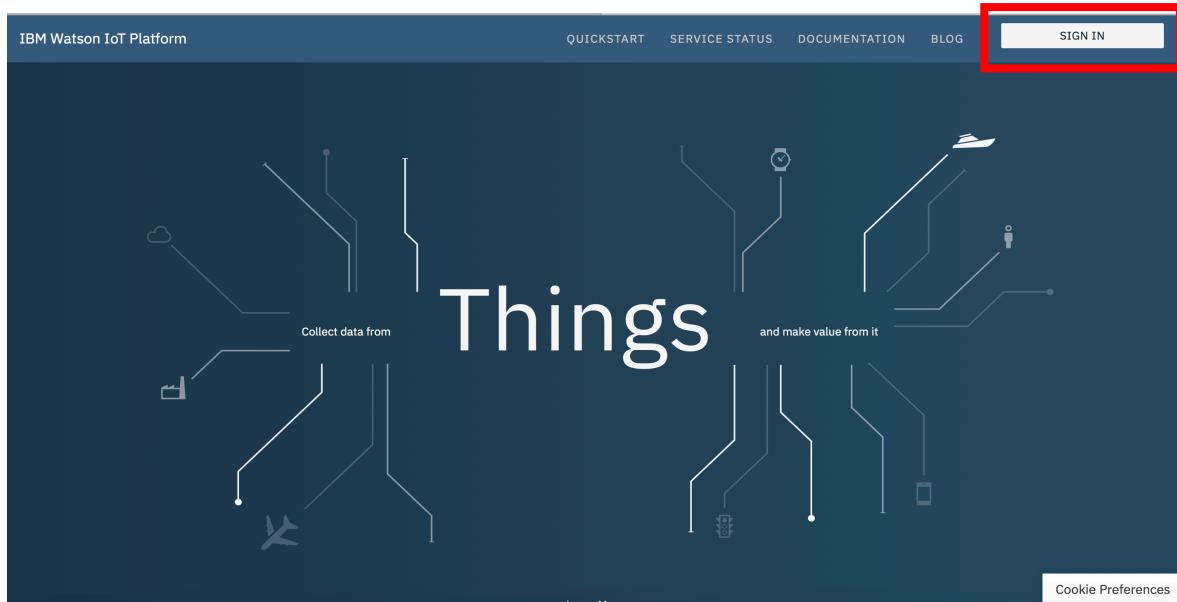


Let's get started with Watson IoT Platform

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

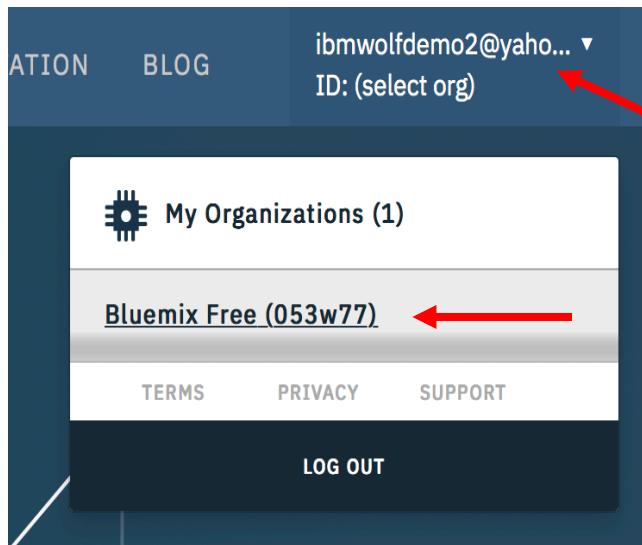


- You should now see the IBM Watson IoT Platform welcome screen. If you are not automatically logged in, in the upper right corner click **Sign In** and login with your IBM Cloud ID and password



- 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.

IBM Watson IoT Platform

ibmwolfdemo2@yahoo.com
ID: 053w77

Browse Action Device Types + Add Device

Browse Devices

Type the Device ID to search for

All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

<input type="checkbox"/> Device ID	Device Type	Class ID	Date Added	Descriptive Location			
0 results							

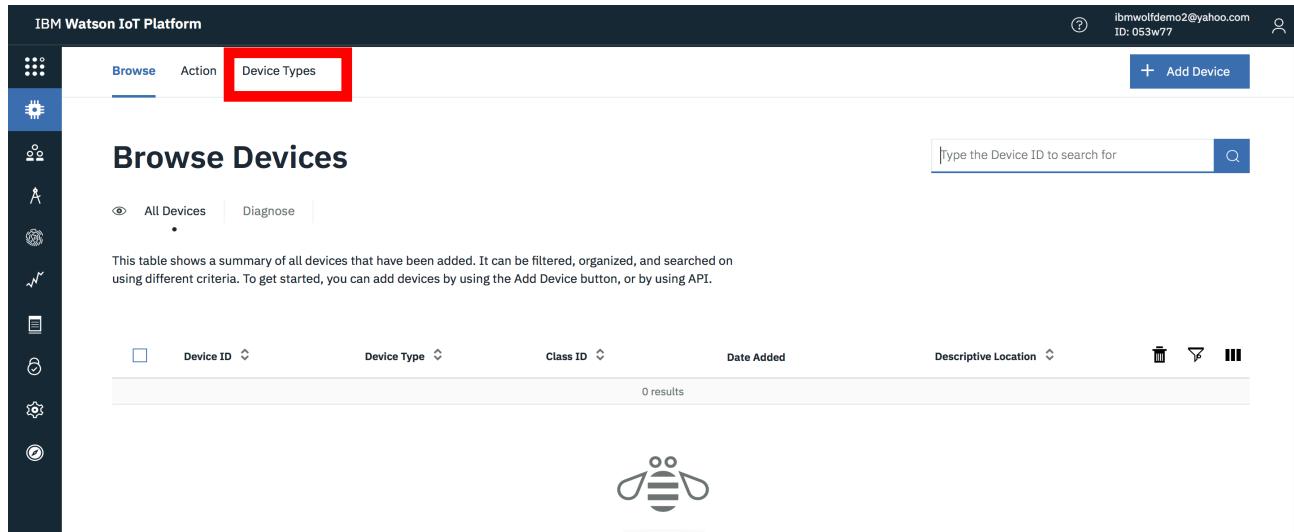
You don't have any devices.
Create a device.



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

[+ Add Device Type](#)

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
<p>Select Type</p> <p>Device types group devices that have similar characteristics, such as model number, firmware version, or location. Give the device type a unique name and a description that identifies characteristics that are shared by devices of this type.</p> <p>Type <input checked="" type="radio"/> Device Or <input type="radio"/> Gateway</p> <p>Name: TemperatureSensor</p> <p>The device type name is used to identify the device type uniquely and uses a restricted set of characters to make it suitable for API use.</p> <p>Description:</p>
<p>h. Leave Device Information blank. Select Done. You have successfully added a new device type. Now we need to register Devices of that type.</p> <p>You added the new device type: TemperatureSensor</p> <p>Register Device Advanced Flow</p> <p>Optional</p> <p>Register Devices, Define Interfaces</p> <p>Now that you added a device type, you can register and connect devices for this type.</p> <p>Register Devices</p>

Action

Watson IoT Platform

Browse Action Device Types

Add Device **Identity** Device Information Security Summary

Identity Select a device type for the device that you are adding and give the device a unique ID.

Device Type	TemperatureSensor
Device ID	qb48dr-001

Cancel **Next**

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

Add Device **Identity** **Device Information** Security Summary

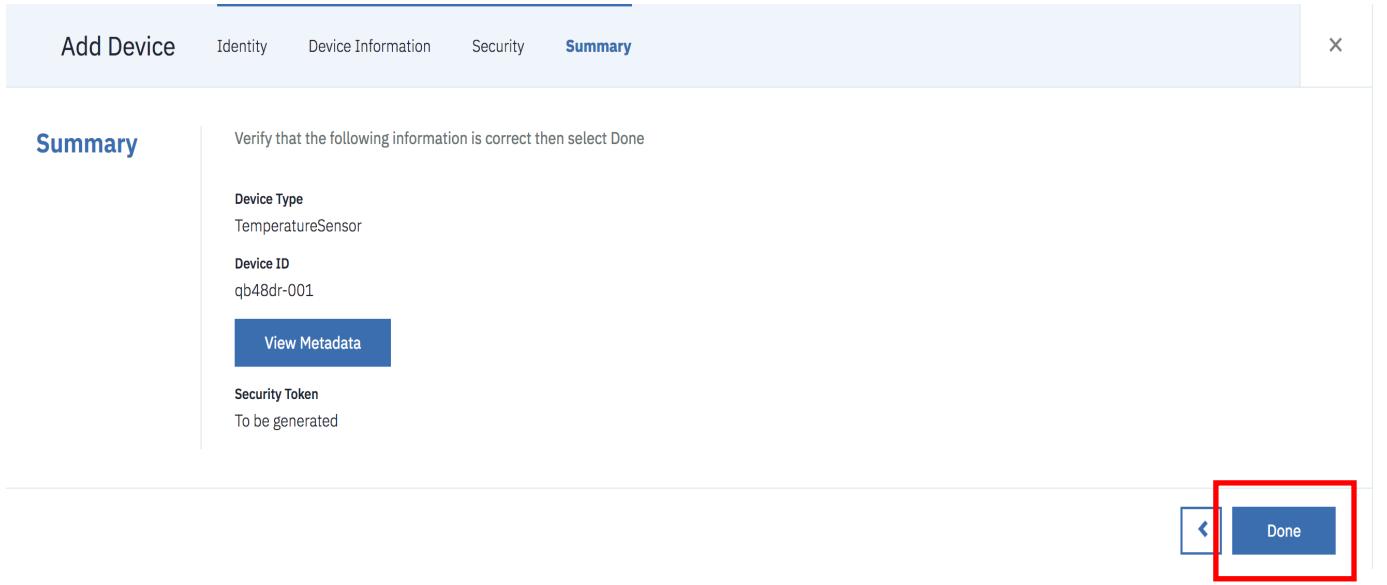
Device Information You can modify the default device information and enter more information about the device for identification purposes.

Serial Number	Enter Serial Number	Manufacturer	Enter Manufacturer
Model	Enter Model	Device Class	Enter Device Class
Description	Enter Description	Firmware Version	Enter Firmware Version
Hardware Version	Enter Hardware Version	Descriptive Location	Enter Descriptive Location

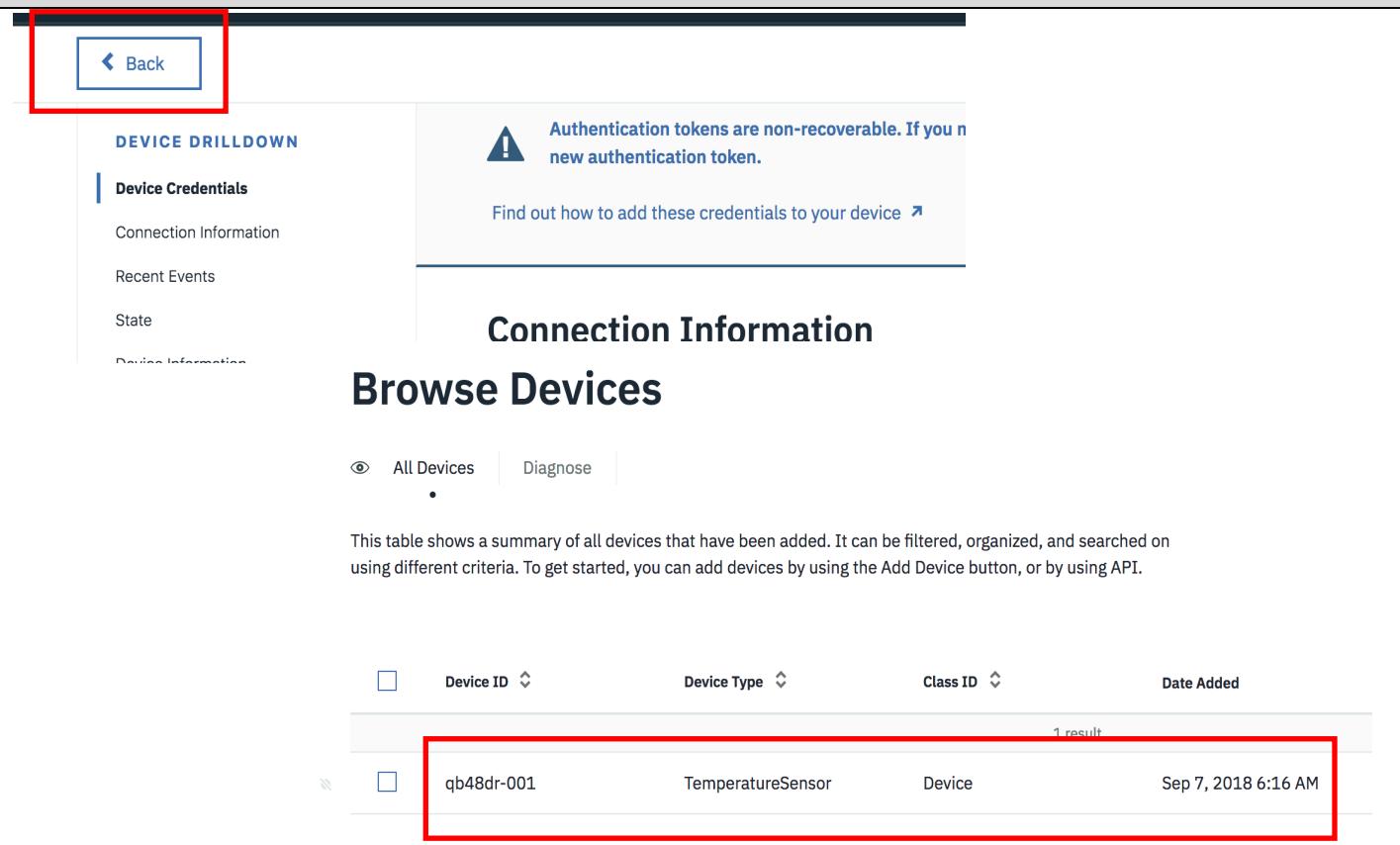
+ Add Metadata

Back **Next**

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

Action	
<p>Device Security</p> <p>There are two options for selecting a device authentication token.</p> <p>Auto-generated authentication token (default)</p> <p>Allow the service to generate an authentication token for you. Tokens are 18 characters and contain a mix of alphanumeric characters and symbols. The token is returned to you at the end of the device registration process.</p> <div style="border: 2px solid red; padding: 5px; margin-top: 10px;"> <input type="text" value="Authentication Token"/> TempSensor ⓘ </div> <p>Make a note of the generated token. Lost authentication tokens cannot be recovered. Tokens are encrypted before being stored.</p> <p>Authentication token are encrypted before we store them.</p>	<p>Self-provided authentication token</p> <p>Provide your own authentication token for this device. The token must be between 8 and 36 characters and contain a mix lowercase and uppercase letters, numbers, and symbols, which can include hyphens, underscores, and periods. Do not use repeated characters, dictionary words, user names, or other predefined sequences.</p>
<p>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.</p> 	
<p>e. Click Back in the upper left corner. Your device should now be listed on the “Browse Devices” page.</p>	

Action



The screenshot shows the 'Action' step of a process. It displays the 'Device Drilldown' interface for a registered device. A red box highlights the 'Back' button in the top-left corner of the header. Another red box highlights the warning message about non-recoverable authentication tokens. The 'Connection Information' section is visible, along with a link to add credentials. Below this, the 'Connection Information' and 'Browse Devices' sections are shown. The 'Browse Devices' table lists one result: qb48dr-001, which is highlighted with a red box. The table columns are Device ID, Device Type, Class ID, and Date Added.

