



IBM PHASE 5 project

PREDICT HOME VALUE USING IBM WATSON MACHINE LEARNING AND
DB2 DATABASE.

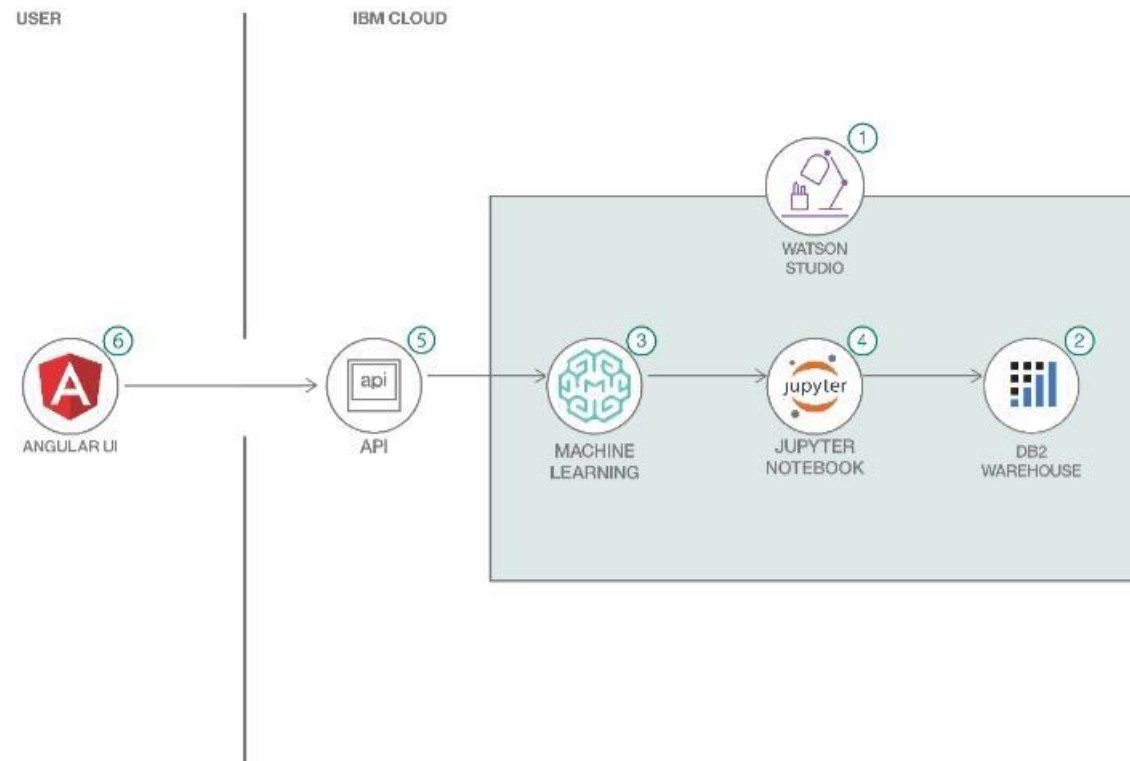
Group members

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Use IBM watson studio and Db2 on cloud to create a machine learning model to predict home value

- ▶ Data keeps on growing and extracting meaningful information out of that data is very important. Using machine learning models from the existing data helps a company to not only extract meaningful insights but also predict future results.
- ▶ This code pattern will demonstrate a data scientist's journey in creating a machine learning model using IBM Watson Studio and IBM Db2 On Cloud. This deployed model can now be used by exposing an API and use the input data to the API to predict the home value.

Flow chart



Explanation

- ▶ Create a Watson Studio Project on IBM Cloud.
- ▶ IBM DB2 on Cloud database stores information that will be used for machine learning and predictions.
- ▶ Watson Machine Learning helps to create ML models so that new predictions can be run against the model.
- ▶ Jupyter notebook uses IBM Db2 on Cloud and Watson Machine Learning to create the machine learning model.
- ▶ The model is exposed through an API
- ▶ Angular UI uses the API to send new data for predictions.

Steps

- ▶ Clone the repo
- ▶ Create an IBM cloud account
- ▶ Load data into IBM Db2 On cloud
- ▶ Setup watson studio Project
- ▶ Creating and deploying a machine learning model
- ▶ Testing Using UI

1.CLONE THE REPO

- ▶ Before we start anything, we need to clone the repo. The repo has our dataset and python notebook which we will use when creating Our model

2.CREATE AN IBM CLOUD ACCOUNT

- ▶ Create a free IBM on Cloud Account if you don't already have one using the following link:
- ▶ **IBM cloud** : [creating this](#) account will give us access to Db2 on Cloud and Watson Studio services.

3.LOAD DATA INTO IBM Db2 ON CLOUD

- ▶ **Now that we have created our IBM Cloud account. We need to create a Db2 on Cloud service. Once we have create that, we will then we able to load our data into our database.**
- ▶ **Create Db2 on Cloud Service.**
- ▶ **Load Data into Db2 on Cloud.**

3a.CREATE Db2 ON CLOUD SERVICE.

- ▶ Go to the dashboard of your IBM Cloud account and follow the steps to create your Db2 On cloud services.

