

Step 1:

Create a free IBM cloud account.

Step 2; Adding the required resources:

We will require the following resources:

1. Internet of Things Platform (Create resource → Internet of Things)
2. Streaming Analytics (Create resource → Analytics)
3. Watson Studio (Create resource → AI)
4. Cloud object storage (Create resource → Storage)
5. Machine learning (Create resource → AI)

Internet of Things Platform

Setting up your phone as sensor:

Source: <https://developer.ibm.com/tutorials/iot-mobile-phone-iot-device-bluemix-apps-trs/>

1. "On your phone, go to Settings > Security. Under Device Administration, enable Unknown sources. Now you can install .apk files from outside of Google Play.
2. Open the browser on your phone, and enter this URL: <https://github.com/deveops/iot-starter-for-android/releases>
3. Search for the iotstarter-v2.1.0.apk link, and click the link to download the .apk file.
4. Click the downloaded file, and confirm that you want to install the app.

The IoT Starter app is now installed on your Android device."

Setting up Internet of Things Platform:

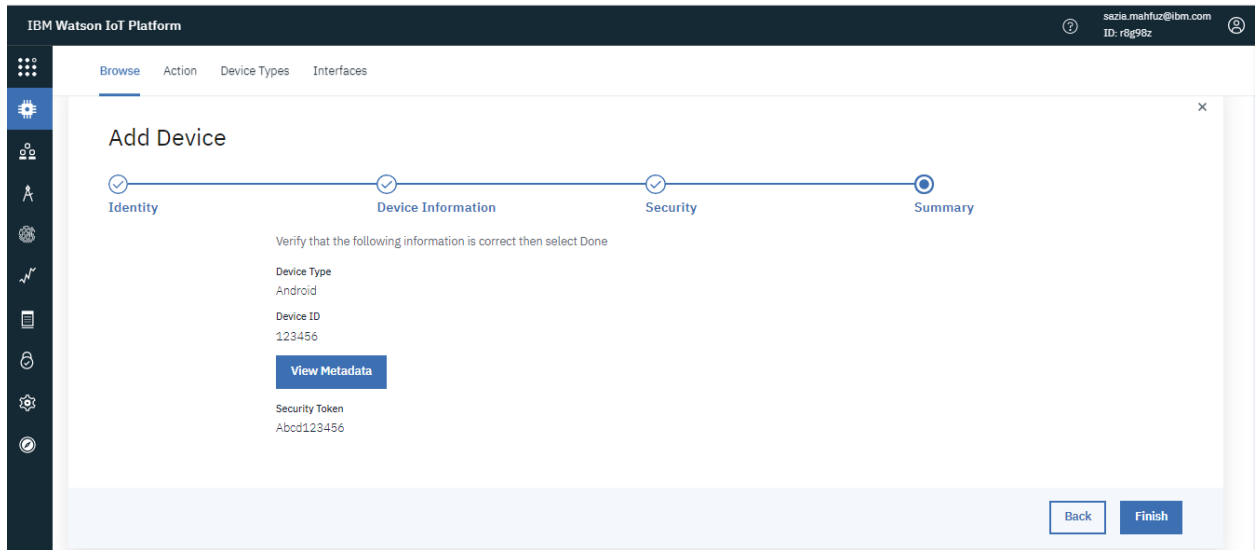
1. When registering your device, create a new device type called Android (case sensitive). The device ID can be any number you provide, but you have to use this device ID to connect to your phone.

The screenshot shows the 'Add Device' wizard in the IBM Watson IoT Platform. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. The left sidebar contains various icons. The main content area is titled 'Add Device' and features a progress bar with four steps: Identity (selected), Device Information, Security, and Summary. Below the progress bar, a message states: 'Select a device type for the device that you are adding and give the device a unique ID.' There are two input fields: 'Device Type' with the value 'Android' and 'Device ID' with the value '123456'. At the bottom right, there are 'Cancel' and 'Next' buttons.

2. Click on “Next”, then you can skip the metadata information by clicking “Next”.
3. Provide the authentication token and remember it as the same token will be required for connecting to the IoT starter on your phone.

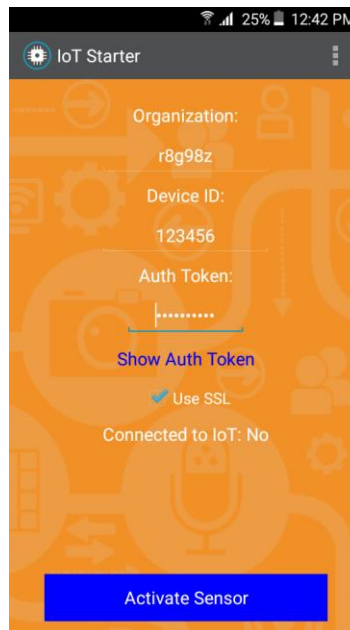
The screenshot shows the 'Add Device' wizard in the IBM Watson IoT Platform, specifically the 'Security' step. The progress bar shows 'Identity' and 'Device Information' as completed steps, 'Security' as the current step, and 'Summary' as the next step. The main content area is titled 'There are two options for selecting a device authentication token.' It presents two options: 'Auto-generated authentication token (default)' and 'Self-provided authentication token'. The 'Auto-generated authentication token' option is selected. Below this, a text box displays the generated token 'Abcd123456'. A warning message states: 'Make a note of the generated token. Lost authentication tokens cannot be recovered. Tokens are encrypted before being stored.' At the bottom right, there are 'Back' and 'Next' buttons.

4. After clicking on “Next”, the subsequent page will let you verify the information. Click on “Finish” to complete the process.



Connecting your phone with IBM Watson IoT platform on IBM cloud:

1. Start the IoT start on your phone, skip the tutorial, then you will be directed to enter the device information.
2. On the screen, enter the same organization ID that is shown on the top left corner of your Internet of Things Platform interface. Enter the device ID and authentication token that you have entered when you added a device in your Internet of Things Platform on IBM cloud.



3. Click on Activate Sensor. Then your phone can pass sensor information to IBM Cloud through the Internet of Things Platform. The device will show connected as below:

IBM Watson IoT Platform

saizla.mahfuz@ibm.com
ID: r8g98z

Browse Action Device Types Interfaces

Add Device

Browse Devices

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.

Search by Device ID

Device Simulator

	Device ID	Status	Device Type	Class ID	Date Added
>	1234	Disconnected	Android	Device	Oct 25, 2019 4:49 PM
>	123456	Connected	Android	Device	Oct 28, 2019 12:35 PM