	Device ID	Device Type	Class ID	Date Added
<input type="checkbox"/>	qb48dr-001	TemperatureSensor	Device	Sep 7, 2018 6:16 AM

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

End of Lesson 2



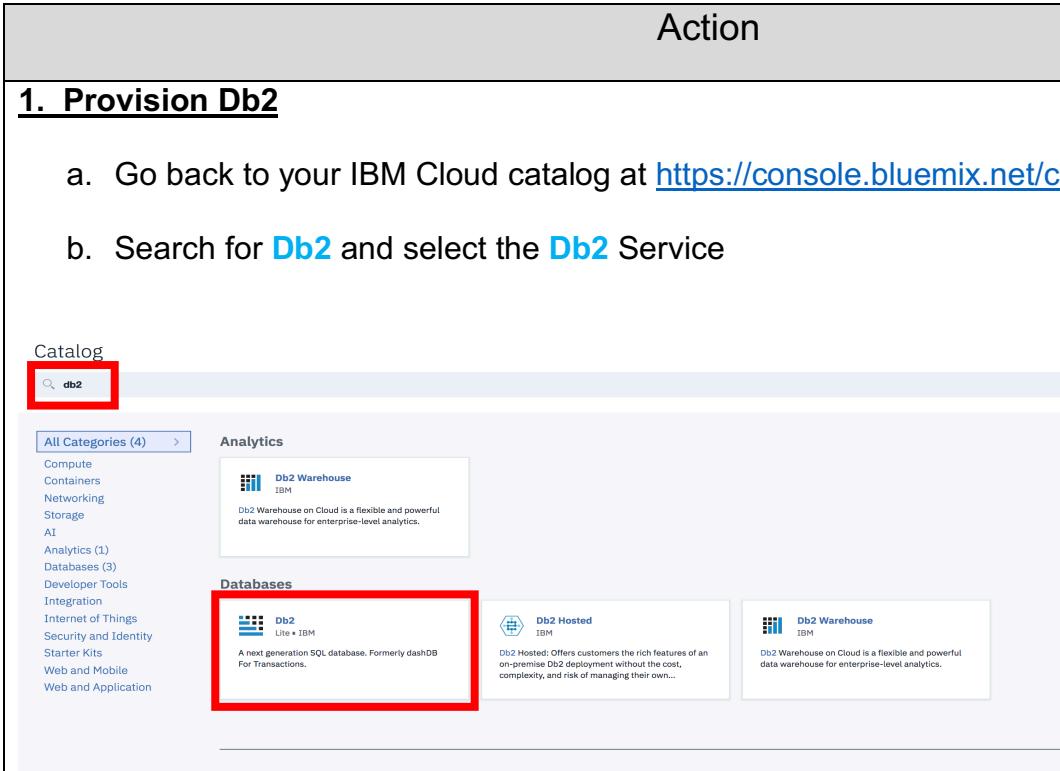
Lesson 3: Configure Db2 on Cloud

Purpose:	This lab introduces how to provision the Db2 on Cloud service and create a table. The database will be used to persist IoT sensor data.
Tasks:	<p>The tasks you will complete in this section are:</p> <ul style="list-style-type: none">• Provision Db2 on Cloud Service• Create Table in Db2 on Cloud

Lesson 3: Workflow Overview



Lesson 3 Instructions

Action
<p>1. Provision Db2</p> <ol style="list-style-type: none">Go back to your IBM Cloud catalog at https://console.bluemix.net/catalog/Search for Db2 and select the Db2 Service 
<ol style="list-style-type: none">Keep the default service name and click Create

Action

View all  **Db2**
Lite • IBM

A fully-managed cloud SQL database. Powered by a turbo-charged Db2 engine.

[View Docs](#) [Terms](#)

AUTHOR	IBM
PUBLISHED	08/29/2018
TYPE	Service
LOCATION	Sydney, Germany, United Kingdom, US South

Service name:

Choose a region/location to deploy in:

Choose an organization:

Choose a space:

Email:

Please provide an email address where we can reach you for updates

Features

- Fast, Reliable & Robust**
Uses Db2 technology for enterprise-level OLTP performance. 99.99% uptime SLA with high availability plans and now with options for full geo-isolated disaster recovery. Supports .NET, ODBC, JDBC and REST. Compatible with Netezza and Oracle.
- Flexible pricing & scalability**
See plans for details. Monthly price is adjusted based on days of activated service, providing billing-by-the day. (Non-baremetal plans only.) For a limited time, the small plan (2.8.500) offers a 7-day free trial. For questions, contact sales@bluemix.net.
- Fully managed, safe, and secure**
Includes daily backups for 14 days, at-rest database encryption, and SSL connections. High availability plans include two servers configured as an HA pair. HIPAA option, ISO2K1, SOC2/3 and more.
- Related Db2 cloud products**
Check out Db2 Warehouse on Cloud, the enterprise-class cloud data warehouse. Or, for an unmanaged service that you configure yourself, consider Db2 Hosted.

Need Help? [Contact IBM Cloud Support](#) [Estimate Monthly Cost](#) [Cost Calculator](#)

Google Chrome

Create

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

Dashboard

RESOURCE GROUP All Resources	CLOUD FOUNDRY ORG All Organizations	CLOUD FOUNDRY SPACE All Spaces	LOCATION All Locations	CATEGORY All Categories	Filter by resource name...	Create resource
---------------------------------	--	-----------------------------------	---------------------------	----------------------------	----------------------------	------------------------

Cloud Foundry Services

Name	Region	CF Org	CF Space	Plan	Service Offering
Db2-it	US South	bigesademo@gmail.com	dev	Lite	Db2
Internet of Things Platform-9f	US South	bigesademo@gmail.com	dev	Lite	Internet of Things Plat...

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

Action

IBM Cloud Catalog Docs Support Manage

Manage Service credentials Connections

Data & Analytics / Db2-r7

Location: US South Org: wolfpackdemo@yahoo.com Space: dev

[Open Console](#)

Getting Started

Get started with by referencing our documentation. Connect applications to the service, upload your data, and start running SQL.

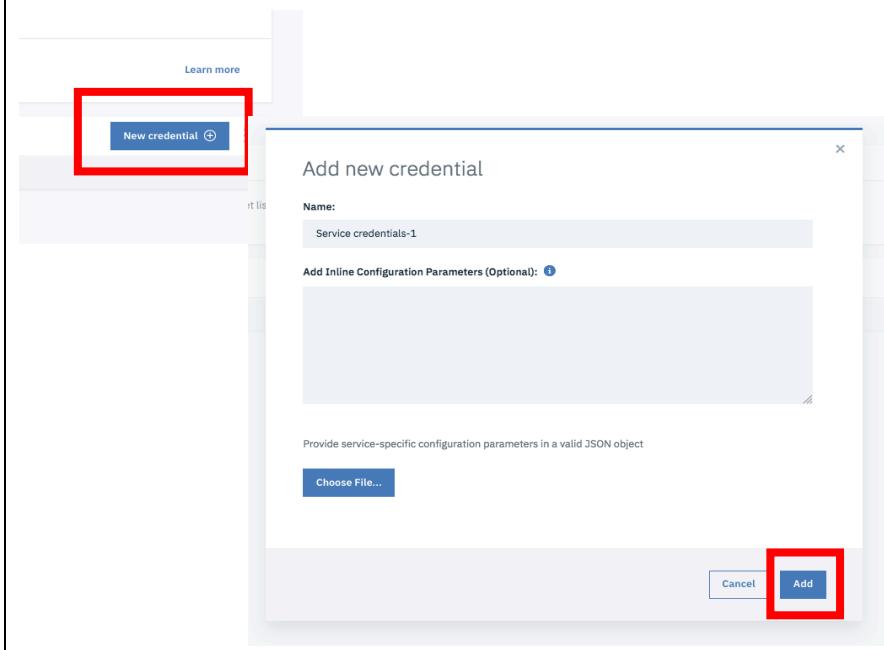
[Getting Started](#)

Need Help?

Use IBM dW Answers to view recently asked questions or ask your own. Still unable to find an answer? Submit a Bluemix Support Ticket to our team.

[IBM dW Answers](#) [Support Ticket](#)

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



New credential +

Add new credential

Name: Service credentials-1

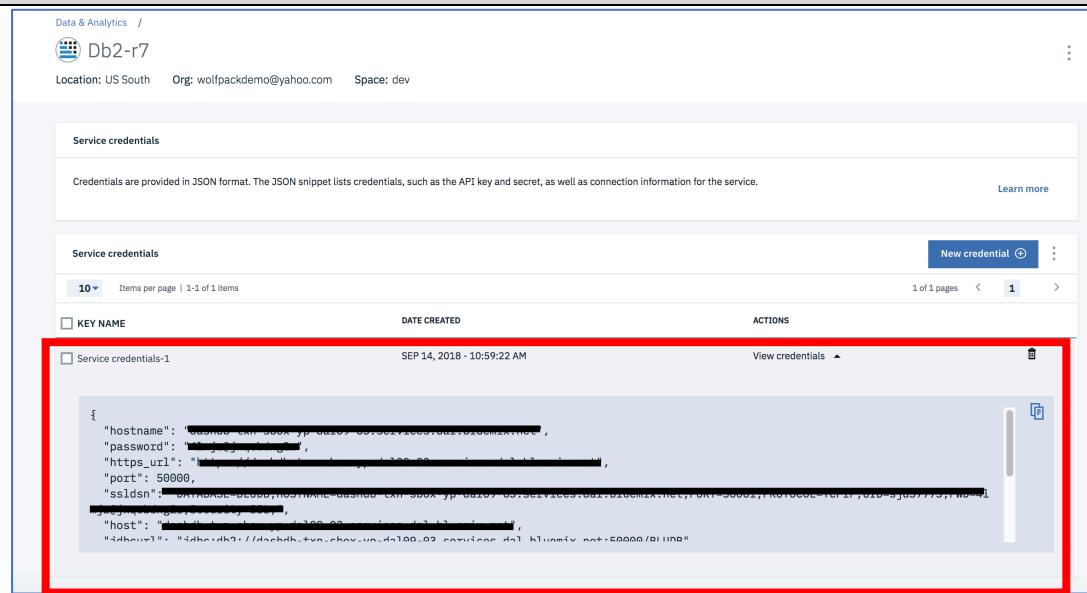
Add Inline Configuration Parameters (Optional):

Choose File...

Cancel Add

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

Action

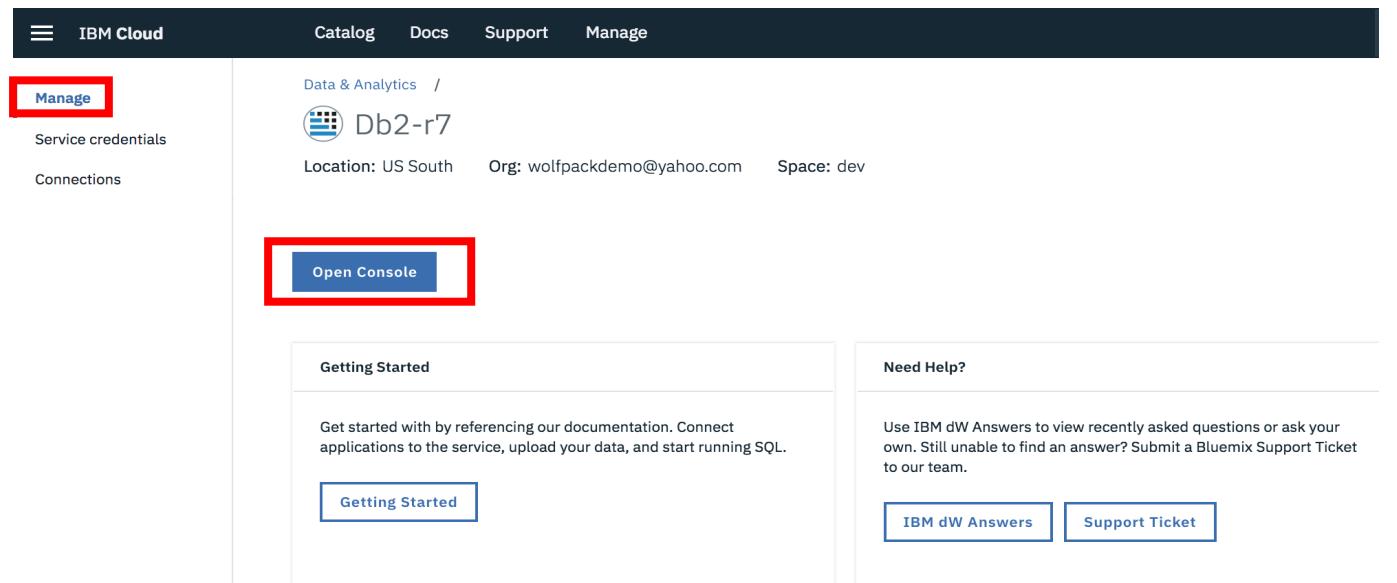


The screenshot shows the 'Service credentials' section of the Db2-r7 service. It displays a single credential entry with a red box highlighting the JSON content:

```
{
  "hostname": "dashdb-ent-580x-yp-00107-0133242609.dashdb.us-south.bluemix.net",
  "password": "XXXXXXXXXXXXXX",
  "https_url": "https://dashdb-ent-580x-yp-00107-0133242609.dashdb.us-south.bluemix.net:50000",
  "port": 50000,
  "sslssl": "DASHDB-ENT-580X-YP-00107-0133242609.dashdb.us-south.bluemix.net:50001,TLSv1.2,Cipher-Suite:TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256",
  "host": "dashdb-ent-580x-yp-00107-0133242609.dashdb.us-south.bluemix.net:50000"
}
```

2. Create Table in Db2

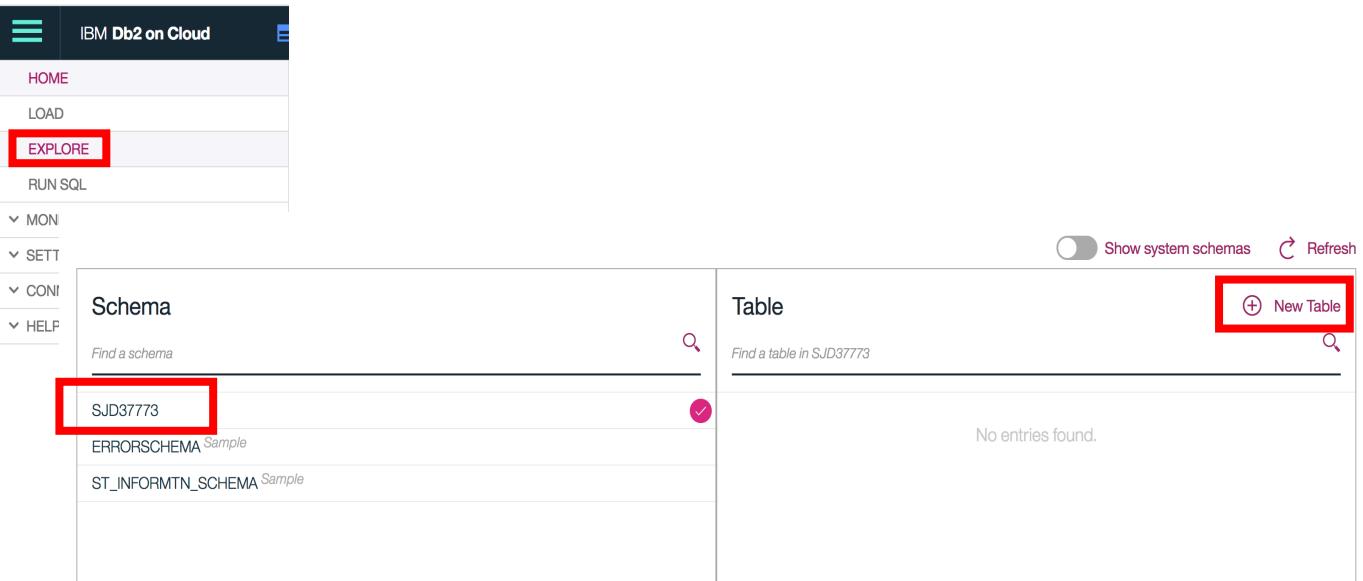
- Select **Manage** from the menu on the left-hand side to return to the main page. Click **Open Console** to launch the Db2 on Cloud service



The screenshot shows the IBM Cloud main dashboard with the 'Manage' menu item highlighted by a red box. Below it, the Db2-r7 service card is shown with its details and an 'Open Console' button, which is also highlighted by a red box.