The screenshot displays the IBM Cloud dashboard interface. At the top, the header includes the IBM Cloud logo, a search bar containing 'db2', and the user's account name 'Rohith Ravindranath's Accou...'. A dropdown menu for the search results is visible, showing '0 resource results found' and a list of 'Catalog Results' including 'Db2', 'Db2 Hosted', and 'Db2 Warehouse'. Below the search bar, the dashboard is divided into several sections: 'Resource summary' with a 'Storage' link, 'Location status' showing regions like Asia Pacific, Europe, North America, and South America with green checkmarks, 'Apps' with a 'Create an app' button, and 'Support cases' with a 'View support' button. On the right side, there are buttons for 'Upgrade account' and 'Create resource', and a 'Planned maintenance' section with a 'View events' link. A 'FEEDBACK' button is located on the far right edge.

IBM Cloud

db2

Rohith Ravindranath's Accou...

Dashboard Customize

Resource summary

Storage

0 resource results found

Catalog Results View all catalog results

- Db2
- Db2 Hosted
- Db2 Warehouse

Search "db2" in Support Cases

Search "db2" in Docs

Add more resources

Upgrade account Create resource

Planned maintenance View events

Next event: Tue, Jul 16, 2019 4:00 PM

Perform Compose host maintenance (Applicati...

coming

Perform Compose host maintenance (Applicati...

Update the TLS certificates (some clusters only)

Migrate the service to the IBM Cloud database

Location status View status

- Asia Pacific
- Europe
- North America
- South America

Apps

You can view your apps here after you create them. Learn more about how to get started.

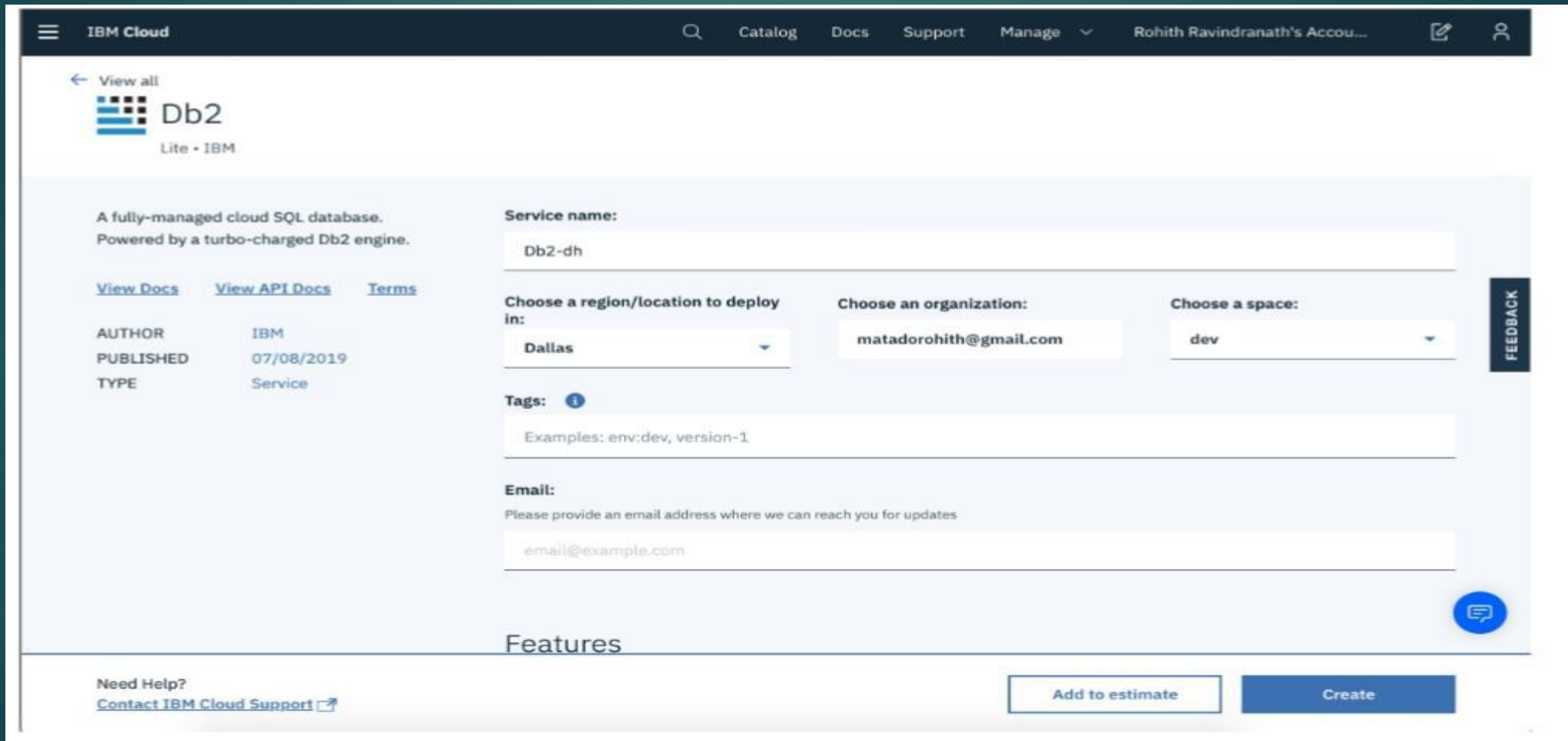
Create an app

Support cases View support

You can view a summary of your support cases here after you submit them. Learn more about how to get support.

FEEDBACK

- ▶ In the search bar at the top of your dashboard, search Db2.
- ▶ Although there are different database options to choose from, for the purposes of this tutorial we will be using the Db2 option. Click Db2 when that option appears in the search bar.