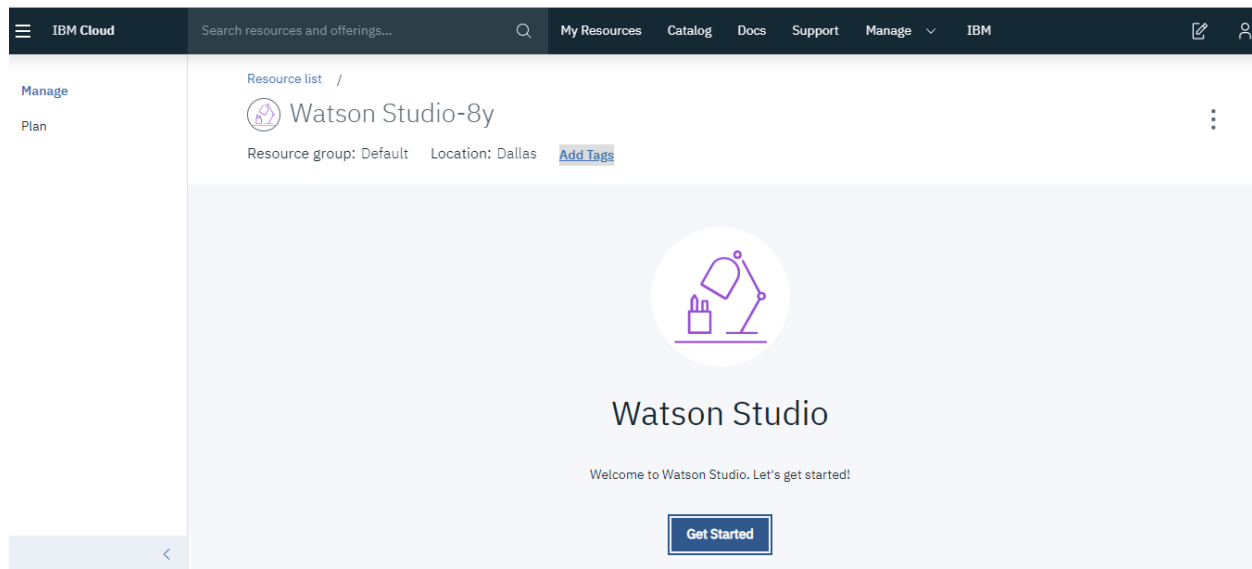
Items per page 50 | 1-2 of 2 items

1 of 1 pages

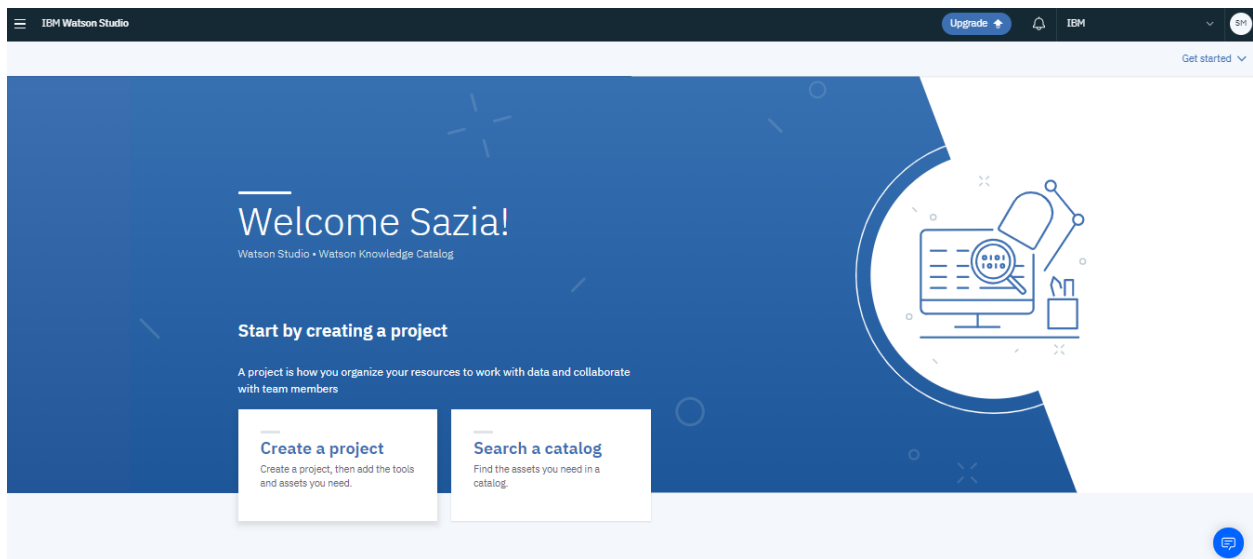
Watson Studio

Create a project:

1. When you click on Watson Studio after adding the resource from your IBM cloud dashboard, click on “Get Started”.



2. Click on “Create a Project”.

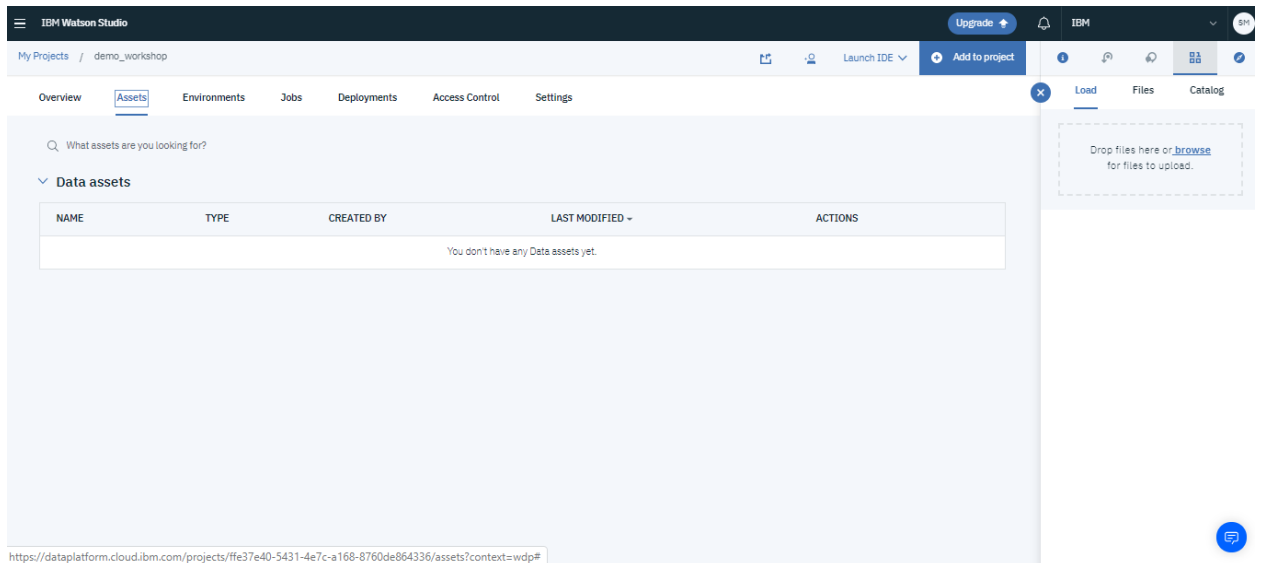


3. Click on “Create an empty project”. Then provide a name for the project name. On the right side, your cloud object storage will be shown associated with the project.

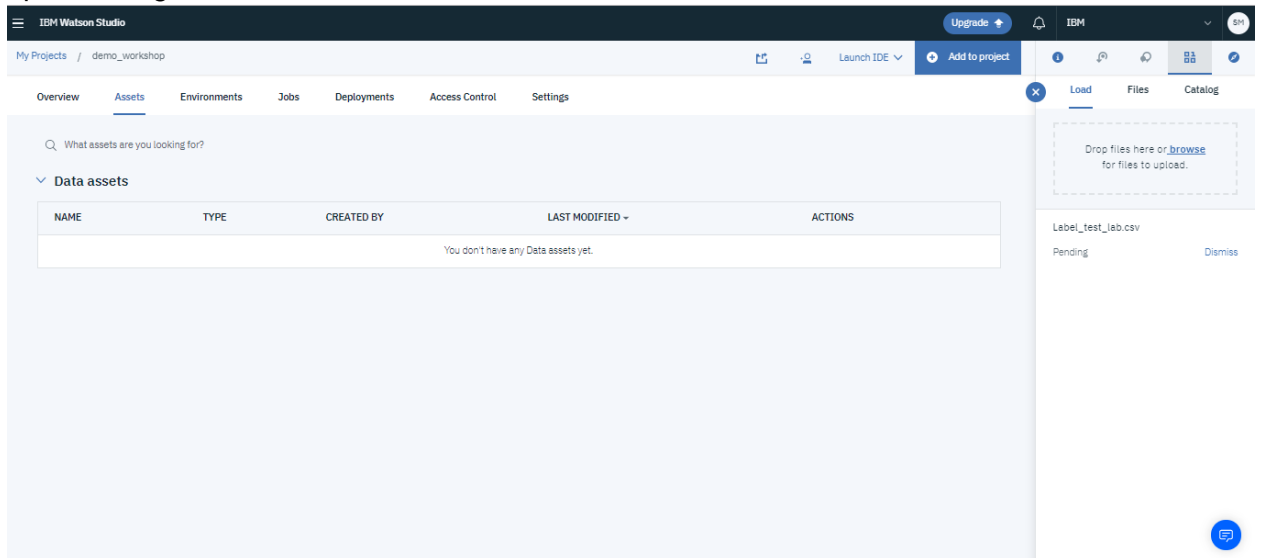
4. Click on “Create” to create the project.

