

MODEL DEPLOYMENT ON IBM CLOUD

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|--------------|--|
| Date | 12 November 2022 |
| Team ID | PNT2022TMID13084 |
| Project Name | Flight Delay Prediction Using Machine Learning |

DEVELOPMENT PHASE:

Creating IBM cloud account & Required Resources

Deploy our model in IBM Watson

Creating Dashboard using HTML/CSS

Create web app and Hosting in flask

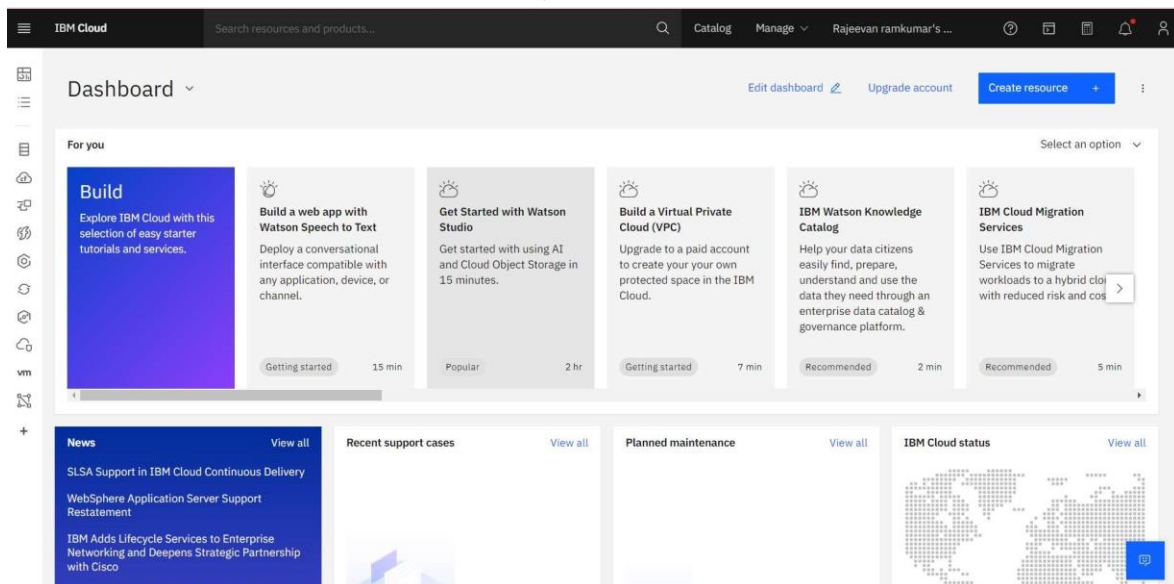
Testing web app

Creating IBM cloud account & Required Resources:

Creating IBM cloud account:

First, need to create IBM Cloud account by using SI Mail Id and SI Password which is provided by IBM in profile.

Below dashboard of an account after created,



Creating IBM Cloud Required Resources:

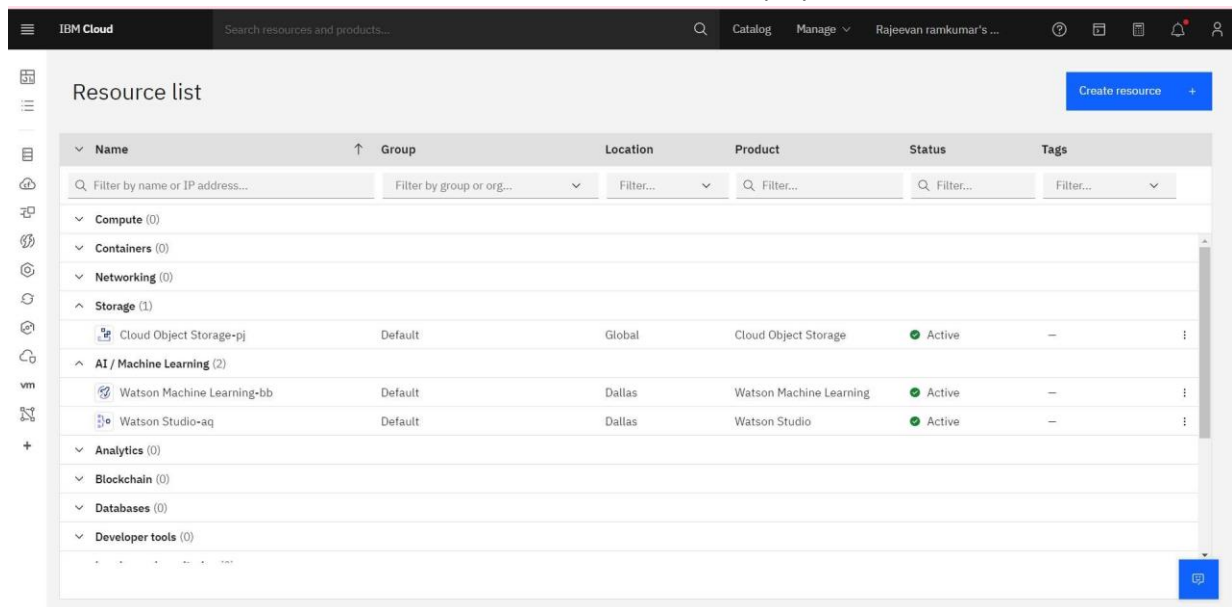
After creating IBM cloud account, to deploy ML model, need to create following resources such as,