The screenshot shows the IBM Cloud dashboard for the Db2 service. The top navigation bar includes the IBM Cloud logo, a search bar, and links to Catalog, Docs, Support, and Manage. The user's account name, Rohith Ravindranath's Accou..., is visible on the right. The main content area is titled 'View all Db2 Lite • IBM'. Below the title, there is a description: 'A fully-managed cloud SQL database. Powered by a turbo-charged Db2 engine.' To the left of the description, there are links for 'View Docs', 'View API Docs', and 'Terms'. Below these links, a table lists the service details: AUTHOR (IBM), PUBLISHED (07/08/2019), and TYPE (Service). The main configuration form on the right includes a 'Service name' field with the value 'Db2-dh'. Below this, there are three dropdown menus: 'Choose a region/location to deploy in:' (Dallas), 'Choose an organization:' (matadorohith@gmail.com), and 'Choose a space:' (dev). There is also a 'Tags' field with a placeholder 'Examples: env:dev, version-1'. An 'Email' field is present with a placeholder 'email@example.com'. At the bottom of the form, there is a 'Features' section. The footer contains a 'Need Help?' link to 'Contact IBM Cloud Support' and two buttons: 'Add to estimate' and 'Create'.

IBM Cloud

Search Catalog Docs Support Manage Rohith Ravindranath's Accou...

View all Db2 Lite • IBM

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

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

AUTHOR	IBM
PUBLISHED	07/08/2019
TYPE	Service

Service name: Db2-dh

Choose a region/location to deploy in: Dallas

Choose an organization: matadorohith@gmail.com

Choose a space: dev


Tags: Examples: env:dev, version-1

Email: Please provide an email address where we can reach you for updates email@example.com

Features

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

Add to estimate Create

- 
- ▶ For the service name, enter in Data-Science-Track.
 - ▶ Make sure you pick the region that is closest to where you currently reside.
 - ▶ Scroll down to the Pricing Plan section and choose the Lite plan.
 - ▶ Once you have created your database instance, we can go back to the dashboard and click on the View Resources link under the Resource Summary section. You should then be able to see and verify that your Db2 instance has been created under the Cloud Foundry Services tab.

3b. LOAD DATA INTO DB2 ON CLOUD

- ▶ **Go to the dashboard of your IBM Cloud account and follow the steps to load your data onto Db2 On Cloud service.**
- ▶ **In the search bar, search Data-Science-Track and click on your Db2 on Cloud service.**

Click to close this tab; Option-click to close all tabs except this one

Storage: 1%

Discover

LOAD

Source

Target

Define

Finalize

Select a data source

My Computer
A single delimited text file (CSV).


S3 Amazon S3

SoftLayer Swift

Netezza and large CSV file migrations

Lift

File selection



Drag a file here or [browse files](#)

☐ High-speed loads powered by Aspera

Next

- Click on Open Console which will direct you to the Db2 on Cloud Console.
- Click on Load under the Hamburger menu.
- Click on browse files and select home-sales-training-data.csv from your computer.
- Click Next.

LOAD



You are loading the file **home-sales-training-data.csv** into **SKP44849.HOME_SALES**

Select a load target

Schema	Table	Table definition																					
<input type="text" value="Find a schema"/>	<input type="text" value="Find a table in SKP44849"/>																						
SKP44849	HOME_SALES	HOME_SALES Approximate 1460 rows (288 KB) Updated on 7/15/2019 at 1:52:27 PM																					
ERRORSCHEMA <i>Sample</i>		<input checked="" type="radio"/> Append new data <input type="radio"/> Overwrite table with new data																					
ST_INFORMTN_SCHEMA <i>Sample</i>		<table><thead><tr><th>COLUMN NAME</th><th>DATA TYPE</th><th>NULLABLE</th></tr></thead><tbody><tr><td>ID</td><td>SMALLINT</td><td>Y</td></tr><tr><td>LOTAREA</td><td>INTEGER</td><td>Y</td></tr><tr><td>BLDGTYPE</td><td>VARCHAR</td><td>Y</td></tr><tr><td>HOUSESTYLE</td><td>VARCHAR</td><td>Y</td></tr><tr><td>OVERALLCOND</td><td>SMALLINT</td><td>Y</td></tr><tr><td>YEARBUILT</td><td>SMALLINT</td><td>Y</td></tr></tbody></table>	COLUMN NAME	DATA TYPE	NULLABLE	ID	SMALLINT	Y	LOTAREA	INTEGER	Y	BLDGTYPE	VARCHAR	Y	HOUSESTYLE	VARCHAR	Y	OVERALLCOND	SMALLINT	Y	YEARBUILT	SMALLINT	Y
COLUMN NAME	DATA TYPE	NULLABLE																					
ID	SMALLINT	Y																					
LOTAREA	INTEGER	Y																					
BLDGTYPE	VARCHAR	Y																					
HOUSESTYLE	VARCHAR	Y																					
OVERALLCOND	SMALLINT	Y																					
YEARBUILT	SMALLINT	Y																					

[Back](#) [Next](#)

- The next step is to decide where our data will be stored. Click on the first schema that shows up, then select New Table.
- Enter HOME_SALES as our table name and select Create and finally Next.
- Make sure the column names and datatypes are correct, and click Next.
- Click Begin Load.