Add Data Assets to the project:

1. Click on the “Assets” tab.



2. On the right side of the screen, click on “Browse” to browse your local file system and upload the given csv file.



3. After upload has been completed the file will be displayed under “Data Assets” tab.

Create an SPSS modeler flow:

1. Click on “Add to project” from the top of the screen, and select “Modeler flow”.
2. Provide a name for the modeler flow. Maintain the flow type as Modeler Flow and the runtime as IBM SPSS modeler. Click on “Create”.

IBM Watson Studio

Upgrade + IBM

New modeler flow

New From File From Example

Name*
Demo_SPSS

Description
Type description here.

Select flow type
☒ Modeler Flow ☐ Neural Network Modeler BETA

Runtime
☒ IBM SPSS Modeler ☐ Spark BETA

Cancel Create

- From the left side of the screen, click on “Import”, select “Data Asset”. Drag it onto the middle of the screen. Click on the just added Data Asset icon.

IBM Watson Studio

Upgrade + IBM

My Projects / demo_workshop / Demo_SPSS

Search Palette

- Import
- Data Asset
- User Input
- Sim Gen
- Record Operations
- Field Operations
- Graphs
- Modeling
- Outputs
- Export

Data Asset

DATA

Change data asset

Source location

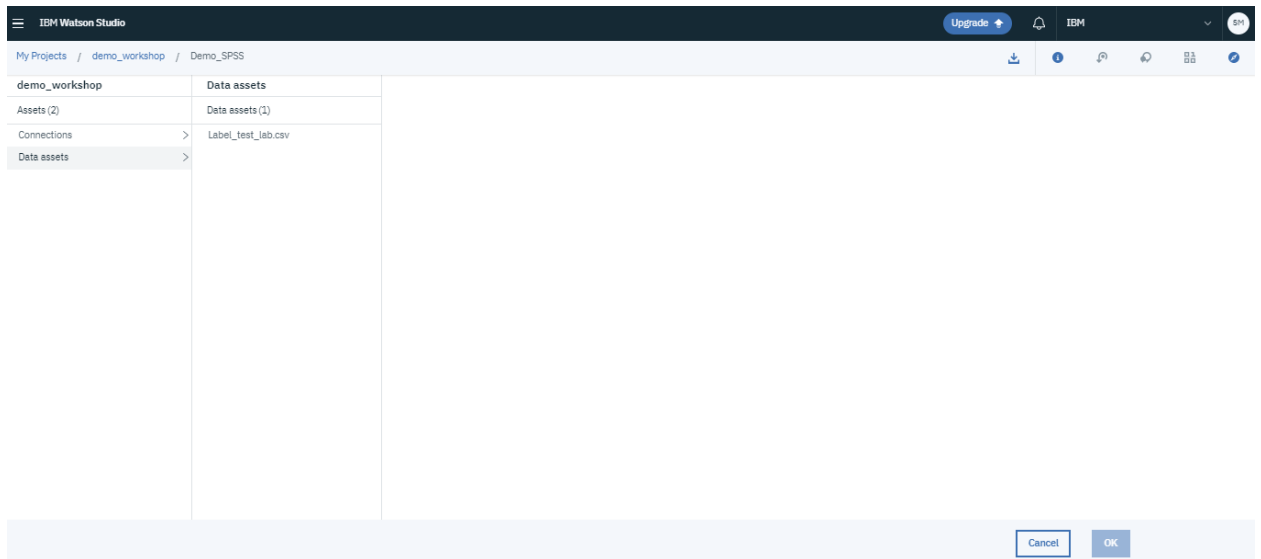
ANNOTATIONS

Drop files here or browse for files to upload.

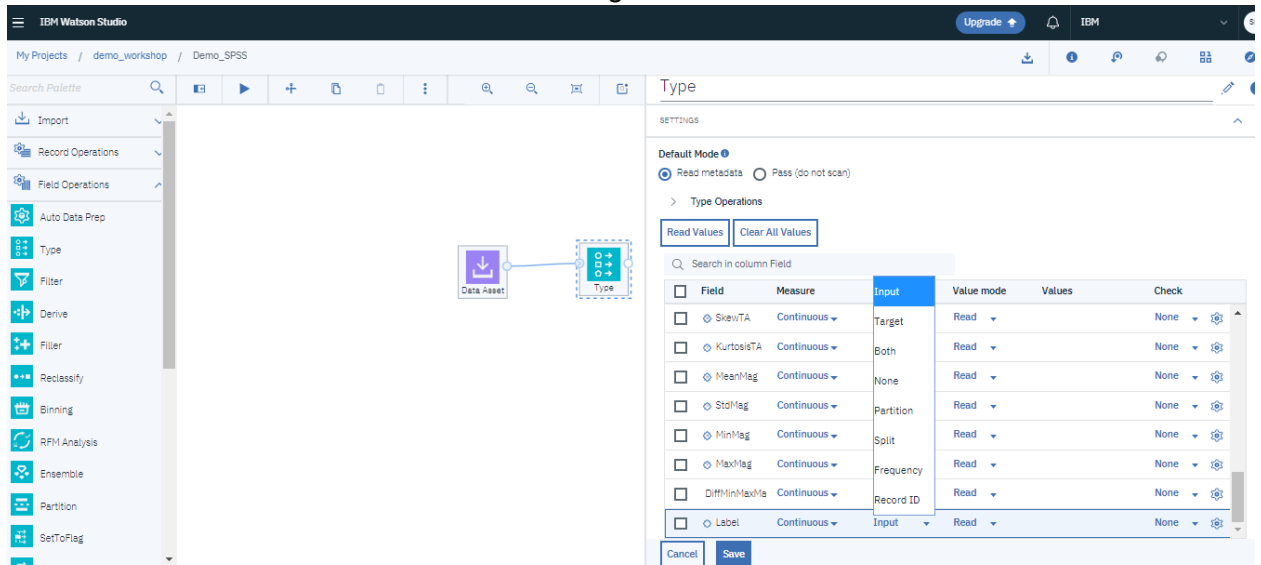
Data Assets
You may upload multiple data assets.