- From the menu, select **Explore**. Select the schema called **XXXXYYYY**, (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

Create a new Table

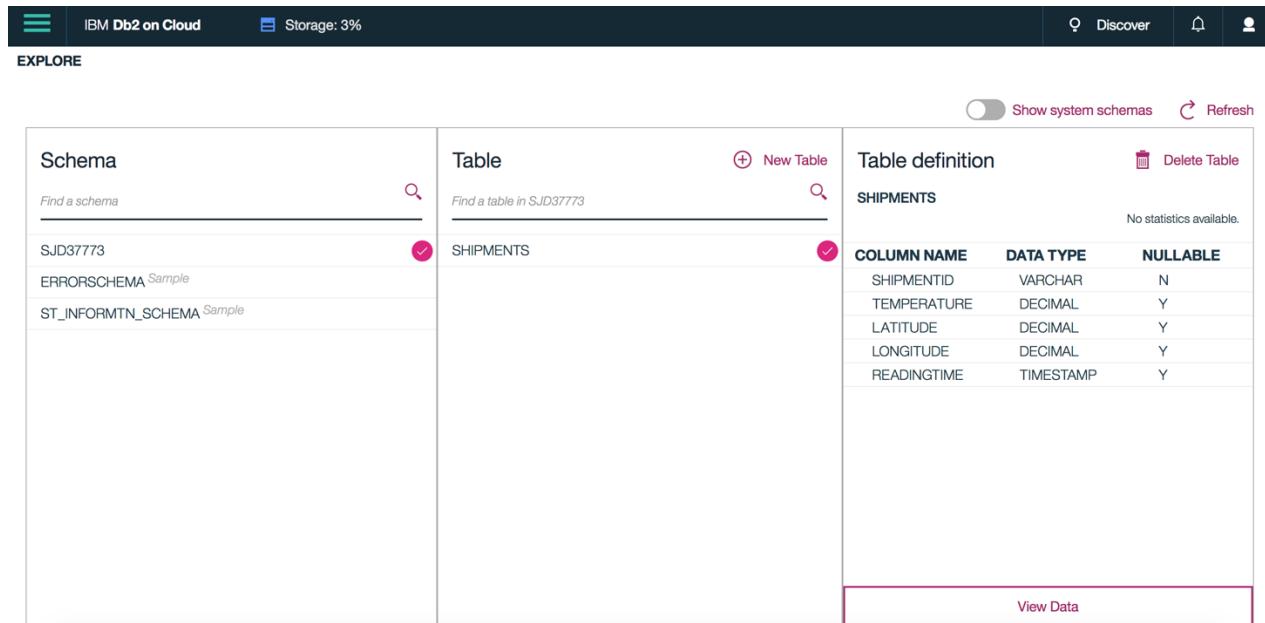
SHIPMENTS

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

Define one column per line by entering name and data type.

Create

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



The screenshot shows the IBM Db2 on Cloud interface. At the top, there's a navigation bar with 'IBM Db2 on Cloud' and 'Storage: 3%'. On the right of the bar are 'Discover', 'Refresh', and user profile icons. Below the bar is a section titled 'EXPLORE' with a 'Show system schemas' toggle and a 'Refresh' button. The main area is divided into three sections: 'Schema' (listing 'SJD37773' and 'ERRORSCHEMA Sample'), 'Table' (listing 'SHIPMENTS'), and 'Table definition'. The 'Table definition' section shows the schema for 'SHIPMENTS' with the following columns:

COLUMN NAME	DATA TYPE	NULLABLE
SHIPMENTID	VARCHAR	N
TEMPERATURE	DECIMAL	Y
LATITUDE	DECIMAL	Y
LONGITUDE	DECIMAL	Y
READINGTIME	TIMESTAMP	Y

At the bottom of the 'Table definition' section is a 'View Data' button.

End of Lesson 3



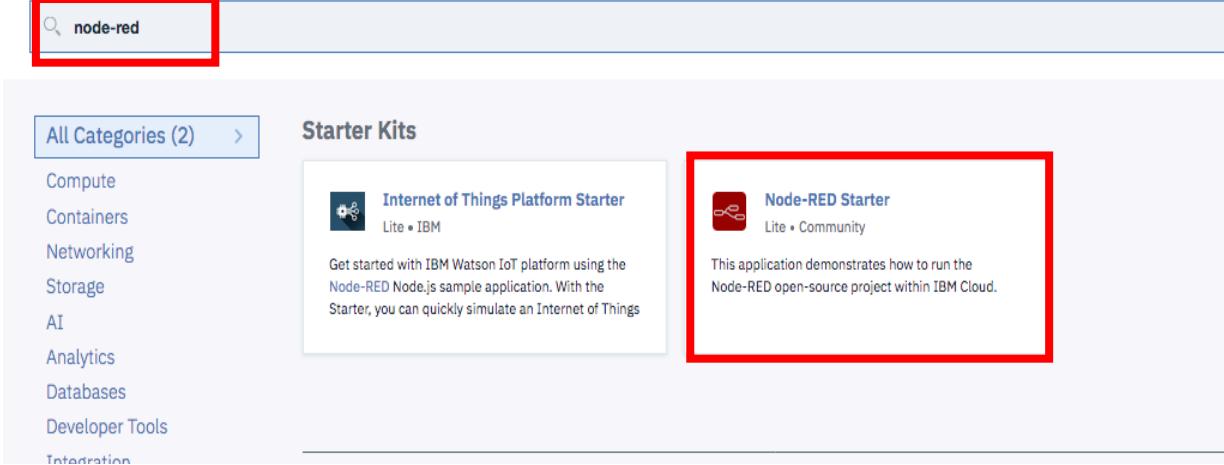
Lesson 4: Configuring Node-RED

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: <ul style="list-style-type: none">• 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
<p><u>1. Provision Node-RED Service</u></p> <p>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.</p> <ol style="list-style-type: none"> Go to your IBM Cloud account catalog at https://console.bluemix.net/catalog/ Search for node-red and select the Node-RED Starter service. <hr/>  <p>c. Give the app a unique name and select Create.</p>

Action

[View all](#)

 [Create a Cloud Foundry App](#)

Lite • Community

Node-RED Starter

This application demonstrates how to run the Node-RED open-source project within IBM Cloud.

[View Docs](#)

VERSION	0.8.1	App name:	<input type="text" value="IoTBlockchainLab-LRM"/>
TYPE	Boilerplate	Host name:	<input type="text" value="IoTBlockchainLab-LRM"/>
LOCATION	Sydney, Germany, United Kingdom, US East, US South	Domain:	<input type="text" value="mybluemix.net"/>
		Choose a region/location to deploy in:	<input type="text" value="US South"/>
		Choose an organization:	<input type="text" value="wolfpackdemo@yahoo.com"/>
		Choose a space:	<input type="text" value="dev"/>

Selected Plan:

SDK for Node.js™	Cloudant
<input type="text" value="Lite"/>	<input type="text" value="Lite"/>


SDK for Node.js™

Cloudant

Need Help? [Contact IBM Cloud Support](#) [Estimate Monthly Cost](#) [Cost Calculator](#)

[Create](#)

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

☰ **IBM Cloud**

e. Your cloud foundry application will now appear on your dashboard. [Click on the application name](#).

Action

Dashboard

RESOURCE GROUP CLOUD FOUNDRY ORG CLOUD FOUNDRY SPACE LOCATION CATEGORY Filter by resource name...

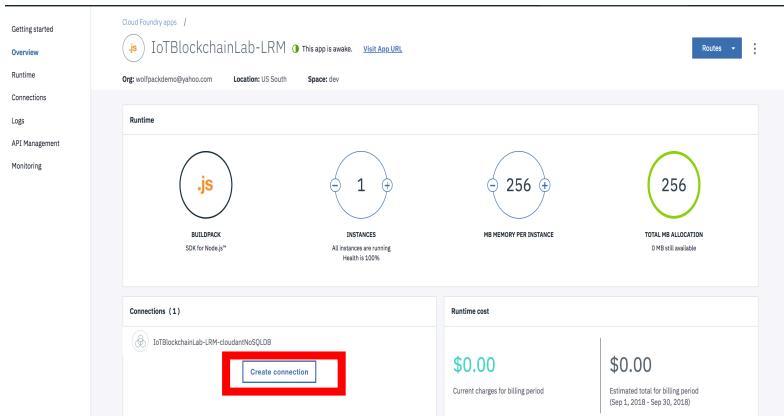
Cloud Foundry Applications

Name	Region	CF Org	CF Space	Memory (MB)	Status
IoTBlockchainLab-LRM	US South	wolfpackdemo@yahoo...	dev	256	Running

Cloud Foundry Services

Name	Region	CF Org	CF Space

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**



Connect Existing Compatible Service

All Resources

SERVICES	RESOURCE GROUP	PLAN	SERVICE OFFERING
Internet of Things Platform-42	--	Lite	Internet of Things Platform

A red box highlights the 'Internet of Things Platform-42' row, and a blue box highlights the 'Connect' button.

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

Action
<p>Restage app</p> <p>Your 'IoTBlockchainLab-LRM' app must be restaged to use the new 'Internet of Things Platform-42' service. Restaging makes this service available for use. Do you want to restage it now?</p> <div style="text-align: right; margin-top: 20px;"> Cancel Restage </div>

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

Cloud Foundry apps /



IoTBlockchainLab-LRM ● This app is awake. [Visit App URL](#)

Org: wolfpackdemo@yahoo.com **Location:** US South **Space:** dev

2. Import Node-RED Flow

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

Cloud Foundry apps /



IoTBlockchainLab-LRM ● This app is awake. [Visit App URL](#)

Org: wolfpackdemo@yahoo.com **Location:** US South **Space:** dev

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

Welcome to your Internet of Things Platform (IoTP) boilerplate application on IBM Bluemix

This sample application uses Node RED to help demonstrate the wonderful things you can do with your IoTP service. We know you're eager to check it out, but first there is something important to do:

- Secure your Node-RED editor



Previous

Next

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

Applying your settings and starting Node-RED



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

Action

Node-RED on IBM Bluemix

Node-RED
Flow-based programming for the Internet of Things

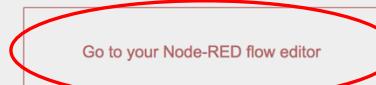
Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

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

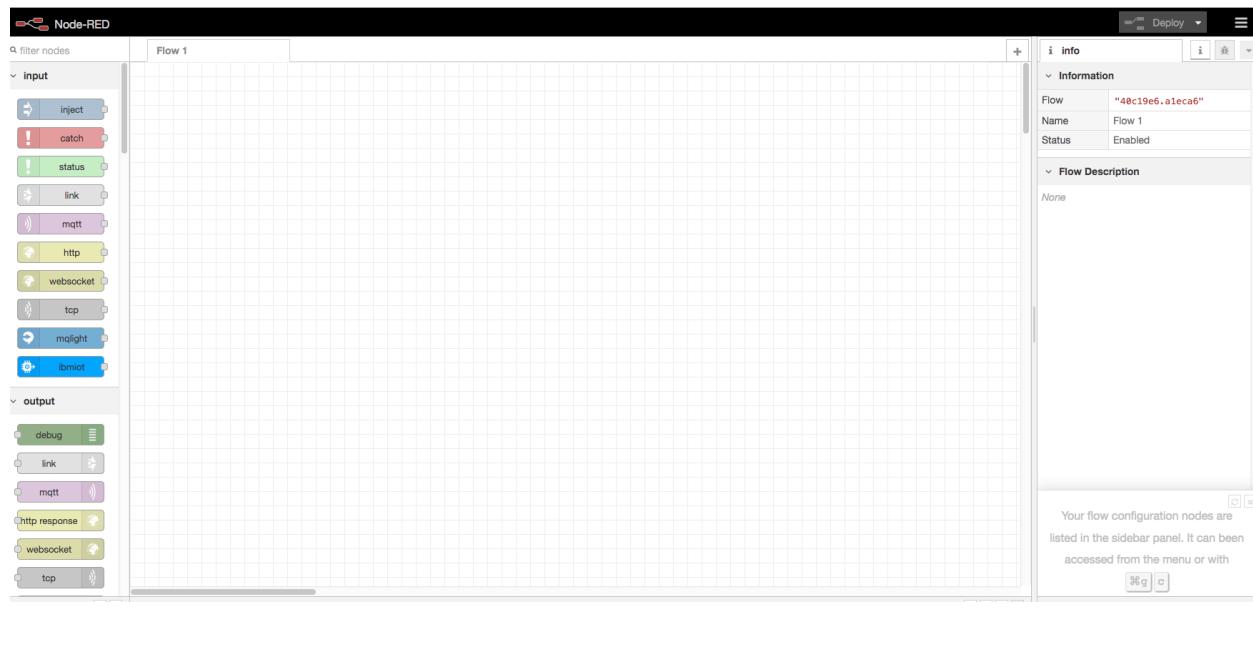
More information about Node-RED, including documentation, can be found at nodered.org.