4.SETUP WATSON STUDIO PROJECT

- ▶ Setting up our project environment can be broken down in the follow steps.
- ▶
- ▶ Get Db2 on Cloud credentials
- ▶ Creating Watson Studio service
- ▶ Creating a Watson Studio project
- ▶ Connect Db2 on Cloud with Watson Studio

4a.GET db2 ON CLOUD CREDENTIALS

Before we create a Watson Studio service, we need to first create credentials for our database so that Watson Studio can connect to it.

- ▶ In the search bar, search Data-Science-Track and click on your Db2 on Cloud service
- ▶ Click on Service Credentials on the left hand side.

IBM Cloud

Resource list /

Db2 on Cloud-DataScienceTrack

Location: Dallas Org: rohithravin@gmail.com Space: dev

Service credentials

Credentials are provided in JSON format. The JSON snippet lists credentials, such as the API key and secret, as well as connection information for the service. [Learn more](#)

Service credentials [New credential +](#)

Items per page 10 | 1-1 of 1 items 1 of 1 pages < 1 >

<input type="checkbox"/> KEY NAME	DATE CREATED	ACTIONS
<input type="checkbox"/> Service credentials-1	JUL 1, 2019 - 11:28:07 AM	View credentials

Click on New Credentials and then Add. Make sure to save the credentials for later use.

- The key information that is important for us is:

- 1.HOSTNAME
- 2.USER
- 3.PASSWORD
- 4.DATABASE

IBM Cloud

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.

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

AUTHOR IBM
PUBLISHED 05/24/2019
TYPE Service

Service name:
Watson Studio-2w

Choose a region/location to deploy in:
Dallas

Select a resource group:
Default

Tags:
Examples: env:dev, version-1

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)
- **Power on demand**
Enterprise-scale features on demand. From data exploration and preparation, to enterprise-scale performance. Manage your data, your analytical

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

[Add to estimate](#) [Create](#)

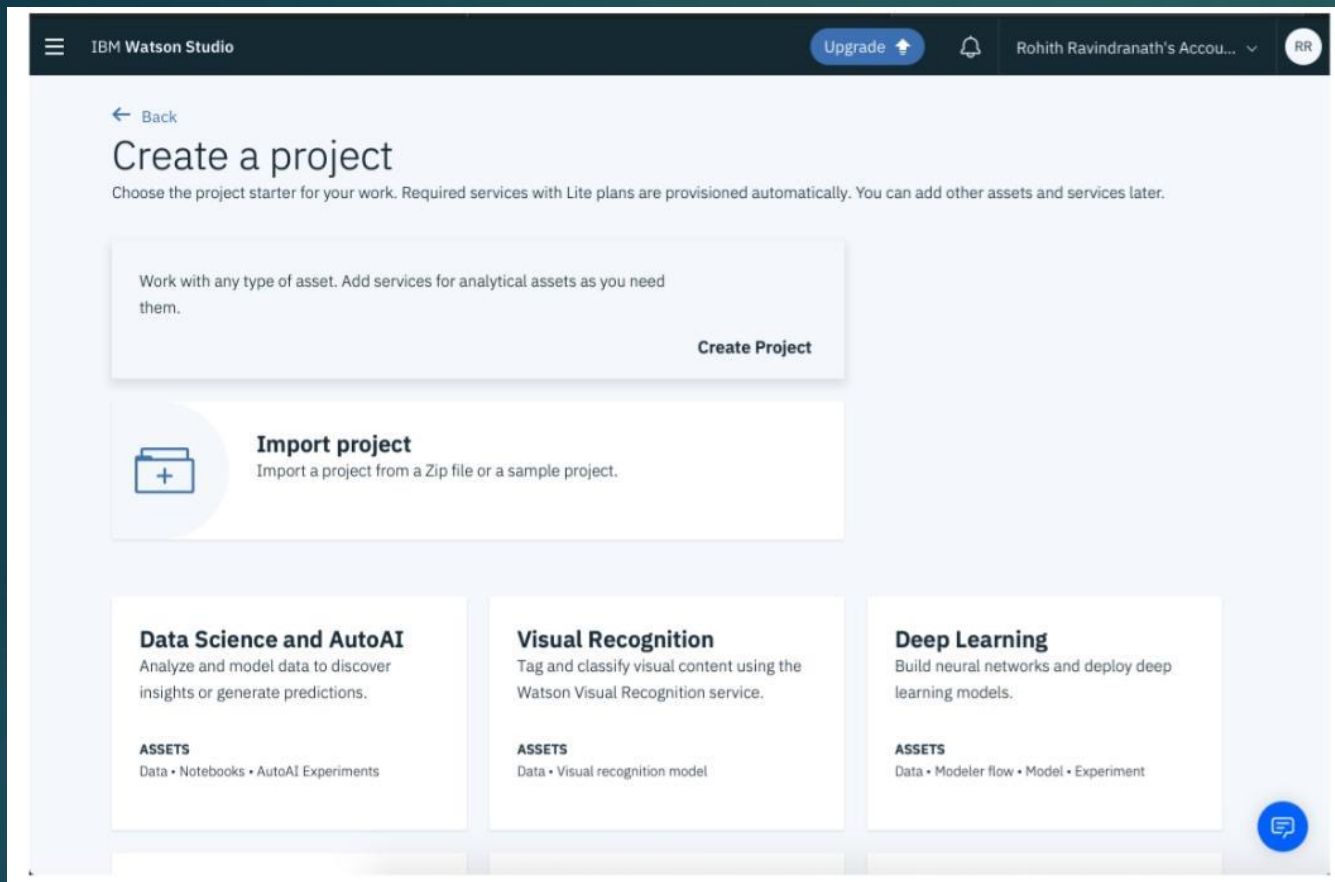
FEEDBACK

Fill out all the fields and choose 'Lite' plan. Click Create and then Get Started.