Cancel Save

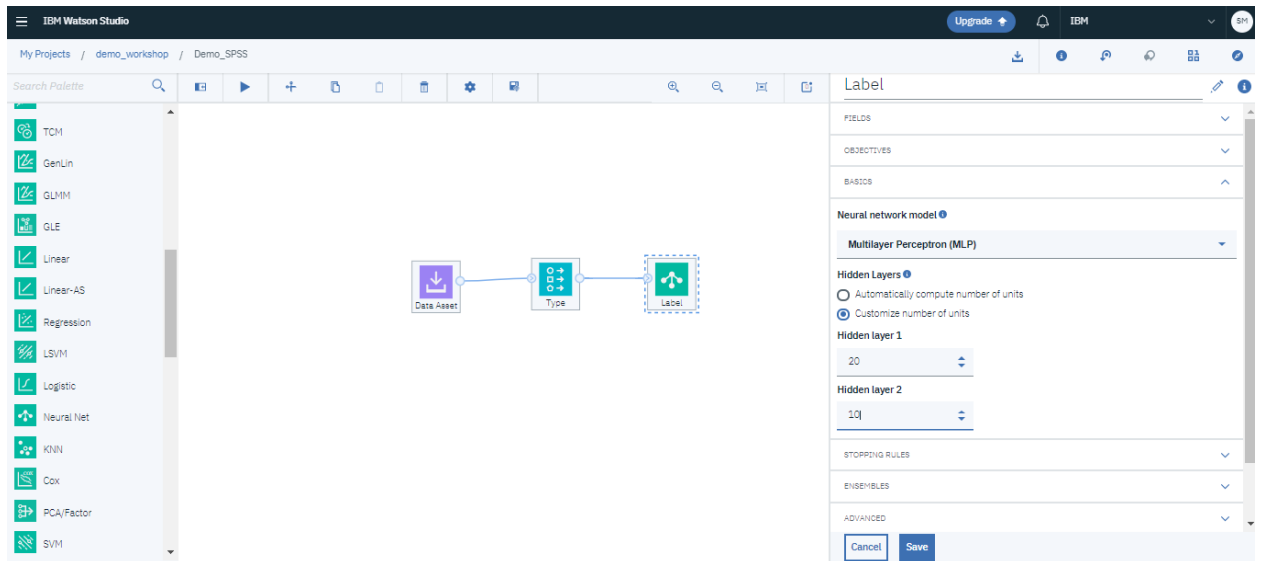
- Click on “Change data asset”. On the next screen, click on “Data assets”, then select the CSV file that you previously uploaded. Then click on “OK”.



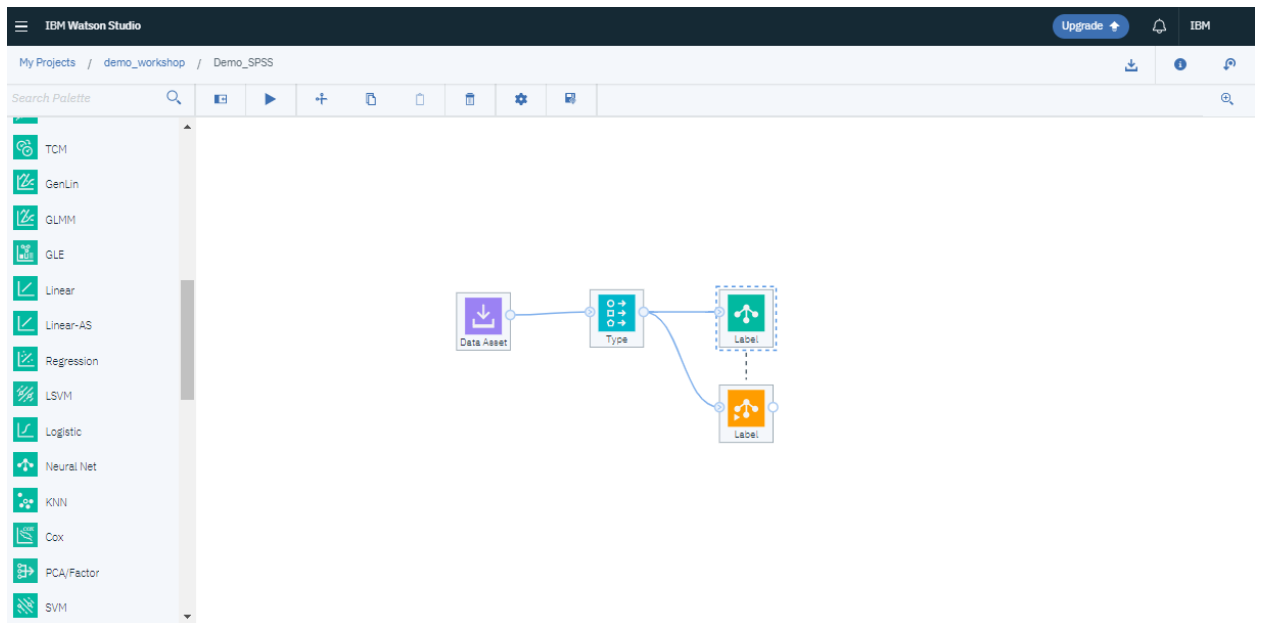
5. Now, from the left side of the screen, click on “Field Operations”, select “Type”. Drag it on to the middle. Then join Data Asset with Type by clicking on the circle on the right side of Data Asset icon and then dragging it to connect to the left circle on the Type icon.
6. Double click on the “Type” icon to open the options. Change the role of the Label field to Target instead of Input to specify that this is the target for our model. Change the measure to Nominal instead of Continuous as Label specifies two values: 0 for non-fall and 1 for fall. Click on “Save” to save the changes.



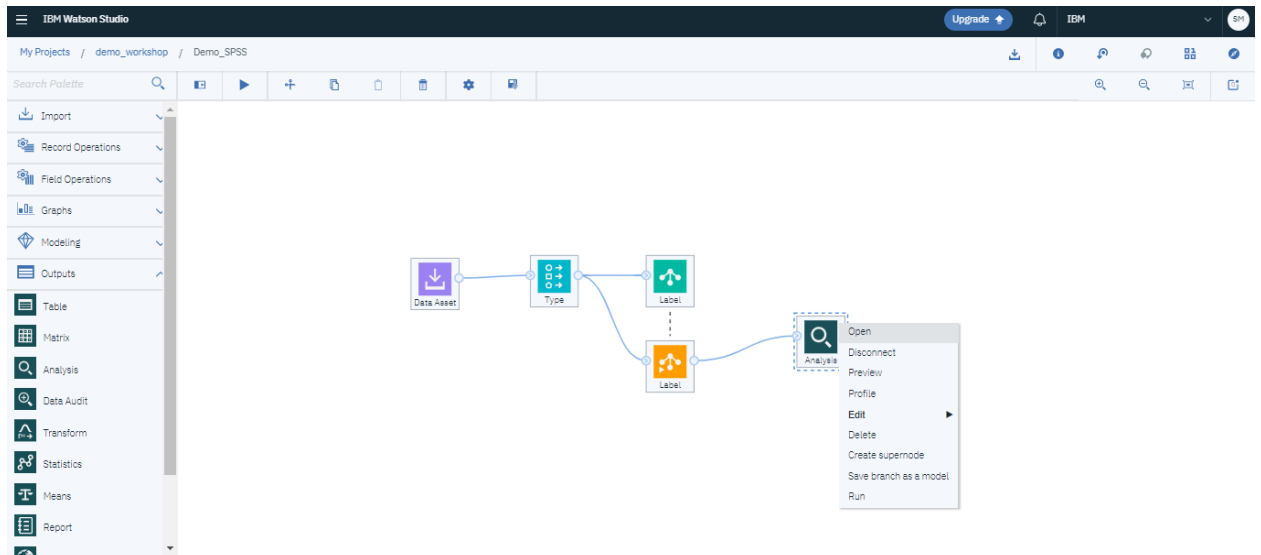
7. Now, from the left side of the screen, click on “Modeling”, then select “Neural Net”. Drag it to the middle of the screen. Connect the right circle of the Type icon with left circle of Neural Net icon. The name will change to Label to match with the target value. Double click on the Label icon, which will open up the options. Click on “Basics”, then change to “Customize number of units”. Enter 20 for hidden layer 1 and 10 for hidden layer 2. Click on “Save” to save the changes.