[Go to your Node-RED flow editor](#)

[Learn how to customise Node-RED](#)

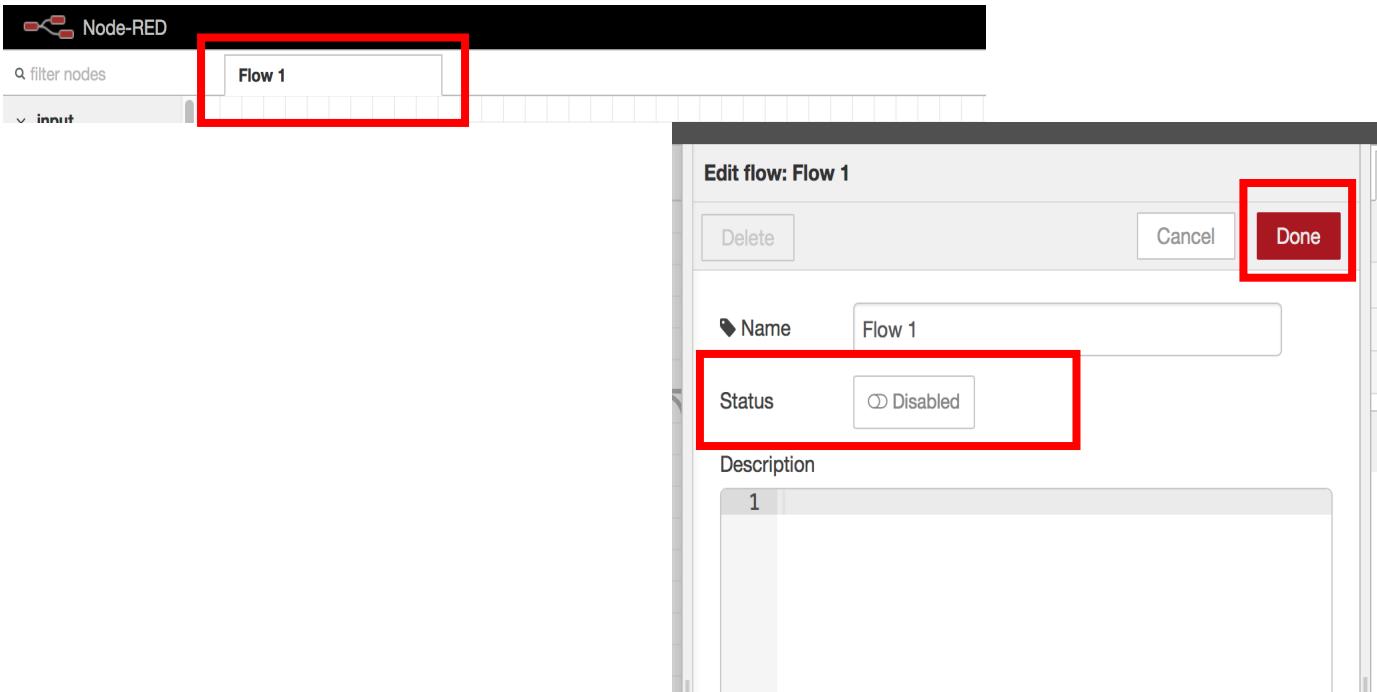


- The Node-RED flow editor will appear. The left panel lists all of the nodes available to build a Node-RED flow. The right panel displays information about the Flow.



Action

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

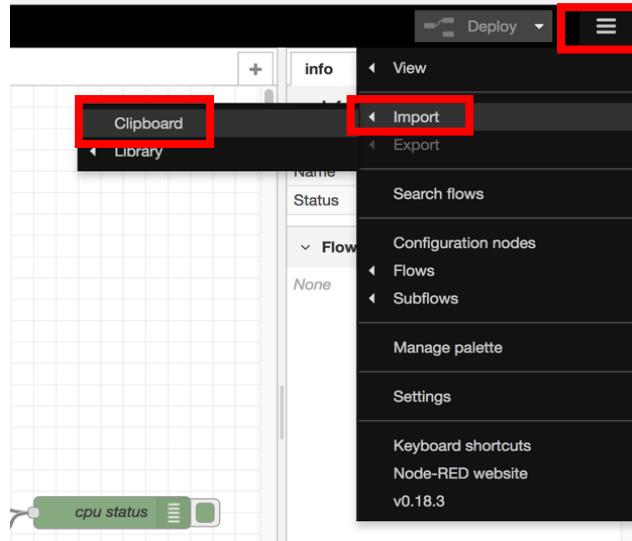


- g. The **Flow 1** tab should now have a **disabled icon** beside it

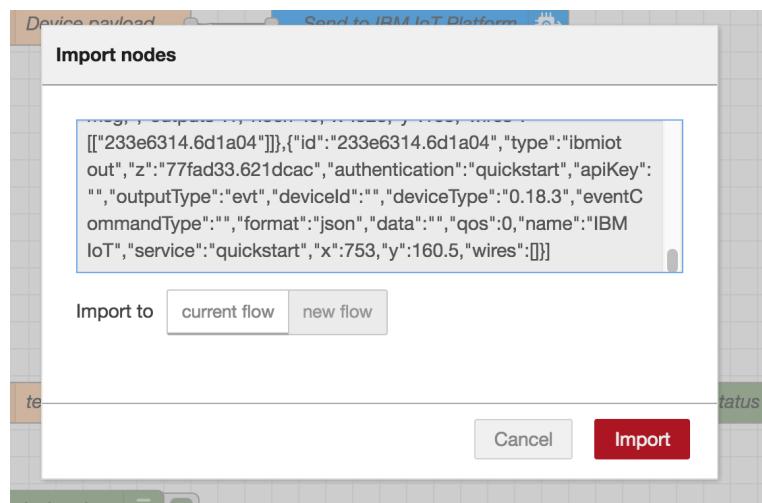


- h. A starter flow, **IoT_Blockchain_NodeREDFlow.json**, has been provided to you for the lab. Open the file and copy its contents.
i. Select the **3-bar menu tile** in the upper right corner, select **Import -> Clipboard**

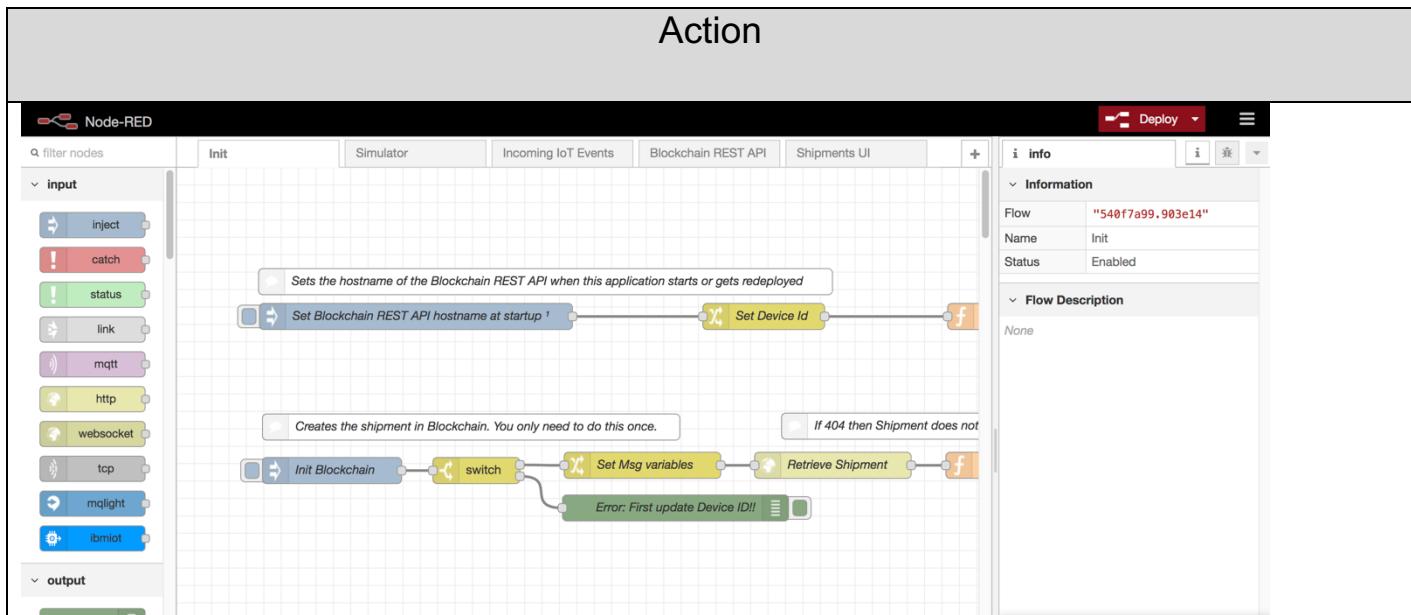
Action



- 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.



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

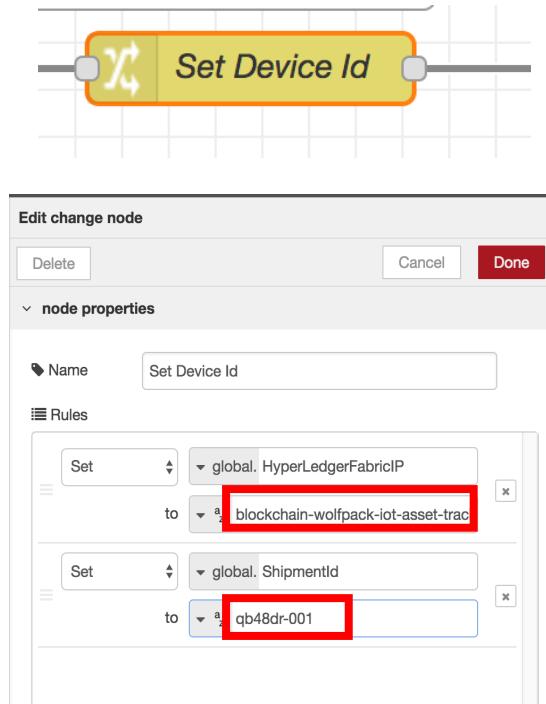
This flow renders a simple user interface that first retrieves the shipment from blockchain and renders the list of the shipment's temperature readings. If you see readings on this tab then events are being captured from Watson IoT Platform and are being successfully sent to blockchain.

3. Configure Node-RED Flows

- 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

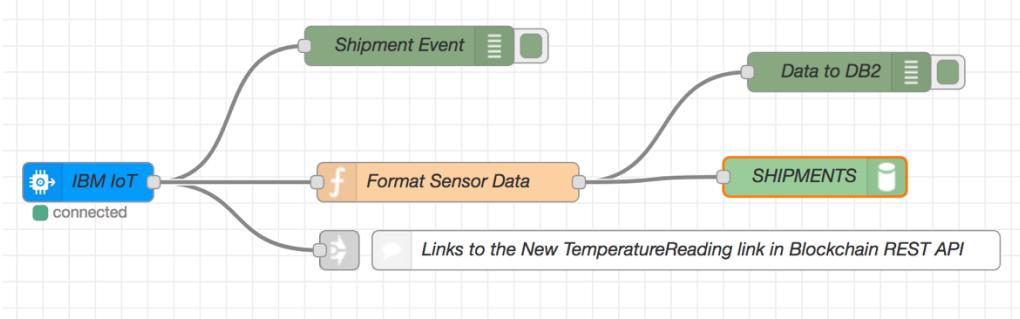
Action

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.

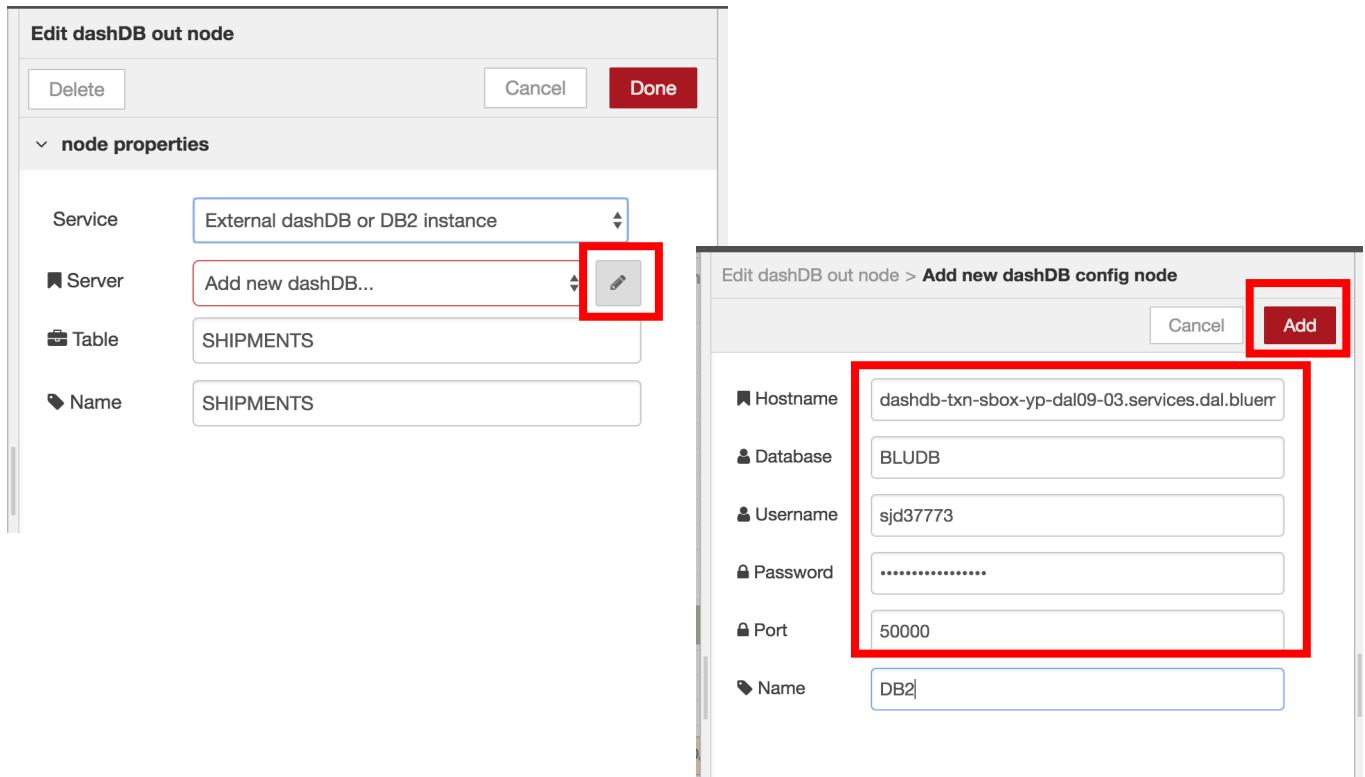


c. Double click the **Shipments** node.