This will redirect you to the Watson Studio homepage.

4b.CREATING WATSON STUDIO SERVICE

Go to Catalog and search for Watson Studio and click on that option.



Go back to the project page and make sure to choose the Cloud Object Storage that you have created earlier. Fill out the project details and click Create. This will take you to your project dashboard/homepage.

4d.CONNECT db2 ON CLOUD WITH WATSON STUDIO

4c.CREATING WATSON STUDIO PROJECT

Select Create a Project and then select Standard. If you haven't created object storage earlier, go to the bottom of the page and click the link Cloud Object Storage. Choose the Lite plan and click Create.

On the top of the project homepage, select Add to project and then click Connection. Select Db2 connection option

IBM Watson Studio

Upgrade

Rohith Ravindranath's Accou...

New connection (Db2)

Connection overview

Name *

Connection name

Description

IBM Db2 database

Connection Details

User name *

Password *

Port *

1234

Port is SSL-enabled

☐ The port is configured to accept SSL connections

Host name or IP Address *

my_host.my_company.com or 12.34.56.789

Database *

Database to connect to

SSL Certificate

Secure Gateway

☐ Use a secure gateway

Connection discovery

☐ Discover data assets

Enter information for the selected data source

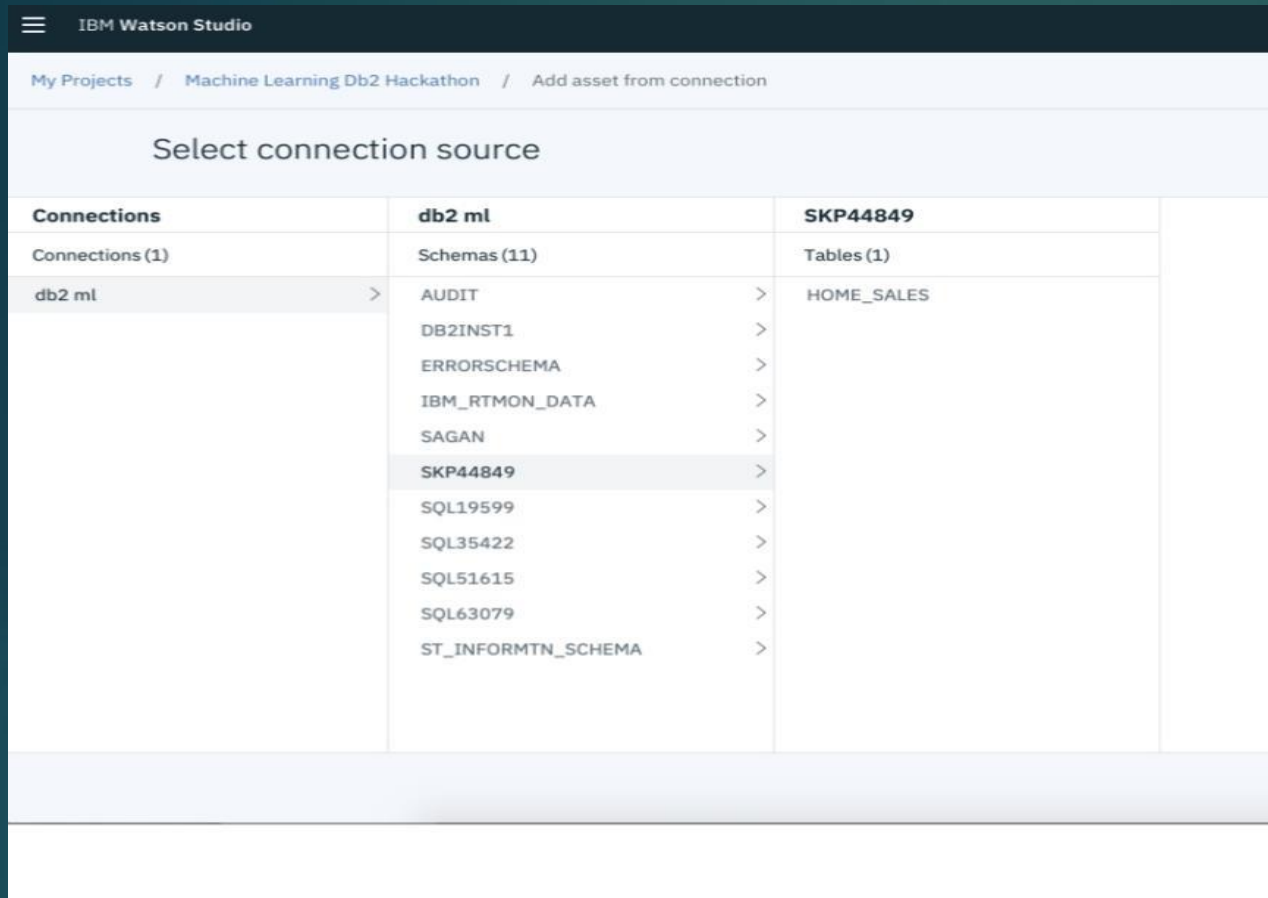
Cancel Create

This will take you to a connection configuration page. Here, we will enter the Db2 credentials that we got from Step 4a. Make sure to use 50000 for the Port option. Click Create once you have entered all the required information.