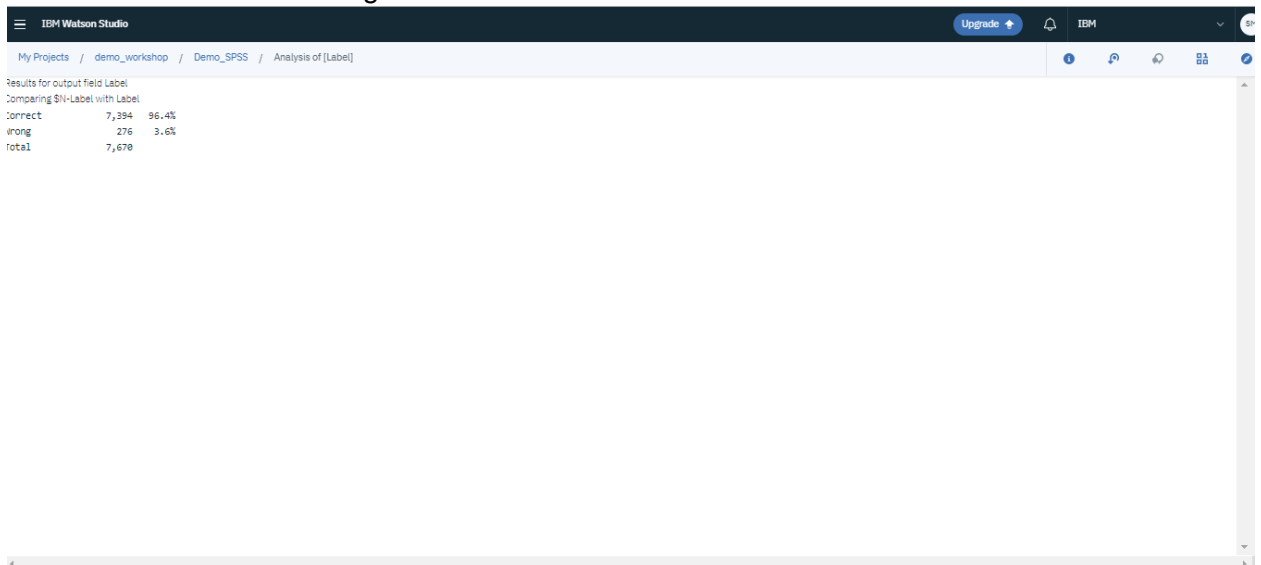
8. Click on Run (play button) from the top of the screen. This will create an orange icon for the trained model.



9. Click on "Outputs" from the left side, select "Analysis", drag it on to the middle. Connect the orange Label icon to the Analysis icon. Then single click on the right 3 dots of the analysis icon and click run.



10. Click on “Analysis of [Label]” from the right side. This will show you the accuracy of the trained model on the training data.



11. Click on “Demo_SPSS” (name of the Modeler flow) to go back to the flow. Click again on the right 3 dots of the Analysis icon and select Save branch as a model. This will give you Required Service Missing error: “No Watson Machine Learning instances found. Create a new Watson Machine Learning service instance to save your model.”. Click on “Create a new Watson Machine Learning service instance”, then select the existing service instance from the list. Click on “Select”.
12. Again click on “Save branch as a model” from Analysis icon. Provide a unique model name. Then select “Save”.

IBM Watson Studio

My Projects / demo_workshop / Demo_SPSS / Save

Save Model

Saving Mode

☒ Scoring branch ☐ Individual algorithm as PMML

Branch Terminal Node*

Analysis

Model name*

Analysis_demo

Model description

Machine Learning Service

WatsonMachineLearning

The model will be saved to your project. You can access your model and create deployments from the Models section under Assets.

Cancel Save

Create a bucket in Cloud Object Storage:

- Click on the storage instance from IBM Cloud dashboard. Once this opens, enter a unique bucket name, select “Cross Region” for Resiliency, “us-geo” for location, then click on “Create bucket”.

IBM Cloud

Search resources and offerings...

Resource list /

cloud-object-storage-si

Resource group: Default [Add Tags](#)

[View docs](#) [Aspera Transfers](#)

Create bucket

Unique bucket name [See naming rules](#)

demo-analysis

Resiliency **Location**

Cross Region us-geo

Highest availability

Storage class [See pricing for each class](#)

Standard

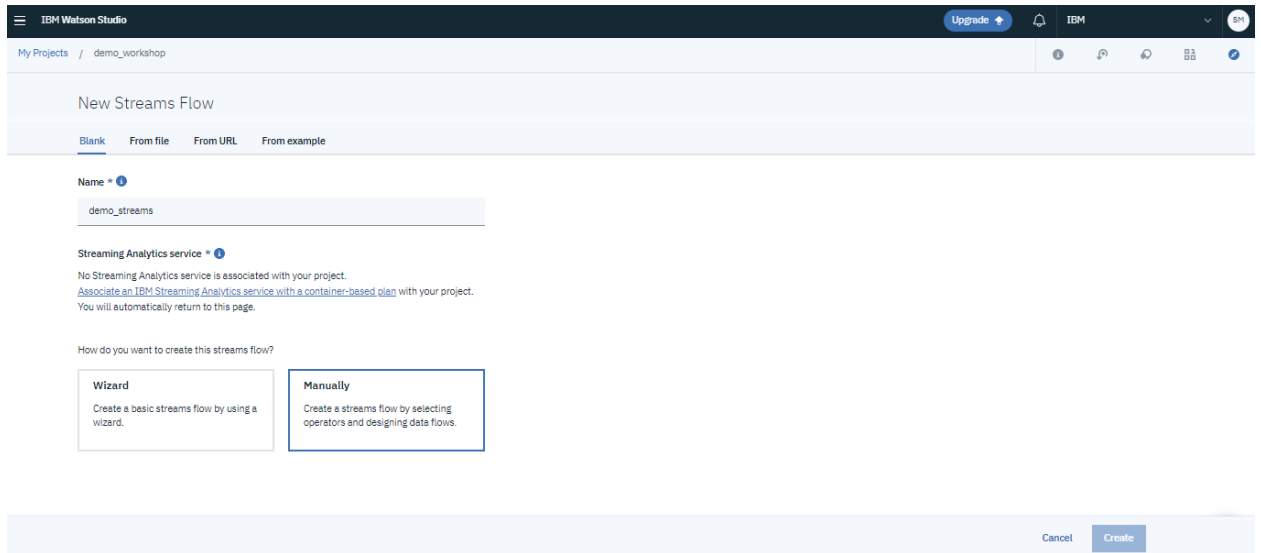
Additional configuration (optional)

☐ Add Archive rule [Learn more](#)

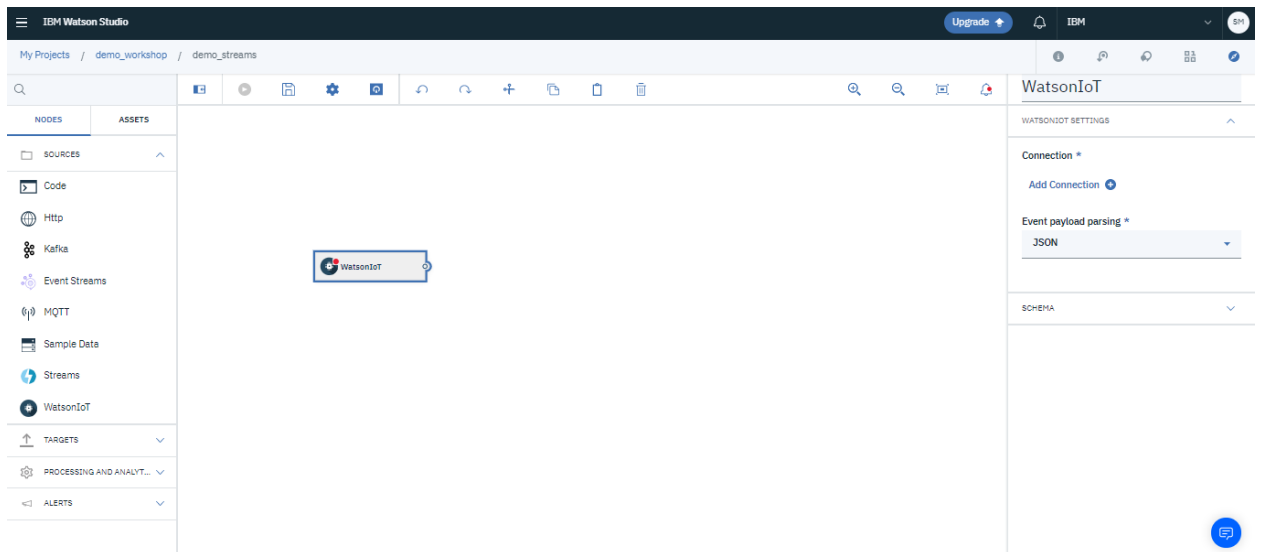
The feature is currently not supported in the location you have selected.