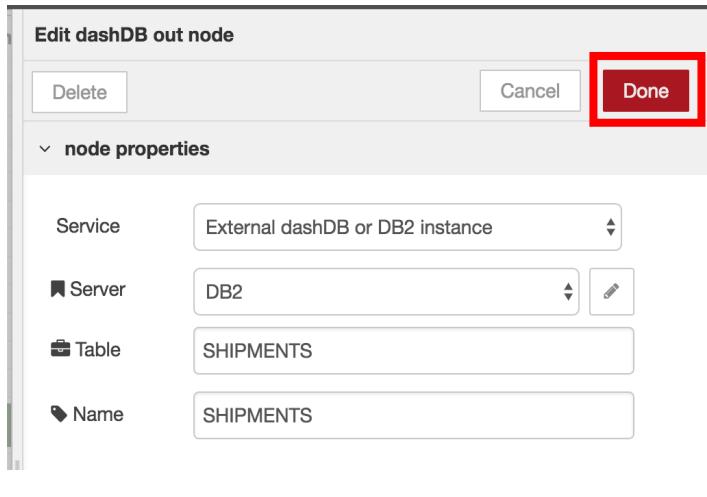


Action

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

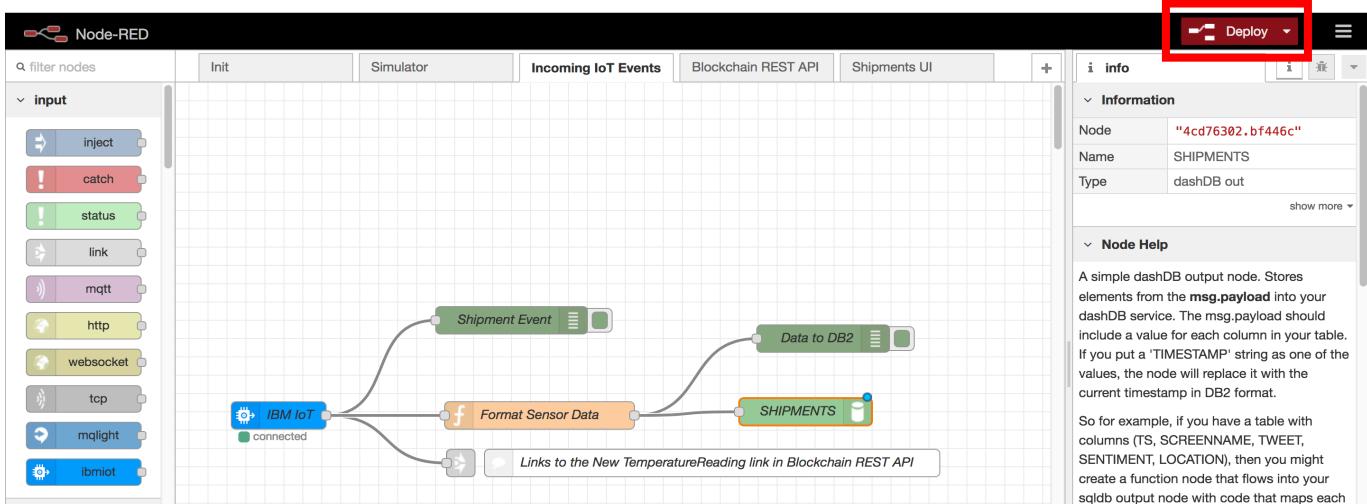


- e. Click **Done**



Action

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



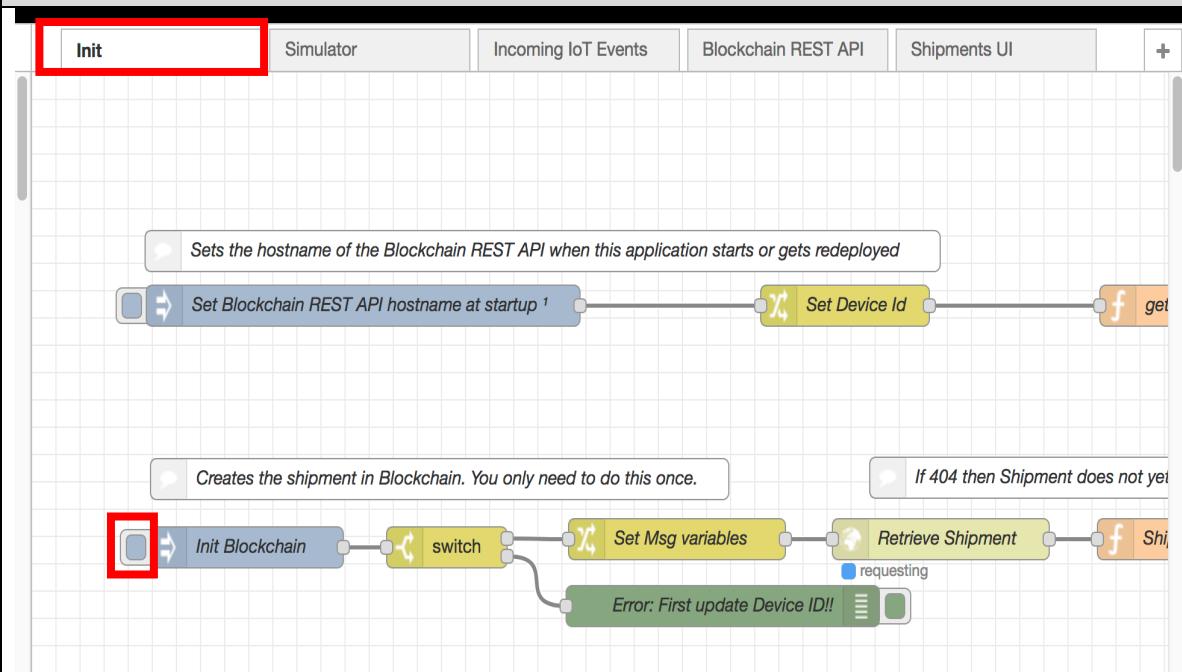
Congratulations! Your node-RED Flow is configured.

4.Run Node-RED Flow

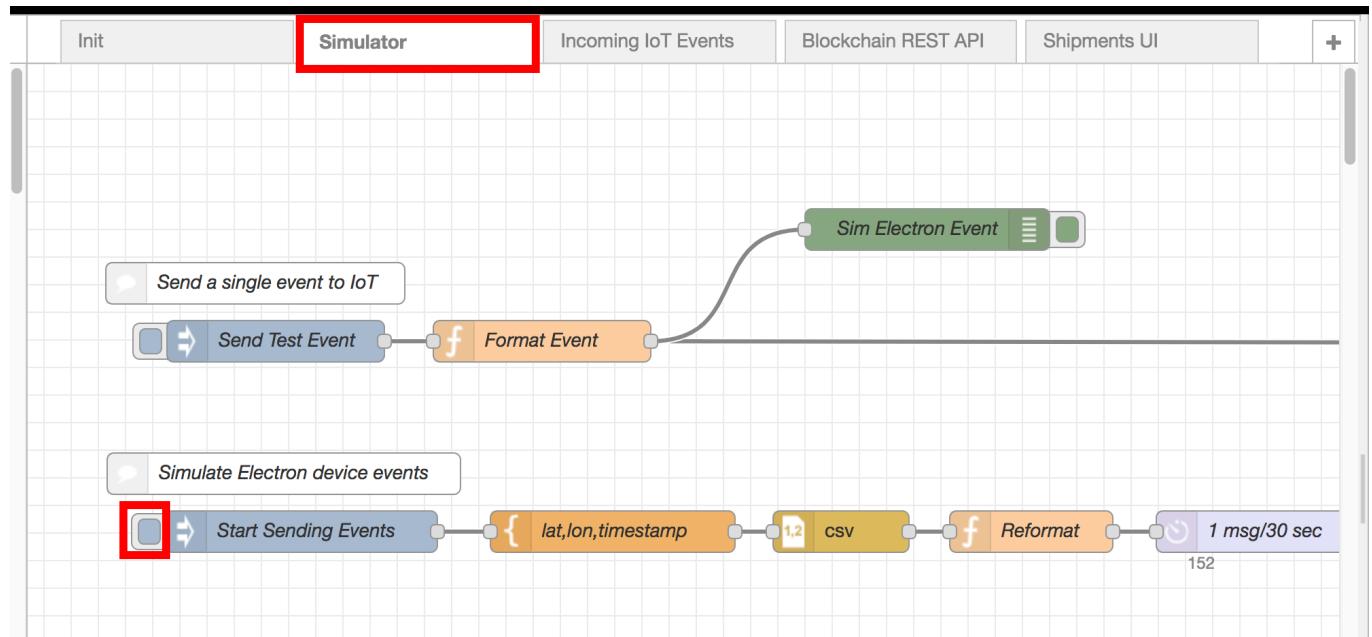
Now that our flow is configured, we need to run the flow.

- 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.

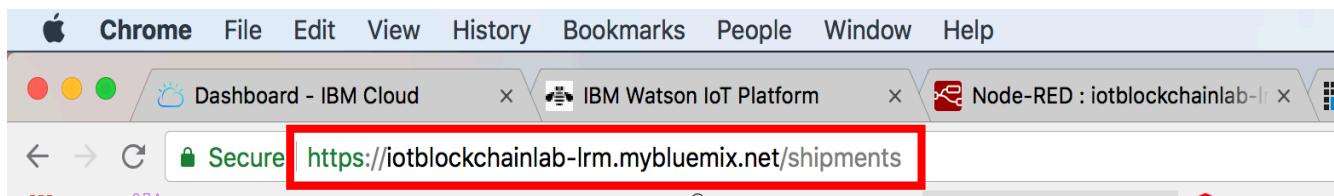


4. View Shipment Data in Blockchain

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.

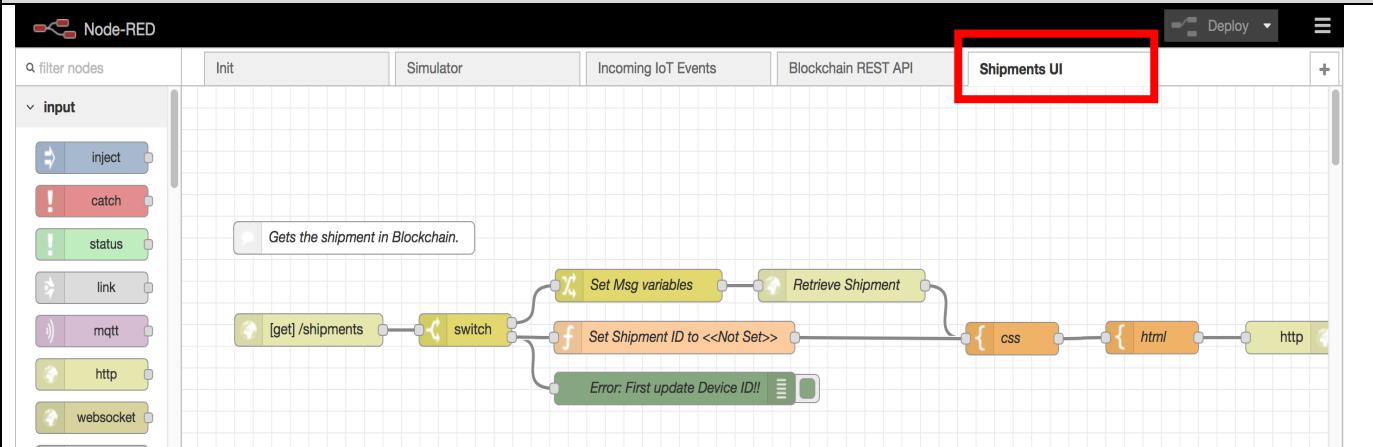


- b. The webpage will display the temperature readings in the Blockchain for your unique Shipment ID. The Node-RED flow to create this webpage can be found under the **Shipment UI** tab.

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

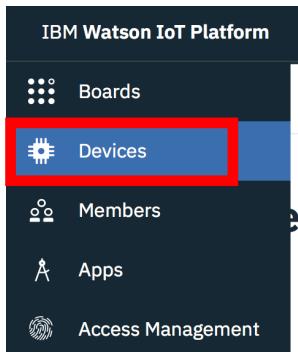
Action



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.

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



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

Action

Browse Devices

All Devices
Diagnose
Type the Device ID to search for


This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Device ID	Device Type	Class ID	Date Added	Descriptive Location	  
1 result					:
 qb48dr-001	TemperatureSensor	Device	Sep 7, 2018 6:16 AM		...

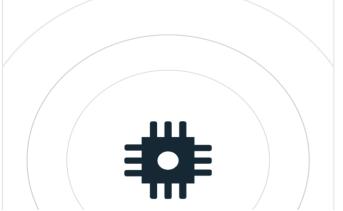
c. Click the **Recent Events** tab. You should see the real-time temperature sensor events coming in from your Node-RED flow.

Device ID	Device Type	Class ID	Date Added	Descriptive Location	  
1 result					:
 qb48dr-001	TemperatureSensor	Device	Sep 7, 2018 6:16 AM		...

Identity
Device Information
Recent Events
State
Logs
 

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

Event	Value	Format	Last Received
AssetTrackerTemp...	{"AssetID": "qb48dr-001", "timestamp": "2017...}	json	a few seconds ago
AssetTrackerTemp...	{"AssetID": "qb48dr-001", "timestamp": "2017...}	json	a few seconds ago

6. View data in Db2 on Cloud Service

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

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

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51

Action

IBM Db2 on Cloud Storage: 5% EXPLORE

Show system schemas Refresh

Schema	Table	Table definition																		
SJD37773 ERRORSCHEMA Sample ST_INFORMTN_SCHEMA Sample	SHIPMENTS	SHIPMENTS No statistics available. <table border="1"> <thead> <tr> <th>COLUMN NAME</th> <th>DATA TYPE</th> <th>NULLABLE</th> </tr> </thead> <tbody> <tr> <td>SHIPMENTID</td> <td>VARCHAR</td> <td>N</td> </tr> <tr> <td>TEMPERATURE</td> <td>DECIMAL</td> <td>Y</td> </tr> <tr> <td>LATITUDE</td> <td>DECIMAL</td> <td>Y</td> </tr> <tr> <td>LONGITUDE</td> <td>DECIMAL</td> <td>Y</td> </tr> <tr> <td>READINGTIME</td> <td>TIMESTAMP</td> <td>Y</td> </tr> </tbody> </table>	COLUMN NAME	DATA TYPE	NULLABLE	SHIPMENTID	VARCHAR	N	TEMPERATURE	DECIMAL	Y	LATITUDE	DECIMAL	Y	LONGITUDE	DECIMAL	Y	READINGTIME	TIMESTAMP	Y
COLUMN NAME	DATA TYPE	NULLABLE																		
SHIPMENTID	VARCHAR	N																		
TEMPERATURE	DECIMAL	Y																		
LATITUDE	DECIMAL	Y																		
LONGITUDE	DECIMAL	Y																		
READINGTIME	TIMESTAMP	Y																		

View Data

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

IBM Db2 on Cloud Storage: 5% EXPLORE

Back SJD37773.SHIPMENTS Delete Table Export to CSV

	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

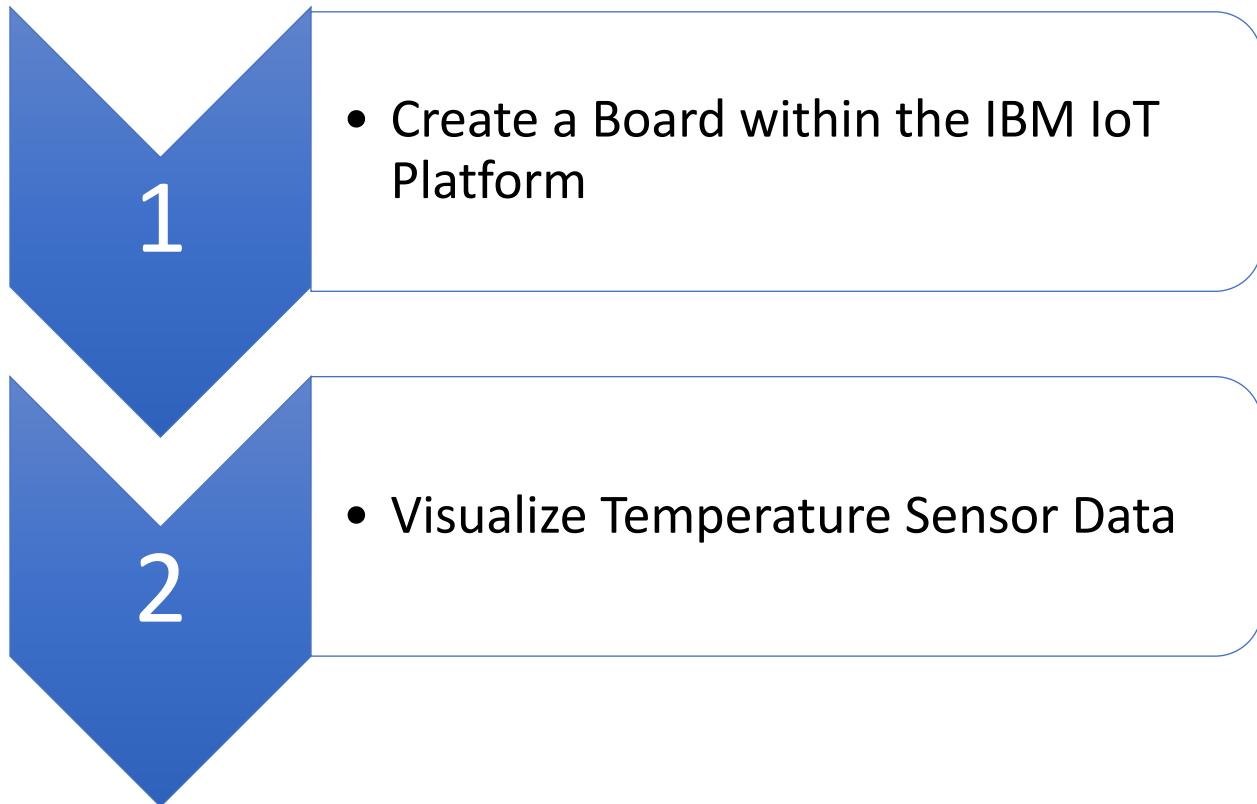
Congratulations! You have successfully provisioned and configured the node-RED flow. Your flow is simulating temperature sensor data and sending the information to the IoT Platform and Blockchain Service.