This will redirect you to the asset page for this project, and you should see your new Db2 connection as one of the assets.

Now that we have our database connected to our project, we need to also connect our data that is stored in our database to the project as well.

On the top of the project homepage, select Add to project and then click Connected data. Select select source

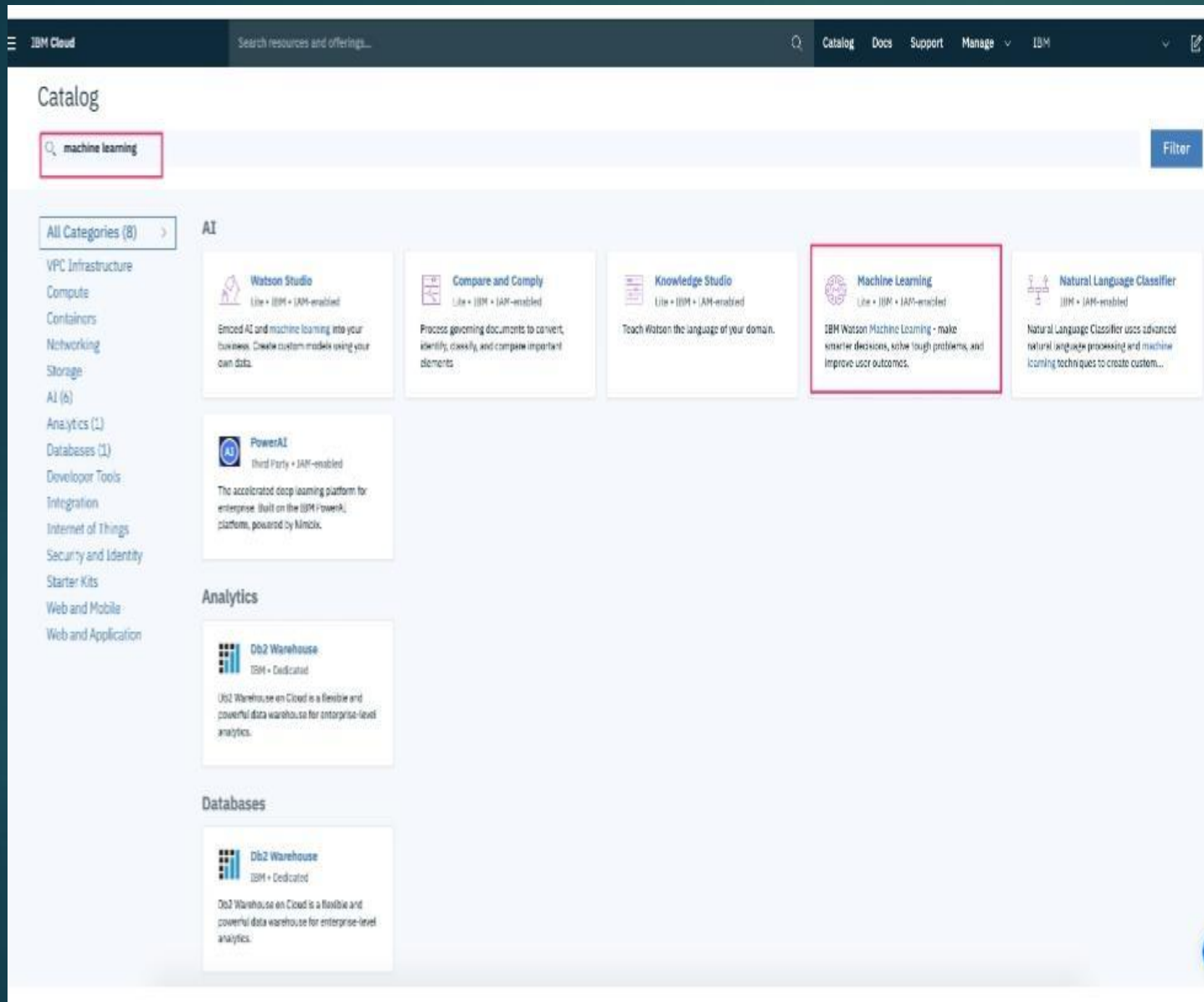


Select our database, scheme and finally our table HOME_SALES.
Click Select.
Let's name this connected data as HOME_SALES and then click Select.

We have finally created our Watson Studio service. Within that, created a project where our database and data are connected. We can now finally start coding and building our model!

5.CREATING AND DEPLOYING MACHINE LEARNING MODEL

On the top of the project homepage, select Add to project and then click Notebook. Fill out the notebook details



Before we run the notebook, we need to create Watson Machine Learning instance so that we can deploy the model to Watson Machine Learning on IBM Cloud. Here are the steps:

Go to IBM cloud dashboard and click Create Resource
Search for machine learning and select Machine Learning service
Fill out the details, select Lite plan and click Create.

search resources and offerings...

CatalogDocsSupportManageIAM

Resource list /

Machine Learning-pq

Resource group: defaultLocation: DallasAdd Tags

Service credentials

Credentials are provided in JSON format. The JSON snippet lists credentials, such as the API key and secret, as well as connection information for the service.