Create a Streams Flow:

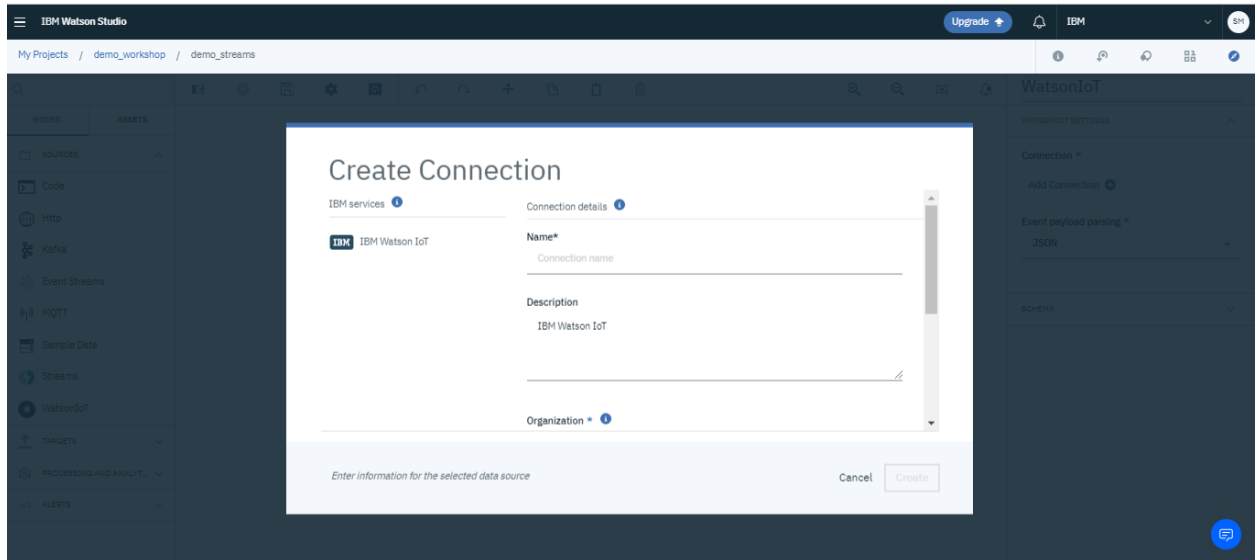
- Click on “Add to project”, and then “Streams flow”.



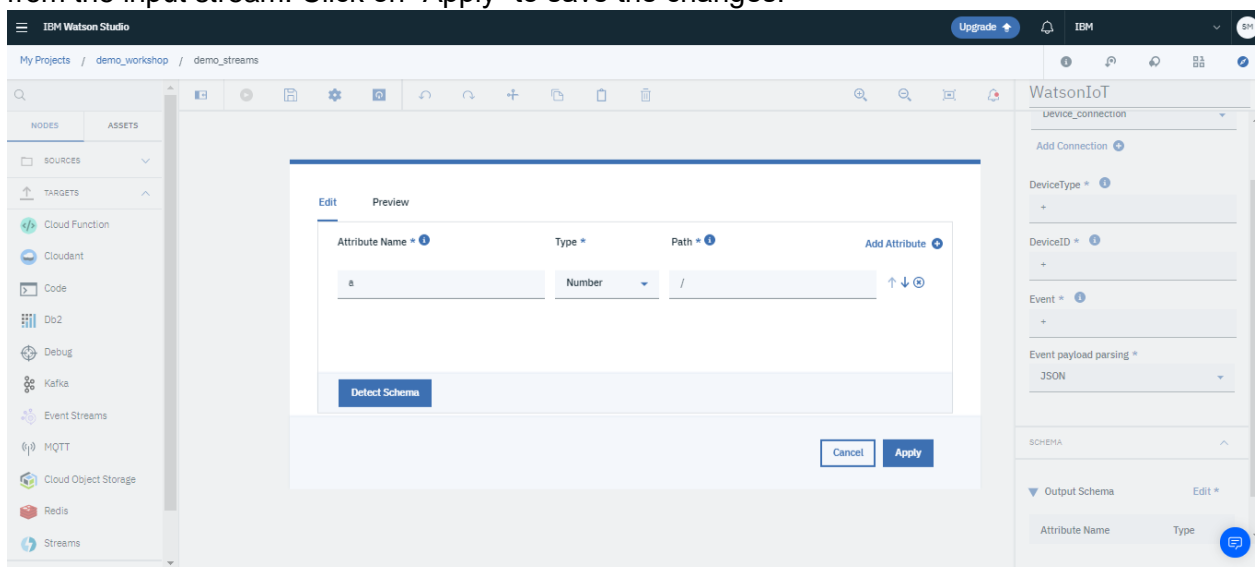
2. In the “Streaming Analytics service”, click on “Associate an IBM Streaming Analytics service with a container-based plan”. Select an existing service instance from the list. Then click on “Select”. Enter a name for the Streams flow, select “Manually” for creating the Streams flow, then click on “Create”.
3. From the left side of the screen, click “Watson IoT” from “Sources”, and drag it on to the canvas.



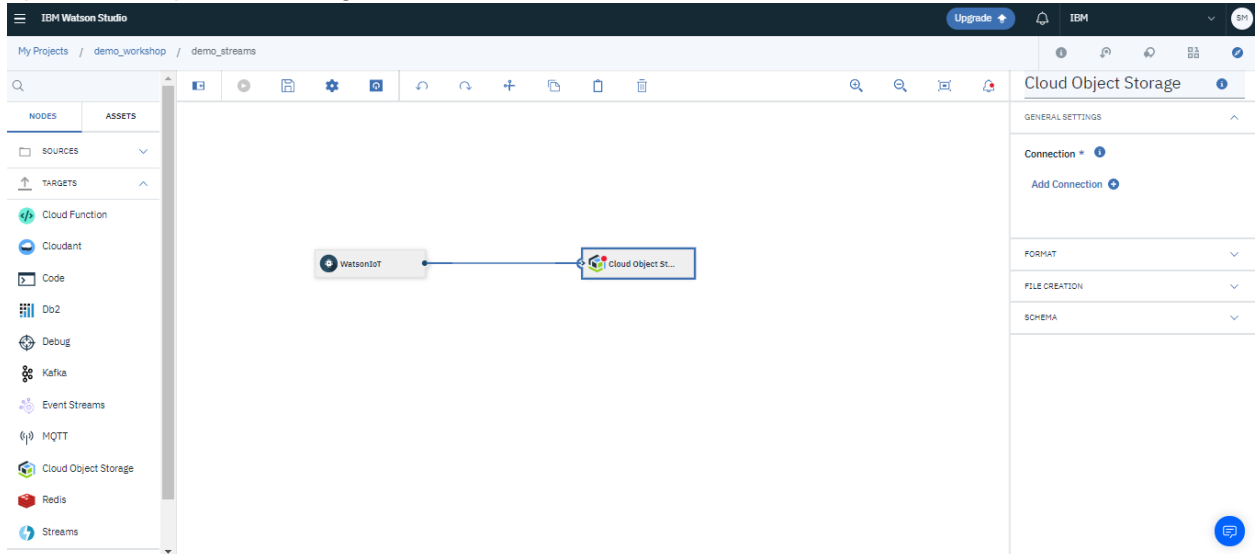
4. On the WatsonIoT operator settings, click on “Add Connection”. Select “IBM Watson IoT”, then a window will appear for adding a connection.