Cloud Object Storage

Watson Machine Learning

Watson Studio

After created above resources Resource List of an account is displayed as follow,



| Name | Group | Location | Product | Status | Tags |
|---|---------|----------|-------------------------|--------|------|
| Filter by name or IP address... Filter by group or org... Filter... Filter... Filter... Filter... | | | | | |
| Compute (0) | | | | | |
| Containers (0) | | | | | |
| Networking (0) | | | | | |
| Storage (1) | | | | | |
| Cloud Object Storage-pj | Default | Global | Cloud Object Storage | Active | — |
| AI / Machine Learning (2) | | | | | |
| Watson Machine Learning-bb | Default | Dallas | Watson Machine Learning | Active | — |
| Watson Studio-aq | Default | Dallas | Watson Studio | Active | — |
| Analytics (0) | | | | | |
| Blockchain (0) | | | | | |
| Databases (0) | | | | | |
| Developer tools (0) | | | | | |

All the resource are in active state.

All the required cloud resources are created successfully.

Deploy our model in IBM Watson:

To deploy ML model in IBM cloud, need to create project in IBM Watson. After successful creation of project import .ipynb file of sprint-1 which ML models are build in Jupyter notebook.

Upload required datasets and import it.

Deploy model using following code,

```
!pip install -U ibm-watson-machine-learning from
ibm_watson_machine_learning import APIClient
import json import numpy as np
wml_credentials = {
    "apikey":"UcLivhHTTfB4iebNB-BWzL3XrtMNT9_bDLi3qw0rosnB",
    "url":"https://us-south.ml.cloud.ibm.com"
}
```

```
wml_clients=APIClient(wml_cred) wml_clients.spaces.list()
space_id="5a7700b2-ea31-42e3-b588-b2e077f7c0cc"
```

```
wml_clients.set.default_space(space_id)
wml_clients.software_specifications.list(500)
model_name="demo_model"
deployment_name="demo_deploy"
model=dc
software_spec_uid=wml_client.software_specifications.get_id_by_name("runtime-22.1-py3.9")
```

In [87]:

```
model_props={
    wml_client.repository.ModelMetaNames.NAME : model_name,
    wml_client.repository.ModelMetaNames.TYPE : "scikit-learn_1.0",
    wml_client.repository.ModelMetaNames.SOFTWARE_SPEC_UID : software_spec_uid
}
```

In [88]:

```
model_details= wml_client.repository.store_model(
    model=model,
    meta_props=model_props,
    training_data=x_train,
    training_target=y_train
)
```

In [89]:

```
model_details
```

NOTE: APIKey must need to create to deploy and connect API

After successful of deployment,

```
In [89]: model_details

Out[89]: {'entity': {'hybrid_pipeline_software_specs': [],
  'label_column': 'NDELAY',
  'schemas': {'input': [{'fields': [{'name': 'QUARTER', 'type': 'int64'},
    {'name': 'MONTH', 'type': 'int64'},
    {'name': 'DAY_OF_MONTH', 'type': 'int64'},
    {'name': 'DAY_OF_WEEK', 'type': 'int64'},
    {'name': 'FL_NUM', 'type': 'int64'},
    {'name': 'ORIGIN', 'type': 'int64'},
    {'name': 'DEST', 'type': 'int64'},
    {'name': 'CRS_DEP_TIME', 'type': 'int64'},
    {'name': 'CRS_ARR_TIME', 'type': 'int64'},
    {'name': 'CRS_ELAPSED_TIME', 'type': 'int64'},
    {'name': 'ACTUAL_ELAPSED_TIME', 'type': 'float64'},
    {'name': 'DISTANCE', 'type': 'int64'},
    {'name': 'SEASON', 'type': 'int64'}]},
  'id': '1',
  'type': 'struct'}],
  'output': []},
  'software_spec': {'id': '12b83a17-24d8-5082-900f-0ab31fbfd3cb',
    'name': 'runtime-22.1-py3.9'},
  'type': 'scikit-learn_1.0'},
  'metadata': {'created_at': '2022-11-15T09:35:49.505Z',
    'id': '8f8521cd-a7c9-4c8d-a77b-bb0c185e674b',
    'modified_at': '2022-11-15T09:35:51.926Z',
    'name': 'demo_model',
    'owner': 'IBMid-6650020DSQ',
    'resource_key': 'ff14804e-0dfc-4fc9-86e2-889f0b4ead8a',
    'space_id': '5a7700b2-ea31-42e3-b588-b2e077f7c0cc'},
  'system': {'warnings': []}}
```

Model details:

IBM Watson Studio

Search in your workspaces

Buy ?

Rajeevan ramkumar's Acco...

Dallas

RR

Deployments / flight_deploy /

demo_model

Deployments

Model details

Input (1)

| Column | Type |
|---------------------|---------|
| ACTUAL_ELAPSED_TIME | float64 |
| CRS_ARR_TIME | int64 |
| CRS_DEP_TIME | int64 |
| CRS_ELAPSED_TIME | int64 |
| DAY_OF_MONTH | int64 |
| DAY_OF_WEEK | int64 |
| DEST | int64 |
| DISTANCE | int64 |
| FL_NUM | int64 |

demo_model

Created
Nov 15, 2022, 3:05 PM

Type
scikit-learn_1.0

Model ID
8f8521cd-a7c9-4c8d-a77b-bb0c1...

Software specification
runtime-22.1-py3.9

Description
No description provided.

Tags
Add tags to make assets easier to find.