Learn more

Service credentials

Items per page 10 | 1-1 of 1 items

1 of 1 pages

☐

KEY NAME

☐

Service credentials-1

DATE CREATED

JUL 30, 2019 - 12:24:10 PM

ACTIONS

View credentials

```
{  "apikey": "t21V3E",  "iam_apikey_desc": "IAM API Key for Machine Learning",  "iam_apikey_name": "Machine Learning API Key",  "iam_role_crn": "arn:aws:iam::123456789012:role/MachineLearningRole",  "iam_serviceid_credential": {    "instance_id": "c",    "password": "163",    "url": "https://",    "username": "b3c1",    "serviceid": "ServiceId-e36e568d-774f-496c-b61d-dd3704ca9bbd",  },}
```

In the notebook, after the import cell, add cell to create connection as shown below.

IBM Watson Studio

My Projects / WML and DB2 / WML DB2

File Edit View Insert Cell Kernel Help

Not Trusted Python 3.6

db2 wml

Requirement already satisfied, skipping upgrade: pandas in /opt/conda/envs/Python36/lib/python3.6/site-packages (from watson-machine-learning-client) (0.24.1)
Requirement already satisfied, skipping upgrade: xlrd<1.10.0 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from lmond->watson-machine-learning-client) (1.12.0)
Requirement already satisfied, skipping upgrade: idna<2.9,>=2.5 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->watson-machine-learning-client) (2.8)
Requirement already satisfied, skipping upgrade: chardet<3.1.0,>=3.0.2 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->watson-machine-learning-client) (3.0.4)
Requirement already satisfied, skipping upgrade: ibm-cos-sdk-core==2.*,>=2.0.0 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.4.3)
Requirement already satisfied, skipping upgrade: ibm-cos-sdk-core==2.*,>=2.0.0 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.4.3)
Requirement already satisfied, skipping upgrade: numpy==1.12.0 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from pandas->watson-machine-learning-client) (1.15.4)
Requirement already satisfied, skipping upgrade: pytz==2018k in /opt/conda/envs/Python36/lib/python3.6/site-packages (from pandas->watson-machine-learning-client) (2018.9)
Requirement already satisfied, skipping upgrade: python-dateutil<2.7.0 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from pandas->watson-machine-learning-client) (2.7.5)
Requirement already satisfied, skipping upgrade: docutils<0.10 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (0.14)
Requirement already satisfied, skipping upgrade: jupyter<1.0.0,>=0.7.1 in /opt/conda/envs/Python36/lib/python3.6/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (0.9.3)

1. IMPORTING DATA

The first step as data scientist is to import our data from our data source. In a real world application, your data is going to be too big to be stored locally on your computer. Chances are, your data will most likely be stored on the cloud or in some other method. For the purposes of this notebook, our data is stored on IBM DB2 on Cloud. In order to retrieve data from there, we are going to import IBM's python module `ibm_dbpy`. This module allows Python users to import data from IBM's databases. Our data is stored in schema `SALES` and the table name is `HOME_SALES`.

```
In [3]: from ibm_dbpy import IdbDatabase, IdbDataFrame

# @hidden_cell
# This connection object is used to access your data and contains your credentials.
# You might want to remove those credentials before you share your notebook.
idbdb = IdbDatabase(dsn='DATABASE=BLUDB;HostName=saasdb-txn-sbox-yp-da109-04.servicelb.dal.bluemix.net;Port=50000;PROTOCOL=TCP;UID=wm44382;PWD=qw44a9xv5f6')

df = IdbDataFrame(idbdb, 'SALES.HOME_SALES')

# You can close the database connection with the following code. Please keep the comment line with the #hidden_cell tag,
# because the close function displays parts of the credentials.
# @hidden_cell
# idbdb.close()
# To learn more about the ibm_dbpy package, please read the documentation: http://pythonhosted.org/ibm_dbpy/

pd_df = df.as_dataframe()
pd_df.head()
```

Out[3]:

ID	LOTAREA	BDRGTYPE	HOUSESTYLE	OVERALLCOND	YEARBUILT	ROOFSTYLE	EXTERCOND	FOUNDATION	BMTCOND	..	GARAGETYPE	GARAGEFINISH	GARAGEGARS	GARAGECOND	POOLAREA	POOLCG	FENCE	MOBOLD	YRSOLD	SALEPRICE
0	1	8460	1Fam	2Story	5	2003	Gable	TA	PCore	TA ..	Attchd	FFn	2	TA	0	NA	NA	2	2008	208000
1	2	9600	1Fam	1Story	9	1976	Gable	TA	CBck	TA ..	Attchd	FFn	2	TA	0	NA	NA	9	2007	191500
2	3	11760	1Fam	2Story	5	2001	Gable	TA	PCore	TA ..	Attchd	FFn	2	TA	0	NA	NA	9	2008	225000
3	4	9960	1Fam	2Story	5	1915	Gable	TA	BrkTl	Od ..	Detach	Unf	0	TA	0	NA	NA	2	2009	140000
4	5	14080	1Fam	2Story	5	2000	Gable	TA	PCore	TA ..	Attchd	FFn	3	TA	0	NA	NA	12	2008	290000

5 rows x 32 columns

Gradient Boosting R squared": 0.7539

```
In [37]: y_pred = model.predict(x_test)
model_mse = mean_squared_error(y_pred, y_test)
model_rmse = np.sqrt(model_mse)
print('Gradient Boosting RMSE: %.4f' % model_rmse)
```

Gradient Boosting RMSE: 39648.7992

We notice that the metrics are significantly better than the Linear Regression model, however not as good as the Random Forest model.