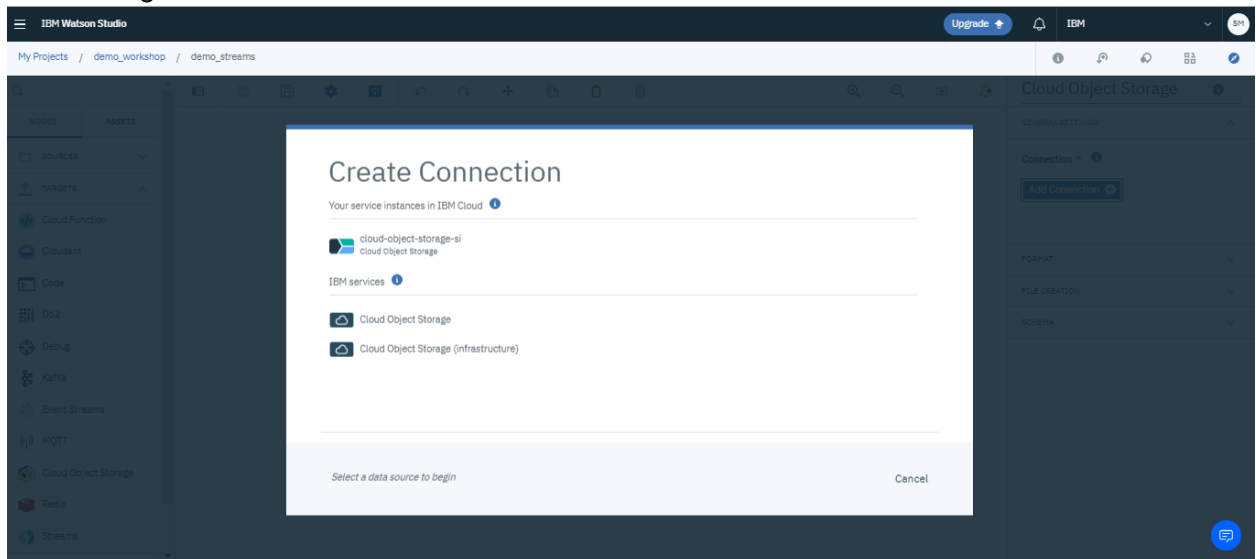
5. To add the connection, open Internet of Things Platform from IBM cloud dashboard in another window. Once opened, click “Launch”. In the opened window, click on “Apps” from the left side, then click “Generate API Key”. Provide a description for the connection, click on “Next”. In the next window, select “Standard Application” as Role from the list. Then click on “Generate Key”. In the next window, copy the authentication token, then paste it in the Watson Studio “Add connection” window authentication token box. Again copy the API key from the Internet of Things Platform window and paste it in the in the Watson Studio “Add connection” window API key box. In the Organization box, type the same organization that appears on the top right side of the Internet of Things Platform window. Then click on “Create”.
6. Now, in the WatsonIoT operator settings, click on expand “Schema” option, click on “Edit” beside “Output Schema”, then type a name for the attribute name, select “Number” as “Type”, enter “/” as “path”. This is just a dummy attribute. Once, the flow starts running, then we can use “Detect Schema” option to receive the actual attributes coming from the input stream. Click on “Apply” to save the changes.



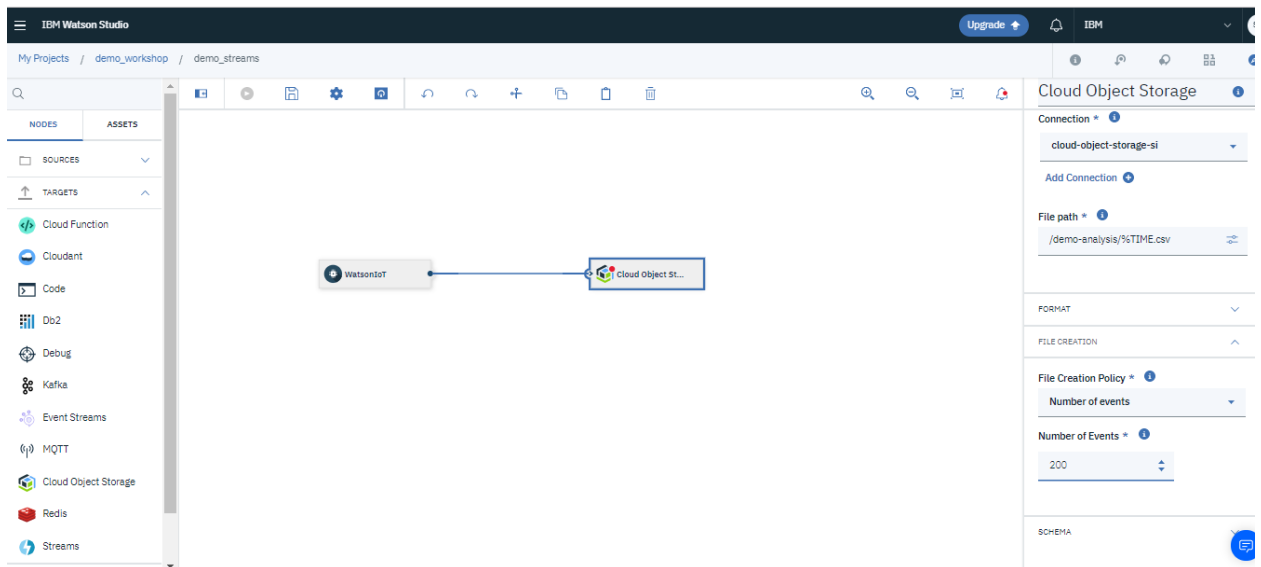
- Now, from the “Targets” option on the left side, select “Cloud Object Storage”, drag it to the canvas. Connect WatsonIoT operator to the Cloud Object Storage operator by clicking on the circle on the right of WatsonIoT operator and then dragging it to include the circle on the left side of the Cloud Object Storage. Click on the Cloud Object Storage operator to open its settings.



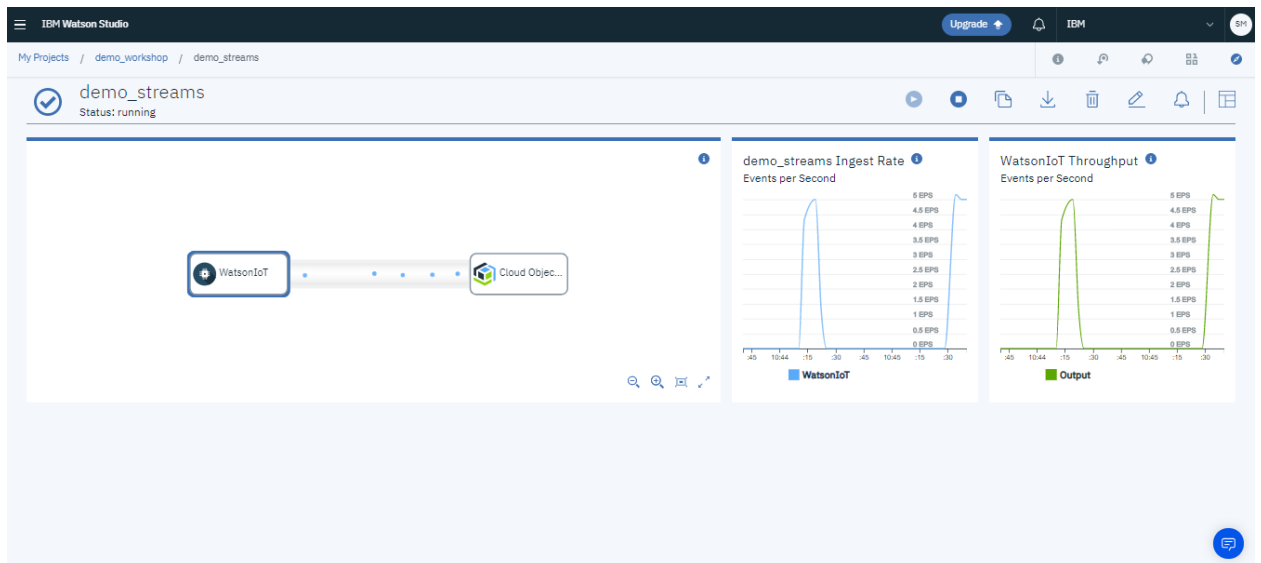
- Click on “Add Connection” in the Cloud Object Storage settings. This will open a window for entering the connection information.