End of Lesson 4

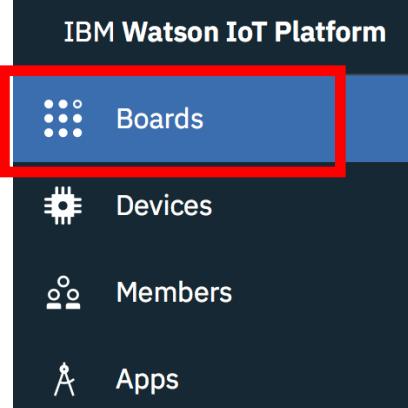
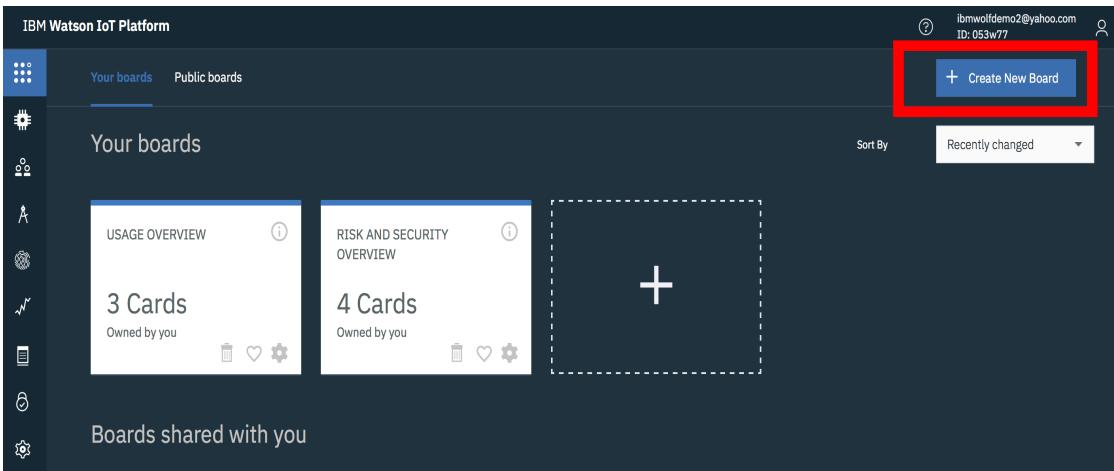
Lesson 5: Visualizing Data in the IoT Platform

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: <ul style="list-style-type: none">• Create a Board within the IBM IoT Platform• Visualize temperature sensor data

Lesson 5: Workflow Overview



Lesson 5: Instructions

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

Action

Information

Members

Board settings

Provide a name and description for your new board.

Board name
IoTBlockchain Lab

Description
board for lab

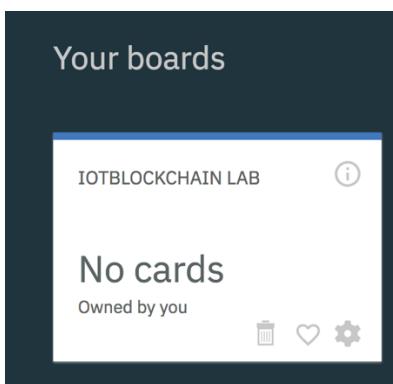
Make this board my landing page.
 Favorite (this also adds this board to your navbar)

Next

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

Action					
<p>Information</p> <p>Members</p>	✖ <h3>Board settings</h3> <p>Adding viewers allows them to see your dashboard.</p> <hr/> <p>Owner wolfpackdemo@yahoo.com (YOU)</p> <hr/> <p>Members</p> <hr/> <p><input type="radio"/> Share as read-only with everyone?</p> <p>+ add user ID</p> <hr/> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Name</th> <th>Editor?</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <div style="text-align: right; margin-top: 10px;"> Back Submit </div>	Name	Editor?		
Name	Editor?				

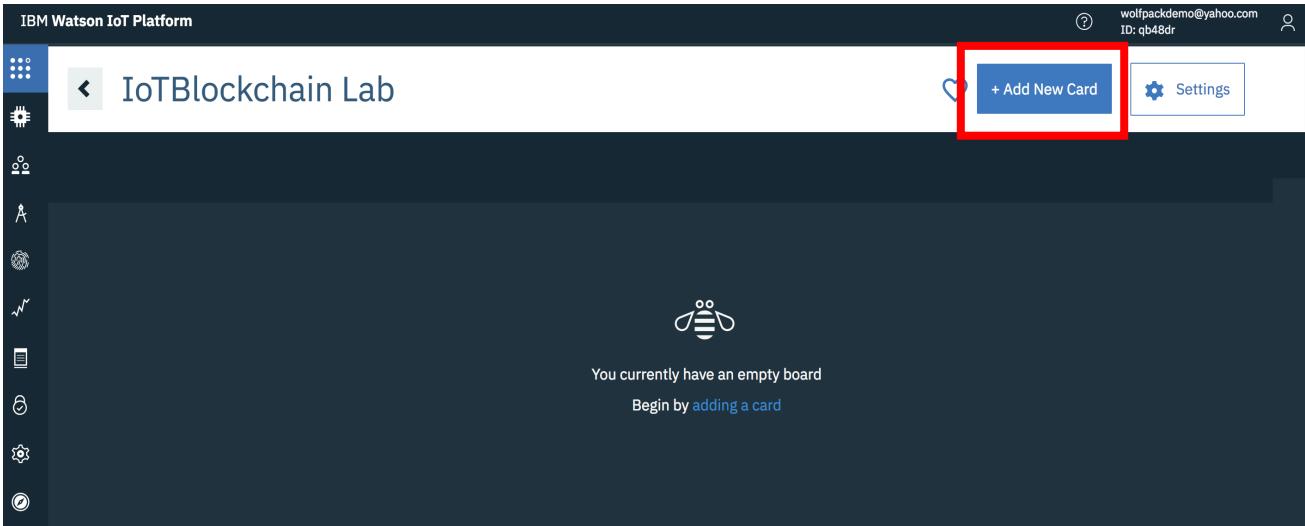
e. Your board should now appear under **Your Boards**.



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



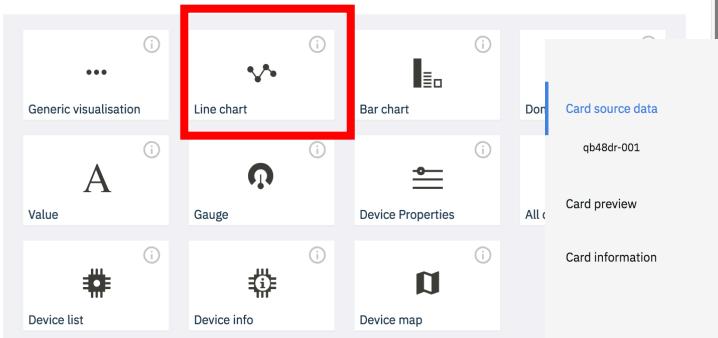
- b. Select **Line Chart** as the card type and select **your device ID**. Click **Next**

Action

Create Card

Card type
Select card type

Devices



Create Line chart Card

Specify the data source for the card

Devices

Search for card data sources using the filter:

Device ID	Device Type
qb48dr-001	TemperatureSensor

Next

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								
<p style="text-align: right; margin-bottom: 0;">×</p> <h3>Create Line chart Card</h3> <p>Connect data set</p> <hr/> <p>AssetTrackerTemperatureEvent</p> <hr/> <p>Property</p> <p>Temperature.Celsius</p> <hr/> <p>Name</p> <p>Temperature.Celsius</p> <hr/> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Type</td> <td style="width: 50%;">Unit</td> </tr> <tr> <td>Number</td> <td>°C</td> </tr> <tr> <td>Min</td> <td>Max</td> </tr> <tr> <td>0</td> <td>100</td> </tr> </table> <p>+ Connect new data set</p> <div style="display: flex; justify-content: space-around; width: 100%;"> Back Next </div>	Type	Unit	Number	°C	Min	Max	0	100
Type	Unit							
Number	°C							
Min	Max							
0	100							
<p>d. Select L as the chart size. Click Next</p> <div style="border: 1px solid #ccc; padding: 10px; border-radius: 10px;"> <p style="text-align: right; margin-bottom: 0;">×</p> <h3>Create Line chart Card</h3> <p>Select the card size and specify additional information</p> <hr/> <div style="display: flex; align-items: center;"> Settings S M L XL </div> <div style="border: 1px solid #ccc; padding: 10px; border-radius: 10px; margin-top: 10px;"> <p>Line chart</p>  <p>5 minutes</p> <p>Temperature.Celsius</p> </div> <div style="display: flex; justify-content: space-around; width: 100%; margin-top: 10px;"> Back Next </div> </div> <p>e. Name the chart Temperature and click Submit.</p>								

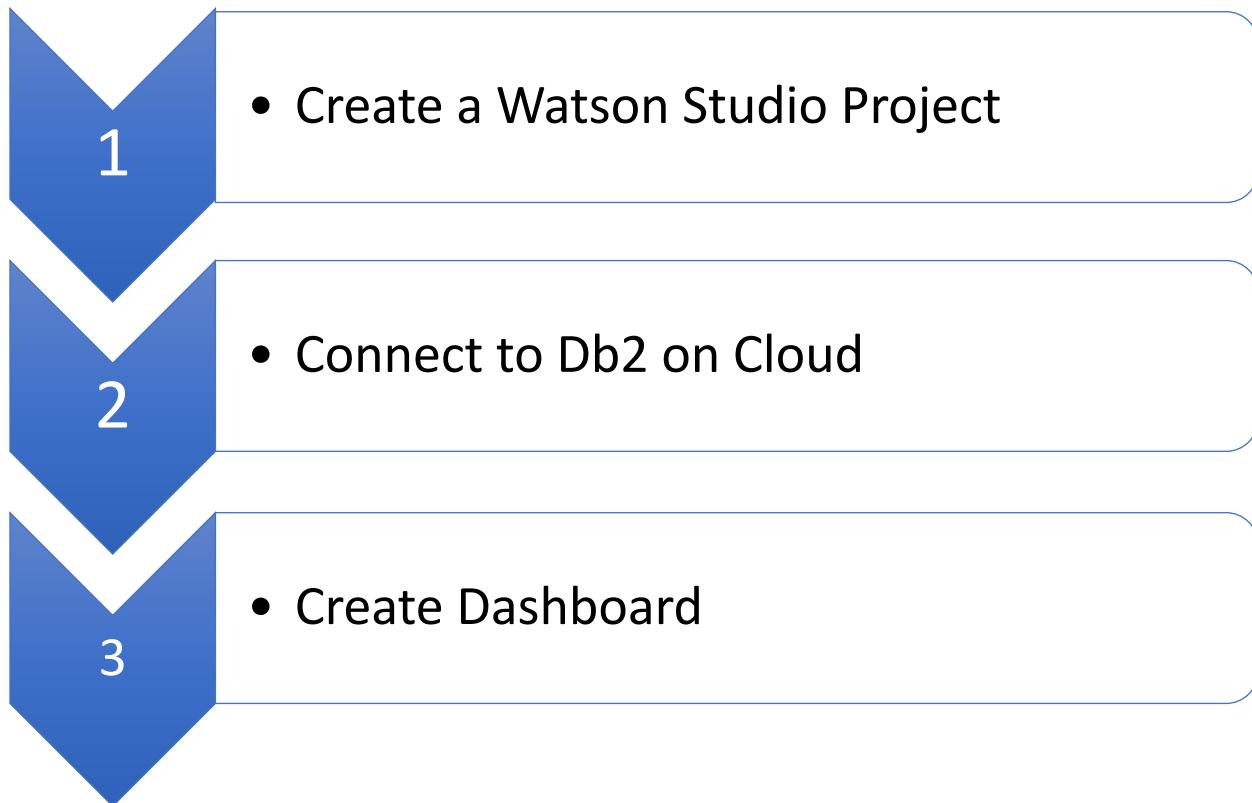
Action
<p style="text-align: right; margin-bottom: 0;">×</p> <p>Create Line chart Card</p> <p>Enter title and description of the card</p> <hr/> <p>Title Temperature</p> <p>Color scheme</p> <div style="display: flex; justify-content: space-around; align-items: center;"> █ █ █ █ █ </div> <p>A line chart to display time series information with historic and live data</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> Back Submit </div>
<p>f. You should now see your temperature values displayed in Real-time.</p> <hr/> <p>< IoTBlockchain Lab</p> <div style="border: 1px solid #ccc; padding: 10px; background-color: black; color: white; text-align: center;">  </div>
<p>Congratulations! You have successfully visualized your sensor data.</p> <p>End of Lesson 5</p>



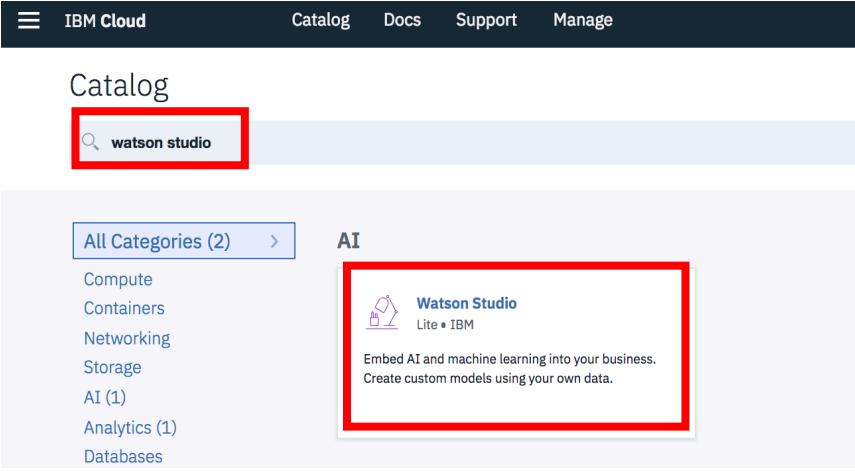
Lesson 6: Visualize Historical IoT Data in IBM Cognos Dashboard Embedded

Purpose:	This lesson will visualize the historical IoT data using IBM Cognos Dashboard Embedded within Watson Studio
Tasks:	<p>Tasks you will complete in this lab exercise include:</p> <ul style="list-style-type: none">• Create a Watson Studio Project• Connect to Db2 on Cloud• Create Dashboard

Lesson 6: Workflow Overview



Lesson 6: Instructions

Action
<p>1. Create Watson Studio Project</p> <p>a. Go to the Catalog within your IBM Cloud account https://console.bluemix.net/catalog</p> <p>b. Within the catalog, search for Watson Studio and select the Watson Studio service.</p>  <p>c. Rename the Watson Studio service name or keep the default name. Click Create to provision the service. Resource group should be default.</p>

Action

[View all](#)



Watson Studio

Lite • IBM

Watson Studio democratizes machine learning and deep learning to accelerate infusion of AI in your business to drive innovation. Watson Studio provides a suite of tools and a collaborative environment for data scientists, developers and domain experts.

Service name:

Watson Studio-lb

Choose a region/location to deploy in:

US South

Select a resource group: [i](#)

default

[View Docs](#) [Terms](#)

AUTHOR IBM
PUBLISHED 07/12/2018
TYPE Service

Features

- [Use what you know, learn what you don't](#)

Start from a tutorial, start from a sample, or start from scratch. Tap into the power of the best of open source (RStudio, Jupyter Notebooks) and Watson services for flexible model creation. Use Python, R, or Scala. Stop downloading and configuring analysis environments and start getting insights.

- [Be a founding member](#)

- [Power on demand](#)

Enterprise-scale features on demand. From data exploration and preparation, to enterprise-scale performance. Manage your data, your analytical assets, and your projects in a secured cloud environment.

- [Collaborate for better outcomes](#)

Need Help?
[Contact IBM Cloud Sales](#)

Estimate Monthly Cost
[Cost Calculator](#)

[Create](#)

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



Watson Studio

Welcome to Watson Studio. Let's get started!

[Get Started](#)

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

Action

IBM Watson
Projects
Tools
Catalog
Community
Services
Docs
Support
Manage
Get started



Welcome Watson!

Watson Studio and Watson Knowledge Catalog are both part of IBM Watson.

Get started with key tasks



New project



Catalog and find data



Refine data



New notebook



Deep learning



New Modeler flow

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

Get started with key tasks



New project



Catalog and find data

New project

Select a project tile to get the right tools and services for your work. You can add additional tools later as the needs of your project grow. All projects include data storage.

Basic Want to start simple? Upload data in your project and add tools later.	Data Science Analyze data to discover insights and share your findings with others.	Visual Recognition Tag and classify visual content using the Watson Visual Recognition service.
Deep Learning Build neural networks and deploy deep learning models.	Modeler Build modeler flows to train SPSS and Spark models or design deep neural networks.	Business Analytics Create visual dashboards from your data to gain insights faster.
Data Engineering Combine, cleanse, analyze, and shape data using Data Refinery.	Complete <input checked="" type="checkbox"/> Want to explore every corner of Watson Studio? See every tool in one project.	

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

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Action
New project
Define project details
Name IoT Blockchain
86
Description hands on IoT and Blockchain Lab
2969
Choose project options
<input type="checkbox"/> Restrict who can be a collaborator <small>(i)</small>
Project will include integration with Cloud Object Storage for storing project assets.
Define Storage:
<ul style="list-style-type: none">Under Define Storage, click AddChoose “Lite” plan then “Create”Verify your options then “Confirm”Refresh. Your storage instance should now appear. Note: The name will be different than below.
Storage
cloud-object-storage-kc
h. Click Create to create your project.

Action

New project

Define project details

Name
IoT Blockchain

Description
hands on IoT and Blockchain Lab

Choose project options

Restrict who can be a collaborator (i)

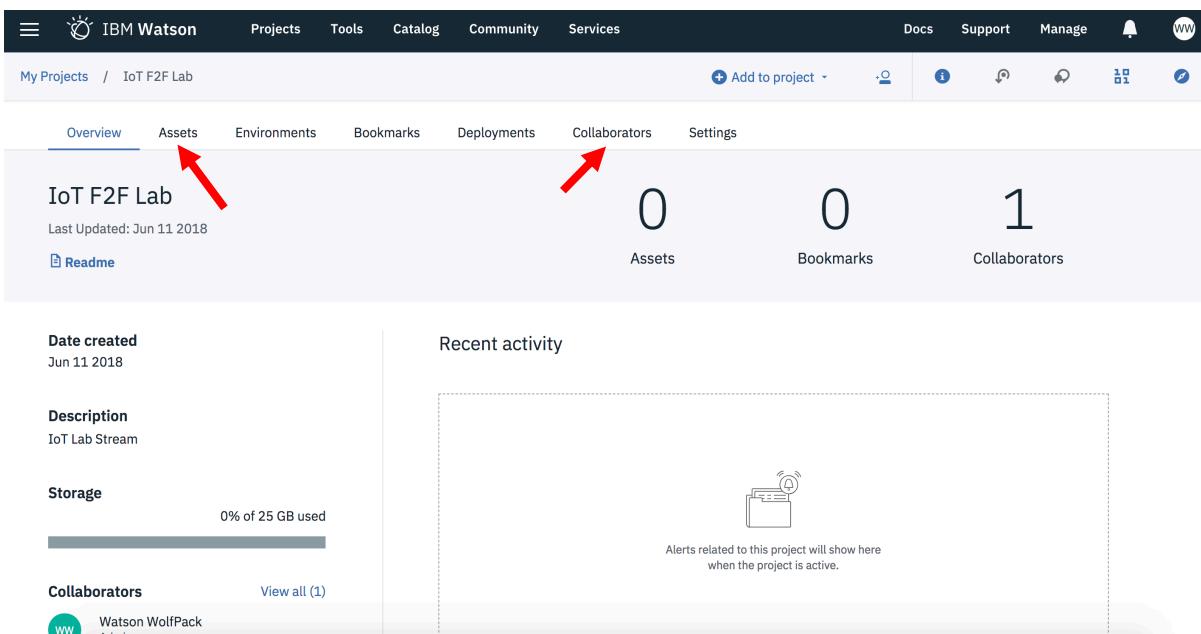
Project will include integration with Cloud Object Storage for storing project assets.

Storage

cloud-object-storage-kc

Cancel
Create

- 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.



The screenshot shows the IBM Watson Project Overview page for the 'IoT F2F Lab' project. The top navigation bar includes links for IBM Watson, Projects, Tools, Catalog, Community, Services, Docs, Support, Manage, and a user icon. The main header shows 'My Projects / IoT F2F Lab'. Below the header, there are several tabs: Overview (underlined), Assets, Environments, Bookmarks, Deployments, Collaborators, and Settings. Red arrows point to the 'Assets' tab and the 'Collaborators' tab. The 'Overview' section displays the project name, last updated date (Jun 11 2018), and a 'Readme' link. It also shows metrics: 0 Assets, 0 Bookmarks, and 1 Collaborator. The 'Recent activity' section is currently empty. On the left side, there are sections for 'Date created' (Jun 11 2018), 'Description' (IoT Lab Stream), 'Storage' (0% of 25 GB used), and 'Collaborators' (Watson WolfPack). A 'View all (1)' link is also present.

2. Connect to Db2 on Cloud

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

Action



Add to project

- Connected assets
- Notebook
- Connection**
- Data asset
- Model
- Experiment BETA

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

IBM services

BigInsights HDFS	Cloud Object Storage	Cloud Object Storage (infrastructure)	Cloudant
Compose for MySQL	Compose for PostgreSQL	Db2	Db2 for i
Db2 for z/OS	Db2 Hosted	Db2 on Cloud	Db2 Warehouse
Informix	Object Storage OpenStack Swift	Object Storage OpenStack Swift (infrastructure)	PureData for Analytics
Watson Analytics			

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

New connection (IoT DB2 on Cloud - Db2 on Cloud)

Connection overview	Connection details
Name IoT DB2 on Cloud	Database * <input type="text" value="BLUDB"/> Password * <input type="password"/> Secure Gateway <input type="checkbox"/>
Description IBM Db2 fully-managed cloud SQL database	Hostname or IP Address * <input type="text" value="dashdb-txn-sbox-yp-dal09-03.services.dal.bluemix.net"/> Username * <input type="text" value="sjd37773"/>

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

Action

IBM Watson Studio Projects Tools Community Services Manage Support Docs

My Projects / IoT Blockchain [+ Add to project](#) [Log in](#)

Overview **Assets** Environments Bookmarks Deployments Access Control Settings

What assets are you looking for?

▼ Data assets

0 asset selected.

<input type="checkbox"/> NAME	TYPE	SERVICE	CREATED BY	LAST MODIFIED	ACTIONS
IoT DB2 on Cloud	Connection	Project	Josh Jones	14 Sep 2018, 2:44:47 pm	⋮

3. Create Dashboard

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

Overview **Assets** Environments Bookmarks Deployments Collaborators Settings

What assets are you looking for?

▼ Data assets

[+ New data asset](#)

NAME	TYPE	SERVICE	CREATED BY	LAST MODIFIED	ACTIONS
You currently have no data assets					

▼ Visual recognition models

[+ New visual recognition model](#)

NAME	MODEL ID	SERVICE INSTANCE	LAST MODIFIED	ACTIONS
You currently have no visual recognition models				

▼ Notebooks

[+ New notebook](#)

NAME	SHARED	SCHEDULED	STATUS	LANGUAGE	LAST EDITOR	LAST MODIFIED	ACTIONS
You currently have no notebooks							

▼ Dashboards

[+ New dashboard](#)

NAME	SHARED	LAST EDITOR	LAST MODIFIED	ACTIONS
You currently have no dashboards				

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**

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Action											
<p>IBM Cognos Dashboard Embedded</p> <p>Existing New</p> <p>IBM Cognos Dashboard Embedded</p> <p>The IBM Cognos Dashboard Embedded lets you, the developer, painlessly add end-to-end data visualization capabilities to your application so your users can easily drag and drop to quickly find valuable insight and create visualizations on their own.</p> <p>Features</p> <table border="0"> <tr> <td>Live connection to underlying data Interactive dashboards produce visualizations directly from your data in real-time.</td> <td>Smart creation of visualizations Smart data analysis and visualization capabilities help users discover underlying patterns and meanings in their data.</td> <td>Interactive exploration of data Data can be explored using filtering and navigation paths.</td> </tr> </table> <p>Pricing Plan: Monthly Process shown above reflect the: United States</p> <table border="1"> <thead> <tr> <th>PLAN</th> <th>FEATURES</th> <th>PRICING</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="radio"/> Lite</td> <td>50 sessions/month</td> <td>Free</td> </tr> </tbody> </table> <p>A session is a 60 minute period where end-users can perform unlimited interactions with an embedded dashboard.</p> <p>After 50 sessions</p> <table border="0"> <tr> <td><input type="radio"/> Pay as you go</td> <td>Live connection to underlying data Embed dashboards where users are without losing interactivity Smart Creation of Visualizations Interactive exploration of data through filtering and navigation paths</td> </tr> </table>	Live connection to underlying data Interactive dashboards produce visualizations directly from your data in real-time.	Smart creation of visualizations Smart data analysis and visualization capabilities help users discover underlying patterns and meanings in their data.	Interactive exploration of data Data can be explored using filtering and navigation paths.	PLAN	FEATURES	PRICING	<input checked="" type="radio"/> Lite	50 sessions/month	Free	<input type="radio"/> Pay as you go	Live connection to underlying data Embed dashboards where users are without losing interactivity Smart Creation of Visualizations Interactive exploration of data through filtering and navigation paths
Live connection to underlying data Interactive dashboards produce visualizations directly from your data in real-time.	Smart creation of visualizations Smart data analysis and visualization capabilities help users discover underlying patterns and meanings in their data.	Interactive exploration of data Data can be explored using filtering and navigation paths.									
PLAN	FEATURES	PRICING									
<input checked="" type="radio"/> Lite	50 sessions/month	Free									
<input type="radio"/> Pay as you go	Live connection to underlying data Embed dashboards where users are without losing interactivity Smart Creation of Visualizations Interactive exploration of data through filtering and navigation paths										

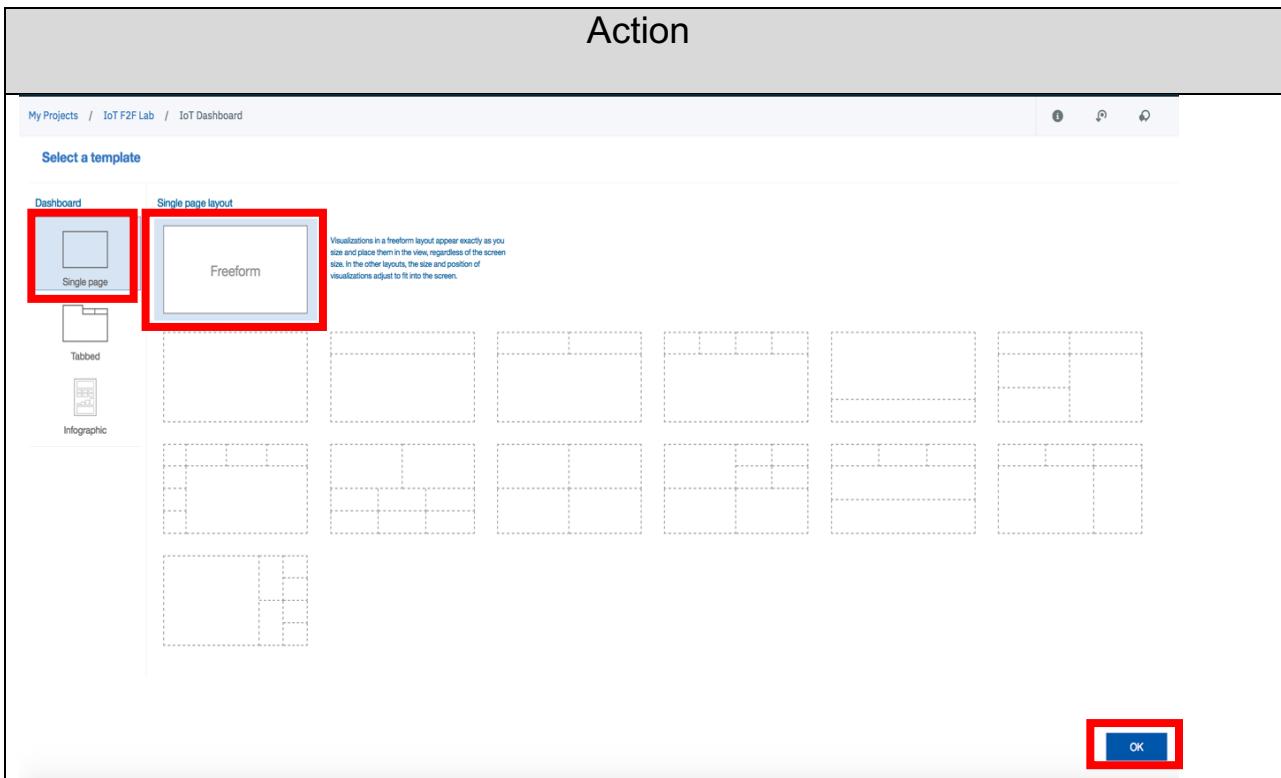
- c. Keep the default Resource group and service name values and select **Confirm**

<p>Confirm Creation</p> <p>Plan Lite</p> <p>Resource group default</p> <p>Service name dynamic-dashboard-embedded-jr</p> <p>Cancel Confirm</p>

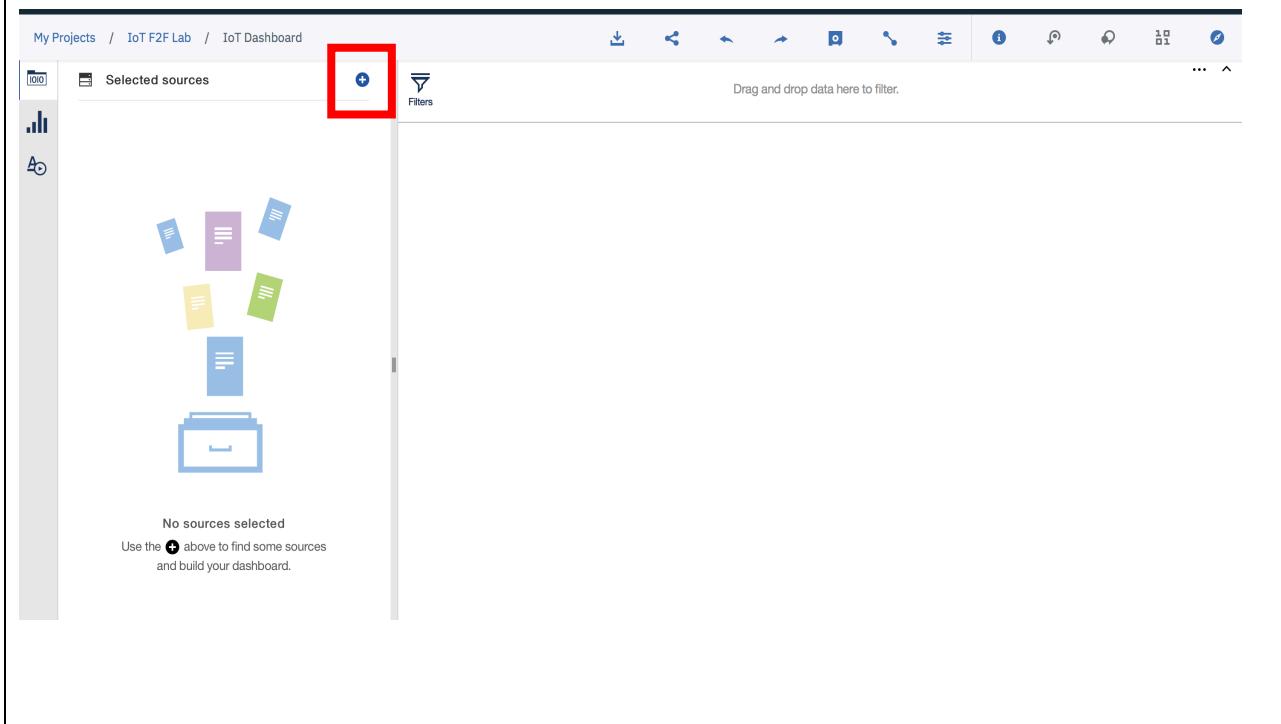
d. Click **Reload** and the newly provisioned **Cognos Dashboard Embedded Service** will appear.

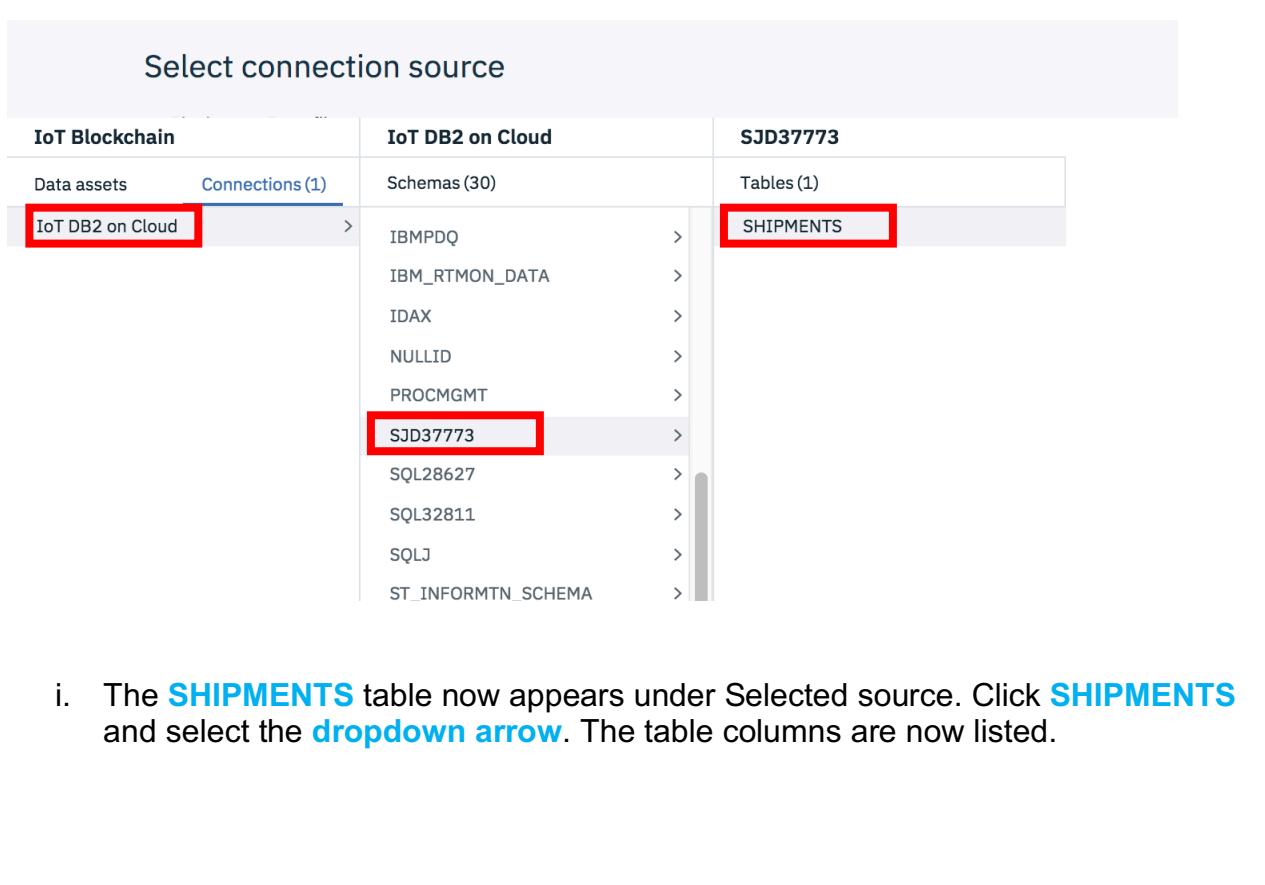
Action
<p>Associate a Cognos Dashboard Embedded service instance No Cognos Dashboard Embedded service instances associated with your project.</p> <p>Associate a Cognos Dashboard Embedded service instance with your project on the project settings page, then click the reload button below to refresh the instances available for association with your new model builder instance.</p> <p>Reload </p> <p>Cognos Dashboard Embedded Service cognos-dashboard-embedded-cw </p> <p>e. Name the dashboard IoT Temperature and click Save</p> <p>New Dashboard</p> <p>Blank From file</p> <p>Name* IoT Temperature 84</p> <p>Description Type your description here 300</p> <p>Cognos Dashboard Embedded Service cognos-dashboard-embedded-bo </p> <p>f. On the Select a Template page, select Single Page dashboard and Freeform. Click OK</p>

Action



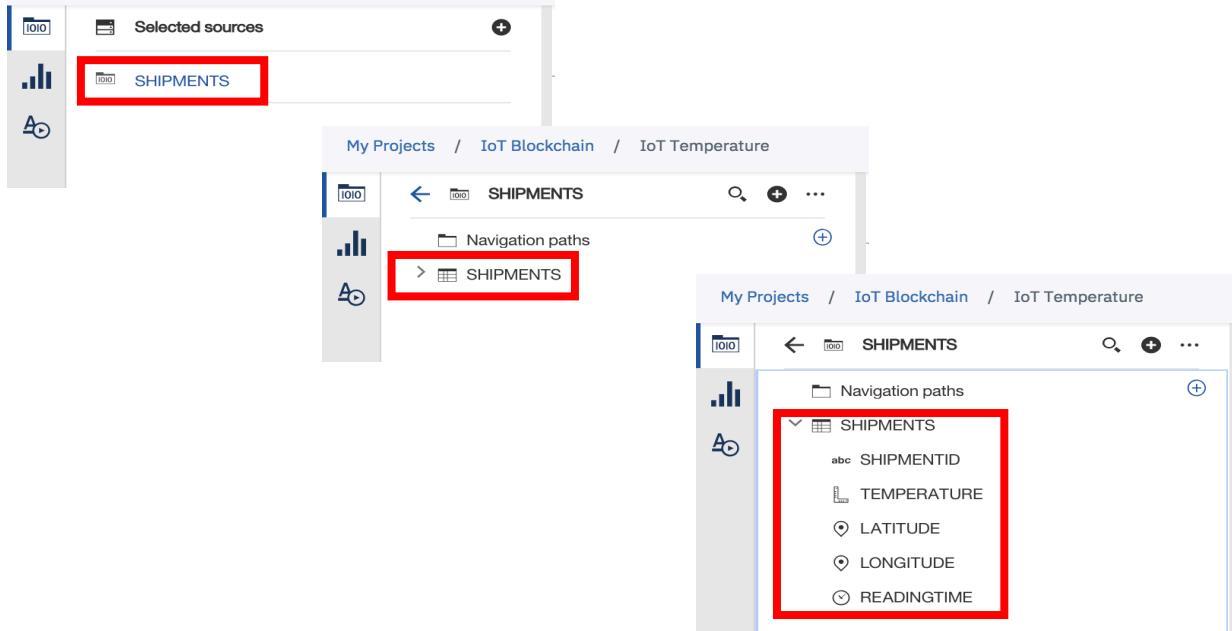
- g. You will be taken to the homepage. Click the **+ button** beside **Selected Sources** to add data and build your dashboard.



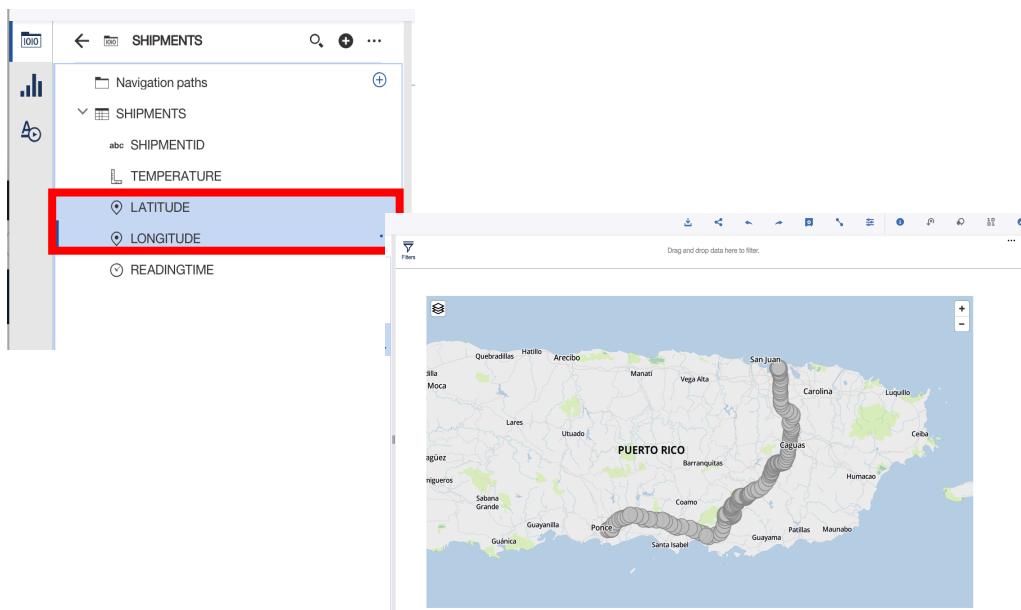
Action
<p>h. Click the Connections tab. Select IoT Db2 on Cloud as the database, SJDXXXX as the Schemas and IOTLAB as the Table. Click Select</p>  <p>The screenshot shows the 'Select connection source' interface. On the left, under 'IoT Blockchain', the 'Connections (1)' tab is selected, and 'IoT DB2 on Cloud' is highlighted with a red box. In the center, under 'IoT DB2 on Cloud', the 'Schemas (30)' section lists various schemas, with 'SJD37773' highlighted with a red box. On the right, under 'SJD37773', the 'Tables (1)' section shows a single table named 'SHIPMENTS', which is also highlighted with a red box.</p>
<p>i. The SHIPMENTS table now appears under Selected source. Click SHIPMENTS and select the dropdown arrow. The table columns are now listed.</p>

Action

My Projects / IoT Blockchain / IoT Temperature

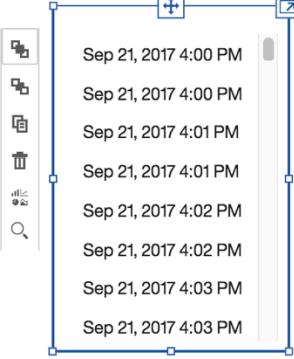


- j. Select both **Latitude** and **Longitude** columns and drag and drop them onto the dashboard. A visualization of the truck's path should appear.



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

Action

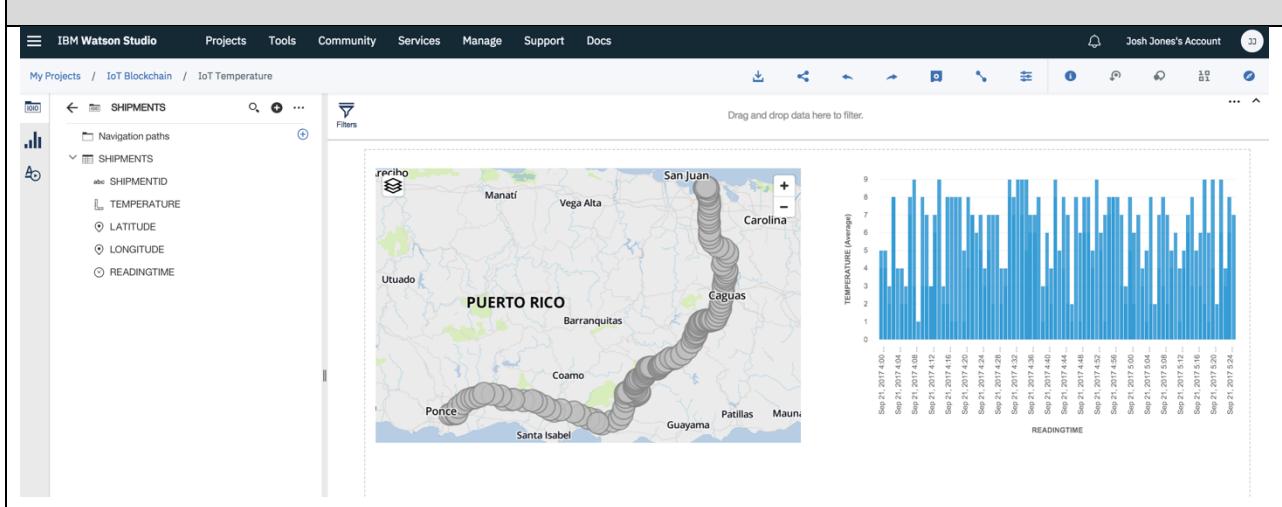


I. Next select **Temperature** and drag and drop it **on top of the Reading Time visualization**. The following visualization should appear which shows the temperature at each reading time.



m. Your final dashboard should look like the following.

Action



The screenshot shows the IBM Watson Studio interface. The top navigation bar includes 'IBM Watson Studio' and 'Josh Jones's Account'. The left sidebar shows 'My Projects / IoT Blockchain / IoT Temperature' and a tree view of data fields: SHIPMENTS (Navigation paths, SHIPMENTID, TEMPERATURE, LATITUDE, LONGITUDE, READINGTIME). The main area features a map of Puerto Rico with several grey lines representing shipment paths. A legend indicates path thickness based on reading time. To the right is a bar chart titled 'TEMPERATURE (Average)' with the x-axis labeled 'READINGTIME' and the y-axis ranging from 0 to 9. The chart shows a series of blue bars representing temperature values at different reading times.

End of Lesson 6
End of Hands-on Workshop!