5. Deploying Model

From our evaluation, we can see that our Random Forest Model performed best out of the models we trained. For this reason we are going to use the that model for deploy. Below are the instructions to deploy our model.

```
In [38]: from watson_machine_learning_client import WatsonMachineLearningAPIClient

wml_credentials = {
    "apikey": "lTmIn...re8E",
    "username": "298",
    "password": "3f4",
    "instance_id": "...38",
    "url": "https://us-south.ml.cloud.ibm.com/v4/runtimes/96084e00-42e5-49c3-8fc2-f378171f8016"
}
client = WatsonMachineLearningAPIClient(wml_credentials)
```

```
In [39]: runtimes_meta = {
    client.runtimes.ConfigurationMetaNames.NAME: "Home_Sale_Model",
    client.runtimes.ConfigurationMetaNames.DESRIPTION: "Home Sale Model hype",
    client.runtimes.ConfigurationMetaNames.PLATFORM: { "name": "python", "version": "3.6" },
}

runtime_details = client.runtimes.store(runtimes_meta)
runtime_url = client.runtimes.get_url(runtime_details)
runtime_uid = client.runtimes.get_uid(runtime_details)
print("Runtimes URL: " + runtime_url)
print("Runtimes UID: " + runtime_uid)
```

Runtimes URL: https://us-south.ml.cloud.ibm.com/v4/runtimes/96084e00-42e5-49c3-8fc2-f378171f8016
Runtimes UID: 96084e00-42e5-49c3-8fc2-f378171f8016

```
In [40]: model_props = {client.repository.ModelMetaNames.NAME: "Home Sale Model hype",
    client.repository.ModelMetaNames.RUNTIME_UID: runtime_uid
}

published_model = client.repository.store_model(model=forest_reg, meta_props=model_props)
import json
published_model_uid = client.repository.get_model_uid(published_model)
model_details = client.repository.get_details(published_model_uid)
print(json.dumps(model_details, indent=2))
```

```
{
  "metadata": {
    "guid": "f5052e1f-32ca-4f56-9e71-09f2fb1047f6",
    "url": "https://us-south.ml.cloud.ibm.com/v3/wml_instances/1f171325-6a6f-4e5b-978c-0954f87d218",
    "created_at": "2019-07-29T18:36:55.269Z",
    "updated_at": "2019-07-29T18:36:55.269Z"
  },
  "runtime": {
    "name": "python",
    "version": "3.6",
    "platform": "python",
    "version": "3.6"
  },
  "description": "Home Sale Model hype",
  "name": "Home Sale Model hype",
  "runtime_uid": "96084e00-42e5-49c3-8fc2-f378171f8016"
}
```

- ▶ Then, run all the cells. At the end of the run the model will be deployed using Watson Machine Learning on IBM Cloud so that you could use the same model to predict home value using an API exposed through Watson Machine Learning service.

5.TESTING USING UI

- ▶ Run the code from the github URL:
- ▶ <https://github.com/IBM/crud-using-nodejs-and-db2>.
- ▶ Replace the value of GO_DB2_API: 'https://<url>', in src/enviornments/enviornment.ts with the API URL of your go server which would be http://localhost:8080/predict
- ▶ Click Predict from the navigation bar on top right.
- ▶ Fill out the details, Choose Predict using Watson Machine Learning in Predict Options and click Submit.

Analyze the prediction result.

House2Home

LoadViewManagePredictHouse2Home

House Information

Predict Options

☐ Predict using IBM Db2 AI

☒ Predict using Watson Machine Learning

address information

address 1	address2	City	State	Zipcode	Country
1234 abc st.		Pflugerville	TX	78660	USA


General Information

Lot Area	Bldg Style	House Style	Overall Cond	Year Built
<input type="text" value="LotArea"/>	<input type="text" value="Select BldgType"/>	<input type="text" value="Select HouseStyle"/>	<input type="text" value="Overall Cond"/>	<input type="text" value="Year Built"/>

Rooms

Total Rooms AbvGr	Full Bath	Half Bath	Bedroom Above Ground	Kitchen Above Ground	Kitchen Quality
<input type="text" value="Total Rooms AbvGr"/>	<input type="text" value="Full Bath"/>	<input type="text" value="Half Bath"/>	<input type="text" value="Bedroom Above Ground"/>	<input type="text" value="Kitchen Above Ground"/>	<input type="text" value="Select KitchenQual"/>

View Entry



Address: 15000 Pflugerville, TX 78660
Sale Price: \$213000

Lot Area
1234 sqft

Built
4/2016

Beds
3

Baths
2

Garage
1

Condition
2

Public Records

- Building Style: 1Fam
- House Style: 1Story
- Kitch AbvGr: 1
- Kitchen Quality: Ex
- Bmnt Condition: TA
- Pool Area: 234
- Pool QC: Gd
- Fences: GdPvt
- Garage Finish: Fin
- Garage Condition: Ex
- Garage Cars: Ex

- Total Rooms AbvGr: 3
- Heating Floor
- Heating QC: Ex
- Central Air: N
- Electrical: FuseA
- Roof Style: Gable
- Exter Condition: Gd
- Foundation: CBlock
- Fireplaces: 1
- Fireplace Quality: Gd
- Garage Type: Attchd