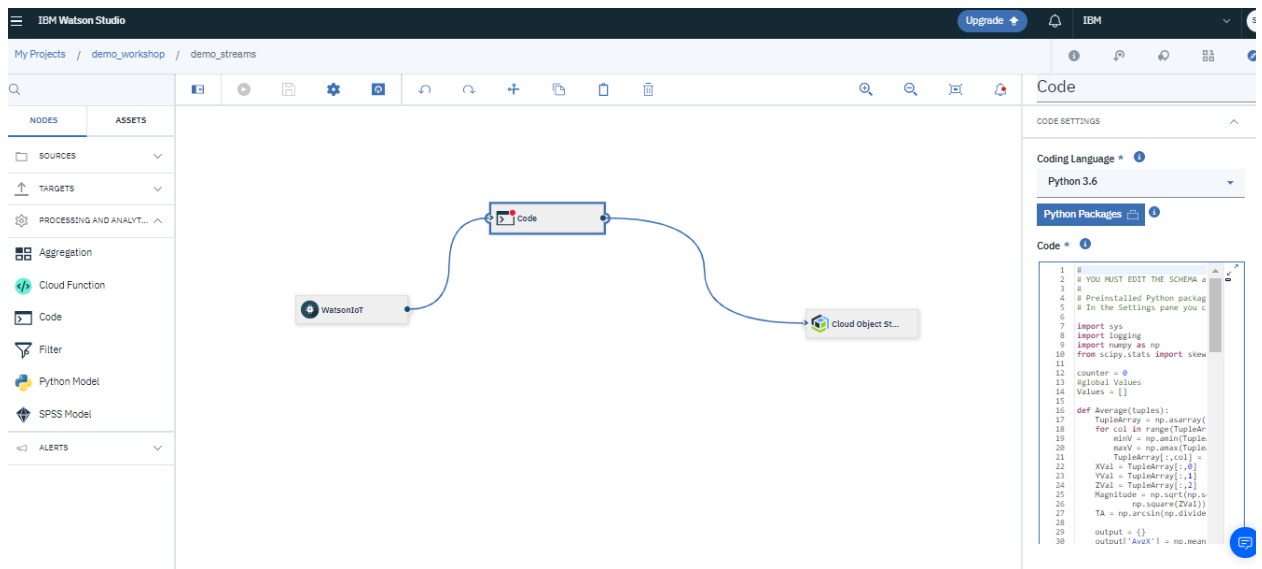
- Select the cloud storage instance from “Create Connection” window. This will show you the connection details. Click on “Create”. Now, on the settings window, enter the file name on the file path; for example: `/demo-analysis/%TIME.csv`
In the “File Creation” option: select “Number of events” as the “File creation policy”, 200 as “Number of events”.



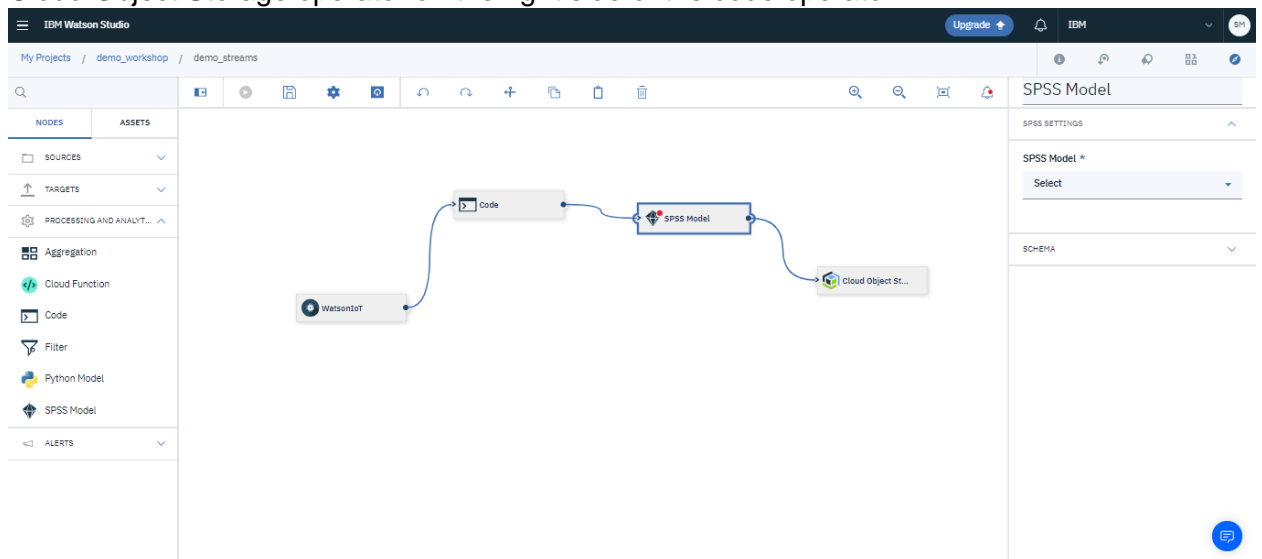
10. Click on Save (Floppy disk icon), then run (play icon) from the top. If the Streaming Analytics service has not already been started, there will be a prompt for starting the service. Click “Yes” to start the service.



11. Once the Streams flow has successfully started running, you view the flow information on the right. If you click on the line of flow in between WatsonIoT and Cloud Object Storage operator, you can view the data samples passing through the operators as well.
12. Now, click on Edit (pencil icon) from the top, and click on the WatsonIoT to open the settings. Click on the “Schema” option, click on “Edit” beside “Output Schema”, then click on “Detect Schema”. Click “Yes” to the reversion warning. Then click “Apply” to save the changes.
13. From “Processing and Analytics” option on the left, select the “Code” operator, and drag it on to the canvas. Connect WatsonIoT operator on the left side of the Code and Cloud Object Storage operator on the right side of the code operator.



14. Click on the “Code” operator, this will open up the settings. Copy the code (given in the code_operator_edit.txt file) for the code operator and paste it in the “Code” section. Click on the Schema section, then click on “Edit” beside “Output Schema”. Add the attributes listed for output dictionary in the code section. All of the attribute types are “Number”. Add an additional attribute for Label of type “Number” to match the expected input schema for the SPSS Model. Click on “Python Packages” just above the Code section, type “numpy==1.15.4”, and click “add”. This will add this Numpy version to the runtime.
15. From “Processing and Analytics” option on the left, select the “SPSS Model” operator, and drag it on to the canvas. Connect Code operator on the left side of the Code and Cloud Object Storage operator on the right side of the code operator.



16. Click on “SPSS Model” operator to open the settings. Select the previously saved SPSS model from the list under “SPSS Model” option.
17. Now, click on save (floppy disk icon), then run (play icon) from the top. The flow can be seen as follows:

